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ASIAN HOSPITAL'S DRIVING FORCE

HOW ANDRES LICAROS JR HAS LED THE MANILA HEALTHCARE CENTRE TO BE A GLOBAL RESEARCH HUB

WHAT'S NEXT IN THE DIGITAL HEALTHCARE EVOLUTION?

HOSPITALS' MAD DASH TO A 'SMARTER' WAY

HOW HOSPITALS IN INDIA WERE 'FORCED' TO GO DIGITAL

ACCELERATING AGEING POPULATION DRIVING CHANGES IN SINGAPORE'S LONG-TERM CARE

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[1] *Alzheimer's Association®, "What Is Alzheimer's?" 2019, www.alz.org/alzheimers-dementia/what-is-alzheimers.*
[2] *Alzheimer's Association®, "What Is Alzheimer's? - Causes and Risk Factors" 2019, www.alz.org/alzheimers-dementia/what-is-alzheimers.*

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FROM THE EDITOR

Rising from one of the hardest challenges the healthcare sector has faced is no small feat. We need leaders to help us up and guide us towards the path to recovery.

One such leader is the Philippine's Asian Hospital and Medical Center's CEO Andres Licaros Jr. who talked about his everyday life as a leader in healthcare and tumultuous years he had to navigate through before bringing Asian Hospital and Medical Center to where it is now. Check out our quick catch-up with one of *Healthcare Asia*'s previous speakers on page 11.

This issue also contains what a 'smart' hospital looks like and what the role the pandemic played with this new trend.

We also examined how hospitals in India dealt with decreasing admissions and the ensuing mad scramble to reach patients by other means.

We took a long look at Singapore on how long term care for the elderly should be done and what healthcare providers must do especially in a country with an accelerated ageing population.

Finally, we look at China's internet hospital model and how it could essentially be the next step in digital healthcare.

The future of healthcare may be hard to predict, but hopefully with this issue you have a glimpse on what it will look like.

Best of health to you all.

Tim Charlton

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BIG BOOST FOR OVER-THE-COUNTER SALES

INDIA

Over-the-counter drugs saw strong growth in 2020

Rising populations in countries like India and China, as well as the growing preference amongst pharma companies, are driving the growth of Asia Pacific's over-the-counter (OTC) drugs market, according to Market Insights Reports.

The OTC market posted strong growth in 2020, resulting from a rising demand from consumers for the opportunity to self-medicate. In countries with high populations, patients mostly rely on their neighborhood chemist to prescribe the appropriate medicines for illnesses, such as coughs, colds, nasal congestion, or fever, the report noted.

In India, the frequency of certain ailments, like common colds and headaches, was also significantly high, but also inconsistently distributed across different states.

Last year, local pharmas in South Korea saw a sales surge to $910m (KRW1t), a report by Yonhap has found. Some of this record breaking surge in sales were experienced for the first time by some pharmaceutical companies such as contract manufacturing organisation giant Samsung Biologics,who posted an all-time high of $910m since its inception in 2011.

For instance, contract manufacturing organization giant Samsung Biologics, the biopharmaceutical arm of top conglomerate Samsung Group, posted sales of more than $910m (KRW1t) for the first time since its inception in 2011.

More consumers are now also seeking over-the-counter (OTC) remedies and medicines rather consulting their physicians first.

"Furthermore, many countries in South Asia-Pacific and Japan have a large number of the elderly population who are more prone to diseases. Thus, this factor is also likely to drive the OTC drugs market in the future," the report added.

The smart hospital market is projected to reach $14.59b by 2023

Asian hospitals welcome in a new "smart" era

ASIA PACIFIC

With several companies and hospitals installing e-health concepts in their services, Asia-Pacific can potentially see growth in the smart hospital market, which is projected to reach a market size of $14.59b by 2023, a report from Supply Demand Market Research has revealed.

This translates to a compound annual growth rate of 28.4%, driven by a rising use of mobile devices across the region. "It helps them to stay connected to the doctors on a real time basis, and the patient's health can be monitored quickly," the report stated.

At the same time, the collaborative work of governments and private organisations has helped make smart hospital implementation easier. The "smart cities" concept is likewise pushing the need for having smart hospitals and similar infrastructure in developing countries across the Asia Pacific region.

More hospitals in APAC are also expanding their digital services as a way to lower the cost of healthcare.

India's government has encouraged telemedicine, along with other digital and smart solutions

In India, ongoing expansions of digital healthcare will help make healthcare more affordable and accessible according to a report from Fitch Solutions.

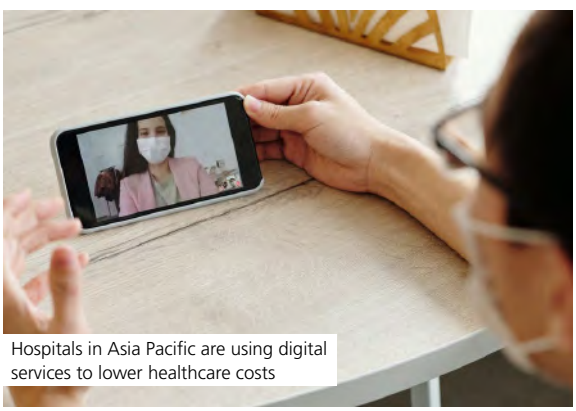
India's government has encouraged telemedicine, along with other digital and smart solutions as a complementary strategy for strengthening existing healthcare systems and for leveraging the growing reach of mobile and fixed broadband networks.

Several initiatives, such as Digital India and Aadhaar, have given digital solutions prominence in the healthcare sector.

Not just India, but market giant China, who also has a huge population and comparatively fewer doctors, are adopting telemedicine as "It is easier for doctors to follow up and remotely supervise patients using the Internet of Things and artificial intelligence which is growing in this region", the Supply Demand Market Research report said.

Technological advancements have made it possible for more hospitals to become 'smarter' In Singapore, a report from GlobalData said that the country retained its top spot in the IMD-SUTD Smart City Index for the second year in 2020 for its continued innovation in the healthcare sector. The successful adoption of technology to combat and contain the pandemic effectively has, in part, helped the country do so.

Countries like India and Taiwan are also gaining more attention from Europe, North America and the rest of the world for outbound medical tourism because of their affordable rates and quality service.



Hospitals in Asia Pacific are using digital services to lower healthcare costs

Pharmaceutical companies spent about $2.4b on research and development in 2019

Big research budgets aid Korean bio-medical sector growth

SOUTH KOREA

South Korea's biomedical research and development sector will continue to flourish, owing to growing investments by the government, according to a report from Fitch Solutions. The country's highly effective regulatory environment and advanced medical infrastructure are also fermenting the sector's continued growth..

The report noted that the country's government remains committed to the strengthening of the domestic pharmaceutical and healthcare system, with a view to bringing more novel drugs to the market to meet the needs of the country's ageing population.

To this end, the South Korean government has rolled out several measures to develop the nation as a global biotech and medical industry hub. The ongoing business transformation amongst South Korean companies towards drug discovery will also see the introduction of more innovative treatments, the report stated.

The South Korean government has rolled out several measures to develop the nation as a global biotech and medical industry hub

"Moreover, South Korean firms have made significant investments in R&D as they seek to shift away from their traditional focus on generic drugs. Spurred on by government incentives such as subsidies and tax breaks, the ratio of R&D spending to sales has increased among South Korean drug manufacturers."

At the same time, prospects for South Korea's pharmaceutical industry are expected to remain bright. In December 2020, South Korean drug and biopharmaceutical companies recorded stellar performances amidst the pandemic.

Back in December 2017, the government and pharmaceutical firms first announced their plans of investing 3.5t won or USD3.2bn into R&D in the pharmaceutical sector by 2022 as compared to 1.7t won (USD1.5bn) invested the year before.

The surge was attributed to large investments in developing new drugs and expanding production facilities. The 113 listed pharmaceutical companies' spending on R&D rose 7.6% YoY to $2.4b (KRW2.6t) in 2019.

In 2019, the government declared bio-health as a national vision, aiming to capture 6% of the global pharma and medical device market. It has since ramped up related exports to $50b, and is working to foster its bio-health sector as one of the nation's mainstay export industries by the year 2030.

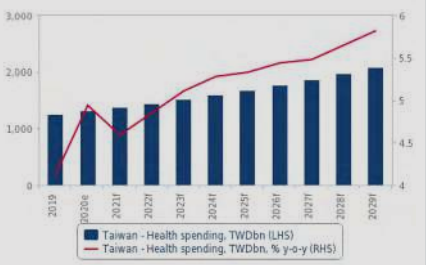
CHARTIST: TAIWAN'S AGEING AND SHRINKING POPULATION TO IMPACT HEALTHCARE SPENDING

Taiwan continues to age but fertility rates are starting to decline as well and that may lead to higher costs of care and an increase in healthcare utilisation.

Fitch predicts the rise of healthcare spending in Taiwan, with universal health insurance as the main driving force. However, as working age people able to pay the NHI premiums decrease, the government may be forced to drive up the cost even further.

"At the start of 2021, the government raised premiums from 4.69% to 5.17% and supplemental premiums from 1.91% to 2.11%. Even with the increase, the NHI administration projects the reserve fund will be exhausted by 2023," Fitch Solutions advised in its report.

Taiwan's healthcare spending



Sources: Fitch Solutions

Taiwan's pharma sales

Source: Fitch Solutions

APAC HOLDS 26% OF GLOBAL MARKET

ASIA PACIFIC

Global hospitals and outpatient care centers market is expected to grow to $3.78t this 2021

Asia Pacific has emerged as the second largest region for hospitals and outpatient care centres, accounting for 26% of the market in 2020, according to a report released by ReportLinker.

Beating Asia Pacific in first place was North America, which accounted for 40% of the world market in 2020. Africa was revealed to be the smallest region in the global hospitals and outpatient care centers market.

The report noted that an effective implementation of health plans was the core reason for the improvement in healthcare access in many developing countries such as India and China. Further, China's basic medical insurance for urban residents, and new rural cooperative medical insurance schemes were set to further improve overall access to healthcare services in that country.

The global hospitals and outpatient care centers market is expected to grow from $3.38t in 2020 to $3.78t in 2021, at a compound annual growth rate of 11.8%, mainly due to companies rearranging their operations to accommodate restrictive changes by governments and recovering from the continued impact of the COVID-19 pandemic.

The market is expected to reach $4.96t in 2025, at a CAGR of 7%.

The hospitals and outpatient care centers market consists of sales of hospitals and outpatient care services by entities such as organizations, sole traders and partnerships, that are engaged in providing diagnostic and medical treatment to patients with a wide range of medical conditions. Clinics offer medical care or treatment that does not require any overnight stay in a hospital or medical facility.

Malaysia private healthcare poised for growth

MALAYSIA

Private hospitals in Malaysia will play a bigger role in combating the COVID-19 pandemic, following the enactment of an emergency ordinance to mobilise resources of the private healthcare sector, according to a new research report from Fitch Solutions.

Fitch said this may mean private healthcare is poised to improve in the country as the Malaysian government turned to private healthcare to ease some of the pressures in the public healthcare system.

As part of the emergency effort, the government will integrate both public and private hospital services for better coordination. Both public hospitals and participating private ones will operate in a hybrid cluster under the Malaysian government's COVID-19 Integrated Control Centre to treat patients with the virus or otherwise, based on the Malaysian Ministry of Health's advice and directions.

Hospitals involved are currently converting some of its wards to accommodate COVID-19 cases, whilst some like Sunway Medical Centre, located in the Klang Valley suburb of Subang Jaya, are expanding their capacity to take in more cases.

96 out of 210 registered private hospitals throughout Malaysia have agreed to provide COVID-19 treatment during the country's state of emergency, which is effective from 11 January to 1 August. They will add an additional 1,344 beds and 65 beds in ICU for treatment, according to Prime Minister Muhyiddin Yassin.

The surge in the number of cases is expected to paralyse the existing capacity of the country's healthcare system. Yassin admitted that Malaysia's healthcare system is at its breaking point as government hospitals are unable to support over 2,000 new positive cases per day.

He also bared that 15 hospitals are seeing consistent utilisation rates of more than 70% across its non-intensive care unit beds.

More private hospitals in Malaysia are pledging to provide COVID-19 treatments during the country's state of emergency

The government is providing tax rebates for setting up new private hospitals, and refurbishing existing establishments

In the Klang Valley, the take-up of ICU beds for COVID-19 patients at Hospital Kuala Lumpur and Universiti Malaya Medical Centre have reached maximum capacity, whilst Sungai Buloh Hospital has reached 83% of its total capacity.

Meanwhile, more than 1,450 medical officers at hospitals nationwide have been infected or directed to undergo quarantine.

Malaysia opened its health sector to further private involvement, as resources at public facilities remain stretched, with long waiting times for non-emergency services and substantial ongoing demand for patient beds in public hospitals.

The government is providing tax rebates for setting up new private hospitals, refurbishing an existing establishment, buying new equipment and applying for international accreditation. From a split of about 80:20 between public and private facilities a decade ago, the ratio is now nearly 70:30 in favour of public hospitals.

"Government efforts to encourage the development of the private sector have been helped in recent years by rising incomes, the expansion of health insurance and the opening of specialist facilities," the report said.

State commitment boosts Hong Kong's healthcare sector

HONG KONG

A strong government commitment to healthcare will largely be positive for the healthcare sector in Hong Kong, as the sector remained as one of the most significant spending priorities in the city, according to a report from Fitch Solutions.

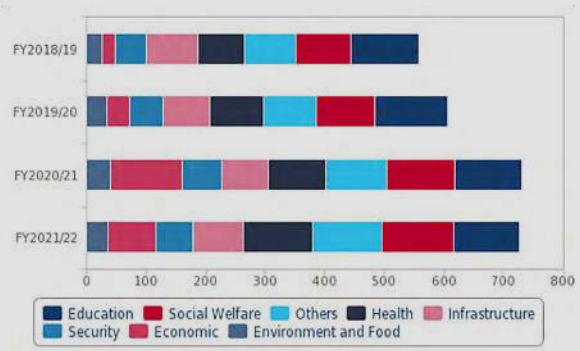
Hong Kong's government has allocated 15% of the 2021 budget, which is earmarked at $93.7b (HK$731.1b), Finance Secretary Paul Chan said in the Budget 2021/2022 speech. The sector saw the second largest allocation after social welfare.

The government aims to step up COVID-19 surveillance and testing efforts and The Department of Health will receive a total of $670m (HK$5.2b) over the next three years to help them.

At the same time, another $3.4m (HK$27m) will help fund health IT systems to implement anti-epidemic measures. Further, the government pledged $1b (HK$8.4b) to buy and administer the vaccines. Hong Kong's free mass vaccination programme started for the general public on 26 February, with the most vulnerable citizens prioritised.

A sum of $18m (HK$147m) has also been pledged to support hospital and community psychiatric services to enhance juvenile and elderly mental health services run by the Hospital Authority (HA). About $15.9m (HK$124m) will also go towards the HA's cancer services.

Hong Kong's projected expenditure



Source: Fitch Solutions

The budget documents reported that the HA will press ahead with the implementation of the first 10-year Hospital Development Plan (HDP) and the planning of the second 10-year HDP.

"The HA will review the design of hospital projects under the two 10-year HDPs considering the experience in combating Covid-19 and incorporate required provisions for two to three general wards in each selected hospital, so that they can be readily converted into Tier-2 isolation wards when the need arises," Fitch said.

The report noted that for the past several years, the government's budget for medical health services has grown YoY. The country has established a dual medical economy in which the government has been involved in both the funding and provision of health services mainly through tax financing and personal insurance.

"In recent years, leveraging on available capacity and capability in the private sector through public-private partnership has become a key strategy for managing demands for and enhancing patients' access to clinical services, ultimately leading to an overall improvement in healthcare service quality through the combined efforts from both the public and private healthcare sectors in Hong Kong," Fitch said.

SOUTH KOREA

Exports of South Korea's virus-related medical goods surged fourfold in 2020

South Korea's exports of test kits for COVID-19, protective masks and other virus-related goods soared to $5.9b in 2020, from $1.28b in the previous year according to a report on the latest data compiled from the country's Ministry of Trade, Industry and Energy.

Exports of medical test kits surged more than fourfold on-year to reach $4.5b in 2020, whilst those of masks also soared sixfold to reach $723m. In 2020, the country's overall exports came to $512.8b, declining 5.4% from the same figure in 2019.

The ministry attributed the robust performance to the country's relatively successful efforts to contain the spread of the virus, which led to higher credibility of local products. Since reporting its first patient in 2020, South Korea has so far reported a little more than 103,000 cases.

At the same time, South Korea plans to speed up the exports of medical supplies through official development assistance (ODA) projects, whilst seeking to penetrate deeper into existing markets, including the United States and Europe as well.

The country also plans to help local companies win overseas approval for medical supplies, including from the U.S. Food and Drug Administration and to foster more potentially lucrative export goods as low dead space (LDS) syringes designed to minimize wasted vaccine doses with its reduced spacing between the needle and plunger.

South Korea exported $5.9b virus-related medical goods in 2020, up from $1.28b in 2019

Technological advancements are now pushing the growth for orthopedics, making it easier for patients to get the care they need

Taking a technology advantage when it comes to fragility fracture care

More and more hospitals in Asia Pacific are gaining access to a fracture liason service that is changing the way hip fractures are operated on, with strong outcomes for patients.

In the absence of artificial intelligence (AI) detecting tools, up to 70% of compression fractures can go unnoticed. This calls for an opportunity to use other technology to detect underlying osteoporosis and for earlier intervention, Taipei Medical University's Department of Radiology chief Wing Chan said in an interview with the Asia Pacific Fragility Fracture Alliance (APFFA) earlier this year.

Chan has spearheaded the building of a comprehensive fragility fracture care programme at Wan Fang Hospital within the Taipei Medical University comprising 33 technologists that he has trained personally. Their mission has been to standardise and provide quality assurance in osteoporosis care.

Particularly, Chan has implemented technology to make it possible to automate the reporting of dual-energy X-ray absorptiometry, which scans bone density to evaluate a person's risk of breaking their bones. He worked hand-in-hand with an IT company to establish AI software that captures compression fractures on CT scans for opportunistic compression fracture analysis.

"There are so many missed cases and signs that we should interpret as osteoporotic, like an empty box appearance, the deformity of the vertebrae, and also some thinning or erosion of the end plate," Chan said.

In countries such as Taiwan, patients need to pay for their own treatments, unless they have a -2.5 T-score, plus one or more compression fractures. This often means patients go without preventative medication.

Chan said that most patients don't take preventive medication despite doctor recommendations.

"Most of the patients don't take preventative medication, despite the doctors' recommendations. In Taiwan, patients are responsible for paying for their own treatment, in the majority of cases, when a compression fracture is not identified," Chan said.

In countries such as Taiwan, patients need to pay for their own treatments, unless they have a -2.5 T-score, plus one or more compression fractures

Such programmes are also in development in Australia. The profile of secondary fracture prevention has been rising in the country, said Jacqui Close, member of the APFFA Joint Steering Committee and co-chair of APFFA's Hip Fracture Registry Working Group. A report from the Australia and New Zealand Hip Fracture Registry found a steady increase in availability of fracture liaison services over time which rose to 41% in 2020, up from 15% in 2013.

Close said that this is a reflection of state policies that have mandated that all health districts in New South Wales have to have a fracture liaison service.

Lacking widespread knowledge

However, the country is facing certain challenges in rolling out fracture liaison

services across the country. Close noted that the country is still at a stage of having to remind the public and the health system that osteoporosis is a chronic disease that is associated with significant morbidity and mortality, and that it needs to be managed and resourced in the same way.

She also found that the funding arrangements for health in Australia created a challenge particular to the country, with general practice and primary care funded by the Commonwealth government, whilst hospitals are funded by the various state governments.

"It is the states that bear the brunt of the impact of osteoporosis in terms of managing fractures, yet the responsibility for treating osteoporosis largely sits with the Commonwealth government," Close said.

APFFA also emphasized the need for better registry data to highlight the challenge the sector faces and the progress it has made over time. The Hip Fracture Registry data revealed that only 37% of hip fracture patients are on treatment for osteoporosis 120 days after their hip fracture, despite medications being widely available.

In Taiwan, the resources available in local hospitals are often limited, making it difficult for clinicians to promote optimal osteoporosis care in local clinics.

Chan advised for hospitals to adhere to international dual-energy X-ray absorptiometry (DEXA) scanning standards, utilise databases to reach 30% of post-menopausal women who are at risk of osteoporosis, and keep a record of positioning and beta analysis performed by technologists.

He also emphasized the need to invest in an innovation culture and train for an opportunistic 'capture the fracture' concept, train colleagues to optimally detect compression fractures, and offer support, passion and consistency.

Across the six clinics, there are currently 700 cases of hip fracture. To date, data has been collected from more than 50,000 cases of quality DEXA reports.

Comeback for orthopedic procedures

The number of orthopedic procedures performed in Australia was estimated to decline in 2020 compared to 2019 due to the pandemic.

A report by GlobalData found that the total number of orthopedic procedures performed in Australia was about 11 million in 2019 and about 55% of the orthopedic procedures performed in the country were elective.

"The impact of the Covid-19 pandemic will have many unintended and long term consequences including our ability to provide surgical interventions which significantly enhance the quality of a person's life and enables them to function and live independently," Close commented.

However, the outlook for 2021 is comparably more promising and optimistic as the number of COVID-19 cases are declining, resulting in a rise in the number of orthopedic, especially for elective, procedures performed.

GlobalData's medical devices analyst Anusha Kaushik noted that a decline in COVID-19 cases is expected to free up beds and reduce the pressure on the country's healthcare system which can mean elective procedures can be expected to resume.

Close also commented that additional government funds have been made available in Australia to ramp up surgical capacity to address long waiting lists.

Meanwhile Kaushik emphasized that urgent elective procedures are expected to resume first.

"The length of stay at hospitals can be reduced and telemedicine can be used for postoperative visits by the discharged patients.The use of technology is expected to result in more elective procedures being performed as doctors get to spend less time on patient consultations," Kaushik said.

Globally, the market for orthopedic devices is expected to reach $59.7b by 2025 from $44b in 2020

Across Asia Pacific, the booming medical tourism industry is expected to drive the regional orthopedic devices market, according to a report from ResearchAndMarkets. The higher affordability of orthopedic surgeries in an emerging economy such as India is expected to lure in foreign patients.

"Such a cost difference is expected to bring a huge clientele to these countries in Asia Pacific, boosting its orthopedic devices market," the report stated.

Globally, the market for orthopedic devices is expected to reach $59.69b by 2025 from $44.03b in 2020, surging at a compound annual growth rate of 6.3% between the two periods attributed to a rise of musculoskeletal injuries.

As the global healthcare system recovers from the pressure of COVID-19, it has been able to increasingly give more attention to elective surgeries. The market also stands to benefit from improving diagnostics that help in identifying osteoporosis fractures and musculoskeletal injuries.

According to the World Health Organization, about 20-33% of people around the world suffer from musculoskeletal conditions, a staggering indication that demand for orthopedic devices required for treating hip, vertebral, and forearm fractures will remain high between 2020 and 2025.

"Remarkable number of women taking part in sporting activities, upcoming sporting events such as Olympics 2021, and an active lifestyle are expected to result in injuries that will demand orthopedic devices for restoration joints," the report added.

Economies with higher affordability of orthopedic surgeries will lure in more foreign patients

A healthcare leader must be strong-willed and focused on the outcomes, while highly cognizant of the fact that the biggest barrier to quality care is cost

Andres Licaros, Jr.
CEO
Asian Hospital
Medical Center

Asian Hospital's driving force behind its push to be a global site for healthcare research

CEO Andres Licaros, Jr. explains some of the hospital's key goals and accomplishments over the past few years.

A man with more than three decades of experience from various fields such as design and construction, feeds and livestock, confectionery, pharmaceutical and healthcare, Asian Hospital and Medical Center's CEO **Andres Licaros, Jr** comes to the healthcare sector with a broader business background than most. That has been one part of his success in driving the Manila-based hospital's success and long-term development of its integrated and multi-disciplinary services.

With him at the helm, Asian Hospital has navigated through a challenging financial crisis, working with a strong determination to operate free of debt to better focus on growing the business, whilst still providing the best healthcare for everyone.

Healthcare Asia recently caught up with Licaros to learn more about the story behind his achievements as CEO, the challenges in healthcare, and also the shortage of medical professionals in the Philippines. He reveals what Asian Hospital and Medical Center has been doing to help address this concern.

Tell us what your typical work day looks like. How do you tackle everyday challenges?

Every day is an opportunity to do good. Our business is a consistent, quality healthcare service that assures each patient and family an easy and convenient access to the solutions they need no matter how difficult and complex they may be.

My day therefore is defined by the emerging issues brought about by the [COVID-19] pandemic whilst keeping focus on a greater responsibility to ensure the safety of our doctors and staff, because we must protect ourselves to be able to save and protect others.

What are the projects and achievements that you accomplished as CEO of Asian Hospital?

Since December 2011, when Metro Pacific Investments Corp. acquired majority ownership of Asian Hospital, my "North Star" has always been to create a stronger service delivery platform that provides wider access to Quality and Safe Patient Care among the communities here in the Southern corridor of Mega Manila.

We inherited a PHP1.8B loan (US$37m) from the previous operators, so it was always at the top of my to-do list. I had to grow the business whilst paying off a huge debt because we wanted to operate the hospital debt-free. We did that in October 2018.

We got our very first JCI Accreditation in November 2013, despite preparing for the week-long survey in just 10 months. We will go for our fourth survey in the middle of next year.

Our business is a consistent, quality healthcare service that assures each patient and family an easy and convenient access to the solutions they need

We established the Asian Cancer Institute in July 2015, fully embracing the responsibility of caring for a fast-growing community of cancer patients here in the south [of Metro Manila].

By the end of 2019, we had established three more institutes, namely: The Asian Cardiovascular Institute; The Asian Brain Institute; and The Institute for Senior Wellness and Homecare. These are the pillars of our fully integrated and multi-disciplinary services that were patiently built to support our big dream of providing better outcomes at a lower total cost of care.

We have become an official teaching/training institution since 2012 when we opened the country's first Fellowship Programme in Minimally Invasive Surgery, followed by the Residency Programme in Pediatrics in 2013, the Residency Programme in Internal Medicine in 2014, the Fellowship Programmes in Critical Care Medicine in 2016, the Fellowship Programme in Pain Management in 2017, the Residency Programme in Surgery in 2018, and the Fellowship Programme in Cardiology in 2019.

This year we are opening three more training programmes, namely: residency programmes in OB-gyne, neurology and otolaryngology, and rhinoplasty, head and neck surgery. This secures the future depth and quality of our bench of clinicians who are deeply committed to Asian's Vision of being the best value-based care provider in the Philippines.

More than any of these, we have built an organisation that takes pride in bringing the very best of ourselves each day in our desire to always do what is right, no matter how risky, challenging and difficult. We value our people more than anything else.

What are some of your recent challenges as a leader in healthcare?

The greatest challenge we face is the uncertainty that the coronavirus continues to bring in the midst of a business platform that has been brought down to its knees because of the risks we all face each time we provide direct care to a patient.

To respond with agility, our determined efforts towards transforming our business processes and care delivery platform into a more digital form allowed us to survive 2020 and still turn in a positive bottom line. This was despite the lost revenues and census brought about by the very long "lockdown" imposed since March 2020.

What do you think are the key factors to be a great leader in healthcare?

To my mind, a healthcare leader must be strong-willed and focused on the outcomes, while highly cognizant

Licaros address AHMC employees in a recent event.

of the glaring fact that the biggest barrier to access to quality care is cost.

I am a firm believer that every healthcare organization would successfully bring down its costs to provide quality care if they were to consistently pursue programs that improve clinical outcomes. Couple this with a digital transformation strategy that guarantees a safer environment and means of providing care at a lower cost, and it will lead to better patient outcomes (both clinical and patient experience).

The leader must always be authentic, laser-focused on their goals, and people caring.

Crisis presents opportunities, even in the healthcare industry. What current opportunities do you see as most likely to shape healthcare in the Asia Pacific region in the future?

A long and global healthcare crisis like the one we are having will always unmask the integrity of people and organisations who are truly capable and willing to face up to the responsibility and be accountable for the outcomes.

This pandemic has accelerated the long overdue shift from fee-for-service models into value-based care. The organisation that can pivot and embrace a digital healthcare service delivery platform will survive and dominate the landscape long after this crisis wanes and becomes over.

What are some recent healthcare trends have you observed in Asia Pacific?

The consolidation of small and big providers is inevitable to achieve greater efficiencies, lower the costs of care, and standardise the delivery of care. This will allow the creation of a network of providers that are committed to the same goal of value-based care. This is the only way we can truly impact on population health, create a stronger and healthier population and sustain economic growth despite the havoc the pandemic has created.

This pandemic has accelerated the long overdue shift from fee-for-service models into value-based care

Aside from the current battle with COVID-19, what urgent health concern do you see rising the Philippines? What has the Asian Hospital done to address this concern?

The growing shortage of healthcare professionals as the demand for them abroad continues to drain us of our best talents, and only a good and responsible management team that can put in place a stronger talent retention programme will survive.

By providing an environment for learning and growth at the workplace, Asian is able to sustain its growth and deliver on the higher expectations of a happy customer.

What initiatives have you been working on?

Asian Hospital has just been accredited as a Level 3 Healthcare Research Institution in December 2020 and this is a key initiative I have pursued from the start that is finally seeing its fruition. We will be a global site for major research agendas in Oncology, Cardiology, Neurology and Successful Ageing.

Do you see any dramatic change in the healthcare scene moving forward?

It has now become clearer than ever that the levers of power in healthcare have shifted to the payors and the patients. Unless a provider like us recognises and embraces this fact, we will not survive. Every patient needs to be consistently served with respect, compassion, and the utmost integrity.

A transparent, seamless, and real-time access to quality care from anywhere is the new standard of service and patient experience in healthcare.

What will the Asian Hospital be working on in the future? What will be your goals for the next five years?

Asian Hospital will be a fully wired hospital, a healthcare provider with no walls by end 2022. One that is capable of providing quality and safe patient care at a lower total cost of care, anywhere, anytime.

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As healthcare evolves, what would these new wave of 'smart hospitals' bring to the medical landscape?

COVID-19 catapults hospitals into adopting "smart ecosystem" technology

The "new normal" will see the healthcare sector further minimising the risks associated with physical contact, often by leveraging off integrated technology systems.

As the effects of COVID-19 unraveled around the globe, one thing became clear: most hospitals in their current state were still not prepared for pandemics, even in Singapore where healthcare is considered more advanced than in other countries in the region.

While many hospitals in the city have been making progress in terms of smart infrastructure and digitalisation, their functions and services continue to be centralised, and patients still flock to single locations for their health needs. Doctors, meanwhile, still find it difficult to obtain key customer information at the right time.

Smart hospitals are intended to address these problems, by leveraging big data and analytics to deliver care and consultation in-person or virtually. David Brown, senior analyst at GlobalData Healthcare, said that COVID-19 has revealed the importance of smart technology in hospitals and its value during a pandemic, which requires remote patient monitoring and less frequent direct physical contact.

Smart hospitals leverage big data and analytics to deliver care and consultation both in-person and virtually

With COVID-19, there is now a renewed attention on how healthcare should be delivered in a post-pandemic world, and innovations such as telemedicine, smart triage, and independent care centers have provided those in the health sector with a fresh concept of what smart healthcare is and how it should look like.

"2020 marked a year when hospitals were recognized as truly strategic infrastructure, holding Singapore's frontline in the face of a global pandemic. The healthcare system rose to the challenge, by systematically tackling novel issues such as contract tracing, PPE supply chains, mass testing, and frontline safety processes to name a few, and safely avoided excess strain," Alex Boulton, management consultant at Bain & Company, said.

What makes a hospital "smart"?

Azadeh Laffafian, analyst at GlobalData Healthcare, said that hospitals around the world are working with the Internet of Things (IoT) to efficiently track and coordinate devices and personnel, minimising patient wait times and optimising patient treatment.

"Smart hospitals allow for rapid response times during emergencies through the sophisticated coordination of elevators, staff movements, patient health records, and surgical suites to maximize emergency response effectiveness. Other smart hospital solutions

New technology also means doctors should learn to adapt new ways

include automated pharmacy systems and medical robotics, which reduce human error and the burden of labour and (patient) care," she added.

Many hospitals in Singapore have already adopted smart technologies and solutions within their facilities, but Boulton maintains that no hospital in the city has truly eradicated patient, physician, and clinical staff pain points - even with upgraded facilities and the latest technology and equipment.

Implementations of isolated digital technologies alone do not make a hospital "smart", Laffafian stresses. It is the interconnectedness of people, systems, building infrastructures, and devices that characterise a smart facility, in addition to the utilisation of artificial intelligence (AI) and machine learning.

"The utilization of smart solutions in hospitals is on the rise globally. GlobalData expects this trend to continue in the next five years. As the elderly population continues to rise and the need for healthcare continues to increase, smart solutions can help reduce healthcare costs, increase efficiency, and lift some of the burdens off of healthcare staff while improving patient health outcomes at the same time," Brown added.

Farrer Park Hospital is a relatively new hospital in Singapore, but is an example of what a smart facility should look like. With over 8,500 data points within the hospital-hotel-medical centre complex, which opened in 2016, Farrer Park Hospital aims to be a truly digitally connected hospital that allows the uninterrupted flow of real-time information from clinicians and service providers, and back.

Meanwhile, public facility Tan Tock Seng Hospital (TTSH) has been redefining "smart" for the last 10 years. In fact, TTSH has pioneered many digital healthcare solutions in the country, including the C3 system which features a focal point of control integrating systems within the hospital and allowing administrators to better manage resources and patient flow. As part of Singapore's goals of becoming a smart city, the C3 system has been introduced to other hospitals and will be introduced to many more.

"As the government concurrently expands its UHC coverage through the 3Ms and future proofs its financial model, the players in the local health system will need to continue to work to build out the hub-and-spoke centralised vs decentralised models. This is across the public-private sector, and different stakeholder types including the hospitals but also GP practices, digital health companies, telcos, life sciences industry, among the spectrum of technologies and data sharing in the middle," Chris Hardesty, global director, KPMG Singapore Healthcare & Life Sciences, said.

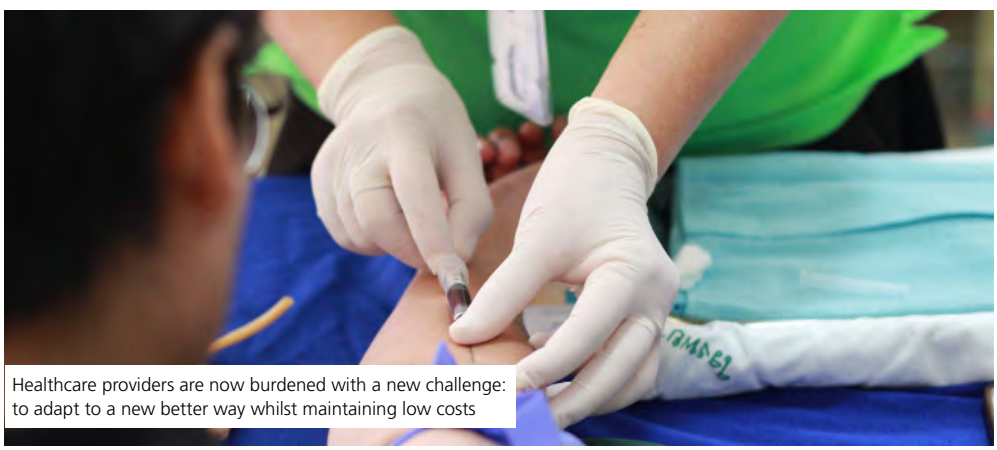
Smart solutions can help reduce healthcare costs, increase efficiency, and lift some of the burdens off of hospital staff

COVID-19's shot in the arm

In a country where the population is ageing like Singapore's, the costs of healthcare provision has seen an increase in recent years. Elderlies are pushing further pressures onto providers and hospitals, Laffafian said, and cost control measures for private and public health systems, are critical to ensure care continuity going forward.

Prior to 2020, Boulton said that telemedicine adoption was already beginning to reach a tipping point. When the lockdowns were implemented, hospitals and clinics saw an instant and material jump in telemedicine adoption that broke even the most aggressive forecast models. "Telemedicine usage has since demonstrated persistence even as patients return to the hospitals, confirming its long-term sustainable role in the healthcare ecosystem," Boulton added.

Hardesty said that COVID-19 also led to a rise in healthcare literacy, not just in Singapore, but around the world. He says this will



Healthcare providers are now burdened with a new challenge: to adapt to a new better way whilst maintaining low costs

Empowering the workforce to enact the change towards a 'smarter' future is winning half the battle towards becoming a smart hospital

empower a new wave of individual ownership over care pathways in order to truly unlock the value in concepts like prevention, home or remote care, nationalized health insurance and savings account schemes, and adherence.

"Patients are increasingly self-directed and interested in taking greater control of their health. They are frustrated with complicated care journeys and want a single, convenient, touchpoint to manage their care – either online or offline. In 2020 we witnessed meaningful user traction in healthcare super-apps seeded by a range of different stakeholders; from digital startups to hospitals, from the regulator to payers," Boulton added.

Hardesty also lauds Singapore's efforts to combat COVID-19, noting that the country has done far better than other markets around the world. According to him, the preparedness, agility, and resiliency have paid off not only in terms of local healthcare safety but the wider societal trust in the system.

Healthcare as a "smart ecosystem"

Trust in the system is a huge opportunity for the government to introduce major changes in healthcare delivery. The healthcare sector will continue to welcome a number of players from technology, insurance, and finance to step up its digital game, something Hardesty says iis what the third stage of digital health looks like: fixing existing inefficiencies through more basic interventions and also adoption of modern tools and technology into healthcare.

Payers, private and public hospitals, digital health startups, and regulators in Singapore are now working even more closely to map out Healthcare 4.0 and catch up with other industries when it comes to building seamless digital ecosystems. Boulton notes that two of the most critical obstacles here are: driving physician adoption of digital tools, and ensuring health data and IT infrastructure security.

Hardesty also pointed out that startup platforms in the healthcare space have seen increased utilisation by as much as 100%. Governments in the region are partnering with banks and even telecommunications players to provide formal digital health valuation and reimbursement.

Patients are increasingly self directed and interested in taking greater control of their health.

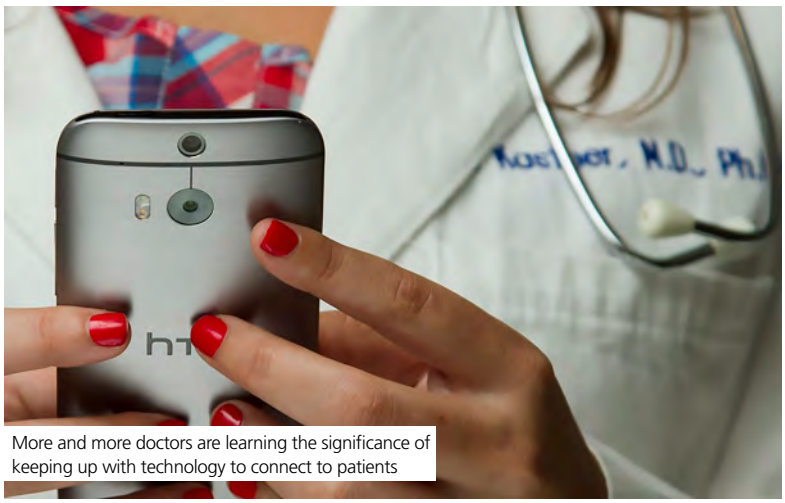
"When speaking to hospital executives in the region, two capabilities always ring the loudest – the need for more seamless journeys in the system and to have an empowered workforce to enact the changes. What is interesting is that neither point is really a technical one per se – it's more about multi-party stakeholders working more collaboratively together. I'm inspired by what I've seen during the COVID-19 period in this regard," Hardesty added.

The even bigger challenge is not for Singapore's hospitals to become "smart", as many of them are already in that direction, but to be part of the transformation of the entire healthcare system into a smart system. This means becoming more holistic physical and digital infrastructure providers, connecting physicians and patients across facilities and platforms.

"The major challenges to hospital systems moving forward will be embracing digital innovation while ensuring interoperability capabilities to futureproof technology adoption as well as protecting patient data. Moving to adopting novel technologies threatens to fragment the solutions that providers in the region (and across regions) adopt and also potentially exposes patient data to attack," Brown adds.

KPMG's Asia-Pacific Frontline of Healthcare Report anticipates the growth of transition care outside of hospital walls to relieve cost and

Embracing digital innovations whilst future-proofing technological adoption are hospital system's biggest hurdle.



More and more doctors are learning the significance of keeping up with technology to connect to patients

capacity burden. Boulton mentions that in 2020, patients took every opportunity to avoid hospital visits in favour of outpatient services and teleconsultations.

Hardesty, meanwhile, foresees hospitals in the future without an A&E department; allowing for triage to occur in the home or community, then focusing secondary or tertiary models on the specialized needs and advanced research programs. Hospitals could also consider their future valuation possibilities as data stewards, not just as service providers.

Patient recordkeeping is another important aspect of smart healthcare. Hardesty said that healthcare passporting is the final evolution in this arena. "While we start with use cases like COVID-19 tests and vaccine certificates, the potential for such a wallet concept is enormous. We need to be smart about how it is designed, commercialized, and the data ownership therein, but I believe the ultimate output is for the greater good. Proactive intervention, safer travel protocols, more tailored healthcare journeys are all in front of us," Hardesty added.

Healthcare-led economic development

During the early days of COVID-19, many of Singapore's neighbours in Southeast Asia frantically tried to meet soaring demand for facilities and beds, while the city was lauded for its preparedness and prompt response to infrastructure and capacity needs, resulting in a low mortality rate from the coronavirus.

Within the first half of 2020, more than 10,000 beds have been made available along with several swab isolation facilities with around 4,000 bed spaces. Back then, hospitals were focused on delivering care to COVID patients, and those with other illnesses took to telemedicine and less hospital visits for their healthcare needs.

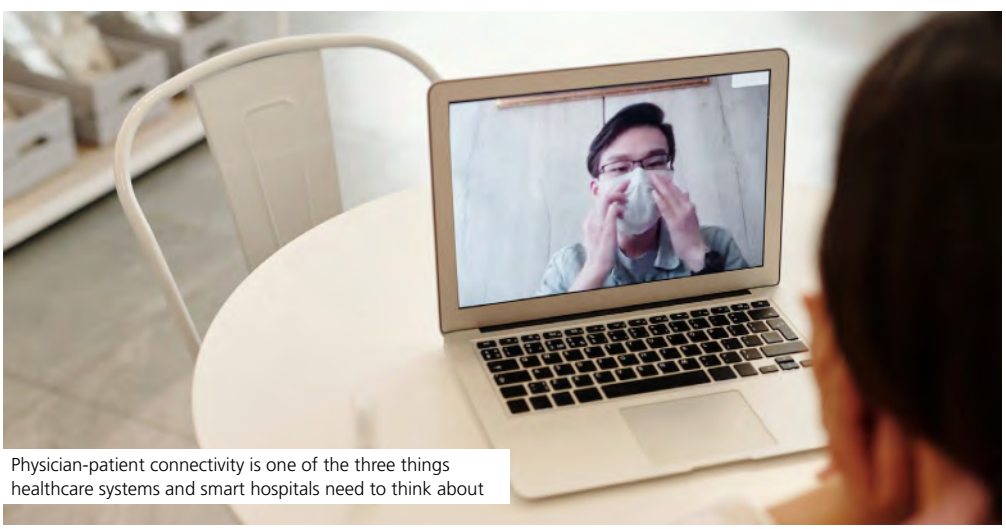
Singapore's local patient volumes may have bounced back since, but medical tourists remain largely absent. Hardesty mentions that care in the 21st century is no longer about building infrastructure and extending life expectancies, but about decentralising care and improving the quality of life.

"It is not really about "smart hospitals" but rather "smart health systems" that allow each stakeholder to maximize its role in the ecosystem, for the benefit of population health and financial returns in the form of a productive society," he said. In addition, Singapore's borders will gradually reopen and hospitals in other countries will take a proactive role to support travel bubbles and impactful innovations such as certificate issuance.

It is not really about 'smart hospitals' but rather 'smart health systems' that allow each stakeholder to maximize its role in the ecosystem.

In the longer term, the prospects for Singapore's healthcare system are looking good. "Firstly, Singapore has cemented its position as a globally exemplar healthcare system and an attractive destination for medical tourists. Secondly, the ecosystem stakeholders were forced to coordinate on a new level; setting the tone for the future collaborations needed to enable a long-term sustainable healthcare system, and tackle the issue of rising chronic needs and escalating costs," Boulton added.

As economies attempt to reopen post-pandemic, smart hospitals and healthcare systems need only to think of three things: patient-centricity, physician-patient connectivity, and seamless data handoffs. According to Boulton, patients should not be burdened by working out what they need and where they will be treated, patients must have access to their physicians across platforms, and both patients and physicians should have the right information at the right time, and at all times.



Physician-patient connectivity is one of the three things healthcare systems and smart hospitals need to think about

Indian hospitals forced to go digital as elective admissions dwindle

Amid the pandemic crisis, India's digital health market is now surging, with hospitals and clinics now scrambling to reach and serve patients through a wide range of online channels.

When India rolled out the world's largest COVID-19 lockdown in March last year, an eerie silence immediately descended upon Apollo Hospitals' network of medical facilities. The company, which runs India's largest collection of private hospitals, watched as its patient foot traffic vanished almost overnight.

Luckily, Apollo Hospitals had launched a new telemedicine platform just one month before the pandemic struck. "The greatest shift in the pandemic has undoubtedly been toward digital health - customer adoption has skyrocketed," noted Shobana Kamineni, executive vice-chairperson of India's Apollo Hospitals. "In India, 50 million people accessed healthcare online from March 2020 to May 2020, with 80 percent of all telemedicine users and patients using it for the first time."

The greatest shift in the pandemic has undoubtedly been toward digital health - customer adoption has skyrocketed

The COVID-19 pandemic has driven the growth of healthcare innovation to historic levels. "We started 'Apollo 24/7' (the network's telemedicine offer) in February 2020, just a month before the lockdown took place in India. We already knew before the pandemic that we could never live just in the physical world—but during the pandemic we had to (be agile and) turn on a dime.

"Without something like this, hospitals across the world would have lost so much money because the beds are empty," she said, speaking at a virtual congress organised by McKinsey & Company.

The doctor is in the app

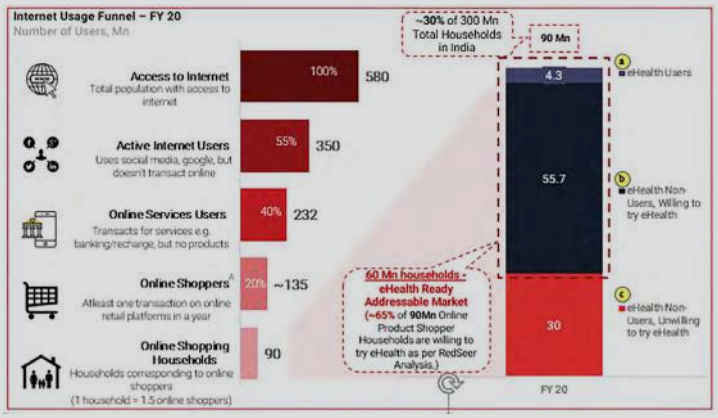
Apollo Hospitals' experience is just one example of the digital healthcare boom that has swept India in the wake of the COVID-19 pandemic. "COVID and the new normal saw healthcare companies adopt new ways of working. Globally and in India, there has been a massive expansion of telemedicine and digital health applications," noted Satyam Mehra, partner, Bain & Company New Delhi. "eSanjeevani, the telemedicine service of the Health ministry crossed 1 million teleconsultations in December 2020. Similarly, the private networks like Practo, Mfine and the hospital apps themselves have seen tremendous traction during this period," he added.

A recent survey by EY and Imperial College London showed that healthcare organisations in India had among the highest adoption rates of digital technologies in 2020, with over half or 51% of respondents saying that they had increased their use of digital technologies and data solutions since the outbreak of the pandemic.

"The response to the COVID-19

How well did Indian hospitals acclimatize to this change in the healthcare environment?

India's internet usage FY2020



Source: Redseer

pandemic has shown that data and technology can make a real difference to the work of health and human services professionals in India, who have worked tirelessly and heroically in the face of this dreadful disease," said Gaurav Taneja, Partner and Leader, Government and Public Sector, EY India.

A staggering 78% of respondents from India agreed that the use of digital solutions had been effective in ensuring access to care when and where people needed it, while 69% reported that their capability to deliver service had improved since the pandemic, owing to employing a broader range of digital and analytical solutions. Meanwhile, 74% of respondents in India reported that digital technologies and data solutions had increased staff productivity, and 75% reported that digital solutions had been effective in delivering much better outcomes for both patients and service users.

However, the survey also revealed key challenges that Indian healthcare organisations faced when it comes to scaling up their digital services. Nearly 40% of the respondents cited ethics and privacy concerns as one of the most prevalent barriers, significantly higher than other countries featured in the survey.

"The vital question now is, are we prepared to address the key pre-COVID and post-COVID barriers highlighted in the survey," Taneja asks. "Some of the pre-COVID barriers include the ability to protect an individual's identity and personal information, ethical concerns about the use of technology, while post-COVID barriers include lack of adequate financial resources to acquire needed tools, technologies and equipment. The focus now should be on putting in place the right processes, digital tools and skills that are required to meet the medical needs of a post-pandemic world, and to prepare for any future health crises," he added.

A national framework

Government support will be crucial in maintaining India's digital healthcare boom. "Digital health makes healthcare more accessible. India needs to step up its investment in healthcare services to sustain its economic growth as well as prepare for future public health emergencies," noted Dr. Shoba Suri, Senior Fellow, Observer Research Foundation. "The remedy to overcome India's healthcare afflictions calls for the amalgamation of data, technology and collaboration.

Digital health makes healthcare more accessible. India needs to step up its investment in healthcare services to sustain its economic growth as well as prepare for future public health emergencies

Here is an opportunity to redesign the health system and building resilience equipped to handle future pandemics without actually disrupting routine health services."

The Indian government does appear to be moving in this direction, with the use of national mobile apps for contact-tracing and its COVID-19 vaccine rollout.

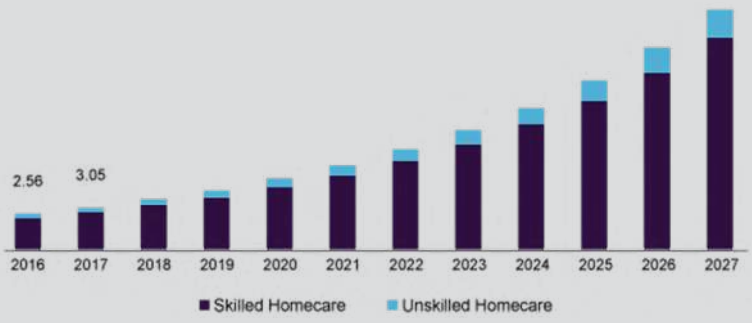
"Technology in healthcare plays a crucial role in resolving crises and improving efficiency. The use of telemedicine — an enabler of healthcare access and affordability — l or artificial intelligence in pandemic detection, vaccine development, and facial recognition with masks, have been greatly enhanced in the pandemic," Dr Suri noted. "AI can impact Indian healthcare by enabling access, enhancing efficiency and enabling preliminary diagnosis."

Bain's Mehra agrees, noting that the launch of the National Digital Health Mission (NDHM) and the proposed Draft Health Data Management Policy point to a future where there will be greater coordination, and appropriate use of data and digital technology to provide quality care to the vast population of India. "On the private side as well, several of the providers have had to respond quickly to the pandemic, but are now putting together a game-plan for a future where healthcare will be far more omni-channel and swing between offline and online touchpoints seamlessly," he added.

The rise of home healthcare

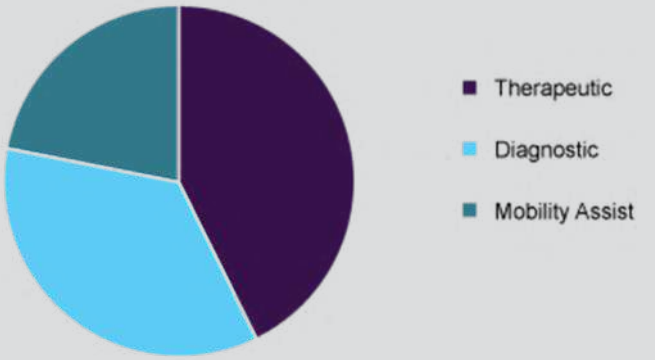
Analysts expect India's digital health boom to continue even after the

India home healthcare market size



Source: www.grandviewresearch.com

India's home healthcare market share by equipment, 2019



Source: www.grandviewresearch.com

pandemic. According to a report by Grand View Research, the country's home healthcare sector is expected to expand at a compound annual growth rate (CAGR) of 19.2% from 2020 to 2027. The sector's revenue is projected to reach $21.3b by 2027, up from only $5.2b just two years agoin 2019.

"The growth can be attributed to the need for better quality postoperative and primary care and advancement in technologies. Growing geriatric population and disposable income are other factors expected to fuel the market over the forecast period. Several companies have ventured into delivery of medicines, further contributing to the patient-centric advantages of in-home care," the report stated.

Meanwhile, a survey by the Federation of Indian Chambers of Commerce & Industry showed that over half (54%) of people preferred laboratory tests, delivery of medicines, and nursing care at home. As a result, leading market players are expanding their service offerings to maintain and increase market share.

"Companies can promote home healthcare as a clinically safer choice for postsurgical recovery and for traditional inpatient services, including ICU services and dialysis/ chemotherapy, which require greater clinical supervision, Grand View Research noted. "Mature market players can form Public-Private Partnerships to tap into the rural market. Various leaders in the healthcare sector have recommended fiscal and non-fiscal interventions for certain sectors, with a primary focus on services sectors such as homecare, pathology labs, MedTech, insurance, and hospital diagnostics."

While the pandemic has galvanised the growth of digital health providers and e-pharmacies, Mehra notes that most offline healthcare providers actually took a hit to the bottom-line as patient volumes shrunk sharply in the wake of COVID-19. "There were sectors in which COVID served as a catalyst of growth, [but] these were fast-growing spaces anyway. Overall most providers are expected to report a drop of between 20% and 35% in revenues in FY21," he cautioned.

Mehra added that most of these impacts will not subsist in the long term at the current magnitude, but the industry itself will likely never be the same again.

An uphill battle

India's healthcare sector may have weathered the storm caused by the pandemic, but challenges remain as the country enters a new era dominated by digital health. "While the digital revolution has come to Indian healthcare finally, the current state of data and systems is too fragmented for the true power of data and digital to be leveraged to make a difference to outcomes," Mehra noted.

"The first and biggest issue we face is the lack of ability to pay, and an unevolved payer and insurance system. There is a vast middle section of the population that does not qualify for coverage under government schemes and does not have private insurance either," he said. "An unevolved payer system, mis-aligned incentives and general lack of awareness among the population has led to a system where the bulk of care and spend is on late curative interventions, not solely preventive interventions."

While the digital revolution has come to Indian healthcare finally, the current state of data and systems is too fragmented for the true power of data and digital to be leveraged to make a difference to outcomes

Despite these challenges, experts remain optimistic about India's healthcare market. Data from the Strategic Investment Research Unit shows that the healthcare market might be worth $370b by 2022, promising yields of up to 40%, according to several investors. Health tech, meanwhile, is forecasted to create 40 million jobs by 2030.

Bain & Company's tenth annual Global Healthcare Private Equity and M&A Report showed that deal volume in Asia-Pacific increased significantly to 156 during the year, an increase from 68 in 2019, and 88 in 2018.

"Despite the pandemic, 2020 was the biggest year on record for healthcare PE activity in Asia Pacific, investors continued to put capital behind emerging biopharma innovation ecosystems in China and India, in addition to investing to bridge the large care delivery gaps in the region. This momentum has continued into 2021" said Vikram Kapur, a Partner with Bain & Company Singapore.

The 2020 gains mirrored the region's long-term growth and derived largely from greater domestic investing, especially in China and India biopharmaceuticals and services as smaller, venture deals of the past are beginning to evolve into growth equity opportunities for investors.

Mehra said he believes the next decade will be the decade of the healthcare revolution in India.

"The next decade will determine if India can fulfill its potential on this front. For 2021, there will be a lingering of the impact of COVID, especially in the first half of the year but overall I see a very strong bounce back especially in the second half as we will see a stronger more battle-hardened set of leaders in the sector take on the emerging opportunities. Second half revenue and profitability numbers could be the best ever especially for players who have learnt their COVID lessons well," Mehra said.

Mary Mediatrix Medical Center is one of the leading medical centers in Southern Tagalog. Since 1958, the goal is to provide the best and appropriate care for its valued patients. The hospital has extended its services to provide for advance medical diagnostics and treatment as well as educate the locality for a more holistic approach to healthcare.

Since its humble beginnings, MMMC has upheld clinical process standards that allowed it to gain recognition for the quality of service it has provided. Collecting multiple milestones such as being classified by the DOH as a tertiary level hospital, being certified for ISO 9001:2015 and being awarded by various healthcare organizations such as the Hospital Healthcare Asia Awards, PHA Outstanding Hospital Awards and Gawad Bayaning Kalusugan Awards which eventually led to the hospital being known as The Hub of Healthcare Experts.

Even in these trying times, the hospital continuously extends its services to provide quality healthcare to its patients. The latest development is the newly launched Mary Mediatrix Cancer Institute – the 1st and only one-stop-shop cancer center with a multidisciplinary approach in Lipa City.

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With working-age citizens who may support the elderly declining, how will Singapore help support its older citizens?

Reimagining long-term care options for Singapore's growing aged demographic

The country's ageing population is growing fast, and the healthcare industry must catch up.

With a COVID-19 mortality rate as high as five-times the average, ageing populations (defined as 65 and older) have received newfound attention from the Singapore healthcare sector over the past year. Doctors, hospital administrators, and caregivers needed to rethink the delivery of long-term care for elderlies, and they needed to do that thinking quickly.

As the scientific community attempted to understand the inner workings of the coronavirus, several elderly communities in the west faced a crisis in contamination. At one point, one-third of COVID-19 deaths in the US were linked to a continuing spate of nursing home transmissions.

Singapore's healthcare sector managed to avoid a similar crisis, simply by acting quickly to control vulnerable points.

As early as February 2020, the government's Silver Generation Office (SGO) reached out to 27,000 elderlies, educating them about the virus and providing information on precautionary measures and relevant support and services. Today, nursing home residents in the country account for only 0.03% of 58,000 cases, and a measly 14% of the 30 deaths.

Doctors, hospital administrators, and caregivers have needed to rethink the delivery of long-term care for the elderly

Despite this success, the pandemic has revealed several gaps in Singapore's healthcare system, especially in the current dynamic of long-term care for elderlies. Alex Boulton, management consultant, Bain & Company, notes that there is still a clear over-reliance on family-based care and foreign domestic workers, which have been put under strain by COVID-19.

Boulton also points to mental health issues among the ageing demographic, exacerbated by prolonged and extended periods of isolation.

"These vulnerabilities have highlighted the importance of transforming and upgrading Singapore's long-term care ecosystem. This will include supporting more remote and home-based care for ageing-in-place, increasing emphasis on prevention and better chronic care management, lowering costs and facilitating independence through better automation of long term care facilities, and connecting and coordinating a holistic care ecosystem around caregivers," he added.

It is undeniable that advances in global healthcare need to move at lightning speed, but the future of medical management depends largely on the delivery of long-term care to vulnerable populations, especially in advanced countries where best practices are piloted and replicated.

Long term care in Singapore

Singapore, compared to its Southeast Asian neighbours, has a more aged population, with around one third expected to be

65 and older by 2050. Add to this a relatively robust and developed healthcare system, and the country is well-placed to explore advances in long-term care (LTC) policies and procedures for elderly patients.

When the government implemented the Circuit Breaker measures, SGO went from house visits to telephone engagements to connect with seniors and help them cope with the pandemic. As many as 47,000 vulnerable seniors, many of whom lived alone, received calls from SGO. Over 3,000 sent in requests for individual assistance.

Chris Hardesty, global director, KPMG Singapore Healthcare and Life Sciences, says Singapore had been consistent in providing adequate attention to its ageing population, from ensuring that they were well informed during the early days of the pandemic, to placing them at the center of the country's vaccination programme today.

According to him, this is not simply a crisis management technique for Singapore, but a long-term plan to shift the care and funding models in a rapidly ageing society. This could be the first lesson for other countries in the region, which have failed to employ sustainable disease mitigation strategies amidst COVID-19.

Hardesty also mentions the concept of a "longevity dividend" that can be used to offset the "demographic dividend" that populations face in the near term. The longevity dividend revolves around elderly employment, a topic which insurers, tourism, entertainment, real estate, technology, and other players have been discussing actively as of late.

"Active ageing, leveraging experience and skill sets, reducing isolationism, increased consumerism, improved well-being, and tailored products and services are not only good for the people, but good for sustainable business models too. It will be exciting to see more attention to this space over the coming period," Hardesty added.

In 2020, the Singapore government expanded programmes like CareShield Life and ElderFund for these purposes.

In a report called *Navigating a New Reality*, analysts at Oliver Wyman also stress the importance of the healthcare workforce. According to them, there are several lessons that can be learned from Singapore's experience with COVID-19. These includes redesigning certain roles, such as creating care-ambassador-type positions for daycare staff. This would enable them to see the bigger picture at the center or at a home, and fill communication or workforce gaps as soon as they are spotted.

"Staff also require enhanced training in remote client management, recreation and activity design, and tech skills to bring care to virtual platforms (such as telehealth training for doctors and nurses)," they added.

This is perhaps what the future of long-term care for elderlies looks like: leaps and bounds away from the idea that seniors can no longer live fulfilling lives after the age of 65.

Seniors and technology

In the *Navigating a New Reality* report, the authors observe that long-term care capacity in Singapore has grown significantly in recent years to catch up with its ageing population. For instance, daycare capacity has grown by as much as 400% over the past decade, and homecare capacity is up by as much as 300%.

The trends will continue to go up as Singapore's ageing population grows, and the only way for the country to properly respond to this is through technology adoption. COVID-19 has forced healthcare systems around the world to speed up digitalisation. But contrary to popular opinion, the public and even seniors are indeed willing to use new technologies, particularly if it means improving the care they receive.

The availability of qualified professionals remains a key challenge and, unsurprisingly, innovative startups have emerged to tackle the problem in Singapore

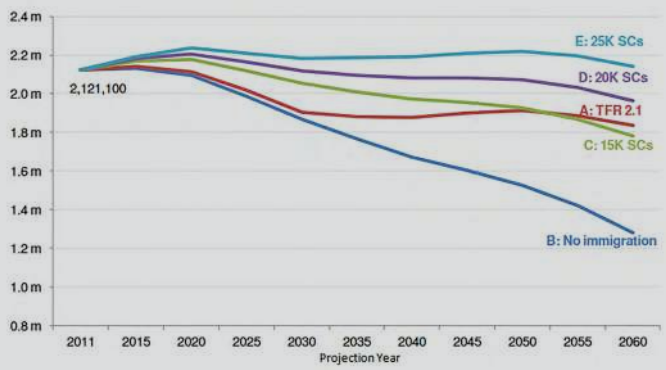
"The availability of qualified professionals remains a key challenge and, unsurprisingly, innovative startups have emerged to tackle the problem in Singapore," Boulton notes. "For instance, Homage is a Singapore-based startup that has built a meaningful network of care professionals for home-based care, and connects them via a low-cost digital platform with customers to provide them the support they need for independence."

The problem of crowded nursing homes as well as concerns related to infectious disease transmission were already being tackled in pre-COVID policymaking, but the solutions have been slow to arrive and even slower to be adopted. The good thing is that telehealth, daycare centers, and homecare solutions have become even more popular during COVID, resulting in greater interest from the public and private sectors to improve these services significantly.

"The decision of which elderly care provider to select depends first on the level of care required. Is minor home-based support sufficient, or is more intensive support and perhaps healthcare services required? In addition, proximity to family and cost play an important role," Boulton said. These are also the key considerations for new entrants to the healthcare sector, as they think about the solutions and innovations that can elderlies need, wherever the care happens to be delivered.

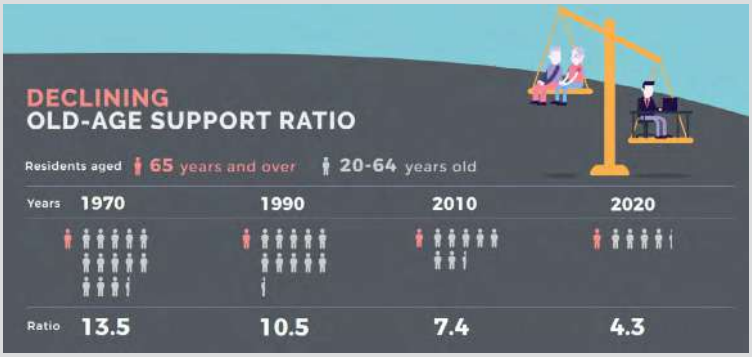
In a recent study by the National

Projection of the number of working-age Singaporeans (20-64 years olds) through the years



Source: population.gov.sg

Declining old age support ratio



Source: singstat.gov.sg

University of Singapore (NUS) entitled Ageing and Health Tech, experts enumerate four domains where investment in health IT has been focused: monitoring and tracking outcomes and behaviour using technology that collects and transmits data via mobile, wearables, and home-based devices; supporting individual self-management via various platforms; enabling access to professional healthcare goods and services; and engaging community-based resources, such as crowd sourcing and social media.

"Greater research and innovation to alleviate loneliness and promote inclusion are necessary, especially for elderly suffering from cognitive deficits. Digital health technology can play a part in creating solutions to these and other problems, and innovations that respond to these concerns will foster better well-being, especially for the economically disadvantaged elderly," Sarah Elgazzar, research affiliate, Research for Impact Singapore said.

However, she added that it is also important to highlight the need for regulatory frameworks, which have not been fast enough to accompany technological advancements in the healthcare industry.

Smart ecosystems for LTC

Some interesting innovations have popped up recently, according to analysts at Oliver Wyman. These include an integrated "kampung" or traditional village featuring health, social, and community needs, with innovative homecare tech platforms. "Nursing homes have also seen a gradual shift from open wards sleeping up to 30 people to newer, smaller bed "clusters," with four to eight residents in a room. This is LTC 2.0," the report authors added.

Additionally, privatisation opportunities abound and have been emerging in the healthy ageing space, according to Hardesty. Those in the healthcare sector should consider these open doors, but also seek to align those strategies to public health ambitions around the world, such as the World Health Organization's Action Plans.

"This will ensure that we are doing the right things for the right reasons, while still developing sustainable business models. Seek true business model innovation for elderly support operations in terms of modernized case mix interventions, place-based care settings, and bringing over the Value Added Services (VAS) mindset from other industries," KPMG's Hardesty told *Healthcare Asia*.

Like the idea of smart hospitals moving into a smart national-level ecosystem, long-term care for elderlies will no longer be about technology adoption within care centers moving and operating independently. As the government strengthens coordination among healthcare players and facilities, long-term care will also gradually be in the mix and will find itself integrated into a larger "smart healthcare" community.

Healthy ageing

Long-term care is likely to find itself integrated into larger "smart healthcare" communities

At the end of the day, the most important aspect of healthcare is ensuring that all members of the population receive the care they need, when they need it. This is so they can continue to meaningfully contribute to their communities, an important aspect of sustainable development and a healthy economy.

In Asia, where elderlies are given a high level of respect as part of culture and tradition, long-term care for ageing populations should not be undermined. A report by The Lancet, Building Community Resilience Beyond COVID-19, emphasizes the importance of intentionally reaching out to seniors to empower them with digital knowledge, rethinking their living spaces, and support through social networks, so they can be prepared for future public health emergencies like COVID-19.

Boulton notes that the government has already made it a top priority to take care of Singapore's ageing population. Support for elderly care has been evident and will continue to be seen in the form of infrastructure, services, and coverage. Soon, there will be greater coordination among new entrants and players and the public and private sectors.

"While of course there must be controls and safety nets as alluded earlier to the expanded Singapore programmes, we seem to be moving in the right direction with ushering in a longevity dividend boom. A variety of new entrants are becoming interested too, as seen by Singapore Press Holdings' US$120mn acquisition of an elderly care home chain," Hardesty said.

The World Health Organization has designated the next period to be the "Decade of Healthy Ageing." One key theme is "functional ability," which covers basic living needs, continued learning, mobility relationship development, and social contributions.

"The elderly cohort are encouraged to help design the system too, including the care coordination models and tech innovations they would like to see implemented. Whether one is operating in the public or private sector, alignment and leverage of the Healthy Ageing agenda will be key for momentum going

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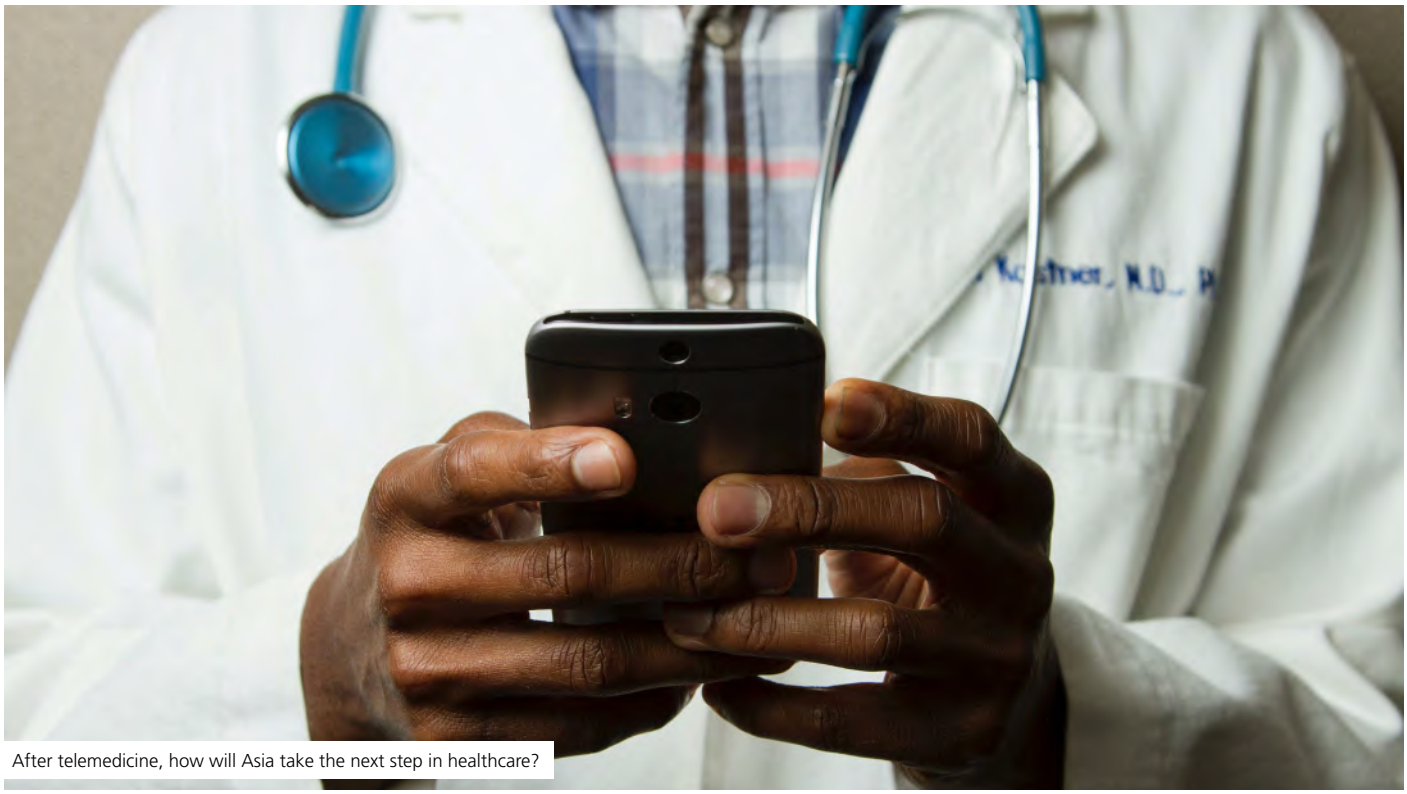


After telemedicine, how will Asia take the next step in healthcare?

China's internet hospital: Could this be the next step in digital healthcare?

How a forward thinking initiative from China may become a new strategy for healthcare providers globally.

The pandemic has brought about an era of bold changes in the world, especially in healthcare. Tele-health and tele-medicine became the trend that healthcare providers adopted and leveraged through the days when face-to-face contact was restricted throughout many different markets.

But long before telehealth, China was already taking advantage of the opportunities in the spreading use of internet technology throughout its healthcare industry.

The birth of internet hospitals throughout Mainland China

According to a bulletin released by the World Health Organisation, China has a three-tier healthcare system: primary healthcare facilities are expected to provide affordable first-contact care, while secondary and tertiary care facilities provide specialist referral services.

China has long been taking advantage of the opportunities in the spreading use of the internet through its healthcare industry

However, with no gatekeeping in the primary healthcare system, patients can freely choose their provider at any health facility, and many routinely use established hospital outpatient services for first-contact care.

This has meant primary healthcare services in the country face several challenges,including overprescribing of profitable drugs and diagnostic tests, competition for patients where there is a fee-for-service, and increasing demand for healthcare, especially in the context of China's rapidly ageing population.

But authorities found that internet access was increasing in line with that same demand for healthcare. In statistics by Datareportal, there were 939.8 million internet users in China in January 2021. This was an increase of 10% from 2020 figures, and represents sustained growth since 2008, with internet penetration rising 22.7% then, to 59.6% today.

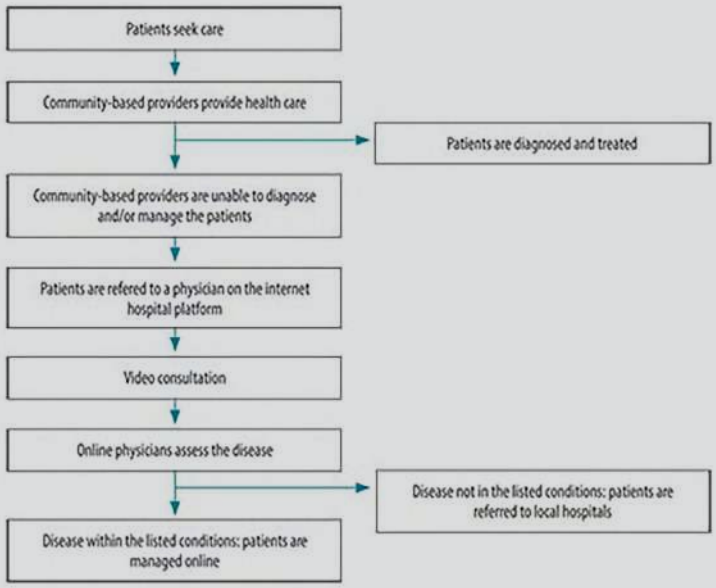
China has been developing online triage and consultation services throughout that time.

It was in October 2014, that the first "internet hospital" went online in China: the Guangdong Second Provincial General Hospital was fully accredited by the Health Commission of Guangdong Province. By the end of that year, the fully online facility was dealing with almost 200 patients and issuing 120 prescriptions daily.

Between 2016 and 2017 a wave of internet hospitals were being built in China. However, a period of uncertainty came in 2018 where a trial administration policy required local authorities to revoke all previously approved internet hospital licenses and to re-register them into the new policy.

In 2019 policies were enacted

Medical consultation process for an internet hospital, China



Source: L.E.K. Consulting and GRG Health Survey

that supported internet hospitals. In the same year WHO reported that the Guangdong Second Provincial General Hospital had expanded to then 700 licensed or assistant physicians from 19 county-level hospitals and the Guangdong Second Provincial General Hospital.

These physicians have been re-trained and accredited through a general practitioner training programme. The physicians provide online video consultations for about 14 000 community-based health providers working in health centres, village clinics, university health services, and pharmacies in Guangdong Province.

The internet hospital model

In WHO's bulletin Description of an Online Hospital Platform, China from 2019, the global body explained that internet hospitals in China work by supporting a primary healthcare provider at the community level in diagnosis and treatment. The provider can link the patient directly to the platform for a video consultation with a physician. If no diagnosis can be made, the patient is referred to a physical hospital associated with the platform.

According to Deloitte's Internet Hospitals in China: The New Step in Digital Healthcare report, policies of internet hospital management only allow internet hospitals to provide patients with family doctor contract services and subsequent effective diagnosis for common diseases and also chronic diseases.

Internet hospitals have two main operation models. One is the "hospitals + internet" model which are online hospitals that work directly under an offline medical institutions, and the "internet + hospitals" model which are independent online hospitals with less firm affiliations to established physical medical institutions.

Deloitte said "hospitals + internet" operators have the advantage substantial experience in medical resources, policies and national health insurance (NHI) support, quality management, and patient safety - but adopting these online can be an issue.

Meanwhile, "internet + hospitals" are usually commercial organisations, have better platform operation and user attraction but can be limited to only health information, prescription renewal, and drug re-purchases for common and chronic diseases. They are heavily dependent on offline hospitals and multi-point practitioners for their medical personnel and resources.

As China's policy encourages internet hospitals, more offline hospitals are starting their own online medical facilities

As China's policy encourages internet hospitals, more offline hospitals are starting their own online medical facilities. However, these hospitals, especially tertiary public hospitals, lack resources to allocate to their online operations. Additionally, reforming of the overall service mode is difficult and the trend still leans towards joint operation as a group.

Deloitte pointed out that the ideal approach was an integration and deep combination of the two models.

"It would open the internet to offline hospitals, allowing them to use it for channel expansion," its report noted. "Meanwhile, it would also allow medical resources to be amassed, transforming medical service processes, extending the medical ecosystem, boosting consultation and treatment, enhancing industrial innovation and reform, supporting the equal distribution of medical resources, boosting medical service efficiency, and eventually realizing Healthy China 2030's goal of improving health across the population."

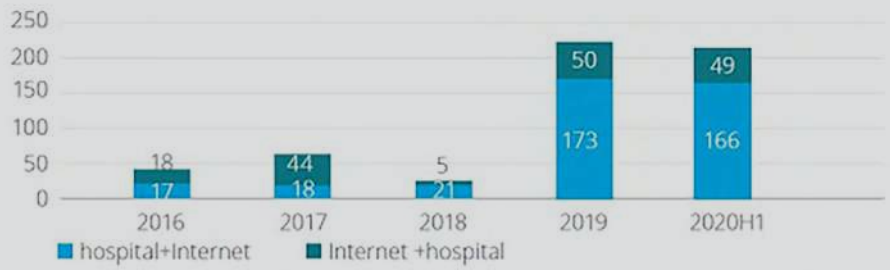
Pandemic pushes expansion

In statistics released by the National Health Commission of China, the pandemic prompted a 38.2% year-on-year decline in medical and healthcare visits, as of February, 2020. Meanwhile, the number of discharged patients fell by 35.6% year-on-year.

Before the pandemic, the Chinese government, through a series of online hospital-related policies supported the internet hospital market. 2016 saw the launch of the Healthy China 2030 blueprint with "Internet + Medical Services" a national strategic priority.

In 2019, the Drug Administration Law of the People's Republic of China was revised that ended the prohibition of direct online sales of prescription drugs. Several measures were also put in place in 2020 to

The number of internet hospitals opened in China from 2016 to H1 2020.



Note: from the recent news report, there were around 900 i-Hospitals licensed in China as of October 2020.

Source: Internet Hospitals in China: The new step into digital healthcare, Deloitte

further the scope of telehealth and medical insurance as well as support for electronic prescriptions.

In the 2020 Online Hospital Report by Vcbeat VBR, it was pointed out that the rise of online prescription medicine market and implementation of online hospital policies, construction of online hospitals has accelerated and the "hospital + internet" mode has become the most adopted model throughout China.

In consulting and research firm Frost & Sullivan's analysis, Digital Hospitals: Creating Growth Opportunities in Patient Care during the COVID-19 Pandemic and Beyond, the adoption of smart technologies, such as artificial intelligence (AI), remote health monitoring, and robotics also gained traction in 2020.

"Digital hospitals address limitations of traditional providers such as centralized care delivery, closed systems, fee-for-service care models and a reactive approach through decentralized care, interoperable systems, and outcome-driven and proactive approaches," said Neeraj Nitin Jadhav, an analyst at Frost & Sullivan.

Technology adoption is expected to rise further in the next two to three years due to higher-quality care and significant productivity gains.

Investments on the rise

Between 2000 and 2014, internet hospitals in China went through an explorative stage, before a surge in sector investments in 2015.

In 2016 and 2017, investments slowed down due to the central government's stance on the online medical industry becoming uncertain leading to an industry reshuffling with several organisations transforming and implementing a wait-and-see approach.

However, once 2018 came around, medical related policies became clearer, and this prompted another round of surging investments to as much as three times the investments that were made in 2017.

Investments further increased when the pandemic struck in 2020, accelerating the boom in internet hospitals. The government of China issued more policies that further the development of internet hospitals. By the end of 2020, market investments in internet hospitals reached over $4.6b (CNY30b).

Technology adoption is expected to rise further in the next two to three years due to higher-quality care and significant productivity gains

The next steps

The rapid growth of internet hospitals in China will continue to be supported by the continued innovation in the online economy. This could well become the next step in the evolution of healthcare as the country is known to be a trendsetter in the digital world.

Countries are adopting the internet + healthcare strategy, with more internet hospital regulations being enacted that will give clarity on the scope and coverage of this growing new healthcare system.

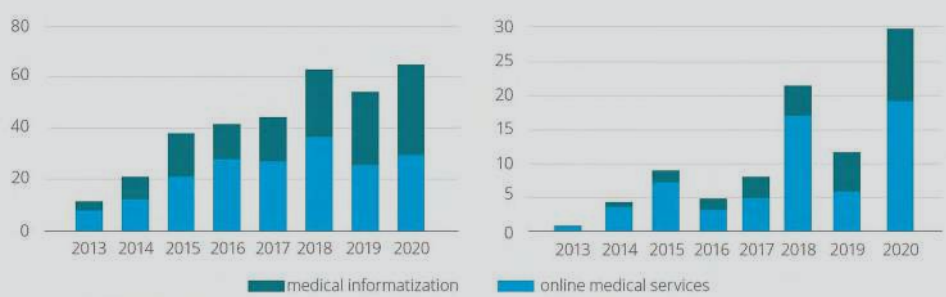
Deloitte said third party internet hospital platforms are more likely to adopt the "internet + hospital" model whilst offline hospitals would be more into the "hospital + internet" mode,

"With the online economy development, mindsets and business models changing due to COVID-19, new infrastructure construction and sharply growing demand for hospital transformation, it is now the time for internet hospitals to enter a rapid growth," Deloitte said.

Deloitte predicts that in the next 10 years, healthcare will undergo an unprecedented transformation, radical innovation and changes to the nature of services and processes. Traditional medical services may give way for smart health management.

"We also look forward to the influx of more and more cross-industry leaders, not only pharmaceutical and healthcare enterprises, but also scientific and technological innovation players," Deloitte said.

Number of investments/fundraisings and scale of investments/fundraisings in CN¥b



Internet Hospitals in China: The new step into digital healthcare, Deloitte

BILL TAYLOR

Can intelligent automation reduce errors in the healthcare sector?

BILL TAYLOR
Vice President, ASEAN and Korea
Blue Prism Pte. Ltd.

Due to the COVID-19 pandemic, healthcare systems globally have been tested like never before. The healthcare sector has been under enormous strain, and medical errors represent a greater risk than they did in the past. Such mistakes are not only extremely dangerous, but when patients are involved, they carry an emotional burden, along with the potential for an investigation into, and action taken against, the healthcare provider.

A recent case of a technical error made the headlines last October 2020 when news broke that nearly 16,000 COVID-19 cases went unreported in England due to a technical glitch. Patients who had tested positive were informed about their results but their close contacts weren't traced. This technical error was a result of some Microsoft Excel files exceeding the maximum size after being sent from the testing provider. An investigation into this incident is currently underway, but it reminds us that mistakes can, and do, happen and the consequences for patients, healthcare providers and the general public, can be serious.

No healthcare provider wants to expose patients to this kind of risk, especially during a critical global health crisis when services are stretched to capacity. So can such errors be reduced, or even eliminated?

Our experience before, and certainly during the pandemic is that implementing intelligent automation can create real impact for the healthcare sector by helping to reduce errors. Intelligent automation combines AI, machine learning and RPA (robotic process automation) to create more agile, accurate and streamlined business processes, reducing the time spent by staff on manual data entry tasks. For the healthcare industry, its application has a number of positive impacts—particularly in the areas of patient safety and experience—that allow highly trained staff to focus on their patients and improve the overall quality of their care.

Intelligent automation can be used by healthcare providers in a number of different ways:

- Case Management. Manual transfer of data throughout systems used to manage the patient journey can be onerous and time-consuming. As a patient moves through primary care, ambulance services, secondary care and into community care, manually collecting and transferring data creates significant risks of both errors and delay. Intelligent automation can create cases and add data and notes to existing cases across multiple systems, reducing manual effort and minimising the risk of human error.
- Patient information presentation. Intelligent automation, through cloud-based intelligent digital workers, aggregates patients' medical records across multiple systems to present attending medical staff with a full overview of the facts and the patient's history. This ensures that the treatment pathway accounts for all of the relevant information.
- Patient engagement. Following a patient's discharge, digital workers can be used to create a patient portal, sending out links and reminders to patients. In turn, the treatment plans for patients requiring repeat visits are automatically updated to streamline the approach taken by their healthcare specialist.
- Patient self-service. Intelligent automation can be used at the frontline of treatment to allow patients to register themselves at kiosks. This not only reduces check-in times but helps to minimise person-to-person contact during Covid-19, freeing up resources. In addition, healthcare providers can integrate facial recognition technology to enable digital workers to automatically check in repeat patients and retrieve their records on arrival, reducing waiting times and improving patient experience.
- Patient diagnostics. Using intelligent automation, healthcare providers can shorten the time between tests, results and treatment by connecting disparate systems and streamlining clinical pathways. This not only improves patient care, but gives critical time back to clinicians.

As boundless data is continuously uploaded into administrative systems and medical databases, especially during the COVID-19 pandemic, these examples showcase how intelligent automation can support the healthcare infrastructure. Whilst automation is not able to solve every pain point, it is a valuable tool in helping to reshape data processes, improve efficiencies and enhance patient outcomes.

Technology innovation in medical care has taken great strides in the current age of digitalisation, but deeper digital transformation is required to optimise healthcare systems. It's imperative that healthcare providers consider intelligent automation not only as a technology play, but as an essential resource that can release clinical and non-clinical services to focus on patient care by reducing the time spent on repetitive and time-consuming administrative tasks. At the same time, intelligent automation can connect disparate systems between departments to facilitate the exchange and sharing of information, while digital workers process data at machine speed and eliminate administrative errors. By integrating intelligent automation into healthcare processes, healthcare providers can serve patients better and keep pace with the country's healthcare needs.

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MABEL C. CHOU

Better healthcare decisions will ultimately depend on better data collection

MABEL C. CHOU
Director for Life Sciences
National University of Singapore

The huge advances seen in healthcare over the past 50 years are among the greatest achievements of modern science. As a result we are living longer than ever.

The downside to this is that whilst the average age of populations is growing older, chronic diseases are becoming more common and the medical needs of individuals are becoming increasingly complex resulting in burdensome demand for healthcare and healthcare budgets.

Governments and healthcare managers acknowledge that the current trajectory is unsustainable.

Singapore's prime minister Lee Hsien Loong warned recently that "hard choices will need to be made" on where to spend and which drugs and procedures are considered cost-effective.

Patients expect that the latest medical treatments will be immediately available to them, and many doctors say they are often pressured to prescribe medicines, tests or procedures that patients do not need.

Especially in advanced economies, a significant and growing drain on health budgets is overtreatment and overconsumption of healthcare.

According to some estimates in the United States at least $200 billion is wasted annually on excessive testing and treatment. Studies have shown this approach can also cause actual harm to patients, contributing to an estimated 30,000 deaths annually.

How then can we continue to provide comprehensive healthcare yet also ensure that optimum choices are made that both maximise benefit to the patient and avoid unnecessary pressure on health budgets?

Treatment of chronic diseases in particular is becoming a major challenge in rapidly ageing societies. Chronic diseases are fraught with complexity and uncertainties, caused by factors such as the diversity of symptoms, the disease's unpredictable progression between different stages, and their tendency to be closely associated with other secondary conditions.

In medical decision-making, when so many uncertainties are involved, it is important to determine the optimal time for doctors to begin medical treatment.

In my work at NUS Business School, a major focus of my research is how analytical models used in business operations can be applied to healthcare decisions. A recent study looking at chronic disease progression, we developed a framework related to a mathematical model known as a Markov Decision Process and then applied it to the different stages of a disease.

Markov Processes, named after 19th century Russian mathematician Andrey Markov, are often used to model resource optimisation decisions in situations where businesses and industries are faced with a range of random inputs and outcomes.

By taking elements of this process framework, our model of treatment decision-making takes into account the random factors influencing the progression of chronic diseases between different stages.

Intuitively many patients suffering from chronic diseases will want to begin treatment as early as possible after diagnosis, seeing this as offering their best chance. Being told to hold off and simply "monitor the disease" often leaves patients frustrated, feeling that they are being denied treatment or even that, for some reason, the doctor does not want to help them.

Our model however provides a mathematical rationale for holding back until a more optimal time as a better course of action.

One reason for this is that starting medical treatment too early, when the patient is in a relatively good health state, could result in unnecessary suffering and lower quality of life. Many treatments, such as chemotherapy for certain types of cancer, can be highly effective in combating the disease but can also have severe effects on the patient's quality of life because of the inherent toxicity of the powerful drugs and medications involved.

On the other hand, there is the risk that delaying treatment until the patient is in a worse health state may lessen the treatment's effectiveness or even rule it out having any impact at all.

The key therefore is to find the best treatment time that delivers an acceptable trade-off between quality of life and prolonging survival.

Our model enables doctors to map out the likely progression of the patient's illness from within any given stage of the disease, providing simple guidelines on when starting treatment will deliver the best outcome for the patient.The model also enables them to present this decision to the patient as a course of action that delivers maximum benefit to them.

Whilst there is more work to be done to refine the model for specific diseases, it shows the exciting potential that analytical modelling commonly used in non-medical industry situations could bring to making better healthcare decisions.

The crucial factor, however, is the quality of data.

As with any analytical model, the quality of the outcome it is able to produce is only as good as the quality of the data that goes into generating it. Currently in many cases gathering of medical data is patchy at best and frequently fails to provide a comprehensive picture.

Patients switch between GPs, consultants and specialists and whilst data is routinely captured in each instance it often ends up recorded in different formats, inconsistent, and stored across different systems that are not connected to each other.

As demands on healthcare grow and patient needs become more complex, this outdated and even haphazard approach to gathering medical data will be one of the main issues hampering efforts to control rapidly growinghealth costs.

An emerging solution to this might be found in the fast-developing technology of blockchain through its decentralised structure offering potential for sharing medical information whilst preserving patient security and privacy.

Recognising the potential opportunities, some initiatives are already exploring this technology as a basis for new health information exchanges. Yet for the full benefits to be realised, such models will need to be adopted at scale, requiring governments to take the lead.

But to be truly effective new approaches to organising the comprehensive and standardised collection of patient health data will be essential for any lasting solution.

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