

**CELEBRATING**



**YEARS OF TRANSFORMATIVE MEDICINE**

**SingHealth Duke-NUS Academic Medical Centre**  
**ANNUAL REPORT 2020/2021**

**SingHealth Duke-NUS  
Academic Medical Centre  
Annual Report 2020/2021**

Singapore General Hospital (SGH)  
Changi General Hospital (CGH)  
Sengkang General Hospital (SKH)  
KK Women's and Children's Hospital (KKH)  
National Cancer Centre Singapore (NCCS)  
National Dental Centre Singapore (NDCS)  
National Heart Centre Singapore (NHCS)  
National Neuroscience Institute (NNI)  
Singapore National Eye Centre (SNEC)  
SingHealth Community Hospitals (SCH)  
SingHealth Polyclinics (SHP)  
Duke-NUS Medical School (Duke-NUS)

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# We strive to build another 200 years of legacy, caring for generations of Singaporeans in good and tough times.

**Mr Peter Seah**  
Chairman, SingHealth



## 200 Years and Beyond

2021 is a historic year for SingHealth, as we celebrate Singapore General Hospital's (SGH) bicentennial and 200 years of Medicine in Singapore. Through the years, we have witnessed many significant milestones - from the birth of medical specialisations in the 1980s, the establishment of specialty centres in the 1990s, to the launch of the SGH Campus Master Plan in 2016 to support future models of care. Today, Singapore is known globally for the reliability, accessibility and affordability of our healthcare system, and every member of the SingHealth family has played a crucial role in bringing medicine in Singapore to where it is today.

## Standing strong with our patients

The tenacity and resilience of our staff continue to withstand the test of time and we stand strong in the face of adversity as we battle the COVID-19 pandemic. As one SingHealth family, we scaled greater heights, with individuals and care teams going above and beyond in a display of extraordinary courage and strength for our patients and the migrant workers community. In the midst of the protracted battle, our staff stepped forward to overcome challenges by seeking new and improved ways of doing things. Through it all, we remain steadfast in our commitment to keep patients at the heart of what we do.

## Pushing the boundaries of care

Care transformation has never been more critical than now, amidst the global pandemic. In recent months, we have seen an average of more than 3,000 phone and video consultations for our patients per month, which is almost a three-fold increase from April 2020 when the nationwide Circuit Breaker period first started. Our patients can now save time travelling to our hospitals and specialty centres for their outpatient appointments, which brings about added convenience to their family members and caregivers. For instance, SingHealth Polyclinics (SHP) launched a telehealth programme for patients to track their high blood pressure at home, while the National Heart Centre Singapore (NHCS) introduced telecounselling services for patients with post-cardiac events or procedures.

Adoption of technology has also brought other benefits to patients. With the use of online platforms and mobile applications, our patients are empowered to take charge of their health. For example, the MyVisit mobile application enables patients to keep track of their appointments, and have easy access to consultation summaries and test results, enhancing the outpatient journey and empowering our patients as partners in care. To make hospital visits hassle-free, we also introduced free delivery of medications to patients' homes, workplaces or selected pharmacies in the community.

Our transformative journey to put patients at the centre of every visit continues, with the establishment of four new SingHealth Duke-NUS Disease Centres in the areas of supportive and palliative care, cell therapy, vascular diseases, and memory and cognitive disorders. By leveraging clinical expertise across SingHealth for patient-centred care, we hope to achieve a seamless continuum of care to address patients' growing needs in these areas.

To further drive our transformative efforts, we established the Academic Medicine Innovation Institute, convening innovators across the SingHealth Duke-NUS Academic Medical Centre (AMC) family. A forum for planning strategic activities and investments in healthcare innovation, structures and processes, it helps to assess the impact of our efforts in healthcare innovation and provides a systematic framework for innovators to navigate and engage healthcare innovation expertise and resources both within and externally.

## Extending our reach

We continue to grow our reach to other areas of Singapore to ensure accessibility of care. A new integrated general and community hospital will be built in Bedok by 2030. The general hospital will include emergency, inpatient and specialist outpatient services, while the adjoining community hospital will provide intermediate services, such as rehabilitation care to support patients discharged from the general hospital. Another new development is the new Eunos Polyclinic, which is slated to open in September 2021 and will cater to the growing primary healthcare needs of Singaporeans.

Our efforts on the population health front continue unabated. The SingHealth Regional Health System (RHS) collaborates and fosters close relationships with partners in the community to identify population health needs, promote behavioural changes and develop sustainable programmes to improve quality of life. In partnership with SHP, RHS is piloting HealthUp! this year, a programme that brings together General Practitioners, Tampines Town Council, ActiveSG and the Health Promotion Board to

encourage residents in Tampines to adopt healthy lifestyle habits and complete age-appropriate health screenings. Leveraging technology as an enabler to improve access of care to elderly in the community, Vital Signs Monitoring kiosks were introduced to 20 Community Nurse Posts in the eastern region of Singapore. These kiosks, consisting blood pressure monitors connected to iPads, allow elderly residents to measure their blood pressure at their convenience, and provide recommended action plans based on the readings. Community nurses will also have access to these readings, and are ready to follow up with patients if there are any unusual readings.

## Transforming Academic Medicine

Earlier this year, SGH was ranked in the top ten of Newsweek's "World's Best Hospitals" for the third consecutive year and CGH was the highest ranked regional hospital in Singapore. The National Cancer Centre (NCCS), NHCS and SGH's Diabetes & Metabolism Centre too, earned places in Newsweek's inaugural ranking of the "World's Best Specialised Hospitals 2021" for three specialties - Cardiology, Oncology and Endocrinology. These recognitions are testament to how far we have come as an AMC and the solidarity of our cluster in making these achievements possible.

As a mark of clinical and research excellence, clinicians from KK Women's and Children's Hospital (KKH) and SHP were awarded the National Medical Excellence Awards 2020 for their outstanding contributions towards translational research for health of women and children and mentorship for future generations of physicians. Our clinician scientists and researchers also clinched National Medical Research Council Awards, honouring their commitment to transforming patient care through research. On the global front, three of our clinicians - Prof Wong Tien Yin (SNEC), Prof Jerry Chan (KKH) and Prof Derek Hausenloy (NHCS) made the list for the world's most cited researchers.

Drawing on the collective strengths of our institutions and people, we have excelled and achieved much as one SingHealth family. As the Chairman of the SingHealth Board for the past 12 years, I have witnessed SingHealth's transformation with pride. It has been my honour to serve alongside capable and dedicated board members and healthcare professionals, and I would like to take this opportunity to thank the Board of Directors, senior leadership and staff. As I pass the baton to Mr Cheng Wai Keung, I am fully confident that we will continue to forge ahead to transform the way we deliver care to our patients. Resolute in our call of duty, we strive to build another 200 years of legacy, caring for generations of Singaporeans in good and tough times.



# Together, we make greater things happen for our patients.

**Goh Yew Lin, Chairman**  
Governing Board  
Duke-NUS Medical School



## Harnessing Strengths to Combat a Global Pandemic

2020 has been a trying year not just for the SingHealth Duke-NUS Academic Medical Centre (AMC) but also across the globe. While Duke-NUS Medical School and SingHealth marked our 15th and 20th anniversaries respectively, our celebrations had to be markedly low key. Instead, our scientists and clinicians fought the novel coronavirus in the trenches. Whether that was in the lab, clinic or community, we collectively demonstrated that we can do great things even in challenging times.

Despite the pandemic, our faculty continue to pursue impactful research and translate discoveries into bedside care. Last year alone, our research community published more than 1,300 papers in academic and scientific journals, with many shaping our understanding of SARS-CoV-2. This brings Duke-NUS' tally of publications to more than 7,800 peer-reviewed journal articles. Many of these achievements were made possible by the synergistic partnerships between our researchers and colleagues within the SingHealth Duke-NUS AMC.

In 2020, Duke-NUS welcomed our 14th cohort of MD students. Students in the Class of 2024 hail from many different educational backgrounds, professions and cultures. They include an architecture graduate, a Traditional Chinese Medicine practitioner, a former public relations senior manager from the Republic of Singapore Air Force and even an English teacher. They have the foundations to grow into 'Clinicians First Clinicians Plus' and become clinician-leaders, innovators, educators and more.

To ensure that we continue to provide a world-class medical education even as access to the hospital was limited, our curriculum had to be nimbly adjusted. While many medical institutions cancelled examinations, our education team and clinical faculty pioneered new ways of conducting high-stakes examinations in a COVID-19-compliant yet rigorous manner. This ensured that we graduated students who were competent, compassionate and caring young doctors. It also instilled confidence in our students that they were fully equipped with the skills and knowledge to care for their patients upon entering the workforce.

Our researchers, too, worked tirelessly to shed light on this virus, tackling the most pressing challenges head-on. Early on in the pandemic, we were among the first in the world to isolate and sequence the virus. From there, we developed a surrogate neutralising antibody test to help with contact tracing. Called cPass™, it was the first in the world to receive Emergency Use Authorisation from the US Food and Drug Administration. As it can process animal and human samples, cPass™ may yet play a key role in identifying the origin of COVID-19.

The novel self-replicating messenger RNA COVID-19 vaccine that our AMC researchers and clinicians had jointly developed with Arcturus Therapeutics is also well into its second phase of testing. This partnership is testimony to the strength of our SingHealth Duke-NUS academic medical partnership, which facilitates interdisciplinary collaboration to deliver exceptional outcomes. As vaccinations are rolled out more widely, our scientists are now focusing on decoding the different immune responses to the virus and vaccines. Such knowledge allows us to better understand how immunity is conferred and how long our immune system can keep us safe. Most recently, our scientists found that antibodies last from days to months in different individuals.

Aside from combating COVID-19, researchers from our Signature Research Programmes have continued to address pressing needs in chronic diseases such as cancer and neurodevelopmental disorders. An anti-cancer drug, developed in Singapore by Duke-NUS and A\*STAR researchers, progressed to Phase 1b trials. Our researchers discovered a protein that can predict cancer survival and developed computational algorithms that will boost cell therapies. Through their work, our researchers have been recognised with top talent awards such as the Singapore Translational Research Investigator Award, Clinician Scientist Award and even The Straits Times' Singaporean of the Year

2020. Many also received international recognition from their peers, including prestigious organisations like EMBO and the US Academy of Medicine and American Academy of Microbiology.

Reaffirming Duke-NUS' commitment to translating impactful research discoveries into clinical care, our commercialisation efforts continue to bear fruit. We now have a network of research and education alliances, encompassing more than 230 partners. Next-generation biotech start-up PairX, incubated at Duke-NUS, was successfully spun out with strong investor backing. The company focuses on discovering and developing innovative cancer immunotherapies.

Our research ecosystem has been further strengthened with the addition of our new Pre-hospital and Emergency Research Centre (PERC), a first of its kind in Singapore. PERC will be working with the Ministry of Health's Unit for Pre-hospital Emergency Care, the Ministry of Home Affairs and the Singapore Civil Defence Force to elevate the nation's pre-hospital emergency care system. It will also be a unique academic centre that serves as a national and regional resource in this field.

With plans for further joint centres well underway, our robust partnership with SingHealth amplifies our efforts to transform medicine and improve lives.

I would especially like to thank the members of the Duke-NUS Governing Board, senior leadership, faculty, staff, alumni and students for their unwavering dedication to furthering the School's vision and the AMC's common purpose to improve the lives of those whom we serve.

I am thrilled for the future of medicine as we continue to prove that, together, we make greater things happen for our patients, for Singapore and for the world.



**The unrelenting quest for new solutions to deliver better patient outcomes and improve their lives will be the driving force in our transformative journey, undergirded by cutting edge bench to bedside research and our steadfast dedication in nurturing committed healthcare professionals.**

**Prof Thomas Coffman**  
Dean, Duke-NUS Medical School



**Prof Ivy Ng**  
Group Chief Executive Officer, SingHealth

#### **Strength to Strength**

Over the past 16 years, SingHealth and Duke-NUS have forged a strong bond and established close collaborations to attain new heights in the advancement of Academic Medicine (AM). Our strategic partnership, founded on the shared vision that the convergence of innovative care, research and education is the means to improving patient lives, represents a significant development in the 200 year history of Medicine in Singapore.

Today, the SingHealth Duke-NUS Academic Medical Centre (AMC) is a thriving eco-system, with structures and shared processes in place to harness the collective strengths of SingHealth's clinical expertise and Duke-NUS' medical education and research capabilities.

The impact of our combined strengths was evident during the COVID-19 pandemic, where the AMC spearheaded innovative initiatives such as telehealth services and digitisation strategies, to deliver quality care despite challenges posed by the global pandemic. Examples of this strong emphasis of an innovative mindset and putting patients at the nexus of our efforts are manifold.

Dr Goh Su-Yen, Head of SingHealth Duke-NUS Diabetes Centre and Clinical Director, Future Health Systems, Singapore General Hospital promoted the quick implementation and escalated use of telehealth services, including the establishment of suitable videoconferencing platforms, hardware and software—amidst the COVID-19 pandemic to ensure seamless continuity of care, despite the challenges posed by the pandemic. Acknowledging that telemedicine will not completely replace in-person care, she endorses its convenience and positive impact on patients' daily lives, as consultations are conducted in the comfort of their home environment, and the company of their loved ones.

Two key drivers of our transformational journey, Ms Lee Chen Ee, Group Director, Innovation and Transformation, SingHealth, and Associate Professor Christopher Laing, Vice-Dean for Innovation and Entrepreneurship, Duke-NUS Medical School, are co-leads of the newly established Academic Medicine

Innovation Institute (AMII), a platform that fosters an environment encouraging experimentation with the ultimate aim of finding novel ways to deliver care. As innovators of various specialties and professional groups come together to brainstorm exciting ideas, we are better able to address tomorrow's healthcare challenges, today.

The innovative spirit that the AMII seeks to inculcate is exemplified in Ms Stacey Chong, Nurse Clinician, Accident and Emergency (A&E), Changi General Hospital. Having been a nurse for over 15 years, she has observed the evolution of nursing education over the years. An advocate of continual improvement, she led the development of a new learning and assessment app allowing A&E nurses to gain confidence by learning to triage in a feel-safe environment.

New knowledge has led to a better understanding of diseases with significant improvements in clinical health care outcomes. One example is precision medicine, where information stored in an individual's genes can be used to understand his or her risk of developing certain diseases. This field has grown exponentially and Dr Saumya Jamuar, Head of SingHealth Duke-NUS Genomic Medicine Centre, anticipates that the Centre will play an important national role as Singapore builds its capabilities in precision medicine.

Looking ahead, this unrelenting quest for new solutions to deliver better patient outcomes and improve their lives will be the driving force in our transformative journey, undergirded by cutting edge bench to bedside research and our steadfast dedication in nurturing committed healthcare professionals. The SingHealth Duke-NUS AMC family is poised to achieve many more significant milestones in the next 200 years. We are deeply grateful to our staff, who inspire us each day with their strong sense of duty and purpose, to our partners, donors and supporters who enable us to make our dreams and vision to Define Tomorrow's Medicine a reality, and to our patients and their loved ones, for entrusting their care in us.





# JOURNEYING THROUGH 200 YEARS OF MEDICINE

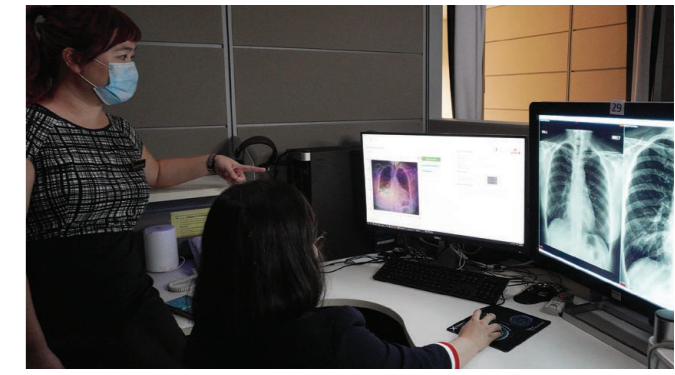
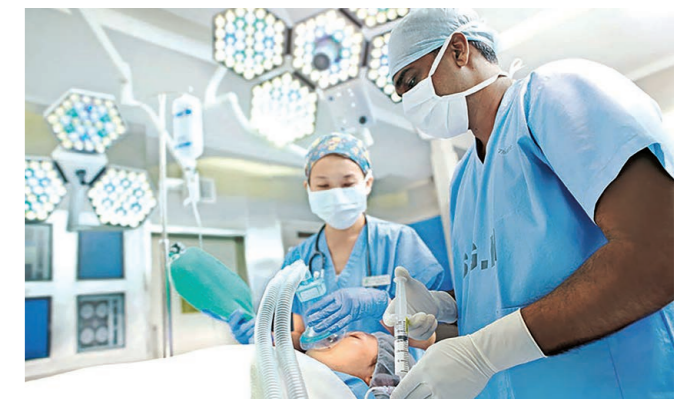
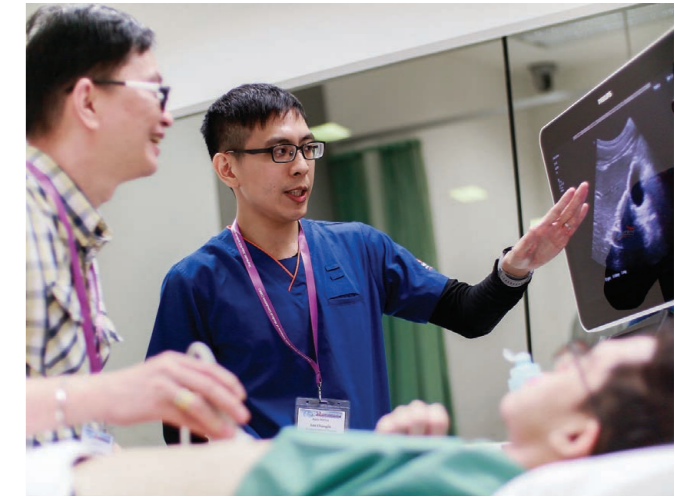
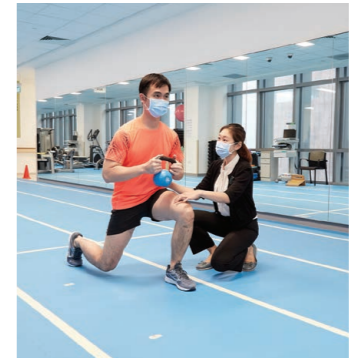
**SCAN THE QR CODE**  
to learn more about the evolution of healthcare in Singapore over the last two centuries!



In 2021, SingHealth celebrates 200 years of Medicine in Singapore, with our flagship hospital – Singapore General Hospital – marking its Bicentennial. Over the years, we have witnessed the birth of momentous milestones, as we continue to evolve, grow and transform to offer the best quality of care to our patients. We have come a long way with the nation, caring for generations of Singaporeans in good and tough times, in a journey enriched by the breadth and depth of expertise of each healthcare institution within the SingHealth Duke-NUS Academic Medical Centre (AMC) family.

From humble beginnings in a wooden shed to the formation of hospitals and specialty centres, our healthcare system has grown through time and tide to best serve the needs of our nation with the advanced care and services we now offer. This strong foundation, rooted in a legacy of excellence, is the result of visionary and dedicated healthcare professionals with a strong moral compass and a dedicated commitment to our values and sense of purpose.

Today, with a network of acute hospitals, national specialty centres, community hospitals and polyclinics offering over 40 clinical specialties, the SingHealth Duke-NUS AMC is well placed to drive the transformation of healthcare and provide affordable, accessible and quality healthcare to all Singaporeans.





# FEATURES

## OUR STAFF, OUR PRIDE

As we celebrate 200 years of Medicine in Singapore, hear from our staff who share about the transformative journeys in their respective professions.

From top row (left to right)

**Clinical Assoc Prof Marianne Ong**  
**Senior Consultant and Director (Education)**  
National Dental Centre Singapore (NDCS)  
**Academic Vice Chair (Education)**  
SingHealth Duke-NUS Oral Health  
Academic Clinical Programme

**Ms Felicia Seah**  
**Senior Principal Physiotherapist**  
Sengkang General Hospital (SKH)

**Ms Stacey Chong**  
**Nurse Clinician**  
Accident and Emergency  
Changi General Hospital (CGH)

**Dr Saumya Jamuar**  
**Senior Consultant Genetics Service**  
KK Women's and Children's Hospital (KKH)  
**Head**  
SingHealth Duke-NUS Genomic  
Medicine Centre

**Dr Michael Wong**  
**Group Director**  
SingHealth Regional Health System (RHS)  
**Senior Consultant, Family Physician**  
SingHealth Polyclinics (SHP)

**Ms Lee Chen Ee**  
**Group Director**  
Innovation and Transformation  
SingHealth

**Dr Goh Su-Yen**  
**Clinical Director**  
**Future Health Systems**  
Singapore General Hospital (SGH)  
**Head**  
SingHealth Duke-NUS Diabetes Centre

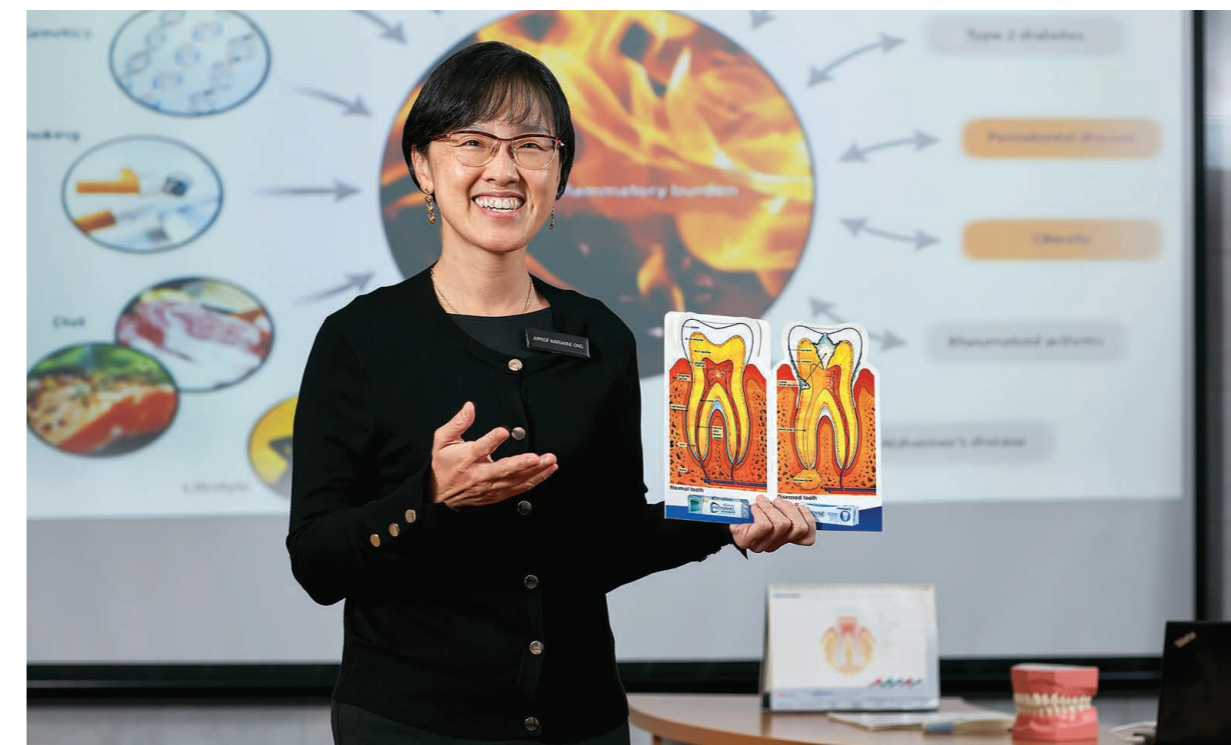
**Assoc Prof Christopher Laing**  
**Vice-Dean**  
Innovation and Entrepreneurship  
Duke-NUS Medical School



## OUR STAFF

Moving forward,  
the future of dental  
education will be an  
exciting one with the  
continuous and rapid  
advancements in  
technology and  
big data.

**Clinical Assoc Prof Marianne Ong**  
Senior Consultant and Director (Education)  
National Dental Centre Singapore (NDCS)  
Academic Vice Chair (Education)  
SingHealth Duke-NUS Oral Health  
Academic Clinical Programme



Since I started out as a dental officer in 1991 in the Government Dental Clinic on Singapore General Hospital grounds, there have been significant changes in the delivery of dental education. Back then, training primarily followed an on-the-job apprenticeship model, where the focus was on clearing daily workload. Dental officers and Residents were viewed as extra pairs of hands primarily to address clinical service demands, with teaching done on the side line.

Now, more is done to prepare newly qualified dental officers coming to NDCS for their Dental Officer Posting Exercise. An in-house NDCS Dental Officers Advanced Practice Programme (NDCS DO APP), started in 2015, provides dental officers with training opportunities, comprising didactics and clinical exposure, in the various specialty departments and units in NDCS.

This helps ease their transition from dental school to the work environment, where they move from managing relatively straightforward patient cases in school and the primary care setting, to encountering a wider variety of patients with more

complex dental conditions in a multi-disciplinary specialist institution. The NDCS DO APP ensures that every dental officer will have a well-rounded foundation on clinical skills and patient-centred care, in addition to instilling values of professional ethics and lifelong learning. In recent years, we have also adopted technology-enhanced learning such as the use of online teaching platforms and digital dentistry to enrich our learners' educational journey.

A major advancement in the field of dentistry is the recognition of oral health therapists as allied healthcare professionals in the oral healthcare team. With the enactment of the Dental Registration Act in 2008, oral health therapists are required to register with the Singapore Dental Council and they work together with licensed dentists. Since the first cohort of oral health therapists graduated in 2007, they have played an important role in delivering patient care and supporting dental specialists, especially periodontists.

NDCS has also worked hard on improving patient education and raising awareness of how oral health conditions relates to overall health and well-being. Since 2020, we have been conducting an Oral Health module for final-year Duke-NUS medical students as part of interprofessional education and collaborative practice.

Moving forward, the future of dental education will be an exciting one with the continuous and rapid advancements in technology and big data. Following the COVID-19 pandemic, we have moved towards adopting blended learning and moving face-to-face teaching online whenever possible. We are also exploring the use of virtual reality and augmented reality to complement clinical practice but these cannot completely replace the actual experience with real patients. Essential clinical skills workshops will still be run under prevailing national and cluster guidelines following safe management measures and infection control protocols.





## OUR STAFF

**We anticipate that in the coming years, the SingHealth Duke-NUS Genomic Medicine Centre will play an important role at a national level as Singapore builds up her capabilities in Precision Medicine.**

**Dr Saumya Jamuar**

Senior Consultant, Genetics Service

KK Women's and Children's Hospital (KKH)

Head

SingHealth Duke-NUS Genomic Medicine Centre



Since the first human genome was sequenced two decades ago, our understanding of the relation between our genome and our health has improved at an exponential pace. This, in turn, has led to a better understanding of diseases with significant improvements in healthcare outcomes.

The traditional approach to medicine is a reactive process, where we prescribe treatments based on symptoms presented. However, over the last decade, we have moved towards a more individualised approach, called Precision Medicine, where we use information stored in an individual's genes to understand his or her risk of developing certain diseases and personalise medicine tailored to the individual.

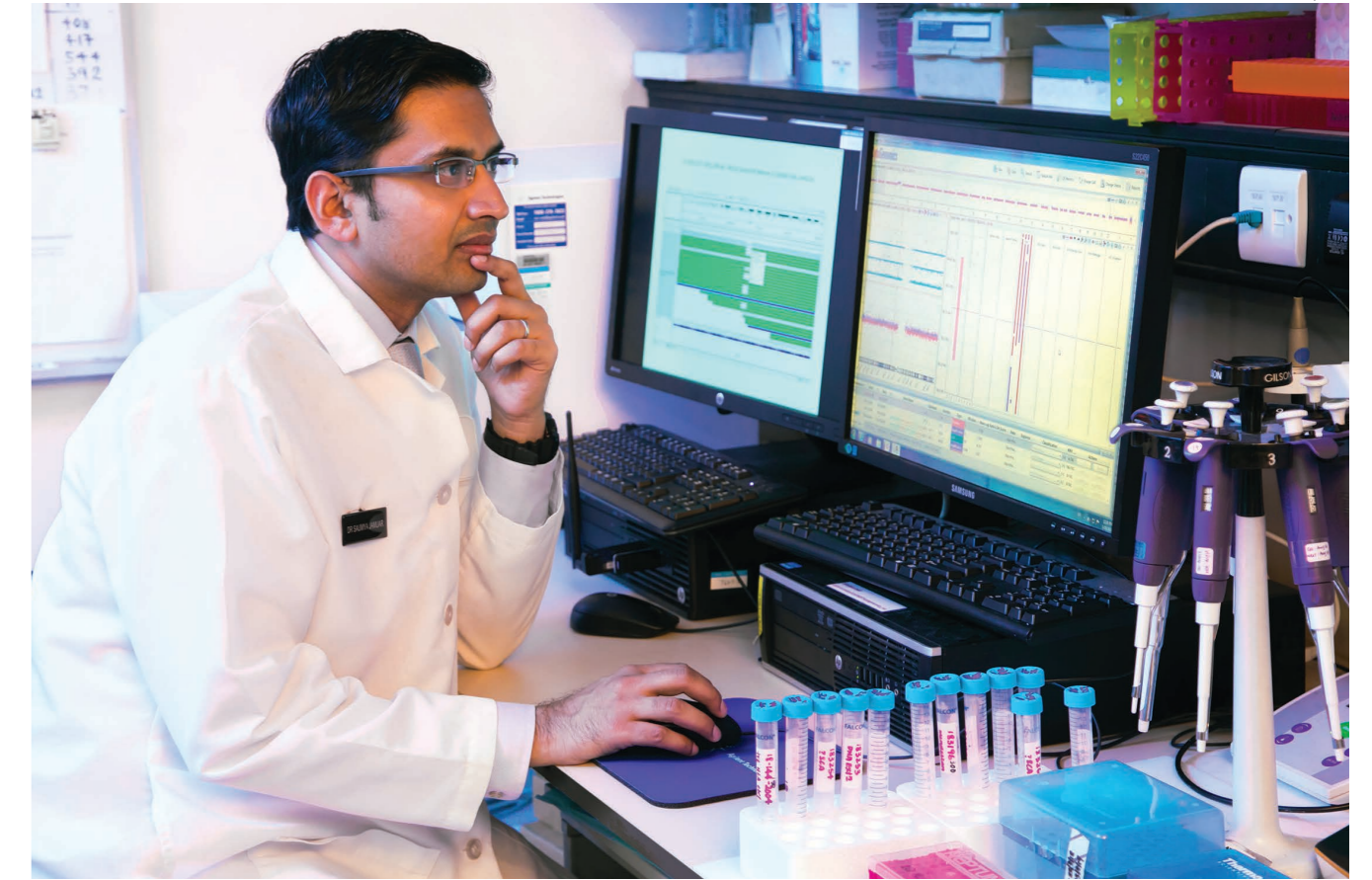
As a clinical geneticist based at KKH's Genetics Service, I see paediatric patients with rare genetic disorders. Increasingly, our service has observed a trend of adult patients being referred for evaluation of genetic disorders.

While there is a robust structure at KKH to assess and manage paediatric patients with genetic disorders, there were no similar structures in other hospitals seeing adult patients. That spurred the launch of the SingHealth Duke-NUS Genomic Medicine Centre (SDGMC) in October 2019, which provides highly-specialised clinical genomics services to institutions across SingHealth to manage adult patients with genetic disorders or suspected genetically-linked conditions. It also aims to facilitate genomics research and education.

Our first major milestone was establishing clinics across multiple institutions, including Singapore General Hospital, Sengkang General Hospital, National Heart Centre Singapore, National Neuroscience Institute and Singapore National Eye Centre. We also introduced a genetics education programme for healthcare professionals across SingHealth and have trained more than 150 individuals in clinical genetics since 2018.



Photo credit: KK Women's and Children's Hospital



Another key development is our role in the National Precision Medicine programme, where I, together with Dr Joanne Ngeow, Head, Cancer Genetics Service at National Cancer Centre Singapore, and Dr Lim Weng Khong, who leads the bioinformatics team at the SingHealth Duke-NUS Institute of Precision Medicine (PRISM), chair the SG10K Med Workgroup. Using the genomic data from 10,000 healthy Singaporeans, we aim to identify genetic diseases present in our population, rather than follow guidelines based on Western population data.

We anticipate that in the coming years, the SDGMC will play an important role at a national level as Singapore builds up her capabilities in Precision Medicine.



## OUR STAFF

The practice of physiotherapy has evolved over the years with the introduction of new methods of care, allowing continual growth in the profession.

**Ms Felicia Seah**  
Senior Principal Physiotherapist  
Sengkang General Hospital (SKH)



Having been on the job for 15 years, I have witnessed how physiotherapy has grown as a healthcare profession in Singapore. To practise in Singapore, physiotherapists must now be registered with the Allied Health Professions Council, a professional board under the Ministry of Health that governs and regulates the professional conduct and ethics of registered allied health professionals in accordance with the Allied Health Professions Act 2011. This is a noteworthy milestone as it shows that physiotherapists have important roles to play in healthcare.

When I first started in this field, physiotherapists would take instructions from doctors on what to do when they referred their patients to us. Today, however, physiotherapists work alongside doctors to discuss the management plans for patients with evidence-based best practices.

Patient management has also moved from a modality-based management approach to an exercise-focused approach. For



**WANT TO KNOW MORE ABOUT HOW PHYSIOTHERAPY HAS EVOLVED?**

Watch this video of our longest serving physiotherapist - Mr Albert Lee from Singapore General Hospital

instance, cervical traction and back traction used to be popular treatments for patients with neck and back pain. However, studies show that these modalities are not as effective. We now encourage treatment that involves more active patient participation, such as strengthening and stretching exercises and avoiding being in certain postures for prolonged periods.

At SKH, we have incorporated evidence-based practices into our research programmes. An example of this is a comprehensive screening system called the Individual Physical Proficiency Test for Seniors (IPPT-S). Developed by a team from SKH and Singapore General Hospital, the screening system identifies frailty in at-risk seniors living in the community and guides follow-up care plans for them.

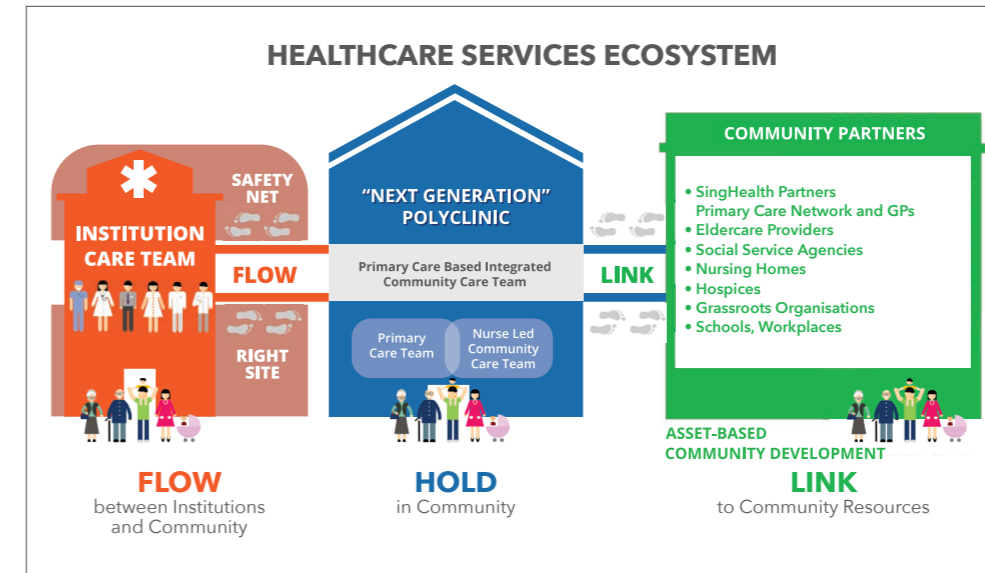
Technology is another new area that we have been leveraging to treat our patients more effectively. A robotic walker training system, called the G-EO System, helps patients with post-stroke conditions and spinal-related injuries regain the ability to walk, and a high-tech virtual reality-enhanced treadmill called Zebris allows patients to play an active role in their rehabilitation process. We are also looking into the use of applications to customise rehabilitation exercises and monitor patients' progress remotely, which will be helpful as face-to-face consultations may be constrained by restrictions imposed by the pandemic. The practice of physiotherapy has evolved over the years with the introduction of these new methods of care, allowing continual growth in the profession.



## OUR STAFF

The programmes put in place by RHS and its community partners will play a large role in narrowing the gap between lifespan and healthspan of Singaporeans.

**Dr Michael Wong**  
Group Director  
SingHealth Regional Health System (RHS)  
Senior Consultant, Family Physician  
SingHealth Polyclinics



When I started practising family medicine, I realised that beyond the patients sitting in front of me, their families, communities and even workplaces have an impact on their health. Case in point: A taxi driver who does the day shift and another who takes the night shift can have very different health issues, especially in the context of a person with diabetes. Whether the person lives alone or with a family can also impact his or her health.

My work in population health in the RHS is an extension of what I do as a family physician; it looks at individuals living in the community and their families holistically, along with the factors that impact their health.

The RHS looks at how we can move care outside the four walls of medical institutions and impact health upstream. It recognises that the population can be empowered to keep well, get well and live well in their communities and homes.

To achieve this, SingHealth and our network of partners across health and social care sectors collaborate to identify population health needs, promote behaviour changes and develop sustainable programmes using the "Flow-Hold-Link" care model. The idea is to provide a seamless continuum of care - "flowing" patients from the hospital setting to "holding" them in integrated community care teams, then "linking" them with community partners to empower them to take charge of their health.

An example of such a care model is the Primary Care Based Integrated Care Team (PACE-IT). Bringing together SingHealth

Polyclinics (SHP), the Agency for Integrated Care and the Ministry of Health's Office for Healthcare Transformation, a unique care process was developed to improve the outcomes of elderly patients living with diabetes and complex care needs. A multidisciplinary community care team develops a personalised care plan for each patient, addressing their health and psychosocial needs. The team, which comprises doctors from SHP, SingHealth Community Nurses, and social workers from social service agencies, use the PACE-IT mobile app to share care plans and keep each other updated on patients' progress real-time.

Another example is social prescribing at SingHealth Community Hospitals and SHP. Recognising that social determinants of health (SDH) play a key role in our patients' well-being, our well-being coordinators screen them for risk factors of poor SDH-related outcomes, engage them in activities that promote well-being and link them to community organisations to sustain the engagement.

Our services are organised around 12 Communities of Care in the East. These are geographically defined areas with dedicated teams providing holistic care across the life journey of residents from young to elderly, prevention to palliation, health to social. This enables relationship-building and trust between the care team, community partners and residents. It also allows for customisation of services based on the needs of the population, taking into account their epidemiology, demography, socio-



Watch the video of **Prof Wong Kok Seng, Deputy CEO (Clinical Services), SingHealth Community Hospitals (SCH)**

who shares what inspired him from medical school, SARS and the role that technology plays in the practice of medicine today.



economic status and existing service providers.

While the lifespan of Singaporeans is among the highest in the world, healthspan has not caught up. Many people are spending the last 10 years of their lives in poor health, which is taxing on individuals, their families, the community and health system. The programmes put in place by RHS and its community partners will play a large role in narrowing the gap between lifespan and healthspan of Singaporeans.





## OUR STAFF

**We are actively working to bridge gaps, addressing the digital divide which puts those who currently lack access at a disadvantage. Telehealth should ultimately pave the way for more equitable care and we will strive to achieve that.**

**Dr Goh Su-Yen**  
 Clinical Director, Future Health Systems  
 Singapore General Hospital (SGH)  
 Head  
 SingHealth Duke-NUS Diabetes Centre



In today's climate where safe distancing is one of the key measures to fight the COVID-19 pandemic, there is no better time to escalate the use of telehealth in SingHealth.

In 2020, we were able to equip clinical services across SingHealth to convert in-person visits to teleconsultations without compromising delivery of care. It took a concerted effort to provide a suitable videoconferencing platform, hardware and software, as well as implementation toolkits.

Doing so allowed us to provide continuity of care that patients are familiar with, without the need to defer appointments. At the same time, we are able to reduce the risk of overcrowding and unnecessary in-person interactions on hospital campuses. Although telemedicine will not and should not completely replace in-person care, it makes it possible for us to deliver a similar level of medical care to our patients. This is similar to "house calls" that physicians used to make. Medicine does not exist only in a clinic or hospital setting. Telemedicine allows us to have insights into our patients' daily lives when we conduct consults in their environments, rather than in ours.

As one of the Institution Project Leads involved in driving telehealth adoption in SGH, our focus was to convert "walk-in" care to "log-in" care. At SGH, we piloted video consultations with Endocrinology, going from fewer than five video consultations a week in March 2020 to 60 a week in May 2021, benefiting more than 1,500 patients.

There is, however, a broader vision for telemedicine across SingHealth, going beyond just teleconsultations to remote monitoring, telerehabilitation and learning efficient ways to enhance interactions between patient and provider, as well as among healthcare staff across inpatient, outpatient and community settings. In public healthcare, the number of clinical services and programmes offering teleconsultations has increased tenfold from 2019 with 45 percent residing in SingHealth and benefitting almost 20,000 patients.

The response from patients has been consistently positive. An average of 92 to 97 percent of users surveyed post-teleconsultation said that they were satisfied with the experience, would recommend it to others and would engage in more teleconsultations in the future. One of my patients, who is hard of hearing, was initially doubtful about teleconsultations, but later connected his hearing aid directly to the audio output for his video consultation and declared it a great success!

While the pandemic expedited adoption of this parallel mode of care, there is still much to be accomplished. We are actively working to bridge gaps, addressing the digital divide which puts those who currently lack access at a disadvantage. Telehealth should ultimately pave the way for more equitable care and we will strive to achieve that.





## OUR STAFF

**Learning no longer happens only in the classroom, as CGH nursing educators leverage digital advancements in smart applications, data analytics and predictive modelling to innovate clinical training and education for enhanced patient care.**

**Ms Stacey Chong**  
Nurse Clinician, Accident and Emergency (A&E)  
Changi General Hospital (CGH)



Having been in nursing for close to two decades, I have observed a transformation in nursing education over the years. With CGH's strong culture of innovation, teaching and learning have become more interactive and creative, taking into consideration the fluidity of real-life situations. Learning no longer happens only in the classroom, as CGH nursing educators leverage digital advancements in smart applications, data analytics and predictive modelling to innovate clinical training and education for enhanced patient care.

With doctors from the Accident & Emergency Department (A&E) at CGH, my team and I co-developed a learning and assessment mobile application called Improving Triage in Emergency Departments (ITED), equipping A&E nurses with greater knowledge and confidence in processes and best practices on triage.

A&E triage plays a vital role in determining the priority of care, so that those who need urgent life-saving treatments are attended to first. Not all patients may display obvious clinical symptoms, and less communicative patients may find it a challenge to pinpoint their area of pain. Nurses' clinical judgement, assessment and critical thinking skills all come into play during triage in a highly dynamic environment.

Through the use of interactive case scenarios, the ITED app simulates true-to-life situations and allows nurses to learn triage



with instantaneous intuitive feedback. Nurses can access the app on their smart devices anywhere, anytime, making learning-on-the-go a reality.

The project won the InnovPlus Flame Award from the Institute of Adult Learning, and we are keen to share this learning tool with more healthcare teams.







**Ms Lee and Assoc Prof Laing co-chair the Academic Medicine Innovation Institute (AMII), a newly-established platform in the SingHealth-Duke-NUS Academic Medical Centre (AMC).**



Innovation is not new to our AMC – over the years, we have seen many wonderful ideas and successful innovations emerge. Many of these have made a difference to the way we work and improved our delivery of patient care.

Supported by the SingHealth Office for Innovation and Duke-NUS Medical School's Office of Innovation and Entrepreneurship, the AMII is a newly established platform that seeks to build on the existing foundation by bringing together the various innovation offices and innovation-related programmes in the Academic Medical Centre (AMC). Our goal is to create conditions to better support healthcare innovation, foster a culture of innovation and experimentation across the AMC and jointly chart broad strategic directions for healthcare innovation. In doing so, we hope to advance healthcare and ultimately deliver improved patient care.

**I believe that this conviction and passion that we see in our innovators will be a significant force that propels our innovation efforts forward.**

**Ms Lee Chen Ee**  
Group Director, Innovation and Transformation  
SingHealth

The AMII also plays an important role in advising innovators and funders on the potential impact of healthcare innovations and the extent to which they may improve health outcomes. To do this, SingHealth and Duke-NUS have jointly established an Impact Assessment Unit.

It has been very encouraging to hear from innovators across the AMC, who shared that the exchanges and sharing of ideas are useful, and that they have found new ways to collaborate. It is also very exciting to witness burgeoning interest in innovation amongst our colleagues from different professions.

In the past two years, we have seen a threefold increase in the number of applicants for innovation seed funding. Different parties have come together to brainstorm and implement exciting ideas to enhance patient care.

For example, I recently had the privilege of meeting a group of nurses from Sengkang General Hospital. They had such conviction in the importance of their innovation that they put in their own personal resources, time and effort in developing their first prototype even before they had any external help. The team was driven by a deep compassion and empathy for our patients to create a solution to give our patients a more reassuring experience in the interventional radiology room. What we are doing at AMII is to support innovators like them – so they can solve the problems they see on the ground, and deliver better patient care. I believe that this conviction and passion that we see in our innovators will be a significant force that propels our innovation efforts forward.

**Innovation in our AMC ecosystem needs to be owned by everybody – at the leadership level as well as on the ground. It is about empowering us all to think of ourselves as innovators.**

**Assoc Prof Christopher Laing**  
Vice-Dean, Innovation and Entrepreneurship  
Duke-NUS Medical School



Most people would associate a healthcare system with delivering medical services. One of the things that may not come to mind immediately is: Where does the “best practice” of healthcare come from? The difference between an AMC and a hospital system is that the former not only delivers the best care, it is also at the leading edge of discovering, developing and refining care; it sets best practice, and does not just deliver it.

The SingHealth Duke-NUS AMC aspires not only to serve patients by delivering quality service, but also by being thought leaders in the field, creating tomorrow's cures and preventions. Working closely with our clinical counterparts at SingHealth, Duke-NUS brings rigorous scientific research and education to the table. The goal is to create a seamless continuum from science and discovery to real-world patient care, and innovation plays an important role in this process.

To facilitate innovation, AMII is laying out a strategy and framework for convening healthcare innovators across the AMC.

In building a culture of innovation, “top down” or “bottom up” only approaches will not work. Innovation in our AMC ecosystem needs to be owned by everybody – at the leadership level as



well as on the ground. It is about empowering us all to think of ourselves as innovators and creating a healthy approach to managing risk.

Collaboration is also key as innovation is not something one does in a bubble. Successful innovation requires multiple fingerprints from people who bring diverse ideas to the table. Additionally, it is equally important to consider external partnerships. I am a huge champion for bringing industry perspectives into the equation. This is because the quicker we can test and validate new ideas in the real world and marketplace, the more likely we are to find ideas that can be adopted and scaled.

If staff across the AMC are empowered to think of themselves as innovators—whether they are administrators, educators, physicians, scientists or nurses—that to me, would be a sign of success for AMII.







# HIGHLIGHTS

1 | ENHANCING CARE

2 | KEEPING OUR PATIENTS AND HEALTHCARE WORKERS SAFE

3 | EDUCATION

4 | SINGHEALTH DUKE-NUS GLOBAL HEALTH INSTITUTE

5 | RESEARCH

6 | GIVING



## ENHANCING CARE

**PATIENTS. AT THE HEART OF ALL WE DO.**® We remain steadfast in our commitment to provide the highest quality care to our patients, while taking strides to continually improve patient experience and care accessibility.



### Collaborative effort in dental care

To meet rising demand while remaining accessible, the National Dental Centre Singapore (NDCS) launched the Care Partnership Programme (CaPP) with community dentists to support the co-management and right-siting of dental cases. Patients with stable and low-risk dental conditions will have their care transited to General Dental Practitioners for follow-up care.

### Telehealth service to track blood pressure

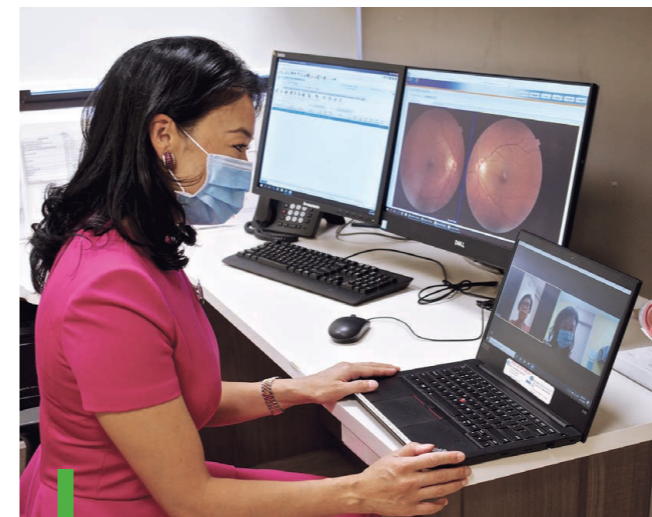
With the aid of a Bluetooth-enabled device, patients with high blood pressure can now monitor their blood pressure at home via SingHealth Polyclinics' (SHP) telehealth programme. The device transmits readings to a care team via a mobile application, reducing the need for frequent polyclinic visits. The app also alerts patients whose blood pressure levels are not well-controlled, shares tips on blood pressure control and reminds patients to take their readings.

### Enhancing advance care planning, geriatric care and end-of-life care



Project EAGLEcare, an initiative by Sengkang General Hospital's (SKH) emergency department (ED), aims to train and equip nursing home partners in the northeast region of Singapore with resources and support to provide holistic care to residents, including managing acute medical crises and providing geriatric and palliative care. These efforts will help reduce attendances and admissions at the hospital's ED.

## NEW FACILITIES AND SERVICES



### Telemedicine for glaucoma patients

The Singapore National Eye Centre (SNEC) introduced telemedicine and video consultations in 2020 for its growing pool of patients with glaucoma whose conditions are stable. This allowed patients to continue having their conditions monitored during the COVID-19 pandemic, where face-to-face consultations were confined to urgent cases.

### New clinic for patients with inherited cardiac conditions

Run by doctors of the Electrophysiology and Pacing subspecialty, the Inherited Cardiac Conditions (ICC) clinic at the National Heart Centre Singapore (NHCS) provides patients with hereditary cardiac conditions with resources and tools to manage their conditions as well as counselling and screening for family members.

### New integrated hospital expected to open in Bedok

Slated to open in 2030, the new hospital will be located next to Bedok North MRT station, integrating the functions of a general hospital and community hospital. The former will provide emergency, inpatient and specialist outpatient services and the latter will offer services such as rehabilitation and sub-acute care to support patients discharged from the general hospital.



### New light device illuminating surgical procedures

Unlike conventional surgical lights and head lamps that cast shadows, Klaro is a new tool designed with a flexible light cord and large clip that can be fastened to various surfaces and directly illuminate cavities in open surgery. Designed by Vivo Surgical and Panasonic, in collaboration with the National Cancer Centre Singapore (NCCS) and SingHealth's Medical Technology Office, Klaro is equipped with a row of small LED lights, which are cooler than regular LEDs, to avoid damaging body tissue. Disposed after each use, Klaro is a sterile alternative to traditional lamps that require thorough cleaning after every use.

### Safer, faster surgery for a curved spine



A new radiation-free system at KK Women's and Children's Hospital (KKH) ensures more effective treatment for patients with severe scoliosis. The 7D Machine-vision Image Guided Surgery system uses visible light in place of radiation. With the system's patented surgical light placed above the patient, built-in camera technology and light sensors are linked to computing resources in the operating theatre to provide real-time 3D images. This helps paediatric spinal surgeons perform intricate procedures with greater accuracy and certainty.

*Photo credit: The Straits Times © Singapore Press Holdings Limited.*



### New lab helps customise treatment for chronic diseases

The Shimadzu-Changi General Hospital (CGH) Clinomics Centre is equipped with cutting-edge technology to offer personalised treatment for patients with chronic diseases such as hypertension. Using liquid chromatography and tandem mass spectrometry, clinical samples as tiny as one to ten microlitres of blood can be accurately analysed to yield results that enable doctors to offer more individualised treatment.

## CARE IN THE COMMUNITY





# INTEGRATED AND MULTI-DISCIPLINARY CARE



## New SingHealth Duke-NUS Disease Centres (SDDCs)

The SingHealth Duke-NUS Disease Centres (SDDCs) bring together specialist expertise from across the cluster to offer our patients integrated and multi-disciplinary care.

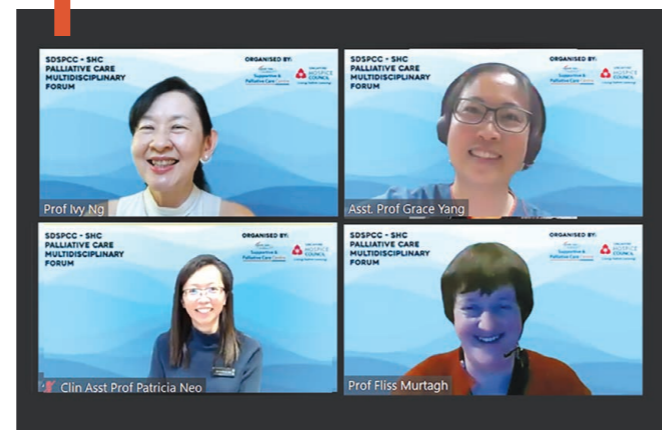
## SingHealth Duke-NUS Memory and Cognitive Disorder Centre

Different specialties across SingHealth institutions – Singapore General Hospital (SGH), CGH, SKH, the National Neuroscience Institute (NNI), SingHealth Community Hospitals (SCH) and SingHealth Polyclinics (SHP) – come together to create greater collaboration to improve dementia research, education and support for patients and caregivers at all stages of the disease.

## SingHealth Duke-NUS Vascular Diseases Centre

The SingHealth Duke-NUS Vascular Diseases Centre will leverage clinical expertise from specialists across SingHealth to meet the growing demand and complexity of care in vascular diseases. In partnership with various stakeholders and experts, the Centre aims to provide integrated, holistic clinical services and cutting-edge, value-driven care to improve patient outcomes.

## SingHealth Duke-NUS Supportive and Palliative Care Centre



Established in April this year, the SingHealth Duke-NUS Supportive and Palliative Care Centre is dedicated to improving the quality of supportive and palliative care by fostering collaboration with community partners to achieve a more specialised, seamless continuum of care, both inside and outside the hospital. The Centre will also promote health services, advance cutting-edge research and introduce educational programmes for medical professionals and the public.

## SingHealth Duke-NUS Cell Therapy Centre

The SingHealth Duke-NUS Cell Therapy Centre launched last year will focus on bolstering current translational research in cell therapy and explore cellular-based therapies in patients. It will also play a pivotal role in planning both clinical and infrastructural resources to facilitate the implementation of clinical trials and services by various specialties across the cluster.

# PREVENTION AND EMPOWERMENT



Diabetes patients can take charge of their health with the MyVisit app

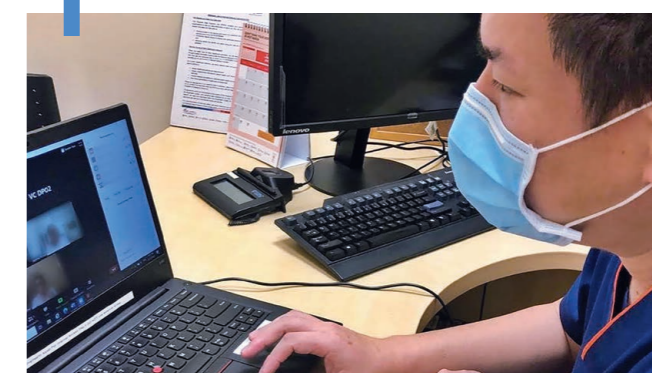
The MyVisit app, piloted at SGH's Diabetes & Metabolism Centre, keeps track of patients' appointments and what they need to do before visiting the doctor, making the outpatient journey a less stressful experience. It helps patients plan their visit and also includes features such as pre-appointment questionnaires, consultation summaries and previous test results, giving patients easy access to information that allows them to better monitor their condition.



Empowering elderly patients

SCH launched e-social prescribing at Sengkang Community Hospital, where coordinators guide elderly patients on the use of QR code scanners and other basic digital skills to help them with the digital contact-tracing measures in place across Singapore. Apart from group lessons, there are also one-to-one practice sessions to build patients' confidence in the use of such technology.

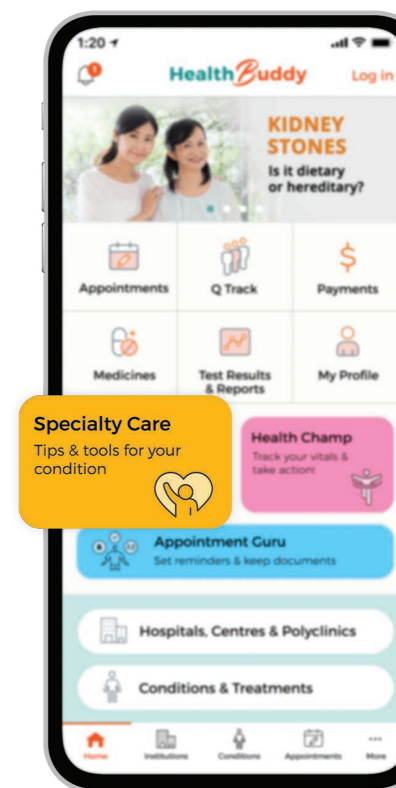
Support groups go online to help cancer patients



Amidst the COVID-19 pandemic, NCCS took to online platforms to conduct virtual talks, group activities that offer psycho-social support and even bra fittings for breast cancer mastectomy

patients, to help them manage their medical conditions. These sessions were co-led by a volunteer patient leader and a team of healthcare professionals, including medical social workers, nurses and physicians.

An app that offers personalised advice for stroke survivors



The newly launched Stroke Buddy mobile application – housed within SingHealth's Health Buddy app – is a one-stop portal providing personalised advice, exercise videos, medication reminders and other resources aimed at helping stroke survivors regain independence on their journey to recovery. Developed by the NNI-SGH Stroke Team, it was created during the COVID-19 "circuit breaker" in 2020 to connect with patients when non-urgent specialist appointments and rehabilitation services were temporarily suspended.





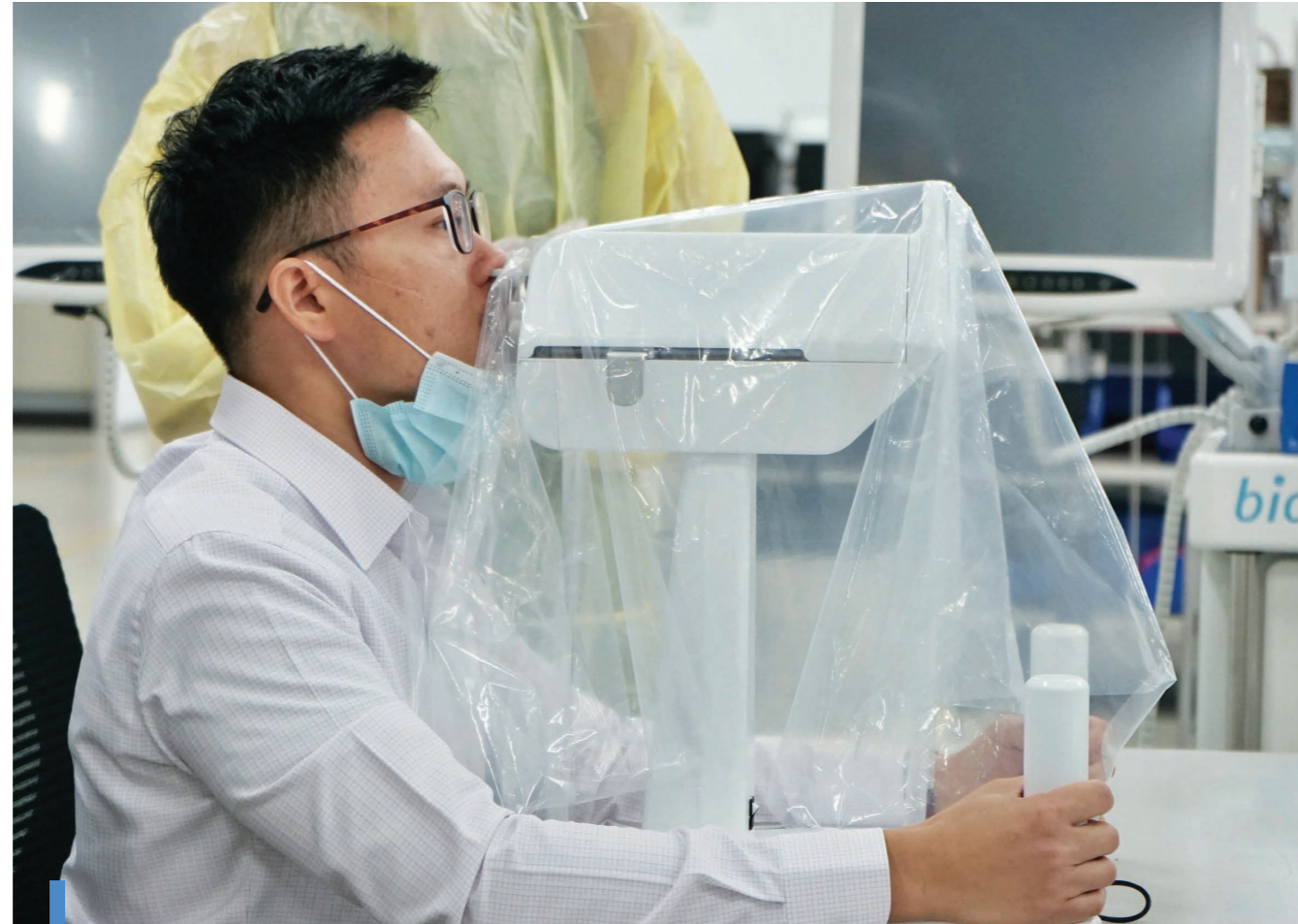
Care innovations amidst the COVID-19 pandemic

Within a few months after COVID-19 hit our shores, SingHealth institutions and teams rallied together to design, build and deploy smart solutions and novel technologies to address challenges faced by patients and healthcare staff during the pandemic.



SG SAFE

A collapsible U-shaped screen with a roof that acts as a shield between healthcare staff and patient during swab testing, SG SAFE was designed by staff at SGH to ensure faster, efficient testing without compromising the safety of healthcare workers. The doctor stands behind the clear, high-performance polycarbonate plastic panels and puts his or her hands inside the attached gloves to perform swabbing.



SwabBot

Clinicians from NCCS, SGH and Duke-NUS Medical School worked with Biobot Surgical Pte Ltd, a local medical robotics technology company, to develop the first-of-its-kind fully

patient-controlled nasal swab robot. The made-in-Singapore robot can automatically complete a nasal swab test in just 20 seconds, which is faster and more comfortable compared to a manual swab test. It also reduces swabbers' risk of exposure to the virus and standardises the swab technique, which leads to a consistent swab done on every patient.



Photo credit: The Straits Times © Singapore Press Holdings Limited.



Andago

A robotic walking aid, Andago, was deployed to help COVID-19 patients who experienced muscle loss as a result of being bed-bound for an extended period. Strapped to patients, the device bears part of their weight to allow patients to walk and strengthen their limbs. The harness will automatically tighten if the patient suddenly buckles to ensure their knees do not hit the ground. It can also match walking pace and stop if obstacles such as walls or barriers are detected ahead.

Photo credit: The Straits Times © Singapore Press Holdings Limited.



SG-Inspire

Clinician-innovators from KKH, SGH, CGH and SKH, in collaboration with the SingHealth Medical Technology Office and industry partners, created SG-Inspire, a ventilator prototype intended to supplement the supply of ventilators in Singapore. Since its creation, the team has received multiple enquiries locally and overseas for the production of SG-Inspire. It was awarded special recognition by the International Hospital Federation in December 2020.





# KEEPING PATIENTS AND HEALTHCARE WORKERS SAFE

The SingHealth Duke-NUS Institute for Patient Safety & Quality (IPSQ) integrates cluster-wide efforts in building a safe environment for our patients and healthcare workers.

## Ensuring the safety of patients and healthcare workers in the face of COVID-19



### CSDA framework

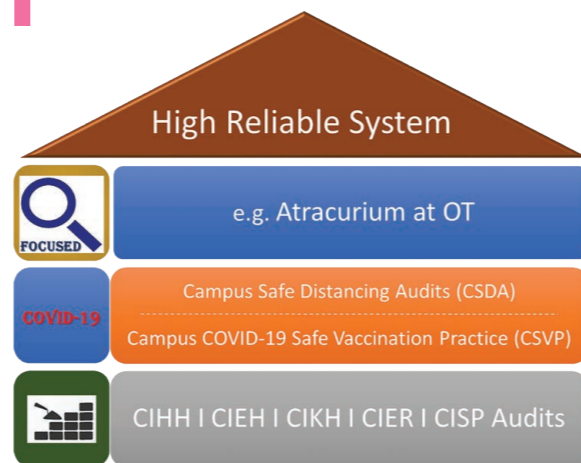
IPSQ adopted the COVID-19 Safe Distancing Audit (CSDA) Framework to reduce the spread of diseases, thereby keeping patients and the healthcare workforce safe. The checklist comprises environment distancing and environment hygiene, human factors, and safe activity distancing. More than 150 CSDAs across SingHealth were conducted, with an overall compliance rate of 95 percent as at February 2021.

### CSVP survey

In January 2021, the Campus COVID-19 Safe Vaccination Practice (CSVP) Survey was initiated to ensure COVID-19 vaccinations are

carried out safely, and to encourage the sharing of best practices across all 16 SingHealth Vaccination Sites.

## Elevating patient safety & quality (PSQ) assurance



▲ Diagram 1: CIAA Framework

IPSQ implemented a robust Cross-Institution Assessment and Audits (CIAA) framework, supported by more than 200 trained and appointed auditors. The sharing of best practices from CIAA is fundamental in driving continuous improvement and safety.

The CIAA Framework consists of Cross Institution Infection Control (CIIC) Audits like Hand Hygiene (CIHH), Environmental Hygiene (CIEH) and Kitchen Hygiene (CIKH) audits, to prevent the spread of infection. In January 2021, the CIHH Audit mobile application was launched, allowing automation of data extraction and easier report generation. This has led to improved audit experience, efficacy and cross sharing as well as learning of best practices.

## SingHealth Duke-NUS IPSQ webinar series

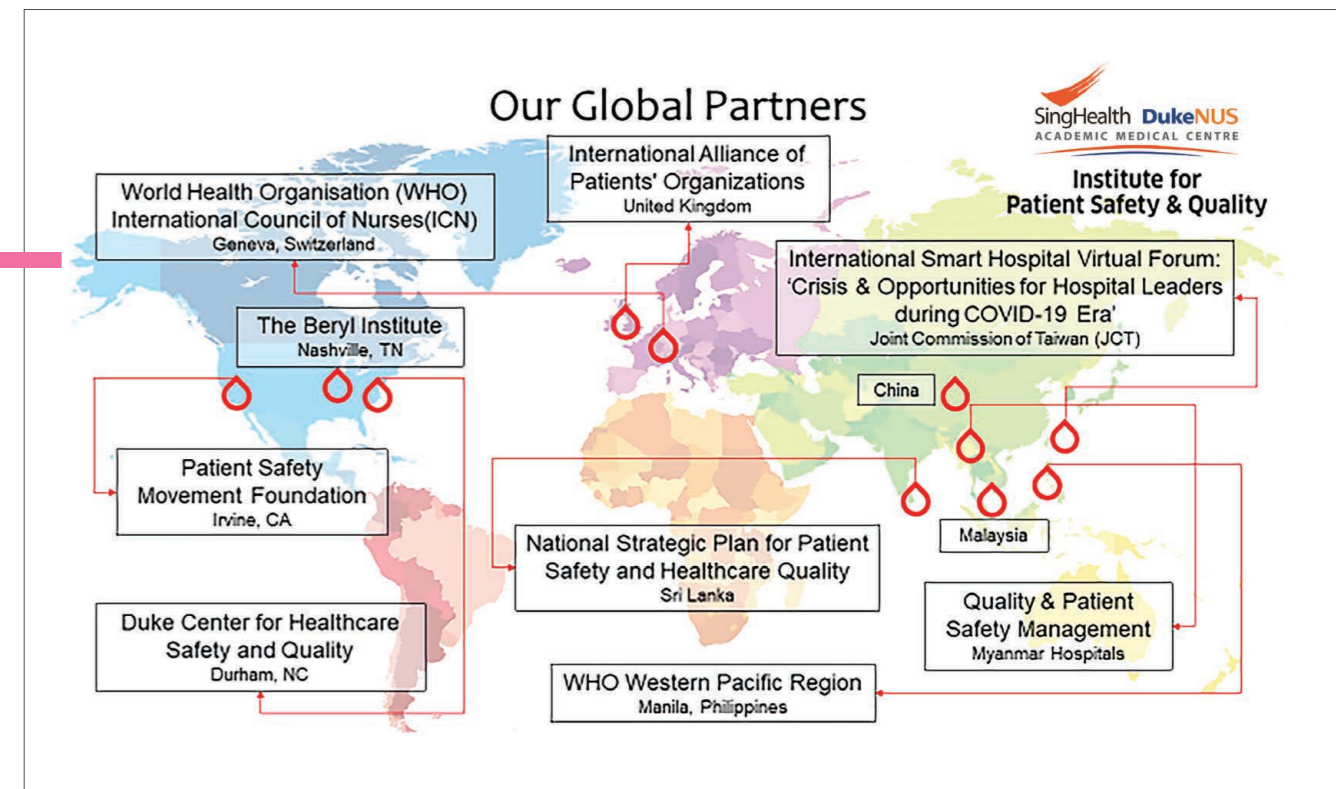
Themed 'The New Norm in Patient Safety and Quality - How We Adapt, Innovate and Thrive with COVID-19', the IPSQ webinar series began in June 2020. As of March 2021, 17 webinars have been organised with support from internal and external partners, such as the United States of America's Patient Safety Movement Foundation. The SingHealth Patient Advocacy Network (SPAN) also debuted the Partners-in-Care Webinar 2020, as part of the IPSQ webinar series, with monthly sessions held since 5 November 2020.

## Developing staff competencies in patient safety and quality



During the COVID-19 pandemic, various virtual interactive workshops were organised in patient safety and quality improvement, in place of physical training sessions. The September 2020 edition of Proceedings of Singapore Healthcare shared IPSQ's experience in redesigning healthcare quality improvement workshops through interactive video-conferencing during the height of the pandemic.

## Our Global Partners



## Fostering a joyful and resilient workforce

Optimal communications, participative leadership and teamwork are crucial in promoting a strong patient safety culture and nurturing mental wellness amongst healthcare workers. New programmes were introduced to better support staff mental well-being and self-care, which became more critical in the long battle against the pandemic.

## TeamCARE™

TeamCARE™ aims to provide foundation-level empathy training, where participants learn to build empathy, express care the right way and techniques to strengthen relationships and inculcate mindfulness practices.

## ARTpreciate

The Singapore Art Museum (SAM) and National Gallery Singapore (NGS) partnered IPSQ to curate art pieces, leading to the creation of The Care Collection. ARTpreciate is a weekly hour-long mindfulness session conducted using art from The Care Collection to foster self-reflection.

## TeamTHRIVE™

The TeamTHRIVE™ programme was piloted, introducing concepts on team resilience, ways to cope with burnout and its effects, and positive psychological tools to build a resilient team. With the success of its pilot programme, TeamTHRIVE™ will be rolled out to all SingHealth institutions and healthcare professionals on a monthly basis.

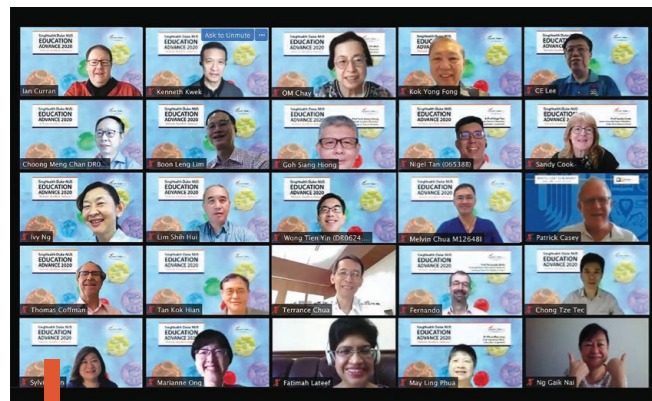




# EDUCATION

There were unprecedented opportunities for transformation and growth in education this year, encouraging innovation, adaptability and resilience as the training of healthcare professionals continued in a safe and efficient way.

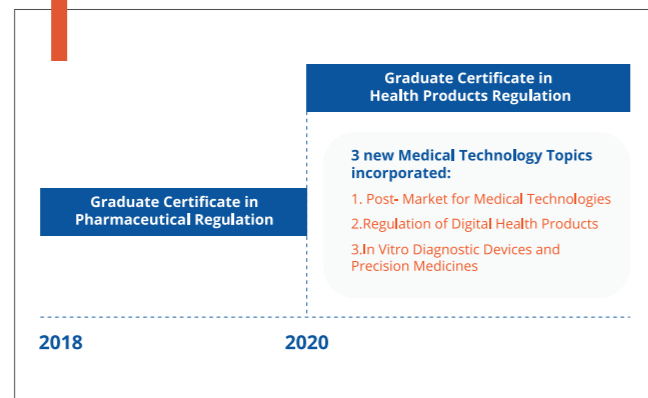
## ADVANCING EDUCATION



### Reaffirming the way forward in education

More than 150 education leaders and key stakeholders attended the 2nd SingHealth Duke-NUS Education Advance to discuss new initiatives and reaffirm key focus areas in the Joint Education Masterplan. The updated Joint Education Masterplan represents a continued commitment across the various healthcare professions to advance education for better patient care.

### Advancing education amidst adversity



To ensure the relevance of its programmes in the ever-evolving healthcare landscape, the Centre for Regulatory Excellence (CoRE) has expanded its Duke-NUS Graduate Certificate Programme from Pharmaceutical to Health Products Regulation to cover the critical and expanding area of medical devices and medical technology. The enhanced programme allows participants the flexibility to develop their professional competencies across the domains of both pharmaceutical and medical technology or to focus on just one area. The Centre also collaborates with other local institutions; for example, working with A\*STAR's Diagnostics Development Hub to develop a joint training programme to build the business and regulatory capacities of Singapore's medical technology start-ups.

### Launch of first Allied Health Residency programme

The first Allied Health Residency programme in Medical Dosimetry, jointly developed by the SingHealth Academy College of Allied Health (CAH) and the Division of Radiation Oncology of the National Cancer Centre Singapore, was launched in March 2021. The two-year programme prepares mid-tier Medical Dosimetrists to transit from generalists to specialised practitioners and provides more structured clinical training, mentorship and practical training opportunities.

### Shaping the delivery of healthcare simulation

Since the start of the COVID-19 pandemic, the SingHealth Duke-NUS Institute of Medical Simulation (SIMS) has published over 10 papers in renowned journals, including the Journal of Emergency Medicine & Intensive Care, to share its experiences in conducting simulation-based training, as well as key considerations for healthcare simulation during the pandemic.

### Celebrating graduate medical education excellence



In 2020, SingHealth Residency celebrated its 10th year in graduate medical education in Singapore. SingHealth has trained more than 900 Residents across 32 specialties over the last decade, building a strong pipeline of clinicians for tomorrow's healthcare.

SingHealth also nurtured more than half of Singapore's Clinician Scientist (CS) Residents; every year since 2016, we have had seven CS Residents receive the National Outstanding CS Resident Awards. The SingHealth Residency Leadership Programme (SRLP) and the national Singapore Chief Residency Programme (SCRIP) groomed over 140 Residents, including 18 dentists, nursing and allied health professionals, to take on future leadership roles in healthcare.

Over the years, SingHealth Residency has achieved continued accreditation for 22 residency programmes by the Accreditation Council for Graduate Medical Education - International (ACGME-I) and 13 residency programmes by the Joint Committee on Specialist Training (JCST) - this is a testament to SingHealth's excellence in graduate medical education.



### Improving students' learning of anatomy

Digital anatomy resources are deployed at Duke-NUS Medical School to supplement anatomy education. The new Immersive Learning Space allows for flexible teaching and self-directed learning, and houses virtual and augmented reality facilities to enhance students' learning of anatomy, clinical skills and history-taking.

The School now has a Digital Printing and Prototyping Laboratory, which includes 3D printers, 3D modelling workstations and small prototyping capabilities that can produce anatomical models to support anatomy teaching, clinical skills simulation and scholarly research projects.

### New integrated teaching and learning platform (Elentra-ME)

Duke-NUS Medical School launched Elentra-ME, a new integrated teaching and learning platform that offers assessment, evaluation, e-portfolio, clinical rotation scheduling, curriculum mapping, reporting and community website support. This aids teaching efficiency as online teaching continued to be the main mode of teaching during the COVID-19 pandemic.

### Advancing Interprofessional Education (IPE) globally

The SingHealth Academy College of Clinical Nursing (CCN) embarked on a scholarly research study to examine the experiences of SingHealth Nurse Trainers who had imparted Cardiopulmonary Resuscitation (CPR) knowledge and skills to healthcare professionals in low-resource countries. The study identified key factors in cross-cultural Interprofessional Education (IPE), such as cultural challenges, language barriers, and is a significant step in advancing the delivery of IPE across different cultures.





# ENHANCING HEALTHCARE CAPABILITIES

## Adapting to COVID-19

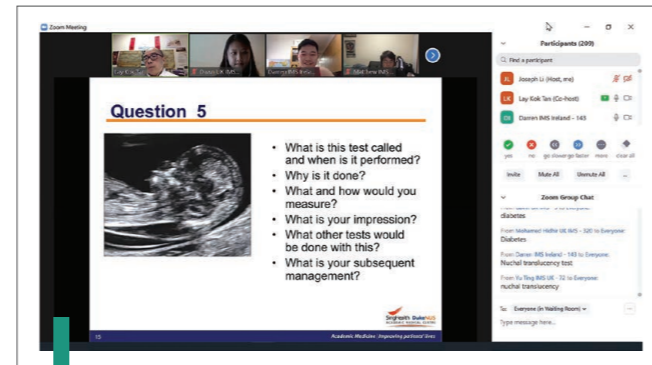
SingHealth Residency worked closely with various stakeholders to mitigate the impact of COVID-19 on medical training in areas like conditional progression, examinations and teaching methods. Through these efforts, there were no delays in year-on-year progression and final year Residents' graduation. Despite the challenging circumstances, SingHealth Residency also achieved continued ACGME-I Institutional accreditation for the next five years with zero citations.

## Online training events and workshops



Key training events and workshops successfully transited online during the pandemic. Some of these included the inaugural Singapore Allied Health Conference, which gathered more than 850 healthcare professionals, administrators and students from Singapore and around the region; the Advancing Clinical Education (ACE) webinar series which brought together more

than 200 clinicians and oral health therapists from Singapore, Malaysia, Australia and USA to hone their clinical skills and expertise in implant dentistry and endodontics; and the AMEI Teachers' Day Webinar which was attended by almost 300 healthcare educators and learners who gained insights on the unique teaching opportunities presented by the pandemic.



## HOME initiative

In May 2020, the Helping Overseas Medics Education (HOME) initiative was launched to help Singaporean medical students studying overseas overcome disruptions to their studies when they returned to Singapore. More than 930 overseas medical students were offered free virtual daily lessons that are mirrored after the curriculum of a standard medical undergraduate programme.

## Survey of Residents

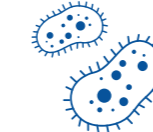
A survey conducted to seek Residents' perception of the impact of COVID-19 and working in the new norm found that they felt well-supported in their training during this time.

## 6 key focus areas of CoRE's new five-year plan



### Digital Health

To help define the domain and relevant follow-through primarily in regulation



### Innovative Therapies

Build competencies in the region and facilitate access



### Clinical Trials

Build competencies in the region and contribute to enhancement of Clinical Trials ecosystem in Singapore



### Patient Engagement

Accelerate systematic and meaningful patient involvement in health systems in the Asia-Pacific



### Medical Devices

Build competencies in Medical Devices regulations for the region



### Vaccines

Promote vaccine access and support pandemic preparedness

## AMALGAMATE EFFORTS TO ACHIEVE TARGETED OUTCOMES

Impact health outcomes

Address strong demand and interest from stakeholders

Play an enabling role with tangible outcomes

Create synergy between education programmes & think tank initiatives

## Launching a new five-year plan at CoRE

Building on its strong foundation as a provider of high-quality educational programmes for adult professionals and being an

effective thought leader and convener of expert stakeholders through its neutral academic positioning, CoRE has sharpened its priorities through its 2025 strategy to continue enhancing regulatory capability and scientific excellence for health products and systems in Asia-Pacific. The Centre has identified six key focus areas to amalgamate efforts in achieving targeted outcomes. In exploring emerging areas such as real-world evidence and precision medicine, CoRE will continue to address regulatory and health system strengthening and policy innovation.

## Harmonising leadership development programmes

The SingHealth Academy College of Healthcare Administration and Leadership (CHeAL) realigned its programmes under the SingHealth Core Milestone Leadership Programmes (CMLP). This provides a comprehensive and progressive roadmap to develop healthcare leaders, including junior staff with supervisory roles, newly hired and promoted team leaders and supervisors across all healthcare professions.

## Strategic partnership to nurture tomorrow's healthcare leaders

Over the last decade, SingHealth has collaborated with the Singapore Management University (SMU) to develop various programmes, with the aim to build a strong pipeline of leaders and administrators.

The SMU-SingHealth Graduate Diploma in Healthcare Management and Leadership equipped more than 250 healthcare professionals with essential knowledge and competencies in public healthcare management and business leadership.

The SMU-SingHealth Health Economics Management (HEM) Second Major was launched in 2019 to prepare industry-ready graduates with the necessary knowledge and skills in effective healthcare administration. SingHealth clinicians and administrators co-taught certain modules, sharing their expertise in health systems and policies, healthcare management, operations and supply chain management.





# TRANSFORMING HEALTHCARE WITH TECHNOLOGY AND INNOVATION

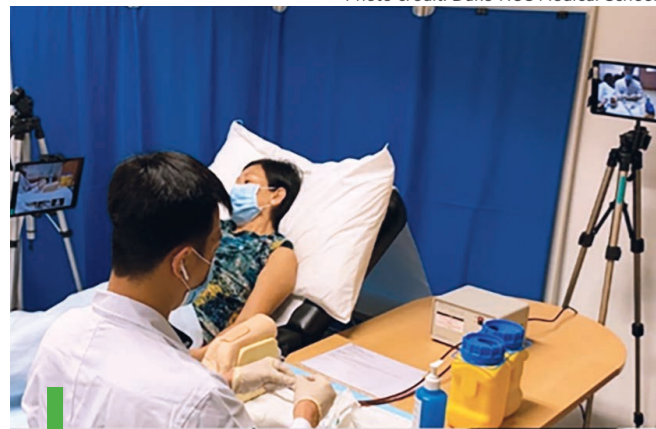
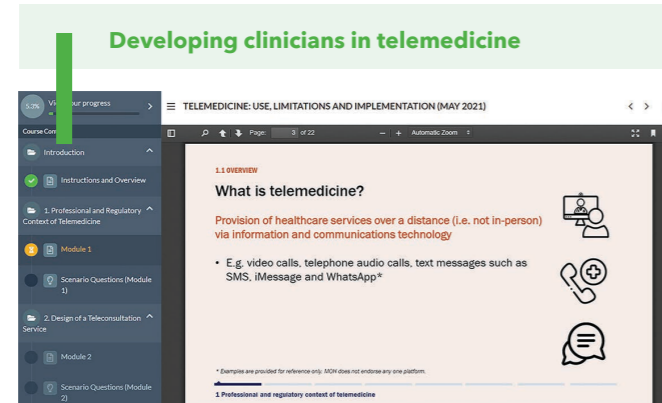


Photo credit: Duke-NUS Medical School

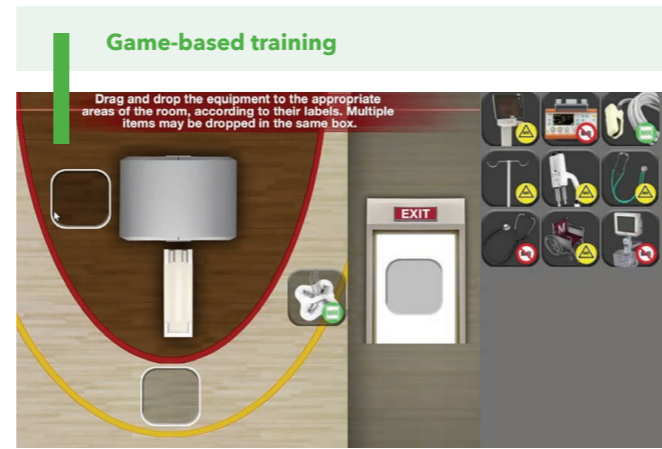
## Embracing technology to deliver high-stakes clinical examinations

Against the general global trend of cancelling high-stakes examinations for medical programmes, Duke-NUS Medical School and the Ministry of Health (MOH) worked to safely conduct such examinations at Duke-NUS Medical School and Academia.

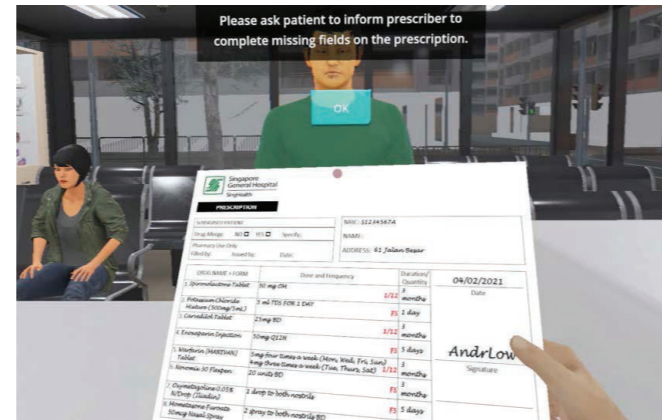
Over a ten-day period, teams used technology to minimise the burden on busy clinicians, eliminating close interactions between individuals while maintaining the validity of these examinations.



With telemedicine set to become a key feature of the healthcare landscape, SingHealth Academy launched the online telemedicine course in March 2020 in partnership with the Ministry of Health. The course has equipped close to 1,800 SingHealth clinicians with the knowledge and skills to design and deliver safe telemedicine services.



▲ Screenshot from the MRI Safety in Healthcare Game where learners place various equipment with MR safety labels in the appropriate locations.



▲ Screenshot from the Project VRx Game where players check the authenticity of the prescription and for any incomplete information.

Since 2019, SingHealth has been developing a series of game-based training and assessment programmes. Two of the 14 games currently being developed - namely the Project VRx Game and the Magnetic Resonance Imaging (MRI) Safety in Healthcare Simulation Game - were launched in 2020. Both games have trained over 90 pharmacists, radiographers and nurses to date. Project VRx equipped pharmacists with essential skills to perform their daily tasks well, while the MRI Safety game teaches radiology staff to identify, analyse and prevent MR safety lapses.

# FOSTERING WELL-BEING AND BUILDING RESILIENCE

## Fostering wellness among junior doctors



▲ Camaraderie among junior doctors.

To support Postgraduate Year 1 doctors (PGY1s) during their transition to working in a healthcare setting, SingHealth Residency developed the PGY1 Bolstering, Listening, Understanding & Emotional Support (BLUES) scheme in January 2021. Leveraging a peer support structure, the scheme lends emotional support to PGY1s during their clinical postings.

More than 40 programme directors, faculty and programme executives have also been trained to identify and support junior doctors in distress during the "Helping At-Risk Individuals (HARI)" workshop.



## Enhancing mental resilience through gaming

An interactive digital game app, "Wild Resilience", was created to introduce six mental resilience tools built by the Health Promotion Board (HPB) to help players manage difficult situations in life. Developed by KK Women's and Children's Hospital, in collaboration with the Singapore Polytechnic's School of Game Design and Development, the game hopes to develop a healthier sense of self-esteem in players. About 60 nurses have completed both the app and table-top versions of the game, with 91 percent of participants providing positive feedback.

## Strengthening resilience and wellness among clinicians

More than 30 senior clinicians in SingHealth attended the Inspiring Self to Energise Others (ISEO) workshop as part of the Senior Academic Clinician Development Programme (SACDP)\*, gaining practical techniques and strategies to enhance their well-being. The workshop was initiated to empower senior clinicians to be role models in mental wellness and resilience, while providing better emotional support to the juniors.

\*The SACDP is jointly organised by the Duke-NUS Academic Development Department and SingHealth Academy College of Clinical Medicine (CCM).





# SINGHEALTH DUKE-NUS GLOBAL HEALTH INSTITUTE

Established in 2018, the joint institute harnesses the strengths and expertise of SingHealth and Duke-NUS Medical School and aims to address current and emerging health challenges across ASEAN member states and in other Asian countries. Over the years, the institute has continued its efforts to strengthen health systems, advance global health research and policies in the region, while driving community engagement, education and awareness.



## THE PROGRAMME FOR PANDEMIC PREPAREDNESS AND RESPONSE

### Pandemic response

In response to the pandemic, the SingHealth Duke-NUS Global Health Institute (SDGHI) created a two-year Programme for Pandemic Preparedness and Response (PPPR) in the ASEAN Region. The programme looks into encouraging research, regional collaborations and community engagement.

## RESEARCH

### Research and regional collaboration

Contributing to the body of knowledge surrounding COVID-19, SDGHI launched a range of research partnerships in FY2020, including an inaugural joint grant call with Duke Global Health Institute (DGHI) and Duke Kunshan University (DKU), culminating in the funding of four projects with Principal Investigators from all three institutions along with regional collaborators, one of which is a project on strengthening healthcare systems through improved molecular diagnostics for COVID-19 and dengue.

SDGHI funded a range of regional research projects to better understand issues related to COVID. These include a study which compares COVID-19 mitigation strategies across ASEAN countries to examine the impact of pandemic control measures on prevention and treatment of non-communicable diseases (NCDs), a study on best practices and preparedness for emergency healthcare workers in Asia, and a study on the pandemic impact to surgical systems in Southeast Asia and South Asia.

SDGHI also collaborated with pharmaceutical firm, Upjohn Pfizer, to tackle the global crisis of NCDs. 21 experts from six countries convened in September 2020 to discuss NCD care in the times of COVID-19 in ASEAN.

### Publications

Amidst the pandemic, SDGHI faculty published papers covering different aspects of COVID-19, pushing the envelope on pandemic response with breakthrough studies on surveillance, virus characterisation and diagnostics. From a COVID-19 policy lens, SDGHI faculty have contributed to strengthening global regulatory coordination and agility.

## EDUCATION AND TRAINING



### Student participation in global health research projects

As part of SDGHI's education and training programmes to provide the next generation of leaders with the necessary skills and knowledge to meet future global health challenges, medical students from Duke-NUS Medical School and Yale-NUS were involved in global health research projects with faculty members on topics such as the impact of COVID-19 on surgical systems in the region, good practices and lessons learned from COVID-19 pandemic control measures across Asia, and a literature review of simplified protocols and processes for the prevention and management of NCDs in Cambodia.

▲ Duke-NUS students *Julienne Keong Si Ying* and *Low Zhen Luan* with *Prof Truls Ostbye* during a site visit in Sri Lanka.

With support from SDGHI, Duke-NUS Medical School students *Low Zhen Luan* and *Julienne Keong Si Ying* also had the opportunity to explore research avenues for students under the SingHealth Duke-NUS Surgery Academic Clinical Programme (ACP) in 2019, which led them to visit Sri Lanka in pursuit of their research projects: Under the supervision of Professor *Kuda Banda Galketiya Zhen Luan* studied the treatment of chronic venous disease in the local population, while Professor *Meegahalande Durage Lamawansa* supervised *Julienne's* research to examine the quality of life of patients receiving treatment for haemorrhoids.

### Community engagement



The PPPR aimed to facilitate evidence-based communication to promote awareness, knowledge sharing and academic debate on the topic of COVID-19 through a recurring series of webinars.

SDGHI also hosts a monthly Global Health Seminar Series, covering pressing global health topics, including discussions on implementing a One Health approach in emerging infectious diseases, universal health coverage and urgent unmet needs in heart failure in Asia.

Both series are open to public.

## POLICY AND CAPACITY BUILDING

### Outreach to strengthen regional health systems

SDGHI forged a research collaboration with the Hanoi University of Public Health and the Health Strategy and Policy Institute, Vietnam to map gaps in health services and access to medicines for hypertension at the primary healthcare level in urban Vietnam. With funding from the World Health Organization, SDGHI is supporting the development of a roadmap on the prevention, identification and management of NCDs at the primary healthcare level in Cambodia.





## RESEARCH

The SingHealth Duke-NUS Academic Medical Centre remains committed to its pursuit of research and innovation for better clinical care and patient outcomes. Every discovery seeks to transform healthcare outcomes for our patients.

### FIGHTING COVID-19

In response to the COVID-19 pandemic, we designed, built and deployed care innovations to address challenges faced by patients and healthcare staff. Read more about SwabBot, SG-Inspire, SG SAFE and Andago in Enhancing Care (Page 34).

#### Local review of COVID-19 in paediatric patients

KK Women's and Children's Hospital (KKH) published a series of six studies on COVID-19 in children, detailing KKH's experience of caring for paediatric cases from January to May 2020. Understanding how the SARS-CoV-2 infection affects children is vital in guiding clinical management of young patients and recommendations for public health measures. The review provided insights into adult-to-child transmission, transmission risk in educational settings, symptomatic versus asymptomatic infections in children, viral load dynamics and screening modalities for COVID-19 in children.

Photo credit: Duke-NUS Medical School



#### cPass™ gets FDA approval

cPass™ – a novel blood test to detect neutralising antibodies from past COVID-19 infections or vaccinations – received Emergency Use Authorisation from the US Food and Drug Administration in 2020 and saw its US patent application approved in June 2021. Developed by Duke-NUS Medical School investigators, it detects neutralising antibodies without the need for containment facilities or live biological materials. The test kit, codeveloped by GenScript and Agency for Science, Technology and Research (A\*STAR), can also be used in animals and may play a key role in identifying the origin of SARS-CoV-2.



#### Using mouthwash reduces coronavirus levels in saliva

A team from the National Dental Centre Singapore (NDCS), Singapore General Hospital (SGH) and Duke-NUS Medical School found that using mouthwash containing povidone iodine and cetylpyridinium chloride prior to dental treatment may reduce transmission of SARS-CoV-2 through aerosols. The study results showed that compared with rinsing with water, those who used these gargles had a significant decrease in saliva viral load within five minutes and six hours after rinsing.

#### Study published on attitudes to vaccination

The Lien Centre for Palliative Care (LCPC) at Duke-NUS Medical School published a study that explored the acceptance and uptake rates of a COVID-19 vaccine among Singaporeans. Interviewing 515 participants via an online panel survey, the team explored risk perceptions and willingness to take a vaccine. The LCPC also co-developed the "Best Practices for COVID-19" and revised it to include guidelines on a phased approach in resuming activities for community-based projects.

## INNOVATIONS, TECHNOLOGY AND COMMERCIALISATION

#### Bleeding detection device to improve patient safety



A team from Changi General Hospital (CGH), together with the Singapore University of Technology and Design, developed a lightweight, continuous monitoring device to detect real-time bleeding from wound sites following invasive medical procedures. The Blood Warning Technology with Continuous Haemoglobin (BWATCH) sensor is able to differentiate blood from other fluids. It was tested in a clinical trial involving CGH patients who have had a dialysis catheter inserted or removed where all instances of early bleeding were detected. The device can increase safety for haemodialysis patients by alerting healthcare personnel to early bleeding and avert a major bleeding episode. It can also be adapted to monitor other types of wounds at risk of bleeding. BWATCH is patented in Singapore and the US.

#### Molecular predictions that keep laboratory cells safe

Photo credit: Uma Sangumathi Kamaraj, Duke-NUS Medical School



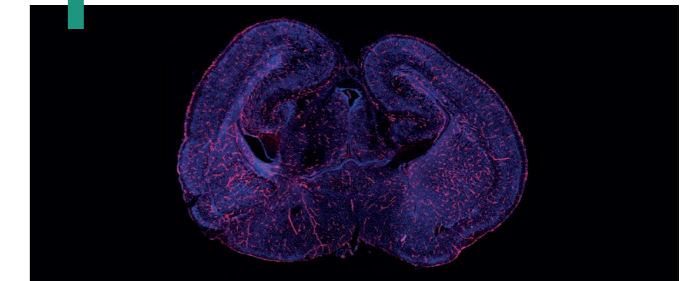
Researchers from Duke-NUS Medical School and Monash University in Australia developed a computer model, called EpiMOGRIFY, which predicts the molecules that will keep cells healthy in laboratory cultures or trigger stem cells to turn into specific tissue cells. Other algorithms similar to EpiMOGRIFY could be the foundation for developing cell therapies by identifying the right factors more efficiently and creating well-characterised cell mediums.

#### Smart sensors flag early cognitive impairment



To gauge the cognitive abilities of seniors without using traditional screening tests, researchers at Sengkang General Hospital (SKH) used a network of smart sensors installed in their homes to track their memory, movements and sleep patterns over a period of time. The method correctly identified seven in 10 seniors diagnosed with mild cognitive impairment. People with mild cognitive impairment face a higher risk of developing dementia but early detection and treatment offer the best chance of reversing or delaying deterioration.

#### New transport for drugs across the blood brain barrier



A licensing agreement between Duke-NUS Medical School and biotech start-up, Travecta Therapeutics, will develop and commercialise an effective platform for drug-delivery into the brain. Travecta raised US\$15 million from investors to support the start-up's growth and the development of TVT-004, the lead non-opioid product to treat pain, which relies on this novel drug-delivery platform. The platform originated from research by Professor David Silver, the deputy director of Duke-NUS' Cardiovascular and Metabolic Disorders (CVMD) Programme and the scientific founder of Travecta. The platform showed that the protein Mfsd2a naturally transports lipids that are critical for development into the brain.











### The genetic code of ageing love handles

White fatty tissue plays a major role in ageing, according to analyses of long RNA strands that do not code for proteins. Zhou Qiuzhong and Lei Sun from the Duke-NUS Cardiovascular & Metabolic Disorders (CVMD) Programme and colleagues identified 1,675 'long non-coding RNAs' (lncRNAs) that functioned differently as mice aged. They found a significant

▲ Asst Prof Ong Choon Kiat, Principal Investigator of the Lymphoma Genomic Translational Research Laboratory, NCCS, and Prof Lim Soon Thye, Deputy Medical Director (Clinical), NCCS and Principal Investigator of the study.

proportion in white adipose tissue. One lncRNA in particular, whose expression decreased with age, was involved in new fat cell generation. Impairments in this process can lead to obesity and diabetes. The study offers a valuable resource for further understanding the roles of lncRNAs in ageing.

### New Asian genetic factors for Parkinson's Disease identified

Researchers from the National Neuroscience Institute (NNI), Nanyang Technological University, Singapore's Lee Kong Chian School of Medicine and the Genome Institute of Singapore discovered two new gene loci (SV2C and WBSR17) in Asians that contribute to an increased risk of Parkinson's disease. Using findings from its multi-centre global study involving 30,000 participants across various Asian populations, the team will develop a genetic diagnostic kit to identify individuals at risk of developing Parkinson's. Early diagnosis and timely intervention could slow the disease progression.

### Hope for patients with rare, aggressive blood cancer

A National Cancer Centre Singapore (NCCS) study found that patients with natural-killer T-cell lymphoma (NKTCL), a rare but aggressive type of blood cancer, respond well to anti PD-1 immunotherapy pembrolizumab if they have a mutation in their PD-L1 gene. In the study, a group of NKTCL patients with the PDL1 gene mutation achieved complete remission with no trace of detectable cancer after the therapy. The team filed a patent for the technology, and worked with local biotech company, Lucence Diagnostics, to develop a diagnostic test to detect PD-L1 mutation. The improved treatment selection process translates to better clinical and cost benefits for patients battling NKTCL.

### Skin cells reprogrammed into placenta precursors

An international collaboration involving Duke-NUS Medical School and Monash University has discovered an approach for forming induced trophoblast stem cells (iTSCs) in early-stage embryos and first-trimester placentas. These findings could pave the way to better understanding pregnancy complications and aid in studying trophoblast dysfunction, which causes complications like pre-eclampsia and restricted foetus growth.

### Drug shown to precisely target non-small cell lung cancer driven by mutations to gene RET.

An international team of researchers found that selpercatinib, a drug that precisely targets cancers driven by mutations or alterations in the gene RET, was effective at shrinking tumours in patients with non-small cell lung cancer (NSCLC), with a majority of patients living for more than a year without disease progression. NCCS, one of three Asian centres to participate in the trial, implemented routine testing of the gene RET for all lung cancer patients. The trial showed the targeted therapy to have good efficacy, strong, sustained response rates and fewer side effects.



### Mothers pass on allergies to offspring

A team from A\*STAR, KKH and Duke-NUS Medical School has found that mothers can pass allergies to offspring while they are developing in the womb. Research in mice showed that maternal antibodies primed to react to specific allergens can cross the placenta and lead to reactions after birth, at least temporarily. Studies in human cells suggested that a similar mechanism likely exists in humans. This hints at why infants exhibit allergies so early in life in ways that cannot be only explained by genetics.

### Strengthening Health In ELDERly through nutrition (SHIELD)



CGH, SHP and Abbott published results of the SHIELD randomised placebo-controlled clinical trial of 811 participants which highlights the four-fold higher prevalence of low muscle mass in community-dwelling elderly Singaporeans at risk of malnutrition (81.2%) as compared to their nourished counterparts (20.6%). The researchers found that the addition of specialised oral nutrition supplement in addition to individualised dietary counselling vs placebo and individualised dietary counselling in community-dwelling older adults at risk of malnutrition, can lower their risk by three-folds, improve their muscle mass and strength, improve their nutritional status, and leads to enhanced physical function, specifically increased leg strength and handgrip strength.

### Singapore scientists identify genetic mutation of most common cause of glaucoma

A team of researchers from SERI and A\*STAR identified a genetic mutation (functionally defective CYP39A1 gene) associated with exfoliation syndrome, the most common cause of glaucoma. The discovery was made from sequencing genes of more than 20,000 participants from 14 countries across Asia, Europe, and Africa, including more than 1,200 Singaporeans. The findings pave the way for future research into the cause of exfoliation syndrome and potential cures.





## AWARDS AND ACHIEVEMENTS



### First dental scientist to clinch Open Fund Young Individual Research Grant

Dr Thanuja Herath, Research Fellow from NDCS, is the first dental scientist to receive the Open Fund Young Individual Research Grant by National Medical Research Council. Her research project looks into developing neutrophil (white blood cells)-based immunomodulation strategy for bone tissue regeneration. The project will provide vital clues on how to utilise the new strategy for the development of future therapeutics and facilitate Phase 1 clinical trials.

### Improving Singapore's chain of survival

The Pre-hospital and Emergency Research Centre (PERC) was established in September 2020 through a collaboration between SingHealth Duke-NUS Academic Medical Centre, National Healthcare Group, National University Health System, the Unit for Pre-hospital Emergency Care of the Ministry of Health Singapore and the Ministry of Home Affairs' Singapore Civil Defence Force. It will conduct research and develop strategies to improve pre-hospital and emergency care in Singapore. Researchers at the Centre will come from a broad range of disciplines.

## HEALTH SERVICES



### Asia's only same-day total knee replacement enhanced recovery programme

SGH is the only hospital in Asia and one of the few hospitals in the world to offer total knee replacement (TKR) as a day surgery. Under the enhanced recovery programme, eligible patients have been able to go home within 23 hours of surgery instead of the average four days hospital stay in the past. About 40 patients have benefitted from the same-day TKR enhanced recovery programme each month since its launch last year after a small pilot trial.

### Cataloguing the 'fingerprints' that reveal cancer's secrets

In a significant advance in unmasking the origins of some cancers, an international team, including Professor Steven Rozen from the Duke-NUS' Cancer and Stem Cell Biology (CSCB) Programme, used machine learning to mine mutation data from 24,000 human cancer samples. They identified 81 'mutational

signatures': recognisable genetic fingerprints that can be caused by DNA copying problems or agents like tobacco, UV light and chemotherapeutic drugs. The findings can contribute to new cancer prevention strategies and screening exposed individuals more intensively.

### Riding through the pandemic - strategies to maintain transplant services during the COVID-19 outbreak

SGH developed new guidelines to enable critically-ill patients to receive life-saving organ transplants during the COVID-19 pandemic. By adopting a tiered approach based on disease outbreak alert levels and adopting enhanced infection prevention strategies based on the best available evidence, the SGH team safely performed a lung transplant and a liver transplant during the height of the COVID-19 pandemic.

### Identification of potential new treatment for Angelman syndrome



Photo credit: Duke-NUS Medical School

▲ From left: Dr Alfred Sun from NNI, Assoc Prof Shawn Je and Dr Qiang Yuan from Duke-NUS Medical School.

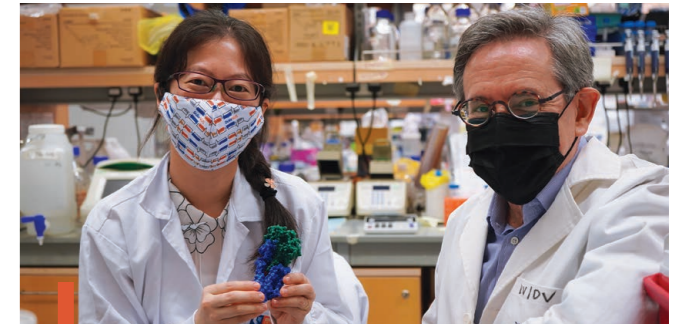
Researchers from NNI and Duke-NUS Medical School have developed an experimental method using neural cells, 2D neural networks and mini brains to understand epileptic seizures in Angelman syndrome (AS), a neurodevelopmental disorder.

Uncovering the role of overactivated ion channels in AS patient-derived neurons, the team identified a potential treatment target for untreatable epilepsy in AS patients.

### Local study on deprescribing safety



Polypharmacy is common amongst the elderly and is linked to adverse health outcomes such as falls and confusion. A randomised controlled trial conducted in Bright Vision Hospital has shown that weekly deprescribing rounds led by a dedicated multidisciplinary team results in a significant reduction of medicine, doses and cost upon discharge, and one month post discharge without increased risk of re-hospitalisation or death. Thus, such deprescribing rounds are effective, safe and potentially applicable in other intermediate care settings.



### Made-in-Singapore anti-cancer drug enters phase 1b trials

A new phase of clinical trials will test the efficacy and safety of a drug developed by Duke-NUS Medical School and A\*STAR researchers for treating a subset of colorectal, ovarian and endometrial cancers. ETC-159 inhibits an overactive signalling pathway called Wnt signalling, thereby improving immune cell infiltration in these tumours. ETC-159 is currently undergoing clinical trials on whether it can be a treatment for a subset of colorectal and gynaecological cancers.





## GIVING

Philanthropic gifts go a long way in supporting the four key pillars of research, education, improvements in clinical care and resilience in crisis as we pursue Academic Medicine. With generous support from like-minded partners who believe in our vision to define tomorrow's medicine and our passion to do the best we can for our patients, their gifts enable us to:



provide financial and other forms of assistance to patients in need



enable groundbreaking research for new treatments



support continuing education of healthcare professionals



build and strengthen the physical and mental wellness of our healthcare professionals, especially during health emergencies

## FUNDS RECEIVED IN FY2020



## NEW NAMED FUNDS CREATED

In FY 2020, 11 named funds, including 1 Professorship, were established.

- Asian Cancers Research and Education Fund
- Goh Cheng Liang Rheumatology ARISE (Advancing Research and Innovation with Synergistic Expertise) Programme Fund
- Kathy Goh Professorship in Pathology
- Lee Seng Tee and Betty Wu-Lee Paediatric Cardiac Care Programme Fund
- Paediatric Neurology Research Fund
- Paediatric Proton Therapy Research Fund
- Pancreatic Cancer Research Fund
- Peter and Mary Fu Paediatric, Adolescent and Young Adults Research Programme
- Scholarship for Advancing Education in Medicine
- Scholarship for Advancing Education in Nursing and Allied Health
- Surgical Oncology Programme

## TRANSFORMATIONAL GIFTS



### Goh Cheng Liang Rheumatology ARISE Programme

The Goh Cheng Liang Rheumatology ARISE (Advancing Research and Innovation with Synergistic Expertise) Programme will advance research and initiatives that will improve the lives of patients with rheumatological diseases. The programme aims to raise awareness and empower patients to better manage their conditions and build a collaborative research community through training and capacity building.

### Cheng Kin Ku Herbal Biodiversity & Medicine Programme

The newly-established Cheng Kin Ku Herbal Biodiversity & Medicine Programme pioneers science-based herbal studies to generate new knowledge and bring about novel breakthroughs that will be translated into clinical outcomes.

Made possible with a \$5 million gift from Verdant Foundation and Biodiversity Research Limited, in memory of its Chairman's father, the programme aims to deepen understanding of the molecular basis of the medicinal value of herbal plants and translate them into clinically approved therapeutic agents.

### Kathy Goh Professorship in Pathology

Established in memory of the late Mrs Kathy Goh, the first professorship for the SingHealth Duke-NUS Pathology Academic Clinical Programme (ACP) will help women by finding targeted treatments towards breast diseases, such as triple negative breast cancer. It will also support long-term research to improve diagnostic, prognostic and therapeutic accuracy through biomarker discovery, leading to increased survival rates for patients.

### Two new scholarships established

Two new scholarships have been established with a combined gift of \$1 million from Mr Oei Hong Leong, Chairman and Chief Executive of Oei Hong Leong Foundation, and his brother Mr Frankle Widjaja, Chairman and Chief Executive of Bund Center Investment. The gifts were made in memory of their late father, Mr Oei Ek Tjhong.

The new 'Scholarship for Advancing Education in Medicine' and 'Scholarship for Advancing Education in Nursing and Allied Health' will improve the training pathways and development opportunities available to scientists, educators and other healthcare professionals.

### A \$2.28 million gift for game-changing research



The multinational Asian Diabetes Outcome Prevention Trial (ADOPT), led by Professor Carolyn Lam, Clinician-Scientist and Senior Consultant at the National Heart Centre Singapore (NHCS), aims to prevent heart diseases in high-risk patients with diabetes. With trial sites in Singapore, Malaysia, China, Taiwan and India, the study will identify those with high-risk of heart disease using blood biomarker-based screening, and prioritise them for intensive preventive treatment. To bring forth significant health outcomes and benefits to the people in Singapore and across Asia, a local Foundation has pledged a donation of \$2.28 million to support this game-changing research.





# MAJOR GIFTS



**Gift from STMicroelectronics Asia Pacific Pte. Ltd.**

SingHealth Community Hospitals (SCH) received a donation of \$250,000 from STMicroelectronics Asia Pacific Pte Ltd. in support of SCH's e-Social Prescribing programme. The objective of the programme is to engage patients and prepare them for community life after discharge through initiatives such as equipping elderly patients with basic digital skills to use QR Codes and Zoom functions.

## Paediatric Neurology Research Fund

In support of paediatric neurology research, Mr and Mrs Donald Lee have made a \$150,000 gift towards establishing the Paediatric Neurology Research Fund under the SingHealth Duke-NUS Paediatrics ACP. This Fund will enable the KK Women's and Children's Hospital (KKH) Paediatric Neurology team to further their research, beginning with a study on discovering mechanisms underlying childhood epilepsy.

## A legacy of supporting breast cancer research and education



In appreciation for the team who cared for her in her final days, Ms Low Lye Fan (above) bequeathed a gift in support of the Changi General Hospital (CGH) Breast Centre's research and education efforts. With a gift of \$200,000, a Fund was set up in 2020 to raise awareness of early detection of breast cancer, and spur research into the disease.

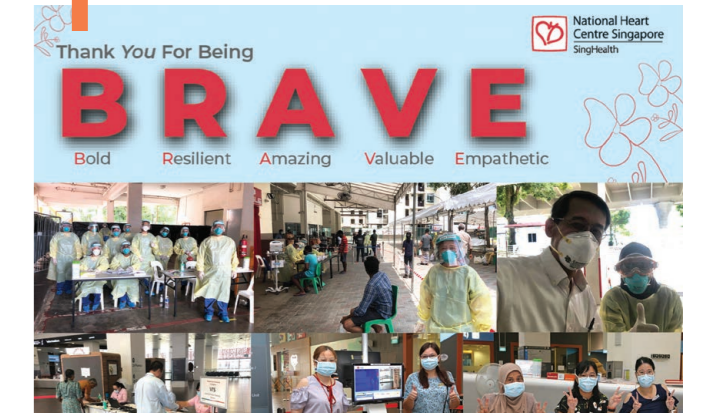
# RESILIENCE IN CRISIS



**Boosting the well-being of healthcare workers**

The generosity of many organisations has helped to boost the physical and mental well-being of our healthcare workers amidst the pandemic. The Real Estate Developers' Association of Singapore raised over \$450,000 to benefit healthcare workers fighting at the frontlines. The Singapore Exchange contributed over \$300,000, while SingTel donated \$200,000. Other donors included Prestige Ocean, Tanglin Trust, F5, Satin and CMA CGM.

## Appreciating BRAVE colleagues at the frontline



The BRAVE Fund is a staff-initiated fund, set up in 2020 by NHCS staff who were inspired by their frontline colleagues' dedication in braving all odds to keep our nation safe. The Fund, which has received \$56,000, was a way for staff to express their appreciation and support to their colleagues in the fight against COVID-19.

## Providing support for mental health workers

An anonymous donor's gift of \$3,000 kick-started the Sengkang General Hospital (SKH) Mental Health Resilience Programme. The fund acknowledges the contributions of mental health workers who have worked tirelessly through the pandemic to engage SKH staff and residents in the northeast of Singapore. The programme aims to help mental health workers relieve stress through mental health talks and mindfulness sessions to boost resilience, build morale, and foster team bonding.





# STAFF INITIATIVES TO BUILD A CULTURE OF GIVING



**iWALK2020**

As the first virtual fundraising event organised by Bright Vision Hospital (BVH), iWALK 2020 encouraged participants to get on their feet for a good cause. With 794 participants covering a distance of over 11,787 kilometres over a period of six days, iWALK 2020 raised over \$350,000, which went towards the BVH Needy Patients Fund.



**A singing good time**

National Dental Centre Singapore's (NDCS) year-end event saw senior management and staff joining in song to garner donations from fellow colleagues. The virtual gathering had everyone revelling with songs, reflections and sharing of holiday memories. Funds raised went towards the NDCS Tooth Fairy Fund for needy patients, oral healthcare research and education.



**Heroes Fund**

The Singapore National Eye Centre (SNEC) and Singapore Eye Research Institute (SERI) launched the Heroes Fund, which aims to raise \$1 million to strengthen Singapore's defences against epidemics. The fund will support initiatives to detect,

diagnose and prevent the spread of infectious eye diseases. It will support the Centre's workforce with quality training and tools to leverage innovations and develop new models of care in the field of Ophthalmology. \$970,000 has been raised as of April 2021.



**Prosperity for a cause!**

As a token of appreciation for their hard work and perseverance over the past year, SKH staff received customised red packets from the SKH Development Office to gift their loved ones for the Lunar New Year. Staff who wished to pay it forward were encouraged to make a donation toward the SKH Needy Patients Fund.

**SGH Solidarity Pledge**

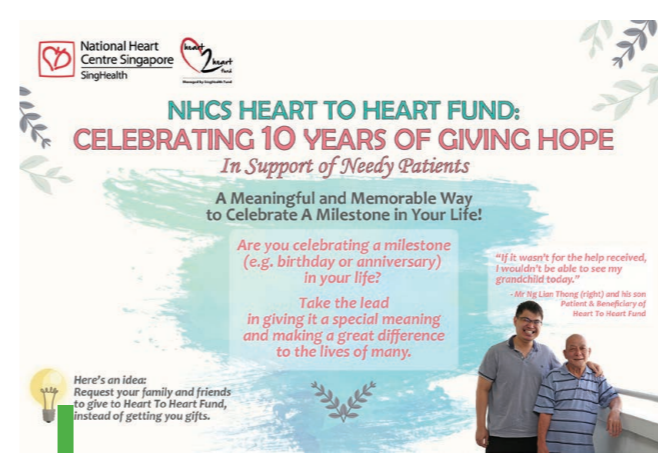


Three doctors from Singapore General Hospital (SGH) initiated the SGH Solidarity Pledge, rallying colleagues to donate their solidarity payments to the SGH Needy Patients Fund and SGH Healthy Communities Fund. The SGH Needy Patients Fund provides financial assistance for basic and life-saving needs like interim dialysis and milk feeds, after existing available financial schemes have been exhausted. The SGH Healthy Communities Fund enables patients to receive the most appropriate help in familiar environments, ensuring that they are supported with nursing services, doctor visits and medical support to reduce risks of re-admissions.



**'One Heart, One Mind' Hope Hamper Draw**

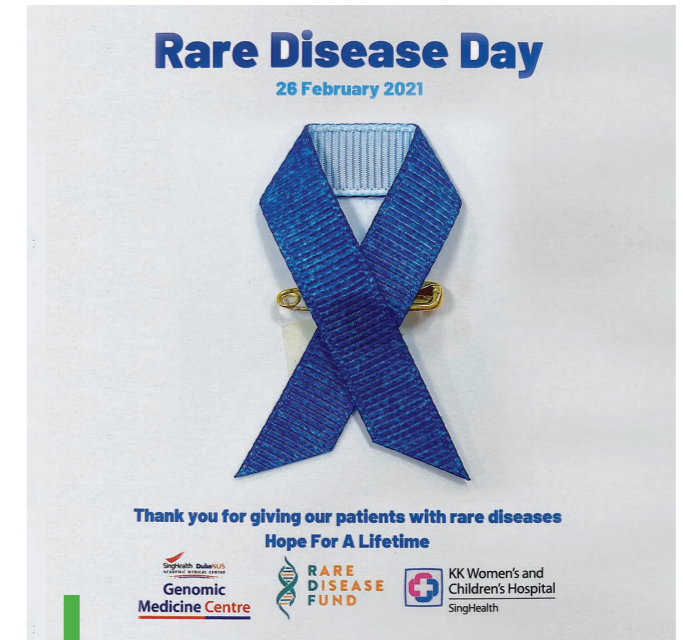
To bring festive cheer after a challenging year, the National Neuroscience Institute (NNI) organised the inaugural 'One Heart, One Mind' Hope Hamper Draw in December 2020. Donors who made a nominal gift stood a chance to win one of 160 hampers worth \$80 or more. The Draw raised \$60,000 for the NNI Fund.



**In support of needy patients**

To mark the NHCS Heart To Heart Fund's 10th anniversary in 2020, NHCS launched a campaign to raise funds for needy heart patients. The campaign promoted giving to heart patients

in need as an alternative way of celebrating a life milestone for someone, instead of buying a gift. By mid-April 2021, over \$20,000 had been raised for the cause.



**International Rare Disease Day**

In support of the international Rare Disease Day, the SingHealth Duke-NUS Genomic Medicine Centre and KKH staff rallied together in support of patients with rare diseases. Many gave generously to the Rare Disease Fund and donned a denim ribbon pin - a global symbol of hope for rare disease communities. More than \$15,000 was raised.

**A MAD Hike for good**

On 8 August 2020, in conjunction with Singapore's 55th National Day, 23 SingHealth Polyclinics (SHP) staff hiked 55km around the island to raise funds for patients whose livelihoods have been vastly affected by the COVID-19 pandemic, especially those with chronic conditions that require long-term treatments. The Move Against Diabetes (MAD) Hike raised \$13,388 within 13 hours - the duration of the hike.



**Run For Hope**

Run For Hope is an annual run organised by Four Seasons Hotel Singapore and the National Cancer Centre Singapore (NCCS) to raise awareness and support for cancer research. For 27 consecutive years, Run For Hope has been a meaningful event which has brought families together in support of a worthy cause. The virtual Run in 2020 raised \$70,000 for the NCCS Cancer Fund.



**Changi Run 2021**

CGH's inaugural virtual running event raised close to \$74,000 for needy patients, supported by the CGH Health Fund's HomeCare Assist, a patient welfare programme. Themed "We Dare to Care," it celebrated the solidarity of Singaporeans coming together to support the less fortunate.





# FACTS AND FIGURES

1 | ABOUT US

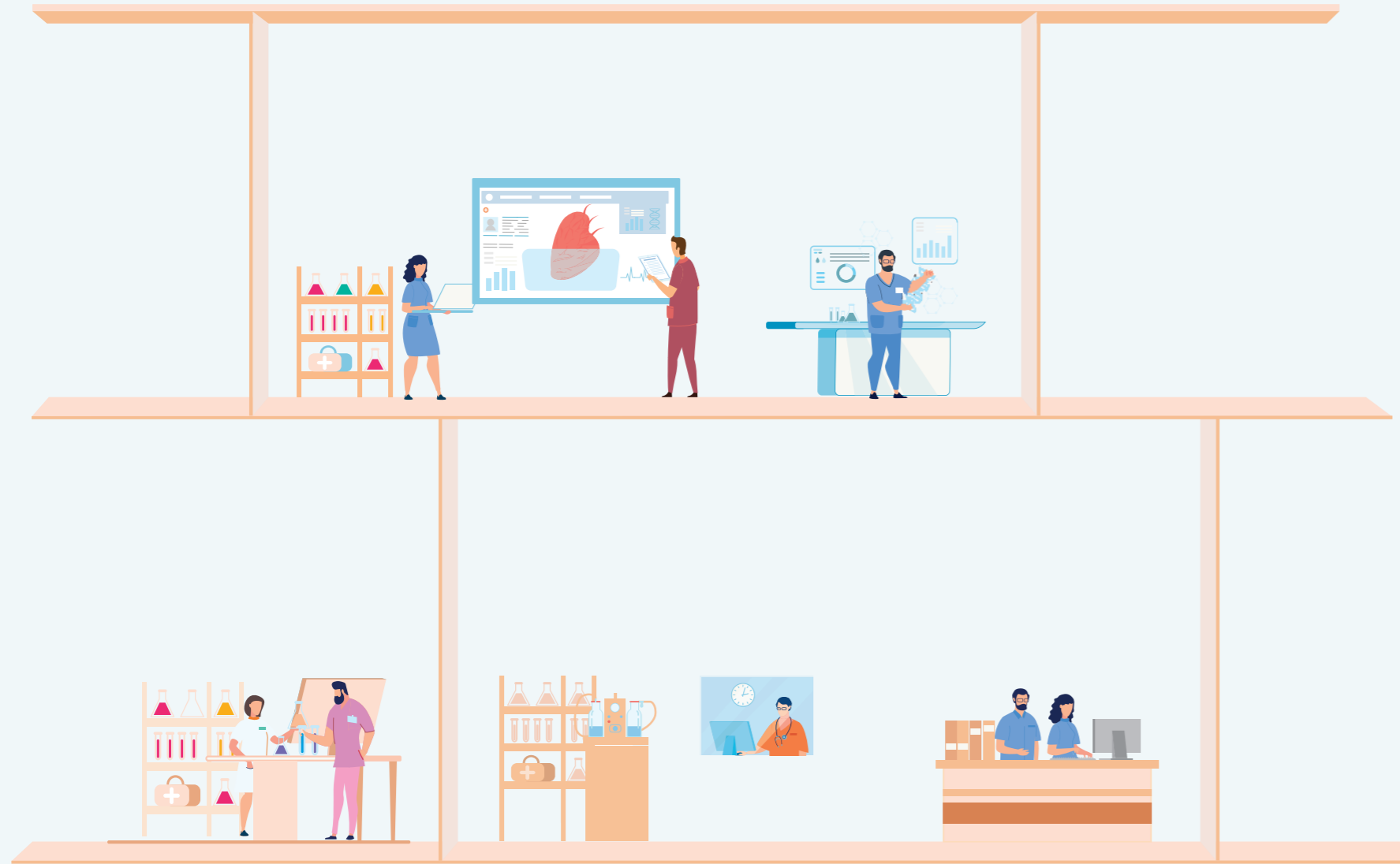
2 | LEADERSHIP

3 | OVERALL  
KEY FIGURES  
AND STATISTICS

4 | INSTITUTION  
STATISTICS

5 | RESEARCH  
STATISTICS

6 | EDUCATION  
STATISTICS





## ABOUT US



The SingHealth Duke-NUS Academic Medical Centre (AMC) draws on the collective strengths of SingHealth and Duke-NUS Medical School to provide our patients and community with the best outcomes and experience.

By leveraging the synergies in clinical care, research and education created through our Academic Clinical Programmes, Disease Centres and Joint Institutes, the SingHealth Duke-NUS AMC fosters the exchange of scientific knowledge and clinical perspectives to accelerate innovation and new discoveries, advance the practice of medicine as well as nurture the next generation of healthcare professionals.

SingHealth delivers comprehensive, multi-disciplinary and integrated care across a network of acute hospitals, national specialty centres, polyclinics and community hospitals. Offering

over 40 clinical specialties, SingHealth is Singapore's largest public healthcare cluster.

Duke-NUS, Singapore's flagship graduate-entry medical school, nurtures 'Clinician Plus' graduates to become leaders in the global healthcare and biomedical ecosystem, while scientists from its five Signature Research Programmes and nine Centres transform medicine and improve lives in Asia and beyond.

For more information, please visit:

[www.singhealthdukenus.com.sg](http://www.singhealthdukenus.com.sg)

[www.singhealth.com.sg](http://www.singhealth.com.sg)

[www.duke-nus.edu.sg](http://www.duke-nus.edu.sg)

## OUR VISION

**Defining Tomorrow's Medicine**

## OUR MISSION

**Care to Heal.  
Educate to Empower.  
Innovate to Advance.**

## OUR COMMON PURPOSE

**PATIENTS. AT THE HEART OF ALL WE DO.®**

## OUR CORE VALUES

**Compassion.  
Integrity.  
Collaboration.**

## MEMBERS OF THE SINGHEALTH GROUP

### Hospitals:

Singapore General Hospital, Changi General Hospital, Sengkang General Hospital, New integrated general and community hospital in Bedok North (expected completion: 2030) and KK Women's and Children's Hospital

### National Specialty Centres:

National Cancer Centre Singapore, National Dental Centre Singapore, National Heart Centre Singapore, National Neuroscience Institute and Singapore National Eye Centre

### Community Hospitals:

Bright Vision Hospital, Sengkang Community Hospital and Outram Community Hospital

### Polyclinics:

Bedok, Bukit Merah, Marine Parade, Outram, Pasir Ris, Punggol, Sengkang, Tampines, Eunos (expected completion: 2021) and Tampines North (expected completion: 2023)

## OUR PARTNER IN ACADEMIC MEDICINE

Duke-NUS Medical School is Singapore's flagship graduate entry medical school, established in 2005 with a strategic, government-led partnership between two world-class institutions: Duke University School of Medicine and the National University of Singapore (NUS). Through an innovative curriculum, students at Duke-NUS are nurtured to become multi-faceted 'Clinicians Plus' poised to steer the healthcare and biomedical ecosystem in Singapore and beyond. A leader in ground-breaking research and translational innovation, Duke-NUS has gained international renown through its five Signature Research Programmes and nine Centres. The enduring impact of its discoveries is amplified by its successful Academic Medicine partnership with SingHealth, Singapore's largest healthcare group. This strategic alliance enables Duke-NUS to harness multi-disciplinary research and education to transform medicine and improve lives.

For more information, please visit:

[www.duke-nus.edu.sg](http://www.duke-nus.edu.sg)



## SINGHEALTH BOARD OF DIRECTORS

### Chairman

#### Mr Peter Seah

(till 30 June 2021)

Chairman

DBS Group Holdings & DBS Bank Ltd

#### Mr Cheng Wai Keung

(from 1 July 2021)

Chairman & Managing Director

Wing Tai Holdings Ltd

### Members

#### Mr Chan Yeng Kit

Permanent Secretary

Ministry of Health

#### Mr Khoo Boon Hui

Director

Certis CISCO Security Pte Ltd

#### Prof Tan Ser Kiat

(till 22 January 2021)

Chairman

SingHealth Fund

#### Prof K Ranga Rama Krishnan

CEO

Rush University System

for Health, USA

#### Ms Euleen Goh

Chairman

DBS Foundation Ltd

#### Mr Tony Chew

Executive Chairman

Asia Resource Corporation Pte Ltd

#### Prof Thomas M Coffman

Dean

Duke-NUS Medical School

#### Mr Loh Ngai Seng

Permanent Secretary

Ministry of Transport

#### Mr Lim Chin Hu

Managing Partner

Stream Global Pte Ltd

#### Dr Tan Yew Oo

(till 30 September 2020)

Specialist in Medical Oncology

Icon Cancer Centre Farrer Park

#### Ms Khartini Binte Abdul Khalid

Senior Lecturer

Ngee Ann Polytechnic

#### Ms Joy Tan

Partner

WongPartnership LLP

#### Mr Fong Heng Boo

Non-Executive Director

Surbana Jurong Pte Ltd

#### Ms Woon Lai Har

(till 30 September 2020)

Managing Director

LwH Consultancy Pte Ltd

#### Ms Jacqueline Poh

Deputy Secretary

Prime Minister's Office Strategy Group

## DUKE-NUS GOVERNING BOARD

### Chairman

#### Mr Goh Yew Lin

Managing Director

G.K. Goh Holdings Ltd

### Deputy Chairman

#### Prof Ho Teck Hua

Senior Deputy President and Provost

Tan Chin Tuan Centennial Prof

National University of Singapore

### Members

#### Dr Fidah Alsagoff

Senior Managing Director

Joint Head, Enterprise Development Group

Head, Life Sciences

Temasek International Pte Ltd

#### Prof Edward G Buckley

Vice-Dean for Education

Chair, Department of Ophthalmology

Duke University School of Medicine

#### Mr Chng Hak-Peng

Chief Executive Officer

Singapore Symphony Group

#### Prof Fong Kok Yong

Deputy Group Chief Executive Officer

(Medical & Clinical Services)

Singapore Health Services

#### Dr Geh Min

Immediate Past President

Nature Society (Singapore)

Former Nominated Member of Parliament

#### Mr Lee Kim Shin

Partner

Allen & Gledhill LLP

#### Mr Lee Ming San

Managing Director

One North Capital Pte Ltd

#### Ms Lee Sze Yeng

Head of Audit

KPMG Singapore

#### Mr Alvin Lim

(till 31 December 2020)

Director (International Directorate)

Ministry of Finance

#### Assoc Prof Kenneth Mak

Director of Medical Services

Ministry of Health

#### Mr Mak Lye Mun

Chairman

Hwa Hong Corporation Ltd

#### Ms Joan Moh

Divisional Director for Higher Education

(Planning, Skills & Academic Research)

Ministry of Education

#### Prof Raj Mohan Nambiar

(till 31 December 2020)

Visiting Consultant Surgeon

SGH, KTPH and TTSH;

Emeritus Consultant CGH;

Senior Consultant

Ministry of Health

#### Prof Ivy Ng

Group Chief Executive Officer

Singapore Health Services

#### Mr Ong Tze-Ch'in

(till 31 December 2020)

Chief Executive

SkillsFuture Singapore;

Deputy Secretary (SkillsFuture)

Ministry of Education

#### Mrs Quek Bin Hwee

(till 31 December 2020)

Independent Non-Executive Director

The Hongkong and Shanghai Banking

Corporation Limited

#### Ms Teo Swee Lian

Non-Executive and Independent Director

Singapore Telecommunications Ltd

#### Prof A. Eugene Washington

Chancellor for Health Affairs

Duke University;

President and Chief Executive Officer

Duke University Health System

## SINGHEALTH DUKE-NUS SENIOR MANAGEMENT

### SingHealth

#### Prof Ivy Ng

Group Chief Executive Officer

#### Prof Fong Kok Yong

Deputy Group Chief Executive Officer

(Medical & Clinical Services)

#### Prof Kenneth Kwek

Deputy Group Chief Executive Officer

(Innovation & Informatics)

#### Prof Lee Chien Earn

Deputy Group Chief Executive Officer

(Regional Health System)

#### Prof Wong Tien Yin

Deputy Group Chief Executive Officer

(Research & Education)

#### Prof Ng Wai Hoe

Deputy Group Chief Executive Officer

(Strategy & Planning)

#### Prof Terrance Chua

Group Chairman, Medical Board

#### Assoc Prof Peter Lim Ai Chi

(till 30 June 2021)

Group Chief Risk Officer

#### Assoc Prof Ong Biauwei Chi

(from 1 July 2021)

Group Chief Risk Officer

#### Mr Sia Kheng Hong

Group Chief Financial Officer

#### Mr Tan Jack Thian

Group Chief Operating Officer

#### Ms Esther Tan

Group Chief Human Resource Officer

#### Assoc Prof Tan Say Beng

Group Chief Research Officer

#### Prof Chan Choong Meng

Group Chief Education Officer

#### Assoc Prof Chow Wan Cheng

Group Director, Academic Medicine

#### Adj Assoc Prof Tracy Carol Ayre

Group Chief Nurse

#### Assoc Prof Lita Chew

Group Director, Allied Health

#### Ms Audrey Lau

Group Chief Communications Officer

#### Mr Benedict Tan

Group Chief Digital Strategy Officer

#### Dr Goh Min Liong

Group Chief Medical Informatics Officer

#### Prof Tan Kok Hian

Group Director,

Institute for Patient Safety & Quality

#### Assoc Prof Tan Hiang Khoon

Group Director,

International Collaboration Office

#### Dr Michael Wong

Group Director, Regional Health System

#### Ms Lee Chen Ee

Group Director, Innovation & Transformation

#### Mr Kevin Tay

Group Chief Information Officer

#### Ms Quay Keng Wah

Group Director, Office of Strategy Management

#### Ms Elizabeth Quah

Group Director, Regional Hospital Network

#### Prof Aung Tin

Group Director, Research (Scientific)

#### Ms Enny Kiesworo

Group Director, Research (Corporate Admin & Technology Development)

#### Prof Goh Yeow Tee

Group Director, Research (Research Integrity, Compliance & Ethics)

#### Assoc Prof Nigel Tan

Group Director, Education (Undergraduate)

#### Assoc Prof Lim Boon Leng

(till 31 May 2021)

Group Director, Education (Graduate)

#### Assoc Prof Adrian Koh

(from 1 June 2021)

Group Director, Education (Graduate)

#### Mr Chua Kim Chuan

Group Chief Information Security Officer

### Duke-NUS

#### Prof Thomas M Coffman

Dean

#### Prof Patrick J Casey

Senior Vice-Dean, Office of Research

#### Ms Karen Chang

Senior Vice-Dean & Group Director,

Office of Corporate Services

#### Prof Ian E Curran

Vice-Dean, Office of Education

#### Prof Wong Tien Yin

Vice-Dean, Office of Academic & Clinical

Development

#### Assoc Prof Christopher J Laing

Vice-Dean, Office of Innovation &

Entrepreneurship

## SINGHEALTH INSTITUTIONS SENIOR MANAGEMENT



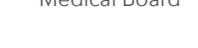
#### Prof Kenneth Kwek

Chief Executive Officer

#### Prof Ruban Poopalalingam

Chairman,

Medical Board



#### Prof William Hwang

Medical Director



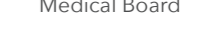
#### Prof Ng Wai Hoe

Chief Executive Officer

#### Adj Assoc Prof Siau Chuin

Chairman,

Medical Board



#### Prof Terrance Chua

Medical Director



#### Assoc Prof Au Wing Lok

Medical Director



#### Prof Christopher Cheng

(till 30 June 2021)

Chief Executive Officer

#### Prof Teo Eng Kiong

(from 1 July 2021)

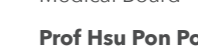
Chief Executive Officer

#### Assoc Prof Ong Biauwei Chi

(till 30 June 2021)

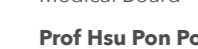
Chairman,

Medical Board



#### Ms Margaret Lee

Chief Executive Officer



#### Prof Hsu Pon Poh

(from 1 July 2021)

Chairman,

Medical Board



#### Prof Alex Sia

Chief Executive Officer

#### Prof Ng Kee Chong

Chairman,



## MANPOWER

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	3,778	165	10,832	5,826	9,293	29,894
2021	4,025	173	11,387	6,222	9,763	31,570

## OVERALL KEY FIGURES

## ACUTE CARE AND POLYCLINICS

Size		Change
Beds (as at end of March)	4,814	3.6%
	4,645	
Workload per annum		
Beds Occupancy Rate	79.3%	-2.6%pts
	81.9%	
Inpatients	239,150	-6.3%
	255,348	
Total Patient Days	1,263,594	3.8%
	1,217,413	
Average Length of Stay (days)	5.3	0.5day
	4.8	
Day Surgeries	179,396	-1.8%
	182,697	
Inpatient Surgeries	106,059	0.5%
	105,533	
Specialist Outpatient Clinic Attendances	2,468,322	-2.4%
	2,528,225	
Accident & Emergency Attendances	412,220	-21.2%
	522,910	

	Year ended 31 Mar 2021	Year ended 31 Mar 2020	Change
Dental Attendances	208,468	244,470	-14.7%
Dental Procedures	315,960	325,005	-2.8%
Polyclinic Attendances	1,591,998	1,837,506	-13.4%

## COMMUNITY HOSPITALS

Size		Change
Beds (as at end of March)	552	-9.2%
	608	
Workload per annum		
Beds Occupancy Rate	77.3%	1.2%pts
	76.1%	
Inpatients	6,852	45.1%
	4,722	
Total Patient Days	175,650	21.3%
	144,860	

## FINANCIAL INFORMATION

## ASSETS BY MAJOR CATEGORIES

	Year ended 31 Mar 2021	Year ended 31 Mar 2020
Plant and Equipment	1,119	1,191
Trade and Other Receivables	1,838	1,709
Other Assets	2,703	1,687
<b>TOTAL</b>	<b>5,660</b>	<b>4,587</b>
LIABILITIES BY MAJOR CATEGORIES		
Trade and Other Payables	3,250	2,408
Trade and Other Receivables	508	318
Other Assets	590	612
<b>TOTAL</b>	<b>4,348</b>	<b>3,338</b>
<b>TOTAL EQUITY</b>	<b>1,312</b>	<b>1,249</b>

## REVENUE BREAKDOWN BY MAJOR CATEGORIES

	Year ended 31 Mar 2021	Year ended 31 Mar 2020
Clinical Revenue	2,091	2,112
Subvention	2,971	2,708
Other Revenue*	1,060	953
<b>TOTAL</b>	<b>6,122</b>	<b>5,773</b>
EXPENDITURE BY MAJOR CATEGORIES		
Manpower	3,402	3,161
Supplies and Consumables	982	865
Other Operating Expenses	1,248	1,238
Depreciation and Amortisation	427	380
<b>TOTAL</b>	<b>6,059</b>	<b>5,644</b>

\* Includes donations to Charity Funds





31 Third Hospital Avenue, #03-03  
Bowyer Block C, Singapore 168753  
Tel: 6225 0488  
www.singhealth.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	0	0	11	98	797	906
2021	0	0	12	107	839	958



Outram Road, Singapore 169608  
Tel: 6222 3332 www.sgh.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	1,161	0	3,682	1,755	2,395	8,993
2021	1,160	0	3,740	1,893	2,408	9,201



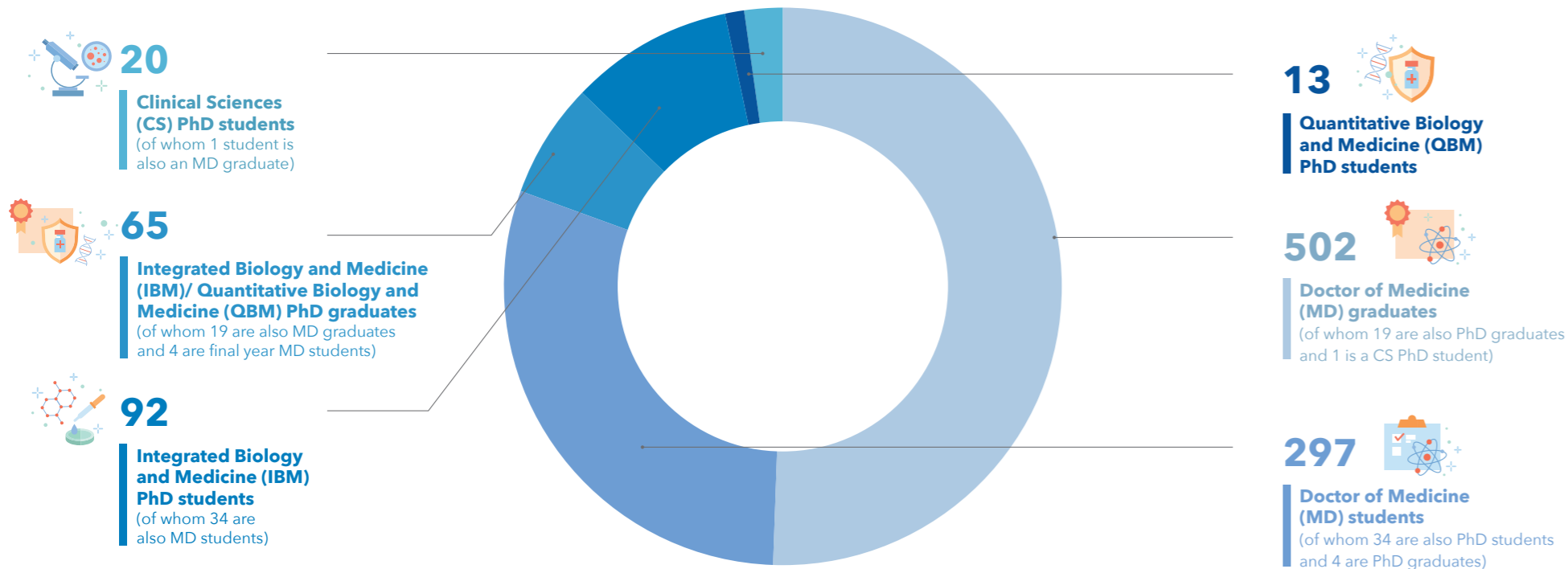
8 College Road,  
Singapore 169857  
Tel: 6516 7666  
www.duke-nus.edu.sg

### OVERALL STUDENT NUMBERS (AS AT 31 MARCH 2021)

**931**  
TOTAL NUMBER  
of MD and PhD  
students and graduates

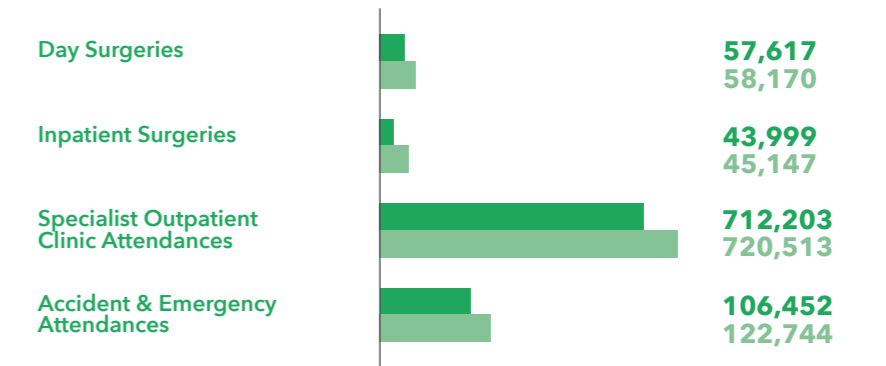
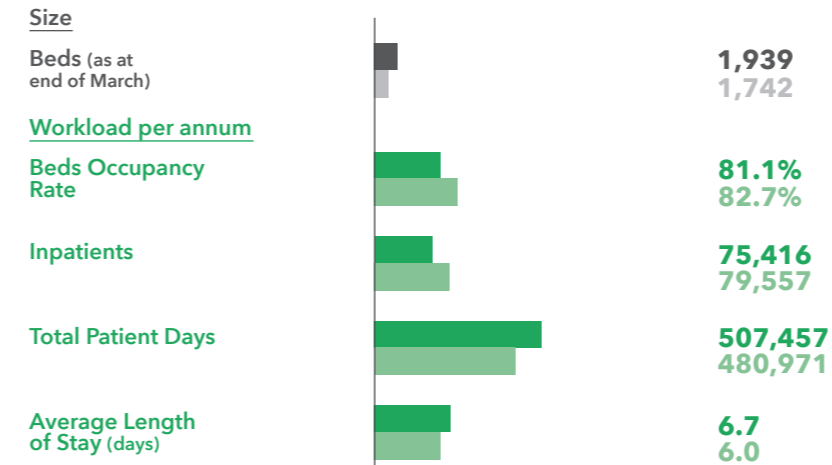
### ALL FACULTY (AS OF 31 MARCH 2021)

**2181**  
TOTAL NUMBER



### KEY FIGURES

Year ended 31 Mar 2021  
 Year ended 31 Mar 2020





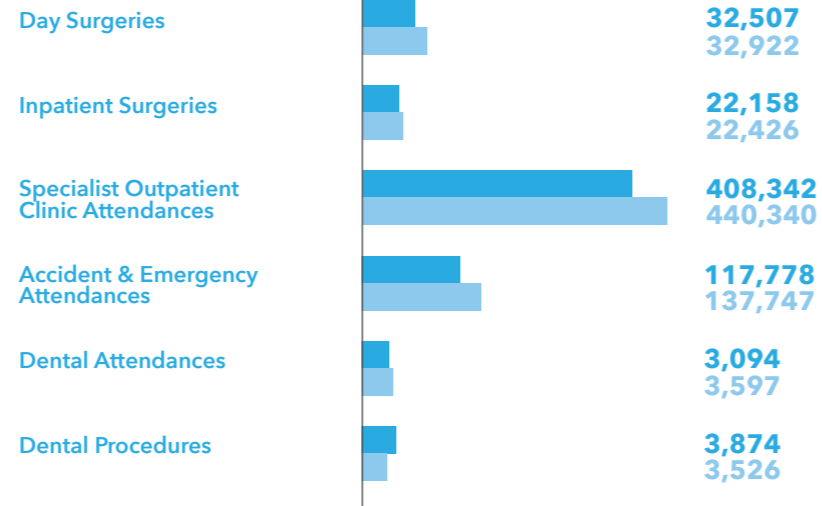
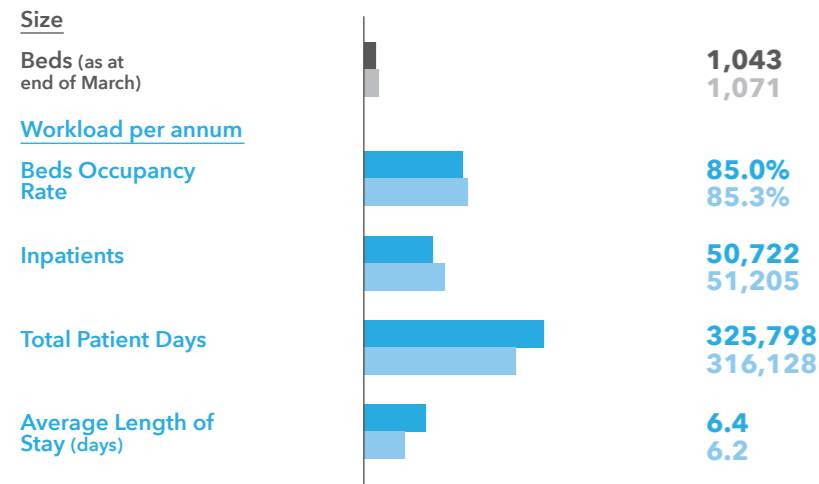


2 Simei Street 3, Singapore 529889  
Tel: 6788 8833 www.cgh.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	707	6	2,256	1,005	1,609	5,583
2021	732	5	2,294	1,028	1,677	5,736

### KEY FIGURES

Year ended 31 Mar 2021  
 Year ended 31 Mar 2020

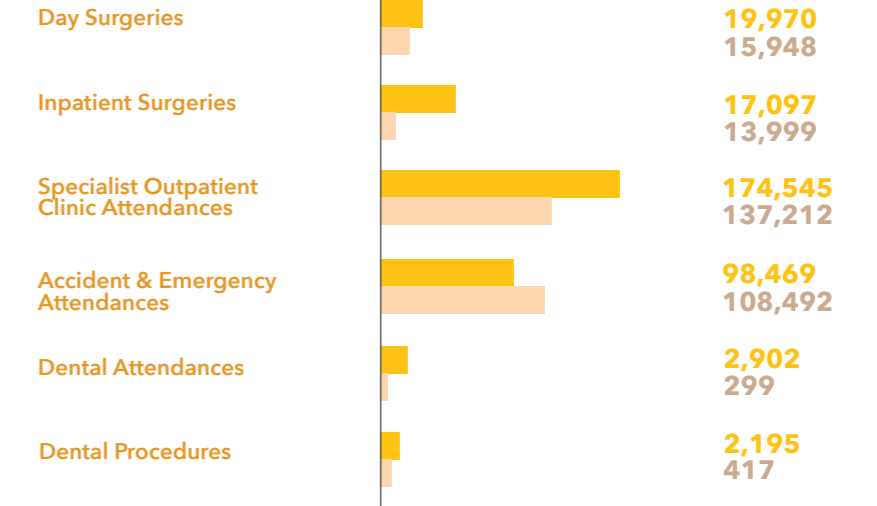
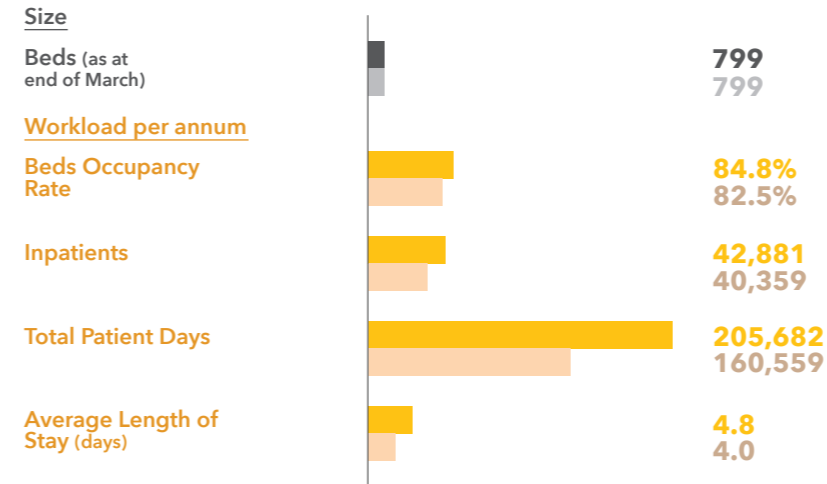


110 Sengkang East Way, Singapore 544886  
Tel: 6930 6000 www.skh.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	425	2	1,425	572	982	3,406
2021	492	2	1,618	641	1,044	3,797

### KEY FIGURES

Year ended 31 Mar 2021  
 Year ended 31 Mar 2020



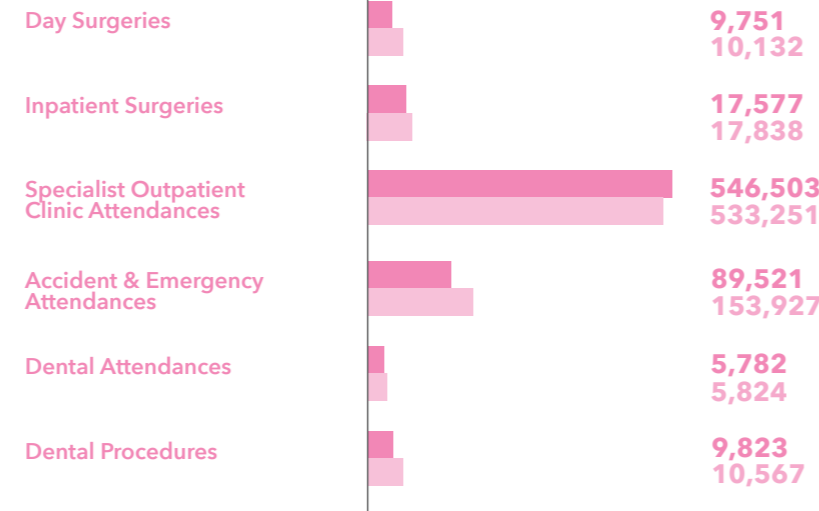
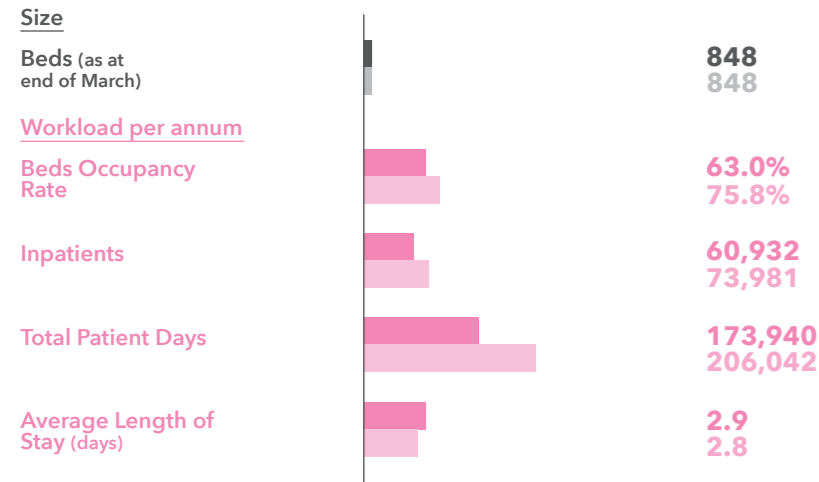
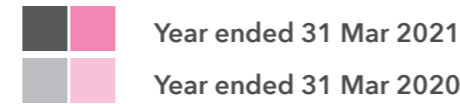




100 Bukit Timah Road, Singapore 229899  
Tel: 6225 5554 www.kkh.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	712	10	1,888	911	1,254	4,775
<b>2021</b>	<b>776</b>	<b>11</b>	<b>1,869</b>	<b>925</b>	<b>1,280</b>	<b>4,861</b>

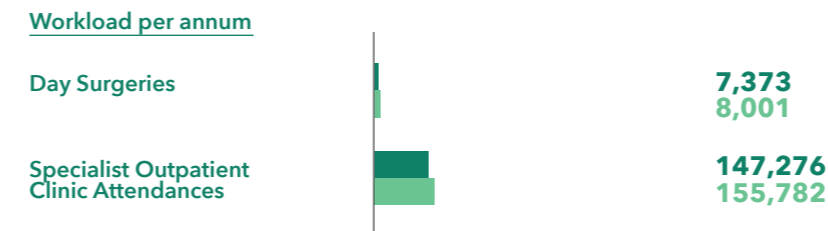
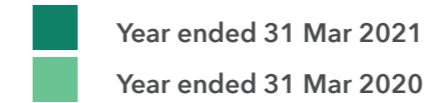
### KEY FIGURES



11 Hospital Drive, Singapore 169610  
Tel: 6436 8000 www.nccs.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	187	0	174	453	370	1,184
<b>2021</b>	<b>190</b>	<b>0</b>	<b>200</b>	<b>446</b>	<b>381</b>	<b>1,217</b>

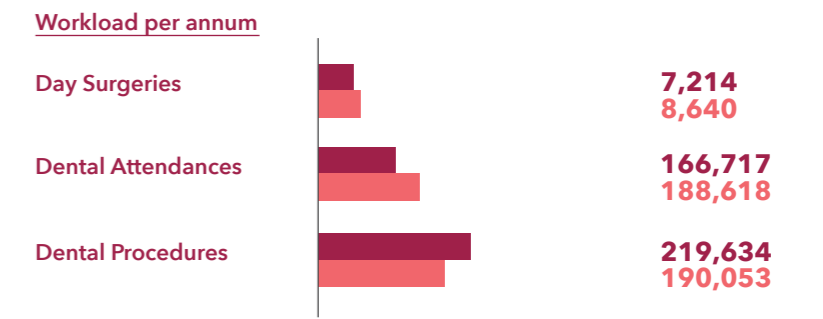
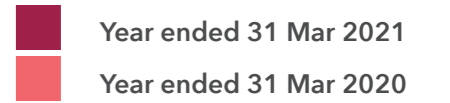
### KEY FIGURES



5 Second Hospital Avenue, Singapore 168938  
Tel: 6324 8802 www.ndcs.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	0	125	20	69	299	513
<b>2021</b>	<b>0</b>	<b>133</b>	<b>20</b>	<b>78</b>	<b>303</b>	<b>534</b>

### KEY FIGURES



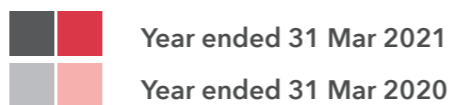




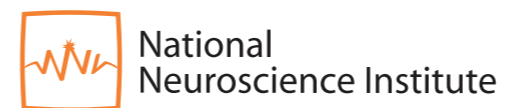
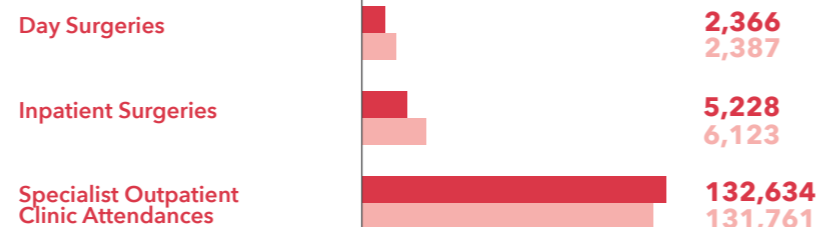
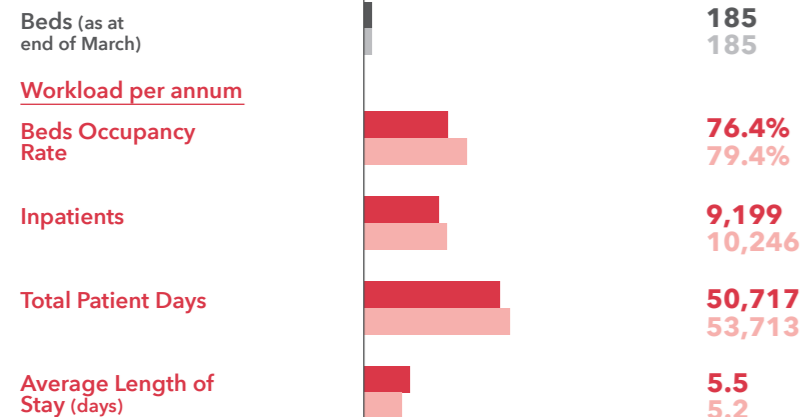
5 Hospital Drive,  
Singapore 169609  
Tel: 6704 8000 www.nhcs.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	113	0	479	311	359	1,262
<b>2021</b>	<b>146</b>	<b>0</b>	<b>472</b>	<b>301</b>	<b>358</b>	<b>1,277</b>

### KEY FIGURES



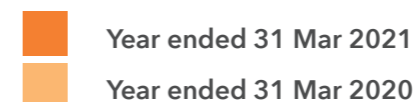
#### Size



11 Jalan Tan Tock Seng,  
Singapore 308433  
Tel: 6357 7153 www.nni.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	125	0	42	158	136	461
<b>2021</b>	<b>126</b>	<b>0</b>	<b>44</b>	<b>150</b>	<b>145</b>	<b>465</b>

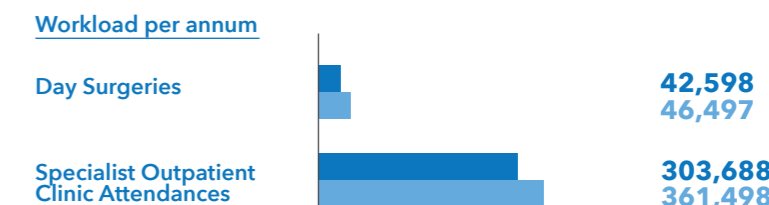
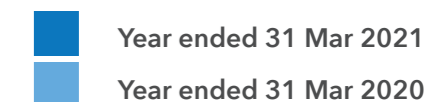
### KEY FIGURES



11 Third Hospital Drive,  
Singapore 169751  
Tel: 6227 7255 www.snec.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	113	0	291	161	337	902
<b>2021</b>	<b>115</b>	<b>0</b>	<b>310</b>	<b>167</b>	<b>367</b>	<b>959</b>

### KEY FIGURES







1 Anchorvale Street,  
Singapore 544835 Tel: 6930 6000  
www.singhealthch.com.sg

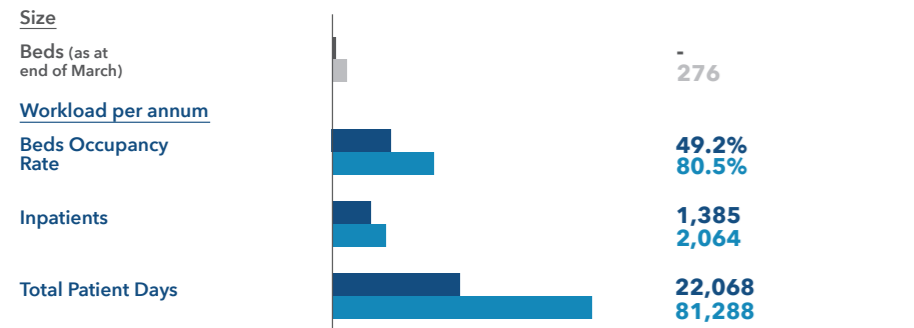
**HQ**

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	1	0	4	1	100	106
<b>2021</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>1</b>	<b>116</b>	<b>125</b>

**BRIGHT VISION HOSPITAL**

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	23	0	194	101	158	476
<b>2021</b>	<b>7</b>	<b>0</b>	<b>179</b>	<b>76</b>	<b>136</b>	<b>398</b>

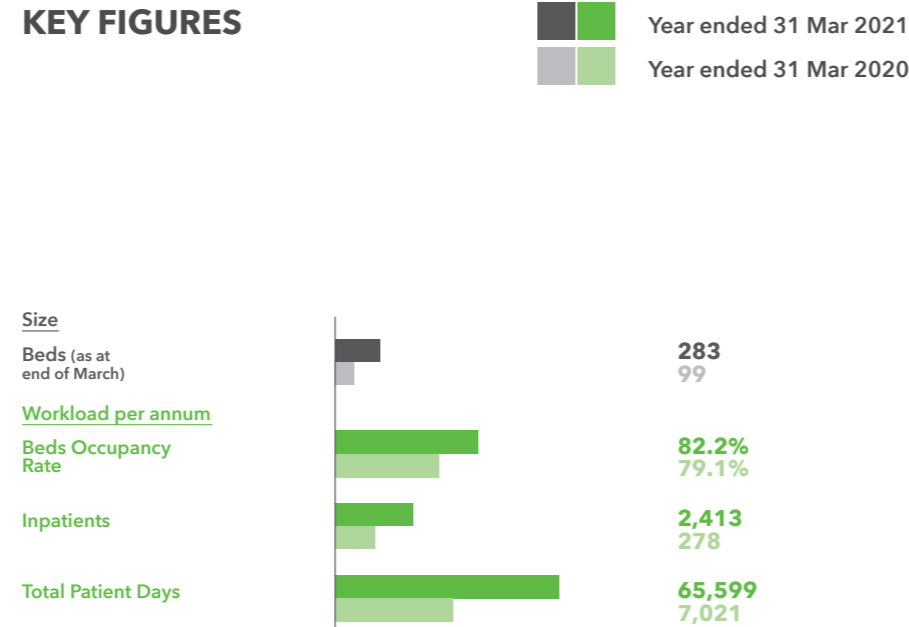
**KEY FIGURES**



**OUTRAM COMMUNITY HOSPITAL**

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	17	0	105	50	53	225
<b>2021</b>	<b>31</b>	<b>0</b>	<b>142</b>	<b>98</b>	<b>79</b>	<b>350</b>

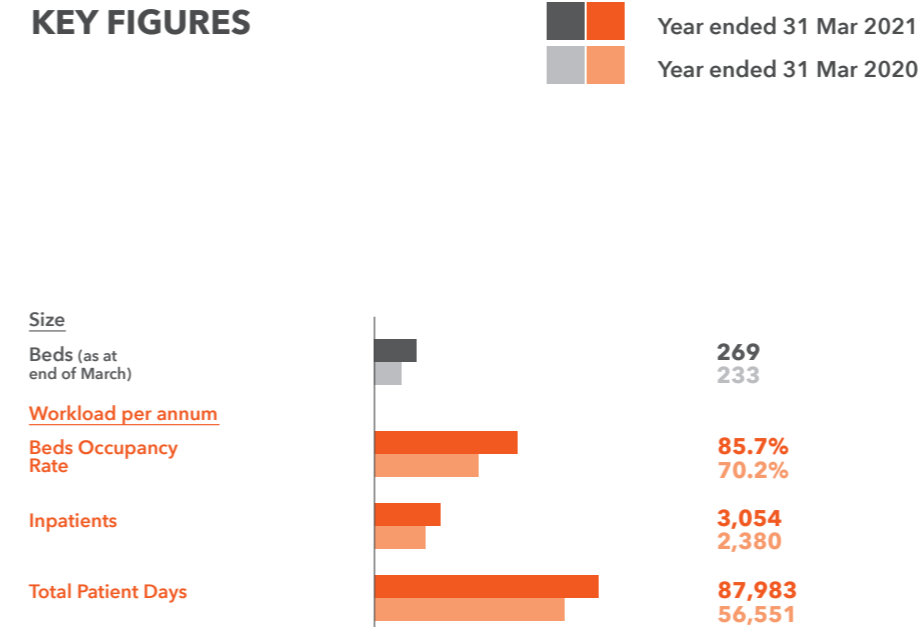
**KEY FIGURES**



**SENGKANG COMMUNITY HOSPITAL**

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	21	0	178	77	104	380
<b>2021</b>	<b>31</b>	<b>0</b>	<b>180</b>	<b>90</b>	<b>106</b>	<b>407</b>

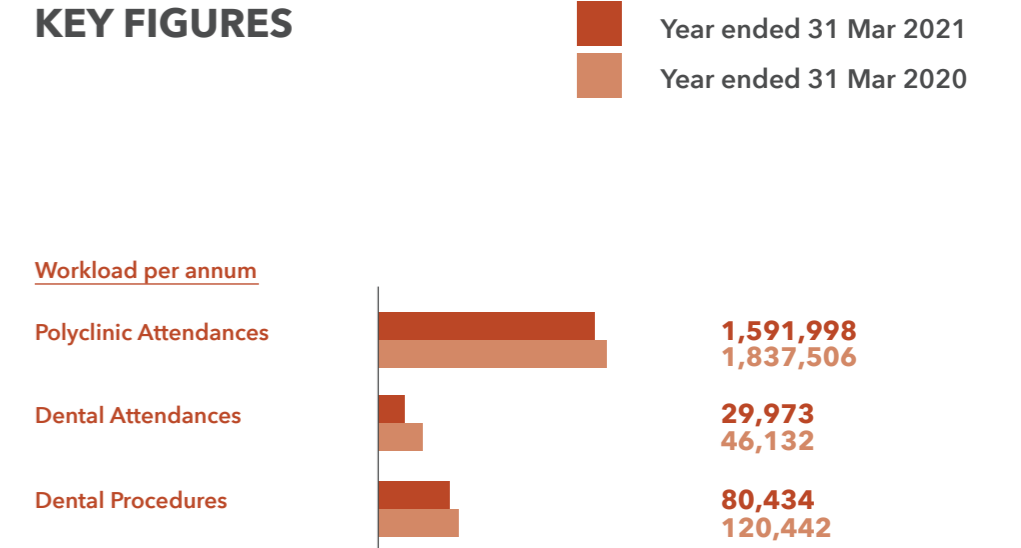
**KEY FIGURES**



167 Jalan Bukit Merah, Tower 5,  
#15-10, Singapore 150167  
Tel: 6236 4800  
polyclinic.singhealth.com.sg

YEARS	Medical	Dental	Nursing	AHPs	Others	Total number
2020	198	22	277	206	498	1,201
<b>2021</b>	<b>219</b>	<b>22</b>	<b>299</b>	<b>221</b>	<b>524</b>	<b>1,285</b>

**KEY FIGURES**





## RESEARCH STATISTICS



### STAFFING

**104** Clinician-Scientists (CSs)

(includes National, Cluster and Faculty CS)  
[SingHealth & Duke-NUS]

**365** Clinician-Investigators

[SingHealth]

**485** Principal-Investigators leading ongoing research

[SingHealth]



### RESEARCH ACHIEVEMENTS

**Publications in international peer-reviewed journals**

(SingHealth)

**>18,500**

(Duke-NUS)

**>8,400**

**Competitive Funding**

[SingHealth & Duke-NUS]

**>S\$2.03B**

**Awards**

[SingHealth & Duke-NUS]

**2** Singapore Translational Research Investigator Award

**4** Clinician Scientist Awards (3 CSA-INV & 1 CSA-SI)

**2** Transition Awards



### NURSING

**\$762,600**

Quantum of grants awarded

**15**

Grants

**35**

Research projects with nurses as principal investigators

**68**

Publications

**5**

Presentations



### ALLIED HEALTH PROFESSIONALS

**>200**

Allied Health Professionals involved in research

**217**

Papers published

**\$1,786,863**

In Grants received

## EDUCATION STATISTICS



### UNDERGRADUATE EDUCATION

SingHealth handles about **40.8%** of the nation's clinical teaching load annually. On an average day in FY20, SingHealth provides training to

**270** Medical Students

**463** Nursing Students

**125** Allied Health Students



### GRADUATE EDUCATION

#### MEDICAL RESIDENCY

As the largest Sponsoring Institution for medical Residency programmes in Singapore, SingHealth has:

**206** new medical Residents in AY20

**1,716** faculty members

**934** medical Residents in training across **35** programmes

**22** ACGME-I Accredited programmes

**13** JCST Accredited programmes

**151** medical Residents graduated from SingHealth Residency in AY20

#### ORAL HEALTH RESIDENCY

**21** new dental Residents joined SingHealth in AY20



### POSTGRADUATE & CONTINUING EDUCATION

#### ALLIED HEALTH EDUCATION

**12,774** healthcare professionals trained in **336** Allied Health Continuing Professional Education programmes

**MEDICAL EDUCATION**  
Close to **360** junior and senior clinicians attended clinician development programmes

#### NURSING EDUCATION

**37,778** nurses trained in **880** Continuing Nursing Education programmes

#### TECHNOLOGY-ENHANCED LEARNING & INNOVATION

**>750** simulation training workshops conducted for **8,672** healthcare professionals

More than **38%** increase in online courses created on the SingHealth eLearning Portal, with **>33,000** users from FY19-20

#### EDUCATORS DEVELOPMENT

**>2,400** educators equipped through **>60** AMEI Education Grand Rounds and workshops

**SGD38,500** of AMEI Education Grant awarded to **8** projects and scholarly efforts to improve educational outcomes

#### ORAL HEALTH EDUCATION

**222** education programme sessions conducted for oral health professionals

#### HEALTHCARE ADMINISTRATION & LEADERSHIP

**1,178** healthcare professionals and administrators trained in **55** programme sessions



### RECOGNISING EDUCATIONAL EXCELLENCE

**12** educators conferred the AMEI Golden Apple Awards 2020

**293** Residency faculty and Residents received the Residency in SingHealth Excels! (RISE) Awards 2020

**9** House Officers **30** Medical Officer received the SingHealth Best Junior Doctors Awards 2020

**7** graduating Duke-NUS students accorded the SingHealth Awards 2020





PATIENTS. AT THE HE<sup>ART</sup> OF ALL WE DO.®



Singapore General Hospital



Changi General Hospital



Sengkang General Hospital



KK Women's and Children's Hospital



National Cancer Centre Singapore



National Dental Centre Singapore



National Heart Centre Singapore



National Neuroscience Institute



Singapore National Eye Centre



SingHealth Community Hospitals



Polyclinics SingHealth