YEARS OF TRANSFORMATIVE MEDICINE

SingHealth Duke-NUS Academic Medical Centre
ANNUAL REPORT 2020/2021
200 Years and Beyond

2021 is a historic year for SingHealth as we celebrate Singapore General Hospital’s bicentennial and 200 years of Medicine in Singapore. Through the years, we have witnessed many significant milestones – from the birth of medical specialisations in Singapore to the establishment of specialty centres for the NHCS, to the launch of the SGH Campus Master Plan in 2016 to support better care of our patients. Today, Singapore is known globally for its reliability, accessibility and affordability of our healthcare system, and 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 are proud to forge ahead to transform the way we deliver care to our patients 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

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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 app application enables patients to keep track of their appointments, and they 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 deliveries 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 Academic Medical Centre (AMC) family & a forum for planning strategic activities and investments in healthcare innovation, structures and processes, it is our vision to become the global leader in patient-centred innovative care. To make hospital visits hassle-free, we also introduced free delivery of medications to patients’ homes, workplaces or selected pharmacies in the community.

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2020 has been a trying year not only 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 clinician fought the novel coronavirus in the trenches. Whether that was in the lab, in the field or online, we collectively demonstrated that we are on the great things even in challenging times.

During this pandemic, we continued to pursue impactful research and translate discoveries into bedside tools. Last year alone, our research community published more than 1,300 peer-reviewed publications, and more than 3,800 peer-reviewed preprints. This brought SingHealth Duke-NUS to a new milestone—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. Together, our students created more than 600 articles. Many of these achievements were made possible by the partnership with SingHealth Duke-NUS. Together, we make greater things happen for our patients, lives of those whom we serve.

Our researchers, too, worked tirelessly to light a fire on this virus, tackling the most pressing challenges faced. Early on, our clinicians led our hospital and community efforts to contain and sequence the virus. From there, we developed a surrogate modelling, which led to the first COVID-19 vaccine in the world. It was the first in the world to receive Emergency Use Authorization from the US FDA and Drug Administration. As it becomes process and human samples, this may yet play a key role in identifying the origin of COVID-19.

This ensured that we graduated students who were competent, confident in our students that they were fully equipped with compassionate and caring young doctors. It also instilled confidence in our students that they were fully equipped with compassion and confidence in our students that they were fully equipped with compassionate and caring young doctors. It also instilled confidence in our students that they were fully equipped with compassion and confidence in our students that they were fully equipped with compassion and confidence. This ensured that we graduated students who were competent, confident in our students that they were fully equipped with compassion and confidence. This ensured that we graduated students who were competent, confident in our students that they were fully equipped with compassion and confidence. This ensured that we graduated students who were competent, confident in our students that they were fully equipped with compassion and confidence.
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 home to many organizations, 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 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 role in 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.
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.
As we celebrate 200 years of Medicine in Singapore, hear from our staff who share about the transformative journeys in their respective professions.

**OUR STAFF, OUR PRIDE**

- **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

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

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

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

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

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

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

- **Assoc Prof Christopher Laing**
  Vice-Dean
  Innovation and Entrepreneurship
  Duke-NUS Medical School
Moving forward, the future of dental education will be an exciting one with the continuous and rapid advancements in technology and big data.

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 multidisciplinary specialist centre. 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. 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 relate 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. This was initially done as a means 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.
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.

Another key development is our role in the National Precision Medicine programme, where I, together with Dr. Joanne Ngwia, Head, Cancer Genetics Service at National Cancer Centre Singapore, and Dr. Lim Peng Chiang, 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.
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 body 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 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 elderly 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 Zebra Systems allows patients to exercise in a real-world environment. 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.
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’s programmes put in place are tailored to the needs of medical institutions and impact healthspan. It recognises that the whole population can be empowered to live well, get well and well look after their communities and homes.

To achieve this, SingHealth and our network of patients 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 who 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), which integrates SingHealth Polyclinics (SGP), the Agency for Integrated Care and the Ministry of Health’s Office for Healthcare Transformation, to better coordinate care for patients with diabetes and complex care needs. A multidisciplinary care team develops a care plan, addressing patients’ health and psychosocial needs. The team, which comprises doctors from SGP, SingHealth Community Hospitals 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 SGP. 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 teams, 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-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 and the 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
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 training.

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 visits, it can provide 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 consultations in their environments, rather than in ours.

As one of the Institution Project Leads involved in driving telehealth adoption in SingHealth, our focus was to convert “walk-in” care to “log-in” care. At SGH, we piloted video consultations with Endocrinology, going from zero in April 2020 to 20 consultations 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, as well as training healthcare staff to enhance interactions between patient and provider, as well as among healthcare staff across specialty, 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 benefiting 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.

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). The app is designed to make learning and teaching in A&E more accessible and engaging. 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.

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.

Our Staff

200 YEARS
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 be immediately obvious is what distinguishes 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 applying new knowledge, and seeks best practice, and does what best.

The SingHealth-Duke-NUS AMC aspires not only to serve our patients by delivering quality service, but also by being thought leaders in healthcare innovation. 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 patients, and innovation plays an important role in this process.

In the past two years, we have seen a threefold increase in the number of applicants for innovation seed funding. Different areas of the AMC have contributed to this number. From the Office of Innovation and Transformation, the AMII is a newly established platform in the Duke-NUS Medical School’s Office of Innovation and Entrepreneurship, the AMII is a newly established platform in the Academic Medicine Institute (AMII), a newly-established platform in the Academic Medicine Institute (AMII).

Ms Lee and Assoc Prof Laing co-chair the Academic Medicine Institute. The AMII is 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 AMC and jointly chart broad strategic directions for healthcare innovation. In doing so, we hope to advance healthcare and ultimately deliver improved patient care.

In the AMC, we support innovators like them and for most people, this is something that propels our innovation efforts forward.

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 Leo Chan Ee
Group Director, Innovation and Transformation
SingHealth

The AMII also plays an important role in advising innovators and leaders 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 AMII.

In building a culture of innovation, “top down” or “bottom up” 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.

In the AMC, every idea brought to the table will be considered, and the goal is to support innovators and foster a culture of innovation and experimentation across the AMC. Our goal is to create a seamless continuum from science and discovery to real-world patients, and innovation plays an important role in this process.

Collaboration is key as innovation is not something one does in a bubble. Successful innovation requires multiple fingerprints. It is equally important to consider external partnerships. I am a huge champion for bringing industry perspectives into the equation. This is because the quids we can test and validate new ideas in the real-world market, the more likely we are to find ideas that can be adopted and scaled.

It should be noted that our AMC is empowered to think of themselves as innovators – whether they are administrators, educators, physicians, scientists or nurses. And that we would be the final idea that is adopted and scaled.

200 YEARS
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
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 transitioned to General Dental Practitioners for follow-up care.

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.

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.

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.

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.

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.

The 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 medical advice and conditions with measures to ensure their conditions are well managed and screened for family members.

The Shimadzu-Changi General Hospital (CGH) Clinomics Centre is equipped with cutting-edge technology to offer personalized treatment for patients with chronic diseases such as hypertension. Using liquid chromatography and 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 individualized treatment.

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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.

The SingHealth Duke-NUS Memory and Cognitive Disorder Centre brings together specialist expertise from across the cluster to offer our patients integrated and multi-disciplinary care.

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.

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.

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

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.

The newly launched Stroke Buddy mobile application—housed within SingHealth’s Health Buddy app — is a one-stop portal providing patients with rehabilitation, medication, and the latest stroke research. Stroke survivors regain independence on their journey to recovery, developed by the NNI-SGH Stroke Team, during the COVID-19 “circuit breaker” in 2020 to connect with patients when non-urgent specialist appointments and rehabilitation services were temporarily suspended.

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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.

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.

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.

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 also stops walking if obstacles such as walls or barriers are detected ahead.

SG-Inspire

Clinicians-innovators from KKH, SGH, CGH and SKH, in collaboration with the SingHealth Medical Technology Office and industry partners, created SG-Inspire, a prototype ventilator 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.
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

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.

In January 2021, the Campus COVID-19 Safe Vaccination Practice (COSP) 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.

Developing staff competencies in patient safety and quality

During the COVID-19 pandemic, various virtual interactive workshops were organized 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.

The SingHealth Duke-NUS IPSQ webinar series

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.

Open 200 years

Fostering a joyful and resilient workforce

TeamTHRIVETM 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 program, TeamTHRIVETM will be rolled out to all SingHealth institutions and healthcare professionals on a monthly basis.

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.

Keeping PatientS and Healthcare workers Safe

The New Normal 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 organized 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 Partnership Care Webinar in 2020, as part of the IPSQ webinar series, with monthly sessions held since 5 November 2020.

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PLANNED PROGRAMME FOR YEAR 2022

Elevating patient safety & quality (PSQ) assurance

The SingHealth Duke-NUS IPSQ webinar series

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Optimal communications, participative leadership and teamwork are crucial in promoting a strong patient safety culture and nurturing resilient health workforce amongst healthcare workers. New programmes were introduced to support staff mental well-being and resilience.

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ADVAncing education amidst adversity

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 Emergencies, Trauma & Shock, and the Archives of Emergency Medicine & Intensive Care. To facilitate experiential learning, simulation-based training is now conducted on a virtual platform, as well as key considerations for healthcare simulation during the pandemic.

Reaffirming the way forward in education

In 2020, SingHealth Residency celebrated its 10th year in graduate medical education. SingHealth has trained more than 900 Residents, including 21 specialties over the years. Since the start of the COVID-19 pandemic, SingHealth Residency has recruited five new CS Residents, fostering a strong pipeline of clinicians for tomorrow’s healthcare.

Improving students’ learning of anatomy

Digital anatomy resources are deployed at Duke-NUS Medical School to support anatomy education. The new Immersive Learning Space allows for flexible teaching and self-directed learning, and features 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 robotic arms. The Library also houses virtual and augmented reality facilities.

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, mapping, reporting and community website support. This aids teaching efficiency, allows better tracking and provides the best 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 Nurses who had acquired a degree in nursing and went on 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.

Launching of first Allied Health Residency programme

In 2020, SingHealth Residency launched its first Allied Health Residency programme, the Allied Health Residency in Radiation Oncology. The Residency, jointly developed by the SingHealth Academy and the National Cancer Centre Singapore, was launched in March 2021. The programme prepares nuclear medical Dosimetrists to transit from generalists to specialists, equipping them with the knowledge and skills to support patients at all stages of treatment.

Celebrating graduate medical education excellence


2016
2018
2020

Shaping the delivery of healthcare simulation

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Adapting to COVID-19
SingHealth Residency worked closely with unique stakeholders to integrate the impact of COVID-19 on medical training in various aspects of progressive examinations and teaching methods. Through these efforts, there were no delays in year-on-year progression and final year Resident graduation. Despite the challenging circumstances, SingHealth Residency and SingHealth Medical Academic Centre (SMAC) continued ACMEI institutional accreditation for the next five years with zero citations.

Despite the challenging circumstances, SingHealth Residency worked closely with various stakeholders to mitigate the impact of COVID-19 on medical training in various aspects of progressive examinations and teaching methods. Through these efforts, there were no delays in year-on-year progression and final year Resident graduation. Because of the pandemic, some of these included the inaugural SingHealth Residency Foundation (SRF) ACGME-I Institutional Accreditation for the next five years with zero citations.

Online training events and workshops
Key training events and workshops successfully operated online during the pandemic. Some of these included the inaugural Singapore Allied Health Conference, which gathered more than 200 clinicians and oral health therapists from Singapore, Malaysia, Australia and USA to share their clinical skills and expertise in implant dentistry and endodontics; and the AMEI Teachers’ Day Webinar, which have attracted by almost 300 healthcare educators and learners who gained insights on the unique teaching opportunities presented by the pandemic.

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

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 200 overseas medical students were offered free virtual daily lessons that are mirrored to their counterparts studying overseas. 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.

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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 to develop healthcare leaders, including junior staff with supervisory roles, newly hired and promoted team leaders and supervisors across all healthcare professions.

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 convenor 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 in amalgamating efforts in achieving targeted outcomes. In exploring emerging areas such as real-world evidence and precision medicine, CoRE will continue to strive for innovation in the healthcare system strengthening and policy innovation.

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Embracing technology to deliver high-stakes clinical 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.

Developing clinicians in telemedicine

Against the general global trend of canceling 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.

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THE PROGRAMME FOR PANDEMIC PREPAREDNESS AND 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.

Pandemic response

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 Yale-NUS College to study emerging disease threats. SDGHI is also investigating the funding of four projects with Principal Investigators from all three institutions along with regional collaborations, 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 migration strategies across ASEAN countries to examine the impact of pandemic control measures on mobility and disease control. A study on non-communicable diseases (NCDs) is a tool for 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, 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. SDGHI also collaborated with pharmaceutical firm, 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.

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Publications

As of April 2021, SDGHI faculty published papers covering different aspects of COVID-19, pushing the envelope on pandemic response with breakthrough studies on surveillance, virology, and diagnostics. From a COVID-19 policy lens, SDGHI faculty have contributed to strengthening global regulatory coordination and agility.

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 College, along with medical students from other institutions in the region, were involved in global health research projects with faculty members on topics such as the impact of COVID-19 on surgical systems and the impact of COVID-19 on NCD control measures across Asia.

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 Asia-Pacific Centre of Public Health (ACP) in 2019, which led them to visit Sri Lanka in pursuit of their research project. Under the supervision of Professor Kuda Banda Galketiya Zhen Luan studied the treatment of chronic venous disease in the local population, while Professor Moungathithebe Duonghimee Lounaneva of Savannakhet University supervised Julienne’s research to examine the quality of life of patients receiving treatment for haemorrhoids.

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In response to the COVID-19 pandemic, we designed, tested and deployed an innovation in saliva sampling for rapid COVID-19 detection. The Local 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. The Lien Centre for Palliative Care (LCPC) at Duke-NUS Medical School also co-developed the “Best Practices for COVID-19” and revised it to include guidelines on a phased-vaccine. The LCPC also co-developed the “Best Practices for COVID-19” and revised it to include guidelines on a phased-vaccine. The LCPC also co-developed the “Best Practices for COVID-19” and revised it to include guidelines on a phased-vaccine.
Duke-NUS Medical School spin-off to develop cancer immunotherapies

The Singapore National Eye Centre (SNEC) and Singapore Eye Research Institute (SERI) have created an Artificial Intelligence-based deep-learning system that can interpret multiple photographs of the back of the eye and accurately detect if there is an eye condition that points to a brain tumour or other life- or vision-threatening conditions. The AI system scored 96 per cent in sensitivity in picking up images with papilledema, a rare condition that can lead to blindness due to high pressure within the skull, using virtual reality (VR) technology. Using the AI system, the team is also developing an accurate and low-cost screening tool that could be used in hospitals, clinics, and private clinics.

A new immersive virtual reality tool developed by Singapore Polyclinics (SHP) and Duke-NUS Medical School in collaboration with the Institute of Technical Education, has shown promise in helping older adults. SHP is a Singapore-based, not-for-profit organisation that works to help older adults into possible alternative technologies and designs to help older internet users overcome these health-related barriers. A survey of nearly 4,000 Singaporeans by Duke-NUS Medical School, Nanyang Technological University, Singapore and University of Massachusetts found that older adults encounter difficulties using the internet due to health issues, such as poor vision or difficulty moving. These findings could provide insights into possible alternative technologies and designs to help older internet users overcome these health-related barriers.

A team from Duke-NUS Medical School found that inhibiting the enzyme JNK in MBNL1-low cancers could reverse a process that makes them more invasive. These findings could lead to the development of new cancer treatments.

The Singapore National Eye Centre (SNEC) and Singapore Eye Research Institute (SERI) have identified a unique lean diabetic phenotype among Asian patients with heart failure. Despite having a low body mass index, these patients had symptoms of heart failure, with a higher risk of hospitalisation and death. A team from Duke-NUS Medical School found that inhibiting the enzyme JNK in MBNL1-low cancers could reverse a process that makes them more invasive. These findings could lead to the development of new cancer treatments.

Protein predicts cancer survival

Photo credit: PairX and Duke-NUS Medical School

Genetic sleuths identify world’s first cases of Jamuar Syndrome

KKH clinicians played a pivotal role in identifying the world’s first known cases of a rare genetic disease named the Jamuar Syndrome. The Jamuar Syndrome is named after Dr Saumya Jamuar, Senior Consultant, Genetics Service at KKH and Head of the SingHealth Duke-NUS Genomic Medicine Centre, who first encountered the disease in patients seen at KKH. Dr Jamuar identified the disease as a unique genetic disorder that affects the brain and nervous system. The disease is characterised by seizures and speech and developmental delays. A team from KKH and researchers from A*STAR discovered that the genetic cause for developmental epileptic encephalopathies – a group of disorders characterised by epileptic seizures and speech and developmental delays – lies in a mutation in the protein-coding gene UDP-glucose 6-dehydrogenase.

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Drug shown to precisely target non-small cell lung cancer drivers

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 in all patients with NSCLC who do not have an EGFR or ALK mutation. The results have significant efficacy, strong, sustained response rates and fewer side effects.

Strengthening Health in ELDerly through nutrition (SHIELD)

A team of researchers from A*STAR, IMH 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 mothers pass allergies to offspring while they are developing in the womb, and further studies in human cells suggested that a similar mechanism likely exists in humans. This hints at why infants are developing allergies so early in life in ways that cannot be only explained by genetics.

Mothers pass on allergies to offspring

An international collaboration involving Duke-NUS Medical School and Murdoch University has discovered an approach for forming induced trophoblast stem cells (iTSCs) in early-stage human embryos. It opens the door to better understanding pregnancy complications, which cause complications like pre-eclampsia and restricted foetus growth.

Skin cells reprogrammed into placenta precursors

An international team of researchers from the National Neuroscience Institute (NNI), Singapore University of Technology and Design (SUTD), Duke-NUS Medical School, A*STAR and Oxbridge identified two new gene loci (SV2C and WBSCR17) in Asians with Parkinson’s disease, which could slow the disease progression. Early diagnosis and timely intervention could slow the disease progression.

New Asian genetic factors for Parkinson’s Disease identified

Researchers from the National Neuroscience Institute (NNI), Nanyang Technological University, Singapore National Eye Centre and the Genome Institute of Singapore discovered two new gene loci (SV2C and WBSCR17) in Asians with Parkinson’s disease, which could slow the disease progression. The findings pave the way to better understanding pregnancy complications.

Skin cells reprogrammed into placenta precursors

A National Cancer Centre Singapore (NCCS) study found that patients with natural killer (NK) T-cell lymphomas (TCLs), a rare but aggressive type of blood cancer, respond well to a PD-1 immunotherapy drug. Thye, Deputy Medical Director (Clinical), NCCS and Principal Investigator of the Lymphoma Genomic Translational Research Laboratory, NCCS, and Prof Lim Soon Eng, Senior Consultant, NCCS, explained that the drug, pembrolizumab (trade name Keytruda), that precisely targets the PD-L1 gene mutation, was effective at shrinking tumours in patients with natural killer cell (NK) T-cell lymphoma (TCL), a rare but aggressive type of blood cancer, responding well to the drug pembrolizumab (trade name Keytruda). The drug precisely targets the PD-L1 gene mutation, which is expressed on many types of cancer cells.

Female Drs. Choe and Ratna investigate the Lymphoma Disease, Translational Research Laboratory, NCCS, and Prof Lim Soon Eng, Senior Consultant, NCCS, explained that the drug, pembrolizumab (trade name Keytruda), that precisely targets the PD-L1 gene mutation, is effective at shrinking tumours in patients with natural killer cell (NK) T-cell lymphoma (TCL), a rare but aggressive type of blood cancer, responding well to the drug pembrolizumab (trade name Keytruda).

Impairments in this process can lead to obesity whose expression decreased with age, was involved in new fat proportion in white adipose tissue. One lncRNA in particular, whose expression decreased with age, was involved in new fat proportion in white adipose tissue. One lncRNA in particular, that functioned differently as mice aged. They found a significant proportion in white adipose tissue. One lncRNA in particular, that functioned differently as mice aged. They found a significant proportion in white adipose tissue. One lncRNA in particular.
HEALTH SERVICES

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, 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

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.

Local study on deprescribing safety

Polypharmacy is common amongst the elderly and is linked to adverse health outcomes such as falls and confusion. A recent study from the 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.

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 immunemodulation 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 I 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.

Cataloguing the ‘fingerprints’ that reveal cancer’s secrets

In a significant advance in unravelling 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, treatment strategies, and screening exposed individuals more intensively.

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

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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:

**FUNDING RECEIVED IN FY2020**

<table>
<thead>
<tr>
<th>Category</th>
<th>Funds Received</th>
<th>Patients in need</th>
<th>Resilience in crisis</th>
<th>Areas of greatest need</th>
<th>Total funds received</th>
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</thead>
<tbody>
<tr>
<td>Academic Medicine (Research &amp; Medical Education)</td>
<td>$44.06m</td>
<td>$12.99m</td>
<td>$2.09m</td>
<td>$11.54m</td>
<td>$70.68m</td>
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</table>

**NEW NAMED FUNDS CREATED**

In FY2020, 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 Teo and Betty Huian Paediatric Cardiac Care Programme Fund
- Paediatric Neurology Research Fund
- Paediatric Plasma 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**

- The newly-established Cheng Kim Kiu Herbal Biodiversity & Medicine Programme aims to pioneer science-based herbal studies to generate new knowledge and bring about novel breakthroughs that will translate into clinical outcomes. Made possible with a $5 million gift from Verdant Foundation and Biodiversity Research Limited in memory of Dr. Cheng Kin Kiu’s father, the programme aims to drive understanding of the molecular bases of the medicinal value of selected plants and translate them into clinically approved therapeutic agents.

- The newly-established Cheng Kin Kiu Herbal Biodiversity & Medicine 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.

- The newly-established 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. Two new scholarships established

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**THE 2020 ANNUAL REPORT**

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

- Cheng Kim Kiu Herbal Biodiversity & Medicine Programme
- Hong Kong University of Science and Technology (HKUST) in particular the Institute for Quantum Computing (IQC) and the Department of Physics, to develop new methods for quantum control and quantum communication.

**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 highest risk for heart disease based on blood biomarkers. The research team also 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.

**Two new scholarships established**

- Kathy Goh Professorship in Pathology
- Goh Cheng Liang Rheumatology ARISE Programme

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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.

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.

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.

Major Gifts

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 900 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.

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. 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

An anonymous donor’s gift of $1,000 kick-started the SingHealth General Hospital (SH) Mental Health Resilience Programme. The fund acknowledges the contributions of mental health workers who have worked tirelessly through the pandemic to engage 900 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.

The BRAVE Fund is a multi-stakeholder fund, set up in 2020 by NGOs and firms to support the mental well-being of our frontliners in the fight against COVID-19.
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.

Prosperity for a cause!

As a token of appreciation for their hard work and perseverance over the past year, SKH 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.

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.

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.

SGH Solidarity Pledge

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.

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<thead>
<tr>
<th></th>
<th>FACTS AND FIGURES</th>
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<tbody>
<tr>
<td>1</td>
<td>ABOUT US</td>
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<tr>
<td>2</td>
<td>LEADERSHIP</td>
</tr>
<tr>
<td>3</td>
<td>OVERALL KEY FIGURES AND STATISTICS</td>
</tr>
<tr>
<td>4</td>
<td>INSTITUTION STATISTICS</td>
</tr>
<tr>
<td>5</td>
<td>RESEARCH STATISTICS</td>
</tr>
<tr>
<td>6</td>
<td>EDUCATION STATISTICS</td>
</tr>
</tbody>
</table>
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, SingHealth 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 translate medicine and improve lives in Asia and beyond.

For more information, please visit:
www.singhealthdukenus.com.sg
www.singhealth.com.sg
www.duke-nus.edu.sg

OUR COMMON PURPOSE

PATIENTS: AT THE HEART OF ALL WE DO.*

OUR MISSION

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

OUR VISION

Defining Tomorrow’s Medicine

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 groundbreaking research and translational innovation, Duke-NUS has gained international recognition. The enduring impact of its discoveries is amplified by successful Academic Medicine partnerships with SingHealth, Singapore’s largest healthcare group. This strategic alliance enables Duke-NUS to harness multidisciplinary research and education to transform medicine and improve lives.

For more information, please visit:
www.duke-nus.edu.sg

MEMBERS OF THE SINGHEALTH GROUP

Hospitals:
Singapore General Hospital, Changi General Hospital, Singapore 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, Punggol, Sengkang, Tampines, Eunos (expected completion: 2021) and Tampines North (expected completion: 2023)

*For more information, please visit:
www.singhealthdukenus.com.sg
### OVERALL KEY FIGURES

#### MANPOWER

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical</th>
<th>Nursing</th>
<th>Others</th>
<th>Total Number</th>
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<tbody>
<tr>
<td>2020</td>
<td>3,778</td>
<td>10,832</td>
<td>5,826</td>
<td>29,894</td>
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<tr>
<td>2021</td>
<td>4,025</td>
<td>11,387</td>
<td>6,222</td>
<td>31,570</td>
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#### FINANCIAL INFORMATION

**OVERALL KEY FIGURES**

<table>
<thead>
<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
<th>Workload per annum</th>
<th>Beds Occupancy Rate</th>
<th>Workload per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year ended 31 Mar 2021</td>
<td>4,816</td>
<td>79.3%</td>
<td>81.9%</td>
<td></td>
</tr>
<tr>
<td>Year ended 31 Mar 2020</td>
<td>4,645</td>
<td>77.3%</td>
<td>81.9%</td>
<td></td>
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</tbody>
</table>

**COMMUNITY HOSPITALS**

<table>
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<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Year ended 31 Mar 2021</td>
<td>552</td>
<td>77.2%</td>
<td>74.1%</td>
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</tr>
<tr>
<td>Year ended 31 Mar 2020</td>
<td>608</td>
<td>77.2%</td>
<td>74.1%</td>
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</table>

**FINANCIAL INFORMATION**

#### EXPENDITURE BY MAJOR CATEGORIES

<table>
<thead>
<tr>
<th>Category</th>
<th>Year ended 31 Mar 2021</th>
<th>Year ended 31 Mar 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Revenue</td>
<td>1,119</td>
<td>1,191</td>
</tr>
<tr>
<td>Supplies</td>
<td>1,828</td>
<td>1,709</td>
</tr>
<tr>
<td>Other Revenue*</td>
<td>2,703</td>
<td>1,467</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,640</td>
<td>4,587</td>
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**REVENUE BREAKDOWN BY MAJOR CATEGORIES**

<table>
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<tr>
<th>Category</th>
<th>Year ended 31 Mar 2021</th>
<th>Year ended 31 Mar 2020</th>
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<tbody>
<tr>
<td>Clinical Revenue</td>
<td>2,091</td>
<td>2,112</td>
</tr>
<tr>
<td>Supplies</td>
<td>2,971</td>
<td>2,708</td>
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<tr>
<td>Other Revenue*</td>
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<td>10,7</td>
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<tr>
<td>TOTAL</td>
<td>6,122</td>
<td>5,773</td>
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**ASSETS BY MAJOR CATEGORIES**

<table>
<thead>
<tr>
<th>Category</th>
<th>Year ended 31 Mar 2021</th>
<th>Year ended 31 Mar 2020</th>
</tr>
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<tbody>
<tr>
<td>Plant and Equipment</td>
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<td>2,408</td>
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<tr>
<td>Other Assets</td>
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<td>TOTAL</td>
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<td>4,816</td>
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**LIABILITIES BY MAJOR CATEGORIES**

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<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Other Assets</td>
<td>3,068</td>
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<td>TOTAL</td>
<td>6,122</td>
<td>5,773</td>
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<th>Category</th>
<th>Year ended 31 Mar 2021</th>
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<tbody>
<tr>
<td>Manpower</td>
<td>1,119</td>
<td>1,191</td>
</tr>
<tr>
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<td>1,828</td>
<td>1,709</td>
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<tr>
<td>Other Assets</td>
<td>3,250</td>
<td>2,408</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,658</td>
<td>4,816</td>
</tr>
</tbody>
</table>

**LIABILITIES BY MAJOR CATEGORIES**

<table>
<thead>
<tr>
<th>Category</th>
<th>Year ended 31 Mar 2021</th>
<th>Year ended 31 Mar 2020</th>
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</thead>
<tbody>
<tr>
<td>Other Assets</td>
<td>3,068</td>
<td>2,610</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6,122</td>
<td>5,773</td>
</tr>
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</table>

**EXPENDITURE BY MAJOR CATEGORIES**

<table>
<thead>
<tr>
<th>Category</th>
<th>Year ended 31 Mar 2021</th>
<th>Year ended 31 Mar 2020</th>
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<tbody>
<tr>
<td>Manpower</td>
<td>1,119</td>
<td>1,191</td>
</tr>
<tr>
<td>Supplies</td>
<td>1,828</td>
<td>1,709</td>
</tr>
<tr>
<td>Other Revenue*</td>
<td>2,703</td>
<td>1,467</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5,640</td>
<td>4,587</td>
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**ASSETS BY MAJOR CATEGORIES**

<table>
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<th>Category</th>
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<td>Plant and Equipment</td>
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<td>2,408</td>
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<td>2,408</td>
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</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>TOTAL</td>
<td>5,640</td>
<td>4,587</td>
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</table>

### Footnotes:

* Includes donations to Charity Funds
ANNUAL REPORT 2020/2021

OVERALL STUDENT NUMBERS (AS AT 31 MARCH 2021)

SINGHEALTH DUKE-NUS AMC

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical</th>
<th>Dental</th>
<th>Nursing</th>
<th>AHPs</th>
<th>Others</th>
<th>Total number</th>
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<td>0</td>
<td>11</td>
<td>98</td>
<td>797</td>
<td>906</td>
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<td>0</td>
<td>0</td>
<td>12</td>
<td>107</td>
<td>839</td>
<td>958</td>
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TOTAL NUMBER of MD and PhD students and graduates

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

92 Integrated Biology and Medicine (IBM) PhD students (of whom 34 are also MD students)

20 Integrated Sciences (CS) PhD students (of whom 1 is also an MD graduate)

931 TOTAL NUMBER of all MD and PhD students and graduates

2181 ALL FACULTY (AS OF 31 MARCH 2021)

502 Doctor of Medicine (MD) graduates (of whom 17 are also PhD graduates and 7 are also MD (IBM) graduates)

13 Quantitative Biology and Medicine (QBM) PhD students

65 Integrated Biology and Medicine (IBM)/ Quantitative Biology and Medicine (QBM) PhD graduates (of whom 19 are also MD graduates and 4 are final year MD students)

297 Doctor of Medicine (MD) students (of whom 34 are also PhD students and 4 are PhD graduates)

58,170 57,617

720,513 712,203

45,147 43,999

106,452 107,924

57,617 56,170

4,399,999 4,501,147

712,203 729,312

106,452 122,744

SingHealth General Hospital

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

2020

2021

YEAR

YEARS

Year ended 31 Mar 2020

Year ended 31 Mar 2021

KEY FIGURES

Size

Beds (as at end of March)

Beds Occupancy Rate

Average Length of Stay (days)

8,9933,682 2,3950 1,755

9,2012,4080 1,8933,740

729,312

1,93981.1%

75,416 6.0

79,55781.1%

480,971 6.7

507,457 6.0

450,971 6.7

480,971 6.7

1,742 82.7%

1,939 81.1%

1,939 81.1%
### SingHealth Duke-NUS AMC

**ANNUAL REPORT 2020/2021**

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

<table>
<thead>
<tr>
<th><strong>KEY FIGURES</strong></th>
<th><strong>Year ended 31 Mar 2021</strong></th>
<th><strong>Year ended 31 Mar 2020</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beds (as at end of March)</td>
<td>1,043</td>
<td>1,071</td>
</tr>
<tr>
<td>Workload per annum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beds Occupancy Rate</td>
<td>85.6%</td>
<td>85.3%</td>
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<tr>
<td>Inpatients</td>
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<td>51,205</td>
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<tr>
<td>Total Patient Days</td>
<td>325,798</td>
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<tr>
<td>Average Length of Stay (days)</td>
<td>6.4</td>
<td>6.2</td>
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**Medical**

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2020</th>
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<tbody>
<tr>
<td>Day Surgeries</td>
<td>3,526</td>
<td>3,406</td>
</tr>
<tr>
<td>Inpatient Surgeries</td>
<td>23,159</td>
<td>22,426</td>
</tr>
<tr>
<td>Specialist Outpatient Clinic Attendances</td>
<td>408,342</td>
<td>440,540</td>
</tr>
<tr>
<td>Accident &amp; Emergency Attendances</td>
<td>117,778</td>
<td>137,747</td>
</tr>
<tr>
<td>Dental Attendances</td>
<td>3,094</td>
<td>3,597</td>
</tr>
<tr>
<td>Dental Procedures</td>
<td>3,874</td>
<td>3,525</td>
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</tbody>
</table>

**Nursing**

<table>
<thead>
<tr>
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<th>2021</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Surgeries</td>
<td>32,507</td>
<td>32,912</td>
</tr>
<tr>
<td>Inpatient Surgeries</td>
<td>22,189</td>
<td>22,426</td>
</tr>
<tr>
<td>Specialist Outpatient Clinic Attendances</td>
<td>408,342</td>
<td>440,540</td>
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<tr>
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</tr>
<tr>
<td>Dental Procedures</td>
<td>3,874</td>
<td>3,525</td>
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</table>

**Others**

<table>
<thead>
<tr>
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<tr>
<td>Day Surgeries</td>
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<td>799</td>
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<tr>
<td>Inpatient Surgeries</td>
<td>42,881</td>
<td>40,359</td>
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<tr>
<td>Specialist Outpatient Clinic Attendances</td>
<td>117,742</td>
<td>137,747</td>
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<tr>
<td>Accident &amp; Emergency Attendances</td>
<td>117,778</td>
<td>137,747</td>
</tr>
<tr>
<td>Dental Attendances</td>
<td>4,8</td>
<td>4,8</td>
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<tr>
<td>Dental Procedures</td>
<td>417</td>
<td>417</td>
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</tbody>
</table>
### Key Figures

#### Year ended 31 Mar 2021

<table>
<thead>
<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
<th>Workload per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>848</td>
</tr>
<tr>
<td>Beds Occupancy Rate</td>
<td>63.8%</td>
<td>73.5%</td>
</tr>
<tr>
<td>Inpatients</td>
<td>60,932</td>
<td>73,981</td>
</tr>
<tr>
<td>Total Patient Days</td>
<td>173,940</td>
<td>200,042</td>
</tr>
<tr>
<td>Average Length of Stay (days)</td>
<td>2.9</td>
<td>2.8</td>
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</table>

#### Year ended 31 Mar 2020

<table>
<thead>
<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
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</tr>
</thead>
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<td>Total Patient Days</td>
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<td>200,042</td>
</tr>
<tr>
<td>Average Length of Stay (days)</td>
<td>2.9</td>
<td>2.8</td>
</tr>
</tbody>
</table>

#### Inpatient Surgeries

- 2021: 10,606
- 2020: 15,321

#### Specialist Outpatient Clinic Attendances

- 2021: 333,251
- 2020: 323,251

#### Day Surgeries

- 2021: 513
- 2020: 513

#### Accident & Emergency Attendances

- 2021: 190
- 2020: 190

#### Dental Attendances

- 2021: 299
- 2020: 299

#### Dental Procedures

- 2021: 125
- 2020: 125

#### Workload per annum

- 2021: 2,892
- 2020: 2,824

### National Cancer Centre Singapore

#### Year ended 31 Mar 2021

<table>
<thead>
<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
<th>Workload per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2,912</td>
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<tr>
<td></td>
<td></td>
<td>195,122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>219,634</td>
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#### Year ended 31 Mar 2020

<table>
<thead>
<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
<th>Workload per annum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2,912</td>
</tr>
<tr>
<td></td>
<td></td>
<td>195,122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>219,634</td>
</tr>
</tbody>
</table>

#### Specialist Outpatient Clinic Attendances

- 2021: 546,503
- 2020: 533,251

#### Day Surgeries

- 2021: 303
- 2020: 303

#### Accident & Emergency Attendances

- 2021: 147,276
- 2020: 133,782

#### Dental Attendances

- 2021: 89,521
- 2020: 89,521

#### Dental Procedures

- 2021: 453
- 2020: 453

#### Workload per annum

- 2021: 147,276
- 2020: 133,782

### National Dental Centre Singapore

#### Year ended 31 Mar 2021

<table>
<thead>
<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
<th>Workload per annum</th>
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#### Year ended 31 Mar 2020

<table>
<thead>
<tr>
<th>Size</th>
<th>Beds (as at end of March)</th>
<th>Workload per annum</th>
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<tbody>
<tr>
<td></td>
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</table>

#### Dental Attendances

- 2021: 299
- 2020: 299

#### Dental Procedures

- 2021: 303
- 2020: 303

#### Workload per annum

- 2021: 202
- 2020: 202
### Key Figures

#### National Heart Centre Singapore

<table>
<thead>
<tr>
<th>Size</th>
<th>Year ended 31 Mar 2021</th>
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<tbody>
<tr>
<td>Beds (as at March)</td>
<td>185</td>
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<td>Beds Occupancy Rate</td>
<td>76.4%</td>
<td>79.4%</td>
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<td>50,717</td>
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<td>Average Length of Stay (days)</td>
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</table>

**Day Surgeries**
- 2,366
- 2,307

**Inpatient Surgeries**
- 5,228
- 6,123

**Specialist Outpatient Clinic Attendances**
- 132,634
- 105,761

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical</th>
<th>Dental</th>
<th>Nursing</th>
<th>AHPs</th>
<th>Others</th>
<th>Total number</th>
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<tbody>
<tr>
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<td>479</td>
<td>311</td>
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<td>1,277</td>
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### National Neuroscience Institute

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<th>Nursing</th>
<th>AHPs</th>
<th>Others</th>
<th>Total number</th>
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<tbody>
<tr>
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<td>145</td>
<td>465</td>
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### Singapore National Eye Centre

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<th>Nursing</th>
<th>AHPs</th>
<th>Others</th>
<th>Total number</th>
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</thead>
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<tr>
<td>2020</td>
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<td>291</td>
<td>161</td>
<td>337</td>
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<td>310</td>
<td>167</td>
<td>367</td>
<td>959</td>
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### Workload per annum

**Day Surgeries**
- 42,598
- 46,497

**Specialist Outpatient Clinic Attendances**
- 167,902
- 161,469

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**Key Figures**

- Year ended 31 Mar 2021
- Year ended 31 Mar 2020
## Annual Report 2020/2021

### Key Figures

<table>
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<th>Hospital</th>
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<th>Year ended 31 Mar 2020</th>
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<tr>
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<td>2,380</td>
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<td>79%</td>
<td>53%</td>
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<tr>
<td>Workload per annum</td>
<td>7,021</td>
<td>56,551</td>
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<tr>
<th><strong>Outram Community Hospital</strong></th>
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<tbody>
<tr>
<td><strong>Sengkang Community Hospital</strong></td>
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<table>
<thead>
<tr>
<th><strong>Bright Vision Hospital</strong></th>
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<tbody>
<tr>
<td><strong>Outram Community Hospital</strong></td>
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</tr>
<tr>
<td><strong>Sengkang Community Hospital</strong></td>
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### Medical Attendances

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<th>Year ended 31 Mar 2020</th>
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</thead>
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<td>1,591,998</td>
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<tr>
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<td>221</td>
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<tr>
<td>Workload per annum</td>
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<td>1,285</td>
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### Dental Attendances

<table>
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<th>Year ended 31 Mar 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyclinic</td>
<td>1,591,998</td>
<td>1,591,998</td>
</tr>
<tr>
<td>Dental</td>
<td>1,285</td>
<td>1,285</td>
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### Dental Procedures

<table>
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<th>Year ended 31 Mar 2020</th>
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<tbody>
<tr>
<td>Polyclinic</td>
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<tr>
<td>Dental</td>
<td>80,434</td>
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### Workload per annum

<table>
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<th>Year ended 31 Mar 2020</th>
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<td>Polyclinic</td>
<td>1,591,998</td>
<td>1,591,998</td>
</tr>
<tr>
<td>Dental</td>
<td>80,434</td>
<td>80,434</td>
</tr>
</tbody>
</table>
**RESEARCH STATISTICS**

**STAFFING**
- 106 Principal-Investigators (led ongoing research)
- 365 Clinician-investigators (led ongoing research)
- 485 Investigators leading ongoing research

**RESEARCH ACHIEVEMENTS**
- 18,500 Publications in international peer-reviewed journals
- $2.03B Competitive Funding
- 2 Singapore Translational Research Investigator Awards
- 2 Transition Awards
- 8,400 Clinician Scientists Awards
- 26 Medals
- 237 Research grants

**NURSING**
- $762,600 Quantum of grants awarded
- 68 Publications
- 15 Grants
- 35 Research projects with nurses as principal investigators

**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 programs in Singapore, SingHealth has:
    - 206 new medical residents in AY20
    - 22 Singapore-funded ACGME-I Accredited programs
    - 13 JCST Accredited programs
    - 1,716 faculty members
    - 934 medical residents in training across 35 programs

**POSTGRADUATE & CONTINUING EDUCATION**
- Allied Health Education
  - 12,774 healthcare professionals received 336 Allied Health Continuing Professional Education programs
  - 222 education programs were conducted for oral health professionals
  - 1,178 healthcare professionals and administration trained in 55 programme sessions

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

**TECHNOLOGY-ENHANCED LEARNING & INNOVATION**
- >2,400 educators equipped through >60 AMEI Education Grant workshops
- SGD38,500 of AMEI Education Grant awarded to 8 projects and programmes to enhance educational outcomes

**RECOGNISING EDUCATIONAL EXCELLENCE**
- 12 educators conferred the AMEI Golden Apple Awards 2020
- 293 Residency Faculty and Residents received the Residency in SingHealth Excellent (REX) Awards 2020
- 9 House Officers received the SingHealth Best Junior Doctors Awards 2020
- 7 graduating Duke-NUS students accorded the SingHealth Awards 2020