



STANDING STRONG

WITH



SingHealth Duke-NUS Academic Medical Centre believes in empowering patients to manage their care. Mr Toh Kiat Sheng (left on the front cover) and one of his care team members, Exercise Physiologist Zack Teng (right on the front cover), are close partners in Mr Toh's journey to health. Read their story on page 20.

EMPOWERING PATIENTS

“

WHATEVER PROBLEMS YOU HAVE,
THERE WILL ALWAYS BE SOMEONE
TO HOLD YOUR HAND AND
WALK THE JOURNEY WITH YOU.

Mr Ellil Mathiyan

”

SingHealth Duke-NUS Academic Medical Centre Annual Report 2018/2019

Singapore General Hospital (SGH)
Changi General Hospital (CGH)
Sengkang General Hospital (SKH)
KK Women's and Children's Hospital (KKH)
National Cancer Centre Singapore (NCCS)
National Dental Centre Singapore (NDCS)
National Heart Centre Singapore (NHCS)

Duke-NUS Medical School (Duke-NUS)

National Neuroscience Institute (NNI)
Singapore National Eye Centre (SNEC)
SingHealth Community Hospitals (SCH)
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CHAIRMAN'S MESSAGE

FORGING AHEAD FOR OUR PATIENTS



2018 was a momentous year, with memorable highlights and vital lessons learnt that have motivated us to keep doing better for our patients. Earlier this year, Singapore General Hospital (SGH) was ranked the world's third best hospital by Newsweek magazine, coming after two hospitals that are held in high esteem - Mayo Clinic and Cleveland Clinic in the USA. SGH was recognised for providing affordable care, outstanding nursing, leading patient-driven clinical research and providing undergraduate to postgraduate training. This laudable achievement is thanks to the full commitment of a driven and passionate team, not just at SGH but the whole cluster that it operates in - along with the National Specialty Centres.

The year also presented an unprecedented challenge for the cluster. SingHealth was the victim of the worst cyberattack in Singapore's history, where the data of more than 1.5 million patients was illegally accessed. Despite this setback, staff rose to the occasion and did not let the cyberattack get in the way of what is most important - taking good care of our patients.

The cyberattack was a learning experience not just for SingHealth but for the nation. It has taught us to remain vigilant at all times and not let our guard down when it comes to cybersecurity. In collaboration with the Integrated Healthcare Information Systems (IHIS), Ministry of Health and other agencies, SingHealth has strengthened cyber-defence by implementing the 16 recommendations made by the Committee of Inquiry.

The cyberattack did not steer us off our course. Our sights are firmly set on continuing to deliver the best care for our patients. This year, teams have made strides in bringing care closer to

home, transforming care to anticipate future needs and advancing SingHealth's academic medicine journey.

Bringing Care Closer to Home

The opening of Sengkang General Hospital and Sengkang Community Hospital marked a new chapter in bringing care closer to the community. Satellite clinics from National Cancer Centre Singapore (NCCS), National Heart Centre Singapore (NHCS) and Singapore National Eye Centre (SNEC) in Sengkang General Hospital bring specialised care to residents who need it. Together with the nearby Sengkang and Punggol Polyclinics, SingHealth is now able to deliver seamless and integrated care to the population in the North-East.

Similarly, the opening of the Medical Centre at Changi General Hospital (CGH) offers residents in the East access to a range of outpatient specialist services, including those through partnerships with our national specialty centres like NHCS and SNEC.

Transforming Care

Care transformation remains a focus with concerted efforts to improve patient experience and care accessibility. The official launch of the SingHealth Duke-NUS Transplant Centre is an important step in this direction, with multidisciplinary consolidated transplant activities under one roof and improved accessibility to organs.

The Future Outpatient Journey, a cluster-wide initiative, is looking at ways to transform the outpatient experience by redesigning processes and leveraging digital technologies. The upcoming "My Visit" mobile app will do this by empowering patients at SGH Diabetes and Metabolism

Centre as active partners in their own care with the ability to track care outcomes, access care instructions and customised educational materials to meet their individual needs, as well as manage appointments and order medicine delivery.

As part of the ongoing SGH Campus Masterplan infrastructure development, the impending opening of Outram Community Hospital and ground-breaking of the Elective Care Centre and new National Dental Centre Singapore (NDCS) building are important milestones that will enhance person-centric, value-based care on SGH Campus.

Advancing Academic Medicine

The demands of delivering quality care today have not detracted us from ongoing efforts in research and educating the next generation of healthcare professionals.

We are proud of our clinician scientists who received grants, fellowships and research scholarships at the National Medical Research Council Awards 2019. A team from National Neuroscience Institute (NNI) received a grant of \$25 million for research into new therapies to slow down or treat Parkinson's disease, while a team from NCCS received a grant of \$10 million to further study the disease mechanisms of lymphoma. Clinician scientists from NNI received the President's Science Award, the highest honour conferred for achievements in science and technology, for their outstanding research on clinical biomarkers, novel models and therapeutics for Parkinson Disease.

The SingHealth Duke-NUS Global Health Institute (SDGHI) was launched with the aim of addressing current and emerging health challenges across ASEAN member

states and in other Asian countries. This opens up the opportunity for a strong network of partnerships for research, training and clinical care to create impact on a global scale.

An Enduring Legacy

2018 marked the 160th anniversary for KK Women's and Children's Hospital (KKH) since it started operations in 1858. KKH has evolved to become Singapore's largest tertiary referral centre and a recognised leader in treating high-risk and complex conditions in women, children and newborns. This enduring legacy is one that the hospital takes pride in and will continue to uphold as it innovates to deliver high quality care.

Looking ahead, SingHealth remains committed to delivering affordable and accessible care that patients deserve, even as the healthcare industry continues to evolve and present new challenges. I would like to thank all staff for their passion, dedication and commitment. Together, we will work to transform care for the future - while always putting patients at the heart of all efforts.



MR PETER SEAH
Chairman, SingHealth

CHAIRMAN'S MESSAGE

INSPIRING EXCELLENCE THROUGH GREATER ACADEMIC MEDICINE INTEGRATION



The year 2018 saw Duke-NUS continue at the forefront of innovation, pushing boundaries in multidisciplinary research and medical education as it advanced with SingHealth towards a world-class Academic Health System aimed at transforming medicine and improving lives.

Advancing our mission of **educating pioneering clinicians** for Singapore and beyond, we partnered with SingHealth to enhance joint clinical and academic leadership in all areas of our curriculum. We undertook a curriculum redesign aimed at greater integration and enhancement of clinical clerkship experiences and integrated longitudinal learning experiences for our students, in alignment with Singapore's National Health Outcomes Framework and the Ministry of Health's accreditation standards.

Duke-NUS' deepening of pathways with Singapore Management University, Singapore University of Technology and Design, Nanyang Technological University, in addition to those from Duke University and the National University of Singapore, has enhanced its position to educate high-quality individuals from diverse backgrounds to be outstanding clinicians, capable of becoming future leaders, educators, innovators, scholars and scientists in healthcare, who will serve the needs of Singapore and beyond, with compassion and excellence.

We continue our catalyst role of producing clinicians with a pioneering spirit, willing and keen to blaze new trails in science and leadership careers – '**Clinicians Plus**'. In June 2018, we graduated our eighth cohort of Doctor of Medicine (MD) and fourth cohort of Doctor of Philosophy (PhD) and MD/PhD students. We are indeed proud that some of our Duke-NUS alumni have emerged as leaders — National Outstanding

Clinician Scientist Resident Award winners, Chief Residents, Founders of online healthcare platform and businesses, as well as Leading Educators. **Clinicians Plus**, indeed.

Our five signature research focus areas, aligned with the Ministry of Health's research strategy and Singapore's 2015-2020 Research, Innovation and Enterprise Plan, are increasingly aimed at establishing the nation as a global research and development hub. Our researchers continued their **impactful research achieving significant breakthroughs in medicine**. Research in Cancer and Stem Cell Biology, Cardiovascular and Metabolic Disorders, Emerging Infectious Diseases, Health Services and Systems Research, and Neuroscience and Behavioural Disorders continue to produce discoveries for the betterment of health and wellbeing. SingHealth and Duke-NUS have garnered the lion's share of the nation's most prestigious awards over the years: Singapore Translational Research Investigator Awards (STaR: 11), Clinician Scientist Awards (37), Transition Awards (39), National Research Foundation Fellowship Awards (6), and National Research Foundation Investigator Awards (3). More than 5,000 research papers have been published.

Two new and unique PhD Programmes, led by established clinician scientists, in Integrated Bioinformatics and Biostatistics, and in Clinical Sciences, aim to meet Singapore's demand in biomedical research and health data sciences, as well as equip clinicians with core knowledge in clinical research methodology, and quantitative and biological sciences.

For the first time, our SingHealth Duke-NUS team of cancer researchers won the prestigious American Association for Cancer Research (AACR) Team

Science Award, one that honours researchers for their global impact on cancer research. An international collaboration led by Professors Patrick Tan, Teh Bin Tean and Steve Rozen from Duke-NUS, National Cancer Centre Singapore, Genome Institute of Singapore respectively, and researchers from Japan, Taiwan and Thailand identified new genes and pathways in common cancers in Asia, with a view towards developing new therapies.

In March 2018, a coalition of seven virology research institutions in Singapore including Duke-NUS, was inducted into the prestigious Global Virus Network (GVN) as a Centre of Excellence for effective pandemic control, joining 42 other Centres of Excellence and 7 Affiliates in 27 countries. Another team of researchers from Duke-NUS collaborated with researchers from Singapore General Hospital to develop a safer and faster method for growing human skin cells for skin grafts, which could potentially lower the risk of infections and adverse immune reactions. In September 2018, we launched the SingHealth Duke-NUS Global Health Institute, aimed at tackling emerging health challenges, advancing health and well-being, and achieving health equity in Asia and beyond.

Duke-NUS' Centre for Technology and Development, in its **'Innovate to Enhance Health'** mission, continued to identify and support projects with potential for healthcare impact and commercial value. To date, it has achieved 163 invention disclosures, 141 patent applications, three registered trademarks and licensing, exceeding performance indicators set by stakeholders.

We celebrated another win in January 2019, when Duke-NUS was ranked by Glassdoor among the top ten best-rated employers in Singapore,

among giants like SAP, Cisco Systems, Google, LinkedIn, Goldman Sachs and others. Indeed, a very commendable outcome of an indomitable **'Inspiring Excellence'** spirit, fostered with a culture of trust, and amplifying values of **courage, integrity, compassion and collaboration**. Our staff and faculty engagement survey last year recorded an engagement score reflective of a high-performing organisation based on Hewitt's best-employers range, putting us in a steady state to effectively drive the School's vision through an engaged and motivated workforce. Additionally, we identified issues on work processes, performance management and career opportunities. These concerns have become important opportunities to strengthen our service quality ethos and create value for our stakeholders.

I am delighted that Duke-NUS' Academic Medicine partnership with SingHealth has resulted in evidently outstanding clinical research, an important contributor cited by Newsweek magazine in ranking Singapore General Hospital 'the World's Third Best Hospital'.

I thank all members of the Duke-NUS Governing Board and its sub-committees for their indispensable insights and unstinting support of our endeavours. I am immensely proud of Duke-NUS' achievements and thank the senior leadership team, management, faculty and staff, who had worked so ably towards another great year of **transforming medicine and improving lives**.



MR KAI NARGOLWALA

Chairman, Duke-NUS Medical School
Governing Board

JOINT LEADERS' MESSAGE

STANDING STRONG TOGETHER

In the joint pursuit of excellence in Academic Medicine, SingHealth and Duke-NUS have fostered a strong partnership. This alliance has progressed on several fronts, including novel education initiatives, Academic Clinical Programmes and transformative care models that aim to deliver care more effectively.

The development of the next generation of healthcare professionals is a major focus of our educators and faculty members. High-profile studies by our researchers and clinician scientists have made their mark on the global stage and over the years, the partnership has yielded more than 18,000 publications in international peer-reviewed journals.



To ensure quality care across the spectrum of health service providers, we have expanded our reach to the community and further afield through our Regional Health System (RHS) and the new SingHealth Duke-NUS Global Health Institute.

As partners in Academic Medicine, we are united in our goal of delivering the best care to patients, while responding to their changing needs. Now that patients have better access to information in the digital age, the “doctor knows best” model of the past has changed. Healthcare today is characterised by close collaboration between healthcare providers, patients and their caregivers.

We believe that healthcare is a continuous process of listening to and answering the needs of our patients. The formation of SingHealth Duke-NUS Disease Centres (SDDCs) is the result of changing our models of care to better meet patients’ needs. The 9 SDDCs give patients easier access to seamless, multidisciplinary care within one setting.

An example of someone who has benefitted from this new model of care is Mr Toh Kiat Sheng, a patient at the SingHealth Duke-NUS Sport and Exercise Medicine Centre (SDSC). Having enrolled on the Weight Management Programme, Mr Toh works with a multidisciplinary team that includes a dietitian, sports and exercise medicine consultant and exercise physiologists.

Playing an active role in shaping his treatment journey, Mr Toh – together with the help of his care team – mapped his weight management plan based on his personal lifestyle. This has allowed him to make informed and realistic diet and exercise choices. The

sense of ownership that comes with being involved in the decision-making process has motivated him to adhere to the tailored plan. After six months on the programme, Mr Toh has seen significant improvement in his blood pressure and diabetes, as well as his overall health.

Mr Toh’s story is a reminder that patients and caregivers have valuable perspectives that we can benefit from, as we strive to deliver quality care. To tap on the collective wisdom of patient advocates, the SingHealth Patient Advocacy Network (SPAN) was launched last year. The network of patients and caregivers act as advocates, lending their voices to issues that matter to them. SPAN Patient Advocates are involved in aiding the design of services for cluster-wide transformative projects and new infrastructure development.

As co-chair of SPAN, Mr Ellil Mathiyani works with our healthcare team to ensure that patients’ perspectives are taken into account, as we aim to enhance the patient experience in our healthcare institutions. Mr Ellil, who was diagnosed with rectal and testicular cancer in 2011, underwent surgery and has to wear a stoma bag for the rest of his life, but that has not stopped him from being a committed patient advocate. An enthusiastic Patient

Ambassador of the SGH Colorectal Cancer Support Group, he lends a listening ear and shares his experiences with patients who are going through similar health challenges. By inviting patients like Mr Ellil to participate in the design and implementation of our processes, we benefit from a better understanding of what matters to patients and caregivers.

This year’s Annual Report features the stories of Mr Toh and Mr Ellil, which illustrate how patient empowerment and continued, constructive dialogue between healthcare professionals and patients help to improve health outcomes and transform the patient experience.

Clinical care, research and education are pillars of our academic medicine journey; these are mutually interdependent and equally important. The SingHealth Duke-NUS academic partnership harnesses SingHealth’s clinical expertise and Duke-NUS’ research and education capabilities, nurturing committed healthcare professionals who will play a pivotal role in transforming care and charting tomorrow’s medicine.

The future holds a world of possibilities as we involve patients as co-creators in our journey.



PROF THOMAS COFFMAN

Dean, Duke-NUS Medical School



PROF IVY NG

Group Chief Executive Officer,
SingHealth



EMPOWERING PATIENTS

**EMPOWERING OTHERS
BY WALKING THE JOURNEY**

MR ELLIL MATHIYAN

**WORKING TOGETHER
FOR BETTER HEALTH**

MR TOH KIAT SHENG

EMPOWERING OTHERS

BY WALKING THE JOURNEY

When Mr Ellil Mathiyan was first diagnosed with both rectal and testicular cancer in March 2011, his family did not notice a change in his cheerful demeanour at family gatherings.

“Despite being stricken with cancer, he was still his usual upbeat, positive self,” recalled Mr Darren Ching, his nephew. “Everyone was quietly rooting for him, and we were all so impressed by his resilience in the face of his illness.”

It was not an easy journey for Mr Ellil, now 60. He had surgery at Changi General Hospital (CGH) to remove his rectum and underwent 28 radiation treatment sessions and eight chemotherapy cycles, before he was declared cancer-free nine months later. Just as he completed the arduous treatment, he was greeted with another challenging piece of news. He would have to wear a stoma bag for the rest of his life to collect stool through an artificially created hole in his abdomen.

“It was a big blow to me. I had to learn how to live with such a permanent change to my body,” he recalled.

The importance of support

Determined to deal with the change, he looked online for information on stoma care and found a UK-based online support group with fellow cancer survivors who shared useful tips and information with one another. He started looking for local groups that could offer the same support, and a chance encounter with a fellow colorectal cancer survivor at the National Cancer Centre (NCCS) led him to the SGH Colorectal Cancer Support Group (CCSG).

“The CCSG was one of the best things that happened to me after surgery,” he said. “It means a lot to meet others who are going through the same challenges as you who can share their own experience and give advice.”



Mr Ellil speaking to patients at a support group meeting.



“
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CHALLENGES AS YOU.

Mr Ellil Mathiyan

”



Mr Ellil and Senior Nurse Clinician Ong Choo Eng, who is the Nurse Lead of the SGH Colorectal Cancer Support Group (CCSG)

It was also through the support group that he met Senior Nurse Clinician Ong Choo Eng, who is the Nurse Lead of the group. As a stoma nurse, Sister Ong gave him valuable post-surgery care tips, including how to prevent parastomal hernias -- a common complication in people who have undergone colostomies (surgery to remove the rectum).

From Patient to Patient Advocate

It came as no surprise to Sister Ong that Mr Ellil signed up to become a Patient Ambassador of the CCSG. After all, he was already a regular face at the group's monthly gatherings. As a Patient Ambassador, he visits wards to talk to patients undergoing treatment and shares his experiences dealing with the side effects of chemotherapy and adapting to the resulting lifestyle changes. He also lends a listening ear to those who need a friend, such as Mr Tan Beng Hua, who had six lymph nodes removed due to cancer.

"Ellil has shown me that there are people with cancer who have survived and even thrived. Seeing him bustling around so healthy and lively gives me hope that my life will improve for the better too," said Mr Tan.

In early 2017, Mr Ellil was nominated by Sister Ong to join the SingHealth Patient Advocacy Network (SPAN), a platform for patients and caregivers to work with hospital staff to improve patient care. SPAN members participate in focus group discussions and engage healthcare providers to improve different aspects of patient care. Mr Ellil currently co-chairs SPAN with a fellow patient advocate.

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FOR THE BETTER TOO.

Mr Tan Beng Hua, support group member

”



Mr Ellil and Mr Tan Beng Hua at a monthly support group gathering.

"SPAN members, like Mr Ellil, lend their voices to the design of care delivery processes and help to ensure that what matters to patients is taken into account," said Adj Assoc Prof Tracy Carol Ayre, Group Chief Nurse, SingHealth, who is a SPAN advisor. "We

have greatly benefitted from their input in developing the Nursing Software Suite, which will be used to educate patients and caregivers about their condition through a bedside tablet and mobile app, empowering them to be a part of their recovery process."



Different activities like line dancing are organised for the monthly support group gatherings.

Mr Ellil and his fellow SPAN members have given input on wayfinding around SGH and have tested an appointment-making chatbot prototype that the National Dental Centre (NDCS) is planning to launch. They will also be involved in future projects to improve patient experience.

“We can empower patients and caregivers to engage constructively with healthcare professionals and be more involved in their own care. For healthcare professionals, it’s a reminder to always have the patients’ needs in mind,” said Mr Ellil.

Mrs Tan-Huang Shuo Mei, Group Chief Communications Officer of SingHealth and advisor to SPAN, agreed, “The partnership between SPAN and healthcare professionals creates a ‘space’ for new conversations, which pulls back the veil on areas in healthcare that must change in the evolving healthcare landscape. This allows

good ideas to benefit more patients and caregivers.”

Letting others know they are not alone

Since his struggle with cancer, Mr Ellil knows not to take life for granted.

“The possibility of a relapse is always there,” he said. “Because of this uncertainty, I want to do something meaningful in the remaining years of my life.” Mr Ellil now spends up to four days a week volunteering at support groups, SPAN and other events.

Darren said proudly, “He has always been our fun-loving uncle, and now he shares his infectious enthusiasm with even more people.”

Mr Ellil hopes that through his actions, people who have been newly diagnosed with cancer will know that while it is natural to feel despondent, there is support and they are not alone.

“

SPAN MEMBERS, LIKE MR ELLIL, LEND THEIR VOICES TO THE DESIGN OF CARE DELIVERY PROCESSES AND HELP TO ENSURE WHAT MATTERS TO PATIENTS IS TAKEN INTO ACCOUNT.

Adj Assoc Prof Tracy Carol Ayre,
Group Chief Nurse, SingHealth

”

“Whatever problem you have, there will always be someone to hold your hand and walk the journey with you,” he said.



Mr Ellil with his nephew Mr Darren Ching (right), who is proud of the way his uncle has overcome many setbacks.

EMPOWERING PATIENTS

Today's healthcare is focused on delivering care in ways that matter to our patients and caregivers. At SingHealth, we value the voices of our patients. Patients and caregivers have become key partners in the care journey and play active roles in improving the quality of care.

Patient Support Groups

In addition to the care teams, patient support groups are excellent sources of information and support for patients. Members share their first-hand experiences of the disease condition, treatment and coping strategies. The support of patient-to-patient networks relieves the emotional burden on patients and caregivers. Support groups have proven to be an integral part of patient empowerment.



The SGH Colorectal Cancer support group.

ESTHER Network Singapore

Launched in 2016, the ESTHER Network Singapore aims to promote the philosophy of person-centred care by always asking "What is best for Esther?", drawing inspiration from the ESTHER Network which started in Sweden. Esther symbolises a patient whose health and social care needs require close coordination across different care settings. The Network seeks to improve care delivery processes and coordination among hospitals, intermediate and long-term care (ILTC) agencies, voluntary welfare organisations (VWOs) and general practitioners (GPs) to better serve our Esthers.

The Network has trained more than 190 ESTHER coaches comprising healthcare and community care professionals. These coaches have initiated various projects, which include ESTHER Cafés, where patients are invited to share their care journey experiences. With their feedback, ESTHER coaches identify areas for improvement and start projects to increase the competence of the whole care continuum.



The Revival Connection, a support group from NCCS for patients with advanced and recurrent cancer.

SingHealth Patient Advocacy Network (SPAN)

Established in 2017, the SingHealth Patient Advocacy Network (SPAN) is a self-driven network of patients and caregivers that represents the voice of patients. Working in partnership with the healthcare team, SPAN provides important patient perspectives and plays an active role by giving inputs on how SingHealth can improve the patient experience.

“Involving the voices of patients calls for a fundamental rethink of our current care model, and SPAN is the bridge between patients and the healthcare team,” explained Prof Tan Kok Hian, Group Director, Institute for Patient Safety & Quality (IPSQ), SingHealth.

To help members be effective patient advocates, SPAN has also initiated the Patient Advocacy Communication Training (PACT), which is slated to commence in the second half of 2019.

“Through the PACT programme, we want to empower Patient Advocates to give their perspectives on proposed initiatives and equip them with the skills to communicate their input,” Prof Tan added.

Key Milestones and Events for SPAN

- | | |
|-----------------|--|
| Mar 2017 | SPAN is established. |
| Mar 2018 | SPAN members invited to evaluate and share feedback on the concept model of the NDCS-OST Appointment Chatbot. |
| May 2018 | SPAN members participate in Mobility-X focus group discussions to give input on solutions that enhance the travel experience into and out of the SGH campus. |
| Oct 2018 | SPAN member appointed to Singapore Health Quality Service Awards Judging Panel.

SPAN member serves as panelist at Patient Safety Day 2018. |
| Dec 2018 | SPAN co-chairs appointed. |
| Feb 2019 | Official launch of SPAN at the inaugural SPAN Partners-in-Care Forum 2019 with more than 150 participants.

SPAN member serves as judge at SingHealth Hackathon, evaluating healthcare solutions to help Singaporeans to keep well, get well and age well. |
| Mar 2019 | SPAN member invited to speak on Patient Engagement at SingHealth Quality and Innovation Day 2019.
SPANtastic Theatre, made up of SPAN members, act out examples of patient and doctor interactions in a skit. |

WORKING TOGETHER FOR BETTER HEALTH

Being unable to play your favourite sport can be a big blow if your life revolves around it. When his doctor stopped him from playing competitive rugby after he sustained multiple injuries and tore two neck ligaments in 2011, Mr Toh Kiat Sheng gradually lost the discipline to exercise.

His physical health began to deteriorate and his weight increased from 80 kg to 120 kg as he started binge-eating for comfort. A 5-minute walk made him breathless, which further affected his self-esteem.

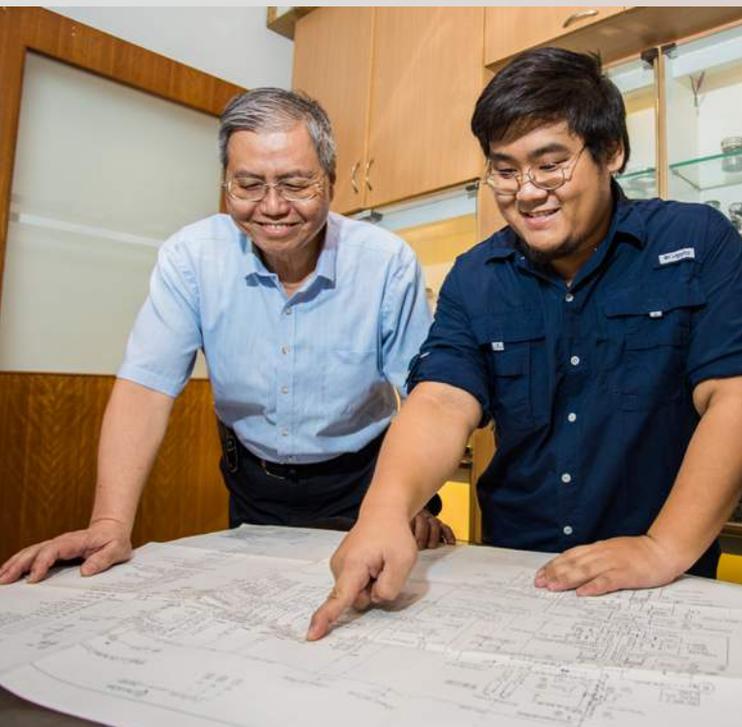
When his father alerted him that the skin around his neck was starting to turn dark - a possible sign of diabetes, Mr Toh went to Tampines Polyclinic for consultation and advice. The Polyclinic referred him to the Weight Management Programme at the SingHealth Duke-NUS Sport & Exercise Medicine Centre (SDSC) at Changi General Hospital (CGH). He roped in his older brother, Mr Toh Kiat Boon, and together the two siblings started on the programme.

Personalised care from a multidisciplinary team

Both brothers found the multidisciplinary care highly effective in helping them develop a holistic weight management plan tailored to their lifestyles. The younger Mr Toh was introduced to a team comprising Dr Leonard Lim Ang Tee, a Sport and Exercise Medicine Consultant at CGH, Ms Miko Yeo, a dietitian, and Mr Zack Teng, an exercise physiologist.

The team worked hand-in-hand to ensure that the advice they gave Mr Toh was relevant to his specific healthcare needs. "We work closely as a team and have regular update sessions on each patient's progress to see how we can help them achieve their goals," said Dr Lim.

One example of the healthcare team personalising the care plan to suit Mr Toh's lifestyle was when dietitian Ms Yeo asked him to keep a food diary for a few days before working with him to come up with a customised diet plan. Ms Yeo said, "Looking at his food diary, I saw that he enjoys meat and rice dishes so I suggested healthier alternatives like stir fried meat dishes, with half a bowl of brown rice. That way, he still gets to enjoy what he likes, but with a lower calorie intake."



Mr Toh and his father, both engineers, at work. His father encouraged and supported him to get fit and healthy.

“
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HEALTHY AND
STAY WELL.

Mr Toh Kiat Sheng

”



WORKING TOGETHER FOR BETTER HEALTH

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Dr Leonard Lim Ang Tee, Sport and Exercise Medicine Consultant at CGH

”

Similarly, exercise physiologist Mr Teng formulated an exercise regime that Mr Toh was able to do and was comfortable following. “We used Mr Toh’s knowledge of physical training from his rugby days to come up with a suitable exercise regime. This allowed him to better identify with the exercises, thereby facilitating better continuity and adherence,” explained Mr Teng. Along with the diet and exercise plans, Dr Lim regularly assessed Mr Toh’s medical condition and kept a close eye on his progress to make sure he was exercising safely and effectively.

The nine SingHealth Duke-NUS Disease Centres (SDDCs) are models of care that leverage the resources of the cluster for patients with specific conditions who require multidisciplinary care. Adj Assoc Prof Benedict Tan, Head of the SDSC and Chief of the Sport and Exercise Medicine Department at CGH, said, “CGH is not the only SingHealth facility that offers comprehensive weight management programmes. SGH Life Centre, KKH and others have such



Mr Toh with his multidisciplinary care team.



Exercise physiologist Zack Teng keeps a close eye on Mr Toh's physical fitness.



Mr Toh goes for regular follow-ups where he sees Dr Leonard Lim and other members of the care team in one visit.

capabilities as well. If the overweight patient is in his teens, then he would be referred to KKH. If the overweight patient has poorly controlled diabetes, he would be referred to an endocrinology-led programme like the one at SGH Life Centre,” explained Adj Assoc Prof Tan.

Empowering patients to take charge of their health

Weight management requires a lifelong commitment to lifestyle changes and patient involvement is critical. As education is key to empowering patients to make the right choices, the SDSC team focuses on equipping patients with resources and tools to lead a healthier lifestyle, after their discharge from the 6-month weight management programme.

For example, Ms Yeo makes it a point to teach patients how to read food labels and select food products with essential nutrients. She also shares useful websites which have reliable educational materials.

“Before the programme, I relied on what I found on the internet and didn’t really know where to get accurate information. At first, I wanted to go on a no-carbohydrate diet but thankfully, the dietitian suggested a safer alternative and gave me information to help me do it. The best part is having healthcare professionals who help and empower me to make the right decisions. These are tools I can use for the rest of my life.” Mr Toh said.

Along with a caring father who accompanies him for evening walks and gets rid of unhealthy snacks around the house, feeling fitter and healthier has served as Mr Toh’s



motivation. He has lost more than 30 kg since enrolling on the weight management programme and now takes a daily walk to and from work every day without feeling breathless.

Having been deeply involved in his own care journey, Mr Toh knows the importance of being empowered and supported to keep well and stay healthy. Yet, he admits it can be an uphill struggle to embark on the journey to health.

“You just have to dig deep and find the discipline to get healthy and stay well,” Mr Toh advised.

“
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Mr Toh Kiat Sheng

”



With support from their father (left), Mr Toh and his brother (right), have made great strides in their journey to health.

SINGHEALTH DUKE-NUS DISEASE CENTRES

What are SDDCs?

SingHealth Duke-NUS Disease Centres (SDDCs) are strategic models of care for patients with specific conditions who require multidisciplinary teamwork. The structure enables professionals from different disciplines and institutions to work closely together to enhance care. SDDCs provide quality clinical care throughout the care continuum and improve outcomes.

In conventional care, a patient with a nodule (growth of abnormal tissue) in his neck may be referred to a thyroid specialist or surgeon, who would then refer him to a diagnostic radiologist for imaging tests. If the nodule is found to be a cyst, the patient would be given an appointment for a biopsy. By this time, the patient would have made multiple trips to the hospital to see different specialists.

With the SDDCs, the patient's journey is streamlined, cutting down the number of visits, and saving time and money. It also translates to greater efficiency for the care team.

For Tomorrow's Medicine

The SDDCs' approach to collaborative care places emphasis on developing a comprehensive database for care and research. In the long term this will change the way treatment is recommended as outcomes are collectively measured and studied to continuously improve protocols.

Our SDDCs

9 SDDCs that leverage multidisciplinary coordination to enhance care have been established.



Diabetes



Head and Neck



Sleep



Blood Cancer



Lung



Sport and Exercise
Medicine



Breast



Transplant



Genomic Medicine

FY2018 Highlights

Head & Neck Centre

Enhanced programmes and services were implemented upon the return of the Head & Neck Allied Health Professionals (AHP) faculty team from HMDP Fellowship. Some examples include the introduction of a cancer survivorship programme, increased capacity with more services offered at the combined multidisciplinary clinics and improved wound management and early rehabilitation protocols for surgery preparation and recovery. These initiatives have helped to improve the quality of care for patients. New research infrastructure has also been set up to track surgical outcomes and facilitate greater collaboration between head and neck surgeons, nurses and allied health professionals.

Lung Centre

The Lung Cancer Consortium from NCCS secured a \$10-million collaborative grant at the National Medical Research Council (NMRC) Awards 2018, boosting research efforts. Two clinician scientists from the Lung Centre also clinched awards at the NMRC Awards 2018 for their outstanding contributions.

The SGH Lung Endoscopy Centre and the SGH-SKH Chronic Obstructive Pulmonary Disease Clinic were the first team in Southeast Asia and the second in Asia to perform bronchoscopic segmental lung volume reduction for patients with advanced emphysema. They have since trained interventional pulmonologists from the region.

Breast Centre

With all the Breast Units across SingHealth completing the move to the Breast Centre in 2018, a centralised SingHealth Breast Cancer Registry is

currently being developed to measure outcomes, aid research and advance value care.

The Breast Care Nurse Specialty Course will have its first intake in FY2020 to train nurses to advance their skills in breast cancer care through e-learning and clinical attachment.

Diabetes Centre

In September 2018, the Diabetes & Metabolism Centre Dental Clinic was established to provide preventive dental care for patients with diabetes as they are at higher risk of developing periodontal disorders.

Blood Cancer Centre

A pilot project was implemented in August 2018 at NCCS and SGH lymphoma clinics to assess cost-effectiveness of patient care for Diffuse Large B-cell Lymphoma patients.

In October 2018, a multidisciplinary fellowship team comprising staff from SGH and KKH travelled to Toronto under the Health Manpower Development Plan to learn about survivorship and long-term follow-up programmes for young people with malignant and benign haematological conditions, who are transiting to the adult haematology programme.

Sleep Centre

The Sleep Centre officially launched the Sleep Clindoc, an electronic data input system, in March 2019 to harmonise patient care, clinical data input and collection, allowing clinicians to conduct research with the SingHealth Duke-NUS Sleep Registry in the near future.

The Centre successfully attained the Ministry of Health's (MOH) approval for the subsidy of Home Sleep Study

to diagnose patients with obstructive sleep apnea, nation-wide. This will help reduce the waiting time for diagnosis and treatment of obstructive sleep apnea.

The SingHealth Duke-NUS Sleep Centre-Philips Sleep Medicine Course was established to train healthcare professionals from Asia Pacific in sleep medicine.

Sport and Exercise Medicine Centre

In line with MOH's nationwide war on diabetes, CGH launched the Health Peers Programme, in partnership with community stakeholders and government agencies and received the PA Community Partnership Excellence Award 2018 in recognition of its efforts. CGH Sport and Exercise Medicine and NTU Lee Kong Chian School of Medicine developed and launched the Graduate Diploma in Sports Medicine programme for doctors – the first and only in Singapore and Asia.

Transplant Centre

The Transplant Centre was launched in April 2019 to amalgamate all transplant programmes in SingHealth. The centre aims to double transplant survival, optimise the quality of patients' lives and improve access and affordability. The Liver Transplant Centre is now part of the new Transplant Centre.

Genomic Medicine Centre

The Genomic Medicine Centre was newly formed in 2019 to benefit patients with genetic diseases. The Centre aims to be a global leader in delivering state-of-the-art clinical care by using advanced genomic technologies to improve patient diagnostics, therapeutics and healthcare outcomes.



HIGHLIGHTS

ENHANCING CARE

KEEPING OUR PATIENTS SAFE

EDUCATION

RESEARCH

GIVING

ENHANCING CARE

At the heart of quality healthcare lies an integrated team. We are committed to enhancing the quality of care by fostering close collaborations among our care teams.

STRENGTHENING COMMUNITY HEALTH



📍 Providing quality care close to home

The opening of Sengkang General Hospital (SKH) and Sengkang Community Hospital (SKCH) has made it easier for people living in the north-east to receive quality and affordable healthcare close to home. Through partnerships with specialty centres such as the National Heart Centre (NHCS), Singapore National Eye Centre (SNEC) and National Cancer Centre (NCCS), residents also have easier access to specialist services.

👩 Nurses keep the community well beyond hospital walls

With healthcare in Singapore shifting from hospital-centric care to community-based care, nurses play an increasingly vital role in keeping individuals well-supported in the community. Nurses from Changi General Hospital (CGH) and Singapore General Hospital (SGH) are stationed at 42 Community Nurse Posts at Senior Activity Centres across Southern and Eastern Singapore to look after elderly patients. They perform health and geriatric assessment, health education and coordinate care with social care agencies to provide social support.

🔄 Reconnecting with their past as therapy

As part of the Reminiscence Therapy Programme, SKCH and the National Heritage Board (NHB) are collaborating to combine reminiscence therapy with clinical intervention to improve the overall mood, cognition and well-being of older patients through a series of weekly activities such as cooking sessions or visits to NHB's Heritage Institutions like the Sun Yat Sen Memorial Hall. The programme aims to encourage patients to reconnect with their past with the support of volunteers, medical social workers and guidance from subject matter experts from NHB.



New medical centre offers specialist care in the East

CGH's new medical centre houses 14 specialist clinics and centres. Residents in the East with complex conditions will receive same-day referrals to multiple specialists, allowing them to benefit from consolidated diagnosis and treatment closer to home. About 28% of CGH patients require the care of more than one specialist.

INNOVATION AND ADVANCEMENTS

New clinical programme treats patients with blood clots in lungs

Two treatment options (a surgery and a minimally invasive procedure) previously not readily available in Singapore and the region, are now being offered by NHCS for patients with chronic thromboembolic pulmonary hypertension (CTEPH), which causes blood clots to form in their lungs. The condition affects about one in 30,000 people in Singapore. A total of 27 people have undergone the treatment options as of June 2019.

One-stop care for high-risk pregnancy cases

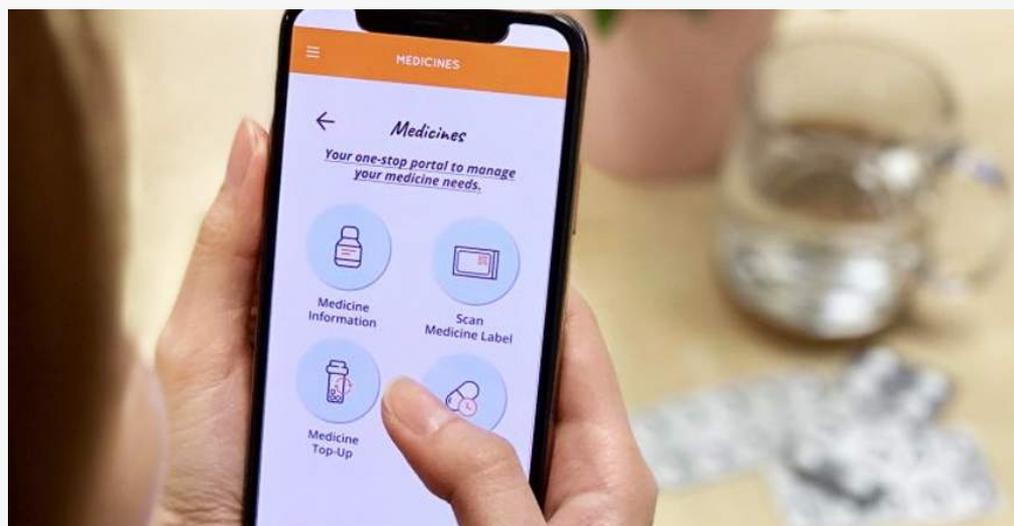
Women undergoing high-risk pregnancies can now save time by seeing doctors from different departments in a single consultation, thanks to SGH's four joint clinics. Diabetes remains the most common condition seen at the joint clinics, with more than one-fifth of pregnant women seeking help for the condition in 2017, followed by cardiac conditions, which made up one-tenth of all cases. The joint clinics also treat rheumatic and haematological conditions.

Keeping an eye on waiting time

A new system at SNEC has cut the average wait time that low-risk glaucoma patients spend in the clinic from more than 2 hours to just 1 hour. Patients who test negative for glaucoma or have stable glaucoma can get their test results by phone instead of seeing a doctor.

Medicine delivery for SingHealth patients

Instead of collecting their medication at outpatient pharmacies, patients from SGH, CGH, SKH, KK Women's and Children's Hospital (KKH), SNEC, NCCS, NHCS and SingHealth Polyclinics (SHP) can skip the queue by signing up for the medication delivery service. Deliveries are made to their home or collection points around the island, to offer patients convenience.



PREVENTION AND EMPOWERMENT

Working to prevent falls

Bright Vision Hospital (BVH) has started a Falls Free initiative to encourage shared staff responsibility for patients, regardless of which ward they are in. Comprising staff engagement sessions and sharing of best practices, the initiative aims to create a safe environment for patients by adopting a systematic approach to falls prevention. Weekly coaching sessions to teach patients how to protect themselves from falls are also included.

Training non-dental healthcare professionals ↗

The National Dental Centre Singapore (NDCS)'s Basic Oral Health Education Programme (OHEP) trains healthcare professionals from outside the dental discipline to educate patients on good oral hygiene habits, and impart skills and tools to better manage their patients' oral health. The programme teaches non-dental healthcare professionals to recognise common oral conditions and perform a simple oral health assessment.

Increasing access to genetic screening

NCCS will partner with Singapore Cancer Society (SCS) to make cancer detection, prevention and treatment more accessible to patients who require financial aid. Co-funded by NCCS and SCS, \$2.6 million will support a genetic screening programme to identify patients with a hereditary genetic predisposition to cancer. Taking a genetic test costs just under \$1,000 and Community Health Assist Scheme (CHAS) cardholders can get up to \$1,000 a year in financial assistance under the programme.

Caring for caregivers

KKH started the Temasek Foundation Cares – Caregiver Support Programme for Families with Chronically Ill Children on Long-term Home Care, a pilot programme that screened caregivers from KKH's Home Care Programme and provided 110 of them with mental wellness intervention or psychosocial counselling and home-based respite care. The programme has also developed a pedagogy and curriculum for a competency-based plan to train community providers to offer respite care services to families with children on long-term care.



Baby steps towards a lifelong bond

A pilot programme by KKH, SURE MUMS (SUpporting Resilience and Empowering MUMS) helps mothers forge emotional bonds with their newborns. Trained therapists visit mothers at home and support them as they learn how to pick up on their baby's subtle behavioural cues. Mothers saw an improvement in their mood and bonding scores, and expressed that they gained understanding of their babies' emotional needs.



Patient voices to improve healthcare outcomes

The SingHealth Patient Advocacy Network (SPAN) held its first Partners-in-Care forum which brought together patients, caregivers and healthcare professionals to share stories, ideas and best practices to improve care delivery.

CELEBRATING ACHIEVEMENTS

SGH ranked world's third best hospital

SGH was ranked the third best hospital in the world by Newsweek magazine, in part for its clinical research and outstanding nursing. The magazine credited SGH for providing affordable care for patients, leading patient-driven clinical research and providing undergraduate to postgraduate educational training for both students and medical professionals. SGH comes third after American hospitals, Mayo Clinic and Cleveland Clinic.

KKH celebrates 160th anniversary

In 2018, KKH commemorated 160 years of heritage, excellence and leadership in medical care for women and children. Commemorative coins bearing the symbolic façade of the hospital were presented to parents whose babies were born in the hospital on 1 January 2018, as well as five other days that held special significance to KKH. \$6.2 million was raised during the anniversary dinner for needy patients and to advance education and research.



KEEPING OUR PATIENTS SAFE

To cultivate a strong patient safety culture, we work to strengthen and integrate cluster-wide efforts to improve patient safety and quality.



The SingHealth Duke-NUS Institute for Patient Safety & Quality (IPSQ) integrates cluster-wide efforts in patient safety and quality.

IPSQ's goal is to eliminate preventable errors and harm, and improve patient outcomes by cultivating a strong patient safety culture. To achieve this, IPSQ with strategic partners and stakeholders from across the SingHealth Duke-NUS Academic Medical Centre (AMC), identified and developed the following six strategies:

- 1 Develop Patient Safety & Quality Competencies
- 2 Provide Recognition for Staff in Patient Safety, Quality Improvement and Innovation
- 3 Strengthen Psychological Safety
- 4 Engage Patients and Caregivers as Key Partners
- 5 Develop a Just Culture
- 6 Build Resilience and Prevent Burnout



Building Capacity and Enhancing Capabilities

• Academic Medicine – Enhancing Performance, Improving Care (AM-EPIC) Framework

This framework comprises programmes in six competency domains: Patient Safety & Quality, Risk Management, Innovation, Staff Resilience, Patient Centeredness and Advocacy, and Clinical Governance. The programmes aim to upskill staff in patient safety, quality improvement and innovation capabilities.

More than 50 staff from different professional backgrounds have been trained as faculty members of the AM-EPIC Framework to contribute towards patient safety and quality management.

• TeamSTEPPS & TeamSPEAK®

IPSQ worked with institutions' quality departments to establish a psychological safety programme, TeamSPEAK® based on the TeamSTEPPS model (by the Department of Defense and Agency for Healthcare Research & Quality, United States of America).

This programme promotes a speak-up culture through the use of a common language to escalate patient safety issues. It is designed to foster a climate of psychological safety, where staff feel safe to speak up for patient safety. As of May 2019, there are 16 TeamSTEPPS faculty and 50 TeamSPEAK faculty.

TeamSPEAK® has been implemented in Singapore General Hospital, SingHealth Polyclinics and SingHealth Community

Hospitals, with plans for roll out in Changi General Hospital and Sengkang General Hospital in 2019.

Quality Improvement (QI)

In response to evolving needs, IPSQ continually redesigns existing programmes such as the 3-day Quality Improvement (QI) programme curriculum. IPSQ also co-creates new programmes with professionals across domains to achieve effective learning outcomes within the local context. An example is the new 1-day blended learning QI programme which incorporates an e-learning component and local scenarios in the teaching curriculum.



Infection Prevention & Control

IPSQ encourages interdisciplinary collaborations and coordination among stakeholders and partners. The Cross-Institution Infection Control (CIIC) Audit was set up to ensure high standards in infection control, with around 150 inter-professional auditors appointed since 2016. Audits are conducted every quarter, based on a standard CIIC audit tool and parameters to assess the institutions' performance and environmental hygiene compliance.

To drive the professional development track for CIIC Auditors, a cluster-wide curriculum was introduced as a pathway for further development. A harmonised platform to capture cross-institution audit data was also developed to allow for effective data management and reporting.

Root Cause Analysis (RCA) to support Organisational Learning

IPSQ, as the domain expert, facilitates RCA learning to support more effective organisational learning from incidents and adverse events.

To build staff capabilities, a RCA workshop was created to guide staff in the use of a common language and a standardised process to perform analysis. The workshop covers effective problem review and the design of effective solutions. Lessons from RCA of past adverse events are also distilled and disseminated to all the staff as part of the regular IPSQ Patient Safety and Quality Bulletin.

External Collaborations

At the national level, IPSQ encourages and supports SingHealth's participation in Singapore Healthcare Improvement Network (SHINe) projects. A strategic partnership between the Institute for Healthcare Improvement and Ministry of Health, SHINe spearheads a system-wide quality improvement initiative to enhance patient safety in public healthcare institutions and private institutions. With SHINe's shared training framework, IPSQ runs a basic SHINe workshop on Human Factors regularly.

IPSQ also works with international partners such as World Health Organisation, Temasek Foundation International-Healthcare Executives in Asia Leadership, International Council of Nurses and countries in the region to share best practices and professional developments in patient safety and quality.

Patient Advocacy & Engagement

As valued partners in care, patient engagement is paramount in building a strong patient safety and innovative quality culture. IPSQ and the Office of Patient Experience set up the SingHealth Patient Advocacy Network (SPAN) in 2017.

Refer to Page 19 for more details on SPAN.

EDUCATION

Education is key to building a sustainable healthcare system. We are committed to nurturing competent and capable healthcare professionals by providing quality education and ongoing training with greater emphasis on Interprofessional Practice and Education (IPE) to groom a healthcare workforce equipped to provide seamless and integrated patient care.

ADVANCING HEALTHCARE EDUCATION AS ONE



More than 80 educational leaders and staff attended the **inaugural SingHealth Duke-NUS Joint Education Advance** on 29 September 2018, and contributed to the formulation of the Joint Education Masterplan, which will chart strategic priorities and developments in education over the next five years.

The master plan focuses on five strategic thrusts to enhance education for healthcare professionals in our Academic Medical Centre.

Five Strategic Thrusts of the Masterplan:

- 1 Build a community of collaborative practice-ready professionals through **Interprofessional Practice and Education (IPE)**
- 2 Enhance education platforms through **innovation and technology**
- 3 Develop capacity and capability to achieve **education excellence**
- 4 Streamline and **integrate training and development, structures and support services**
- 5 Foster **wellness, resilience** and nurture psychologically safe environments in healthcare



A visual representation of the aspirations of SingHealth and Duke-NUS education leaders, charting the directions of the Joint Education Masterplan.

ENHANCING INTERPROFESSIONAL COLLABORATION AND PRACTICE

Interprofessional Practice and Education ↻

The **inaugural SingHealth Academy Interprofessional Practice and Education Day** was held on 21 February 2019. Through a series of fun activities, 120 healthcare professionals deepened their understanding of IPE and learnt the importance of interprofessional collaboration and practice. The IPE 101 toolkit was also launched to equip healthcare professionals with knowledge to kickstart IPE initiatives and activities.



Co-creating Solutions

Led by SingHealth Residents, the **SingHealth Hackathon** held on 15 and 16 February 2019 successfully gathered 80 interprofessional healthcare staff and students to co-create healthcare solutions to improve care for the community. With the highest turnout to date, participants generated 15 new ideas.

A Collaborative Platform for Academic Excellence ↻

Held on 21 and 22 September 2018, the 5th **SingHealth Duke-NUS Scientific Congress** gathered the best minds in healthcare to share the latest scientific discoveries and care innovations to advance medicine. Themed “Academic Medicine: Translating Research into Clinical Practice”, the biennial event brought together over 3,000 healthcare professionals, researchers and educators from Singapore and around the region, to learn about providing integrated care, its challenges and share research findings and scientific advances in academic medicine.

Training Future-Ready Young Healthcare Professionals

Organised by the SingHealth Academy College of Healthcare Administration and Leadership, the **Essential Management Skills Programme** has successfully equipped 80 medical residents, nurses and allied health professionals at the early stages of their career with knowledge and skills to be resilient and future-ready. The programme also stressed on the importance of interprofessional collaborative practice to enhance the delivery of patient care.



BUILDING CAPABILITIES, STRENGTHENING COMPETENCIES



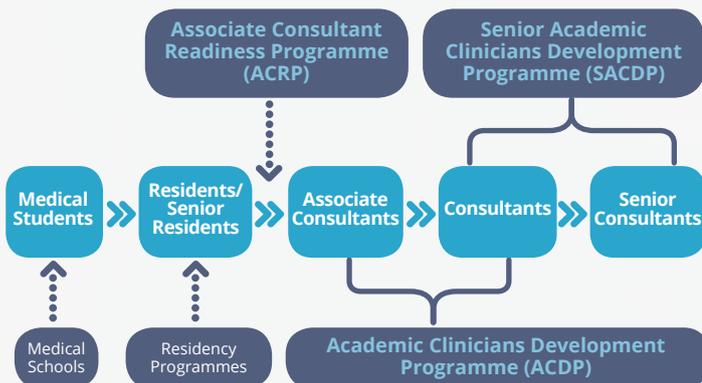
Developing Clinicians for Multi-Faceted Roles

In FY18, SingHealth and Duke-NUS jointly organised three programmes to equip clinicians at all levels with skills and competencies to enhance healthcare delivery.

- The **Associate Consultants Readiness Programme (ACRP)**¹ aims to ease the transition of Senior Residents to Associate Consultants.
- The **Academic Clinicians Development Programme (ACDP)**² prepares clinicians to take on diverse roles in education and research while the **Senior Academic Clinician Development Programme (SACDP)**² cultivates the academic and professional capabilities of senior clinicians to be role models in their Academic Clinical Programmes (ACPs).

To date, more than 370 clinicians have attended the programmes, as part of our efforts to develop our clinicians.

Academic Development After Residency Training



Enhancing Eye Care Delivery

For the first time in Singapore, seven Allied Ophthalmic Personnel (AOPs) successfully attained the Certificate of Ophthalmic Technician (COT) from the **inaugural International Joint Commission on Allied Health Personnel in Ophthalmology (IJCAHPO) examination** held in Singapore. This was made possible as Singapore National Eye Centre (SNEC) signed an MOU with IJCAHPO to be a training and testing centre in the Asia Pacific Region.

A Specialist Diploma in Ophthalmic Medical Technology is being co-developed and will be launched in 2019 by SNEC and SingHealth Academy College of Allied Health Support Staff Education Unit, which will provide training for local and regional candidates.

Developing Collaborative Healthcare Leadership

On 6 July 2018, SingHealth Residency celebrated the graduation of **23 Chief Residents** from the SingHealth Residency Leadership Programme (SRLP) and 13 Chief Residents from the national Singapore Chief Residency Programme. This was the first time SRLP included dental registrars and pharmacists to enhance interprofessional learning and collaboration. To date, 94 SingHealth Chief Residents have completed the leadership programmes.

Shaping Oral Healthcare Education

On 9 March 2019, close to 40 oral health leaders and professionals attended the **inaugural Oral Health Academic Clinical Programme (ACP) Education Forum** organised by the SingHealth Academy College of Clinical Dentistry (CCD). The forum addressed key education priorities and initiatives across the continuum of oral health education.

¹ Facilitated by SingHealth's Learning Leadership and Organisation Development (LLOD) and supported by the SingHealth Academy College of Clinical Medicine (CCM)
² Developed by Duke-NUS Academic Development Department (ADD), Office of Academic and Clinical Development (OACD), and jointly organised with the SingHealth Academy College of Clinical Medicine (CCM)

FORGING PARTNERSHIPS TO ADVANCE HEALTHCARE

Training through Gaming Technology

On 26 October 2018, more than 400 international healthcare and industry professionals attended the **inaugural Serious Games Conference**, jointly organised by the Serious Games Association of Singapore, SingHealth Duke-NUS Institute of Medical Simulation (SIMS) and the Institute for Patient Safety and Quality (IPSQ). Delegates gained insights on how gaming technology, virtual reality, augmented reality, and artificial intelligence can be used to impart knowledge and evaluate skills in healthcare.



Strengthening Regional Collaborations

SingHealth and National Healthcare Group co-organised the 5th run of the **Temasek Foundation International Healthcare Executives in Asia Leadership (TFI HEAL) programme**. Sponsored by Temasek Foundation International, more than 120 healthcare leaders and public officials from 16 countries in Asia attended the programme which covered topics such as healthcare governance, process improvement and hospital management.

Delegates participated in a one-day conference on the rise of Non-Communicable Diseases (NCDs) in the region, and shared initiatives and strategies to address the challenges.

📍 Duke-NUS students champion awareness for paediatric brain and solid tumours

Duke-NUS Medical School partnered with KKH and VIVA Foundation for Children with Cancer to organise the **Paediatric Brain and Solid Tumour Awareness (PBSTA) Day**. It is an annual event aimed at generating awareness about paediatric brain and solid tumours, creating a platform for affected patients and families to interact with one another.

DEVELOPING HEALTHCARE ADMINISTRATORS

Nurturing a Pipeline of Healthcare Leaders and Administrators

On 14 August 2018, SingHealth and Singapore Management University (SMU) signed a MOU to train undergraduates in the new Health Economics and Management (HEM) second major. The collaboration, which aims to **nurture a pipeline of local graduates equipped with knowledge in healthcare administration**, is the first-of-its-kind in Singapore.

Appointed SingHealth faculty will co-teach and supervise SMU students in their projects. Beyond the classroom setting, SMU students will undergo a 10-week or six-month SingHealth Internship Programme at SingHealth hospitals and institutions.





↻ Inaugural SingHealth Nursing Open House

On 5 January 2019, close to 300 nursing students and their parents attended the **inaugural SingHealth Nursing Open House**, organised by SingHealth Academy College of Clinical Nursing. Participants toured operating theatres and simulation wards, and participated in interactive activities to learn more about the nursing profession.

Duke-NUS students raise mental health awareness

The **"I am S.T.E.A.D.Y Lah"** project, spearheaded by Duke-NUS students and in its second year, aims to raise awareness of different channels that young people with depression can seek help from. There were also forum sessions and a panel discussion for the public to learn about depression and anxiety.

Inter Healthcare Camp 2018 for students ↻

In July, SingHealth hosted more than 100 first-year medical, dental, nursing, allied health and pharmacy students as part of the **Inter Healthcare Camp 2018**. A panel discussion with SingHealth educators gave students the opportunity to learn about the latest developments and the joys and challenges of working in healthcare.

CognaLearn recognised at Reimagine Education Awards

A spinoff from Duke-NUS, **CognaLearn transforms the delivery of education by replacing lectures with team-based learning methods and technology**. It earned a bronze award in the Hybrid Learning category at the Reimagine Education Awards, which reward innovative approaches aimed at enhancing student learning outcomes and employability.

Improving communication with adolescent patients

To **prepare medical students for real-world scenarios with adolescent patients**, KK Women's and Children's Hospital (KKH) runs a programme that lets students practise having conversations with young patients. Teenage actors playing the role of adolescent patients help medical students from Duke-NUS Medical School and Lee Kong Chian School of Medicine learn how to broach sensitive topics like sexual health or puberty with teens during consultations.



Camp Compassion

In its 10th year, **Camp Simba** was organised by student volunteers from Duke-NUS Medical School and NUS Yong Loo Lin School of Medicine to provide emotional support and a sense of community to children with family members affected by cancer. The student volunteers are trained in topics such as small group facilitation as well as emotional first aid and child and adolescent psychology before they attend the camp.

SINGHEALTH DUKE-NUS GLOBAL HEALTH INSTITUTE

The SingHealth Duke-NUS Global Health Institute (SDGHI) harnesses the clinical strengths and academic expertise of the SingHealth Duke-NUS Academic Medical Centre to advance global health activities in the region and beyond. SDGHI seeks to improve health outcomes and reduce the burden of disease through evidence-based research. The Institute is committed to working with regional partners to develop local talent, cultivate a strong research culture and ensure sound operational processes. SDGHI is also developing comprehensive education and training programmes to provide future health leaders with the necessary skills and knowledge to meet future global challenges. In Singapore, SDGHI is collaborating with institutions across academic, non-profit, government and private sectors within and beyond the medical sciences to broaden its impact on global health.

GLOBAL HEALTH RESEARCH PROJECTS



Investigating small mammals and bats in Cambodia for disease prevention

Small mammals and bats are responsible for the transmission of parasites that can infect humans. A team led by Prof Gavin Smith (Research Co-Lead, SDGHI) is conducting a study to determine which parasites may have human pathogenic potential by sampling animal populations to discern parasitic genotypes and screen for human exposure. A standardised trapping regimen will be developed to understand the ecological and environmental variables associated with the host and parasite relationship. This will help create ecological niche maps and models to determine risk and shape future surveillance efforts in Cambodia and the region.



Genomic and epigenomics study of bile duct cancer

The incidence of Cholangiocarcinomas (CCAs), a relatively rare bile duct cancer, has been rising worldwide. It is endemic in certain regions, particularly in North-East Thailand due to the liver-fluke *Opistorchis viverrini* infection found in local fresh water fish. To understand the underlying molecular genetics of CCA, a team led by Prof Teh Bin Tean (Deputy Director, National Cancer Centre Singapore), Prof Patrick Tan (Director, Duke-NUS Genome Biology Facility) and Prof Steven Rozen (Director and Associate Dean, Centre for Computational Biology, Duke-NUS), in collaboration with Khon Kaen University of Thailand, delineated the entire spectrum of genetic aberrations in liver-fluke associated CCA. The genomic and epigenomic studies of this cancer have since been expanded to Europe and East Asia.

RESEARCH

We constantly seek breakthroughs to improve healthcare outcomes via outstanding clinical and translational research.

TECHNOLOGY

Shedding light on a surgical problem

A new lighting device called Klaro was created by Vivo Surgical in collaboration with SingHealth's Medical Technology Office, National Cancer Centre Singapore (NCCS) and Panasonic Lighting Europe, to illuminate specific parts of the body during open surgery. Existing overhead lighting in operating theatres is generally unable to illuminate the entire cavity being operated on, while headlamps that some surgeons wear are not ideal. This new device is cooler than regular light-emitting diodes (LEDs), making it safe as it does not damage surrounding body tissue during surgery.

Detecting viruses using portable devices ↻

In this first of its kind study, Duke-NUS researchers at the Emerging Infectious Diseases (EID) programme successfully detected common airborne viruses on MRT trains using portable devices. The method can potentially detect viruses in a population much faster than screening patients at clinics or hospitals, which can take several days.

CANCER

Drug trial for high-risk multiple myeloma

A drug trial started by Singapore General Hospital (SGH) in 2013 for high-risk multiple myeloma patients replaced one of the drugs in a typical cocktail of drugs with a new drug that is currently used only when a patient who has been treated has a relapse. While high-risk multiple myeloma patients generally survive for 2 to 3 years, the majority of patients treated on the trial are still alive today. Half the patients have achieved complete remission – significantly more than those undergoing normal treatment. This is one of the first in the world specifically for high-risk myeloma patients.

Bright lights, big CITI

Led by Duke-NUS and NCCS, the Cancer ImmunoTherapy Imaging (CITI) programme received a \$22 million grant, which will boost global efforts in immunology. The CITI programme is an integrated, multidisciplinary platform for translational immunology imaging that addresses the urgent need for biomarker-driven approaches to monitor tumour immune response.



A game changer for patients with blood cancer

Using stem cells from a newborn baby's placenta and umbilical cord has a limitation as each cord blood unit contains only a small amount of stem cells. A new technique – Nicord® cord blood expansion – aims to overcome this limitation by taking a single unit of cord blood, and culturing and growing the stem cells in the laboratory for transplant. Following the success of the Nicord® cord blood expansion clinical trials, a multidisciplinary team of researchers from NCCS, Duke-NUS and the National University of Singapore is developing a method to expand the blood-forming stem cells in umbilical cord blood.



Ms Judith Chew (with treating doctor Prof Hwang), a business consultant in her early 50s, who was diagnosed with acute myeloid leukaemia, was the first patient in Asia to undergo a stem cell transplant using Nicord® cord blood expansion technique.

NEONATAL AND INFANT CARE

Faster genetic test for rare diseases in children

KK Women's and Children's Hospital (KKH) has developed a Rapid Genomic Sequencing test, or RapidSeq, which uses advancements in genetic sequencing to expedite the identification of the underlying genetic problem in critically ill children. The test reduces the turnaround time of diagnosis from months to 10 working days, allowing the children to receive the treatment they need earlier. The test is part of a collaboration with genomic research institutes including Duke-NUS and A*STAR and has led to successful diagnosis in one out of three families.

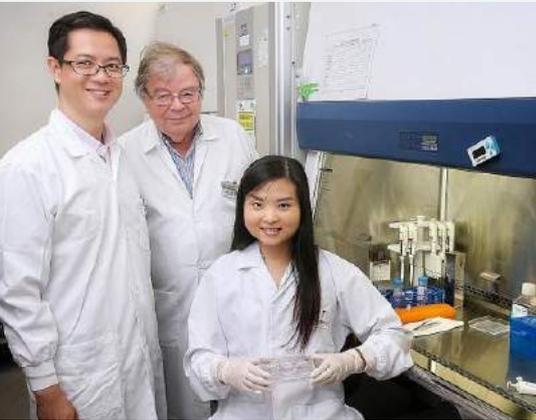
First neonatal guide for vulnerable babies

Lien Centre for Palliative Care, KKH, SGH, National University Hospital and HCA Hospice Care have worked together to develop the first-ever guide book to address the complex needs of vulnerable babies. The guidelines also aim to equip clinicians with the knowledge and skills to provide supportive and comfort care when managing vulnerable babies and those with life-limiting illnesses.

Critical role of DHA on foetal brain development

A Duke-NUS study has discovered that a natural form of Docosahexaenoic Acid (DHA), called Lyso-Phosphatidyl-Choline (LPC-DHA) made by the liver, is critical for normal foetal and infant brain development. The validated research shows that two vital components are needed for DHA to reach the developing brain in sufficient quantities for healthy growth: the presence of functional Mfsd2a, and the abundance of activated DHA.

BURNS



🔗 Human protein to grow new skin

Breakthrough research to culture human skin cells called keratinocytes to produce skin grafts has been published by a team of researchers from Duke-NUS Medical School and SGH. This method is the first to use a specific type of tissue-proteins known as laminins, found in the human body, to create a safer treatment for severe burns or other skin-related defects.

ORAL CARE

Speeding up jaw reconstruction 🔗

National Dental Centre Singapore (NDCS) researchers have developed a titanium modular mandible endoprosthesis to replace the lower jaw in patients who have had sections of the jaw removed due to disease or trauma. The endoprosthesis eliminates the need to harvest bone and tissue from the patient's leg for jaw reconstruction, cuts surgery time and helps patients recover faster with fewer post-operative complications.

CARDIOMETABOLIC DISEASES

New study for heart failure treatment

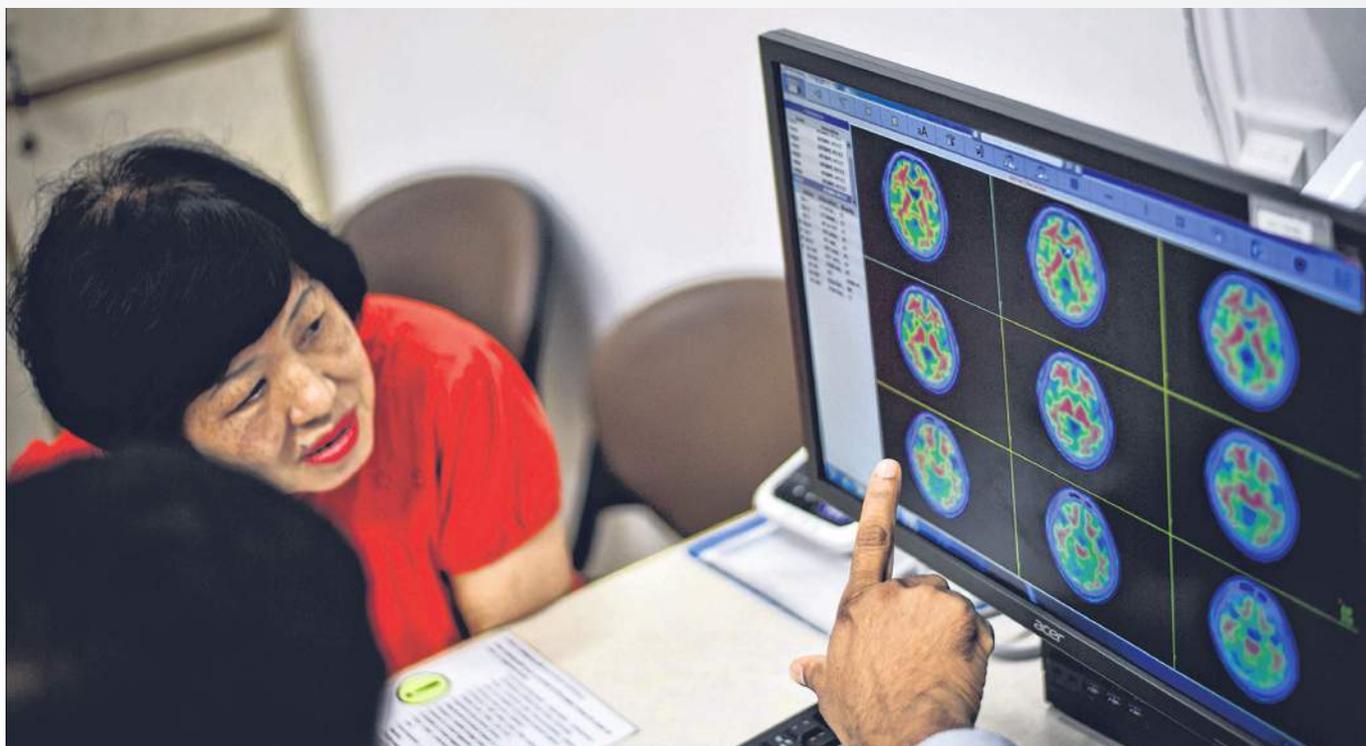
A study led by an international team of researchers, including National Heart Centre Singapore (NHCS), has found that 75% of patients with heart failure with preserved ejection fraction (HFpEF) also have a disease known as microvascular dysfunction. HFpEF is a dominant type of heart failure worldwide and represents at least one-third of heart failure cases in Singapore. No effective treatment for HFpEF currently exists and it often goes undetected. The landmark results support the possibility of using microvascular dysfunction as a composite risk marker for HFpEF and targeting microvascular dysfunction in ongoing and new drug trials. The study paves the way for the eventual detection and treatment of HFpEF.

Study to control hypertension

Researchers at Duke-NUS Medical School, led by Professor Tazeen Jafar, studied patients with hypertension to understand the reasons for poor blood pressure control. Researchers found three main barriers to controlling hypertension, namely, a failure to take antihypertensive medicines, being prescribed one antihypertensive medication instead of two to three, and a lack of familial or social support.



NEUROSCIENCE



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🔍 New diagnostic tools for early detection of Alzheimer's disease

The National Neuroscience Institute (NNI) now offers two new diagnostic techniques to detect pre-dementia. 50% of patients with pre-dementia develop dementia within 5 years. The new tests provide critical early diagnosis that can help prevent or slow down the development of dementia. This also allows a more precise understanding of changes in the brains of patients with dementia.

🌙 Sleep affects cognition and glucose levels

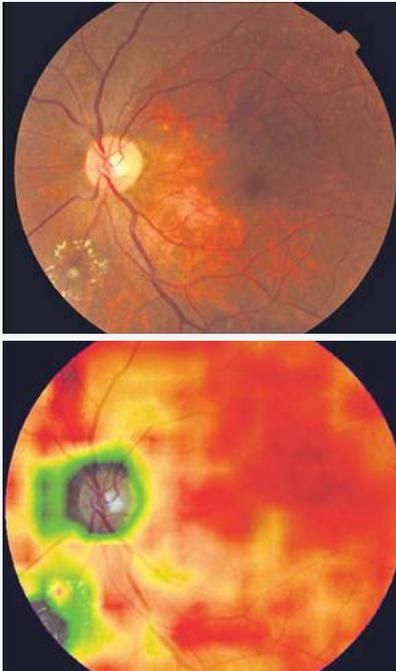
Researchers at Duke-NUS Medical School have demonstrated for the first time that different sleep schedules with the same total sleep opportunity over 24 hours may have dissimilar effects on cognition and glucose levels. This is the first study to gather experimental evidence on the notion that 'what may be appropriate sleep for one health goal may not be for another'.

HEALTH SERVICES RESEARCH

😊 Happy, older people live longer

A Duke-NUS study revealed that an increase in happiness is directly proportional to a reduction in mortality risk for those aged 60 years and older. More specifically, among happy older people, 15% passed away between 2009, when happiness was assessed, and the end of 2015. However, 20% of unhappy older people died during the same period, with the researchers calculating that the risk of dying due to any cause was 19% lower for happy older people.

EYE DISEASES



🔄 Transforming AI vision into reality

A joint venture between Singapore Eye Research Institute and Singapore National Eye Centre (SERI-SNEC), NUS and NovaHealth, known as EYRIS, has developed the world's first fundus imaging analysis AI system, SELENA. The system can detect 3 major eye conditions, namely diabetic retinopathy, glaucoma and age-related macular degeneration. It is potentially able to screen off 40-60% of all fundus photographs, so that graders only have to screen the positive results. This reduces the time taken for diagnosis and allows more patients to be screened in a shorter time.

INFECTIOUS DISEASES, INFLAMMATION AND IMMUNOLOGY

Study on accuracy of urinary tract infection diagnosis

A study conducted by SingHealth Polyclinics (SHP) and the National Centre for Infectious Diseases (NCID) found that out of 564 women with urinary symptoms, 46 per cent of them were eventually diagnosed with urinary tract infection (UTI) after a urine microscopy test. Meanwhile, 54 per cent of the women with urinary symptoms were not diagnosed with UTI. The study shows that if a doctor makes a diagnosis of UTI based only on the presence of certain urinary symptoms, the diagnosis may not be accurate and can lead to over-treatment or unnecessary antibiotic prescription. SHP and NCID will now explore ways to improve the accuracy of diagnosing UTI using an algorithm-based risk calculator.

Drug discovery process accelerated

A collaboration between Duke-NUS, Imperial College London and pharmaceutical company UCB led to the discovery of a new anti-epileptic drug target and a new approach named the 'Causal Reasoning Analytical Framework for Target discovery' (or CRAFT) to accelerate drug discovery for this debilitating disease.

CRAFT is a data-driven approach that combines gene regulatory information with "causal reasoning" to help researchers understand the mechanism of a disease and predict novel drug targets.

New approach to treat airway diseases

Researchers from Changi General Hospital (CGH), SGH, NUS and Duke-NUS Medical School have proposed a new clinical paradigm to treat upper and lower airway diseases using a precision medicine approach. The paradigm is based on a concept known as the United Airways Disease (UAD), which posits that the upper and lower airways form a single organ. The scientists proposed a "treatable traits" approach for the classification and management of UAD, where pathophysiological mechanisms and factors are identified and targeted for treatment. This will advance efforts to deliver precise treatments and achieve better outcomes in patients with UAD.

Duke-NUS inducted into Global Virus Network

A coalition of seven virology research institutions in Singapore, including Duke-NUS, has been inducted into the Global Virus Network (GVN) as a Centre of Excellence for effective pandemic control, joining 42 other Centres of Excellence and seven affiliates in 27 countries. This combined expertise will contribute to global efforts in fighting and containing viral diseases.

AWARDS

Top cancer award for first Asian team

For the first time, an Asian team of cancer researchers has won the prestigious American Association for Cancer Research (AACR) Team Science Award. The researchers found a link between liver cancers and aristolochic acid, a compound found in some traditional Chinese remedies. The international team was led by Singapore researchers including Professors Patrick Tan (Team Leader), Teh Bin Tean, Steve Rozen and colleagues from Duke-NUS Medical School, NCCS, Genome Institute of Singapore, and collaborators from Japan, Taiwan and Thailand.

President's Science and Technology Award ↻

Prof Stuart Cook (Director, National Heart Research Institute Singapore) was conferred the President's Technology Award for advancing research in human genetics and cardiovascular disease. The team, comprising Prof Tan Eng King (Deputy Medical Director (Academic Affairs) and Director, Research, NNI), Assoc Prof Lim Kah Leong (Visiting Lead, Strategic Alliances, NNI), Assoc Prof Louis Tan (Deputy Director, Research, NNI) and Prof Ng Huck Hui (Executive Director, GIS, A*STAR), was awarded the President's Science Award (Team) for their outstanding research on clinical biomarkers, novel models and therapeutics for Parkinson disease.

COMMERCIALISATION

Duke-NUS commercialises discovery

Intellectual property derived from discoveries made at Duke-NUS Medical School have been licensed to a newly formed Singapore-based biotech start-up, Travecta Therapeutics Pte Ltd. The drug discovery company plans to use the Duke-NUS technology to develop new therapeutic agents that can be selectively delivered across the blood brain barrier for treatment of diseases of the brain, eye and central nervous system.

Study to develop stem cell-based therapy

Duke-NUS and Novo Nordisk A/S (Novo Nordisk), a Danish multinational pharmaceutical company, have joined hands to study and develop a novel stem cell-based therapy to treat two chronic conditions: heart failure and vision loss. The research will focus on growing heart muscle and retinal cells to treat cardiomyopathy and macular degeneration.



GIVING

Gifts from our generous donors support the quest to define tomorrow's medicine through research, medical education and improvements in clinical care.

Our philanthropic partners include patients, their relatives, corporate organisations and SingHealth staff. They understand the impact of disease on individuals, families and communities, and their gifts are making a difference in three ways:



Providing financial and other forms of assistance to patients in need



Enabling ground-breaking research for new treatments



Supporting continuing education of healthcare professionals

FUNDS RECEIVED IN FY2018



NAMED FUNDS

In FY2018, two new named funds were established:

Celebrating the legacy of a mentor extraordinaire →

Senior Consultant Dr Minnie Pang worked at SGH for 12 years, during which she taught and mentored a generation of consultant pathologists. The late Dr Pang was well-loved and an inspiration to those who knew her. In appreciation of her exceptionally generous nature, a colleague, who wishes to remain anonymous, made a donation to establish the endowed **Minnie Pang Pathology Academic Fund**. This fund will be used to nurture and develop talents in the field of pathology and raise awareness of the specialty among medical students and junior doctors.



Dr Minnie Pang, cooking up a storm during the final Histopathology Lunch at the old Pathology Lecture Theatre

Improving diagnoses of rare diseases

A grateful patient's family donated \$150,000 to the KKH Paediatrics Genetics Team to support research on undiagnosed rare diseases in children. The goal of the **Supporting WES In Family Testing (SWIFT) fund** is to attain rapid diagnoses through Whole Exome Sequencing (WES) so the right treatment can be given. This will help provide desperately needed answers for sick children and their families. The fund name was chosen to honour one of our pioneering doctors who has worked tirelessly to build the genetics lab over the past two decades.

TRANSFORMATIONAL GIFTS

Former patient gives back to NCCS

A former NCCS patient donated \$1 million to fight cancer and boost education for patients. The gift will be divided equally between research into lymphoma, the same type of cancer the donor suffered as a teenager, and a new interactive education hub to give patients, caregivers and the public better access to reliable information about the disease. The interactive education hub will be housed at the new NCCS, which is slated to open in 2022, and will be managed in partnership with Singapore Cancer Society.

SPECIAL EVENTS



Guest of Honour, Mr Lim Boon Heng, Chairman, Temasek Holdings, teeing off at the first hole to launch the tournament.

The drive for a healthier tomorrow

Generosity, fun and friendly competition were par for the course when around 120 golfers competed in the **SingHealth Duke-NUS Charity Golf 2018** on 24 August 2018. The tournament which was followed by dinner and a charity auction raised \$413,500 to support medical research and education initiatives of four Academic Clinical Programmes (ACPs): Cardiovascular Sciences, Musculoskeletal Sciences, Neuroscience and Oncology.

Growing a giving culture

Mrs Jennifer Yeo, the founder and chair of VIVA Foundation for Children with Cancer (VIVA), shared with SingHealth staff her family's battles with cancer and her tireless drive to improve cancer care for children in Asia. Mrs Yeo's talk was part of **SingHealth Giving Day 2018**, an annual event that aims to promote the culture of giving, create awareness of giving opportunities and the impact giving makes.

This year's event, which included a charity bazaar and 'Bid-A-Bear', a teddy bear auction, raised a total of \$45,194 for medical research, education and patients in need.



Some of the 12 bears which were styled by SingHealth leaders for the Bid-A-Bear auction.

EVERY DOLLAR COUNTS!

From glitzy gala dinners to staff bazaars, every fundraising event made a difference. The generous support of individuals and organisations who are passionate about improving healthcare and supporting patients, will go a long way in advancing medicine through research, education and clinical care.

GALA DINNERS



Michelin-starred chefs served up gastronomic delights paired with fine wines at the **NHCS Heart To Heart Gala 2018** on 5 Oct, helping to raise \$2.14 million for the Heart To Heart Fund.



Donors transformed into their favourite superheroes for the night, raising more than \$872,700 for KKH Health Fund at the **Kidz Horizon Appeal Gala Dinner 2018** on 25 Aug.



President Halimah Yacob was Guest of Honour at the **NCCS Charity Dinner 2018** on 3 Nov, which raised \$1.8 million for the NCC Research Fund and NCCS Cancer Fund.



All things 'candylicious' were the flavor of the night at **The Eye Ball 2018: Eye Candy** on 17 Nov, which raised more than \$1.25 million for SNEC and SERI's VisionSave campaign.

STAFF STEP UP TO SUPPORT SINGHEALTH CAUSES

Makan a difference

More than 200 staff from NDCS donated towards a good cause at the **Annual Charity Lunch Bazaar** which raised more than \$2,500 for the **NDCS Tooth Fairy Fund**, which supports dental patients in financial need, oral health research and medical education.

KKH charity exhibition

More than \$75,000 was raised for the KKH Health Fund at the two-day Eternity in an Hour – A Charity Photography Exhibition by Dr Arif Tyebally, Deputy Head & Senior Consultant, Dept of Emergency Medicine, KKH, who took the photos over the past 20 years during his travels.



Gaia's Embrace was among the 32 photos at the sellout exhibition.

LIKE-MINDED PARTNERS COME TOGETHER TO LEND SUPPORT

Symphony of Hope ↻

A Tang Quartet performance was the highlight of **Symphony of Hope**, a fundraising concert which raised \$80,000 for **TRUEfund**, which supports organ transplant research, medical education and patients. Other performances included music groups from Methodist Girls' School, teen singer Lauren Yeo and the SGH Campus Choir.



SKH festive fundraiser

Lessons In Geometry through Holiday Tidings - LIGHT was a year-end event held at SKH in partnership with Methodist Girls' School. Student performances at the event brought festive cheer to SKH patients and staff while raising close to \$190,000 for the **SKH Better Health Fund**.

Zooming in on brain care

Lamborghini owners took persons with dementia and their caregivers for a ride during the opening of **NNI One Heart, One Mind Neuro-Awareness Roadshow 2018 @ Changi Airport T3**, which raised close to \$25,000 for the **NNI Health Research Endowment Fund**.

Flagged for success

Students and staff were among the 140 volunteers who took to the streets on 19 Jan for the **Bright Vision Hospital Flag Day**. Together they raised \$176,200 to support patients in financial need and patient care programmes at the community hospital.

Pathology scales new heights

One of Singapore's top violinists, Loh Jun Hong, lent his support to the **Classical Music Recital** in January, helping to raise more than \$100,000 for **Pathology ACP**. Other musicians who performed included The Libitum Quartet and a group of SGH pathology doctors.

Making a splash for research ↻

Senior management and staff, together with current and former national swimmers and supporters, clocked 7,500 laps to raise \$197,000 in support of Medicine ACP's **Reverie Rheumatology Research Fund** to improve patient outcomes.



RAD Race 2018 is a winner

Ultra-marathoner Lim Nghee Huat put his best foot forward and helped the **Radiological Sciences ACP** raise more than \$500,000 towards the Tan Kim Ping Academic Fund, which supports research and education in radiological sciences.

Art for a cause ↻

Clay Connections, a group of local ceramic artists, held a week-long exhibition titled, **Shaping Art, Moulding Lives**, at CGH in October. Proceeds from the sale of the exhibits and commemorative 2019 calendars featuring the handmade ceramic artworks raised \$56,000 for CGH's **HomeCare Assist** programme.





FACTS & FIGURES

ABOUT US

LEADERSHIP

OVERALL KEY FIGURES & STATISTICS

INSTITUTION STATISTICS

RESEARCH STATISTICS

EDUCATION STATISTICS

ABOUT US



The SingHealth Duke-NUS Academic Medical Centre draws on the collective strengths of Singapore Health Services (SingHealth) and Duke-NUS Medical School to drive the transformation of healthcare and provide affordable, accessible and quality healthcare.

With over 40 clinical specialties, a network of acute hospitals, national specialty centres, polyclinics and community hospitals, we deliver comprehensive, multidisciplinary and integrated care.

OUR VISION

Defining Tomorrow's Medicine

OUR MISSION

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

OUR COMMON PURPOSE

PATIENTS. AT THE HEART OF ALL WE DO.®

OUR CORE VALUES

Compassion. Integrity. Collaboration.

MEMBERS OF THE SINGHEALTH GROUP

Tertiary Specialty Care

Hospitals:

- Singapore General Hospital
- Changi General Hospital
- Sengkang General Hospital
- 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
- Singapore National Eye Centre

Primary Care

SingHealth Polyclinics:

- Bedok
- Bukit Merah
- Marine Parade
- Outram
- Pasir Ris
- Punggol
- Sengkang
- Tampines

Intermediate and Long-term Care

SingHealth Community Hospitals:

- Bright Vision Hospital
- Sengkang Community Hospital
- Outram Community Hospital
(*expected completion: 2020*)

OUR PARTNER IN ACADEMIC MEDICINE

Duke-NUS is a partnership between Duke University School of Medicine and the National University of Singapore (NUS).

In 2005, with support from the Singapore government, NUS and Duke University, two academic institutions with strong track records in research and education, committed to combine the unique medical education curriculum at Duke University School of Medicine with the academic rigour and rich resources offered by NUS, and to offer students an enriching and innovative medical educational experience.

Duke-NUS is located on the main campus of the largest healthcare group in the country, Singapore Health Services (SingHealth). This group collectively delivers multidisciplinary care among more than 40 clinical specialties across a large network of hospitals, national specialty centres and polyclinics. Together, Duke-NUS and SingHealth constitute a leading, world class Academic Medical Centre embodying the goal of delivering the highest levels of patient care, education and research.

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Specialist in Medical Oncology,
Icon SOC Farrer Park Medical Clinic

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Ms Tan Whei Mien Joy

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LwH Consultancy Pte Ltd

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Duke University School of Medicine

Dr Geh Min

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(Singapore) and Former Nominated
Member of Parliament

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Social Scientist and Former United
Nations Under-Secretary-General

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LinHart Group

Mr Lee Kim Shin

Managing Partner, Allen & Gledhill LLP

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Visiting Consultant Surgeon, (SGH, KPTH,
TTSH), Emeritus Consultant, CGH and
Senior Consultant, Ministry Of Health

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Singapore Health Services

Assoc Prof Benjamin Ong Kian Chung

Director of Medical Services,
Ministry of Health

Deputy Chairman

Prof Ho Teck Hua

Senior Deputy President and Provost,
National University of Singapore

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Duke University and President and CEO,
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SingHealth

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Group Chief Executive Officer

Prof Fong Kok Yong

Deputy Group Chief Executive Officer
(Medical & Clinical Services)

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Deputy Group Chief Executive Officer
(Organisational Transformation & Informatics)

Adjunct Prof Lee Chien Earn

Deputy Group Chief Executive Officer
(Regional Health System)

Prof Wong Tien Yin

Deputy Group Chief Executive Officer
(Research and Education)

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Assoc Prof Peter Lim Ai Chi

Group Chief Risk Officer

Duke-NUS

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Dean

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Senior Vice Dean, Research

Mr Sia Kheng Hong

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Mr Tan Jack Thian

Group Chief Operating Officer

Ms Esther Tan

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Assoc Prof Tan Say Beng

Group Director, Research

Prof Chan Choong Meng

Group Director, Education

Prof Tan Kok Hian

Group Director, Academic Medicine

Adjunct Assoc Prof Tracy Carol Ayre

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Prof Celia Tan

Group Director, Allied Health

Mrs Tan-Huang Shuo Mei

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Mr Kevin Tay Chong Keg

Group Chief Information Officer
(from 1 July 2019)

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Group Chief Digital Strategy Officer

Assoc Prof Loo Chian Min

Group Chief Medical Informatics Officer

Assoc Prof Chua Yeow Leng

Group Director, International
Collaboration Office

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Group Director, Regional Health System

Ms Lee Chen Ee

Group Director, Organisational
Transformation

Prof Wong Tien Yin

Vice Dean, Academic & Clinical
Development

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Prof Fong Kok Yong

Chairman, Medical Board


Adjunct Prof Lee Chien Earn

Chief Executive Officer

Prof Teo Eng Kiong

Chairman, Medical Board


Prof Christopher Cheng

Chief Executive Officer

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Prof Alex Sia

Chief Executive Officer

Assoc Prof Ng Kee Chong

Chairman, Medical Board


Assoc Prof William Hwang Ying Khee

Medical Director


CI Assoc Prof Poon Choy Yoke

Director


Prof Terrance Chua

Medical Director


Assoc Prof Ng Wai Hoe

Medical Director


Prof Wong Tien Yin

Medical Director


Ms Margaret Lee

Chief Executive Officer


Dr Adrian Ee

Chief Executive Officer

SINGHEALTH GROUP

OVERALL KEY FIGURES & STATISTICS

MANPOWER

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
3,682	173	10,515	5,623	8,954	28,947	2019
3,575	176	10,392	5,455	9,005	28,603	2018

Note: Includes MOHH-Hired Doctors and SCH; excludes BVH

KEY FIGURES

Year ended 31 Mar

2019

2018

Change

ACUTE CARE AND POLYCLINICS

Size

Beds (As at end March)

4,345

4,038

7.6%

Workload per annum

Bed Occupancy Rate

82.5%

81.6%

0.9% pt

Inpatients

236,442

185,096

27.7%

Total Patient Days

1,155,880

890,330

29.8%

Average Length of Stay (days)

4.9

4.8

0.1 day

Day Surgeries

171,716

136,392

25.9%

Inpatient Surgeries

105,850

82,180

28.8%

Specialist Outpatient Clinic Attendances

2,520,228

2,116,337

19.1%

Accident & Emergency Attendances

473,068

343,144

37.9%

Dental Attendances

264,317

253,063

4.4%

Dental Procedures

348,897

329,998

5.7%

Polyclinic Attendances

1,808,267

1,819,465

-0.6%

COMMUNITY HOSPITALS

Size

Beds (As at end March)

442

261

69.3%

Workload per annum

Bed Occupancy Rate

85.9%

87.8%

-1.9% pts

Inpatients

2,811

1,749

60.7%

Total Patient Days

105,317

76,370

37.9%

Note: Key figures include CGH data since date of integration (1 Jan 2018) and SKCH data since start of operations (20 Aug 2018).

FINANCIAL INFORMATION

	Year ended 31 Mar	
	2019 (S\$ million)	2018 (S\$ million)
Assets by Major Categories		
Plant and Equipment	945	779
Trade and Other Receivables	1,391	1,272
Other Assets	1,428	1,414
Total	3,764	3,465
Liabilities by Major Categories		
Trade and Other Payables	1,867	1,711
Other Current Liabilities	173	174
Non Current Liabilities	597	597
Total	2,637	2,482
Total Equity	1,127	983
Revenue Breakdown by Major Categories		
Clinical Revenue	2,014	1,657
Subvention	2,440	1,850
Other Revenue	818	787
Total	5,272	4,294
Expenditure by Major Categories		
Manpower	2,933	2,395
Supplies and Consumables	749	593
Other Operating Expenses	1,314	1,109
Depreciation and Amortisation	233	189
Total	5,229	4,286

Note: Revenue and Expenditure figures for the period ended 31 Mar 2018 include EHA subsidiaries from date of integration 1 Jan 2018.



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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
0	0	9	117	729	855	2019
0	0	12	123	883	1,019	2018



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

265 **Doctor of Medicine (MD) Students**
Including 19 students currently enrolled in Integrated Biology and Medicine (IBM) PhD programme, and 5 IBM PhD graduates

61 **Integrated Biology and Medicine (IBM) PhD students**
Including 19 MD Students

7 **Integrated Biostatistics and Bioinformatics (IBB)**
PhD students

1,617 **Faculty**
Including faculty in Research, Education and the Office of Academic and Clinical Development

Figures as at 31 March 2019



Singapore
General Hospital

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
1,147	0	3,708	1,789	2,421	9,066	2019
1,213	0	3,914	1,777	2,444	9,348	2018

	Year ended 31 Mar	
	2019	2018
Size		
Beds <i>(As at end March)</i>	1,723	1,748
Workload per annum		
Bed Occupancy Rate	84.4%	86.1%
Inpatients	80,423	81,495
Total Patient Days	486,015	495,809
Average Length of Stay <i>(days)</i>	6.0	6.1
Day Surgeries	51,928	50,715
Inpatient Surgeries	47,784	47,583
Specialist Outpatient Clinic Attendances	749,507	748,991
Accident & Emergency Attendances	124,691	128,047

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. Figures include MOHH-hired doctors.



**Changi
General Hospital**

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
724	1	2,332	935	1,596	5,588	2019
739	0	2,311	993	1,645	5,688	2018

Year ended 31 Mar
2019 **2018**

Size

Beds *(As at end March)*

1,066

1,066

Workload per annum

Bed Occupancy Rate

84.6%

85.7%

Inpatients

50,507

51,110

Total Patient Days

316,012

319,907

Average Length of Stay *(days)*

6.3

6.3

Day Surgeries

33,951

32,740

Inpatient Surgeries

24,581

25,321

Specialist Outpatient Clinic Attendances

447,829

438,547

Accident & Emergency Attendances

139,006

143,787

Dental Attendances

3,945

3,880

Dental Procedures

4,347

4,687



Sengkang
General Hospital

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
374	2	1,102	502	828	2,808	2019
189	2	898	398	657	2,144	2018

Year ended 31 Mar

2019 2018

Size

Beds *(As at end March)*

523 191

Workload per annum

Bed Occupancy Rate

72.1% 53.1%

Inpatients

19,499 7,001

Total Patient Days

82,080 45,829

Average Length of Stay *(days)*

4.2 6.5

Day Surgeries

8,261 2,155

Inpatient Surgeries

7,410 2,247

Specialist Outpatient Clinic Attendances

65,288 22,264

Accident & Emergency Attendances

54,850 15,581

Dental Attendances

131 685

Dental Procedures

634 2,975



KK Women's and
Children's Hospital

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
722	13	1,909	896	1,261	4,800	2019
706	13	1,942	903	1,351	4,914	2018

Year ended 31 Mar
2019 2018

Size

Beds *(As at end March)*

848

848

Workload per annum

Bed Occupancy Rate

79.8%

80.4%

Inpatients

75,505

73,469

Total Patient Days

215,468

217,172

Average Length of Stay *(days)*

2.9

3.0

Day Surgeries

11,242

11,932

Inpatient Surgeries

19,581

19,802

Specialist Outpatient Clinic Attendances

552,504

560,191

Accident & Emergency Attendances

154,521

163,107

Dental Attendances

5,894

5,373

Dental Procedures

11,315

10,232



National Cancer
Centre Singapore

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
185	0	160	427	358	1,130	2019
186	0	167	399	365	1,117	2018

Year ended 31 Mar

Workload per annum

Day Surgeries

8,524

8,840

Specialist Outpatient Clinic Attendances

156,170

154,173



National Dental
Centre Singapore

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
0	137	21	71	280	508	2019
0	141	18	67	287	513	2018

Year ended 31 Mar

Workload per annum

Day Surgeries

8,980

9,107

Dental Attendances

205,885

202,395

Dental Procedures

210,445

200,373

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. Figures include MOHH-hired doctors.



National Heart
Centre Singapore

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
117	0	491	312	350	1,271	2019
123	0	503	318	385	1,328	2018

	Year ended 31 Mar	
	2019	2018
Size		
Beds <i>(As at end March)</i>	185	185
Workload per annum		
Bed Occupancy Rate	83.8%	78.8%
Inpatients	10,508	10,459
Total Patient Days	56,305	52,891
Average Length of Stay <i>(days)</i>	5.4	5.1
Day Surgeries	2,436	2,244
Inpatient Surgeries	6,494	6,379
Specialist Outpatient Clinic Attendances	128,785	128,417

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. Figures include MOHH-hired doctors.



National
Neuroscience Institute

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
101	0	41	151	132	424	2019
105	0	38	141	130	414	2018

Year ended 31 Mar

2019 2018

Workload per annum

Specialist Outpatient Clinic Attendances

51,395

48,373



Singapore National
Eye Centre

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
115	0	305	160	340	920	2019
124	0	289	146	350	910	2018

Year ended 31 Mar

2019 2018

Workload per annum

Day Surgeries

46,394

43,397

Specialist Outpatient Clinic Attendances

368,750

343,696

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. Figures include MOHH-hired doctors.



SingHealth
Community Hospitals

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
16	0	164	75	169	424	2019
4	0	31	14	47	96	2018

Year ended 31 Mar 2019

SENGKANG COMMUNITY HOSPITAL

Size

Beds *(As at end March)*

166

Workload per annum

Bed Occupancy Rate

81.5%

Inpatients

618

Total Patient Days

18,575

Note: Figures for Sengkang Community Hospital are from August 2018 when it started operations. Outram Community Hospital will start operations in 2020.

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. Figures include MOHH-hired doctors.



Bright Vision
Hospital

5 Lorong Napiri, Singapore 547530
Tel: 6248 5755 www.bvh.com.sg

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
15	0	199	95	161	470	2019
12	0	203	48	199	462	2018

Year ended 31 Mar

	2019	2018
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Size

Beds *(As at end March)*

276

261

Workload per annum

Bed Occupancy Rate

86.9%

87.8%

Inpatients

2,193

1,749

Total Patient Days

86,742

76,370



Polyclinics
SingHealth

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

Medical	Dental	Nursing	AHPs	Others	Total	Year ended 31 March
180	20	274	189	490	1,152	2019
186	20	269	178	460	1,112	2018

Year ended 31 Mar

	2019	2018
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Workload per annum

Polyclinic Attendances

1,808,267

1,819,465

Dental Attendances

48,462

43,783

Dental Procedures

122,156

115,468

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. Figures include MOHH-hired doctors.

RESEARCH STATISTICS

STAFFING

98

clinician scientists
(SingHealth & Duke-NUS)

>204

clinician investigators
(SingHealth)

>392

principal investigators
leading ongoing research
(SingHealth)

NURSING

121

presentations

56

publications

56

research projects
(with nurses as principal investigators)

15

grants

\$891,137

quantum of grants awarded

ALLIED HEALTH PROFESSIONALS

>200

allied health professionals
involved in research

147

papers published

\$2,518,909

in grants received

RESEARCH ACHIEVEMENTS

>13,000

(SingHealth)

publications in international
peer-reviewed journals (FY07 – CY18)

>5,300

(Duke-NUS)

\$1.67B

in competitive funding
SingHealth & Duke-NUS
(FY07 – CY18)
(excluding funding by industry)

AWARDS
(SingHealth & Duke-NUS)

1

Singapore Translational Research
Investigator Award

8

Clinician Scientist Awards

5

Transition Awards

EDUCATION STATISTICS

AVERAGE NUMBER OF STUDENTS PER DAY

386
medical

472
nursing

180
allied health
& pharmacy

8 dentistry students attached to SingHealth in FY18

As the largest Sponsoring Institution for Residency Programmes in Singapore, we have

973 residents in training across **33** programmes

1,734 faculty

206 new residents in AY2018

158 residents graduated from SingHealth Residency in AY2018

22 ACGME-I accredited and **11** JCST accredited programmes

>260 medical specialists across **37** countries came to SingHealth for Fellowship and short-term clinical attachments in FY18

>7,400 allied health professionals participated in **170** Continuing Professional Education Training Programmes

6 allied health residents graduated from **4** allied health residency programmes

214 oral health education programmes conducted for **>150** Oral Health Therapists, Dental Officers, Residents and Clinicians

15 new dentistry residents in AY18

1,366 nursing students engaged in FY18

386 overseas and local nurses attached to SingHealth

13,599 nurses trained in **Continuing Nursing Education** programmes

The SingHealth Duke-NUS Institute of Medical Simulation (SIMS) conducted **846** simulation-based training workshops for **>15,200** healthcare professionals

The College of Healthcare Administration and Leadership (CHeAL) ran **98** programme sessions attended by **>2,100** healthcare professionals and administrators

The Academic Medicine Education Institute (AM•EI) is a joint institute by Duke-NUS and SingHealth that enhances educators' capabilities to build the teaching pipeline and groom generations of healthcare professionals.

3,544 members

>3,000 participants at **79** Education Grand Rounds and Faculty Development Workshops

\$63,080 AM•EI Education Grants awarded to support the development of **9** educational projects and scholarly efforts to evaluate and improve educational outcomes

Educators are instrumental in our Academic Medicine journey. They not only teach; they guide, support and promote the training and career development of others. SingHealth and Duke-NUS recognise educators who have developed and inspired the next generation.

20 outstanding educators conferred the **AM•EI Golden Apple Awards 2018**

300 residency faculty and top-performing residents awarded in **Residency in SingHealth Excel! (RISE) Awards 2018**, of which 13 were Duke-NUS alumni

249 healthcare educators without formal teaching appointments were recognised and appointed Associates in Education at the SingHealth Academy Educator Night 2019



PATIENTS. AT THE HE^{RT} OF ALL WE DO.[®]



Singapore General Hospital



Changi General Hospital



Sengkang General Hospital



KK Women's and Children's Hospital



National Cancer Centre Singapore



National Dental Centre Singapore



National Heart Centre Singapore



National Neuroscience Institute



Singapore National Eye Centre



SingHealth Community Hospitals



Polyclinics SingHealth