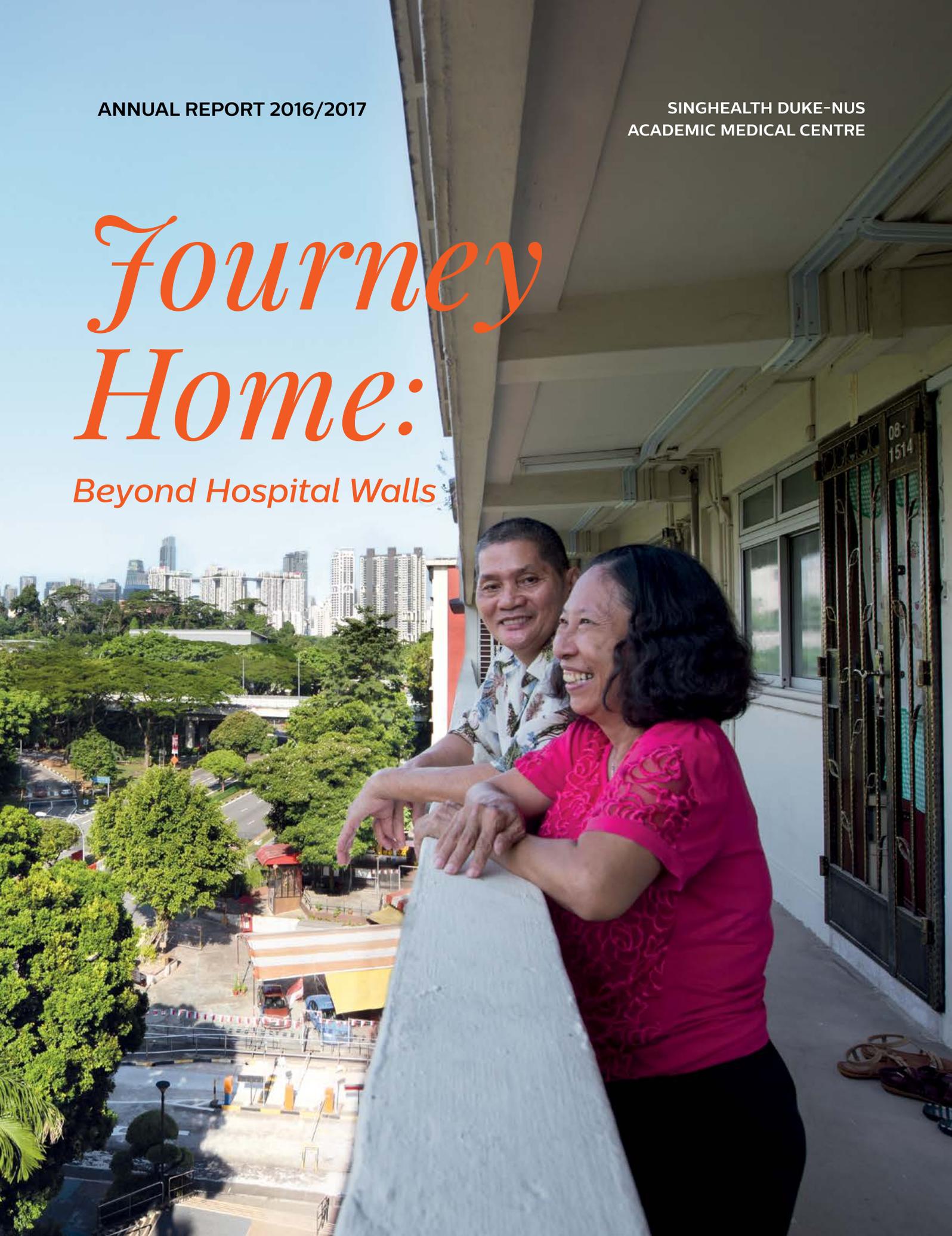


ANNUAL REPORT 2016/2017

SINGHEALTH DUKE-NUS
ACADEMIC MEDICAL CENTRE

Journey Home: *Beyond Hospital Walls*





SingHealth Duke-NUS Academic Medical Centre is a beacon of hope for many patients like Madam Yee Yoke Chun, whose speedy recovery was made possible by integrated care between specialties and institutions.

Journey Home: Beyond Hospital Walls

**SingHealth Duke-NUS Academic Medical Centre
Annual Report 2016/2017**

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

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A part of every patient's journey

As Singapore's largest public healthcare provider, SingHealth sees more than 3.8 million patient visits a year across our institutions. Being entrusted with more than 40 per cent of the nation's patient load has placed us on a good vantage point – one we have leveraged to provide specialised acute tertiary care and attentive post-discharge care.

To us, doing the right thing means listening to our patients, finding out what's important to them in their healthcare journey, and staying relevant to deliver optimal care at the best value, through our institutions and our Regional Health System.

To successfully deliver such person-centred care, we come prepared with a dogged tenacity to continually improve coordination within each institution, with others in the cluster and with the community, with an unrivalled passion of our healthcare professionals. In addition, we work hard to be responsive and adaptive to the evolving needs of the nation and its people.

KK Women's and Children's Hospital will celebrate its 160th anniversary next year in 2018, and in 2021, our flagship hospital Singapore General Hospital (SGH) will turn 200. From our illustrious past comes an exciting future as we advance on SGH Campus' 20-year long redevelopment and expansion. When completed, it will be Singapore's largest medical

campus, delivering its own brand of accessible, integrated and person-centred care.

This enabling network of integrated care extends to the areas of medical research and education, with spaces on SGH Campus dedicated to translating new breakthroughs into better health outcomes for patients. Cancer patients can look forward to cutting edge cancer treatment by proton therapy and clinical trials in immunology housed in the new National Cancer Centre Singapore building overlooking Outram MRT station.

Over the next few years, we will see the completion of Outram Community Hospitals on SGH Campus and the Sengkang General and Community Hospital in the northeast part of Singapore. In 2018, the Sengkang Campus will provide general and acute hospital services to residents, as well as work in partnership with National Heart Centre Singapore and Singapore National Eye Centre on SGH Campus to provide specialised medical care.

Sengkang Health's engagement with residents has introduced telehealth technologies such as video conferencing to better support the rehabilitative needs of the community. Residents

can also look forward to healthy living and preventive healthcare intervention programmes, developed in collaboration with GPs and community hospitals.

Community Hospitals like the ones in Sengkang and Outram form a critical bridge in care transition as patients are discharged from acute care. With close proximity to the specialist multidisciplinary teams at SGH and Sengkang General Hospital, patients and their family members can be assured of overall better care and rehabilitation before they return to the comforts of home.

Undergirding our numerous infrastructural transformations are continual improvements and innovations as we strive to deliver even better care for patients.

We have developed new models of care under the SingHealth Duke-NUS Disease Centres (SDDC) for patients whose conditions require multidisciplinary or cross-institutional care. The SDDCs provide complete oversight of care delivery and outcomes, bringing together specialists and healthcare professionals to contribute towards the treatment of their patients' conditions.

An online portal (Admissions Buddy) allows patients and their caregivers to do pre-admission administrative



and financial transactions from the comfort of home; a 24/7 medication pickup service at our polyclinics (PILBOX) lets patients skip the queue at the pharmacy; pharmacy drug prices have been harmonised across our institutions – are some of the initiatives that improve patient experience.

When patients are discharged home, our Regional Health System works closely with community care partners to enhance their level of care and reduce hospital readmissions.

With the recent public healthcare restructuring, SingHealth will grow even further by tapping on Eastern Health Alliance's strengths in geriatrics, sports medicine, emergency medicine and outreach to the community in the east.

By leveraging our collective talents and compassion for our patients, we can transform the way we deliver care – beyond the hospital into their homes with our Regional Health System; beyond quality to value with our integrated SDDC care models; and beyond healthcare to health with our increased outreach to the community.

For the trust that they place in us, the SingHealth Duke-NUS Academic Medical Centre must continually renew our commitment to walk alongside our patients for every part of their healthcare journey – now and in the future.

A handwritten signature in black ink, appearing to read 'Peter Seah', written in a cursive style.

Mr Peter Seah
Chairman, SingHealth

Bench-to-bedside innovations that improve lives

2016 was yet another significant year for Duke-NUS. Duke University and the National University of Singapore notched up another milestone by successfully completing the second five-year phase of the partnership to shape a world-class school, which was set up to transform medicine and improve lives.

In the past 12 years, the best of Duke and NUS have propelled the school in multi-disciplinary research and education, in Singapore and beyond. Our research is already making a substantive impact on Singapore's biomedical science scene, translating fundamental or discovery science into clinical practices that make positive differences to the lives of Singaporeans.

The start in April 2017 of the third phase of Duke and NUS collaboration is an affirmation of the confidence that our key stakeholders have in Duke-NUS. Such faith inspires us to continue to pursue world-class breakthroughs and innovate relentlessly to stay ahead of the evolving healthcare needs and challenges of our population.

Embedded within this partnership is another significant one – that of Duke-NUS with SingHealth. Our strategic

partnership with SingHealth has already created a seamless ecosystem, and this has brought about significant advances in Academic Medicine in Singapore, by bringing efforts from lab bench to bedside.

Singapore has now streamlined its healthcare sector into three key clusters in 2017, firmly underscoring the importance of patient-centric care. This development presents yet another opportunity for the SingHealth Duke-NUS Academic Medical Centre, as SingHealth continues to be Singapore's largest healthcare cluster. The breadth and depth of clinical services that SingHealth now embraces will enable our clinicians and researchers to take advantage of the wider and deeper access to healthcare issues here. That, in turn, will enable them to be more precise and incisive with their diagnoses and prescriptions for the best way to tackle these issues.

I am deeply proud of Duke-NUS' achievements that clearly demonstrate how these collaborations have resulted in practical solutions that improve the way patients are treated and cared for.

Duke-NUS remains at the forefront of infectious disease research. Last year, our Emerging Infectious Diseases

(EID) team made waves by being the first in history to visualise the structure of the elusive Zika virus. This breakthrough has since accelerated the development of medical therapies which either protect against, or treat, Zika. Most significantly, the team has enabled doctors to detect the virus in a person much more promptly, which is crucial to arresting the virus' worst effects and saving lives.

Duke-NUS, in collaboration with the Singapore General Hospital, scored another breakthrough with the world's first-ever clinical study of antibody-dependent enhancement (ADE) of viral infections. This discovery has since enabled the medical community to design and develop more effective vaccines, as well as extend the limited supply of vaccines so as to protect more of those who are vulnerable.

Keeping abreast of rapidly evolving trends in healthcare, Duke-NUS continues to groom future-ready clinicians. One such forward-looking initiative embarked on was a unique clinical education model called the Longitudinal Integrated Clerkship (LIC). This innovative approach establishes and fosters strong feedback loops among students, faculty and patients over time, while



concurrently exposing students to cross-disciplinary projects in a cohesive way. Our pioneering batch of students under the LIC model will graduate this year, and it is our hope that they will add much value to providing holistic and innovative medical care for all.

In growing Singapore's pool of world-class clinician scientists and healthcare leaders, we saw the seventh batch of our students graduate in June this year. They join our more than 300 alumni in Duke-NUS' ongoing journey to transform healthcare for everyone's benefit. In this, I am certain that those who graduated in June this year will, as so many of our alumni have, return to the school regularly to mentor their juniors. The continuing commitment of these mentors, many of whom are now chief residents, technopreneurs and leaders in community healthcare, in itself is a testament as to how

enduring and resonant the Duke-NUS experience is.

I would like to take this opportunity to thank the members of the Governing Board for their indispensable insights and unstinting support of all our endeavours. I'm proud to recognise our 16-member strong board, of which more than half are independent and accomplished individuals from a vast spectrum of backgrounds.

As complexity is here to stay, world-class innovation will always be the cornerstone of Duke-NUS. We are also committed to a culture of ensuring the best outcomes possible in patient care, by harnessing the synergy between education and research. We look forward to a future in which Duke-NUS and its partners contribute meaningfully to transforming medicine globally with the aim of improving everyone's lives.

A handwritten signature in black ink, reading "Kai Nargolwala".

Mr Kai Nargolwala
Chairman,
Duke-NUS Medical School

Home is where the heart is

As medical professionals, we see life at every stage – from birth through childhood to old age; and from happy, joyous moments to the most tearful ones.

This is a privilege we hold close to our hearts that prompts us to ask “What matters most to our patients?” and “What can we do about it?”. As we journey with our patients, we see opportunities to improve their lives.

In this Annual Report, you will read about the journeys of three of our patients as they go through different stages of care at the SingHealth Duke-NUS Academic Medical Centre (AMC).

Madam Yee Yoke Chun came to us with liver failure that caused fainting spells; her disease cost both her and her husband their jobs. A five-year ordeal was finally put to rest with the help of the integrated care and management by the SingHealth Duke-NUS Liver Transplant Centre. The Liver Transplant Centre is one of the SingHealth Duke-NUS Disease Centres (SDDC) which consolidates multidisciplinary teams of cross-institution professionals into evidence-based care models, to make sure our patients get faster care and better outcomes. Now, six months after her transplant,

Madam Yee hopes to return to work and look after her grandchildren during weekends.

Felice Siau was admitted to KKH in 2015 and found to have a brain tumour. The 16-year-old went from an avid basketball player to being a quiet wheelchair-bound patient suffering from a rare disease. Our Academic Clinical Programmes (ACP) are key to helping us improve care for patients like Felice by bringing together medical professionals for further research and education into specific specialties. These discoveries and initiatives are then applied in our clinics and wards to bring better outcomes for our patients.

Our last patient, Mr Ng Lye Huat, lives alone and was recently hospitalised for a month following an operation on his back. If not for the care and support of a Patient Navigator, provided through our Regional Health System (RHS), he would have found it difficult adjusting to life at home. Our professionals from the RHS work closely with community partners to ensure our patients' transition from hospital to home and back to the community is seamless, increasing their quality of life and reducing readmission rates.

There are many more patients like Mdm Yee, Felice and Mr Ng who trust

us to provide safe, value-based care with the best outcomes. Whether it's to return to work, learning to walk again, or just to be able to have a drink with friends at the neighbourhood kopitiam, we have made it our mission to help fulfill what matters most to all our patients.

From designing care models and ensuring safe care delivery, to forming partnerships for medical research and education, we hope you will enjoy reading about the many ways our AMC improves lives for our patients. Thank you for being a part of our journey.



Prof Ivy Ng
Group Chief Executive Officer,
SingHealth



Prof Thomas Coffman
Dean, Duke-NUS Medical School



Table of contents

JOURNEY HOME: BEYOND HOSPITAL WALLS

No Longer Lost	
Mdm Yee Yoke Chun	10
SingHealth Duke-NUS Disease Centres	18
From Walking Frame to Tongkat	
Mr Ng Lye Huat	20
Regional Health System	26
A Future with Hope	
Felice Siau	28
Academic Clinical Programmes	36

HIGHLIGHTS FROM 2016/2017

Improving Healthcare	40
Target Zero Harm	46
Research	50
Education and Training	54
Giving	58

FACTS AND FIGURES

The SingHealth Duke-NUS Academic Medical Centre	64
SingHealth Duke-NUS Board Members	65
SingHealth Duke-NUS Senior Management	66
SingHealth Group Institutions' Senior Leadership	67
SingHealth Group Overall Key Figures & Statistics	68
Institution Key Figures & Statistics	70
Research Statistics	78
Education and Training Statistics	79

Journey Home: Beyond Hospital Walls

No Longer Lost

MDM YEE YOKE CHUN

From Walking Frame to Tongkat

MR NG LYE HUAT

A Future with Hope

FELICE SIAU

Madam Yee Yoke Chun, 60, received the gift of a liver transplant in December 2016. Now on the mend, she is supported by her steadfast husband, Mr Wong Weng Fook and her two devoted children. Mdm Yee is enjoying a new lease of life. When she is not taking a walk in her friendly neighbourhood, she loves hanging out with her two young grandchildren. It's the simple things in life—like having lunch with them at a kopitiam—that brings her great joy.

No longer lost

Liver cirrhosis, an irreversible scarring of the liver, caused Mdm Yee to become a shell of who she formerly was. The complexity of her condition called for a myriad of treatments from different specialists. Instead of working in silos with each specialist examining only one part of the problem, the SingHealth Duke-NUS Liver Transplant Centre brought together healthcare professionals from across disciplines to treat Mdm Yee holistically.



"The doctor told me to rest for two years, but I'm looking forward to working again!" - Mdm Yee

As a couple in their sixties, Mr Wong and Mdm Yee lived a routine life. After completing her daily shift as a dishwasher, Mdm Yee would head to Chinatown to help her husband at a food stall. That changed one fateful evening in 2011 when Mdm Yee did not turn up.

"She wasn't picking up her phone," says Mr Wong. "I was very anxious." He formed a small search party that located Mdm Yee at midnight, sitting alone and confused at the Outram Park bus terminal. This marked the beginning of a spate of disappearing acts and fainting spells.

The situation worsened. "I would black out suddenly, without warning," says Mdm Yee. "I had stitches on my face and head from the falls." She stopped work for her own safety and Mr Wong stayed home to care for his wife. Mdm Yee gradually lost control of her bodily functions and even stopped recognising her siblings.

It was only during a hospital visit in 2016 that doctors discovered Mdm

Yee was suffering from liver cirrhosis. It was a genetic disorder which led to the build-up of toxins, causing damage to her brain. She needed a liver transplant urgently, but going on the transplant list meant waiting for years. Eager to donate part of his liver, Mdm Yee's son underwent blood tests to see if he was a suitable donor. Thankfully, tests showed that he was clear of the gene and was the best match.

The set-up of the Liver Transplant SDDC that same year fast-tracked Mdm Yee's case. A team of surgeons, physicians, allied health professionals, nurses and many others synchronised efforts to expedite the living donor liver transplant for Mdm Yee.

Today, Mdm Yee's fainting spells are behind her. She's learning to walk again with newfound confidence and takes on simple daily chores. "The doctor told me to rest for two years, but I'm looking forward to working again!" says Mdm Yee, her radiant smile a testament to her incredible recovery.



IN SICKNESS AND IN HEALTH

During the difficult period of Mdm Yee's deteriorating health, Mr Wong put his life on the backburner, stopping work for five years to care for his wife. Financial woes were part of their many worries as they had to live off the support of their children and Mdm Yee's brothers. Thankfully, Mdm Yee's recovery after her transplant progressed smoothly without any major hitches, and Mr Wong has since returned to work.

Home is a three-room flat in Jalan Bukit Merah where Mr Wong handles the household chores and sorts out Mdm Yee's medication. "I haven't cooked in five years, since I became ill. He does that now," says Mdm Yee with a laugh. "He never used to care about things at home but now he does the laundry, mops the floor, everything."

Every member of the transplant team showed up to meet Mdm Yee at her last visit there. Transplant Coordinator Ms Tan Suk Kian was particularly glad to meet her smiling patient.



NO LONGER LOST

MADAM YEE YOKE CHUN



ORCHESTRATING SEAMLESS PATIENT SERVICES

Before the transplant operation, Associate Professor Jeyaraj Prema Raj, Mdm Yee's principal surgeon and Head of the Liver Transplant SDDC, worked closely with the endocrinologist, cardiologist, radiologists, anaesthetist, hepatologists and other physicians, to make sure that both Mdm Yee and her son were fit for surgery. In addition, there was a team of plastic surgeons to help construct the artery, as well as a team that specialised in microvascular surgery.

"We are akin to an orchestra working together to create a harmony of patient services," explains Assoc Prof Raj. "This is medicine at its basic core: the patient and the healthcare professionals caring for her."



Clockwise from top left: Dietitian, physiotherapist, pharmacist, medical social worker and transplant nurse who worked together to coordinate Mdm Yee's care and recovery



IT TAKES A VILLAGE

After the transplant operation, an army of doctors, allied health professionals and nurses continues to care for Mdm Yee. A physiotherapist helps her gradually get back on her feet, while a pharmacist counsels her on the medication. Medical social workers provided financial aid for the rigorous tests and operations.

With the Liver Transplant SDDC, however, Mdm Yee does not have to fret over multiple appointments and unnecessary trips to the hospital. A transplant coordinator works with the different disciplines to coordinate Mdm Yee's schedule and medication, simplifying the process and saving her time. "We work together to deliver a service, so instead of having the patient move from place to place, we move around the patient," says Assoc Prof Raj. "It's patient-centric care."

"This is medicine at its basic core: the patient and the healthcare professionals caring for her." - Assoc Prof Raj





Mdm Yee's journey was facilitated by the Liver Transplant Centre, a SingHealth Duke-NUS Disease Centre (SDDC).

WHAT ARE SDDCs AND WHY ARE THEY NEEDED?

In conventional care, a General Practitioner might refer a patient with a nodule (growth of abnormal tissue) in his neck to a thyroid specialist or surgeon, who would then refer the patient for imaging tests. If the nodule is found to be a cyst, the patient is given an appointment for a biopsy. By this time, the patient would have made at least three trips to the hospital.

At our SDDCs, such patients can go through the whole process in one visit, saving them time and money and facilitating timely treatment. It also translates to greater work efficiency for clinicians.

This new approach to collaborative care emphasises developing a comprehensive database of patients

for care and research. In the long term, it will change the way we recommend treatments – as outcomes are collectively measured and studied for improvements in protocols.

NEW MODEL OF CARE

SingHealth Duke-NUS Disease Centres (SDDC)

Specialists from different institutions / disciplines collaborate across the cycle of care from diagnosis to treatment

- Set standards care, training & accreditation
- Provide oversight of care and delivery & outcomes
- Big data for research and quality improvement
- Opportunities to streamline care



SDDCs
ESTABLISHED
SO FAR



Diabetes



Blood Cancer



Breast



Head & Neck



Lung

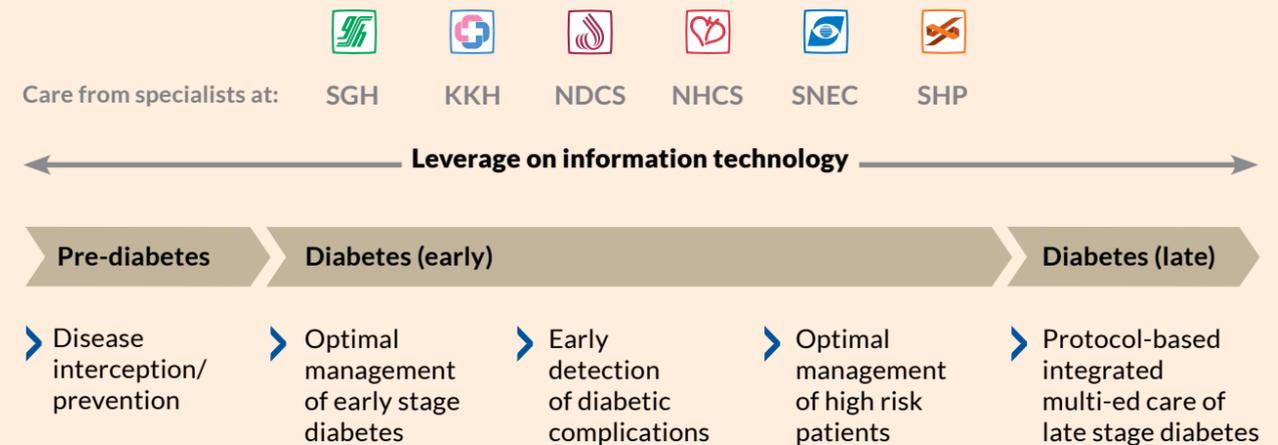


Liver Transplant

OUTCOMES & ACHIEVEMENTS OF OUR SDDCs

As we modify systems and streamline processes to enhance access to care and increase efficiency, we must do it with the patient in mind. The way to approach the increasing complexity and cost of care is to collaborate, not create more silos.

A FULL SPECTRUM OF DIABETES CARE AT THE SINGHEALTH DUKE-NUS DIABETES CENTRE



INTEGRATING BREAST CARE WITH THE SINGHEALTH DUKE-NUS BREAST CENTRE

A common assessment criteria was established that allowed SingHealth Polyclinics to categorise patient referrals into fast or normal tracks at Breast Centre clinics at Singapore General Hospital, KK Women's and Children's Hospital and National Cancer Centre Singapore.

This ensured that patients who needed to see a specialist urgently were given earlier slots, improving clinical outcomes. Patients could also have their choice of preferred location, since the SDDC is able to coordinate care at all three sites.

CROSS-TRAINING FOR BETTER PATIENT OUTCOME

Both the Breast Centre and the Head & Neck Centre have established cross-training fellowships that aim to produce specialists with keen medical knowledge of related-specialties.

For example, clinicians skilled in both oncology and reconstructive surgery give breast cancer patients the benefit of a surgeon who is equally adept at tumour resection and breast reconstruction.

SINGHEALTH DUKE-NUS LUNG CENTRE SETS UP INPATIENT RESPIRATORY CARE UNIT AT SGH

Lung disease patients who require inpatient care are now attended to at an integrated clinic located in Singapore General Hospital.

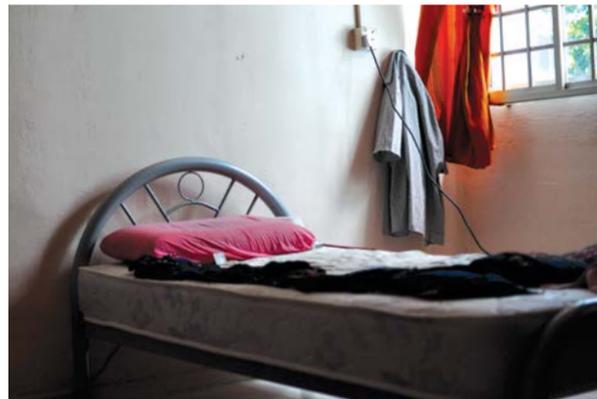
Lung specialists, specialist care nurses and allied health professionals collaborate to provide Acute Non-Invasive Ventilation, Tracheostomy Care, Post-Operative Treatment, ICU Rehabilitation, and Chronic / Home Ventilation care for patients.

Mr Ng Lye Huat, 62, was hospitalised for a month after an operation for severe back pain. As a bachelor living alone, adjusting back to life at home would have been difficult, if not for the care and support of our Regional Health System. Today, he has integrated back into the home and community life that he is used to. His recovery has been steady and his steps, while slow, are sure.

From walking frame to tongkat

For Mr Ng, discharge from the hospital was just the beginning of his road to recovery. The Regional Health System ensures that vulnerable patients like Mr Ng do not fall through the cracks. By appointing a Patient Navigator to coordinate his care, different healthcare professionals, welfare organisations and other sectors of the community are mobilised to provide a continuum of services to Mr Ng. This way, he can ease back into normalcy.





A walking frame stands in a corner of Mr Ng's rental flat, with clothes draped on it to dry. Mr Ng underwent an operation in early 2017 for spondylodiscitis, inflammation in his spine, which gave him severe lower back pain. "It was unbearable. I couldn't walk and had to be hospitalised," he explains in Mandarin.

Mr Ng was warded for a month after the operation. With the help of a Patient Navigator, Assistant Nurse Clinician Ong Li Jiao, and various community services, Mr Ng has made a smooth transition home and progressed from using a walking frame to a simple walking stick, or his handy *tongkat*.

Mr Ng is the face of many seniors in Singapore, with multiple health conditions such as hypertension and diabetes on top of spondylodiscitis. The role of Patient Navigators like

Nurse Ong is to support such patients' recovery, as well as synchronise care from different parties. Besides coordinating and explaining Mr Ng's medication to him, she checks on him and ensures that he gets the equipment he needs. For example, she noticed that he was having difficulty moving around his flat, so she arranged to have grab bars installed.

"I made my first visit about two days after Uncle Ng's discharge, as I was quite worried about him," Nurse Ong said. "My colleagues saw to Uncle Ng's needs in the wards, and I'd follow up at his home.

Today, Mr Ng is happy with his pain-free simple life, enjoying the occasional phone call from his siblings. "I'm more confident, with the home visits and assistance. My favourite times are walking to the market for a breakfast of *chee cheong fun*, and watching TV serials in the late afternoon," Mr Ng beams.



A BEACON OF LIGHT

When Nurse Ong first called Mr Ng to tell him that she would be dropping by for a home visit, he was apprehensive. He took a long time just using the walking frame to open the door for her. "I was quite shocked," admits Nurse Ong. "The house was untidy and the floor was dirty. During my one-hour visit, he was lying down most of the time. I could see that he needed a lot of help."

It took a while but Mr Ng has now completely opened up to Nurse Ong, who affectionately calls him "Uncle". During her home visits, she performs a general check-up and makes sure his recovery, such as the healing of his wounds, is on track. When he complains of discomfort in his abdomen, she examines him to determine if the cause is a side effect from the medication.

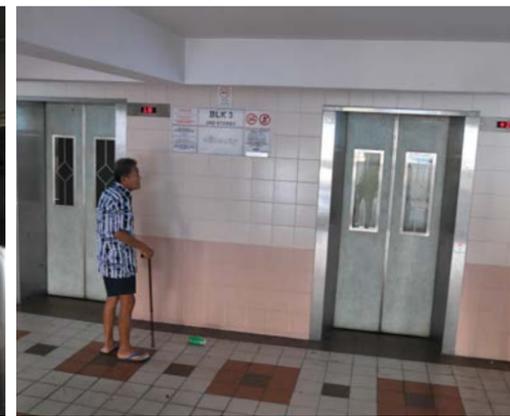
"I was worried I wouldn't be able to look after myself after my operation but now, I'm happy to come home." - Mr Ng



THE COMMUNITY ANSWERS THE CALL

Nurse Ong also checks on the community services arranged by her colleagues. For Mr Ng, assistance is provided by Thye Hua Kwan Moral Charities. They send meals to his doorstep and provided personal hygiene services when he was first discharged. "I knew he would not be able to prepare his own food or take a shower by himself so I requested for those services," explains Nurse Ong.

Now that his condition has improved, Mr Ng has stopped the personal hygiene services and requested for housekeeping services once a week. Thye Hua Kwan also provides Mr Ng with medical escort facilities. For a typical follow-up orthopaedic consultation, a representative from Thye Hua Kwan picks Mr Ng up from home, accompanies him to SGH and stays with him during appointments, before seeing him home.



FROM HOSPITAL TO HOME SWEET HOME

Thanks to combined efforts under the Regional Health System, Mr Ng is able to lead a normal life, within his own home and community, establishing a routine for himself. Every day without fail at 3pm, he makes his way to the Senior Activity Centre at his void deck where he enjoys watching his favourite TV programme and having a drink with friends.

"I live a simple life, keeping to myself," he says. "I was worried I wouldn't be able to look after myself after my operation but now, I'm happy to come home, with Nurse Ong and community services helping me. I'm back to watching Taiwanese TV serials and drinking kopi with my kakis!"



Mr Ng Lye Huat's recovery is possible with the support of the Hospital to Home programme under the SingHealth Regional Health System (RHS).

THE SINGHEALTH RHS

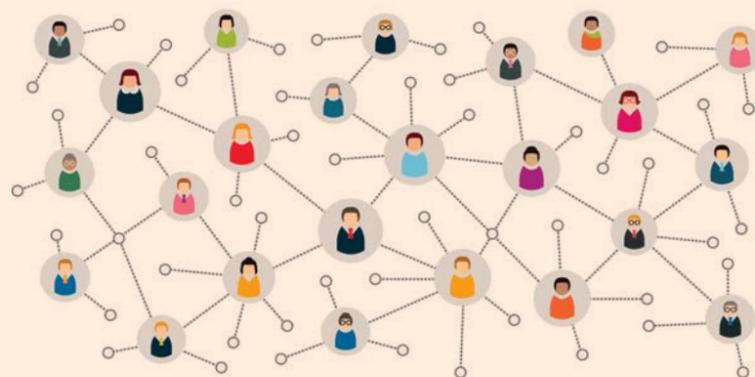
The SingHealth Regional Health System (RHS) recognises that our population can be empowered to stay healthy in their communities and homes. To achieve this, we work closely with partners across the care continuum, such as General Practitioners, Intermediate and Long-Term Care agencies, and Voluntary Welfare Organisations to provide care and social support for the population.

As an academic RHS, we also leverage health services research to better understand the population's healthcare needs and provide care based on those needs.

WHO WE SERVE

The SingHealth RHS comprises two geographically and demographically different populations – an ageing population in the south and a younger population in the north-east.

In early 2018, SingHealth will integrate with the Eastern Health Alliance (EHA) in the public healthcare restructuring. With this move, we are harmonising our programmes with EHA to meet the needs of the population in the east of Singapore.



Vision

Defining tomorrow's health in the community

Mission

To enable the best health outcomes, we shall:

- Empower and equip the healthy to live well
- Connect, build up link up with community support so that people with illnesses can have optimal functional independence and quality to life
- Provide the best care at the most appropriate setting for people with complex illness to have the best health outcomes

Information accurate as at time of print. With the upcoming merger, our RHS' vision and mission is being reviewed and further refined with our new partners and stakeholders.

OUTCOMES & ACHIEVEMENTS OF OUR RHS

POPULATION SEGMENTATION

- SingHealth RHS has developed a population dashboard prototype, which allows for the segmentation of patients based on MOH's defined population categorisation. The dashboard will be enhanced to enable profiling based on demographics, clinical and socioeconomic characteristics. The information will serve as a basis for better healthcare planning and intervention.



SEAMLESS CARE TRANSITIONS

- The Chin Swee Project was launched in October 2016 to enhance the health and social care for elderly residents in Chin Swee Road and Banda Street, and improve care continuity by working with partners in the community including Kreta Ayer Senior Activity Centre, AIC Care Close to Home Programme and GPs in Chinatown. Six months after the launch, 263 seniors had been enrolled in the programme. The initiative will be extended to Tiong Bahru, Telok Blangah, Bukit Merah and Katong.

FRAILTY SCREENING

- A frailty screening trial among seniors, initiated by Sengkang Health (SKH), that tests for grip strength and gait speed, was well-received by partners and the community. Following this success, SKH and Singapore General Hospital (SGH) developed the Individual Physical Proficiency Test for Seniors (IPPT-S),

a comprehensive frailty screening programme to identify elderly at risk of frailty before falls or other health crises occur. They aim to directly reach 2,000 persons in the next three years.

PERSON-CENTRED CARE

- To support SingHealth RHS's care philosophy of person-centred care, the Esther Network Singapore was launched in June 2016 to develop a responsive and robust network committed to person-centred improvement in care delivery. The Network does so by facilitating partnerships among acute, intermediate and long-term care providers, community partners and VVOs. In 2016, the Network trained 60 healthcare and community care professionals to support improvements in person-centred care through its Esther Coaches Training Programme.

COMMUNITY PARTNERSHIPS

- The SingHealth RHS established a Community Partnership Council, which consists of community partners, government agencies and SingHealth representatives. Together, they identify and address healthcare needs and gaps in the community, provide guidance and support for community health programmes and help build and strengthen relations between health and social care providers.
- With their Millennia Kids programme, SKH has been promoting healthy living to primary school



students and training them to be Healthy Living Advocates in the northeast region. To date, they have reached out to 8,500 primary school students. SKH does this in partnership with Health Promotion Board, Sport Singapore and Tobacco Free Generation 2000.

SUSTAINABLE PROGRAMMES & INNOVATIVE FINANCIAL MODELS

- SingHealth participated in the Ministry of Health's pilot for a bundled subvention approach in funding the care of hip fracture patients from acute to community hospitals. SingHealth RHS, through collaboration with SGH and Bright Vision Hospital, launched the Hip Fracture Bundled Payment pathway in February 2017, which allows for efficient right-siting of a range of hip fracture patients. It has resulted in more timely care provided by the right care provider, in the most appropriate care setting.



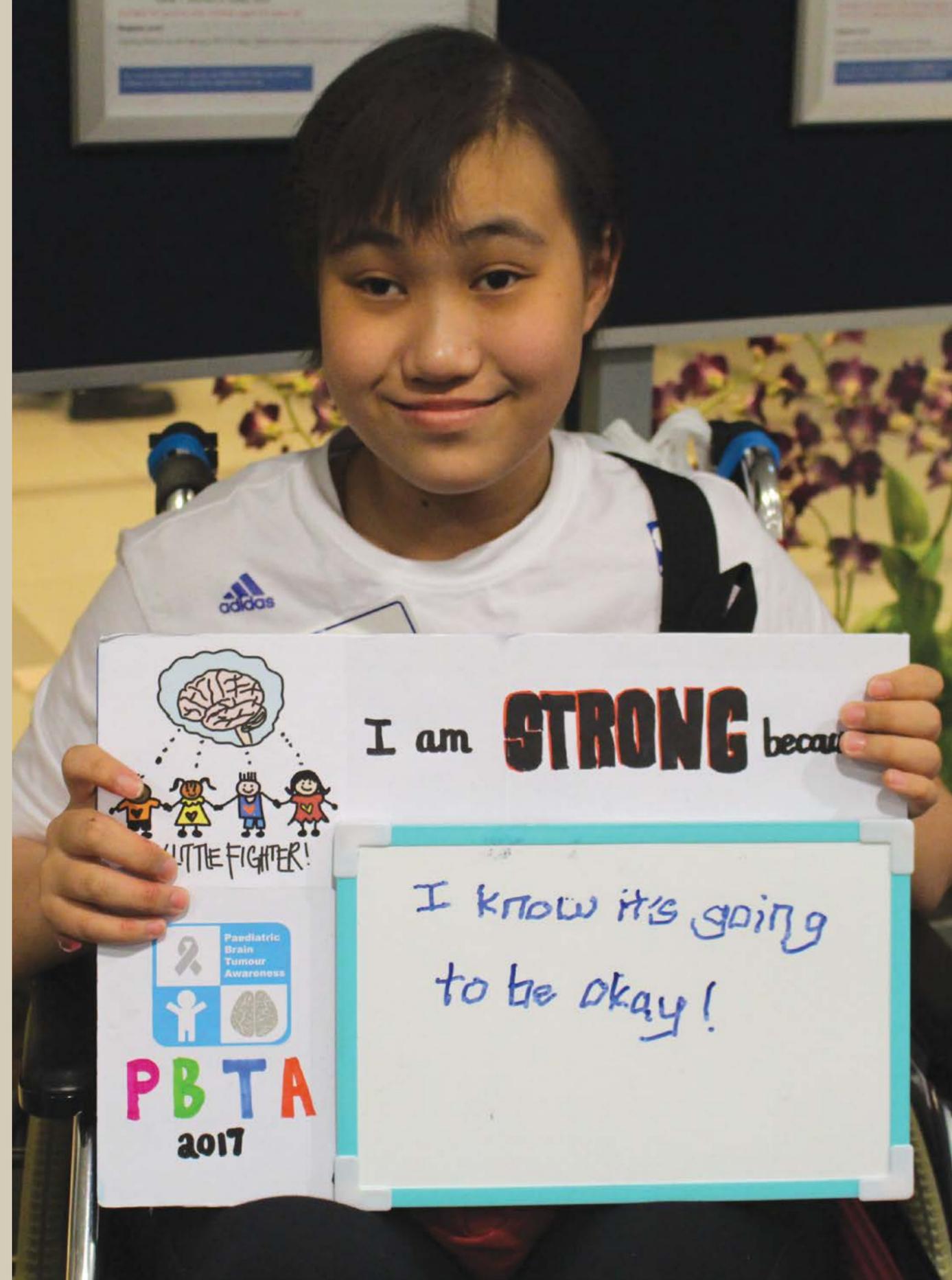
WAR ON DIABETES

- 1,390 participants have undergone basic health screening (including screening for diabetes) at SingHealth RHS' community health events or with its partnering General Practitioners. 985 participants who have abnormal screening results have received nurse counselling and/or are followed up by a GP.

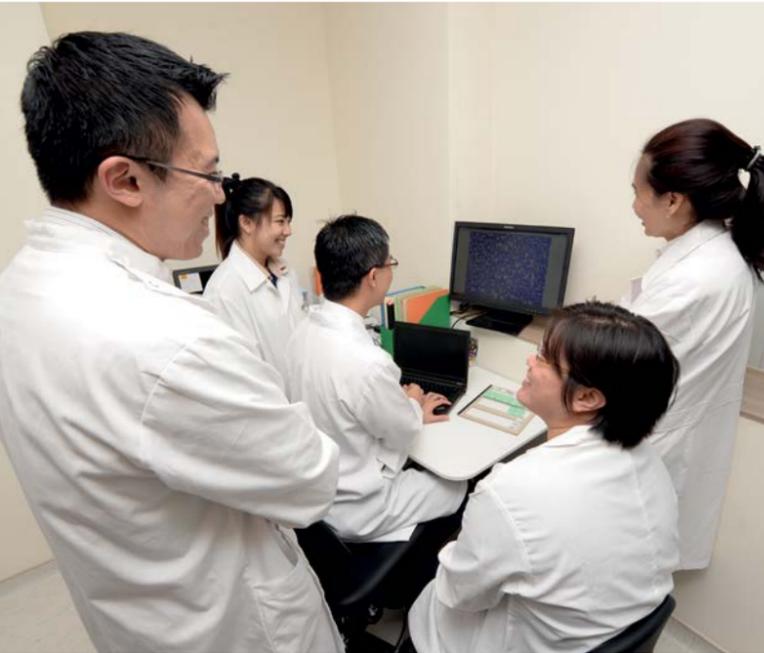
Brain and solid tumours in children are frightening diagnoses. With less than favourable odds and treatments, the young ones often lose their innocence prematurely as they face a grim reality. One such patient is Felice Siau, 16, who was diagnosed with a brain tumour two years ago.

A future with hope

The VIVA-KKH Paediatric Brain and Solid Tumour Programme set out to change the narrative for children diagnosed with brain and solid cancers. Set up in 2015, the programme leverages the collective strengths and expertise of KKH, SGH, NCCS, NNI, the Viva Foundation for Children with Cancer (VIVA) and St Jude Children's Research Hospital, USA. This novel initiative cuts across specialties and institutions as healthcare professionals come together to treat the brain and solid tumours in children.



"By bringing together multiple clinical aspects of care, diagnosis and treatment are fast-tracked."



With the VIVA-KKH programme, patient-centred care takes on a whole new meaning. The treatment of mass tumours in children typically calls on multiple specialities, including surgery, oncology, pathology, radiology and paediatrics. A multidisciplinary team meets up weekly to discuss the progress and treatments of their patients. The surgeons give their views on the operation, while the oncologist weighs in on the need for a biopsy. The pathologists plan lab tests and therapists provide input on rehabilitation.

By bringing together multiple clinical aspects of care, the diagnosis and treatment are fast-tracked, and the patient experiences convenience without having to shuttle from clinic to clinic.

Beyond clinical care, Dr Amos Loh (top right), Chairman of the VIVA-KKH steering committee, believes that the answer to finding cures for rare diseases lies in translational research. Even though KKH sees 75 per cent of brain and solid tumour cases in Singapore, the numbers are small. To gain access to sufficient data, the team has partnered with the Singapore Childhood Cancer Registry which has a database of more than 3,000 childhood cancer cases in Singapore since 1997.

In addition, the way childhood cancers spread and react to treatment in Asian children seems to differ from children in the West. "Studying the differences observed in Asian children may lead to the discovery of genetic reasons for the differences observed in various ethnic groups, and hopefully help

us to refine or direct novel therapeutic approaches for Asian children," says Dr Loh.

The research has far-reaching ambitions. A longitudinal study is planned to study the predisposition and genetics of such tumours among family members and even the future children of patients. The results of such a study can potentially guide early diagnoses and intervention, allowing for less aggressive therapy to be initiated before the disease spreads. The team also actively engages in platforms that bring together medical professionals to discuss the latest research findings and current issues in the field of paediatric oncology, such as at the yearly St Jude Viva forum and through weekly tumour board meetings (below right) where medical professionals from different specialties come together to review cases and recommend treatment plans.

Right: A break-out session at St Jude Viva Forum allowed nurses in attendance, especially those working in paediatric oncology (brain and solid tumour) hands-on experience at KKH's simulation centre



Top: VIVA-KKH steering committee members at the CCF-VIVA Family Learning Exchange, an event aimed at equipping parents with relevant knowledge and resources concerning their children's treatment and care



I AM BRAVE

Every year, the team transforms their patients into rock stars. At the annual Paediatric Brain Tumour Awareness Day held at KKH, patients and their families set their cares aside and enjoy a day of fun, festivities and food. Kids clamour to have photographs taken with their favourite movie characters from Toy Story, and relish joy rides in sports cars, sponsored by Lamborghini Club Singapore and Porsche Club Singapore.

Organised by Duke-NUS medical students in collaboration with the Brain Tumour Society, the event not only aims to raise awareness of paediatric brain tumours, but also endeavours to celebrate the courage of young survivors and support their families.



TEAM VERSUS TUMOUR

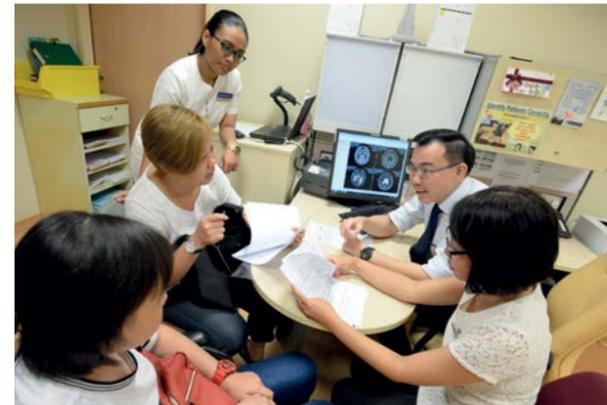
In primary school, Felice Siau was a basketball player for the school team. Going to school daily was a routine like many other children her age. However, life dealt her a curve ball when she was admitted to the KKH A&E department in 2015 and found to have a brain tumour.

Under the VIVA-KKH programme, an entire multidisciplinary team was quickly assembled, comprising the surgeon, oncologist, radiographer, therapists, nurses and a neuro-psychologist. A streamlined process of care was planned for Felice, with each member of the team contributing to her care holistically.

“For a child, undergoing treatment for cancer can be a traumatic experience and does not end with an operation or chemotherapy,” explains Dr David Low, Felice’s neurosurgeon. “We want to support her recovery at every stage - both physically and emotionally.”



"We want to support her recovery at every stage, both physically and emotionally." - Dr David Low



THE PATIENT COMES FIRST

16-year-old Felice still needs therapy but has progressed from the wheelchair to walking with assistance. A nurse coordinator synchronises her care, from ensuring that all the relevant healthcare providers are available during her visits, to scheduling her treatments and therapy. A psychologist communicates with Felice's school to facilitate physical changes that can cater to her needs. Felice also undergoes therapy at St. Andrew's hospital, which has specialty equipment for older children. A systematic approach means that children like Felice can have all of their needs addressed during their follow-up care.

Mdm Vivian Koh, Felice's mother, is grateful for the support. "The VIVA-KKH programme has really helped Felice. Not only are the doctors caring, the whole team is supportive and helps us with whatever we need, even with something as simple as getting lip balm samples when she has dry lips."

Medical professionals from our various Academic Clinical Programmes (ACP) come together to provide care to Felice and other children like her.



To date, there have been 14 ACPs set up. ACPs give recognition to clinicians who have been contributing actively in teaching and research, as multidisciplinary teams that strive to improve patient care and outcomes.

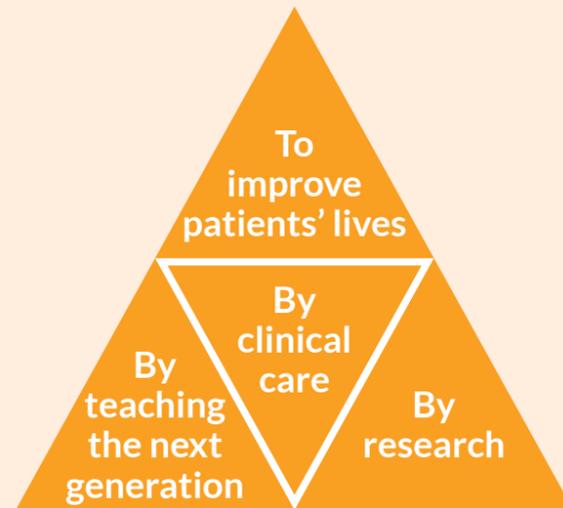


WHAT ARE ACPS?

Academic Clinical Programmes (ACP) were created with the objective of advancing the current level of care for our patients. To achieve this goal, the SingHealth Duke-NUS Academic Medical Centre (AMC) brought together specialists in a particular discipline from different institutions to maximise the power of shared knowledge and resources in research, scholarly work and education.

ACADEMIC MEDICINE - IMPROVING PATIENTS' LIVES

The VIVA-KKH Paediatric Brain and Solid Tumour Programme was made possible with the collaborative efforts of medical professionals from across the SingHealth Duke-NUS AMC. With each speciality contributing its expertise, the Programme is able to improve the lives of young patients through multidisciplinary care, streamlined procedures, dedicated research facilities and improving the knowledge of healthcare professionals in the field.



WHAT ACADEMIC MEDICINE MEANS FOR THE PATIENT

- Being cared for by clinicians who are at the forefront of clinical research and medical education
- Access to cutting edge diagnostics and treatment options
- Excellent quality, evidence-based and holistic care

● TRANSLATING ACADEMIC MEDICINE TO PATIENT OUTCOME

ACPs build bridges that link the current state of healthcare to the future one where patient care is improved. Here are some of their achievements.

OBSTETRICS AND GYNAECOLOGY

- A new structured care model for Gestational Diabetes Mellitus (GDM) that delivers enhanced pre-delivery care and a new structured post-delivery care is estimated to benefit about 5,400 women with GDM over three years. The introduction of care navigators improves existing levels of GDM care and ensures the follow-through of patients through the new care model.
- The eHealthy Pregnancy Journey App, a partnership with the Health Promotion Board, allows expectant couples to start on a 30-week pregnancy journey with action plans developed in consultation with medical professionals from KKH, in addition to medical records synced automatically to the app.

MEDICINE

- A Quality Improvement Portal was set up on the intranet to serve as a one-stop resource portal for clinicians to embark on quality improvement initiatives.

SURGERY

- New joint research funds with Singapore University of Technology and Design and Nanyang Technological University for clinical systems improvement, medical technology and device development.

NEUROSCIENCE

- A partnership with global medical device company Medtronic International, culminated in the establishment of the NNI Centre of Excellence for Deep Brain Simulation (DBS). This centre

enhances patients' access to DBS therapy, develops fellowship training for clinicians and helps identify areas of cooperation in clinical research.

- A collaboration with SingHealth Polyclinics provides hands-on training to family physicians to diagnose and treat dementia.

ORAL HEALTH

- The Geriatric Special Care Dentistry Clinic was officially launched on 21 June 2016 to provide specialised and holistic dental care for the elderly and special needs patients.
- The newly launched Geriatric and Special Care Dentistry Service allows the ACP to conduct a special training module to equip dental surgery assistants with the skills to look after this group of patients.

CARDIOVASCULAR SCIENCES

- Jointly organised the 10th Cardiovascular Update 2016 with Duke Health (Durham), a 2-day regional clinical education symposium which saw four Duke-Health faculty as part of the group of presenters to more than 190 participants from across the world.

Highlights from 2016/2017

Improving Healthcare

Target Zero Harm

Research

Education and Training

Giving

Improving Healthcare

The well-being of our patients takes centre stage. We continually seek ways to bring better, more coordinated care to our patients, from introducing new clinics and surgical procedures, to streamlined processes and apps that save time.

SEAMLESS JOURNEY FOR PATIENTS

Streamlined process saves heart patients time and money

The National Heart Centre Singapore (NHCS) worked with SingHealth Polyclinics (SHP) to streamline the process of checking patients with potential heart problems. As a result, patients now receive results more quickly, and need to make only two visits rather than three to the NHCS. This reduces anxiety and costs for patients.

several clinics in Singapore General Hospital (SGH) and NHCS, and will be introduced.

The Admissions Buddy is a new patient portal that enables patients and their families to do pre-admission administrative and financial transactions from home.

No more queuing for meds

Prescription in a Locker Box (Pilbox) relieves patients of the need to queue at the pharmacy to collect their regular medication. Instead, patients pick up their medication refill at a 24/7 locker. Launched at SHP-Marine Parade and later introduced at SHP-Bedok, Pilbox will soon be available in other SingHealth Polyclinics.



Apps help reduce time waiting at clinics

The Health Buddy app launched a new feature that allows patients to register for consultations using mobile devices. Real-time updates on queue status are sent to patients who can plan their time accordingly. The service has been piloted at



SUPPORTING PATIENTS IN THE COMMUNITY



Coming home to a community of care

Under the Community of Care programme, an SGH multidisciplinary team looks after the health and social needs of elderly residents in Chinatown. With community partners, the team supports those with complex medical conditions and social issues. Launched in April 2017, the programme is expected to be rolled out to Tiong Bahru, Bukit Merah, Katong and Telok Blangah in the next three years.

Match-a-Nurse

Since its launch in SGH in April 2016, 119 nurses have signed up to pilot Match-a-Nurse. The mobile app makes it easy for off-duty nurses to meet the care requests of SGH patients who live near them. The app will also be rolled out to nurses and patients at KK Women's and Children's Hospital (KKH).

SUPPORTING PATIENTS IN THE COMMUNITY



Delivering care centred around the patient

Taking our goal to provide patient-centred care seriously, SingHealth Regional Health System (RHS) initiated the "Esther Network Singapore". Under this initiative, caregivers, clinicians and community partners integrate between different settings to care for individuals (or "Esthers") with complex care needs. This maximises patients chances of living independently and confidently in their homes and community.

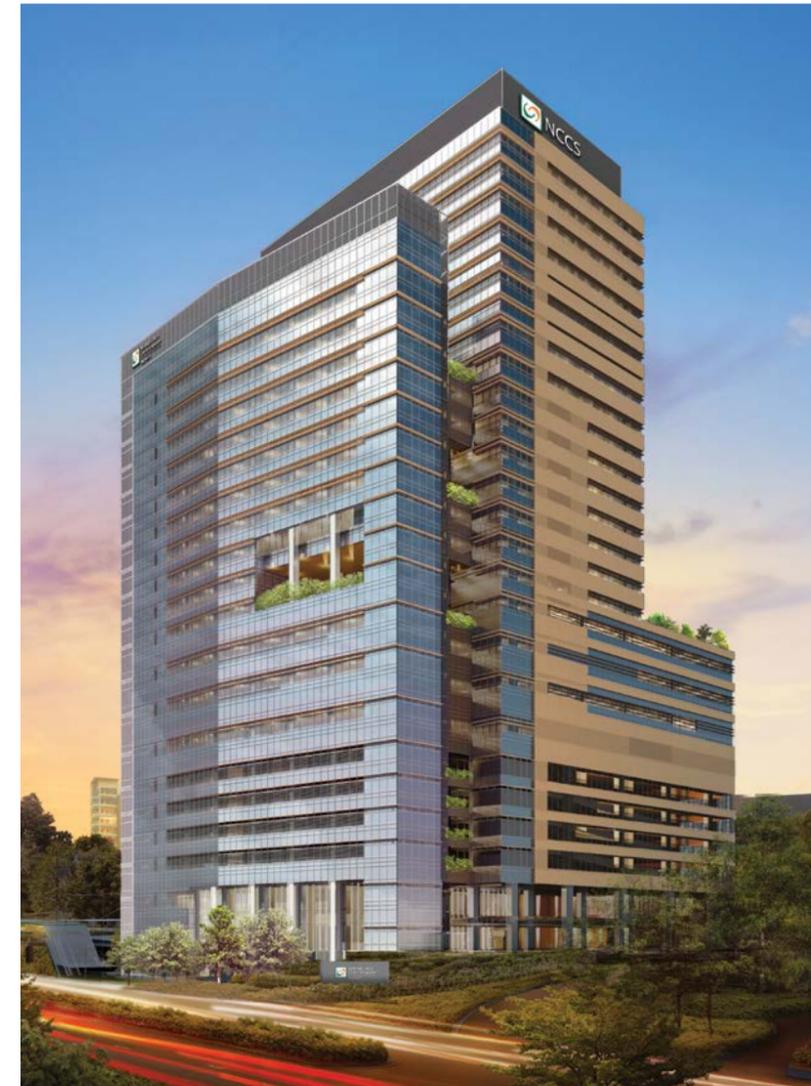
More stories from our RHS on page 26

Home care for patients with Parkinson's Disease

The National Neuroscience Institute (NNI) Parkinson Home Care Training and Support Programme trains community home care nurses to care for Parkinson's Disease patients, bridging the gap between hospital and community services. This allows patients to receive coordinated community care in their homes.



NEW FACILITIES



A bigger, better National Cancer Centre Singapore (NCCS)

The ground-breaking ceremony for the new NCCS building was held on 2 June 2017. Set to open in 2022, the new centre will have four times more capacity than the current centre. It will feature a new Proton Therapy Centre that offers advanced cancer treatment, as well as new facilities for cancer research.

New heart clinic to tackle heart disease in women

Studies show that heart disease in women often goes undiagnosed or undertreated, leading to a higher rate of deaths. In view of this, the National Heart Centre Singapore launched the Women's Heart Clinic in September 2016, which offers end-to-end services, from prevention to diagnosis, treatment and rehabilitation; customised to the specific needs of women.

Singapore's first dental clinic for geriatric and special needs patients

The Geriatric Special Care Dentistry Clinic was opened on 21 June 2016 at the National Dental Centre Singapore (NDCS). The 10-chair specialist outpatient clinic with a minor operating theatre, is the first one-stop specialty clinic in Singapore to deliver integrated oral care for patients with complex medical needs, geriatric conditions, as well as intellectual and physical disabilities.





TECHNOLOGY

3D printing to aid surgery and medicine

The Cardiac Centre at KK Women's and Children's Hospital (KKH) used three-dimensional (3D) printing to produce eight heart models of different congenital heart diseases, to aid cardiothoracic surgeons in pre-planning complex surgeries.

Meanwhile, the National Dental Centre Singapore (NDCS) collaborated with the Nanyang Technological University to produce a 3D-printed scaffold to grow bone for placing dental implants.

New hip replacement technique speeds up mobility

Singapore General Hospital (SGH) introduced a new hip replacement technique that allows patients to return to their daily routine within a month after surgery. This is a significant improvement over traditional hip surgeries that usually require three months for recovery. The new technique is also more precise, reducing the risks of abnormal gait.

A painless treatment for varicose veins

SGH introduced a new procedure for varicose veins that involves injecting medical-grade superglue called cyanoacrylate through a small catheter in the leg. This solution is minimally invasive and allows patients to return home and continue with normal activities, compared to traditional treatments that can leave patients in pain for weeks.



With the new procedure for varicose veins, the surgeon pumps small amounts of a medical-grade superglue using a device that is much like a glue gun
(Photo: Singapore Health)

PREVENTION AND EMPOWERMENT



Madam Juriyah bte Komzari was admitted to the Emergency Department due to a fall three years ago. Thanks to SAFE, she can now confidently walk and use public transport on her own

Tailored physical therapy programme reduces bad falls in the elderly

For the elderly, falls can have disastrous consequences. A research collaboration between Duke-NUS Medical School, SGH, Changi General Hospital (CGH) and Agency for Integrated Care, has shown that a tailored physical therapy programme known as Steps to Avoid Falls in Elderly (SAFE), can reduce bad falls in the elderly.

New programme to help stroke patients prevent dementia

Stroke can lead to dementia and the National Neuroscience Institute Stroke Memory Rehabilitation Programme aims to prevent this by focusing on strengthening skills such as memory and planning abilities. The first such programme here, it is expected to benefit about 2,500 stroke patients annually once it is fully implemented within the next three years.

I-control eczema app for paediatrics patients

A new child-friendly, eczema smartphone app, helps young patients with eczema to track, manage their itchy skin condition and share their progress with their doctors. Called iControl Eczema, the app is available for free on Apple and Android platforms, and was co-developed by KKH, Nanyang Polytechnic's School of Information Technology, and Hyphens Pharma.

Keeping Our Patients Safe

TARGET ZERO HARM

The best outcomes for our patients starts with the delivery of safe care as our top priority. As an AMC, we are best positioned to transform patient safety and quality through the pillars of clinical care, education and research.

Launched in 2016, the Target Zero Harm movement is a coordinated cluster-wide initiative where we reaffirmed our commitment to eliminate preventable harm. It is done through concerted efforts to repeatedly evaluate existing processes, develop new ones to address areas of improvement, and more importantly, cultivate a safety culture that is underscored by open learning and sharing.

SINGHEALTH DUKE NUS PATIENT SAFETY DAY

The SingHealth Duke-NUS AMC observed our inaugural Patient Safety Day on 2 Oct 2017. It was a time for us to reflect on our journey so far and reaffirm our commitment to patient safety. During the event, there was candid sharing of personal journeys and lessons learnt by speakers from Singapore General Hospital, National Dental Centre Singapore and the newly launched Institute for Patient Safety and Quality.

The annual SingHealth Family Target Zero Harm Awards were also given out at this event. This Award recognises individuals and teams for making a difference in patient safety.

SINGHEALTH FAMILY TARGET ZERO HARM AWARDS

The Award comprises two categories – the individual and team awards.

The individual awards recognise those who spoke up against an unsafe practice, or listened and made improvements to patient safety. The team award goes to teams with projects or initiatives that have significantly improved patient safety in their department or work area.

In its second year running, this year's Awards recognised a total of 10 individual and 3 team award winners.



Winners of the SingHealth Target Zero Harm Awards 2017



SINGHEALTH DUKE-NUS INSTITUTE FOR PATIENT SAFETY AND QUALITY

The Institute for Patient Safety and Quality (IPSQ), launched on 31 May 2017, brings us a step closer to our goal of zero preventable harm. The IPSQ coordinates and integrates all patient safety and quality initiatives throughout the cluster so that there is optimal usage of resources and sharing of best practices. Not only does the Institute provide the necessary framework for effective training in patient safety and quality, it also develops staff and patients to be advocates for patient safety.

The IPSQ will also work closely with stakeholders and partners to prioritise building patient safety and quality improvement competencies, as well as improving teamwork and communication processes among our healthcare professionals and developing leaders in patient safety and quality. Adopting a collaborative and inclusive model of engagement, the Institute aims to enable an integrated and concerted effort towards Target Zero Harm.

FUNCTIONS OF IPSQ

Leadership & Coordination	Performance Control & Monitoring	Education & Professional Development	Communications & Engagement	Quality Improvement (QI) Management	Innovation Management
<ul style="list-style-type: none"> Provide advice, recommendations to facilitate improvements in Patient Safety and Quality (PSQ) Oversee/lead development of PSQ initiatives, guidelines, protocols, procedures and practices 	<ul style="list-style-type: none"> Establish performance standards and indicators related to patient safety and quality assurance; develop systems for implementation Foster development of best practices for Patient Safety and Quality Improvement (PSQI); ensure sustainable practice 	<ul style="list-style-type: none"> Develop programmes/ activities to support PSQI capability and capacity building Engage and network with national, regional and global organisations to promote patient safety science and clinical quality professional development 	<ul style="list-style-type: none"> Build PSQI culture within SingHealth Cluster Design channels of communication to cross share learning experiences or best practices among institutions 	<ul style="list-style-type: none"> Consult/ facilitate in QI methodologies, tools, techniques Develop strategies/ programmes to embed the QI mindset 	<ul style="list-style-type: none"> Develop Cluster framework for building capacity in innovation Promote culture of innovation Develop and maintain innovation network
<p>• Clinical Care • Research • Education</p> <p>• Embed Target Zero Harm Culture • Promote Cross-Disciplinary Teamwork</p>					

THE WAY FORWARD

With the formation of IPSQ, the SingHealth Duke-NUS AMC is expanding into new areas such as patient advocacy, leadership training in patient safety and introduction of training programmes on human factors, resilience and burnout management to provide a more holistic approach in advancing patient safety and quality.

SINGHEALTH ENTERPRISE RISK MANAGEMENT CENTRES OF EXCELLENCE

These Centres of Excellence (CoEs) serve as platforms to identify and mitigate key risks across SingHealth through Enterprise Risk Management concepts and principles, including the sharing of best practices and lessons learnt. Each Centre focuses on harmonising policies and procedures, and implementing cluster-wide improvement programmes in safety and quality of both patients and staff.

Centre of Excellence / Chairman	Objectives
 <p>Falls Prevention Dr Tracy Carol Ayre, Group Chief Nurse, SingHealth</p>	<ul style="list-style-type: none"> Standardise an evidence-based framework for the prevention of falls Provide a platform to analyse, discuss, plan, and implement fall prevention strategies and operational guidelines Promote collaborative work such as sharing of best practices
 <p>Procedural Safety Assoc Prof Tan Say Beng, Group Director, Research, SingHealth</p>	<ul style="list-style-type: none"> Strengthen our systems, processes, procedures and protocols for the prevention, detection and response to adverse events during pre-, intra- and post procedure management of patients
 <p>Infection Control and Prevention Prof Terrance Chua, Group Chairman Medical Board, SingHealth</p>	<ul style="list-style-type: none"> Identify and analyse infection control and prevention risk areas through regular reviews of infection control indicators Spearhead preventive measures to address infection control and prevention-related issues Implement infection control and prevention best practices
 <p>Medication Safety Assoc Prof Ng Heng Joo, Director, Patient Safety, SGH</p>	<ul style="list-style-type: none"> Identify and analyse key medication safety-related risk areas through regular reviews of medication errors reports and data Spearhead preventive measures to address medication safety-related issues Implement medication safety best practices
 <p>Operations and Environmental Safety Mr Sia Kheng Hong, Group Chief Financial Officer, SingHealth</p>	<ul style="list-style-type: none"> Strengthen SingHealth's operational readiness to prevent, detect, and respond to potential and actual unintended harm or business disruptions

"I SAVE LIVES" INITIATIVE

Each of us contributes to patient safety in our own unique ways. The "I Save Lives" initiative launched cluster-wide features staff from different professions at different levels, each sharing how they keep patients safe in their respective areas of work.

Staff profiles were shared widely on posters within each institution, and online on Infopedia (staff intranet), the Faces of Healthcare website and Facebook.

This served as a good starting point for us to openly share our own patient safety stories and lessons learnt, across the cluster. With this foundation, we can continue to build on shared experiences and help each other keep patients safe. When we keep our patients safe, we are saving lives.



Benjamin Yap
Occupational Therapist
 Singapore General Hospital
 Other than helping patients regain their ability to perform daily activities of living, I give risk assessment talks to my department regularly to create awareness on the different risks our clinical activities and modalities may have and share ways of mitigating these risks, so harm to patient are greatly reduced. By sharing best practices and making information readily available, I help others understand what we do or not do have an impact on patient safety.



Jocelyn Chng Kailin
Nurse Manager, Ward 44
 KK Women's and Children's Hospital
 As a nurse manager, being fair and non-judgmental allows me to look at weaknesses or errors made with objectivity, and not accusation. By practising this, my colleagues will then feel safe to report not only patient safety concerns, but also errors and near-misses. This also enables them to view incidents or errors that have occurred as opportunities to learn and improve together as a team.



Tarumampal D/O Mariyappan
Patient Care Associate
 SingHealth Polyclinics (Bukit Merah)
 At our Health Monitoring Station, I observe for abnormalities in my patients' blood pressure levels and pulse rates so that I can quickly refer them to our medical staff. During my triage duties, if I suspect a patient has contracted an infectious disease, I will check recent travel history before isolating the patient for further checks. I will also look out for patients with falls risk and activate the alert in our system so my colleagues will take extra care when assisting.



Dr Tay Kay Yaw
Senior Consultant, Neurology
 National Neuroscience Institute
 Taking care of patients and helping them stay safe is a priority at NNI. We are always on the lookout for improvements that we can make to enhance safety. For example, I worked with a team to provide better treatment options for Parkinson's disease patients who fell. For some of these patients, their movements may be limited when they are hospitalised. They may potentially become deconditioned; ultimately facing difficulties in walking and becoming more susceptible to falls.

Research

The SingHealth Duke-NUS Academic Medical Centre is committed to giving our patients better treatment outcomes by pushing the frontiers of medicine. Here are some highlights that hold the promise to improve tomorrow's medicine.

CANCER



New metabolic drug stems weight loss in cancer patients

Severe wasting of muscle mass in cancer patients often leads to drastic weight loss, which affects patients' quality of life and response to treatments. It can be fatal. Researchers from National Cancer Centre Singapore (NCCS) have discovered a metabolic drug for preventing the terminal wasting syndrome and clinical trials are in the pipeline.

(From left) Dr Ng Shyh Chang, Prof Teh Bin Tean and Dr Iain Tan from the NCCS team that discovered a metabolic drug to prevent terminal wasting syndrome in cancer patients (Photo: Singapore Health)

Co-testing programme improves detection rate of cervical cancer

A study by Singapore General Hospital (SGH) involving 1,900 women showed that cervical cancer can be detected more accurately if the Pap smear test is combined with the human papilloma virus (HPV) DNA test. The former checks for abnormal cells, while the latter detects the presence of 14 HPV strains known to cause cervical cancer.

Dr Lynette Oon (left), with Prof Tay Sun Kuie (middle), part of the SGH team studying Cervical Cancer (Photo: Singapore Health)



CARDIOMETABOLIC DISEASES

A differentiated approach to managing heart disease among Asians

A study led by National Heart Centre Singapore (NHCS) found that Asians are at higher risk of heart disease compared to westerners, and heart failure also strikes Asians at a younger age. This first-ever comprehensive heart failure study on the Asian population has implications on how coronary heart disease can be managed in the region.

Ge"titin" to the heart of the matter

A new multinational study by NHCS and Duke-NUS Medical School (Duke-NUS) revealed that gene mutations in a protein called titin affect the heart function in healthy individuals. It was previously thought that the mutations affect only patients with dilated cardiomyopathy, one of the most common forms of inherited heart disease. The findings help scientists understand more about the gene and opens up new possibilities for the diagnosis and treatment of dilated cardiomyopathy.

NEUROSCIENCES

Easier way to study brain disorders by producing human neurons

Scientists from the National Neuroscience Institute (NNI), Duke-NUS and the Agency for Science, Technology and Research (A*STAR) have found a way to mass produce GABAergic neurons (GNs) in the laboratory using human stem cells. GNs act like "traffic lights" to control signals, and access to large quantities of GNs allows researchers to better study brain disorders such as autism, schizophrenia and epilepsy. This finding also allows drugs and small molecules to be screened at an unparalleled rate to discover the next blockbuster treatment for neuropsychiatric disorders.

Growing "mini brains" for research

Scientists from NNI, Duke-NUS and A*STAR have made a leap in studying the human brain by growing them for research. These advanced mini versions of the human mid-brain will help researchers develop treatments and conduct other studies into Parkinson's Disease and ageing-related brain diseases.

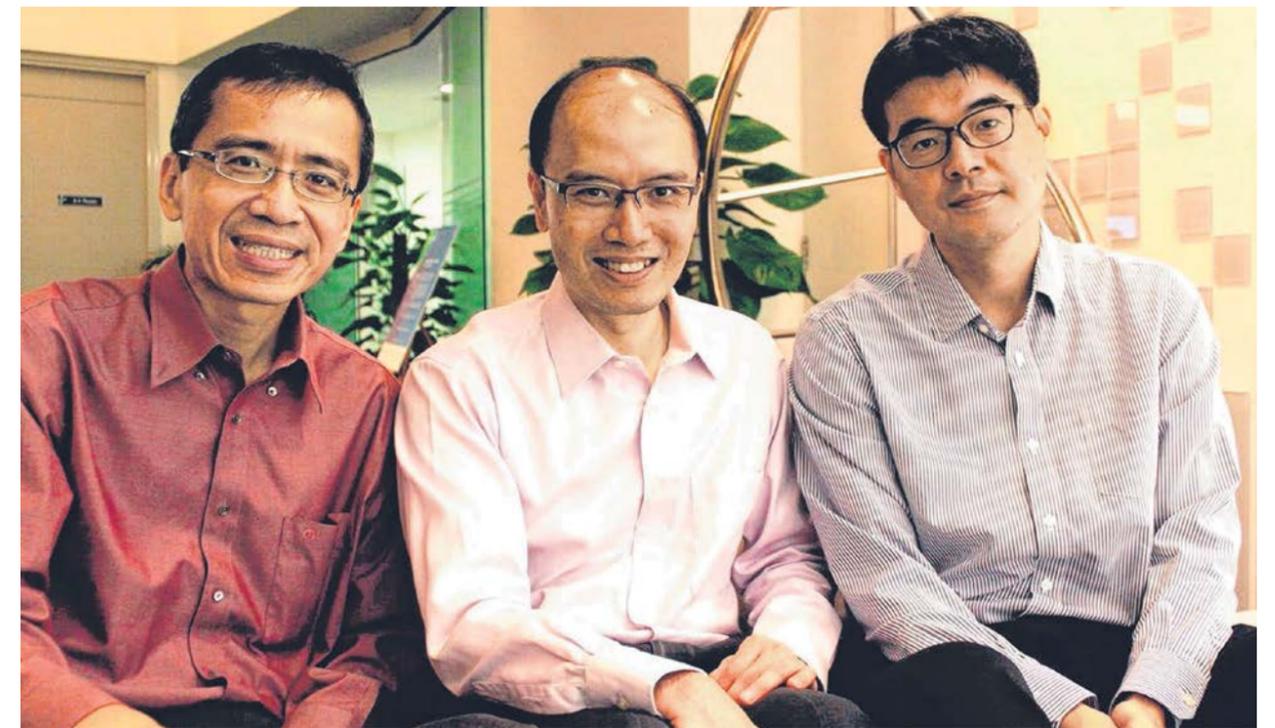
EYE DISEASES

Harnessing AI to prevent diabetic blindness

Developed at the Singapore Eye Research Institute (SERI), the Singapore Eye Lesion Analyzer (SELENA) automatically analyses retinal photographs for diabetic retinopathy, one of the leading causes of blindness for diabetics. With consistently accurate results in diagnosing diabetic retinopathy, SELENA has the potential to be used to detect other eye diseases like glaucoma and macular degeneration.

Creating durable antimicrobial coatings

Scientists from SERI have developed a novel method to make durable, non-leaching antimicrobial coatings that can be used in wound dressings, contact lenses, catheters and many other medical and even for non-medical applications. The team is currently working on further preclinical experiments to evaluate the efficacy of this antimicrobial coating and compare it with currently available products on the market.



(From left) Prof Tan Eng King, Prof Ng Huck Hui and Asst Prof Shawn Je helped lead the research that is a world-first in creating mid-brain tissue (Photo: Genome Institute Of Singapore, A*STAR)



Dr Tan Ngiap Chuan (left) and Asst Prof Nguyen Van Hai (right) are two collaborators in the SHP Duke-NUS research team

HEALTH SERVICES RESEARCH

Reducing the risk of falls among elderly patients with diabetes

Elderly patients are at high risk of falls, especially if they suffer from muscle loss. A study by SingHealth Polyclinics (SHP) discovered that weakened muscle strength in elderly patients with diabetes can be attributed to vitamin B12 and folic acid deficiencies. These findings help doctors to better advise patients on their nutritional needs.

Direct link found between obesity and higher bills for asthmatic patients

A study by SHP and Duke-NUS Medical School (Duke-NUS) found that asthma patients who are overweight and smoke incur significantly higher treatment costs. Doctors can use the findings to plan more holistic treatments for these patients, such as weight management and smoking cessation, to reduce their disease cost burden.

ORAL HEALTH

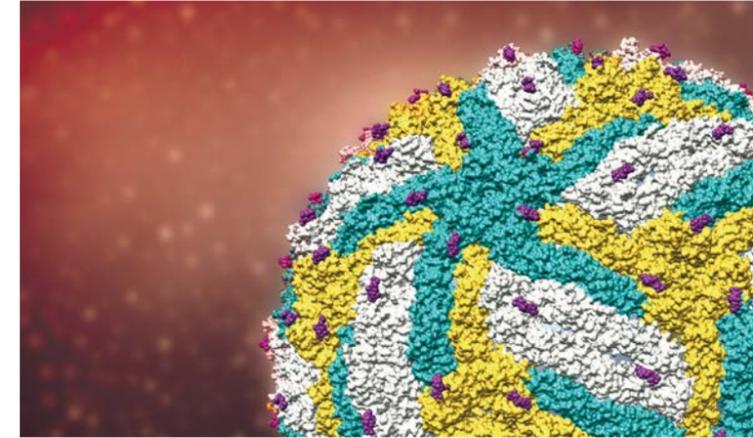
Engineering to the bone

Researchers from National Dental Centre Singapore (NDCS) have found a way of engineering bone tissue to enhance bone regeneration. It can be used to repair oral bone defects, and even has the potential to be applied to other forms of orthopaedic surgery, benefiting patients who suffer from other bone-related injuries and malformations.

INFECTIOUS DISEASES, INFLAMMATION AND IMMUNOLOGY

The structure of the Zika virus revealed

Duke-NUS researchers were the first to discover that the structure of the Zika virus resembles that of the West Nile, Japanese encephalitis and dengue viruses. This knowledge provides clues to destabilising the structure of the virus and contribute to worldwide efforts to reduce the spread and severity of the disease.



An artistic rendering of the Zika virus structure (Photo: Dr Guntur Fibriansah, Duke-NUS)

Zika virus found to infect human fetus brain

A study by KK Women's and Children's Hospital (KKH) and A*STAR found that the mosquito-borne Zika virus affects a fetus' microglia cells in the brain. This causes abnormalities in the brain growth of the fetus. Researchers will be studying how inflamed microglia cells influence surrounding cells, with the aim of finding a cure.

Antibodies from past infections found to influence new infections

For the first time, a clinical trial study showed that a person with antibodies from a previous virus infection may develop more severe effects if struck with a related infection the second time around. This finding by Duke-NUS and Singapore General Hospital (SGH) will allow more effective vaccines to be developed for diseases such as dengue.

Cell research to aid diagnosis of arthritis in kids

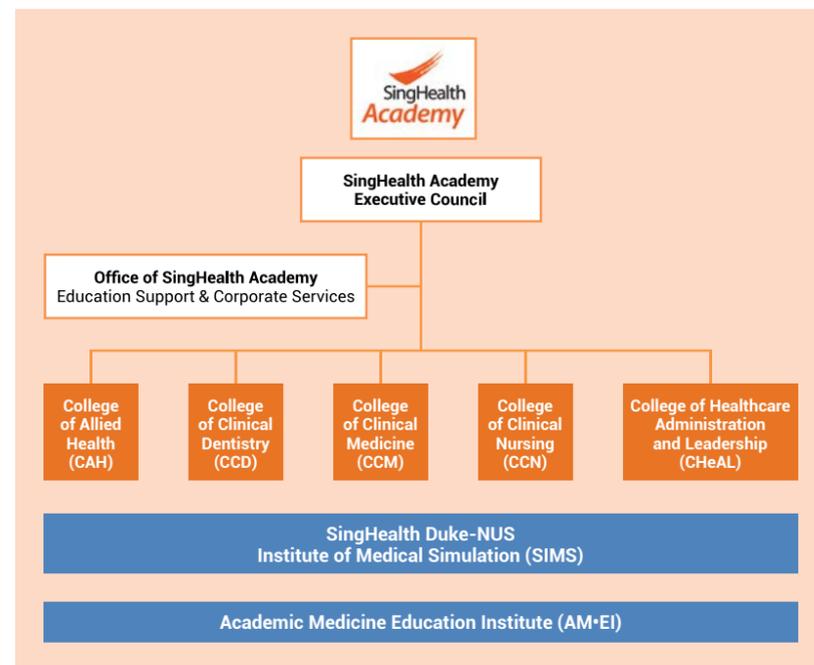
A team of SingHealth and KKH researchers has uncovered a specific type of immune cells known as regulatory T (Treg) cells that can help predict arthritis in children. Juvenile idiopathic arthritis (JIA) patients who have this type of Treg cells do not respond well to conventional therapy. The team can use this group of cells as markers to better predict or monitor patients' responsiveness to treatment.



(From left) Assoc Prof Ooi Eng Eong, Dr Jenny Low and Dr Chan Kuan Rong, part of the team behind findings that will allow more effective Dengue vaccines to be developed

Education and Training

SingHealth's institutions have an illustrious legacy in clinical education, nurturing generations of healthcare professionals. We continually upgrade our professional knowledge and improve the way we teach, to deliver even better care to patients.



ADVANCING EDUCATION

SingHealth Academy Colleges and SingHealth Duke-NUS Institute of Medical Simulation

To boost training of healthcare professionals, SingHealth launched five SingHealth Duke-NUS Colleges and Institute of Medical Simulation (SIMS) under its education arm, SingHealth Academy, in January 2017.

The Colleges offer dedicated training for different groups of healthcare professionals and aim to create more synergy both within and across professions. Each College also provides better coordinated education pathways covering a full spectrum of educational levels, from undergraduate and graduate to post-graduate and continuing education training.

Information accurate as at 1 October 2017

Enhancing medical training through simulation

The launch of SIMS opens up greater opportunities for simulation-based training. SIMS brings together a team of 18 staff and \$5.6 million worth of equipment from the SGH Campus, Sengkang Health and KK Women's and Children's Hospital, allowing more healthcare professionals access to cutting-edge technology. Some 318 workshops were conducted during the year for more than 7,500 participants.



Leadership training by Residents for Residents

In January 2017, the SingHealth Residency Leadership Programme (SRLP) was initiated to develop a pool of leaders among residents in SingHealth. The six-month programme is uniquely designed by 13 alumni from the Singapore Chief Residency Programme, who serve as mentors and co-facilitators. The SRLP aims to build essential leadership skills including systems thinking, communications and team-building. It has an inaugural cohort of 18 residents.



Collectively grooming leadership capabilities

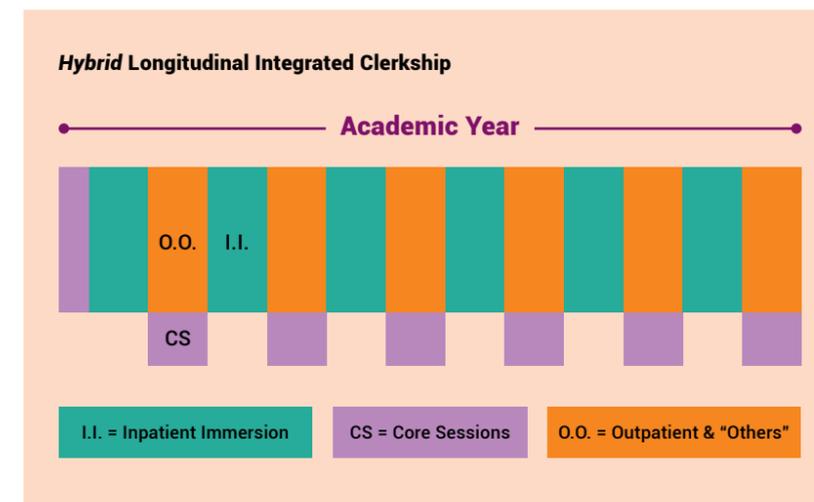
To harmonise efforts to groom a pipeline of leaders, the HR departments from SingHealth's hospitals and institutions collectively developed the SingHealth Competency Framework for Leadership and Healthcare Administration in 2016. A total of 870 healthcare professionals were trained under our Core Leadership Milestone Programmes during the year.

An alternative way to train medical students

Longitudinal Integrated Clerkships (LIC) offered at Duke-NUS Medical School provide students with combined exposure to cross-disciplinary experiences concurrently, rather than block-to-block rotations. This fosters continuity of relationships among students, faculty and patients over time. Combined with traditional block clinical clerkship, Duke-NUS's blended model alternates inpatient immersion at the hospital with exposure at outpatient clinics, and has in-built self-study periods to instil ownership of learning. The pioneering intake of students under the LIC model will graduate in 2017.

Interdisciplinary training for oral health professionals

The National Dental Centre Singapore held its first Senior Residency Training Programme Interdisciplinary Case Conference on 20 March 2017, attended by 34 registrars. Interdisciplinary treatment cases were presented and discussed among in-house dental specialists. The conference will be conducted regularly to build registrars' confidence in managing interdisciplinary cases.



More structured and systematic clinical learning for nurses

A nursing programme has adopted the "building block" approach to help young nursing students master pertinent clinical concepts such as infection control and physical assessment. In addition, a continuing education initiative has commenced, where courses offered in various SingHealth institutions are harmonised to avoid duplication and better standardise course format and content delivery.

COLLABORATIONS FOR BETTER HEALTHCARE

Training overseas healthcare professionals in pre- and post-natal care

In July 2017, SingHealth Academy organised the Training in Pre- and Post-natal Healthcare for Mothers and Children programme participated by 12 healthcare professionals from across 11 countries.

The five-day programme took place at KK Women's and Children's Hospital (KKH) and Singapore General Hospital (SGH). Participants gained better understanding on the whole continuum of care and policies for mothers and children in Singapore's healthcare.



Advancing pre-hospital emergency care

In January 2017, SingHealth and the Singapore Civil Defence Force (SCDF) signed a Memorandum of Understanding to advance pre-hospital emergency care and training for paramedics in Singapore. More than 250 SCDF paramedics will undergo attachments at the emergency departments of SGH and KKH to strengthen their skills. Using realistic simulation tools at the SingHealth Duke-NUS Institute of Medical Simulation, the paramedics will also be able to practise handling different emergency scenarios in a safe and controlled setting.

Allied health education partners

Over the years, allied health professions in SingHealth have made significant headway in collaborations with both local and overseas education partners. To date, we have 17 partners. These collaborations allow us to ramp up education and training efforts for our 19 allied health professions.

AUSTRALIA

Curtin University of Technology
Edith Cowan University
Flinders University of South Australia
University of Melbourne
University of Newcastle
University of Queensland
University of Sydney
University of Western Australia

USA

University of Illinois Chicago
University of Nebraska Medical Center

UK

London South Bank University
University of Southampton

JAPAN

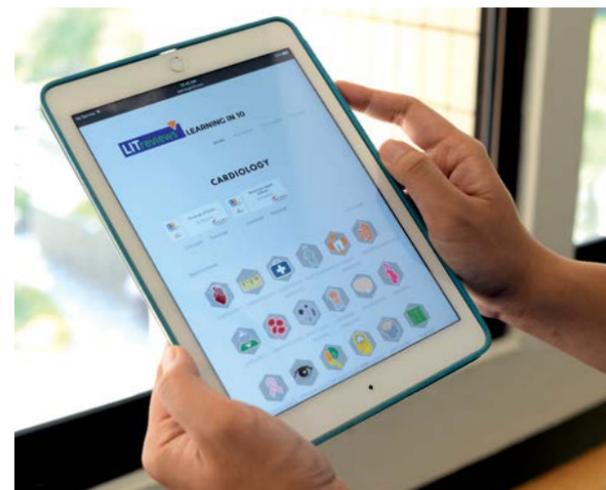
Shinshu University

SINGAPORE

Singapore Polytechnic
Ngee Ann Polytechnic
James Cook University
Temasek Polytechnic

Easy access to medical information via Learningin10.com

An education web portal was launched at the SingHealth Duke-NUS Scientific Congress 2016. The portal comprises a digital library of bite-sized medical topics in the form of 10-minute videos. Accessible anywhere and anytime, the portal serves as a valuable medical repository for medical students, professionals, and members of the public to learn more about a disease or condition.



MAKING AN IMPACT GLOBALLY



TF HEAL Programme

SingHealth Academy, together with SingHealth International Collaboration Office and the National Healthcare Group (NHG), organised the second run of the Temasek Foundation Healthcare Executives in Asia Leadership (TF HEAL) Programme in April. The programme covered a wide range of healthcare management topics and issues, with a focus on policy implementation strategies.

Improving maternal health in India

SingHealth and the Singapore International Foundation launched a three-year training programme aimed at reducing the number of mother and infant deaths at childbirth due to preventable causes in Karnataka, India. Some 100,000 pregnant women and their newborn babies are expected to benefit from this programme.

Training nursing professionals in China

A three-year programme supported by Temasek Foundation International sees SingHealth training 600 nursing leaders and nurses from Sichuan province in clinical specialties, healthcare management, patient safety, infection control and medication management. 88 participants will go on to train 880 more nurses in China, multiplying the benefits of the programme.

Critical care and pre-hospital emergency training in India

Healthcare professionals from West Bengal and Karnataka will receive training in critical care and pre-hospital emergency. In turn, they will train more than 1,300 other specialists in India. Supported by the Temasek Foundation International, the programmes are the result of partnerships between SingHealth and Indian authorities in the respective states.

Post-disaster recovery training in Nepal

More than 560 healthcare professionals from Nepal will participate in a post-disaster recovery training programme jointly developed by the Government of Nepal and SingHealth. The programme aims to equip participants with the skills to manage emergencies post-disaster in a timely and effective way. The programme is supported by the Temasek Foundation International.



Giving

As an AMC, we are committed to improving patients' lives and the health of our communities through innovation, research and the sharing of new knowledge that will nurture the next generation of healthcare professionals. We actively partner like-minded individuals and organisations to bring about a transformational impact as philanthropic gifts enable our clinicians, researchers and educators to pursue new ideas and uncover breakthroughs that will translate into new solutions for medical challenges.



GIVING TO RESEARCH AND EDUCATION: PROFESSORSHIPS & NAMED FUNDS

In FY2016, nine new named funds, including four Professorships, were established for research and education in Ophthalmology, Paediatrics and Oncology. They are:

Professorships

- Kwan Im Thong Hood Cho Temple Professorship in Ophthalmology
- Barry Cullen Professorship in Clinical Education in Ophthalmology
- Chew Sek Jin Professorship in Clinical Innovation in Ophthalmology
- Wallace Foulds Professorship in Ophthalmology Research

Named funds

- Lee Kong Chian Paediatric Neurology Fellowship
- Betty Wu Lee – KKH Paediatric Cardiac Care Fellowship
- Richard Fan Lectureship in Ophthalmology and Visual Sciences
- CCF Psychosocial and Supportive Care Programme for Paediatric Oncology
- CCF Paediatric Oncology Survivorship Programme

Established with an endowment of at least \$2.5 million, Professorships enable distinguished clinicians to accelerate discoveries through research in a particular area of Medicine and nurture future leaders through' mentorship. The Medicine and Ophthalmology Academic Clinical Programmes have also embarked on fundraising efforts to garner support for two new Professorships – the proposed Seah Cheng Siang Professorship in Medicine and Robert Loh Professorship in Clinical Innovation in Ophthalmology in 2017. These proposed Professorships will honour the remarkable achievements of two of Singapore Medicine's luminaries and commemorate their distinguished contributions in their respective fields to preserve and perpetuate the legacy of excellence in future generations of clinicians.

GIVING TO RESEARCH AND EDUCATION: SPECIAL EVENTS

Special events, such as Gala Dinners, celebrate the life-changing impact of philanthropy through the strong support for different healthcare causes in the SingHealth Duke-NUS AMC.



Final cheque presentation witnessed by Minister Ong Ye Kung (centre), the Guest of Honour, at the SingHealth Duke-NUS Gala Dinner 2017. (From left to right) A/Prof Lee Shu Yen, Prof Ivy Ng, Mr Peter Seah, Mr Kai Nargolwala, Prof Thomas Coffman and Dr June Goh

The second SingHealth Duke-NUS Gala Dinner was held on 3 September 2017 at the Ritz-Carlton Millenia Singapore. Themed 'Stars of the Night', more than 700 guests attended the event, where more than \$32.5 million was raised in conjunction with the event to further medical research and education efforts.

Earlier in May 2017, NDCS celebrated its 20th anniversary with a fundraising gala, 'A Serenade of Smiles', which garnered more than \$450,000 to advance oral health initiatives. The annual EYE Ball organised by SNEC and SERI on 19 November 2016, in partnership with Tatler, raised almost \$3.7 million for the VisionSave campaign. The second Heart to Heart Gala held in April 2016 also raised more than \$600,000 for improved patient care and cardiovascular research.

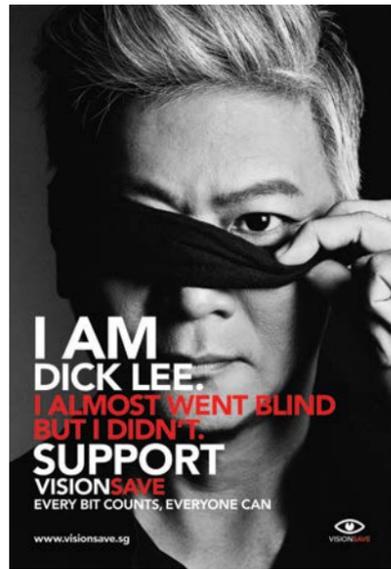
The inaugural SGH Swim for Rheumatology! event on 2 September 2017 raised the awareness for Rheumatological diseases and garnered more than \$100,000 for research into these conditions.



Participants at the inaugural Swim for Rheumatology! event which raised more than \$100,000 for Rheumatology research

PARTNERING PEOPLE WITH A PASSION TO DO GOOD

Over the last year, the SingHealth Duke-NUS AMC has been fortunate to partner individuals who are passionate about raising the awareness of healthcare causes while, at the same time, helping those in need.



VisionSave campaign

Launched in July 2016, the VisionSave campaign partnered local celebrity Dick Lee as the ambassador to increase the awareness of eye diseases and raise funds to boost eye care. The goal of this campaign was to save the precious gift of sight through innovation and research in eye diseases.

Charity auction of paintings by renowned artist

Mr Ong Kim Seng, Singapore's leading watercolour artist and Cultural Medallion Award Recipient, partnered Sengkang Health (SKH) to produce a collection of paintings that captured the memories and history of the Singapore General Hospital (SGH) Campus. The auction of these paintings garnered about \$130,000 for the needy patients at SKH.



Row for Hope

Now into its second year, National Cancer Centre Singapore (NCCS) 'Row for Hope' brought together patients, clinicians and staff to participate in a friendly dragon boat exhibition race in the waters of Marina Bay. Close to \$180,000 was raised to benefit the NCCS Community Cancer Fund, which provides financial assistance for needy patients as well as improvements in patient care.

The 'Heart of a Traveller' photography exhibition

Mr Low Seow Juan, an avid photographer and ardent supporter of NHCS generously donated photographs from his personal collection, taken on his travels for an exhibition. More than \$26,000 was raised for NHCS' needy heart patients.

Heart-to-Heart Run

More than \$19,000 was raised for the Hypertension Research Fund in December 2016 by Dr Calvin Chin from National Heart Centre Singapore (NHCS) and a team of running enthusiasts. By taking part in the Standard Chartered Marathon-Ekiden Race, the efforts highlighted facts about hypertension, its risks and the importance of research into this prevalent chronic condition.



Running enthusiasts from NHCS doing their part to raise funds for hypertension research



The Yarn Wonders Project

This two-year project to raise funds for the KK Women's and Children's Hospital (KKH) Health Fund was initiated by the KK Alpine Blossom Breast Cancer support group. Volunteers' hand-knitted sling bags were sold to well-wishers who wanted to pledge their support for breast cancer patients.

BUILDING A CULTURE OF GIVING AND CARING

Championing the importance of healthcare philanthropy to advance research, education and clinical care for better health tomorrow, starts at home. Across the SingHealth Duke-NUS AMC, activities that promote giving foster a deeper appreciation of the collective effort to better patients' lives while providing the opportunity for staff to engage meaningfully and act in unison towards a common goal. Together, staff work jointly to offer their time, energy and resources for a greater impact in driving change.



\$2 can get you a cup of kopi or go towards efforts to help needy patients

'Give a Little, Help A Lot'

Leading the way in fostering the giving culture, a year-end giving campaign was launched in November 2016. More than 140 new staff donors have pledged their support for annual giving, garnering more than \$23,000 over nine months.

'How your \$2 helps' staff campaign

SKH embarked on a staff campaign to drive home the message that while \$2 may not be a significant sum of money to most people, when combined, the support for needy patients can be significant.

Sale of mini figurines to help needy patients

A collaboration between SGH's Work-Life Unit, Development Office and Communications Department raised more than \$10,000 over four months for the SGH Needy Patients' Fund through the sale of customised mini figurines depicting healthcare professions.



Shining the spotlight on women's health issues

The Women's Health Research and Education Fund was established in October 2016 to advance medical research and education in areas such as women's cancer, pregnancy and childbirth, fertility and parenthood. Pledge cards were distributed to staff at KKH to create awareness for the cause and encourage support.

The G.R.E.A.T programme

Established in 2001, the G.R.E.A.T programme aims to cultivate a spirit of giving among NCCS staff through monthly contributions that support cancer research, education, needy patients and programmes that empower staff, patients, caregivers and volunteers with knowledge about cancer care. To date, close to \$800,000 has been raised.

Facts and Figures

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.

As an Academic Medical Centre, the convergence of clinical care, education and research enables us to pursue innovations to deliver better care to our patients.



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.

SingHealth is the largest healthcare provider in Singapore, attending to more than

40% of the Nation's Patient Load

Our Healthcare Institutions

With our **42 Clinical Specialties** we deliver comprehensive, multidisciplinary and integrated care.

With the restructuring of Singapore's public healthcare, on 1 October 2017, Geylang and Queenstown Polyclinics have joined other healthcare clusters,

In January 2018, the Eastern Health Alliance will integrate with SingHealth. This move will see Changi General Hospital joining our Academic Medical Centre.

Tertiary Specialty Care

- 3 Hospitals**
- Singapore General Hospital
 - KK Women's and Children's Hospital
 - Sengkang General Hospital (expected completion: 2018)

- 5 National Specialty Centres**
- National Cancer Centre Singapore • National Dental Centre Singapore • National Heart Centre Singapore • National Neuroscience Institute • Singapore National Eye Centre

Primary Care

- 9 Polyclinics**
- Bedok • Bukit Merah • Geylang, Marine Parade • Outram
 - Pasir Ris • Queenstown • Sengkang • Tampines

Intermediate and Long-term Care

- 3 SingHealth Community Hospitals**
- Bright Vision Hospital
 - Sengkang Community Hospital (expected completion: 2018)
 - Outram Community Hospital (expected completion: 2020)

Our Partner in Academic Medicine

Duke-NUS Medical School (Duke-NUS) was established in 2005 as a strategic collaboration between the Duke University School of Medicine, located in North Carolina, USA and the National University of Singapore (NUS).

Duke-NUS offers a graduate entry, 4-year M.D. (Doctor of Medicine) training program based on the unique Duke model of education, with one year dedicated to independent study and research projects of a basic science or clinical nature.

Duke-NUS also offers M.D/PhD and PhD programs. As a player in Singapore's biomedical community, Duke-NUS has identified:

5 Signature Research Programs

- **Cancer & Stem Cell Biology**
- **Neuroscience and Behavioural Disorders**
- **Emerging Infectious Diseases**
- **Cardiovascular & Metabolic Disorders**
- **Health Services and Systems Research**

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Chairman, DBS Group Holdings Ltd and DBS Bank Ltd

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Chairman, Caritas Humanitarian Aid & Relief Initiatives, Singapore

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Former Member of Parliament and Senior Parliamentary Secretary

Mr Philip Eng Heng Nee
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Prof Raj Mohan Nambiar
Visiting Consultant Surgeon (SGH, KTPH & TTSH)
Emeritus Consultant, CGH & Senior Consultant, MOH

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Mr Chan Heng Kee
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Prof K Ranga Rama Krishnan
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Dean, Rush Medical College and Senior Vice President, Rush University Medical Center

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Deputy Chairman, Temasek Holdings (Private) Limited

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Mr Tony Chew Leong Chee
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Prof Thomas Coffman
Dean, Duke-NUS Medical School

Mr Loh Ngai Seng
Permanent Secretary, Ministry of Transport

Mr Lim Chin Hu
Managing Partner, Stream Global Pte Ltd

Dr Tan Yew Oo
Specialist, Medical Oncology
Icon SOC Farrer Park Medical Clinic

Ms Khartini Binte Abdul Khalid
Senior Lecturer, Ngee Ann Polytechnic

Ms Tan Whei Mien Joy
Partner, WongPartnership LLP

Mr Fong Heng Boo
Non-Executive Director, Surbana Jurong Consultants Pte Ltd

Ms Woon Lai Har
Managing Director, LwH Consultancy Pte Ltd

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Mr Kai Nargolwala
Chairman & Independent Director, Clifford Capital Pte. Ltd.

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Vice Dean for Education, Chair, Department of Ophthalmology, Duke University School of Medicine

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Social Scientist and Former United Nations Under-Secretary-General

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Dr Benjamin Koh Khay Wee
Coordinating Divisional Director, Higher Education Group, Ministry of Education

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Managing Partner, Allen & Gledhill LLP

Deputy Chairman

Prof Tan Eng Chye
President Designate, National University of Singapore

Mr Lee Ming San
Managing Director, One North Capital Pte Ltd

Mr Alvin Lim Chng Thien
Director (International Directorate), Ministry of Finance

A/Prof Lim Yean Teng
Director, Cardiology Associates Pte Ltd

Prof Raj Mohan Nambiar
Visiting Consultant Surgeon (SGH, KTPH & TTSH), Emeritus Consultant, CGH & Senior Consultant, MOH

Prof Ivy Ng Swee Lian
Group Chief Executive Officer, Singapore Health Services

A/Prof Benjamin Ong Kian Chung
Director of Medical Services, Ministry of Health

Mrs Quek Bin Hwee

Ms Teo Swee Lian
Non-Executive and Independent Director, Singapore Telecommunications Ltd

Prof A. Eugene Washington
Chancellor for Health Affairs, Duke University
President and CEO, Duke University Health System

SingHealth Duke-NUS Senior Management



Prof Ivy Ng
Group Chief Executive Officer

Prof Soo Khee Chee
Deputy Group Chief Executive Officer
(Research and Education)

Prof Fong Kok Yong
Deputy Group Chief Executive Officer
(Medical & Clinical Services)

Prof Kenneth Kwek
Deputy Group Chief Executive Officer
(Organisational Transformation & Informatics)

Adj Prof Lee Chien Earn
Deputy Group Chief Executive Officer
(Regional Health System)

Prof Terrance Chua
Group Chairman, Medical Board

Assoc Prof Peter Lim Ai Chi
Group Chief Risk Officer

Mr Sia Kheng Hong
Group Chief Financial Officer

Mr Tan Jack Thian
Group Chief Operating Officer

Ms Esther Tan
Group Chief Human Resource Officer

Assoc Prof Tan Say Beng
Group Director, Research

Prof Lim Shih Hui
Group Director, Education

Prof Tan Kok Hian
Group Director, Academic Medicine

Dr Tracy Carol Ayre
Group Chief Nurse

Prof Celia Tan
Group Director, Allied Health

Mrs Tan-Huang Shuo Mei
Group Director, Communications
& Service Quality

Mr Benedict Tan
Group Chief Information Officer

Assoc Prof Loo Chian Min
Chief Medical Informatics Officer

Assoc Prof Chua Yeow Leng
Group Director,
International Collaboration Office

Dr Edwin Low Cheng Tee
Group Director,
Regional Health System

Prof Ian Curran
Vice Dean, Education

Prof Wong Tien Yin
Vice Dean, Clinical Sciences

A/Prof David M. Epstein
Vice Dean,
Technology & Development

Prof Thomas M Coffman
Dean

Prof Patrick J Casey
Senior Vice Dean, Research

Prof Soo Khee Chee
Senior Vice Dean, Clinical, Academic &
Faculty Affairs

Karen Chang
Senior Vice Dean and Group Director,
Corporate Services



Information accurate as at 1 October 2017

SingHealth Group Institutions' Senior Leadership



Prof Kenneth Kwek
Chief Executive Officer,
Singapore General Hospital

Prof Fong Kok Yong
Chairman Medical Board,
Singapore General Hospital



Prof Soo Khee Chee
Director,
National Cancer Centre Singapore

Assoc Prof Joseph Wee
Chairman, Medical Board,
National Cancer Centre Singapore



Assoc Prof Ng Wai Hoe
Medical Director,
National Neuroscience Institute



Ms Margaret Lee
Chief Executive Officer,
SingHealth Community Hospitals
Chief Executive Officer,
Bright Vision Hospital



Prof Alex Sia
Chief Executive Officer,
KK Women's and Children's Hospital

Assoc Prof Ng Kee Chong
Chairman Medical Board,
KK Women's and Children's Hospital



Assoc Prof Poon Choy Yoke
Director,
National Dental Centre Singapore



Prof Wong Tien Yin
Medical Director,
Singapore National Eye Centre



Prof Christopher Cheng
Chief Executive Officer,
Sengkang Health

Assoc Prof Ong Biau Chi
Chairman Medical Board,
Sengkang Health



Prof Terrance Chua
Medical Director,
National Heart Centre Singapore



Dr Adrian Ee
Chief Executive Officer,
SingHealth Polyclinics

Information accurate as at 1 October 2017

SingHealth Group Overall Key Figures & Statistics

MANPOWER

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March
2,783	171	8,186	4,361	7,197	22,698	2017
2,652	153	7,983	4,093	7,081	21,962	2016

KEY FIGURES

Year ended 31 March 2016	2017	Change	SingHealth - Overall
2,945	3,165	+ 7.5 %	Size Beds (as at end Mar)
80.4%	79.5%	- 0.90 %	Workload per annum Bed Occupancy Rate
163,809	167,599	+ 2.3 %	Inpatients
769,767	791,053	+ 2.8 %	Total Patient Days
4.7	4.7	-	Average Length of Stay (days)
114,037	122,541	+ 7.5 %	Day Surgeries
71,657	73,699	+ 2.8 %	Inpatient Surgeries
1,901,963	1,963,945	+ 3.3 %	Specialist Outpatient Clinic Attendances
318,953	316,708	- 0.7 %	Accident & Emergency Attendances
223,656	251,306	+ 12.4 %	Dental Attendances
325,116	344,309	+ 5.9 %	Dental Procedures
1,782,672	1,900,964	+ 6.6 %	Polyclinic Attendances

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.

FINANCIAL INFORMATION

Year ended 31 Mar	2017 (S\$ million)	2016 (S\$ million)
Assets by Major Categories		
Plant and Equipments	637	636
Trade and Other Receivables	989	558
Other Assets	1,107	1,367
Total	2,733	2,561
Liabilities by Major Categories		
Trade and Other Payables	1,328	1,134
Other Current Liabilities	125	120
Non Current Liabilities	521	554
Total	1,974	1,808
Total Equity	759	753
Revenue Breakdown by Major Categories		
Clinical Revenue	1,469	1,351
Subvention	1,696	1,596
Other Revenue	612	609
Total	3,777	3,556
Expenditure by Major Categories		
Manpower	2,121	1,994
Supplies and Consumables	514	472
Other Operating Expenses	960	911
Depreciation and Amortisation	180	176
Total	3,775	3,553

Institution Key Figures & Statistics



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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March
0	0	13	84	870	967	2017
1	0	12	77	850	940	2016



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

265 **MD Students**
Including 19 students enrolled in Integrated Biology and Medicine (IBM) PhD programme, and 3 IBM PhD graduates

60 **PhD (Integrated Biology and Medicine) Students**
Including 19 students enrolled in MD programme

>1,300 **Full-Time and Adjunct Faculty in Research and Education**

Figures are as at 31 March 2017

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.



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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March
1,206	0	4,329	1,893	2,543	9,971	2017
1,189	0	4,209	1,815	2,500	9,713	2016

Year ended 31 March
2016 2017

2016	2017	Size
1,725	1,785	Beds (as at end Mar)
83.9%	85.0%	Bed Occupancy Rate
82,260	80,817	Inpatients
493,965	488,451	Total Patient Days
6.0	6.0	Average Length of Stay (days)
44,525	45,206	Day Surgeries
46,852	47,022	Inpatient Surgeries
719,831	724,480	Specialist Outpatient Clinic Attendances
136,014	128,660	Accident & Emergency Attendances

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.

Institution Key Figures & Statistics



KK Women's and Children's Hospital

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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March
696	12	1,989	896	1,358	4,951	2017
690	7	1,980	857	1,329	4,863	2016

Year ended 31 March

2016 2017

2016	2017	Size
843	848	Beds (as at end Mar)
Workload per annum		
79.3%	79.3%	Bed Occupancy Rate
71,902	73,190	Inpatients
213,211	213,379	Total Patient Days
3.0	2.9	Average Length of Stay (days)
12,595	12,712	Day Surgeries
19,276	19,754	Inpatient Surgeries
551,089	564,736	Specialist Outpatient Clinic Attendances
182,939	178,747	Accident & Emergency Attendances

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.



Sengkang Health

378 Alexandra Road, Singapore 159964
Tel: 6472 2000 www.sengkanghealth.com.sg

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March
156	1	575	240	504	1,476	2017
87	0	504	234	448	1,273	2016

Year ended 31 March

2016 2017

2016	2017	Size
192	347	Beds (as at end Mar)
Workload per annum		
44.4%	46.9%	Bed Occupancy Rate
584	4,057	Inpatients
14,278	39,752	Total Patient Days
24.4	9.8	Average Length of Stay (days)
46	1,055	Day Surgeries
33	977	Inpatient Surgeries
533	10,978	Specialist Outpatient Clinic Attendances
-	9,301	Accident & Emergency Attendances
39	416	Dental Attendances
73	1,609	Dental Procedures

Note:

SKH started operations at Alexandra Hospital on 11 August 2015
SOC and surgical operations on 20 January 2016
Dental services on 1 February 2016
Emergency services on 4 April 2016

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.

Institution Key Figures & Statistics



National Cancer Centre Singapore

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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March	
191	0	168	392	357	1,108	●	2017
183	0	165	311	410	1,069	●	2016
Year ended 31 March							
2016		2017					

Workload per annum

9,850	9,588	Day Surgeries
147,559	151,933	Specialist Outpatient Clinic Attendances



National Dental Centre Singapore

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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March	
0	140	14	66	250	470	●	2017
0	130	15	55	249	449	●	2016
Year ended 31 March							
2016		2017					

Workload per annum

7,483	9,813	Day Surgeries
176,878	198,839	Dental Attendances
199,071	202,067	Dental Procedures

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.



National Heart Centre Singapore

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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March	
106	0	501	339	394	1,340	●	2017
110	0	493	318	392	1,313	●	2016
Year ended 31 March							
2016		2017					

Size

185	185	Beds (as at end Mar)
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Workload per annum

71.4%	73.8%	Bed Occupancy Rate
9,063	9,535	Inpatients
48,313	49,471	Total Patient Days
5.3	5.2	Average Length of Stay (days)
1,967	1,947	Day Surgeries
5,496	5,946	Inpatient Surgeries
121,597	121,821	Specialist Outpatient Clinic Attendances



National Neuroscience Institute

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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March	
108	0	40	139	130	417	●	2017
105	0	39	130	133	407	●	2016
Year ended 31 March							
2016		2017					

Workload per annum

44,699	48,182	Specialist Outpatient Clinic Attendances
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Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.

Institution Key Figures & Statistics



Singapore National Eye Centre

11 Third Hospital Drive, Singapore 168751
Tel: 6227 7255 www.snec.com.sg

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March	
125	0	263	134	309	831	●	2017
115	0	268	119	294	796	●	2016

Year ended 31 March
2016 2017

2016		2017		Workload per annum
37,571	42,220			Day Surgeries
316,655	341,815			Specialist Outpatient Clinic Attendances



Polyclinics SingHealth

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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March	
195	17	295	180	483	1,170	●	2017
173	16	298	179	477	1,143	●	2016

Year ended 31 March
2016 2017

2016		2017		Workload per annum
1,782,672	1,900,964			Polyclinic Attendances
46,739	52,051			Dental Attendances
125,972	140,633			Dental Procedures

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include MOHH-funded positions.



Bright Vision Hospital

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

Medical	Dental	Nursing	Allied Health	Others	TOTAL	Year ended 31 March	
22	0	169	49	204	444	●	2017
6	0	169	44	202	421	●	2016

Year ended 31 March
2016 2017

2016		2017		Size
318	317			Beds (as at end Mar)
82%	82%			Bed Occupancy Rate
1,857	1,614			Inpatients
78,040	78,010			Total Patient Days

Staffing figures refer to filled posts, in terms of full-time equivalent, and may not add up to total due to rounding. FY2016 figures include purchased manpower.

Research Statistics

Staffing

12 STaR Investigator Awardees

42 Cluster and Faculty Clinician Scientists

20 Clinician Scientist Awardees

29 Transition Awardees

>295 Other Principal Investigators Leading Projects

Total number of researchers leading projects **692**

Nursing

	CY16	CY15	FY14
Number of Presentations	126	82	103
Number of Publications	35	27	17
Number of Research Projects (with nurses as principal investigators)	41	46	26
Quantum of Grants Awarded S\$	133,852	109,163	195,782

Allied Health Professionals

>200 Allied Health Professionals Involved In Research

	FY16	FY15	FY14
Number of Papers Published	106	134	94
Grants Received S\$	783,710	633,550	1,747,385

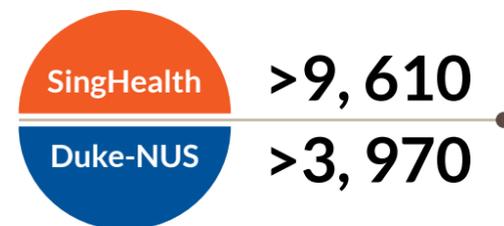
Research Achievements

7 National Awards (SingHealth & Duke-NUS)

- National Research Foundation Investigator Award
- President's Science & Technology Medal
- President's Science Award
- President's Science Award, Team (2)
- President's Technology Award, Team (2)

Publication in International Peer-Reviewed Journals

FY07 - CY16 (Jan 2007 - Dec 2016)



Competitive Funding SingHealth & Duke-NUS (FY07 - CY16) **>S\$1.2B** Grants

Education and Training Statistics

Advancing Education for Clinical Excellence

Average number of students per day in 2016

Medical	200	396	42
		Nursing	Allied Health & Pharmacy

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

>1,000 Residents enrolled in **34** programmes

- 23 ACGME-I accredited and 11 JCST accredited programmes

.219 New Residents **.1,428** Faculty **.138** Residents graduated from SingHealth Residency

>190 Medical Specialists came to us for Fellowship and short-term clinical attachments

17 MOUs forged with Educational Institutions for the Allied Health Profession to date

>254 hours of Oral Health Education programmes conducted for Dental Officers, Residents and Clinicians

A joint institute by Duke-NUS and SingHealth, AM•EI enhances the capabilities of each and every educator, to build the teaching pipeline and better groom generations of healthcare professionals.

>2,700 members

+42% participants at 73 Education Grand Rounds and Faculty Development Workshops

>\$56,000 AM•EI Education Grants awarded to innovative curricular programmes

\$56,000 from the Tan Yew Hock Faculty Development Fund utilised to support 135 Nursing and Allied Health Professionals

Recognising Outstanding Educators

Residency in SingHealth Excels! (RiSE) Awards

296 Residency faculty and top-performing residents awarded in 2016

10 Outstanding educators conferred the AM•EI Golden Apple Awards

