A kinder cure for cancer

How NUH's A/Prof Allen Yeoh developed a treatment protocol for childhood leukaemia that benefits young patients like Victoria Liew

INSIDE
Surgery of the Future — Now
Teaching the Science and Art of Medicine
CONTENTS

12 COVER STORY
A KINDER CURE
Young patients like Victoria Liew benefit from A/Prof Allen Yeoh’s treatment protocol CALL.

02 CONVERSATIONS

06 THE BOARD

08 EXECUTIVE GROUP

CLINICAL CARE
16 A NEW LEASE OF LIFE
Singapore’s first simultaneous pancreas and kidney transplant at NUH.

18 MASTERCFUL SOLUTION
Co-creator of the MASTER, Prof Lawrence Ho, shares his passion for endoscopy.

20 SURGERY OF THE FUTURE — NOW
Less-invasive heart operation; shorter recovery time.

22 MAKING WAVES IN STEM CELL TRANSPLANTS
FACT accreditation for NCIS/NUH stem cell programme; NCIS’ outpatient service.

24 BREATHING BETTER
New heat treatment for asthmatics patients.

26 BEYOND THE BLUES
Multi-disciplinary team-based approach in dementia care.

28 CLOSING LOOPS WITH MEDICAL TECHNOLOGY
IT applications at NUH improve outcomes, safety standards and quality of patient care.
30 BULLETIN
Clinical highlights of the year.

RESEARCH
34 SOON, A CURE FOR DENGUE?
The discovery of an antibody to destroy dengue virus.
36 TAKING MATTERS TO HEART
Determining background factors linked to heart disease.
40 DECODING A DEADLY DISEASE
Dr Ruby Huang wants to unlock the secrets of ovarian cancer.
42 SEEING STRAIGHT
Recent discoveries on the workings of the human eye.
44 A TWO-PRONGED APPROACH
New ways to fight breast cancer.

47 BETTER RECOVERY FROM STROKE
Taking rehabilitation exercises seriously.
48 BULLETIN
Meaningful research.

EDUCATION
52 ROLE MODEL FOR TOMORROW’S DOCTORS
Prof Hooi Shing Chuan’s life experiences help to shape the medical curriculum.
54 TEACHING THE SCIENCE AND ART OF MEDICINE
Producing the best medical graduates for Singapore’s healthcare system.
57 UNDER THE SPOTLIGHT
The inaugural Singapore International Public Health Conference.
58 THAT HEALING TOUCH
Residency training that produces compassionate specialists.
60 BULLETIN
Education highlights.

66 BY THE NUMBERS
NUH statistics at a glance.
68 A HELPING HAND
Assisting the community and students.

Cover Art Direction by Augustine Tan, Neo Aik Sing
Photography by Kelvin Chia
1E Kent Ridge Road, NUHS Tower Block, Singapore 119228
www.nuhs.edu.sg Company Registration No. 200801778C
Publishing Consultant: MEDIACORP
How do you see the National University Health System (NUHS) today, five years after it was established?

PROFESSOR TAN CHORH CHUAN: There is a strong and growing sense of common purpose, and a high degree of cooperative effort that has enabled and enhanced the ability of the NUHS to pursue and fulfil its ‘triple mission’. In particular, the NUHS has been able to go beyond excellent clinical care delivery, to provide state-of-the-art treatments based on our own research. The interlacing of clinical medicine and research, in turn, has helped generate sharper research questions and natural pathways to translate basic research findings into clinical applications. The close partnership between our Schools and the National University Hospital (NUH) has further raised the quality of education and training for undergraduates, specialist trainees and research students.

ASSOCIATE PROFESSOR BENJAMIN ONG: We have increased our staffing and our infrastructure has grown for both the clinical and academic entities. Our two national centres are now actively providing tertiary expertise to the public and distinguishing themselves in relevant research. We now have a core of clinician scientists to serve as a bridge between biomedical research discoveries and unmet clinical needs. The NUS Saw Swee Hock School of Public Health is charting its academic initiatives while strengthening networks regionally and internationally. We have been working on our Centre for Oral Health, our Regional Health initiative and the Khoo Teck Puat-National University Children’s’ Medical Institute. The NUHS is beginning to differentiate itself by applying academic vision in all our missions of care, education and research.

Have we established a distinctiveness that sets the NUHS apart from other academic medical centres (AMC)?

PROF TAN: I think several things set the NUHS apart. Firstly, our focus on diseases which are important in Asian populations and where the biology, progression and response to treatments are significantly different from Caucasian populations in which most clinical trials had been performed to date. This focus helps differentiate our research and generates research findings and applications which are of value to the people and patients of this most populous part of the world. Secondly, this ‘Asia-focus’ has been complemented by our strong expertise in first-in-human studies, particularly in cancer. For example, we have an outstanding Investigational Medicine Unit and Clinical Imaging Research Centre. Thirdly, we have a medical, dental school and public health school together with a teaching hospital, all within one organisational

A CORRECTLY PLACED OBSESSION

NUHS Chairman Tan Chorh Chuan and Chief Executive Benjamin Ong speak about the group’s journey as an academic medical centre.
umbrella. This creates special opportunities and allows powerful synergies to bring medicine from bench-to-bedside, and from bedside-to-community.

A/PROF ONG: I believe no two AMCs are alike. We have strong roots in a broad foundation in clinical medicine, and are on the same campus as Singapore’s leading university, with close links to research-active institutions close by. This unique proximity and close relationship confers advantages for collaborations to tackle many healthcare problems. Our unified governance set up between the NUH and the three NUS schools serves as the catalyst.

In your view, what are some of the highlights of the past year for the NUHS?

PROF TAN: We have further sharpened our collective goals and strategies and set the foundations for even more effective implementation. We continue to grow a fine pipeline of local talent, even as we have successfully stepped up the recruitment of excellent senior and very promising junior staff. I have been very impressed by the high quality of the students and trainees we are attracting, and delighted at the fierce commitment to excellence and innovation in the education we provide. For example, the thoughtful and sophisticated use of simulation technologies for training is making a real impact through consistent, quality team-based training.

A/PROF ONG: We’ve been encouraged that some examples of what are impacting the future of medical practice have already borne fruit quite early on. Breakthroughs in endoscopic procedures, such as the Master-and-Slave robotic ‘crab claw’, are part of our gastric cancer intervention endoscopy initiative, which is built around a very strong team that has taken a number of years to nurture. Related to this is our ability to narrow down targeted populations for screening intervention to give a higher yield. For instance, the team worked quite a bit on developing an algorithm for narrowing the profile of individuals who have the highest risk of developing gastric cancer, which is very common in Asia. What they were trying to do was predict who is at greatest risk to ensure that these people get more personalised screening for diseases such as gastric cancer.

We need to try to replicate this [screening intervention] for as many other conditions as possible. For instance, we looked at diabetes. This is rising to almost epidemic levels in Singapore, affecting 10 to 12 per cent of the general population and almost 30 per cent of those aged 60 and above. The disease is also observed to be more prevalent among Indians and Malays. Therefore, screening for diabetes makes sense because it’s so common.

"THAT WE CAN CREATE EVEN GREATER VALUE FOR OUR PATIENTS, STUDENTS AND THE WIDER COMMUNITY IN SINGAPORE AND BEYOND."

Prof Tan Chorh Chuan, Chairman NUHS Board

But screening alone isn’t enough because we haven’t reduced the risk [of contracting this disease] by this initiative.

Screening for diabetes is not expensive, but problems arise when it comes to other conditions. Take bowel cancer — the risks and cost of the screening processes for this are quite different. Is it practical to arrange for a colonoscopy for every Singaporean above 45? It’s very difficult to do and we will struggle to create the capacity. Also, it’s costly and the pickup rate may not be high. So it’s more important for us to improve our predictive capability and risk-profiling.

We need to be certain that the evidence for the intervention works before we do community outreach. We say that certain foods increase the risk of cancer, this is true. But does it increase the risk for you or for me? We don’t know. It might increase the risk at a population level, but that doesn’t help because you want a targeted intervention that addresses each individual person.

So, you need to find better ways to do that, and this links to the regional health story because we now have a bigger potential population to understand a risk-profile.

Other highlights?

PROF TAN: The good progress that the NUS Saw Swee Hock School of Public Health has made opens up many opportunities for the NUHS to contribute to the improvement of health at a population level, as well as the design and evaluation of new models of clinical care delivery.

The Centre for Translational Medicine provides cutting-edge facilities for education and research. Beyond the facilities, what has been impressive has been the development and implementation of excellent programmes in teaching and basic and translational research.
There have been many achievements in clinical care delivery, innovation and safety which have been recognised, for example, through the 2012 National Medical Excellence Awards.

A/PROF ONG: Every year the National Medical Excellence Awards recognise outstanding clinicians and scientists. In 2012 we had two winners in the clinical category, both of whom are surgeons. Both are working on high-end complex areas of care which really speaks of our capabilities for high-end care for paediatric surgery and spine surgery.

One of our teams, which worked on safety, also won. To achieve a safer hospital environment, you have to work as a team. We want to make sure that in a complex multi-faceted process with many risks — from infections to missed results and avoidable errors — we do no harm. This boils down to people working effectively as teams.

We are happy also that we had a good crop of clinician-scientists recognised last year; that to me was also a highlight.

There’s also the move away from a largely institution-based setting to a more ambulatory setting. Having practiced neurology for quite a number of years, I have seen my own practice shift a lot to the outpatient setting. Hence the importance of building community capability; otherwise, all you have is in the acute hospital and no ability to manage beyond this.

Is there anything in particular that the NUHS needs to work on more? What are the challenges?

“IN OUR VISION OF A REGIONAL HEALTH SYSTEM, KEEPING FOCUS ON WHERE WE ARE HEADED IS IMPORTANT.”

A/Prof Benjamin Ong, Chief Executive, NUHS

PROF TAN: Regardless of the progress being made, AMCs are always “works in progress”. Talent is the most important factor for the success of the NUHS and we constantly have to surmount the challenges of retaining, developing and recruiting high-quality talent. Another major challenge is our high clinical emergency workload. We have been working hard to see how we can continue to cater for this well, while creating more capacity for elective clinical work and tertiary care needs which are also part of our mission. We have a correctly-placed obsession with finding fresh ways to further improve the clinical training for our students and trainees, even as the hospitals and clinical services in the NUHS and Singapore get more and more busy. We need to continually drive up our research quality and impact, to provide the best local science base for discovery, innovation and application in medicine, dentistry and public health.

A/PROF ONG: Grouping our clinical services into a regional health system is still a work-in-progress; implementation is the key. We’ve been fortunate that we’ve had some successes; the main thing is how do we continue to invest in the right things?

We have a very busy hospital, with more than a million unique patient attendance annually. We have a very large medical school. Together, the medical school and the hospital account for a huge amount of research, a lot of it competitively-funded. So choosing the areas to concentrate and research on are very important, because you must address things that will have an impact on the largest number of individuals.

What’s on your wishlist for the NUHS, say, 10 years from now?

PROF TAN: That the NUHS will continue to have a strong, cohesive leadership which is driven by the same spirit of pursuing excellence and seeking differentiation.

That we have a powerful critical mass of talent in an environment that enables each individual to do his or her best work while fostering productive collaborative efforts.

That we can create even greater value for our patients, students and the wider community in Singapore and beyond.

A/PROF ONG: I hope that we will have a suite of primary care services working in an integrated fashion to care for major chronic conditions. I hope we will have sufficient community hospital facilities and good nursing home partners as well. And, equally importantly, that we have good community resources and partnerships to best deliver care on the ground.

I also hope that we will have in place a system to evaluate the effectiveness of care, as we will be looking at care now as a system, not as individual diseases. I think that would allow us to better understand the cost-effectiveness of solutions that are brought to bear at a larger level, instead of just a single person’s case.
THE BOARD

1. MR PATRICK DANIEL
   Editor-In-Chief, English & Malay Newspapers Division (EMND), Singapore Press Holdings Ltd

2. MRS SYLVIA LEE
   Director, Corporate Development, ACTSYS Process Management Consultants Pte Ltd

3. MRS TAN CHING YEE
   Permanent Secretary (Health)

4. MR ANTHONY TAN
   Deputy Secretary (Policy), Ministry of Health

5. MR SANJIV MISRA
   Managing Director, Phoenix Advisers Pte Ltd

6. MR LIM HOCK SAN
   President & CEO, United Industrial Corporation Ltd and Singapore Land Ltd

7. MR PHILIP SU POON GHEE
   Executive Director, Far East Organization

AT THE HELM
Creating opportunities, exploring synergies.
8 **PROF TAN CHORH CHUAN**  
Chairman, NUHS Board;  
President, National University of Singapore

9 **MS KWA KIM LI**  
Managing Partner,  
Lee & Lee (Advocates & Solicitors), Singapore

10 **MR TAN CHONG MENG**  
Group CEO,  
PSA International Pte Ltd

11 **MR NICKY TAN NG KUANG**  
CEO, nTan Corporate Advisory Pte Ltd

12 **DR JOHN CHEN SEOW PHUN**  
Chairman, SAC Capital Pte Ltd;  
Managing Director, JCL Business Development Pte Ltd
TRACK
Leading the NUHS to shape medicine for Singapore’s future.
The National University Health System is helping to find a better way forward in the fight against diseases. It is doing this by training doctors, dental surgeons and nurses to meet the challenges of the 21st century medical practice, in the hospitals and out in the community.
ASSOCIATE PROFESSOR AYMERIC LIM
The Chairman of the Medical Board (CMB) of the NUH, Associate Professor Aymeric Lim is a surgeon who specialises in hand and reconstructive microsurgery. He oversees the professional and quality aspects of clinical care which the NUH provides to patients.

A/Prof Lim’s research interest is in nerve and muscle morphology and peripheral nerve surgery.

ASSOCIATE PROFESSOR YEOH KHAY GUAN
A gastroenterologist by training, Associate Professor Yeoh Khay Guan is Dean of the NUS Yong Loo Lin School of Medicine and Senior Consultant at the Department of Gastroenterology, NUH.

A/Prof Yeoh’s research interest is in the early detection of gastric and colorectal cancers, and he has published over 100 peer-reviewed papers in international journals. He is the Lead Principal Investigator of the Singapore Gastric Cancer Consortium, a national flagship research group which aims to improve the survival outcomes for gastric cancer in Singapore.

A/Prof Yeoh also chairs the National Colorectal Cancer Screening Committee of the Health Promotion Board, Ministry of Health, which recommends guidelines for the national colorectal screening programme in Singapore.

ASSOCIATE PROFESSOR GRACE ONG
Associate Professor Grace Ong, Dean of the Faculty of Dentistry, is a Senior Consultant specialising in periodontics. She is also Chair, Dental Cluster, NUHS.

Her involvement in dental education extends beyond the Faculty to being Consultant to the Peer Review group of the South East Asia Association of Dental Education. Her research interests are in the epidemiology and microbiology of periodontal disease, and teaching and learning outcomes.

PROFESSOR CHIA KEE SENG
The Founding Dean of the NUS Saw Swee Hock School of Public Health, Professor Chia Kee Seng started his professional career as an occupational health physician and subsequently as a molecular epidemiologist.

His current research focuses on how genetic and lifestyle factors interact to cause chronic diseases (cancer, cardiovascular diseases, and diabetes mellitus) and the translation of these findings to preventive measures at the population level.

Prof Chia also serves as a Council Member of the Workplace Safety and Health Council and Board Member of the National Environment Agency.
A kinder CURE

NUH doctors formulate a less aggressive but equally effective treatment for young cancer patients, resulting in safer and cheaper treatment with fewer complications.
The first steps towards developing a more effective and kinder treatment were taken with a 2003 study that involved some 556 children with CALL and spanned four centres in Singapore and Kuala Lumpur, Malaysia. These were NUH and KK Women’s and Children’s Hospital in Singapore, and the University of Malaya Medical Centre and Sime Darby Medical Centre in Subang Jaya. The results showed that a gentler chemotherapy approach can boost survival rates in more than 80 per cent of patients, reduce side-effects and even shorten the length of time a young patient would have to spend in hospital.

Would modifications to the medication regime, adjusted to the individual child, be more effective and yet be less punishing? Which child needs fewer drugs, which requires more aggressive therapy? This was the poser that A/Prof Yeoh and A/Prof Quah mulled over as they reviewed the findings of their study. It revealed that about 30 per cent of children with CALL in countries such as the Philippines, Indonesia and Vietnam would die from the side-effects of treatment within the first month. Overall cure rates in Asia remain low — hovering in the region of 10 to 20 per cent.

**A CUSTOMISED SOLUTION**

The duo’s battle against CALL went through three phases, says A/Prof Quah, Head and Senior Consultant, Division of Haematology-Oncology and Bone Marrow and Cord Blood Transplantation at the Institute. “The initial protocols were rather mild by present standards, and we had survival rates of 62 per cent. Then we switched to the German BFM-style protocol, which was much more intensive, with more toxicity, but the relapse rate was much reduced and we had cure rates of greater than 80 per cent.”

A/Prof Yeoh, Senior Consultant, Division of Haematology-Oncology at KTP-NUCMI and Medical Director, Viva-University Children’s Cancer Centre explains: “Initially, in our first trial, we actually started treatment with three drugs. Unlike most centres, we added the fourth drug only when we thought the patients could tolerate it.”

Here is where the third and last phase — customised therapy — came in. “It’s like cooking. It must be just right. But then it’s difficult to replicate this in centres where you don’t have skilled clinicians like A/Prof Quah. So what I wanted to do was to ‘replicate’ him by taking his clinical skills, but changing them into a way to objectively measure the response,” says A/Prof Yeoh.

The doctors’ solution is the “culmination of many years of work and attempts at improving the cure rate”, says A/Prof Yeoh.
“Childhood leukaemia is highly curable and every child should be given the best chance to be cured with the least side-effects.”

A/Prof Allen Yeoh, Senior Consultant at the Khoo Teck Puat-National University Children’s Medical Institute, National University Hospital

HUNTING THE CANCER BIOMARKERS

Doctors assess the progress of their fight against CALL by looking for specific markers that measure the amount of leukaemia cells remaining in the body. “Each marker is specific for that patient. It means we need to find the marker of the leukaemia cells at diagnosis, construct a primer to detect up to one leukaemia cell among 10,000 normal cells — it’s like detecting one terrorist lurking in a background of 10,000 normal people,” as A/Prof Yeoh puts it.

“We tested this marker on about 46 patients and measured the amount of leukaemia cells remaining in the bone marrow after one month of treatment. What was astounding was we could predict who would relapse up to four years later just within the first month of treatment!

“Of course there were other researchers in Europe and US who were working on a similar method. They used two such markers for each patient which was expensive and technologically demanding,” A/Prof Yeoh’s insight was to use just one marker instead — one marker was “better than nothing”. Limiting the search to one marker was easier, quicker and more cost-effective — and it means that a greater proportion of patients can be helped.

“We can find one marker in 90 per cent of patients. But if we want two markers, you can only find it in about 70 per cent of patients,” says A/Prof Yeoh. “It’s like the hunt for Mas Selamat [a convicted terrorist who was Singapore’s most-wanted fugitive]. If he had shaved his beard, we wouldn’t have recognised him. Yet having one photo of Mas Selamat would have been better than not having any.”

Limiting the search to one marker proved to be the “pivotal change” needed to improve cure
rates. By being able to accurately and cost-effectively measure the patient cancer markers and thus measure his or her response to treatment, A/Prof Yeoh could tailor the regimen of potent cancer-killing drugs to suit the patient. This meant the fourth drug, daunorubicin, which had the most toxic side-effects, could be used more sparingly.

"By the end of the first three months of treatment, we are able to say what will happen [to the young patient] four years later. We can predict what will happen—who will not do well, who will do well. So because of our ability to predict, we can actually start with treatment that is a little gentler, vis-a-vis the rest of the patients," he says. "This is a more personalised way to do it."

With this less-aggressive treatment modality, the six-year event-free survival rate is 80.6 per cent, comparable to cure rates in the West. In 2010, both doctors embarked on the latest phase of trials to completely eliminate the use of daunorubicin. Says A/Prof Yeoh, "For the one-third of patients who really have a very quick response to the three drugs... why add the fourth drug and have all the side-effects and infections?"

Ultimately, the doctors hope to find ways to fine-tune the treatment protocol and identify the optimal intensity of treatment "so that we can actually reduce the risk of patients dying from infections, and at the same time still have a very good chance of a cure," says A/Prof Yeoh.

A/Prof Quah is hopeful for what the future holds in the field of CALL. "The future for oncology generally is very bright, as new laboratory techniques bring new understanding of cancers in general. It's with this basic knowledge that we learn how to devise new therapies. I've been in the field of oncology for 30 years now, and these past five years have been the most exciting, with dizzyingly rapid advances, and with many of these advances rapidly translating into practical modes of therapies," he says.

"My hope is that one day we'll have the capabilities to cure all kinds of cancer without using chemotherapy."

---

VICTORIA'S TRIUMPH

A mother tells of her daughter's harrowing brush with leukaemia.

In 2007, the Liews were on holiday in Indonesia when Mrs Amy Liew first suspected something was amiss with her daughter Victoria, then just five-and-a-half years old. "My maternal instinct made me suspect something was wrong. Victoria was looking unusually pale, couldn't eat much and was picking at her food, which was very rare for her," recounts Mrs Liew.

When Victoria developed a fever three weeks later, a visit to a paediatrician confirmed her worst fears. Their daughter had Childhood Acute Lymphoblastic Leukaemia (CALL). "When we found out, I thought, 'We're in big trouble now.'"

But Mrs Liew and her husband Joshua resolved to let the disease cow their family into submission. When she was younger, Victoria had to have emergency surgery to repair damage to her small intestine. Both parents were determined that Victoria would also overcome the current setback—for them, it was not a question of if she would survive, but how.

"We treated Victoria like an adult. We didn't want her to feel as if she was a victim, nor feel sorry for herself. [We knew] this is a disease that can be overcome; that we, as a family, would get through this," says Mrs Liew.

Victoria's paediatrician referred her to the National University Hospital, where Mr and Mrs Liew consulted with Associate Professor Quah Thuan Chong. Victoria was then enrolled into A/Prof Quah and A/Prof Allen Yeoh's ongoing study of a new treatment protocol for CALL. This new protocol has made significant differences to the overall cure rate for CALL. Yet, chemotherapy still comes with its side-effects—hair loss, nausea, vomiting and a risk of infection.

After a year of chemotherapy, Victoria began Primary 1 classes with other children her age at the St Anthony Canossian Primary School in Bedok. She still required chemotherapy on a weekly basis and had to be on a special diet, but she lived life as a normal kid. It was a rocky start for she had lost her hair and was vomiting because of chemotherapy. But the girl persevered. "Victoria turned it into an opportunity to teach others," says Mr Liew of her elder of two daughters. "She used her experience with CALL as a learning experience about valuing life."

Victoria picked up golf and ballet, and also signed up for art lessons. "She felt a lot of things had been taken from her. It was tough, but she did a lot of painting to cope."

As Victoria matured, she became sensitive to the needs of other sick children in her school. "She wanted to help them feel better," says Mrs Liew. "She understands she is not alone and that it's not her fault that she was sick."

"Now in Primary 5, Victoria represents her school at golf. She also wants to be a wish granter for the Make-A-Wish Foundation. "She wants to reach out to other sick kids and show them that everything will be OK," says Mrs Liew.

"Victoria has excellent family support — and excellent support from her school too! Now that she's ceased therapy, she's living the life of a completely normal girl."

A/Prof Quah Thuan Chong

---

NATIONAL UNIVERSITY HEALTH SYSTEM
Singapore’s first ever simultaneous pancreas and kidney transplant was successfully carried out at the NUH.

It wouldn’t be an understatement to say that Shawn Huang, 29, is perhaps Singapore’s luckiest man alive. A Type 1 diabetic ever since he was 14, Shawn’s kidneys finally failed in April 2011. A lifetime of peritoneal dialysis loomed, with daily 10-hour treatments that were uncomfortable, inconvenient and which left him feeling exhausted all the time. Shawn even had to give up his sales job and became a student at a private school.

But after being on transplant lists for over a year, a call came through one night that would change his life. “I thought I was dreaming,” The New Paper reported Shawn as saying. “I was sleeping when I got the call that they had found a donor, and I was to be the first to receive both a kidney and a pancreas.”

Thanks to his age and the type of diabetes he had, Shawn was the perfect candidate for the landmark operation. In September 2012, a team of surgeons from the National University Hospital (NUH) and Singapore General Hospital (SGH), led by Associate Professor Krishnakumar Madhavan, Head and Senior Consultant, Division of Hepatobiliary and Pancreatic Surgery, together with Dr Tiong Ho Yee, Consultant, Department of Urology and Dr Victor Lee from SGH, worked for over five-and-a-half hours to attach Shawn’s new pancreas and kidneys.

Transplants provide a new lease on life While kidney transplants are relatively common, they cannot provide a cure for diabetes. A pancreas transplant, however, provides a potential cure for
Type 1 diabetes occurs when the pancreas, a gland located behind the stomach, fails to produce enough insulin to regulate the body’s sugar level. Such a transplant can also improve a patient’s quality of life and reduce long-term diabetic complications such as kidney failure, blindness and stroke.

Pancreas transplants can be carried out as a standalone operation, after a prior kidney transplant, or together with the kidney transplant — just like what Shawn underwent. The main benefit of doing both transplants at the same time is the increased rate of survival.

Without a transplant, only 38 per cent of those with kidney failure can expect to survive five years. With a successful dual pancreas-kidney transplant however, the five-year survival rate jumps to more than 90 per cent. Such a transplant patient should also live 10 years longer than a patient who has been given just a new kidney.

There are other benefits as well. For Type 1 diabetic patients with kidney failure such as Shawn, a simultaneous pancreas and kidney transplant will cure both diabetes and kidney failure with just one surgical operation. What’s more, professionals,” he says. “They had to be made to think out of the box.”

To prepare for such a groundbreaking operation, the surgical team went through five years of research and overseas training. The nursing team also spent almost a year after the operation, Shawn no longer needs insulin shots nor peritoneal dialysis. “It’s like a rebirth. I have been given my life back. I can live like a normal person now.”

Shawn Huang, 29, transplant patient

transplanting two organs from the same donor minimises the risk of rejection, as both would be of the same tissue type.

A/Prof Madhavan, who heads NUH’s Hepatobiliary and Pancreatic Surgery division, says that more people need to be aware of the benefits of the procedure. “Many people needed to be convinced this was a good thing to have, even the time with transplant teams to acquire more experience and skills.

Almost a year after the operation, Shawn no longer needs insulin shots nor peritoneal dialysis. “It’s like a rebirth. I have been given my life back and I have the donor, his family and the doctors to thank,” he says. “I can live like a normal person now.”

**TRANSPLANT FACTS**

The transplant was part of an innovation and technology initiative supported by the Health Services Development Programme under the Ministry of Health. Some S$2.7 million has been set aside for a national pilot programme for pancreas transplants that is set to run until 2017.

The pilot programme is based in the NUH, in collaboration with a surgical and medical pancreas transplant team from the NUH and SGH. Following a successful pancreas transplant, the long-term follow up of these patients can be with their original physicians at NUH or SGH.

Potential recipients should:

- Have Type 1 diabetes.
- Be on insulin.
- Have life-threatening or significant diabetic complications.
- Be less than 55 years of age at the time of referral, as the risk of surgery is higher for older patients.

Simultaneous pancreas kidney transplant recipients should also qualify for a kidney transplant on their own merit. That is, they should be on dialysis and be eligible for the national waitlist for kidney transplant.
FROM THE VERY beginning, it was the appeal of getting to the root of a patient’s ailment that led Professor Lawrence Ho to become a gastroenterologist in 1994.

After all, practising medicine, according to Prof Ho, lies in finding the delicate balance between science and art. On one hand, you have the science and technology of modern healthcare and on the other, the style and art of diagnosis and procedural skill. The latter can differ from practitioner to practitioner, as their technique is dependent on their level of experience and training.

“This is a concern for me, as their findings can be inconsistent and subjective as a result,” says Prof Ho, Senior Consultant in the Division of Gastroenterology & Hepatology at the National University Hospital (NUH). “And there are other factors beyond our control that might affect a medical procedure, like human error which might be caused by situations like an error in judgment.”

Motivated by these concerns, Prof Ho found a solution in endoscopy. “Educated guesses on a patient’s condition have to be made based on their symptoms and complaints,” he explains. “But with an endoscope, the answer can be found straight away — you can look into the organs and identify what’s ailing them.”

The journey begins
The endoscope — a long flexible tube with a miniature viewing lens on the end — is inserted via the mouth or nose and directly into an organ to view its interior. While endoscopic knowledge, techniques and equipment have developed greatly over the decades, the technique is still constrained by the fact that it can only make a difference at the time of diagnosis. “If a growth is found inside a patient’s intestines, a surgeon would be needed to cut his abdomen open to remove the growth. The surgery usually lasts several hours and results in scarring, pain and a long period of recovery,” says Prof Ho.

Around the same time that Prof Ho was mulling over this, Associate Professor Louis Phee, the Acting Head of the Division of Mechatronics and Design in the School of Mechanical & Aerospace Engineering at the Nanyang Technological University (NTU) was scouting for an endoscopist to work with. A/Prof Phee wanted to apply engineering know-how to improving endoscopic procedures, and so contacted the National University of Singapore (NUS) in 2004. He was put in touch with Prof Ho. The two men quickly put their minds to finding a solution.

After much discussion, they concluded that having a pair of
“robotic arms” on the endoscope to perform a procedure from inside the body would do away with the need for invasive surgery in some cases. For around a year, Prof Ho and A/Prof Phee worked with the latter’s team of NTU engineering students to create a working prototype. “But initial designs were “clunky”, and it was difficult for the robot to manoeuvre inside the body. “We were very perplexed because it was obvious that we were missing an important piece from this puzzle,” says Prof Ho of that time.

A major turning point
A way forward finally presented itself with the arrival of visiting Professor Sydney Chung, ex-Dean of the Faculty of Medicine at the Chinese University of Hong Kong.

The professors took Prof Chung out for chilli crab at East Coast Park one evening in 2005, to pick his brain for a possible solution to their quandary. Prof Chung thought their idea good, but unnecessarily complicated. He used a crab claw on the table as an example of a simple and elegant design. “Prof Chung said that if such a design has worked so easily and naturally for the crab [to crush and eat prey] for so long, then it should be a template to follow,” recalls Prof Ho. “He explained that a ‘crab’s claw’ — and not its entire arm — would be enough to manoeuvre in such a small space and perform the surgery we wanted.”

Prof Chung sketched out a rough design on the back of the restaurant napkin, and voila — this was the insight the duo were looking for. “I was humbled by the win, and felt that [A/PROF] LOUIS [PHEE] AND I WERE LUCKY TO HAVE MET EACH OTHER... THE INVENTION CAME AT THE TIME WHEN THE WORLD WAS READY TO ACCEPT IT.”

Prof Lawrence Ho, Chair, University Medicine Cluster

Towards a new horizon
Once three patients in India had been confirmed, the professors flew there in July 2011 with the MASTER. They excised the tumours in the stomachs of the three patients at India’s Asian Institute of Gastroenterology. Each operation lasted a maximum of 17 minutes, and the patients went home the same day. They went on to use the MASTER to operate on two other patients with gastric tumours in Hong Kong in December 2011. “The MASTER was a success,” says Prof Ho with a big smile. “After all the hurdles we’d come up against, we were elated that our efforts had paid off.”

In July 2012, the project received $550,000 in funding from Spring Singapore’s Technology Enterprise Commercialisation Scheme, which supports the commercialisation of ideas undertaken by tech start-ups. But the feather in Prof Ho’s and A/Prof Phee’s caps was when they received the prestigious President’s Technology Award in October 2012 from President Tony Tan Keng Yam.

Looking ahead, there are plans to expand the use of the MASTER for other procedures, such as stomach stapling for obese patients and suturing gastric bleeding in the elderly. “Beyond the stomach, the MASTER could be modified to do procedures relating to gynaecology and urology,” adds Prof Ho, who is also Head and Professor, Department of Medicine, NUS Yong Loo Lin School of Medicine (YLLSoM). “I dare say that in five to 10 years, the MASTER will be a paradigm shift in surgery. We already have many of the world’s top endoscopists expressing interest in working with us. This experience has convinced me that regardless of our size and limited resources, Singapore is able to create something world class.”

Prof Ho received the prestigious President’s Technology Award in October 2012 from President Tony Tan.

out trials on humans to prove the Master's effectiveness. After coming so far, giving up was not an option, so in 2009, the professors began the process of seeking approval for the MASTER to be used on patients. Approval was given by the NUH and NUS a year later and the two men set their sights on India and Hong Kong for potential patients with gastric lesions to operate on. Besides, endoscopists there with whom they had worked helped to spread the word, and this lent credibility to the project.

tests, trials and errors followed, with Prof Chung stopping by Singapore once a year to check on their progress.

In 2008, the team finally succeeded in creating a prototype slim and flexible enough to enter the human body, with ‘claws’ strong enough to cut and remove tissue. They named it the MASTER — short for Master and Slave Transluminal Endoscopic Robot. But at this point, the real challenge began.

“We were performing animal trials and publishing reports of the MASTER, but hadn’t received any serious attention,” says Prof Ho. This was because no-one could be sure the MASTER would work on humans as it hadn’t been tested on anyone yet.

The project’s funding from NUS, NTU and the NUH was also running out, leaving them two choices — give up, or carry on.

The professors took Prof Chung out for chilli crab at East Coast Park one evening in 2005, to pick his brain for a possible solution to their quandary. Prof Chung thought their idea good, but unnecessarily complicated. He used a crab claw on the table as an example of a simple and elegant design.

“This was the insight the duo were looking for. “I was humbled by the win, and felt that [A/PROF] LOUIS [PHEE] AND I WERE LUCKY TO HAVE MET EACH OTHER... THE INVENTION CAME AT THE TIME WHEN THE WORLD WAS READY TO ACCEPT IT.”

Prof Lawrence Ho, Chair, University Medicine Cluster

Towards a new horizon
Once three patients in India had been confirmed, the professors flew there in July 2011 with the MASTER. They excised the tumours in the stomachs of the three patients at India’s Asian Institute of Gastroenterology. Each operation lasted a maximum of 17 minutes, and the patients went home the same day. They went on to use the MASTER to operate on two other patients with gastric tumours in Hong Kong in December 2011. “The MASTER was a success,” says Prof Ho with a big smile. “After all the hurdles we’d come up against, we were elated that our efforts had paid off.”

In July 2012, the project received $550,000 in funding from Spring Singapore’s Technology Enterprise Commercialisation Scheme, which supports the commercialisation of ideas undertaken by tech start-ups. But the feather in Prof Ho’s and A/Prof Phee’s caps was when they received the prestigious President’s Technology Award in October 2012 from President Tony Tan Keng Yam.

Looking ahead, there are plans to expand the use of the MASTER for other procedures, such as stomach stapling for obese patients and suturing gastric bleeding in the elderly. “Beyond the stomach, the MASTER could be modified to do procedures relating to gynaecology and urology,” adds Prof Ho, who is also Head and Professor, Department of Medicine, NUS Yong Loo Lin School of Medicine (YLLSoM).

“I dare say that in five to 10 years, the MASTER will be a paradigm shift in surgery. We already have many of the world’s top endoscopists expressing interest in working with us. This experience has convinced me that regardless of our size and limited resources, Singapore is able to create something world class.”

Prof Ho received the prestigious President’s Technology Award in October 2012 from President Tony Tan.

out trials on humans to prove the Master’s effectiveness. After coming so far, giving up was not an option, so in 2009, the professors began the process of seeking approval for the MASTER to be used on patients. Approval was given by the NUH and NUS a year later and the two men set their sights on India and Hong Kong for potential patients with gastric lesions to operate on. Besides, endoscopists there with whom they had worked helped to spread the word, and this lent credibility to the project.

A major turning point
A way forward finally presented itself with the arrival of visiting Professor Sydney Chung, ex-Dean of the Faculty of Medicine at the Chinese University of Hong Kong.

The professors took Prof Chung out for chilli crab at East Coast Park one evening in 2005, to pick his brain for a possible solution to their quandary. Prof Chung thought their idea good, but unnecessarily complicated. He used a crab claw on the table as an example of a simple and elegant design. “Prof Chung said that if such a design has worked so easily and naturally for the crab [to crush and eat prey] for so long, then it should be a template to follow,” recalls Prof Ho. “He explained that a ‘crab’s claw’ — and not its entire arm — would be enough to manoeuvre in such a small space and perform the surgery we wanted.”

Prof Chung sketched out a rough design on the back of the restaurant napkin, and voila — this was the insight the duo needed to fine-tune their then-clunky invention. “We felt that we were fated to have met him,” says Prof Ho, who had been devoting spare time and effort on refining the prototype for the past year or so.

Another challenge awaits
From 2005 to 2008, more
Traditional open heart surgery — median sternotomy — is an invasive procedure in which the surgeon slices down the centre of the patient's chest, before splitting the breastbone open in order to operate on the heart inside.

While a patient would usually be discharged after eight to nine days, and be able to resume work after a month or so, he or she will — henceforth — carry a long, red scar down the centre of the breastbone.

But now it doesn’t have to be this way. National University Heart Centre, Singapore (NUHCS) cardiac surgeon Associate Professor Theodoros Kofi dis, Head of the Division of Adult Cardiac Surgery has pioneered a new single-incision, minimally-invasive form of cardiac surgery (SIMICS) that uses just one six-centimetre cut — and leaves almost no scarring. Australian businessman Craig McEvoy was the first patient worldwide to benefit from this groundbreaking form of cardiac surgery in December 2012 in Singapore, when his leaky mitral valve was repaired.

"While the operation itself is slightly more expensive, this is offset by a shorter hospitalisation time," says A/Prof Kofi dis. After SIMICS, a patient can be discharged in just five or six days — and return to work after a week, instead of the usual one month.

Minimally-invasive cardiac surgery is known to result in fewer post-operation infections, uses less blood products and improves patient mobility. It also results in fewer complications such as irregular heartbeat. The newly-developed SIMICS procedure further reduces the trauma to the patient by omitting all accessory incisions and ports.

While the benefits of SIMICS are many, it is the improved recovery time that is the most appealing for some patients. A/Prof Kofi dis cites many examples of patients who put off much-needed heart procedures because they could not spare the down-time needed to recover from the surgery. "It is very important to provide these patients with a viable option so they can go back to normal functionality and a normal life sooner," he says.
“IT WILL RE SHAPE CARDIAC SURGERY AS WE KNOW IT — IT’S ONLY A MATTER OF TIME. IT’S THE WAY OF THE FUTURE.”

A/Prof Theo Kofidis (below), Head of the Division of Adult Cardiac Surgery, NUHCS

“Twenty to thirty years ago, patients were just praying to come out of this alive. Now they want to come out alive and with fewer complications, and in the best possible cosmetic condition!”

“It’s the way of the future”

In the SIMICS procedure, the surgeon uses just one incision on the side of the chest to gain access to the heart. All portholes for the camera, clamp and tubes are eliminated, thanks to A/Prof Kofidis’ innovative use of a few revolutionary inventions (see side story).

“I didn’t invent the wheel but someone had to think about putting the instruments together in the context of less-invasive heart surgery,” he explains. “You can see how much better it is compared to median sternotomy. SIMICS is open-heart surgery, just like any other, but it makes such a difference.”

The surgeon credits the NUH for fostering an environment that encourages surgical innovation.

The NUHCS has a structured minimally-invasive programme. “We encourage out-of-the-box thinking, because there is always a better and safer way of doing surgery that will benefit our patients. There is a clear trend towards less-invasive surgery. One day, all cardiac surgery will be minimally-invasive. People expect to suffer less, and the technology is continually improving. It will reshape cardiac surgery as we know it — it’s only a matter of time. It’s the way of the future.”

JUST ONE CUT

Single incision, minimally-invasive cardiac surgery (SIMICS) combines recent surgical developments with a specially-designed retractor developed by A/Prof Kofidis. Here’s how it works:

- **ONE INCISION**
  Just one six-centimetre incision is needed to gain access to the heart.

- **NO MORE PORTHOLES**
  The aortic cross clamp passes though the same incision — no separate hole is required.

- **NO FEMORAL INCISION**
  Instead, tubes connecting the heart-lung machine pass through two tiny 5mm holes with the help of an automated closing device — no stitching is needed.

- **NO BULKY RETRACTOR**
  A flexible steel plate, designed by A/Prof Kofidis, holds the internal incision into the heart open.

NEW METHOD:

**One incision, no portholes**

**ONE SURGICAL INCISION**

**AORTIC CROSS CLAMPS**

**FEMORAL HOLES**

GETTING INSIDE THE HEART

**MODIFIED ATRIAL RETRACTOR**

A newly developed flexible steel plate is used to hold the incision in the heart open, without the need for a bulky retractor.

1. Two sutures and their needles are passed through the holes of the retractor. They are either
2. pulled out of the 6cm incision or,
3. passed through the skin of the chest before they are clamped to hold the plate in place. If they are pulled through the skin of the chest, each hole is less than 1mm so it does not cause any wound that needs to be stitched later.

**CURRENT METHOD:**

**Two incisions, four portholes**

**ATRIAL RETRACTOR**

Device with three large articulated arms holds the incision in the heart open for the surgeon to reach the valves inside. It is clamped to prevent movement.

**AORTIC CROSS CLAMPS**

This clamps the aorta to stop the flow of blood. Its handles protrude from the body.

**CARBON DIOXIDE AND SUCTION TUBES**

Carbon dioxide, which is denser than air, is pumped around the heart to prevent air from entering the bloodstream. An air bubble trapped in a blood vessel can block an artery and cause a stroke or heart attack. Blood is constantly sucked out to keep the surgical view clear for the surgeon.

**FEMORAL INCISION**

Through this 3 to 4cm incision, tubes are inserted into the femoral vein and femoral artery and connected to the heart-lung machine during surgery. After surgery is completed, the vessels and incision are stitched closed.
International accreditation for NCIS/NUH stem cell programme is Asia’s first; NCIS introduces outpatient service.

The hematopoietic stem cell transplantation (HSCT) programme at the National University Cancer Institute, Singapore (NCIS) and the National University Hospital (NUH) has received accreditation from the Foundation for the Accreditation of Cellular Therapy (FACT) at the University of Nebraska Medical Center. This internationally-recognised gold standard demonstrates the National University Health System’s commitment to patient care and indicates that it has met the most rigorous standards in every aspect of stem cell therapy. This includes every part of the process, from clinical care to donor management, cell collection, cell processing, cell storage and banking, cell transportation, cell administration, cell selection and cell release.

It’s an accreditation that took years of hard work and preparation. The process began in late 2009, with the appointment of a tripartite team at NUH that included adult and paediatric teams and the laboratory workgroup. Over 1,300 FACT standards had to be met, and almost 200 standard operating procedures had to be drawn up and maintained. Physicians, nurses and healthcare workers were specially trained, and a quality management health care plan was implemented to ensure quality patient care and maintain high safety standards.

The HSCT programme at NCIS/NUH is one of the largest in Singapore, with about 60 to 65 transplants performed each year. It is the only comprehensive centre in Singapore that can treat both adult and paediatric patients at one site, while being fully supported by having all medical and surgical specialities in one hospital.

New stem cell transplant outpatient service lets patients recover at home

An example of the rigorous standards maintained and recognised by FACT is the outpatient service that has transformed the way stem cell transplant work is done at
“The decision to acquire FACT accreditation was made because the transplant team saw the need to establish a self-regulatory process and to meet international accreditation for a quality health care management system in stem cell transplant care and practices.”

Dr Tan Lip Kun, Programme Director, HSCT Programme and Senior Consultant, Department of Haematology-Oncology, NCIS
Senior Consultant, Department of Laboratory Medicine, NUH

“The decision to acquire FACT accreditation was made because the transplant team saw the need to establish a self-regulatory process and to meet international accreditation for a quality health care management system in stem cell transplant care and practices.”

“The decision to acquire FACT accreditation was made because the transplant team saw the need to establish a self-regulatory process and to meet international accreditation for a quality health care management system in stem cell transplant care and practices.”

“Accreditation is the capstone of our bone marrow transplant programme, signifying our commitment to a high quality of care in the delivery of transplants, continuous research into novel therapies and holistic support for our patients through support groups and awareness programmes.”

Prof John Wong, Deputy Chief Executive, NUHS
Director, NCIS

“Being FACT accredited not only endorses the quality of our cellular therapy treatment, it allows us to benchmark against the best and highest global standards of care for our young patients.”

A/Prof Quah Thuan Chong, Head, Division of Paediatric Haematology-Oncology, Department of Paediatrics, Khoo Teck Puat-National University Children’s Medical Institute

NCIS, and which allows its cancer patients to recover from an autologous stem cell transplant in the comfort of their homes. Pre-transplant preparations, the transplant itself, and follow-up monitoring and care are now performed as day procedures in specially-designated isolation rooms at the cancer centre, which eliminates the need for a routine hospital stay. Patients continue to enjoy the same standard of care, treatment protocol and recovery time as inpatient transplant patients, while saving up to $18,000 in treatment costs and hospital fees.

The outpatient autologous stem cell transplant service is currently offered only to multiple myeloma patients as their treatment regimen and recovery are more predictable, said Associate Professor Chng Wee Joo, Head and Senior Consultant, Division of Haematology, Department of Haematology-Oncology, NCIS. Patients are assessed and carefully selected before they are offered the option of an outpatient transplant, added A/Prof Chng. They must have a committed caregiver, a good support system at home, be able to come for daily reviews and be able to comply with instructions for post-transplant care.

Because patient safety is of paramount importance, clinics have extended operating hours and outpatient transplant patients will have access to their transplant physician, a haematologist and BMT nurse coordinators, as well.

The team behind the NCIS/NUH’s successful FACT accreditation.
Breathing better

New treatment uses heat to give asthmatics relief.

 BREATHING, TIGHTNESS and difficulty in breathing — these are all symptoms of asthma, a common disease that affects one in every five children and one in every 20 adults in Singapore. Left untreated, asthma can be fatal, and approximately 50 Singaporeans die from this chronic ailment every year.

In an Asia-Pacific first, the National University Hospital (NUH) now offers a new non-drug treatment for severe asthmatics. Known as bronchial thermoplasty, this novel procedure is a minimally-invasive therapy that complements current medications.

During an asthma attack, the lining of the airways become inflamed, the smooth muscles in the airway walls go into spasm and thick mucus is produced, clogging up the airways. Conventional treatments usually combine a bronchodilator (the commonly seen inhaler) with oral steroids, which, in the long term, may produce negative side effects such as high blood pressure, diabetes, increased risk of infection and osteoporosis.

In place of drugs to reduce inflammation, the new bronchial thermoplasty procedure uses heat. It is applied via the nose or mouth to the patient’s lungs to reduce the smooth muscle mass constricting the airway. It’s a simple procedure that lasts only 30 minutes, and only three visits — each treatment targeting a different lobe of the lungs — are required.

“Bronchial thermoplasty is the first non-drug treatment for asthma. While it is not indicated for all asthmatics, it is a good option to complement current therapy for those with severe asthma who continue to experience symptoms that affect their daily lives,” says Associate Professor Lee Pyng, Senior Consultant with the Division of Respiratory and Critical Care Medicine at NUH.

Clinical studies overseas have shown that patients who undergo the treatment experience fewer asthma attacks and enjoy an improved quality of life. What’s more, they need their inhalers less often and no longer need to be on oral steroids.
ADAM JOAN LIM* (not her real name) used to be tormented by nightly visions of people she did not know. The 73-year old became so terrified she would only go to sleep in the day. Her erratic behavior became hard to cope with — she would have drastic mood swings and become extremely agitated, hold conversations with imaginary people, pinch the domestic helper and tear off her own clothes. Soon, the stress of caring for her got to her daughter and the helper.

Mdm Lim, a former hair stylist, had a particular form of dementia that could not be treated with existing medication because those could make her condition worse. At the end of their tether, her family considered placing her in a nursing home. But then, a visit to the NUH early this year threw up a lifeline.

Since last year (2012), dementia and depression care at the NUH have been streamlined and brought together under an initiative called the NUH Ageing Medicine Psychological Care Programme (NUH-AMPCP), a collaborative, multidisciplinary team-based approach that ensures that from hospital to home, patients get all the care they need — and in the easiest possible way.

Centralised team-based care
Since its inception, the team has worked on enhancing the services at the hospital’s Memory Clinic. The clinic now brings together specialists from three disciplines (Geriatrics, Psychiatry and Neurology) as well as Allied Health Professionals (such as clinical psychologists, occupational therapists and physiotherapists). With this arrangement, instead of multiple visits spanning weeks or months that a patient might previously have had to make to different specialists, he or she now just needs to visit the hospital fewer times — for various tests and counseling advice. This lessens the odds of an elderly patient forgetting or choosing to skip appointments.

“If possible, we try as much to do all the assessments on the same day, and get the patient to see all the necessary doctors and specialists. This means that by the second or third visit, the family gets a proper diagnosis and care plans can be discussed,” explains Associate Professor Rathi Mahendran, Programme Director of the NUH-AMPCP.

The hospital also provides enhanced services...
through their geriatrics clinics where patients with dementia and behavioural symptoms are followed up by Agency for Integrated Care coordinators to ensure home safety, assist patients in medicine reconciliation, provide aids to promote independence, right site them and provide caregiver counseling. The hospital also has a NMRC-funded Memory, Aging and Cognition Centre that is performing research studies on better ways of screening, assessing, diagnosing and treating patients. Clinical Psychology is also a key component in the assessment and management of memory and other cognitive disorders which are prevalent in the elderly. Clinical psychologists at the NUH have been playing a significant role in the neuropsychological assessments, leading to earlier diagnosis and better clinical management.

The NUH-AMPCP also includes a Community Outreach Programme to ensure that the right care can continue at home for those who do not require hospitalisation or who have been discharged. Health care professionals equip caregivers with skills to take care of the patient at home.

In Mdm Lim’s case, a case manager from a community psychiatry team called Golden Race (G-Race) and headed by Dr Chris Tsoi of the Psychological Medicine department, called on her soon after she was discharged to see how she was coping at home. Finding that the elderly woman had few activities to engage her during the day, the case manager and occupational therapist designed an activity schedule for her, taking into consideration what she used to enjoy before her illness. They discovered that Mdm Lim enjoyed music and singing, so these were incorporated into her schedule along with some arts and craft activities.

The domestic helper was also trained in techniques that would improve her care and interaction with Mdm Lim. This includes knowing how to distract Mdm Lim when she became too agitated and diverting her to activities that she enjoys. Arrangements were also made for Mdm Lim to attend a dementia day care centre once a week. The situation at home improved and Mdm Lim’s hospital visits declined. The case manager, who is part of the G-RACE team that includes psychiatrists, nurses, occupational therapists and psychologists, monitors her case and updates the team weekly.

“The important thing is to come forward for help early.”

A/Prof Rathi Mahendran, Program Director of the NUH-AMPCP
A SEVERELY ILL PATIENT undergoes a critical X-ray. Within a minute of the results, the doctor’s mobile phone alerts him to the findings. Within 10 minutes, the system identifies a response that could make the difference between life and death.

The Critical Lab Results Alert System pulls data and information from various IT applications in place at the National University Hospital (NUH), and uses the hospital’s messaging system to keep attending doctors in the loop. If a doctor does not acknowledge an alert within 10 minutes, the critical results dashboard in the lab and call centre keeps staff updated on all outstanding notifications and human intervention is initiated.

An average of 1,500 such SMS notifications go out each month.

In 2012, the NUH team behind the system, led by Associate Professor Sophia Ang, Vice-Chairman of the Medical Board (Safety), won the National Clinical Excellence Team Award at the National Medical Excellence Awards.

Work on the system began in 2006 and it was first implemented at NUH in 2008. It has since grown to include a greater variety of testing capabilities, including microbiological tests and radiology results. The system is supplemented by a real-time dashboard and call centre which provides moment-to-moment updates on closing the loop of critical results.

The system was named one of the Top 10 game-changers in Pathology in 2011 by leading medical resource site Medscape after an article on the evolution of the system was published by the American Journal of Clinical Pathology. It also appeared in the British Medical Journal of
Quality and Safety where it was named the Editor’s Choice article of August 2012. The NUH is one of the first hospitals in the world to effectively deploy the system on an enterprise-wide scale, and it has shared the technology with Alexandra Hospital, Tan Tock Seng Hospital and Khoo Teck Puat Hospital.

“It points to how time is of the essence in the treatment and management of critical illnesses,” explains cardiologist and team member Associate Professor James Yip, who oversees the implementation of clinical IT at the NUH. The project has managed to ensure, with practically 100 per cent certainty, that doctors are informed of their patients’ critical test results within an hour. One hour is the recommended response time laid down by the Ministry of Health.

At the NUH, the average amount of time that lapses between the delivery of test results and a response from the doctor is 21 minutes — down from 109 minutes before the implementation of the Critical Lab Results Alert System.

But this is not the only way technology has been harnessed to help improve patient safety. The hospital also has a Clinical Decision Support System which guides and supports drug safety initiatives. In the dispensing of medication, for instance, this has allowed the hospital to bring down its reported medication-related errors by 44 per cent since 2009.

It also has an Electronic Medication Administration System (EMARS) in which nurses use a personal digital assistant to scan both the patient’s barcode wrist tags and the drugs being issued, preventing medication mix-ups. A system like this is crucial given that the hospital administers some 925,000 medication servings a month.

“The computers flag — in real time — when errors have been made, for instance, the wrong medication, the wrong patient, the wrong dose or a duplication,” says A/Prof Yip. “This system also works asynchronously with a Clinical Decision Support System, which works in tandem with a pharmacist’s review because it also looks at a patient’s lab results, and tracks it on a day-to-day basis to see how a patient’s condition might have changed, based on blood test results,” he explains. An alert might go out if a patient could be allergic or a drug is incompatible with a lab result, or his or her age. This alert can stop the order at the point of entry, preventing harm before it occurs.

Some 98 per cent of such alerts fired off were accurate, and 99 per cent of alerts saw action being taken within a day, says A/Prof Yip. The system has sliced the number of preventable drug allergy reactions down to zero, from about 20 in 2008 in an inpatient setting.

Technology has also given the hospital’s award-winning electronic medical records system, called the Computerised Patient Support System (CPSS), a boost. The system was built from scratch back in 1998 and since then, its use has spread to other local hospitals and polyclinics from its beginnings in the NUH. CPSS offers an integrated view of patient data from multiple source systems such as X-rays, laboratory results, surgical operating notes, discharge summaries, clinical results and reports. In 2003, CPSS was named the winner in the IT category of the Asian Hospital Management Awards.

The hospital launched a new version of the CPSS in September in 2012. The new system allows paperless documentation, which means that notes can be entered by a variety of means including keyboard, scanning, tablets and digital pens. All patient records are also backed up in multiple ways so care can continue in the event of a downtime. It also has a new integrated page called the Patient Summary Page, which has all the patient’s conditions, treatment history, test results and medications summarised on a single screen. The new version has already been implemented at the NUH’s outpatient clinics, and will be rolled out to inpatient setting.

Next on the cards is a system that could allow a doctor to draw on “clinical predictive analytics” to gauge the chances of something going wrong and practicing “proactive medicine”. This will allow the system to track markers indicating that the patient’s condition could take a turn for the worse.

Ultimately, medical technology means better care and outcomes for NUH patients. “While the human element is also important, technology has helped doctors prioritise their work and improve patient safety by closing all the loops,” says A/Prof Yip.

“TECHNOLOGY HAS HELPED DOCTORS PRIORITISE THEIR WORK AND IMPROVE PATIENT SAFETY BY CLOSING ALL THE LOOPS.”

A/Prof James Yip, Chief Medical Information Officer, NUHS
FLAT FEET IN CHILDREN CAN NOW BE CORRECTED BY DAY SURGERY

Children as young as eight can now benefit from a procedure to correct flat feet, known as subtalar arthroereis. Done as a day surgical procedure, this operation had previously been used to treat degenerative flat feet in adults. The procedure, which does not involve any cuts to the bone or joint fusions, is associated with rapid recovery and little post-op pain. To date, NUH surgeons have corrected the feet of four children. “As a child’s bones are still growing, this allows correction of flat feet with a relatively simple procedure. This means the children can be spared the pain and swelling, have a normal childhood and be able to enjoy sports like their peers,” said Dr Tan Ken Jin, Consultant, Division of Foot and Ankle Surgery, University Orthopaedics, Hand & Reconstructive Microsurgery Cluster, National University Hospital.

FIRST ‘HOME-AWAY-FROM-HOME’ FOR FAMILIES WITH SICK CHILDREN IN SINGAPORE

Families with sick children in Singapore now have their very own Ronald McDonald House (RMH), which opened last year at the NUH. Named RMH@NUH, the 24-hour facility is only the 10th in the world to be built within a hospital. Staffed and managed by Ronald McDonald House Charities (RMHC) Singapore and established in partnership with the NUH, RMH@NUH can house up to four families at a time. It is primarily for use by parents with a child in intensive care, with cancer, trauma or undergoing organ transplants.

With RMH just steps from the NUH’s ICU and paediatric wards, the new facility goes a long way in reducing the burden on parents, so they can focus on caring for their child, said Associate Professor Daniel Goh, Head of the Department of Paediatrics at NUH. “Helping a child to heal faster goes beyond meeting the medical needs. We want to play a bigger role by taking care of their emotional needs, too.”
MAJOR MILESTONES
2012 marked a year of major milestones reached by three departments — Paediatrics, Obstetrics & Gynaecology and Orthopaedics Surgery.

The Paediatrics department capped 50 successful years with a celebration in 2012. In the same year, in honour of the department’s founding father Emeritus Professor Wong Hock Boon, the NUH set up an annual international symposium in his name — the Wong Hock Boon Masterclass Series. Paediatrics at the NUH has made many great strides over the years and has many ambitious plans in the works, including a new child-friendly and family-centred ambulatory facility by 2016.

The Obstetrics & Gynaecology department marked its 90th anniversary as a teaching unit of the NUS Yong Loo Lin School of Medicine with the inaugural University Congress of Obstetrics & Gynaecology. This was a three-day international event held in Singapore to showcase advances in the field, with plenary and keynote speeches by world-renowned pioneers.

The Department of Orthopaedics Surgery celebrated its 60th anniversary, with the inaugural Annual Charity Run in December to raise money for the NUHS Fund, which assists needy patients. This caps a year of excellence in research and clinical care that included a 365-patient study of stem cell therapy for damaged knees over a 10 year period.

MEDICAL CENTRE TOPPING UP CEREMONY
The topping-up ceremony for the new NUH Medical Centre was held in October 2012 with Minister Gan Kim Yong as the Guest-of-Honour.

FIRST SUTURELESS AORTIC VALVE IMPLANT IN SINGAPORE
A 65 year-old man with symptomatic aortic stenosis was the first Singapore recipient of the Sorin Perceval sutureless aortic valve in August 2012, thanks to the efforts of Dr Kristine Teoh. She worked together with Associate Professor Theodoros Kofidis, who has performed two more operations using this valve since, making a total of three cases in NUHCS so far.

This new form of surgery takes just a few simple steps, requires no stitches and results in a much shorter operating time. All three patients have since made straightforward recoveries.

RENAL DENERVATION THERAPY AT THE NATIONAL UNIVERSITY HEART CENTRE, SINGAPORE
The Renal Denervation Therapy programme was started by the NUHCS in February 2013. With funding from the Health Services Development Programme (Ministry of Health), the programme was set up to make the treatment available to patients with resistant hypertension.

THE NUH WINS ASIAN HOSPITAL MANAGEMENT AWARD 2012
“Discharge failures”, where patients are readmitted to hospital within a short period, had become a rising trend at the NUH, with 30-day readmission rates higher than average. Dr Raymond Wong and his team from the cardiology department sought to reverse this trend and implemented a Clinical Practice Improvement Programme.

The resultant improvement culminated in the first runner-up prize at the Asian Hospital Management Awards 2012. The team hopes to continue to tweak the workflow to enhance patient care at the NUH, especially for those at high risk of discharge failure for heart conditions.
NEW DIVISION OF SURGICAL ONCOLOGY

The NCIS has formed a new Division of Surgical Oncology and appointed Associate Professor Agasthian Thirugnanam as head with effect from 1 July 2012. The new division will drive and coordinate all surgical oncological services at the NCIS and the NUH, and will also serve as a national and regional centre for complex and rare cancer surgeries. The division will be staffed by senior surgeons together with national experts in medical and radiation oncology. They will provide a holistic and multidisciplinary one-stop facility that will improve overall survival and long-term outcomes for cancer patients.

NEW CANCER EDUCATION INITIATIVE

The European Society for Medical Oncology (ESMO), the National Cancer Centre Singapore (NCCS) and the NCIS have launched a joint education initiative for cancer doctors in Singapore as the incidence of colorectal cancer cases and deaths continues to rise in Asia. The ESMO-Asia CME Program for Colorectal Cancer will establish a new, world-class medical education platform between ESMO and 35 regional cancer centres and hospitals, giving cancer doctors access to the latest scientific knowledge and information on patient-centric care strategies. A long-term education initiative, the programme will offer a unique “East-meets-West” platform for knowledge-sharing and collaboration among oncology professionals from both Europe and Asia, with the aim of improving care for colorectal cancer patients at every stage of treatment.

INAUGURAL SINGAPORE CHEST TRAUMA COURSE LAUNCHED

In response to the growing need for chest trauma expertise in arenas outside of hospitals, Dr Jimmy Hon, Consultant, Department of Cardiac, Thoracic and Vascular Surgery, NUHCS, launched the first Singapore Chest Trauma Course last year. Designed for non-cardiothoracic trained trauma surgeons, the course was conducted by faculty from Singapore and the United Kingdom, and gave participants an extraordinary education in thoracic trauma intervention.

The international and local experts included Surgeon Captain Mark Midwinter, a veteran of the former Yugoslavia, Iraq and Afghanistan conflicts and Defence Professor of Surgery in the United Kingdom, together with Associate Professors Agasthian Thirugnanam and Peter Robless, and Drs Jimmy Hon and Atasha Asmat.

MITRAL VALVE REPAIR WITH ENDO-BALLOON

Heart valve specialist, Professor Frank van Praet, came to the NUH last year to teach surgeons on the use of a special minimally-invasive surgical device known as the Endo-Balloon. NUHCS cardiac surgeon, Associate Professor Theodoros Kofidis, has successfully deployed the Endo-Balloon in three minimally-invasive procedures so far, and hopes to continue to use it to facilitate safe and efficient cardiac procedures in the future.

The NUH is the first hospital in Singapore to use the new Endo-Balloon device called IntraClude, which is used primarily in mitral valve repair procedures. The use of the new device allows surgeons to avoid external aortic cross-clamping, and helps to stop the heart during surgery in a gentle and controllable manner that requires no extra incisions or sutures — and results in a shorter operation with a faster recovery.
WORLD CANCER DAY
CAMPAIGN LAUNCHED

The Singapore Cancer Society (SCS) and NCIS kicked off a year-long cancer awareness campaign, beginning with celebrations on 2 February 2013 to mark World Cancer Day. The year-long campaign will feature events and activities that will raise and strengthen public awareness of the importance of screening for colorectal, cervical and breast cancers. In addition, public symposiums for other cancers such as ovarian, head and neck and lung cancers will be held.

Through these, the two organisations aim to drive home the message that cancer can be prevented through a healthy lifestyle as well as avoidance of risk factors. The campaign kicked off with a family carnival at West Coast Park. It was launched by Associate Professor Muhammad Faishal Ibrahim, Parliamentary Secretary, Ministry of Health.

JURONG HEALTH AND NCIS SIGN MOU

January 2013 saw the signing of a Memorandum of Understanding (MOU) between Jurong Health Services and the NCIS, dedicated to taking cancer care to the next level. This collaboration will improve the oncology-related services on offer when the Ng Teng Fong General Hospital opens in 2014. Known also as the Western Cancer Action Network (WCAN), it will closely mirror the multi-disciplinary care model at NCIS clinics.

This means that residents of western Singapore will be served by a comprehensive cancer care service that combines the resources and medical expertise of two major public health groups. This combined approach will provide a single, unified service that encompasses the conduct and management of screening, detection, treatment and recovery from cancer.

FUDAN UNIVERSITY’S SHANGHAI CANCER CENTRE AND NCIS SIGN MOU

In order to promote joint research and development activities, Fudan University’s Shanghai Cancer Centre and the NCIS signed an MOU in November 2012 to cooperate extensively in the areas of medical oncology, radiation oncology, oncology nursing and radiation therapy through training programmes, staff attachments and joint seminars.

The MOU also aims to leverage each institution’s clinical expertise and experience and identify opportunities to promote a two-way exchange of medical and para-medical staff. Both institutions will also organise and participate in joint education and research activities, including Continuing Medical Education programmes.

MULTIPLE MYELOMA SEMINAR 2012

Thirty participants from around the region gathered for a two-day Multiple Myeloma Seminar led by Associate Professor Chng Wee Joo, Senior Consultant, Haematology-Oncology, National University Cancer Institute, Singapore (NCIS). The seminar included a tour of the NCIS and the research laboratories. With lectures focused on new insights into multiple myeloma and related disorders, participants learned about various topics such as pathogenesis and prognostic factors of multiple myeloma, as well as novel drugs that can be used in its treatment. Doctors from various ASEAN countries also shared interesting case studies for discussion.
Meanwhile, NUS’ Dr Paul Macary and team find an antibody that can destroy the deadly virus.

**DENGUE FEVER** is a disease that can strike anyone, from babies to the elderly and everyone in between. This mosquito-borne illness can make a patient ill for weeks at a time with symptoms that include a high temperature, severe body aches and extreme fatigue.

This year, Singapore experienced one of its worst-ever dengue epidemics, with some 10,000 people infected just in the first half of 2013 alone.

According to the World Health Organization, dengue is the world’s fastest-spreading disease, with 390 million people infected each year and up to 2.5 billion people at risk of contracting it. While the disease isn’t usually fatal, it can lead to dengue haemorrhagic fever which results in low levels of blood platelets and thus severe bleeding, blood plasma leakage, and occasionally, death through dengue shock syndrome.

So far in Singapore, six people have died.

At present, there isn’t a dengue vaccine available although a combined research team from the National University of Singapore’s Yong Loo Lin School of Medicine, Duke-NUS Graduate Medical School, and the Defence Medical and Environmental Research Institute at DSO National Laboratories (DMERI@DSO) is working to change that.

**DEN-1 antibody found**

Funded by the Singapore National Research Foundation under NRF Fellowship, the National Medical Research Council and DR Tech, and led by principal investigator Associate Professor Paul Macary of NUS Yong Loo Lin School of Medicine’s Department of Microbiology, a team...
of scientists in Singapore has uncovered a human antibody that can neutralise and kill the dengue virus within two hours. What’s more, the team has solved the problem of reproducing the antibody in sufficiently large quantities, thus opening the door to a possible cure for this deadly disease.

“We knew the antibody existed based on the fact that most patients recover naturally from dengue infection, but the chance of finding it was like finding a needle in a haystack. We are very encouraged by this breakthrough,” says A/Prof Macary.

“This represents the best candidate for therapy that currently exists for dengue, and is likely to be the first step in treating infected patients as there is currently no specific medicine or antibiotic to take.”

This newly-discovered antibody specifically treats DEN-1, which is one of the four strains (known as serotypes) of dengue virus. Infection with one dengue serotype only confers lifelong immunity to that particular serotype, and only partial — and temporary — protection against the rest. DEN-1 accounts for up to 50 per cent of the dengue cases in Singapore and the ASEAN region, although the dominant serotype here changes from time to time — which is the cause behind dengue outbreaks. The other three serotypes, DEN-2, DEN-3 and DEN-4, are more prevalent in other areas of the world.

Dr Brendon Hanson, Head of the Bio-Defence Therapeutics Lab at DMERI@DSO, says of the possible cure, “Being a completely human antibody, it is likely to have no serious side effects and this makes not only this antibody, but the approach we took to isolate antibodies from recovered patients, an attractive one.”

The search goes on
Since their exciting discovery in June 2012, A/Prof Macary’s team has discovered the antibody for DEN-2 as well, and work on the remaining two serotypes is underway. The hope is that all the antibodies can be combined in the near future to produce a therapy that can treat every serotype and possibly cure the disease in people, says Assistant Professor Lok Shee-Mei of the Duke-NUS Graduate Medical School.

The next step for the team is to embark on clinical trials, which the team hopes will begin in 2014.

A/Prof Macary hopes that a therapy will be available within the next six to eight years following the trials.
Armed with a S$9 million Translational and Clinical Research grant, National University Heart Centre, Singapore doctors are on their way to finding out which background factors are linked to the development of heart disease.
If you are middle-aged, you stand a statistical one-in-five chance of developing heart failure at some point later in your life. Heart failure — a condition in which the heart simply cannot pump enough blood through the body to meet its needs — is the final stage in myriad cardiovascular diseases. It is a rapidly-growing problem in Asia, due to lifestyle changes such as being more sedentary and eating more processed food. Rising rates of smoking, diabetes and obesity have also contributed to the growing burden of heart failure in Asian healthcare.

In Singapore, the incidence of heart failure has risen 40 per cent over the past decade, and it is the most common heart-related cause of hospitalisation. Even with modern medical advances, only one in three patients with heart failure can expect to survive for five more years. Heart transplants, which are a possible solution, are only available to a very small minority of patients.

There are two types of heart failure. Heart Failure with Preserved Ejection Fraction (HFPEF) occurs when a patient has a small, stiff heart that can still pump with reasonable strength, but fills poorly. This occurs in about 30 to 50 per cent of patients. Heart Failure with Reduced Ejection Fraction (HFREF) occurs when a patient has an enlarged heart that pumps weakly.

Yet, research has not been able to conclusively identify which background factors are associated with the development of either type. However, some scientists think there is a genetic link to the type of heart failure that a sufferer exhibits, Professor Mark Richards is one of these scientists, and he wants to know more.

Five years, 5,000 hearts

Thanks to a $9 million Translational and Clinical Research grant, Lead Principal Investigator Prof Richards (along with theme principal investigators Associate Professor Liu Jianjun, Professor Kandiah Jeyaseelan and Professor Colin Stewart) have been given five years to probe this issue, with help from team members from the National University Heart Centre, Singapore (NUHCS), the Genome Institute of Singapore (GIS), the Department of Biochemistry at the NUS Yong Loo Lin School of Medicine and the Institute of Medical Biology (IMB).

“This study will be distinct in a number of ways,” Prof Richards explains. “It will have an Asian background and it will study a big number of people, which gives us a good chance of making a genuine finding, as opposed to previous studies on heart failure.”

The team hopes to recruit 5,000 to 8,000
patients with heart failure. In the research, cardiac ultrasound scans will be used to measure changes in heart function and determine if there is any relation to genetic variation. This data will be compared with GIS data on patients with healthy hearts.

The team is looking to “borrow the DNA data to use as a control,” says A/Prof Liu. “It will be a baseline that will let us see if there are any differences.”

What makes the study unique is not just its magnitude, but also the depth of the genetic profile being pursued. “To study the whole genome — this has not been done before,” he says.

For Prof Richards, head of the Cardiovascular Research Institute at the NUHCS, the breadth and scope of the study shows the benefits of cooperation between researchers with different interests and areas of expertise. “It’s a good illustration of the need for partnership in these studies,” he says. “It’s a marriage of clinical need with technical expertise.”

The team also hopes to investigate the use of microRNAs — small snippets of genetic material that help regulate gene expression — as potential biomarkers to diagnose heart failure. Success on both of these fronts means that they might be able to find more effective, targeted treatments for heart failure in the future. As Prof Richards says: “Treating a particular patient the way a particular patient should be treated — it’s the way of the future!”

TREATING A PARTICULAR PATIENT THE WAY A PARTICULAR PATIENT SHOULD BE TREATED — IT’S THE WAY OF THE FUTURE!”

Prof Mark Richards, Lead Principal Investigator

From building a biobank to conducting Asia’s largest-ever heart failure study, NUHS doctors and scientists are learning more about what keeps Asian hearts ticking.

Huge study first of its kind

NUHS doctors are leading a large-scale study to determine the incidence of sudden death in Asian patients with heart failure. The five-year study focuses specifically on heart failure in 5,000 patients across the Asia-Pacific and is the first of its kind in the region. It is being led by Associate Professor Carolyn Lam of the National University Heart Centre, Singapore (NUHCS). The study will gather and analyse data from 10 countries across Asia to look at sudden cardiac death due to heart failure.

THE IMPACT OF ETHNICITY AND CULTURE

Not only are there regional and international variations in the incidence of heart failure, but researchers now think that socio-cultural practices might also have an impact on disease management. Doctors at NUHCS examined the impact of the Muslim month of Ramadan and the Chinese Hungry Ghost month on heart failure hospitalisation rates within Singapore, looking at a total of 7,999 admissions. They discovered lower admission rates among people of Chinese origin during the Hungry Ghost month and lower admission rates among Malays during Ramadan. This is due to the

Learning more about Asian hearts

JOURNEYS
THE TEAM

PROFESSOR MARK RICHARDS
A graduate from the University of Otago in New Zealand, Prof Mark Richards trained in cardiology in New Zealand and the United Kingdom. He has held clinical responsibilities in cardiology for over 25 years, and for many years also worked alongside basic scientists in researching new biochemical pathways in heart failure. Prof Richards has directed the Cardiovascular Research Institute (CVRI) of the National University Heart Centre, Singapore, since October 2009. For the past 20 years, Prof Richards has also been heading a multi-disciplinary translational cardiovascular research group in the Christchurch Heart Institute, University of Otago, Christchurch, New Zealand.

ASSOCIATE PROFESSOR LIU JIANJUN
A/Prof Liu Jianjun is Senior Group Leader for Human Genetics in the Genome Institute of Singapore (GIS). He gained his PhD in quantitative genetics at Duke University in the United States, and has held scientific appointments in New York and subsequently in Singapore, with positions in NUS, NTU and GIS over the last 10 years. A/Prof Liu and his team will investigate the genetic variation influencing the onset and evolution of heart failure.

PROFESSOR KANDIAH JEYASEELAN
Prof Kandiah Jeyaseelan, Professor, Department of Biochemistry, at the NUS Yong Loo Lin School of Medicine, obtained his PhD and DSc in Molecular Biology from the University of Sheffield, England. He is also a Chartered Biologist and a Fellow of the Society of Biology London. He also holds an Adjunct Professorship at Monash University in Australia and has been working closely with Prof Richards on microRNAs in heart diseases. For this study, he will be developing microRNAs as novel biomarkers for early diagnosis and possibly as new therapeutic agents for cardiovascular diseases.

PROFESSOR COLIN L STEWART
Senior Principal Investigator and Assistant Director at the Institute of Medical Biology, Prof Stewart holds a PhD from the University of Oxford, United Kingdom, and has held scientific posts in prestigious institutions in Germany and the United States. He has pioneered many techniques and made pivotal discoveries in stem cell and gene science.

OTHER COLLEAGUES
In this run of the grant, Prof Richards will also be joined by clinical colleagues from NUHS — A/Prof Carolyn Lam, A/Prof Ling Lieng Hsi and Dr Mark Chan. They provide essential input into the management of patients with heart failure, serious heart valve disease and coronary artery disease. Dr Roger Foo, who has recently joined the CVRI, will also share his special knowledge in the epigenetics of human heart failure to potentially develop gene-targeted treatments.

tendency of superstitious Chinese to avoid hospital admissions during this month, and improved dietary habits among Malays during the fasting month. In light of this, researchers suggest that future heart failure management strategies should take into account socio-cultural factors, especially in Asia.

BUILDING A BIOBANK
Scientists studying cardiovascular disease need access to blood and tissue to conduct their research. Having quick access to blood specimens allows researchers to rapidly find new disease markers without having to enrol patients from scratch. Access to existing tissue specimens means scientists can grow more tissue from the specimen, allowing them to test new drugs without harming the patient himself. At the Cardiovascular Research Institute, scientists have been carefully collecting, preserving and storing blood, blood cells, parts of diseased blood vessels and heart valves donated from NUH patients. Three years after its inception, more than 3,000 patients have donated blood and more than 2,100 have donated blood and tissue.
ANY DOCTORS HAVE encountered patients whose suffering affects them so profoundly that they dedicate their careers to finding a cure or a solution to those diseases. Dr Ruby Huang, a senior fellow at the National University of Singapore’s (NUS) Cancer Science Institute (CSI) and Department of Obstetrics & Gynaecology, is one such doctor.

After witnessing first-hand the pain of one patient and her family, Dr Huang made the search for a cure for epithelial ovarian cancer the focal point of her career. And last year, her team, under the leadership of CSI’s Professor Jean-Paul Thiery, savoured a breakthrough when they uncovered the five different subtypes of ovarian cancer — a discovery that sets them on the path to effectively treating patients of each type.

Ovarian cancer is a deadly disease with grim statistics: some 70 per cent of women who contract it eventually die from it. As no screening test exists for this form of cancer and many patients do not know they have the disease, it often escapes detection until it is too late.

Additionally, research into the disease lags behind that of breast cancer — about one decade behind, in Dr Huang’s estimation. The current treatment regime reflects this.

Although there are five subtypes, there is but one method of treatment available: surgery to remove the cancerous tissue, followed by administering the same drugs for chemotherapy, which often has adverse effects on the entire body.

This lack of truly effective treatment is the reason Dr Huang, 39, has spent the past 10 years in ovarian cancer research.

A patient’s plight
Taiwan-born Dr Huang got her medical degree at the National Taiwan University in Taipei. While in her second year of residency training, she spent three months on gynaecological
oncology rotation. During this time she got to know a patient with ovarian cancer who would impact her life.

This patient was a successful woman in her early 30s who, hoping to start a family, had gone to the doctor for fertility treatment. Instead, she was told that she had advanced ovarian cancer.

She was given chemotherapy but the cancer — which started in the lining of the ovaries — had spread to some of her internal organs. Her intestines and much of her reproductive system were affected, so she had to have her uterus and a large section of her bowels removed.

The young Dr Huang got to know the patient soon after this. Finding herself drawn to personally care for the patient, she would spend nearly every evening after her rounds cleaning the patient’s stoma. Needless to say, cleaning a permanently open wound from which waste passes — in the absence of a working lower intestine — was arduous and painful for both parties.

Through these long care sessions, both doctor and patient discovered they had many things in common, including a love for movies and fine dining — although talking about food was poignant for the patient, being by then unable to eat.

“She was like a big sister to me,” Dr Huang says.

When Dr Huang’s gynaec-oncology rotation was over, she moved to another posting — but not before seeing how devastating ovarian cancer could be. The patient was desperate. Dr Huang recalls, “She kept asking me, ‘Is there any other possible way to treat this disease?’ She was willing to try even untested treatments. I thought, there must be some way to help her.”

But this proved not to be the case, as Dr Huang recounts. “How would I ever know if there were other options? If my professors and seniors couldn’t think of any better ways to help, how could I? I felt helpless.” The patient spent the next year in and out of hospital before dying a year after Dr Huang first met her.

“Seeing her parents cry was extremely hard... I knew I had to do something.” The then 27-year-old doctor chose to specialise in gynaecological oncology. “I decided to do a PhD, as that would be the only way I would be able to find a more advanced treatment to help patients.”

Research trail led to Singapore

Dr Huang embarked on her doctoral studies at the National Taiwan University in 2004, and graduated in 2008. At a conference in Taiwan, she met Paris-based Professor Thiery, who was conducting research into breast cancer.

When Prof Thiery relocated to Singapore’s Agency for Science, Technology and Research (A*Star) he invited Dr Huang to join him to work on ovarian cancer. Researching however was not always easy, as getting hold of tissue samples was initially a problem and clinicians had to be persuaded to provide access to their patients.

In 2009, the CSI was established and Prof Thiery and Dr Huang moved their ovarian cancer project over to the Institute with Dr Huang herself joining the Department of Obstetrics & Gynaecology. From then on, the team has built a stronger partnership with their clinical partners Associate Professor Mahesh Choolani and Associate Professor Jeffrey Low in NUHS.

Their work led to the discovery last year of the five subtypes of ovarian cancer. This is significant — while the international cancer research community has long known that ovarian cancer is a heterogeneous disease, they didn’t have any weapons to deal with it.

Dr Huang says, “Until recently, doctors had no choice but to treat their patients uniformly. But now, it is becoming clearer to them that you should stratify the patients based on their different characteristics, and then try to find the best strategy to treat them.”

But, she says, “After you identify the five subtypes, the next question to ask is, ‘What about them?’ Right now, all we can do with this information is predict how long a patient has to live, based on what subtype they have. But after that, we have nothing else to offer. Isn’t that disappointing?”

Next — a test kit for ovarian cancer

Global interest in ovarian cancer is growing. For the first time in the organisation’s 100-plus-year history, the American Association for Cancer Research held a symposium dedicated to ovarian cancer in September 2013.

In Singapore, Dr Huang says that more medical students, and even junior college students, are asking about joining in the research effort. She also partners ovarian cancer awareness body Positively Teal to educate and inform Singaporeans about the disease.

Dr Huang and her team of five PhD students, one post-doctoral fellow, three research assistants including Dr Tan Tuan Zea and Mr Miow Qing Hao, the two co-first authors of their subtype study, are continuing their research and hope to build on their breakthrough. “We could develop a diagnostic kit molecularly, to define ovarian cancer. Thus, the next step would have the potential to develop new therapeutic, tailor-made personalised medicines,” says Dr Huang. The team hopes to launch a clinical trial of the diagnostic kits in two to three years’ time.

“It’s taken us five years to develop our ovarian cancer work, from scratch. It’s a long journey that is just beginning. We are not finished yet.”

“I DECIDED TO DO A PHD, AS THAT WOULD BE THE ONLY WAY I WOULD BE ABLE TO FIND A TREATMENT TO HELP PATIENTS.”

Dr Ruby Huang (below), senior fellow at NUS’ Cancer Science Institute and Department of Obstetrics & Gynaecology
RECENT NEW DISCOVERIES GIVE DOCTORS A BETTER UNDERSTANDING OF THE WORKINGS OF THE HUMAN EYE
Tracing the genetics of myopia
Researchers from the NUS Saw Swee Hock School of Public Health have discovered the genes behind super-high myopia, a condition that affects one in seven young Singaporeans.

In collaboration with scientists from institutions such as the Singapore Eye Research Institute, the Genome Institute of Singapore and the Duke-NUS Graduate Medical School, the National University of Singapore (NUS) team compared the genetic data of 5,000 myopic adults and children in Singapore to data from the general population. The study, published in *PLoS (Public Library of Science) Genetics* in 2012, identified several particular locations in a person’s DNA associated with high myopia of 600 degrees or more.

The team hopes to conduct more studies to home in on these genetic variations. By the end of 2013, they expect to have a blueprint of the main genetic variants linked to myopia, after including data from the Consortium of Refractive Error and Myopia (CREAM), an international consortium of 40 studies. The hope is to have a pilot test for high myopia ready within two to three years.

“The idea is to produce a test for several significant genes and combine it with behavioural traits, so we can single out which child will become myopic early and suffer a rapid progression of the condition,” explained Professor Saw Seang Mei of the NUS Saw Swee Hock School of Public Health. If discovered early, intervention with eye drops and special lenses can slow the progress of the condition.

Singapore is the myopia capital of the world — eight in 10 people here are short-sighted by the time they are 18 years old. Short-sightedness, typically caused by an elongated eyeball, is the result of both genes and the environment. Children here spend less time outdoors being exposed to sunlight, which in turn encourages the production of chemicals that prevent the eyeball from becoming elongated. Myopia is caused by an eyeball that is too long, causing light rays (and the image data it contains) to fall in front of the retina.

“With a predictive tool that combines gene tests with environmental factors, we can recommend the treatment for those who need it the most,” said Prof Saw.

And a possible cure for blindness
The well known tale of the “The Three Blind Mice” might soon be just a fantasy as researchers have successfully used an injection of stem cells to restore the vision of laboratory mice.

Dr Mandeep Singh from the National University Hospital (NUH), working together with a team of doctors and researchers from the University of Oxford in the United Kingdom, has pioneered a new technique using stem cell transplantation to reform the retina — a process akin to replacing the film in a camera. The findings were published online earlier in 2013 in *Proceedings of the National Academy of Sciences USA (PNAS)*, one of the world’s top science journals.

While previous stem cell trials managed to replace the pigmented lining of the retina, the new discovery shows that the light-sensing layer can be replaced as well. “We found that if enough cells are transplanted together, they not only become light-sensing but they also regenerate the connections required for meaningful vision,” said Dr Singh.

This has major implications for human sufferers of retinitis pigmentosa, a condition in which light-sensing cells in the retina gradually die, leading to progressive blindness. Explained Professor Robert MacLaren, professor of ophthalmology at the University of Oxford, “All the steps are there for doing this in patients in the future. Our study shows what we could achieve with a cell-based approach.”
A two-pronged approach

Breast cancer is the most common cancer among Singaporean women — but doctors have found new ways to fight the disease.
Cancer is a leading cause of death around the world, accounting for nearly 13 per cent, according to the World Health Organization. Breast cancer has rapidly become one of the top killers of women in Asia, and more than 1,500 new cases of breast cancer are discovered in Singapore every year.

Yet, despite the higher incidence, breast cancer survival rates have improved over the years. In the 19th century, 20-year survival rates were only 10 per cent. The 10-year survival rate for all types of breast cancer has jumped from 25 per cent in the 1940s to more than 75 per cent at present. As researchers learn more about this mysterious disease, they hope to discover newer and better ways of treating it.

Does ethnicity play a part?
In 2011, researchers from the National University of Singapore (NUS) Saw Swee Hock School of Public Health and the University Malaya Medical Centre (UMMC) in Kuala Lumpur conducted the first Southeast-Asian study on the link between ethnicity and breast cancer survival. The findings of the study, published in scientific journal *PLoS ONE* in 2012, showed that there was indeed a link.

Researchers compared survival rates among the two countries’ three main ethnic groups — Chinese, Malay and Indian — from the period 1990-2007. They found that Malay women were often diagnosed at a younger age, had larger tumours and had a more advanced stage of cancer at the point of diagnosis than Chinese and Indian women. Tumours found in Malay women, when controlled for size, were more malignant and aggressive and prone to lymph node involvement. Overall, Malay patients were found to have a substantially increased risk of death compared to Chinese women. Indian women were found to have a moderately increased risk.

“Our research highlights the problem of late diagnosis of breast cancer in Southeast Asia, especially among Malay women,” says Associate Professor Mikael Hartman of the Saw Swee Hock School of Public Health. “While there is a need for further research on the factors influencing ethnic differences in breast cancer survival, better awareness and early diagnosis save lives.”

The UMMC Breast Unit in Kuala Lumpur is looking into why breast cancer detection is often delayed, particularly among Malay women. According to Professor Yip Cheng Har, a consultant surgeon at UMMC, “Such a study is important in designing intervention studies that will encourage women to seek treatment earlier. Eventually, we hope to be able to answer the question why Malay women have poorer prognoses.”

Better outcomes with lower doses
Treating cancer usually requires a combination of surgery, radiation, chemotherapy and hormone therapy, though the course of action depends on various factors such as the patient’s age and the type of cancer he or she has.

Another way to treat cancer involves cutting off the blood supply to the cancerous growths themselves. Cancer cells, like other cells, need a

### THE MAIN FINDINGS OF THE 2011 STUDY

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>CHINESE</th>
<th>MALAY</th>
<th>INDIAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age at diagnosis (years)</td>
<td>51</td>
<td>46</td>
<td>53</td>
</tr>
<tr>
<td>Median tumour size (diameter in mm)</td>
<td>25</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>Lymph node involvement (percentage)</td>
<td>42.9</td>
<td>53.6</td>
<td>48</td>
</tr>
<tr>
<td>Negative estrogen receptor status associated with higher chance of relapse (percentage)</td>
<td>41.9</td>
<td>47.5</td>
<td>47.5</td>
</tr>
<tr>
<td>Distant metastasis at presentation ie. Stage IV (percentage)</td>
<td>9</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Poorly differentiated tumours signifying higher malignancy and aggressiveness (percentage)</td>
<td>39.4</td>
<td>44.7</td>
<td>43.9</td>
</tr>
<tr>
<td>Complete treatment for non-metastatic tumours consisting of mastectomy or breast conservation surgery followed by radiotherapy (percentage)</td>
<td>92.7</td>
<td>79.8</td>
<td>90.2</td>
</tr>
<tr>
<td>Chemotherapy (percentage)</td>
<td>57.7</td>
<td>63.7</td>
<td>61.8</td>
</tr>
<tr>
<td>Hormone therapy for estrogen receptor positive tumours (percentage)</td>
<td>86.5</td>
<td>79</td>
<td>89.7</td>
</tr>
<tr>
<td>Five-year overall survival (percentage)</td>
<td>75.8</td>
<td>58.5</td>
<td>68</td>
</tr>
<tr>
<td>Survival at Stage III and Stage IV (percentage)</td>
<td>43.7</td>
<td>34.4</td>
<td>43.3</td>
</tr>
</tbody>
</table>
The supply of blood to survive. Tumours grow their own blood vessels in order to expand, in a process that is called angiogenesis. In some cancers, anti-angiogenic drugs are used to curb the growth of these abnormal blood vessels by targeting the vascular endothelial growth factor (VEGF) secreted by tumours. The drug bevacizumab (sold under the name Avastin) is used in colorectal, kidney and lung cancers, and sunitinib (sold as Sutent) is a standalone drug for the treatment of kidney cancer.

Breast cancer tumours, too, need their own blood supply. And in recent years, doctors have combined an anti-angiogenic agent such as sunitinib with chemotherapy as a strategy to improve the efficacy of breast cancer treatment. Yet, all previous studies have failed to show any improvement in outcomes compared to standard chemotherapy.

And here is where the doctors at the National University Cancer Institute, Singapore (NCIS), had a brainwave. What if earlier studies had failed because the anti-angiogenic drugs were too successful? The doctors hypothesised that sunitinib was so efficient at destroying the abnormal blood vessels that chemotherapy drugs could not be adequately delivered to the tumour. As it is, tumour blood vessels are more leaky than normal vessels and pose their own challenge, which was then compounded by the dose of anti-angiogenics.

Adjunct Associate Professor Lee Soo Chin, Associate Director of Research and Senior Consultant at NCIS, sought to find out if perhaps a lower, intermittent dose of sunitinib would be more effective instead. Along with a joint team of researchers from NCIS, the Cancer Science Institute of the National University of Singapore, the National Cancer Centre Singapore as well as the Clinical Imaging Research Centre, Adj A/Prof Lee conducted a randomised clinical study with 21 breast cancer patients at the National University Hospital (see box on page 45).

Preliminary results showed that a lower dose of sunitinib shrank tumours by one quarter after just one cycle of chemotherapy. Patients who received chemotherapy alone saw minimal tumour reduction after one cycle, and four cycles are typically needed. After four cycles of chemotherapy and treatment with sunitinib, nine per cent of patients showed no traces of cancer at all. None of the patients who only had chemotherapy managed to achieve this. The other patients who received the combined treatment also saw an overall reduction in tumour size. “This treatment means these patients have a higher chance of successful or less-extensive surgery, so they are more likely to be cured,” explains Adj A/Prof Lee.

She presented her findings at the American Society of Clinical Oncology conference in June 2012 and hopes to add another 50 patients to her study in 2013 before proceeding to the next phase of clinical trials.
A study, published in the Archives of Physical Medicine and Rehabilitation in February 2012, focused on two key issues for post-stroke patients: The amount of therapy needed for maximal functional recovery and the importance of supervised therapy. Researchers at the National University of Singapore (NUS) Saw Swee Hock School of Public Health studied 215 patients from Ang Mo Kio — Thye Hua Kwan Hospital and St Luke’s Hospital from 2002 to 2005.

After adjusting for age, hypertension, depression, and cognitive and neurologic impairment, the NUS researchers discovered that post-stroke patients who were supervised for more than a quarter of their recommended therapy time achieved functional recovery faster and to a greater extent. Patients who did not have supervised therapy did not show any improvement in function after one year.

“The results of the study clearly show that performing supervised therapy as recommended can reduce the burden of unnecessary functional disability on stroke patients and their families. Faster and greater functional recovery in the first six months after stroke reduces the medical, financial and emotional costs of caring for a stroke patient, and minimises healthy years lost due to disability or ill-health,” said Associate Professor Gerald Koh of NUS Saw Swee Hock School of Public Health.

The study also found that only one third of patients were performing supervised therapy for more than 25 per cent of the recommended time — indicating that there is a large missed opportunity to improve stroke outcomes.

“We hope that these findings will encourage patients to take their rehabilitation dedicatedly so that they can resume independent living after a stroke sooner,” said Associate Professor Fong Ngan Phoon, also from NUS Saw Swee Hock School of Public Health.

“Rehabilitation therapy is essential for a successful recovery after a stroke. The most important window for recovery through therapy is the first month after the patient has been discharged, when a smooth transition of care from hospital to home is essential.”

Better Recovery from Stroke

Stroke patients who take rehabilitation exercises seriously get well sooner.

“Rehabilitation therapy is essential for a successful recovery after a stroke.”

A/Prof Fong Ngan Phoon, NUS Saw Swee Hock School of Public Health
Researchers at the National University of Singapore Yong Loo Lin School of Medicine and the National Neuroscience Institute have identified a compound — EGCG — which is found in green tea, that confers potent protection against Parkinson’s disease at the cellular level. While the cause of the debilitating disease remains unknown, this discovery holds promises that more effective drugs to combat and treat it can be developed.

The team, led by Associate Professor Lim Kah Leong and Dr Ng Chee Hoe, found that EGCG-treated flies show much better movement and significant preservation of brain dopaminergic neurons. The study also found the cellular target for EGCG, which is a protein known as AMP kinase, that helps to regulate the energy demands of brain cells. The findings were published in the October 2013 issue of the Journal of Neuroscience.
S$25M GASTRIC CANCER GRANT RENEWED

In 2007, the Singapore Gastric Cancer Consortium (SGCC), led by Associate Professor Yeoh Khay Guan of the National University Health System, was awarded a S$25 million grant by a competitive peer-reviewed process. It was the first Translational and Clinical Research (TCR) Flagship Programme to receive the grant from the National Medical Research Council. In 2013 the group was awarded a renewed grant of S$25 million from 2013 to 2017 for the second phase of work on “Redefining the Management of Gastric Cancer”.

The SGCC team will focus on identifying suitable biomarkers for early detection of gastric cancer, improving treatment through genomic-guided chemotherapy and improving the understanding of how gastric cancer develops. Working alongside A/Prof Yeoh will be Professor Yoshiaki Ito, Dr Yong Wei Peng, A/Prof Jimmy So and a team of researchers.

FIGHTING CHIKUNGUNYA WITH GENE SILENCING

Researchers from the NUS Yong Loo Lin School of Medicine have found a new way to combat chikungunya, a mosquito-borne disease that can cause intense joint pain. Lead researcher and post-graduate student Shirley Lam discovered small-hairpin RNA which stops and destroys the virus—a first for anti-viral therapy in Singapore.

According to Principal Investigator Dr Justin Chu, the team’s method killed off the virus within three days, and conferred protection onto healthy cells for up to 15 days—which means that this novel therapy could possibly be used as a preventive measure as well. The new method, which was published in the international scientific journal PLOS ONE, has been tested on human cells and animals. The team hopes to begin clinical trials once funding has been secured.

ONLY 1 IN 3 HEART ATTACK PATIENTS CALL FOR AN AMBULANCE

Researchers have discovered that patients with symptoms of an acute heart attack are not calling for ambulances, which results in a delay in receiving medical help. Only 35 per cent of patients surveyed by the team, led by National University Heart Centre, Singapore registrar Dr Tan Li Ling, used emergency services. Those who did not call for an ambulance received medical help an average of 82 minutes later (than those who did), the study said.

This shows the need to educate the public on symptoms of a heart attack and emphasises the benefits of prompt treatment, said Dr Tan.

GENDER AND ACUTE CORONARY SYNDROME

Associate Professor Carolyn Lam led a nationwide study of 15,151 patients with acute coronary syndrome (ACS), and who were admitted to hospital in the five-year period between 2000 and 2005. The study showed prominent gender differences in the outcome among Asians. More than a quarter of Asian patients admitted for ACS are women—they are likely to have more severe forms of the disease and are twice as likely to die as men. These findings show the need to raise awareness and improve outcomes among Asian women with ACS.
With a novel procedure called FlashFish, expectant women can now find out — within just a few hours — if their unborn babies have any genetic abnormalities. Devised by Associate Professor Mahesh Choolani’s team from the NUS Yong Loo Lin School of Medicine, it is the quickest test of its kind. The next fastest test takes between two and three days to produce results.

“While 19 out of 20 cases will prove to be normal, we can at least allay one of the major anxieties for mums,” said A/Prof Choolani, who added that if the samples were collected in the morning, the results would be available by 6pm the same day. The test was first made available at the NUH last December, though the service is also available to patients from other hospitals or clinics.

DETECING GENE ABNORMALITIES IN UNBORN BABIES

PARENTS SAY KIDS ARE PICKY EATERS: SURVEY

More than half of the 407 parents surveyed in a recent study conducted by the Department of Paediatrics at the NUH, along with Abbot Nutrition, consider their children to be picky eaters. Parents and caregivers also reported that such children often raised stress and anxiety levels, and in some cases, had a negative impact on family relationships as well.

Department Head, Associate Professor Daniel Goh said, “It is clear that many parents are struggling with their child’s picky eating behaviour as well as feeding difficulties. The fact that one-third of the respondents had consulted their doctors about their child’s eating behaviour suggests that most parents are concerned about picky eating. Feeding problems should be part of a routine evaluation of every child, and all healthcare practitioners should adequately screen and manage this in the routine clinic consultation.”
CENTRE TO EYEBALL INFECTIOUS DISEASES
The NUS Saw Swee Hock School of Public Health unveiled the Centre for Infectious Disease Epidemiology and Research (CIDER) in 2012 at the inaugural public health seminar. The new centre hopes to create and manage more robust biosurveillance systems. The centre also aims to partner with the Ministry of Defence to enhance the Singapore Armed Forces’ early warning disease surveillance system to mitigate the threat of infectious diseases in Singapore’s public health system.

SCHOOL OF PUBLIC HEALTH AND HEALTH SCIENCES AUTHORITY SIGN MOU
The Health Sciences Authority (HSA) has signed a Memorandum of Understanding (MOU) with the NUS Saw Swee Hock School of Public Health. The MOU seeks to encourage knowledge exchange, enhance academic and professional competencies and develop scientific leadership to promote the protection of public health and the advancement of public health science within the four domains of epidemiology, biostatistics, health promotion/education, as well as health systems and policy.

The MOU also seeks to “translate public health research into practice” and advance issues from a global and regional perspective linked to HSA’s key areas of focus in regulatory, forensic and analytical science, and transfusion medicine.

UNDERSTANDING AGGRESSIVE BRAIN TUMOURS
A research team has discovered the role of a new tumour suppressor known as parkin, in brain tumors. This promises to provide insights into why certain brain tumours are more aggressive than others. The multi-institutional collaborative work, led by Associate Professor Lim Kah Leong at the NUS Yong Loo Lin School of Medicine’s Department of Physiology and Dr Carol Tang of the National Neuroscience Institute, was published in May 2012 in Cancer Research, a leading international cancer journal.

FOCUS ON WORKPLACE HEALTH AND SAFETY
The NUS Saw Swee Hock School of Public Health conducted a study to examine new ways to launch the Total Workplace Safety and Health Programme in partnership with the ministries of Health and Manpower. The pilot study examined workplace safety as well as occupational health and wellness services in 30 companies within various industries in Singapore.

The aim of the study was to enhance management appreciation of workplace health and safety, and to highlight how wellness services should also play an integral part so that welfare and productivity might be improved.
Role model for tomorrow’s doctors

To help shape the curriculum for the medical school, Prof Hooi Shing Chuan drew on his own life experiences.

An “exceptional” teacher, and a “truly student-centred” educator — descriptions like these swirl around Professor Hooi Shing Chuan. The Vice-Dean for Education at the National University of Singapore Yong Loo Lin School of Medicine (YLLSoM) is the recipient of more than 600 best teacher nominations over the past three years, has won Faculty Teaching Excellence Awards in 2000, 2003 and 2004, and most recently, in 2012, clinched the NUS Outstanding Educator Award.

Prof Hooi has also been instrumental in the development and implementation of the school’s new curriculum, which now places much greater emphasis on practical learning through simulation, as well as on communication, professionalism and medical ethics.

As a schoolboy in Petaling Jaya, Malaysia, Prof Hooi had already made up his mind to be a doctor, though his early career didn’t give too much indication of his eventual vocation as an educator.

Of his medical leaning he says, “I was looking for something that allowed me to interact with, and help people in tangible ways. I also became interested in the human body while studying...”
biology in school. Medicine allowed me to pursue these interests.”

A physiological attraction

A-levels were followed by undergraduate medical degree studies at the NUS. After graduation, the young Prof Hooi pursued surgery and in particular, hand surgery. But while revising physiology (the study of the body’s organs and systems) as part of his surgery exams, he found himself becoming increasingly interested in the subject. “Seeing the relevance and usefulness of physiology to my work changed my perception of it, and I began to appreciate and go deeper into it and thus, I found it more interesting,” Prof Hooi explains. So much in fact, that he went to Harvard University in the United States to do a PhD in it.

But his journey to being an educator began before that. After completing medical school in 1983, he joined NUS’ Department of Physiology two years later, where he briefly taught before being sent by the school to Harvard.

Those who can, teach

When he returned to Singapore in 1992, Prof Hooi continued his research in physiology and teaching at NUS. He found he enjoyed lecturing. “Teaching is something you only realise you enjoy doing or are good at when you do it — when you do it and the students respond, you begin to like it,” he says.

So not only did physiology open up overseas study opportunities for Prof Hooi, it also heavily influenced his work today. “My pedagogical style comes from my own personal journey of how I got to love physiology as a subject.

“T didn’t find physiology especially interesting while in medical school. But, having to relearn it for my surgery exam — while at the same time practising medicine — allowed me to apply what I was learning to my practice.”

He also learned first-hand that practical application of what’s being taught can help one learn much better — for example, seeing how the various systems of the body interact with each other and how they react individually to external factors in order to maintain a stable internal environment.

Holistic approach to education

His appreciation of the value of maintaining an overall view of things explains this emphasis and its application within the new undergraduate curriculum at the medical school. And nowhere is it more evident than in the School’s use of the Simulation Centre. As Prof Hooi puts it, this “simulated hospital” — which covers two floors and includes an Intensive Care unit and employs volunteers (called standardised patients) to role-play sick people — provides a “safe environment” for students to learn and practise their clinical skills, and receive assessment and feedback on their performance.

The focus on learning saw Prof Hooi and his colleagues developing, over a period of eight months and in consultation with various stakeholders, a list of 23 outcome statements they hope every NUS medical graduate achieves. These are specific statements encompassing all facets of student development — from discipline and conduct, to being community-minded doctors who see patients as people and not just as diseases to be treated.

And now, in Phase II of the ongoing curriculum review — in which content comes under the spotlight — Prof Hooi and his team are in the process of aligning the curriculum to stay relevant to current circumstances (such as an ageing population and technological advances in healthcare) and ensuring undergraduates achieve the listed goals.

But training a new generation of patient-centred doctors takes more than curricular refinements. “What is really important is the culture in which the students grow up in,” says the 54 year old ‘teacher’, who still sees patients on occasional medical missions around the region or at monthly charity clinics. “Values and professional behaviour are ‘better caught than taught’ — and the way to ‘catch’ and internalise these principles is to see them expressed or put into action all the time.

“When every healthcare professional places the patient at the centre of everything they do, and model this for our students, that will really change things.”

“TEACHING IS SOMETHING YOU ONLY REALISE YOU ENJOY DOING OR ARE GOOD AT WHEN YOU DO IT.”

Prof Hooi Shing Chuan, Vice-Dean (Education), NUS Yong Loo Lin School of Medicine
State of the art centre for clinical skills training and learning
A key focal point for the training of medical and nursing students is the new Centre for Translational Medicine (CeTM) at the School’s Kent Ridge campus. Opened in 2012, the S$200 million Centre houses cancer, heart and imaging research facilities as well as what is likely Asia’s most comprehensive clinical simulation training suites.

The co-location of the NUS Cancer Science Institute, the National University Heart Centre, Singapore’s Cardiovascular Research Institute and the NUS Clinical Imaging Research Centre, alongside the medical school’s teaching facilities is deliberate. According to NUS Vice-Provost of Academic Medicine, Professor John Wong, “This blending of education and research allows our students and faculty to work and mix like never before.”

Realistic training in handling medical situations
Inside the CeTM, at the Centre for Healthcare Simulation, the mixing and blending is apparent in the team training that brings medical and nursing students together to learn to work as a single healthcare team, as they would be doing eventually in hospital wards and clinics. Student teams are put through their paces by faculty instructors who construct various clinical scenarios. These take place in the 5,247 sq m Centre’s emergency room, operating theatre, intensive care unit and acute paediatrics ward, and test the students’ ability to diagnose, interpret and then treat the various conditions presented by computer-programmed dummies.

These dummies breathe, blink, cry, speak, react to drugs, secrete fluids, give birth and even die, depending on the programmed scenario. The sophisticated technology and equipment deployed at the simulation centre enable students to learn how to solve problems within realistic scenarios, giving
Students meet patients in a community setting, at home or in step-down care facilities. They are introduced to the patients’ families and caregivers and perform follow-up visits throughout their first year of undergraduate medical school. Students are encouraged to continue following up with the patient throughout their undergraduate medical school. “Following the patient and his or her family helps to build more of a rapport and allows them to empathise with the patient’s situation,” says Associate Professor Yeoh Khay Guan, Dean of the School.

Changes to the admissions process
Aspiring medical students applying to the school in April 2013 became the first to be screened under the School’s new admissions format. It is one that has been specially designed to identify “the students that we want”, says Professor Hooi Shing Chuan, the School’s Vice-Dean of Education.

The new format seeks to identify students with the right aptitude as well as attitude. Applicants no longer write essays or attend panel interviews. Instead, prospective students are put through a Focused Skills Assessment and a Situational Judgment Test to evaluate skills and personal attributes such as empathy and teamwork. These assessments make up half of a student’s admissions score, with academic results making up the other half.

The Focused Skills Assessment features a series of interviews, each designed to test a specific characteristic of the candidate.

A ‘longitudinal’ patient experience
Students at NUS Yong Loo Lin School of Medicine are now gaining a greater understanding of chronic diseases and their impact on sufferers right from their first year of medical training. Dubbed the “longitudinal patient experience”, Year One students are paired with patients with chronic illnesses such as diabetes or high blood pressure. Under the guidance of a clinical mentor, students are able to experience and appreciate the difficulties and realities that patients face outside the hospital is coping with their illnesses. The student-patient pairing gives the aspiring doctors an in-depth understanding that extends beyond the science of a disease, to incorporate how it affects not just the lives of patients but their families as well.

“WE WANT OUR GRADUATES TO BE MORE THAN JUST GOOD DOCTORS AND NURSES. THEY NEED HEART AS WELL AS HEAD, AND SHOULD BE AS EQUALLY SKILLED IN THE IN THE ART OF MEDICINE AS WELL AS THE SCIENCE.”

A/Prof Yeoh Khay Guan, Dean, NUS Yong Loo Lin School of Medicine
Unlike the old format, the prospective student is assessed independently at each station, making the tests more standardised. The Situational Judgment Test is a multiple-choice segment that tests a student’s response to various challenges and dilemmas.

These changes bring NUS’ admission system in line with best practices at other world renowned medical schools in the United Kingdom, Canada and the United States.

Enhanced learning with tablets
In keeping up with advances in technology, the School has embarked on a Mobile Learning Programme to explore how mobile computing platforms can be used to enhance teaching and learning in medical education.

This exciting two-year pilot programme examines best practices that can then be applied across various cohorts and courses in the near future. Students and staff can apply for proof of concept funding to embark on mobile learning projects that will enhance the way they learn or teach. This pilot programme, applicable to Academic Year 2012/2013 Phase I medical students only, is designed to test how the projects complement the medical curriculum in both preclinical and clinical years. Students who did not own a tablet were given a subsidy to buy an iPad, Android, or other tablet that meets minimum specifications.

“We want to make sure that technology can be second nature to our students, because that’s how they are going to practise medicine in the future,” explains Prof Hooi.

Students can use their tablets to access lectures and research information while on the go. During anatomy lessons, for example, students can pull up a 3D map of the human body and compare it to what they see on the cadaver.

For the keeping — a rare copy of the Hippocratic Oath
On the fifth and sixth floors of the new CeTM lies the Medical Library, which was designated the World Health Organization Repository Library in Singapore, in 2002. The library holds some 53,000 books dating back to the founding of the medical school in 1905. Including another 172,000 volumes housed at the NUS Central Library Annex, the library has a collection that is second to none.

In 2012, the library added another jewel to its crown when Singaporean book collector John Koh presented the School with a rare version of the Hippocratic Oath. Dating back to 1508, the gold-edged antiquarian book contains a printing of the oath in the original Greek. In gifting it, Mr Koh hopes that the book will serve to remind students of the biomedical issues and ethics they grapple with on a daily basis.

Medspace launched
Undergraduate Year 1 and 2 students and staff now have an integrated solution to their scheduling, content management and curriculum mapping needs. Called MedSPACE (Medicine Scheduling, Portfolio, Assessment, Content, Evaluation), the new learning management system offers a wide range of functions and is easy to use.

Students can view schedules and locate learning materials, while academic staff can view teaching events, set reminders and upload materials. By August 2013, MedSPACE will be made available to students of Years 3 to 5 as well.
FOUR HUNDRED healthcare workers, researchers and doctors from 15 countries gathered in 2012 at the First Singapore International Public Health Conference to focus on evidence-based programmes to tackle the rapidly-changing healthcare environment.

With the theme of “Translating Public Health Research into Practice”, the two-day conference was jointly organised by the National University of Singapore (NUS) Saw Swee Hock School of Public Health and the Chapter of Public Health and Occupational Physicians, Academy of Medicine, Singapore.

The conference also saw the launch of the Demo-Epidemiological Model of Singapore (DEMOS), which is a critical component of the Saw Swee Hock School of Public Health’s Population Health Metrics and Analytics (PHMA) platform. The PHMA helps healthcare professionals simulate population response to various diseases or demographic data. Accurately projecting the behaviour and spread of diseases helps researchers evaluate the impact of public health interventions at the population level.

One pilot programme focuses on forecasting the burden of diabetes in Singapore, taking into account age, genes and obesity levels. DEMOS has shown that traditional methods to estimate the spread of diabetes have resulted in underestimated numbers — and this will have a direct impact on the public health approach to prevention and detection.

Apart from the main conference proceedings, there were also post-conference sessions chaired by industry thought leaders and renowned academics.

“This conference represented a rare opportunity to hear from experts in varied fields of public health, as they shared their latest research and provide fascinating perspectives on public health issues, action and practice that are of critical importance. It was also a unique opportunity to exchange ideas and foster collaboration on an international scale,” said Professor Chia Kee Seng, Dean, NUS Saw Swee Hock School of Public Health.

Saw Swee Hock School of Public Health’s Population Health Metrics and Analytics (PHMA) platform. The PHMA helps healthcare professionals simulate population response to various diseases or demographic data. Accurately projecting the behaviour and spread of diseases helps researchers evaluate the impact of public health interventions at the population level.

One pilot programme focuses on forecasting the burden of diabetes in Singapore, taking into account age, genes and obesity levels. DEMOS has shown that traditional methods to estimate the spread of diabetes have resulted in underestimated numbers — and this will have a direct impact on the public health approach to prevention and detection.

Apart from the main conference proceedings, there were also post-conference sessions chaired by industry thought leaders and renowned academics.

“This conference represented a rare opportunity to hear from experts in varied fields of public health, as they shared their latest research and provide fascinating perspectives on public health issues, action and practice that are of critical importance. It was also a unique opportunity to exchange ideas and foster collaboration on an international scale,” said Professor Chia Kee Seng, Dean, NUS Saw Swee Hock School of Public Health.

UNDER THE SPOTLIGHT

Tackling current health issues at the inaugural Singapore International Public Health Conference.
That healing touch

Residency training at the NUHS aims at producing competent, compassionate specialists.

It takes five years to complete a medical undergraduate degree, and another six before a doctor qualifies to become a cardiologist, paediatrician, geriatrician, oncologist or any other speciality. The decade-long training is needed because the making of a medical specialist is an intensive process, one that sees young doctors learning in the wards, clinics, classrooms, and on the job from senior and more experienced doctors in his or her chosen specialty.

Right from Day One of the NUHS Residency Program, the 385 medical specialists-in-training at the NUHS are put on an intensive and absorbing learning curve. Comprising 14 programs and recently expanded to also include an additional 11 senior residency programs in Endocrinology, Gastroenterology, Advanced Internal Medicine, Geriatric Medicine, Infectious Diseases, Renal, Respiratory, Rheumatology, Cardiology, Medical Oncology and Haematology, the fundamental message that runs through the courses is one that is as old as the practice of medicine itself — you will never stop learning, because knowledge begets more knowledge and each new discovery and epiphany makes a contribution to better care for patients.

These senior residency programs can be pursued by residents after they have undergone the Internal Medicine Residency Program, through which they are trained in clinical competence and also equipped with critical thinking skills in the practice of medicine.

Good trainees

While each program has its own detailed curriculum, all require their specialists-in-training to achieve six core competencies, says Associate Professor Shirley Ooi, Designated Institutional Official overseeing the NUHS Residency Program and an Emergency Medicine physician. “What you know, what you do, how you act, how you interact with others, how you get better at what you do, and how you work within a system — in other words, medical knowledge, patient care, professionalism, interpersonal and communications skills, practice-based learning and improvement and system-based practice.”
At the core
Good teachers form the other half of the equation, and great importance is thus placed on the appointment of the Program Directors and Faculty members. They are selected for their love for teaching and mentoring, and for being good role models. The educators also include the NUH’s Chief Executive Officer, the Chairman of the Medical Board and other senior clinical leaders, all of whom take care to engage with the residents in an effort to ensure that the program produces competent and caring specialists for Singapore.

Assessment is regular and comprises formal evaluations that include written and practice-based examinations that test the trainee’s clinical knowledge and skills.

A unique feature of the NUHS Residency is the Core Education Program (CEP) which has been designed to best address the learning needs of residents. It is an institution-wide education effort involving teachers and learners across medical and surgical disciplines. Weekly protected time is set aside for CEP sessions, and these focus on core curriculum topics that are relevant to all first- and second year residents.

Field training
The learning also takes place outside of the hospital clinics and wards, on the lush, getaway island of Pulau Ubin. One of the signature programmes is a three-day, two-night orientation camp held at the Outward Bound Singapore. New residents join senior staff as well as faculty for a fun-filled induction to the Residency Program.

The activities organised are designed to bring across key learning points that are related to the residents’ work in the hospital, as well as emphasise the high ethical and professional standards which clinicians are expected to demonstrate in keeping with the NUHS’ emphasis on teamwork, respect, integrity, compassion and overall excellence. “It helps to inculcate in the residents the values that we deem important in our doctors,” says A/Prof Ooi.

It is field training that is put into practice back in the wards and clinics. Notes Dr Serene Wong, Chief Resident in Internal Medicine, “When I was first appointed, I thought that the title of Chief Resident was an euphemism for ‘roster planner’. However, I came to realise that a big part of this was learning how to interact with seniors and juniors and more importantly, gain peer and junior support. We had opportunities to attend meetings to further understand from the seniors’ points of view why certain things were done and were given the chance to voice the opinions of our residents, and hopefully better represent them especially when these involve matters close to the ground.”

Reflecting on his first week as a newbie medical officer in a general ward, Dr Lee Chengjie, 2011 intake, says his residency training in Emergency Medicine helped him immensely. “An orthopedic patient in general ward had a STEMI complicated by cardiogenic shock. As the primary team was in the OT, I took charge, considered the differentials, asked for appropriate investigations, delegated tasks to the house officers and nurses. How I had handled this as a relatively junior MO is a testament to how well I have been prepared by the residency training.”
Students from the National University of Singapore (NUS) High School of Mathematics and Science have penned a book about the brain as part of a partnership between the University and the Singapore Technologies Endowment Programme (STEP).

Aimed at high school students in general, the 65-page book is a primer on topics such as pain and stress as they relate to brain function. Called The Brain Book, it took 30 students about a month to complete the volume with the help of postgraduate expert mentors.

Copies of the book were distributed to public libraries and participants of the STEP-NUS Sunburst Brain Camp.

Helping to write the book were NUS High students (from left) Samantha Yong, 17; Ryan You, 18; Lee Tae Jin, 18; Berton Lim, 18; and Candice Ang, 17.
A NEW MINOR IN PUBLIC HEALTH ON OFFER

NUS undergraduates can now read a Minor in Public Health, thanks to the Saw Swee Hock School of Public Health. The Minor will allow them to read modules in Public Health, with topics such as Epidemiology, Lifestyle & Behaviour, Health Economics and Biostatistics. This new addition complements the School’s well-established Master of Public Health and Graduate research programmes.

SINGAPORE’S FIRST PHD NURSE

After 34 years in nursing, Dr Tiew Lay Hwa is now Singapore’s first PhD nurse after she graduated from the Alice Lee Centre for Nursing Studies, NUS. Dr Tiew harboured dreams of being a nurse when she was hospitalised at the age of four. She hopes to pass on what she has learned, and to inspire the next generation.

The Centre offers students both a Master of Science (MSc) (Nursing) and Doctor of Philosophy (PhD) programmes, both of which are designed for research training. With the needs of working nurses in mind, candidates can opt to take the course as a full-time or part-time student.

SINGAPORE’S FIRST PHD NURSE

After 34 years in nursing, Dr Tiew Lay Hwa is now Singapore’s first PhD nurse after she graduated from the Alice Lee Centre for Nursing Studies, NUS. Dr Tiew harboured dreams of being a nurse when she was hospitalised at the age of four. She hopes to pass on what she has learned, and to inspire the next generation.

The Centre offers students both a Master of Science (MSc) (Nursing) and Doctor of Philosophy (PhD) programmes, both of which are designed for research training. With the needs of working nurses in mind, candidates can opt to take the course as a full-time or part-time student.

MOUNT ELIZABETH - GLENEAGLES SCHOLARSHIP FROM PARKWAY PANTAI

A new S$2 million scholarship fund has been created to help up to 16 needy undergraduates each year at the NUS Yong Loo Lin School of Medicine. Named the Mount Elizabeth-Gleneagles Scholarship, the funds were contributed by private healthcare group Parkway Pantai. The government will match the grant, bringing the total scholarship fund to S$4 million. The scholarship will be worth S$10,000 per student per year.
Last year, more than 6,200 Cambodians — 1,400 more than the year before — benefited from the NUS Yong Loo Lin School of Medicine’s largest-ever medical mission trip. Eighty-four students from the medical school raised some S$58,000 from food sales and movie screenings to conduct health check-ups and help needy Cambodians battle chronic diseases.

Three groups from the School worked together for the first time to involve residents in Phnom Penh, Kampong Speu, Pursat, Pailin and Poipet. This was the first time that these groups, who run aid programmes Project Sa’Bai, Project Lokun and Project Battambang, ventured into new areas like Pailin and Kampong Speu, essentially expanding their outreach and combining resources to serve the largest number of needy Cambodians ever.

Project leaders hoped to shift the focus of the mission towards sustainability, and aimed to wean locals off international aid by equipping them with knowledge and resources.

Mr Liu Biquan, head of Project Lokun, said: “Only by combining our resources and learning from each other’s mistakes over the years, will we be better equipped to expand into new areas. We are all working towards the same ultimate goal — contributing towards a healthier Cambodia.”

Drs Priscilla and John Lee have been
In December 2012, students from the Faculty of Dentistry conducted the inaugural Community Health Integration scheme to reach out to disadvantaged residents at Kampong Glam.

Targeting the elderly as well as needy families, the dental students aimed to enhance the residents’ general health and well-being by conducting dental screenings and teaching them techniques for brushing teeth and denture care. Medical and nursing students also measured blood pressure and provided consultations on topics such as healthy living, graceful ageing and healthcare subsidy schemes. A total of 280 residents have benefitted from this project.

In April 2012, Dr Priscilla Lee, mentor for volunteer projects in Cambodia, said: “It is a testament to what our students can achieve. They have given the people hope and a renewed belief in the goodness of mankind.”

Another overseas project the students were involved was Project Khon Kaen, held in May 2012 in north-eastern Thailand, where they conducted health screenings for about 1,000 children, including orphans and disabled kids. Meanwhile, in December that year, another group rendered aid to Hmong tribespeople in northern Thailand as part of Project Phetchabun.

'I WISH TO RUN 2012'
GOING EXTRA MILES FOR SICK KIDS

The inaugural event was the brainchild of two dedicated long-distance runners who are also medical students at the NUS Yong Loo Lin School of Medicine. “We are very privileged to have strong support from our families and the community in our pursuit of running. We want to give back to society through the way it has empowered us,” said Tang Jun Han, then a second-year medical student.

Born of a conversation with his running buddies, the idea crystallised — to marry their love of running with outreach to the community by granting the wishes of terminally-ill children. With that in mind, Mr Tang and his training partner Thiaghu Chandra planned a gruelling 123km run to raise funds for the Make-A-Wish Foundation.

The charity ultra-marathon was a first of its kind among the medical fraternity in Singapore. Setting off from East Coast Park at 1pm on 22 May 2012, Mr Tang and Mr Chandra ran the first 100km across the island, while fellow students and NUHS staff joined in for the last 23km, running laps around the University track.

In all, the duo raised some S$26,000 for the local chapter of the Make-A-Wish Foundation, making it the largest sum ever raised by a charity run. ‘I Wish to Run 2012’ received cash and donations in kind from about 30 local companies and several individuals who have heard about the heart-warming appeal for funds.

Ms Debbie Seah, Chief Executive of the Foundation, said: “We have nothing but praise and appreciation for the students who have spearheaded this with lots of heart.”
Since 2006, the NUS Medical Society has been conducting free public health screenings to help detect chronic diseases. Its 2012 public health screening exercise at Toa Payoh in October included three new tests— a fasting venous blood test, an eye screen for the elderly, as well as a mammogram.

With a focus on screening for prevalent chronic disease, the fasting venous blood test was added to provide more accurate screening for diabetes and high cholesterol which is also in accordance with the Ministry of Health’s Clinical Practice Guidelines which recommends fasting venous sampling for screening of such conditions, while an eye-screening component was added to the list of geriatric screening tests to identify cataract and glaucoma. A mobile screening vehicle or ‘mammobus’, sponsored by the National University Cancer Institute, Singapore and the Singapore Cancer Society, was also on-site to screen women for breast cancer. The students also set up education booths on chronic diseases and health issues to inculcate a sense of responsibility among the elderly.

More than 2,000 residents benefitted from the two-day event from 6 to 7 October.

Some 450 elderly and low-income residents of Taman Jurong had their health screening done in 2012 right at their doorsteps. The Neighbourhood Health Screening programme, first initiated by students from the NUS Yong Loo Lin School of Medicine six years ago, aims to reach out to those who would usually not be able to visit a hospital for a check-up. The programme aims to reintegrate residents into the healthcare system through screening, education and personalised follow-ups.

With the support of Jurong GRC Member of Parliament Tharman Shanmugaratnam, the health screenings were conducted at neighbourhood void decks and aimed to identify three major chronic diseases — diabetes, hypertension and high cholesterol. The students also carried out free follow up door-to-door basic health screening for residents living in Macpherson and mass screenings at Bukit Merah. 2012 was the first year the students pioneered a Patient Care Conference to provide residents with a more specific healthcare plan beyond health screening. It was also the first time the students worked with partners to provide a more holistic follow-up plan that met more than just their medical needs.

Retiree Soo Yew Poh was happy to find out he had a clean bill of health. “This programme is good as there are so many old people now who are sick and may not be able to afford check-ups,” said Mr Soo.

Following a door-to-door visit, the students also check in on individual residents if a medical problem is detected. This helps ensure that these residents go for treatment and are coping well. “It’s actually about personalised follow-up and building a relationship with residents,” observed an appreciative Mr Tharman.
A FALLEN CLASSMATE REMEMBERED THROUGH A BURSARY

Medical student Christine Chong Hui Xian was just 21 when she lost a long battle with brain lymphoma in 2009. Despite her diagnosis, Ms Chong had persisted with her medical studies, even taking her second-year exams while in hospital.

To honour her fighting spirit, the NUS Medical Society and the YLLSoM Class of 2012 came together to raise funds for the first student-initiated undergraduate bursary in a medical school. They have since raised S$350,000 and now medical students struggling to make ends meet can apply for a S$5,000 grant from the NUS Medical Society — Christine Chong Hui Xian Bursary.

Mr Emmett Wong Tsz Yeung, who spearheaded the charity drive, was a classmate of the late Ms Chong. He said that while Ms Chong had also suffered from lupus, an auto-immune disorder, from a young age, she was always “bubbly and cheerful”. Her death made him understand not only how a disease affects a person, but also the family and people around him.

Dr Phua Swee Liang of the Goh Keng Swee Foundation — and widow of one of Singapore’s founding fathers — was one of the early contributors to the new bursary. She said: “I made the contribution because I was touched by the example set by the group in initiating the bursary. I am a firm believer in the saying, ‘Charity must come from the heart.’ The members’ action will entice others to follow.”

CAMP SIMBA 2012

Now into its fourth year, Camp Simba is the result of a collaboration between students from Duke-NUS Graduate Medical School and the NUS Yong Loo Lin School of Medicine to co-organise a fun-packed three-day camp in June for young children whose parents have cancer, or who have passed away from cancer.

The camp organisers hope to make a difference by providing fun, smiles and laughter for these children, thus helping them cope better with their loved ones’ death or disease. Some 49 kids participated in Camp Simba 2012, where they took part in icebreaker activities, went to Sentosa Underwater World, rode the luge, and participated in a fun scavenger hunt. The organisers also hold reunions throughout the year to help build a strong bond between its facilitators and campers.

NURSES PITCH IN TOO

From Medan to Kunming, many nursing students from the Alice Lee Centre for Nursing Studies shared their knowledge, skills and experience with various needy communities throughout Asia. Project Cangyuan Synergy saw a group of NUS nursing and medical students head to villages in Kunming and Cangyuan in China to teach villagers about hygiene, addiction, maternity issues and nutrition, while Project Power Up Serdang had nursing students from the Centre heading to Indonesia to advocate for better healthcare in Serdang Village, Medan.

The nursing students also reached out to heartlanders in Singapore as well with Project Silvercare. Involving medical as well as pharmacy students, it enabled more than 300 residents in Kallang and Dakota Crescent to enjoy free community health screening over two Saturdays in September 2012 at the O’Joy Care Centre.

Doctors Ray Lai (left) and Emmett Wong (centre) were among those behind the effort to set up a bursary in memory of Ms Chong.
BY THE NUMBERS

NUH statistics at a glance

Specialist Outpatient Clinic Patients

TOTAL 704,568
Private 265,626
Subsidised 438,942

Surgical Procedures

TOTAL 59,969
Inpatient 26,818
Day surgery 33,151

Emergency Department Attendances

TOTAL 149,559
Children emergency 24,780
Emergency 124,779

Dental Services

ATTENDANCES 75,520
### Average Length of Stay

<table>
<thead>
<tr>
<th>Type of Bed</th>
<th>Average Length of Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 bedded</td>
<td>4.4 days</td>
</tr>
<tr>
<td>4 bedded</td>
<td>3.8 days</td>
</tr>
<tr>
<td>6 bedded</td>
<td>4.9 days</td>
</tr>
<tr>
<td>8 bedded</td>
<td>6.5 days</td>
</tr>
<tr>
<td>ICU bed</td>
<td>4.5 days</td>
</tr>
<tr>
<td>High dependency bed</td>
<td>2.3 days</td>
</tr>
<tr>
<td>ISO bed</td>
<td>8.4 days</td>
</tr>
<tr>
<td>Other bed</td>
<td>2.9 days</td>
</tr>
</tbody>
</table>

### Total Number of Patient Days

<table>
<thead>
<tr>
<th>Type of Bed</th>
<th>Total Number of Patient Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 bedded</td>
<td>28,375</td>
</tr>
<tr>
<td>4 bedded</td>
<td>21,896</td>
</tr>
<tr>
<td>6 bedded</td>
<td>68,984</td>
</tr>
<tr>
<td>8 bedded</td>
<td>153,635</td>
</tr>
<tr>
<td>ICU bed</td>
<td>16,829</td>
</tr>
<tr>
<td>High dependency bed</td>
<td>27,271</td>
</tr>
<tr>
<td>ISO bed</td>
<td>14,267</td>
</tr>
<tr>
<td>Other bed</td>
<td>8,812</td>
</tr>
</tbody>
</table>
### Financial Assistance AY2012-13

<table>
<thead>
<tr>
<th>Organization</th>
<th>No of students assisted</th>
<th>Total amount disbursed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice Lee Center for Nursing</td>
<td>5</td>
<td>S$44,000</td>
</tr>
<tr>
<td>Faculty of Dentistry</td>
<td>21</td>
<td>S$71,000</td>
</tr>
<tr>
<td>Yong Loo Lin School of Medicine</td>
<td>99</td>
<td>S$1,002,160</td>
</tr>
</tbody>
</table>

### Financial Assistance AY2012-13

<table>
<thead>
<tr>
<th>Organization</th>
<th>No of patients assisted</th>
<th>Total amount disbursed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUH PCF / NUHS Fund Limited</td>
<td>570</td>
<td>S$2,264,714</td>
</tr>
</tbody>
</table>

### Financial Assistance AY2012-13

<table>
<thead>
<tr>
<th>Organization</th>
<th>No of projects funded</th>
<th>Total amount disbursed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUH HREF</td>
<td>22</td>
<td>S$343,193</td>
</tr>
</tbody>
</table>
2012 was a sterling year for the NUHS which won numerous awards in recognition of its commitment to delivering excellent clinical care. These include:

**National Medical Excellence Awards 2012**

**National Outstanding Clinician Award**
Prof K Prabakaran

**National Outstanding Clinician Award**
Prof Wong Hee Kit

**National Excellence Team Award**
- A/Prof Sophia Ang
- Dr Sharon Saw
- A/Prof James Yip
- Dr Sandhya Mujumdar

**NMRC Award Winners**

**Singapore Translational Research (STaR) Investigator Award**
Prof Edward Koo

**Clinician Scientist Award — Senior Investigator Category**
- A/Prof Christopher Chen Li Hsian
- A/Prof Chng Wee Joo
- Prof Yong Eu Leong

**Clinician Scientist Award — Investigator Category**
- Dr Louis Chai Yi Ann
- Dr Mark Chan Yan Yee
- Dr Cheng Ching-Yu
- Dr Chester Lee Drum
- Dr Mohammad Kamran Ikram
- A/Prof Vijay Sharma Kumar
- Dr Raymond Seet Chee Song
- Dr Sue-Anne Toh Ee Shiow

**Transition Award**
- Dr Nicholas Chew Sern Yan
- Dr Ruby Huang Yun-Ju
- Dr Citra Nurfarah binte Zaini Mattar

**President's Science and Technology Award**
Prof Lawrence Ho for the co-development of the MASTER endoscopic robotic system.

**Special Mention (Outstanding Improvement in Fair Employment Practices) Award** from the Tripartite Alliance for Fair Employment Practices, for our efforts to lead in fair, responsible and inclusive employment practices.

**Healthcare Humanity Award 2012**
Prof Yap Hui Kim, Goh Boon Geok, Lee Geok Yian, Lim Hui Shan, Myint Myint Than, Koh Chye Eng for their exemplary service and contributions to the community.

**NTUC May Day Model Partnership Award 2012 (Institutional Category)**
Jou Kin Sang @ Muhammad Salleh also won in the Individual Category.

**The Singapore HR Awards**
- HR Advocate in Fair Employment Practices Award
- Leading HR Practices in Fair Employment Practices Award
- Leading HR Executive Award (Cheryl Gwee)

**MOH Nurses’ Merit Award**
Wang Xiao Bei, P Stella Mary, Nyeo Hui Qing, Lim Pui Yee, Lim Lay Cheng, Liang Sufang, Daphne Ng

**National Community Safety & Security Programme Awards 2012**
Open Category for NUH Security Week 2011 project

**International Winner of the Success Story Award** at the 2012 Press Ganey Awards

**High 5s Achievement Award (Best Correct Site Surgery Hospital)** at the inaugural WHO International Hospital Meeting

**National Day Awards**

**The Public Administration Medal (Bronze)**
- A/Prof Hooi Shing Chuan
- Joyce Elizabeth Jacob
- Koh Siow Lan Catherine
- Patrick s/o Simmon Ruben Ebnyeyen

**Efficiency**
- Koh Mei Jiao (Xu Meijiao)
- Noreza Binte Sailani
- Soh Choy Foon Felicia
- Syed Johara Bte Syed Kasim
- Tan Hwee Hoon Clarice
- Tay Yee Kian
We have a firm grasp on what the future of medicine should look like.

People. The young, elderly and everyone in between. At the National University Health System, we serve them in everything we do. Whether it’s training healthcare professionals, seeking better cures or applying the latest advances in clinical care, each development aims to make lives better. Our patients aren’t seen as people who depend on us, but serve as the source of our inspiration to do better each day.

Shaping medicine for the future.

NUHS
National University Health System