



Singapore National  
Eye Centre

SingHealth

**In Pursuit of Excellence**

1990–2015

# 25 SNEC Highlights

Since its inception in 1990, the Singapore National Eye Centre (SNEC) has gained international recognition for its top-notch patient care and world-class research and training in ophthalmology.

Despite its successes, the SNEC, which handles 300,000 outpatient visits, 27,000 surgeries and 8,000 laser procedures each year, is not about to rest on its laurels. It is now charting its next phase of growth, through active involvement in research and clinical trials to solve the most pressing clinical problems. In advancing ophthalmic science and service, the SNEC will continue to play a key role in training and education, and forge further professional collaboration through strategic links with local eye care and healthcare organisations as well as leading eye institutions around the world.

# **Our Vision**

International Eminence  
in Ophthalmology

# Our Mission

To lead in the overall development of ophthalmology by:

Providing the highest quality cost-effective ophthalmic care

Nurturing and renewing the necessary human resources

Pursuing high-impact competitive research



*Singapore National Eye Centre*

The logo resembles a human eye. Beneath this simplicity is a message of deeper significance. The eyeball, with linear horizontal lines, correlates to a globe, depicting SNEC's global vision. The progressively linear horizontal lines symbolise the importance of the eye in distant vision and the resulting demand for high quality ophthalmic service.

The 'eyelids' with tapered edges form an 'S' which represents the word 'Singapore'. That this should encase a globe conveys SNEC's mission to make Singapore a hub for ophthalmic excellence.

The neatly tapered edges of the 'eyelids' convey a sense of precision, bespeaking the high technological expertise required in ophthalmology.

Both the logo and its words appear in vibrant yet soothing colours of blue and grey – reflective of a fast-moving, progressive organisation.

The logo features the number '25' in a large, white, stylized serif font. The '2' and '5' are connected at the top. The '5' has a horizontal line through its middle. Below the '25' is the word 'YEARS' in a smaller, white, serif font. Below 'YEARS' is the tagline 'VISION TO REALITY' in a white, sans-serif font.

25  
YEARS  
VISION TO REALITY

The logo reflects SNEC's pole position at the cutting-edge of ophthalmology in Singapore and worldwide.

It complements SNEC's corporate logo by using a matching shade of blue and echoing elements from the SNEC logo.

The tagline *Vision to Reality* translates SNEC's 25 years of remit, legacy and achievements, into a simple statement that resonates with the public and employees.



 **SNEC**



 **SNEC**

 Singapore National Eye Centre





## Message from the Medical Director

Although 25 years might not seem like a long time, both Singapore and the state of our healthcare have undergone tremendous changes.

In 1990, when the Singapore National Eye Centre (SNEC) was established, Singapore had a population of just over three million people and the economy was making a transition from manufacturing to knowledge-based industries.

Cataract was the major cause of blindness then; there was a hint of an “epidemic of myopia” in our schoolchildren; and age-related macular degeneration (AMD) was known as “senile degeneration”, denoting an inevitable decline in vision with age. At the same time, the practice of ophthalmology was experiencing a revolution, enabled by technology. For example, eye doctors were beginning to switch from extracapsular cataract extraction (ECCE) to phacoemulsification, a method which gave better and more predictable clinical outcomes. We also saw the transition from inpatient surgeries to day surgeries, and the gradual replacement of general with local anaesthesia during these procedures. These changes provided the foundation for a stand-alone ambulatory eye centre, giving birth to the concept of SNEC.

Undoubtedly, the establishment of SNEC as a specialty centre independent from the Singapore General Hospital (SGH) was one of the most profound changes for ophthalmology in Singapore, a change

which accelerated many other changes in the practice of eye care. When Professor Arthur Lim, founding Medical Director of SNEC, first started out with a team of nine, there was considerable resistance as people felt uncomfortable leaving SGH, not knowing whether SNEC would even survive. Joining a new upstart away from the “mothership” of SGH was risky business! Shortly after, Professor Lim mooted the idea of having a research institute within SNEC, which led to the development of the new Singapore Eye Research Institute (SERI). To build a research institute within a new healthcare institution was an idea way ahead of its time.

SNEC has never failed to take risks while carrying out its mission, with a longer-term goal of excellence in mind. In a sense, as a new Medical Officer in SNEC, I experienced this culture in 1996 when Professor Lim asked me to consider doing a PhD at Johns Hopkins University in the United States. At that time, I was hoping to undergo clinical training to become a full-fledged ophthalmologist, like my peers. To take several years off without pay at this stage seemed so uncertain and risky. Furthermore, it was frowned upon for Singapore doctors to engage in research, which was seen as a distraction from clinical care. In fact, when I applied to the Public Service Commission for support to carry out my studies, they asked, “Should you be seeing patients instead?”

Nonetheless, Professor Lim went out of his way to support me, obtaining permission from the Ministry of Health and the National University of Singapore, and finding funding from the Lee Foundation and the Singapore Eye Foundation.

How times have changed. Today, at SNEC, we fully embrace our role as a major academic eye centre in Asia and globally, with a triple, integrated mission of clinical care, research and education. As part of delivering even better care to our patients, we encourage our younger residents to have training and experience in conducting research and to be part of our teaching faculty. SNEC now partners with Duke-NUS Graduate Medical School Singapore to train future clinician scientists. In Singapore, biomedical sciences is now recognised as the fourth pillar of our economy, alongside electronics, engineering and chemicals, and SNEC/SERI is part of this pillar.

25 years after SNEC was conceptualised, Singapore’s population has almost doubled and now stands to close to 5.5 million. We face new challenges in eye care, with an ageing population and the rise of chronic diseases such as AMD and diabetes.

As SNEC celebrates its silver jubilee, I am confident that our pioneering and dedicated faculty and staff as well as our younger future leaders will rise to meet these new challenges and take calculated “risks” for the next 25 years, just as we have done over the last 25 years.

**Professor Wong Tien Yin**  
*Medical Director, SNEC*

## Felicitations from around the world

“Under the exemplary leadership and vision of Professor Arthur Lim and his successors, SNEC has raised the research, education, and practice of ophthalmology in Singapore to world-class status.”



**Professor Robert J. Cionni**

*President*

*American Society of Cataract and Refractive Surgery*

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“The impact of SNEC is immense through high quality services, matching the best in the world, directly to those who came to you and indirectly through scores of your alumni around the world; and your cutting edge research.”



**Professor Gullapalli N. Rao**

*President*

*Academia Ophthalmologica Internationalis*

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“SNEC’s tremendous progress was evident each time I visited the center and now, after 25 years of development, SNEC has emerged as a center of excellence in the areas of clinical service, teaching and research.”



**Professor Wang Ning Li**

*Director and Vice President*

*Beijing Tongren Hospital*

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“SNEC has grown to be a world leading Centre. It has certainly grown way beyond what one could have reasonably anticipated.”

**Professor Hugh R. Taylor AC**  
*President  
International Council of Ophthalmology*



“For 25 years, the Centre has made spectacular accomplishments from advanced eye care, pioneering ophthalmic research, to extensive education programmes making SNEC the role model in Ophthalmology regionally and internationally.”

**Professor Dennis Lam**  
*President  
Asia-Pacific Academy of Ophthalmology*



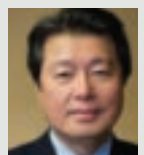
“Your centre is without question one of Singapore’s brightest stars that shines across the world and of which the country is immensely proud.”

**Professor Sir Peng Tee Khaw**  
*Professor of Glaucoma and Ocular Healing,  
and Consultant Ophthalmic Surgeon  
Moorfields Eye Hospital*



“The growth and success of SNEC mirrors the amazing growth and success of your country. Like Singapore, SNEC’s influence in world ophthalmology is far greater than its size.”

**Professor Tatsuro Ishibashi**  
*President  
Japanese Ophthalmological Society*



## Felicitations from around the world

“The growth and development of SNEC has been nothing less than meteoric; a commentary on the enlightened support it has received from the government and private sectors, and the enthusiasm, dedication, and inspiring commitment and innovation of its staff and leadership.”

**Professor Alfred Sommer**

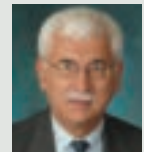
*University Distinguished Service Professor  
Gilman Scholar, Dean Emeritus  
Johns Hopkins University*



“The international ophthalmology community has watched with respect as SNEC has grown and matured under Professor Arthur Lim’s guidance and now your own, from a handful of dedicated clinicians in 1990 to a team of hundreds of professionals with a long list of research and clinical achievements to your credit.”

**Professor William F. Mieler**

*President  
The Association for Research in Vision  
and Ophthalmology*



“In a very short time you have managed to become a world leader in clinical care and cutting edge research. Quite an accomplishment!”

**Professor Edward G. Buckley**

*Vice-Dean for Education, Duke School of Medicine  
Chairman, Department of Ophthalmology  
Duke Eye Center*



“Now, Singapore means excellence for those of us working in the field of ophthalmology and eye research.”

**Professor Nagahisa Yoshimura**

*Professor and Chairman  
Department of Ophthalmology and Visual Sciences  
Kyoto University Graduate School of Medicine*



“The magnificent works at SNEC and SERI have led to profusely improved treatment and prevention for eye diseases, benefiting people in Singapore, Asia, and all regions beyond.”

**Professor C. P. Pang**

*Chairman, Department of Ophthalmology and Visual Sciences  
Director, Shantou University / The Chinese University of Hong Kong  
Joint Shantou International Eye Centre*



“You have been at the forefront of supporting your patients and developing high-quality eye care. Many patients can see again, thanks to the conscientious treatment provided by SNEC.”

**Prof Nguyen Trong Nhan**

*President  
Vietnam Ophthalmological Society*



“During the course of 25 years, SNEC has made remarkable progress and achieved its goal of centre of excellence as set out by its founding Director, Professor Arthur Lim. Indeed, SNEC is now regarded as the top ophthalmic institution in the region in research, training and medical and surgical care.”

**Prof Ko Ko Thant**

*President  
Myanmar Ophthalmological Society*



# 25 Years of Achievements

**“Our vision is for the Singapore National Eye Centre to attain international eminence within a decade.”**



**Dr Kwa Soon Bee**  
Permanent Secretary (Health), Director of Medical Services and Chairman of HCS Pte Ltd appointed Professor Arthur Lim as the Medical Director-designate of the Singapore National Eye Centre.

**“If you perform a good eye operation, you restore vision to one man. But if you spread the teachings of good quality eye surgery to your colleagues, they will ultimately restore vision to millions of blind victims in the world.”**

**Professor Arthur Lim**  
Founding SNEC Medical Director (1989–1999)

## 1991

SNEC was officially opened by then Health Minister Mr Yeo Cheow Tong.



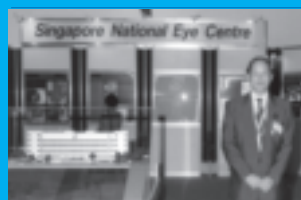
## 1995

SNEC began providing a full range of subspecialty eye care services from cataract to glaucoma, neuro-ophthalmology and paediatric ophthalmology.



## 1990

World-renowned eye surgeon Professor Arthur Lim was appointed SNEC's first Medical Director.



SNEC saw its first patient in October.

SNEC hosted the 26<sup>th</sup> International Congress of Ophthalmology (ICO) for the first time with 7,600 participants, the largest international conference in Singapore.



## 1996

SNEC partnered key public hospitals such as Changi General Hospital and KK Women's and Children's Hospital to offer eye care services across Singapore.

## 1997

The Singapore Eye Research Institute (SERI), the first research institute dedicated to ophthalmic research in Asia, was officially opened.



**“We want to be the first, the best, and the biggest.”**

**Associate Professor Vivian Balakrishnan**  
2nd SNEC Medical Director  
(1999–2000)

## 1999

Associate Professor Vivian Balakrishnan was appointed as SNEC’s second Medical Director.



SNEC phase 2 extension began with a \$50 million, eight-storey building comprising two floors of outpatient clinics, five operating theatres, and two floors of SERI’s research clinics and laboratories, among other facilities.



## 2000

Professor Ang Chong Lye became SNEC’s third Medical Director.

SNEC held the first annual National Eye Care Day with eye screening services for the elderly.



**“We must continue to uphold the values and the commitment to the highest quality of medical excellence.”**

**Professor Ang Chong Lye**  
3rd SNEC Medical Director  
(2000–2008)



## 2003

SNEC received the Excellence for Singapore Award for clinical and research breakthroughs such as conjunctival stem cell transplantation.

SERI released encouraging early findings from the Atropine in the Treatment of Myopia (ATOM) clinical trial on children. A decade later, Atropine is now available as a treatment option for progressive myopia in children at SNEC.

## 2004

SNEC and the National Dental Centre performed the first Osteo-Odonto Keratoprosthesis (OOKP) surgery in Southeast Asia. Also known as ‘Tooth-in-Eye’ surgery, it is aimed at helping those blinded by end-stage corneal disease.

The ASEAN Association of Eye Hospitals (AAEH) was inaugurated in Kuala Lumpur with SNEC being one of the five founding members comprising major eye hospitals in Indonesia, Malaysia, the Philippines, and Thailand.





## 2006

SNEC and SERI scientists published in *Nature Genetics* a study describing a gene that caused congenital corneal hereditary endothelial dystrophy, a severe form of blindness affecting children.

SNEC doctors became the first to establish strong link between a blinding fungal infection with a contact lens solution. That led to a world-wide recall of the product, halting the epidemic. The team received the inaugural Minister for Health Award.

## 2007

SNEC together with Moorfields Eye Hospital (UK) and Rotterdam Eye Hospital (Netherlands) jointly founded the World Association of Eye Hospitals.



## 2008

Professor Donald Tan was appointed as SNEC's fourth Medical Director.

SERI was awarded a \$25 million translational clinical research flagship grant for the Translational Research Innovations in Ocular Surgery (TRIOS), a five-year programme focusing on two major causes of global blindness, corneal disease and glaucoma.



**“To attain excellence, we must develop the best quality skills by sub-specialisation.”**

**Professor Donald Tan**  
4th SNEC Medical Director  
(2008–2014)

## 2009

Professors Donald Tan, Roger Beuerman and Aung Tin were the pioneer recipients of the prestigious President's Science Award 2009 for their innovative breakthroughs in 'bench-to-bedside' medical research in blinding corneal diseases and glaucoma, leading to major advancements in scientific knowledge and the treatment of these diseases.



Tan Endoglide™, a patented endothelium insertion system for corneal transplantation, was named after Professor Donald Tan and his team.

## 2010

Professor Wong Tien Yin, then SERI Director, was awarded the President's Science Award 2010 for the development and use of novel retinal imaging to understand pathways in cardiovascular and metabolic diseases.

## 2011

First-in-Asia DMEK advanced technique for corneal transplantation with a potential for 100 per cent success, was introduced by SNEC.

SERI launched its inaugural fundraising initiative via the *Eyes that tell Stories* photo exhibition, featuring the eyes of Singapore's founding father, the late Mr Lee Kuan Yew, among others.

SERI was admitted as a full member of the International Agency for the Prevention of Blindness (IAPB). An international alliance, the IAPB partners the World Health Organization to lead efforts in blindness prevention.

## 2013

SERI's \$25 million TCR grant was renewed with the introduction of the Surgery and Innovative Technologies (EyeSITE) programme.

SNEC commenced dedicated Myopia Clinic to provide atropine treatment to children aged 6 to 12.

## 2012

SNEC partners with Duke-NUS to launch the Ophthalmology & Visual Sciences Academic Clinical Programme, strengthening its academic medicine mission.

### OPHTHALMOLOGY & VISUAL SCIENCES

Academic Clinical Program

SERI scientists discovered three genes linked to primary angle closure glaucoma (PACG), a leading cause of blindness in Chinese people, and published their findings in the prestigious *Nature Genetics* journal.

SERI partners with Tan Tock Seng Hospital to introduce the Singapore Integrated Diabetic Retinopathy Programme (SiDRP), a national diabetic retinopathy screening programme at polyclinics.

SERI launched its inaugural fundraising gala dinner, *The Eye Ball* in October with President Tony Tan Keng Yam gracing the occasion.



“Our mission is to take care of anyone in Singapore who needs eye care. Every patient who walks through our door will receive good quality, evidence-based care.”

#### Professor Wong Tien Yin

SNEC Medical Director  
(2014–present)

## 2014

Professor Wong Tien Yin was appointed as SNEC's fifth Medical Director.

The \$5 million *Arthur Lim Professorship in Ophthalmology* was set up by SNEC and Duke-NUS. Professor Donald Tan was named the first Arthur Lim Professor in Ophthalmology.



SNEC produced and made available Myopine™ eye drops (0.01% atropine) to reduce progression of childhood myopia.



Two eye research teams were conferred the President's Science and Technology Awards. The first, led by Professor Wong Tien Yin and his team from NUS and A\*STAR for the development of a suite of novel eye image analysis technologies and the other, led by Associate Professor Tina Wong and her team from NTU for the development of a sustained drug-delivery technology to apply anti-glaucoma medicine.

Professor Donald Tan, Professor Aung Tin and Professor Saw Seang Mei from SNEC/SERI were named in the list of the world's top 100 ophthalmologists in the UK-based journal, *The Ophthalmologist*. Professor Wong Tien Yin was named the world's most prolific author on diabetic macular edema.

## 2015

SNEC celebrates 25 years of service to the nation.

25  
YEARS  
VISION TO REALITY

# Numerous Firsts

## S'pore scientists in global study identify eye disease genes

By MELISSA PANG

A MULTI-CENTRE study co-led by a group of Singapore researchers has become the first in the world to succeed in identifying the genes behind a condition that can cause blindness.

The finding could pave the way for more targeted treatment for patients with central corneal thickness – a genetic trait associated with a condition where the cornea progressively thins and takes on a more conical shape. It is also known as keratoconus.

Scientists from the Singapore Eye Research Institute (Seri) and the Agency for Science, Technology and Research's Genome Institute of Singapore used data from three existing population-based eye studies. They spent a year differentiating the DNA of almost 8,000 Singaporeans aged 50 and above. This information was combined with similar data involving 55 hospitals and research centres from over 15 countries in Asia, Europe and the United States.

The 20,000-strong sample size enabled the team – led by Seri's executive director, Professor Wong Tien Yin – to identify 26 genes that are associated with corneal thickness. Six genes in particular were found to be significant in keratoconus.

Associate Professor Eranga Vithana, Seri's basic and experimental sciences associate director, said it was the “first study that identifies that many number of genes for keratoconus”. “We hope that by finding these genes, we can understand the disease better. And that one day, by finding more genes, we will be able to stratify patients and identify those more at risk of keratoconus.”


Seri's deputy director, Professor Aung Tin, added that targeted therapy could also then be developed in the future.

The study was published in the January edition of the prestigious science journal Nature Genetics.

About one in 1,000 people in Singapore are affected by keratoconus. The condition is more common among Asians than Europeans. Among Asians, it is more common in Indians.

The impaired vision can begin in a sufferer from the early teen years. The condition can be managed by wearing spectacles or hard lenses. But many patients will eventually require a corneal transplant by the time they reach their 30s or 40s.

Keratoconus is one of the major reasons for corneal transplants around the world.

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## SNEC gets global accreditation

SINGAPORE National Eye Centre (SNEC) is the first in Singapore and South-east Asia to be accredited by the International Joint Commission on Allied Health Personnel for Ophthalmology (IJCAHPO).

IJCAHPO provides international accreditation by setting academic standards for ophthalmic training programmes to enhance the quality and availability of ophthalmic patient care.

IJCAHPO is the international division of the Joint Commission on Allied Health Personnel for Ophthalmology (JCAHPO), which offers certification and continuing education opportunities to ophthalmic allied health personnel.

# Study links three genes to glaucoma

## Those with all three are three times more likely to have the eye disease

By LIA JIA MIN

SCIENTISTS in Singapore have isolated three genes related to glaucoma which could pave the way to identifying those at risk.

The findings will bring about wider understanding of primary angle closure glaucoma (PACG), as well as explain why some people are genetically predisposed to the disease.

Glaucoma is caused by pressure inside the eyes resulting in

gradual but devastating effects, and could lead to blindness.

One of the genes discovered is thought to be associated with vascular permeability, while another is related to collagen.

Together, the two genes regulate fluid that passes through tissues in the eye. The function of the third gene is still unknown.

A person with all three genes is three times more likely to have PACG compared to a person who does not have any of the genes.

PACG occurs when the iris obstructs the anterior chamber angle in the eye, blocking exiting fluid. This increases pressure in the eyeball, which can damage the optic nerve.

Glaucoma, left untreated, can lead to irreversible blindness. PACG is the second most common glaucoma found worldwide.

The research also confirmed that the condition is more common among the Chinese.

"Chinese people have an anatomical risk... because they have more narrow angles in their eyes," said Dr Eranga Vilhana, a lead author of the paper and associate director of basic and experi-

mental sciences at the Singapore Eye Research Institute (Seri).

It is the first large-scale study to examine genetic variations associated with closed angle glaucoma.

More than 20,000 people from seven countries took part in the three-year study, including nearly 2,000 Singaporeans.

Of the estimated 15 million people affected by PACG worldwide, 87 per cent are Asian.

Locally, the Singapore National Eye Centre sees between 5,000 and 10,000 patients with glaucoma a year. Most are aged above 60.

Funded primarily by a Nation-

Research Foundation grant, the study's findings were published on the website of biomedical journal Nature Genetics last month.

The scientists hope to use the results of the study to better understand the connection between the genes and PACG.

Said Professor Aung Tin, the lead principal investigator of the project and deputy executive director of Seri: "This is the first step towards defining the genetic architecture of this disease."

He added: "Ultimately, we hope that genetic marking will better help us identify people at risk in the future."

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## Keen eyes here avert blinding infections



By SALMA KHALIK  
Health Correspondent

WHEN Professor Donald Tan did his weekly Wednesday morning hospital ward rounds in early January, alarm bells clanged.

There were too many patients with the fungal eye infection keratitis — a disease so rare that the Singapore National Eye Centre (SNEC) sees only six to 10 cases a year, including people from other countries.

This time, all the patients were young Singaporeans.

Fungal eye infections are difficult to treat, as Joel Cheng, 16, found out. He was among those warded with a serious infection that caused visible white patches on his left cornea.

His treatment, which included applying 10 different medicines to his eyes every hour and cost his parents more than \$30,000, has enabled him to retain the use of his cornea.

But five others here were not so lucky and needed cornea transplants. In the United States, the past three months have seen cases of people going blind.

Back in January, Prof Tan, the SNEC's deputy director, had not heard of any outbreak, but thought it very unusual to see so many cases on the same day.

Such infections are usually caused by physical injury to the eye, such as when a jogger runs into a tree branch, or in a work-site accident. None of the hospitalised cases fit the bill.

What Prof Tan did in the days that followed led to the removal of the ReNu contact lens solution from shop shelves, first in Singapore and eventually, worldwide.

He called other public hospitals here, and only Changi General Hospital had seen a rise in cases.

CONTINUED FROM PAGE ONE

## Keen eyes here avert blinding infections

But his antenna was up and he got his team to check the number of fungal infections seen recently. They found an unusually high 13 cases over a period of just two months.

Now he was sure there was a problem, but did not know what it was. He informed the health authorities and got his team to contact patients to check if there was anything in common among them. He also asked corneal surgeons in other countries if they had noticed a similar increase in infections.

The calls to patients paid off. They all used disposable soft contact lenses and Bausch & Lomb's ReNu with MoistureShield contact lens solution. Wearing his other hat as director of the Singapore Eye Research Institute, he set all the public hospitals here digging through their old cases.

Meanwhile, he also went to the hospital's microbiology laboratories to check all eye fungal infections. There are three groups of fungi that cause corneal infections, but all the labs were seeing only one, *Fusarium*.

Prof Tan alerted the Ministry of Health.

Professor K. Satku, the ministry's director of medical services, had epidemiologists looking into the problem right away.

Dr Steven Ooi Peng Lim, the ministry's deputy director (disease control) recalled that at first, "we didn't know what keratitis was all about" — the infection was that rare.

So the medical sleuths had to go back to basics in conducting their checks. Within two weeks, they found that 18 out of 19 patients had used ReNu. Three had needed corneal transplants to save their eyesight.

Prof Satku called an emergency meeting on Feb 17 and emerged determined to blow the whistle on the contact lens solution even though the link was circumstantial and not yet corroborated by other countries.

"If I made the wrong decision, I would have got a kick

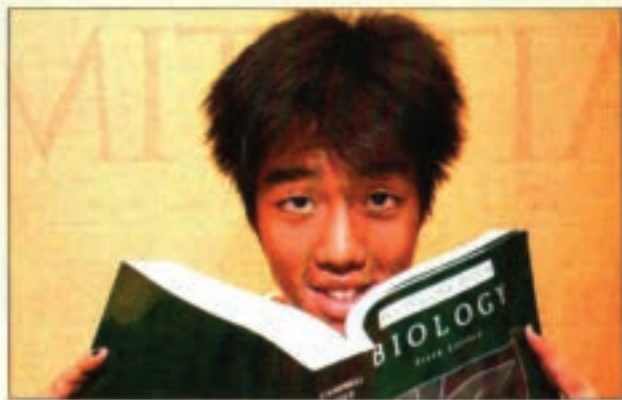


PHOTO: LIM SIN THAI

**SAVED:** Student Joel Cheng got an eye infection from using Bausch & Lomb's ReNu contact lens solution and might have gone blind in his left eye if the infection was not discovered early.



**RIGHT MOVE:** The actions taken by SNEC deputy director Prof Tan led to the eventual removal of the ReNu solution worldwide.

### Chronology of events

**January 2006:** Professor Donald Tan raises alert after noticing unusual surge in cases of fungal eye infection keratitis.

**February 17:** After three people needed corneal transplants to save their eyesight, the Health Ministry issues public warning against using the ReNu contact lens solution, even though tests had found nothing wrong.

**February:** The public warning was followed up quickly with alerts to health authorities in other countries, triggering findings of similar infections in Hong Kong, the US, Malaysia, Europe and Australia.

**May 15:** Bausch & Lomb voluntarily and permanently withdraws the product from all markets worldwide.

in the butt," he told The Straits Times. "But people could lose their eyesight. That was the gravity of the problem."

Looking back, Prof Tan says that move by the ministry was a brave decision. "I must say, they took a big risk," he said.

But Prof Satku disagrees. If it had been a minor problem, like a rash, he could have waited for proof. But here, public safety was at stake.

The Health Sciences Authority informed Bausch & Lomb, which voluntarily

removed the contact lens solution off the shelves here, even as it insisted that there was "no conclusive scientific evidence that our product is responsible for this spike in eye infections in Singapore".

Three days later, the company's US-based chief medical officer, Dr Brian Levy, was in Singapore to help with investigations.

The Health Ministry had meanwhile also contacted health authorities in other countries about the problem.

Now it appeared as if Singapore had cried wolf. No one had seen any cases and a

conference call to the Centers for Disease Control and Prevention (CDC) in Atlanta in the US turned up a blank.

Said Prof Tan: "They didn't see an immediate problem, but said they would ask around."

It subsequently emerged that in July last year, Hong Kong doctors had seen an increase in *Fusarium* keratitis infections, but no connection was established with ReNu.

Prof Tan went on to alert eye surgeons at the World Ophthalmology Congress in Brazil, which he attended in February to give a talk on

managing corneal transplant problems.

One of the experts he spoke to was Professor Eduardo Alfonso of Florida's Bascom Palmer Eye Institute, known for its data on *Fusarium*. In the US, such infections are more common in Florida's tropical climate.

When Prof Alfonso returned and checked, he found a spike. In the latest report, his centre uncovered more than 50 such infections.

Slightly over a week after Singapore's alert, reports from Hong Kong said that three in four of its patients with fungal eye infections had used ReNu. Then cases started appearing in Malaysia, the US, Europe and Australia.

Finally, on May 15, Bausch & Lomb voluntarily and permanently withdrew the product from all markets worldwide.

Since November 2004, when ReNu with MoistureShield was introduced, there have been 79 cases of *Fusarium* keratitis here. The real spike came in January this year with 14 cases, followed by another 14 in February.

Despite the publicity and strong warnings by the ministry, some people continued using ReNu and eight new cases surfaced in March and April.

But by then, doctors were all on the alert, and the patients received treatment early and suffered less.

Looking back, Prof Satku and Prof Tan say that if Singapore had not spotted the trend, someone else might well have. But the time lag could well have left more people without their eyesight.

There were factors in Singapore's favour — including the 400,000 contact lens users here and a concentration of eye specialists at the SNEC.

Still, Prof Satku adds, the episode showed that experience counts.

"It reflects well on our clinicians, who are always alert for changes in patterns of diseases," he said.

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CONTINUED ON PAGE 2



**SIARAN MATA PERCUMA:** Dr Anwar Rahman Anwar, Felo Gajin Klinik Seri (SG), sedang memeriksa mata seorang peserta kajian berkaitan mata menggunakan alat di bawah 'titrasi' di Pusat Mata Nasional Singapura (SMNS). — Foto N.S. SILLER



**JALANI KAJIAN MATA KEDUA:** Cik Siti Zubairah Abdul Wahab (tengah), 68 tahun, antara peserta kajian berkaitan mata SMNS-2. Kelelahan beliau diiringi pengaji kajian, Cik Rosetta Shukh Mohamed, 31 tahun, di samping di Bukit Merah Eye. — Foto YUSRIAN WAZIR

## KAJIAN MATA KEDUA

### Hampir separuh Melayu punya penglihatan lemah

**BERIKUT** beberapa dapatan utama hasil kajian mata pertama, Singapura Malay Eye Study (SiMES), yang dijalankan oleh Institut Kajian Mata Singapura (SiMS).

► Sebarang dapatan setiap orang orang Melayu Singapura mengalami masalah berkaitan mata. Sekitar 47 peratus mempunyai penglihatan yang lemah atau buta di satu atau kedua-dua belah mata.

► Dicapai mereka yang mempunyai penglihatan lemah di kedua-dua belah mata, orang daripada 37 orang adalah wanita. Wanita mempunyai kadar kelesuan seperti lebih tinggi berbanding lelaki (4.27 peratus wanita, 2.3 peratus lelaki).

► Sebanyak 92 peratus kes-penglihatan lemah yang dialami orang Melayu sebenarnya boleh diubati.

Dua punca utama penglihatan lemah bagi mereka ialah sebab jangkitan atau tidak dirawat (55 peratus) dan katarak (37 peratus).

► Katarak merangkumi 60 peratus peserta berkaitan di kalangan orang Melayu. Katarak, masalah penyempitan kanta mata yang mengesan penglihatan, boleh dirawat melalui pembedahan.

► Enam daripada 30 orang Melayu berusia 40 tahun ke atas menghidap tekanan darah tinggi. Penyakit ini, yang tidak boleh dicegah tetapi hanya dikawal, boleh meningkatkan risiko

retinoid dalam di retina (bahagian di belakang mata yang memfokuskan imej).

► Sebarang dapatan lima orang orang menghidap katarak mata. Salah satu penyakit mata yang biasa dikaitkan dengan katarak mata ialah diabetes retinopati iaitu gangguan pada saluran-saluran darah di retina dan boleh menyebabkan buta.

Sekitar 60 peratus dapatan peserta ini menghidap katarak mata antara 15 tahun atau lebih dan berisiko menjadi buta.

► Lelaki Melayu lebih cenderung menghidap glaukoma.

Glaukoma ialah punca utama kebutaan yang menyebabkan buta di seluruh dunia.

Kajian menunjukkan trend penglihatan glaukoma dengan peningkatan satu di kalangan masyarakat Melayu, walaupun kadarnya rendah (4.5 peratus).

► Penglihatan yang lemah boleh dikaitkan dengan status socio-economic iaitu taraf pendidikan dan pendapatan seseorang dan juga masyarakat di sekelilingnya.

Ke komisan taraf pendidikan rendah boleh dikaitkan dengan tahap kelesuan mata yang rendah — atau dapatan baru yang menunjukkan kajian lanjut, menurut pengaji kajian tersebut.

Hasil kajian SiMES ini telah diterbitkan dalam majalah Singapore Medical Journal beberapa Februari 2012.

OHIA ZEYUAN ABRAH  
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**S** EKUMPLEAN orang Melayu yang menjalani kajian berkaitan mata mata telah lalu telah diberi peluang menjalankan kajian kedua yang diwujudkan tahun lalu.

Tujuan kajian kedua kali ini adalah untuk memahami penyebab dan faktor-faktor risiko berbeza bagi penyakit penyakit mata utama di kalangan orang Melayu.

Kajian Singapura Malay Eye Study (SiMES) pertama telah dijalankan dari 2004 hingga 2006 melibatkan 3,240 penduduk Melayu. Dan hasilnya menunjukkan ramai mereka mempunyai tahap kelesuan mata yang agak kurang baik.

Sejarah daripada mereka didapati mempunyai penglihatan kurang jelas di sekurang-karangnya satu mata, dengan separuh daripadanya boleh dibetulkan dengan memakai kanta mata.

Lebih 80 peratus yang menghidap diabetes retinopati (penyakit mata yang berkaitan dengan kencing manis) dan lebih 90 peratus yang menghidap glaukoma tidak sadar mereka mempunyai masalah ini.

Nata lagi dapatan menunjukkan 60 peratus berkaitan di kalangan orang Melayu berusia daripada katank — atau golongan yang lebih dicegahkan melalui pembedahan.

Kajian kedua (SiMES-2) ini dijalankan awal Januari tahun lalu dan dijalankan berbilang tahun dengan ia melibatkan penduduk Melayu lelaki dan wanita berusia 40 tahun ke atas.

Menjelakan lebih lanjut rasmin di sebuah lagi untuk mengaham kajian kedua ini, Pengarah Institut Kajian Mata Singapura (SiMS), yang menghidap kajian tersebut, Profesor Wang Tian Yin, berkata:

"Kajian lanjutan ini satu-satunya cara untuk memahami maklumat mengenai berapa ramai individu yang terlibat dalam kajian pertama yang kemudian menghidap penyakit mata, dan kesannya pada kes penglihatan berkaitan."

"Ulasan ini akan juga membina kanta mengenai faktor-faktor risiko utama yang membolehkan kepada penyakit mata melalui teknologi imbasan terbaru yang kami gunakan untuk mengaham data kajian."

Selain itu, timbalik Profesor Wang, kajian lanjutan akan juga mengahamkan perubahan mereka mengenai katarak yang berkaitnya antara buta dan faktor berkaitan dengan penyakit penyakit mata.

"Maklumat yang penting yang didapati diharapkan dapat membina kanta melalui strategi bagi meningkatkan masalah penglihatan dan kelesuan di Singapura dan Asia," katanya lagi.

Apa dikatakan dengan kajian ini berlanjutan later belakang yang mengaham 60 peratus kes masalah penglihatan dan kelesuan di de-

### Pelawaan sertai SiMES-2

ADAKAH anda di antara mereka yang terlibat dalam kajian berkaitan mata pertama, Singapura Malay Eye Study (SiMES), yang dijalankan Institut Kajian Mata Singapura (SiMS) dari 2004 hingga 2006?

Kita ya, anda dipelawa menyertai kajian keduanya (SiMES-2). Pihak SiMS sedang berusaha mengahamkan kesannya 3,240 peserta yang terlibat dalam kajian pertama untuk mengahamkan bagaimana dalam kajian kedua dan tidak akan mengahamkan mereka walaupun mereka telah berpindah rumah atau tinggal di kawasan lain.

Pegawai kajian akan mengahamkan peserta melalui telefon atau lawatan ke rumah untuk mendapatkan keterangan lanjut dan memberikan surat jampi termu untuk ujian mata.

Ujian mata ini akan dijalankan di Seri di Pusat Mata Nasional Singapura (SMNS) dekat Hospital Besar Singapura (HBS).

Antara pegawai kajian itu ialah Enik Nurul Shab Zin, 25 tahun. Beliau memberitahu sebab menyertai kajian ini kerana 30 ramailah untuk kajian kedua ini.

"Alhamdulillah, saya yang menyertai kanta dengan baik dan saya mengahamkan bagaimana lagi dalam kajian kedua ini, tapi saya yang tak mahu satu mata mereka tak boleh datang kerana sudah tua dan tidak mampu yang boleh mengahamkan mereka untuk jampi ujian mata ini," kata Enik Nurul Shab.

"Tetapi warga tua seperti ini tidak harus mengahamkan kerana kanta boleh jampi mereka di rumah untuk jampi ujian di Seri dan kemudian mengahamkan mereka pulang," kata seorang lagi pegawai kajian, Cik Rosetta Shukh Mohamed, 31 tahun.

Peserta atau ahli keluarga mereka yang ingin menyertai jampi termu lagi kajian ini atau mendapatkan keterangan lanjut boleh mengahamkan koordinat SiMES-2, Enik Abdul Farook, Abdul Kader, di talian 6650-1012 atau 6601-1019 atau kintan e-mail ke [AbdulFarook.abdul.kader@siert.com.sg](mailto:AbdulFarook.abdul.kader@siert.com.sg).

#### Pemeriksaan percuma

Di Mahadani Rosman (Dilaman, Komunitas Pekar Optometriologi di Pusat Mata Nasional Singapura (SiMS)) dan perolehi projek SiMES, berkata mereka yang terlibat dalam kajian kedua ini akan menjalani pemeriksaan mata yang lengkap secara percuma oleh pakar optometriologi seperti dalam kajian pertama.

"Pemeriksaan ini baik untuk mereka yang mendapati mereka mempunyai mata silat atau mata tahun lalu dan ingin tahu keadaan mata mereka sekarang kerana masalah mata boleh timbul setelah beberapa lama dan kebanyakannya tidak menunjukkan tanda-tanda sehingga ia telah di tahap lanjut."

"Tetapi, jika silakan awal, ia boleh dicegah," kata Dr Mahadani Rosman.

Sejauh ini, 675 penduduk Melayu yang terlibat dalam kajian pertama telah menjalani pemeriksaan mata di bawah kajian kedua ini.

Antara mereka ialah Cik Siti Zubairah Abdul Wahab, 68 tahun, ibu bapaknya anak dan mempunyai 23 cucu dan seorang cicit.

"Alhamdulillah, semua menjalani ujian mata yang pertama, saya didapati tak ada apa-apa masalah mata. Cuma, saya memang ada paku cornea mata untuk membuang Queset atau buta."

"Mudah-mudahan ujian mata kali ini pun menyimpulkan saya baik," kata Cik Siti Zubairah yang tinggal di Bukit Merah, salah satu kawasan yang terlibat dalam kajian SiMES-2.

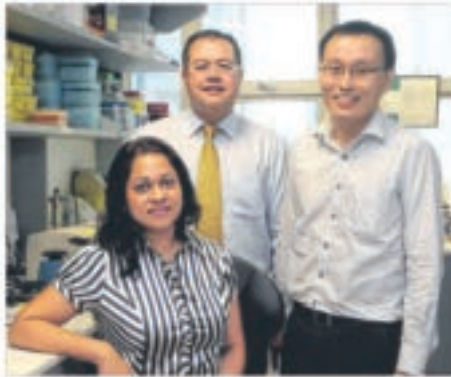
Kawanan-kawanan lain termasuk Jorong West, Telok Blangah, Bukit Merah, Commonwealth, Queenstown dan Tanjong Pagar.

Enik Hussaini Dabari, 59 tahun, seorang lagi peserta kajian kedua ini juga memberitahu pembina mengahamkan keadaan matanya baik ketika hasil kajian pertama.

"Saya memang tak pernah pakai kanta mata, kanta untuk membaca, dan penyakit mata pun tak ada," kata Enik Hussaini.

# 有助了解青光眼等眼疾 我国人员参与首度找出 决定中央眼角膜厚度基因

一组来自我国及另14个国家的科研人员，从拥有超过三万个基因的人体基因组中，找出能决定中央眼角膜厚度的27个基因。新加坡眼科研究所所长陈长裕了教授表示，锁定控制中央眼角膜厚度或圆锥角膜病的基因后，未来可能根据基因为他们预测患病风险分值，并为确诊有高风险的患者提早治疗。



文林 报道  
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眼角膜厚度与眼压息息相关，一旦角膜增厚，眼压就可能升高。一些角膜增厚及导致圆锥角膜病的基因，是从拥有超过三万个基因的人体基因组中，找出能决定中央眼角膜厚度 (central cornea thickness) 的27个基因。

这些基因包括角膜胶原，而角膜胶原是构成角膜的主要成分。角膜胶原是角膜的主要成分，也是角膜硬度的主要决定因素。

科研人员还发现，其中六个基因与一种可导致角膜变厚——圆锥角膜病 (Keratoconus) 息息相关。这是一种由于角膜变薄、导致角膜变凸，造成角膜散光的眼疾。人群中患此病的比例为100分之一，亚洲人患此病的比例比西方人高。

陈长裕说，这些基因与角膜胶原的基因非常相似，只是排列顺序、数量有所差别。这些基因可能控制角膜胶原的合成、降解或交联等过程。陈长裕说，这些基因可能帮助科学家了解圆锥角膜病的发病机制，并可能通过了解其发病机制，为治疗提供新的思路。

科研人员还发现，决定中央眼角膜厚度的27个基因，与近视眼、远视眼、老花眼、青光眼等眼疾的发病机制有关。陈长裕说，这些基因可能帮助科学家了解这些眼疾的发病机制，并为治疗提供新的思路。

## 四年时间找出基因

新加坡眼科研究所 (Singapore Eye Research Institute, 简称SERI)，新加坡国家眼科学研究所 (National Institute of Ophthalmology, 简称NIO) 及全球生物医学及基因组学研究中心的科研人员，经过四年时间，首次发现了决定中央眼角膜厚度的27个基因。陈长裕说，这些基因可能帮助科学家了解圆锥角膜病的发病机制，并可能通过了解其发病机制，为治疗提供新的思路。

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SNEC transmits first live surgery in 3-D HD at 21st APAO Congress

# Eye surgeons get 3-D HDTV view of operations

By THAM YUEN-C

THEY saw exactly what the eye surgeons saw through the surgical microscope, down to the finest detail and depth.

But the 1,500 participants at the congress of the Asia-Pacific Academy of Ophthalmology were nowhere near the operating theatre.

Instead, they were seated

across town in an auditorium at Santeeq City, watching a live telecast — in three-dimensional high-definition format — of two operations performed at the Singapore National Eye Centre (SNEC).

And while the surgical procedures were routine, the technical feat of televising it live and in 3-D was a first.

The live transmission was made possible by a surgical

microscope fitted with 3-D cameras. The two cameras recorded the procedure from different angles and simultaneously transmitted the images via broadband connections to Santeeq City where they were then combined electronically to form the slightly displaced image required for a 3-D display.

With plastic 3-D glasses, the delegates, who were main-

ly eye surgeons, saw a magnified image of the eyes being operated on as well as the depth at which they were prodded and cut, something not possible before in two-dimensional telecasts.

It enabled doctors to appreciate the depth of the surgical procedure, which is especially important when dealing with microsurgery, said SNEC director Ang Cheng Lye.

Eye surgeon Sandeep Mittal of India's LLRM Medical College said: "With 3-D, you get a better sense of where the instruments are moving, and a much better look at the surgery. It's useful, especially for learning surgeons."

And that is exactly what SNEC has in mind.

Its head of training and education, Dr Ong See Guan, said SNEC plans to use the

technology to organise courses for trainee doctors. "This tool allows a larger group of students to watch live surgery demonstrations, and will give them more exposure."

There are also plans to transmit live demonstrations to other centres in the region as part of SNEC's move to establish itself as a regional training centre for eye surgeons.

The Straits Times 16 June 2006



# Numbers at a glance

## Singapore National Eye Centre

---

**300,000**

patients visits annually

---

**65**

ophthalmologists in practice

---

**30,000**

people screened in our annual national eye care day since 2000

---

**27,000**

surgeries performed annually

---

**630**

nurses, allied health, ancillary and administrative staff serving the eye care needs of Singapore

---

**23**

international meetings organised

---

**8,000**

laser procedures performed annually

---

**130**

local fellows trained in SNEC

---

**30,000**

students reached through eye care talks conducted in 30 schools since 2012

---

**10**

subspecialties to provide a comprehensive range of specialised eye services

---

**100**

overseas fellows trained in SNEC

---

## Singapore Eye Research Institute

---

**220**

researchers, doctors, clinicians,  
clinical scientists and administrators

---

**\$198 million**

in grant funding secured

---

**105**

patents filed

---

**2,190**

scientific papers published

---

**165**

masters, PhD, post-doctoral students

---

**320**

national and international awards

---

**1,098**

studies on all aspects of eye research

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Over the years, the Singapore National Eye Centre (SNEC) has evolved into a centre of excellence for ophthalmic service, research and education.

*SNEC 25 Highlights* traces the key milestones and strategic initiatives in SNEC's illustrious 25-year history that have made SNEC the institution it is today.

# 25 Highlights

1. Singapore comes of age in ophthalmology
2. Mission impossible?
3. Keeping an eye on quality
4. Spectacular growth and Phase 2 expansion
5. Punching above the pack
6. Professor Arthur Lim — A giant ahead of his time
7. Towards zero infection
8. Restoring sight with tooth in the eye
9. Nanomedicine: the new frontier
10. Leading the fight against myopia
11. Ushering the largest eye research meeting to Singapore
12. The Eye Ball
13. Eyes that tell stories
14. SNEC wins multiple presidential honours
15. Honouring Southeast Asia's father of ophthalmology
16. Standing tall among the best
17. Striving for organisational excellence
18. Nurturing human resource: SNEC fellowship programme
19. Fostering a culture of academic medicine
20. Going international: SNEC AHP training programme
21. For your eyes only
22. Enabling patient care, one app at a time
23. Early detection is better than cure
24. Age-friendly environment
25. On the frontlines of ophthalmology



Highlight

1

Singapore comes of age in ophthalmology



Even before the Singapore National Eye Centre (SNEC) was set up, the idea of a world-class ophthalmic centre in Singapore was already making its mark at the 26th International Congress of Ophthalmology (ICO) in March 1990.

The prestigious event not only brought the global ophthalmology community to Singapore, many for the first time, but also exposed thousands of ophthalmologists around the world to the launch of what was potentially an international centre of excellence for clinical service, education and research for the whole of Asia.

In many ways, the ICO was the coming of age for Singapore's ophthalmology community, having made significant progress from the late 1970s to 1980s in microsurgery and numerous teaching and skills transfer courses organised locally and in the region.

At the ICO meeting, the proposal on the formation of the SNEC was approved and a model of its building

was showcased to the world ophthalmic fraternity.

Organising the ICO was no mean feat. It required the organising committee to display the same mettle and precision that had served them well during surgical procedures. After all, the event had to host over 7,600 participants from 78 countries, including many key figures in ophthalmology at that time such as the legendary Professor A. Edward Maumenee, President of the International Council of Ophthalmology and dignitaries such as the late Singapore President Wee Kim Wee who officiated the meeting.

With a stellar scientific programme comprising 16 simultaneous scientific sessions, hands-on teaching courses by world experts and over 1,000 scientific papers presented, the 26th ICO in Singapore was recognised as the most successful international congress in its heyday.



Highlight

2



# Mission impossible?

While the need for setting up a national eye centre is apparent to many today, it took years of hard work and perseverance from the pioneering team to turn the vision into reality.

The late Professor Arthur Lim, an eminent eye surgeon in private practice, first mooted the idea in the late eighties, but it would take many more years of discussions and negotiations with government officials to resolve key developmental issues.

For instance, should the centre be developed within the National University Hospital, the private sector, or the Ministry of Health (MOH)? At that time, Dr Kwa Soon Bee, the Permanent Secretary and Director of Medical Services at the MOH felt that such an important development should be spearheaded by the government, and not by the private sector.

Also, should the SNEC be a centre largely focused on service delivery or should it be a centre of excellence emphasising not only quality care but also top-notch teaching and research with the aim to become one of the best ophthalmic centres in the world? A decision was made to go with the latter, and the government eventually committed \$17 million to build the SNEC in 1989.

Dr Peter Tseng, Dr Heng Lee Kwang, Administrator Charity Wai, the late Matron Esther Lim among others were handpicked by Professor Arthur Lim and became the pioneering team responsible to transform the old surgical blocks A and B in the Singapore General Hospital into a modern ambulatory eye facility. The fact that the entire building was to be retrofitted and operational in just 10 months was thought to be mission impossible by many.

Against all odds, the SNEC saw its first patient on 15 October 1990 and was officially opened in January 1991 by then Minister for Health Mr Yeo Cheow Tong.

With state-of-the-art facilities ranging from modern ophthalmic theatres, fully equipped consultation rooms and laser centre to training rooms, patient education centre as well as a unique surgery observation and recording room that allows live surgery viewing and real time communication between surgeons and trainees, the stage is set for SNEC's journey towards becoming a world-class institution.



## Highlight

# 3

## Keeping an eye on quality

SNEC is one of the few eye centres in the world that records every single major eye operation.

The reason: to use the recordings for teaching and monitoring of surgery to ensure high standards and outcomes. While this approach to evaluation of surgical skills is controversial at that time, SNEC believes it is the best way to ensure quality surgery for patients.

The impact has been tremendous. At the SNEC, over 98 per cent of patients who undergo cataract implant surgery can expect a visual outcome of 6/12 or better, and a posterior capsule rupture rate of 1.2 per cent.

Delivering quality services also means developing subspecialties to provide patients with specialised care and treatment. Over the years, the SNEC has nurtured a pool of talent in ten subspecialty services with capabilities to diagnose and treat all major eye conditions.

### 10 Subspecialties

- General Cataract & Comprehensive Ophthalmology
- Cataract
- Corneal & External Eye Disease
- Glaucoma
- Neuro-Ophthalmology
- Ocular Inflammation & Immunology
- Oculoplastic
- Paediatric Ophthalmology & Adult Strabismus
- Refractive Surgery
- Medical & Surgical Retina

## Filming operations can enhance eye surgery standards

### Video-tapes serve as valuable teaching tool

By Julia Goh

Eye operations should be videotaped and then reviewed as this is an effective way to maintain quality surgical skills, said the medical director of the Singapore National Eye Centre (SNEC), Dr Arthur Lim.

Dr Lim, who will be the chief instructor of the Live Surgery and Advanced Implant Surgery Course which starts today at the SNEC, told The Straits Times that such recordings serve as a valuable teaching tool.

He said: "Every operation at the SNEC is recorded. If there are complications, a senior surgeon will review the tape. But if there are no complications, the tapes are erased."

"This has benefited every one in the operating theatre."

During the three-day course, 70 ophthalmologists from South-east Asian countries will watch live 15 complicated eye surgeries requiring lens implantation, such as cataracts.

During the operations, there will be two-way communication between the surgeons in the operating theatre and those observing the procedure on a large screen from the lecture theatre.

This is the first time since the SNEC opened in January that it is conducting the live

surgery demonstrations.

The course participants, half of whom come from Malaysia, Indonesia, the Philippines and Thailand, will also be able to bring home with them video-tapes of the operations.

Dr Lim, who is also Head of the National University Hospital's Ophthalmology Department, said cataract removal forms 70 per cent of an ophthalmologist's caseload.

He said that since 1987, the work of NUH ophthalmologists has been assessed on these criteria:

■ **VISUAL** result: How much the patient can see after the operation is perhaps the most important factor;

■ **POSTERIOR** capsule rupture: A surgeon's skill is reflected if he avoids tearing the posterior capsule, a membrane to hold the lens implant, during the cataract operation. For good surgeons, the incidence of such ruptures should be less than 5 per cent.

■ **LENGTH** of time: The speed of surgery is not significant but an hour is considered too long as most cataract procedures are completed within 20 and 30 minutes.

■ **REVIEW** of videotapes of each operation.

Dr Lim noted that the four criteria can be adapted to suit different medical disciplines as a form of measurement to ensure quality work as this system is both effective and

inexpensive.

Because of the very complicated technological changes in medicine and surgery that have taken place recently, such as laser and ultrasound technology, the evaluation of surgical skills should be introduced, he explained.

"The changes have added tremendously to the way we can improve our management of patients."

"But at the same time, any modern technology, if not properly or wrongly used, is potentially dangerous to patients," he said.

The mounting public concern in the United States for quality eye surgeons led to the formation of the American Board of Eye Surgery in 1985 to evaluate surgical skills.

Dr Lim suggested that doctors, hospitals, the university, and the government should draw up guidelines which will help Singapore decide on the technology that would give our population better and more cost-effective medical care.

Besides Dr Lim, the team of surgeons conducting the live surgery demonstrations includes Dr Low Cee Hong and Dr Lee Chin Piau. A noted American eye surgeon, Dr Robert Sinskey, Associate Clinical Professor of Ophthalmology at the University of California, Los Angeles (UCLA) is a guest instructor.

## Highlight

# 4

## Spectacular growth and Phase 2 expansion

Professor Arthur Lim (centre), founding Medical Director; Associate Professor Vivian Balakrishnan (left), Medical Director of SNEC (1999-2000), being honoured by Professor Ang Chong Lye, incoming Medical Director of SNEC, who took office in September 2000.



The first 10 years saw SNEC enjoying spectacular growth. Patient load grew from 38,000 for the first year to 220,000 in the 10th year, a six-fold increase with education and research strengths growing in tandem. In his message for the SNEC's 10th anniversary publication, Permanent Secretary for Health, Mr Moses Lee wrote: "In its first decade of development, the SNEC has made much progress... Ophthalmology as a discipline is advancing rapidly, with new technology, instrumentation and surgical procedures being introduced at an unprecedented pace.... with Singapore's push to develop the life sciences sector, there are now exciting new research opportunities for SNEC and SERI in areas such as molecular genetics and functional genomics as applied to major eye conditions."

The Phase 2 development was greatly needed to see SNEC through its next phase of expansion, the idea of which was conceived as early as 1992 and went through numerous rounds of board deliberations and submissions to the Ministry of Health before it was finally approved in 1997. Constructed at a cost of \$50 million, the extension wing added 15,000 sq m to the existing area of 6,500 sq m. The design of the new 8-storey purpose-built tower block clearly showed SNEC's commitment to research and also marked the paradigm shift from developing high quality ophthalmic services to the need to push ophthalmic research and be at the cutting edge of medical innovation. Two floors were dedicated to house the Singapore Eye Research Institute (SERI) with its research clinics, basic science laboratories and comprehensive ancillary services. The cost of SERI

was funded under the first grant proposal for \$19 million submitted to the National Medical Research Council by Professor Arthur Lim, Professor Chew Sek Jin, Professor Wallace Foulds and Administrator Charity Wai. In the SERI 2003/2004 annual report, major new initiatives were announced which saw the establishment of the SERI ophthalmic genetics laboratory and a proteomics facility in response to the national initiative towards life sciences. Education as another important pillar of SNEC's activities also received a boost with the inclusion of a 110-seat auditorium capable of transmission of live surgery demonstration, a library/resource centre and dedicated training rooms.

This period also saw the passing of the baton and smooth transition of leadership from founder Professor Arthur Lim to Associate Professor Vivian Balakrishnan (1999 to 2000) and Professor Ang Chong Lye who became Medical Director from 2000 to 2008.



# Punching above the pack

Singapore can learn much from the US experience when it comes to integrating academic research with improved health care.

## Let research loop back to patient care

By WONG TIEN YIN  
FOR THE STRAITS TIMES

In 1981, Mr Philip Yeo, then chairman of the Economic Development Board, went to the United States as its ambassador.

His observations of the R&D scene there shaped his vision for the establishment of the Agency for Science, Technology and Research, or A\*Star, and the foundation of Singapore's biomedical sciences initiative.

Established in 1991, A\*Star is a statutory board that fosters scientific research and talent to promote a knowledge-based Singapore.

Last year, I was privileged to be selected as one of Singapore's Eisenhower Fellows to spend several weeks in the US. As a physician and scientist, an aim was to look out for lessons to take the health of Singapore's health-care ecosystem.

Singapore already has a strong reputation for high-quality, cost-effective health care. Yet the country is faced with significant challenges, including ageing, chronic diseases and increasing health-care costs.

How can Singapore use the biomedical research innovation that it has built to provide better care to patients and thereby create Singapore Medicine 2.0?

During my fellowship, I visited 10 cities and 30 hospitals, universities, and research institutes. I met doctors, academics, scientists and CEOs. This is what I learnt.

Academic centres shape innovation and care

AN ACADEMIC medical centre (AMC) is a university-hospital partnership that has a triple mission: patient care, research and teaching. In Singapore, we currently have two health-care clusters that function as AMCs. They are the SingHealth-Charis-NUS partnership in Outram, and the National University Health System at Kent Ridge.

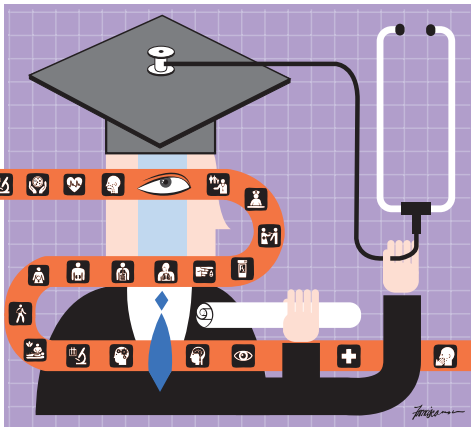
Among the major AMCs that I visited in the US are the Harvard-Massachusetts General Hospital system, the Mount Sinai University Health System in New York, the Stanford University Medical Centre, and the Dana-Farber Cancer Institute.

For decades, these AMCs have provided new understanding of how diseases develop. They have also discovered new treatments and methods of prevention that are now widely practised globally.

However, the most useful lessons for Singapore come from an unexpected place: the University of Pittsburgh Medical Centre (UPMC) Pioneertown.

This AMC was developed in the 1970s, and has done very well in a short span of time. Prior to 1970, the economy of the Pittsburgh region was dominated by coal and steel mining. Today, thanks to a strong university-hospital partnership, it is a hub for health care, education and innovation.

How did they do it? It started



with a vision and commitment from the two partners - the hospital and university - to help each other succeed in a single mission of "research-based patient care".

By providing access to patients, the hospital helped the university do better at clinically relevant research. This research in turn helped improve patient care within the hospital, thereby strengthening the reputation of both institutions.

The hospital-university partnership became attractive employers for top-notch doctors and researchers from around the country. It also started winning large research grants.

Young clinician-scientist stars, the hybrid talents that help translate biomedical research into clinical care, started flocking to Pittsburgh. This sustained the system and attracted even better physicians, and all the while, patients and the community benefited from getting better care.

An example is the work of Professor Thomas Starzl. He was a surgeon who first used anti-rejection drugs to make liver and other human organ transplanta-

To bring innovation into our health-care system we need a diversity of talent. We risk losing talented people and invaluable contributions when holding too rigidly to a "one size fits all" approach.

tion possible.

UPMC's Starzl Institute has since saved thousands of lives, and attracted many aspiring young surgeons to train and jobs.

UPMC as faculty members.

Pittsburgh is now known as the "transplant capital of the world". This virtuous circle revolves around the commitment to treat success in research and success in clinical outcomes as inter-dependent outcomes. This is actually easier said than done.

Initial commitments might waver under the pressure of short-term returns, the tendency to protect one's own turf, or the mistaken belief that research in health care is "optional", and only when economic times are good.

In Singapore, our emerging AMCs need to be similarly nur-

tered and supported as the focal point of Singapore Medicine 2.0. It is difficult to create a fully functioning virtuous loop when there are more immediate strains in our health-care system.

But doing so needs to be our priority if Singapore Medicine 2.0 can ultimately create better long-term outcomes for patients and the community.

Develop a diversity of talent in a system

WHEN I met Professor Cherry Murray, dean of engineering at Harvard, I was surprised at the unconventional route through which she had landed the job. With only 80 academic papers, she is less well-published than most of her faculty.

However, her curriculum vitae

Engage the public as a stakeholder

THE caliber of Singapore's health-care system and its first medical research is already high. However, compared to the US, we have a long way to go in building a legacy and tradition.

Take for example the famous Fiterberg Dome at Massachusetts General Hospital (MGH), where general anaesthesia was first administered in 1846. Despite its significance for health-care workers of MGH, and those who enter the hospital as patients, or even those who visit the Fiterberg Dome as tourists, they felt part of a lasting legacy.

I am not suggesting that Singapore can create a similar history immediately. But Singapore can learn from how America and institutions in general do it in the present day. They do this through a culture of gratitude, and of sharing this with the public as a stakeholder in their health-care, research and teaching.

In the Boston subway, I saw an advertisement that Harvard offers free science seminars to the public. "No prior knowledge necessary."

Imagine such a poster on our Singapore MRT to offer poster talks, and universities advertise themselves as

centers of science and medicine, informing the public about new treatments and approaches they are working on. The broad dissemination of the goals and achievements of biomedical research helps maintain public engagement in these institutions and what they stand for in building Singapore Medicine 2.0.

As a physician and scientist whose career unfolded against the backdrop of the biomedical sciences initiative, I believe that developing three effective strategies is the way towards Singapore Medicine 2.0.

Singapore should build AMCs that bridge hospital and university care and research outcomes. The country should develop a diversity of talent and, finally, engage the public in a unique fashion in the health-care innovation journey.

In a couple of years, I plan to be a director of studies at Tembus College, NY, combined in this article.

Wong Tien Yin is professor and vice-dean, Dana-Farber Cancer Medical School, Harvard University of Singapore (HUS), and deputy medical director of the Singapore National Eye Centre. [tiy@sgnec.com.sg](mailto:tiy@sgnec.com.sg)

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Wong Tien Yin is professor and vice-dean, Dana-Farber Cancer Medical School, Harvard University of Singapore (HUS), and deputy medical director of the Singapore National Eye Centre. [tiy@sgnec.com.sg](mailto:tiy@sgnec.com.sg)

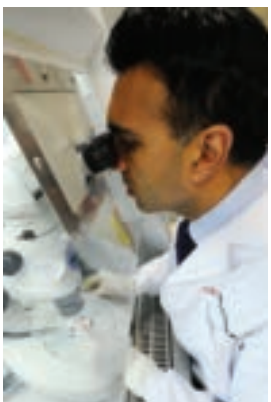
Since its inception in 1997, the Singapore Eye Research Institute (SERI), the research arm of SNEC, has achieved international recognition for the quality of its research. It punches above its weight with Singapore generating the highest number of eye publications per capita in the world amidst global heavyweights such as the United States, United Kingdom and Japan, as reported in *The International Ophthalmology* journal. About 95 per cent of ophthalmic research done in Singapore is carried out by SERI.

More importantly, SERI's research has translated into more effective clinical care for patients suffering from conditions such as corneal diseases, myopia, age-related macular degeneration and glaucoma. The institute is also at the forefront of developing natural anti-microbial drugs that will see potential benefit going beyond treating eye conditions.

As of December 2014, SERI's researchers have 320 national and international prizes plus 105 patents under their belt, including winning the President's Science and Technology Award three times. With a multinational faculty comprising 220 researchers, doctors, clinicians, clinical scientists and administrators, SERI is one of the largest research institutes in the Asia-Pacific region.

Separately, an independent panel also found that from 2002 to 2006, SERI had 64 research papers published in top science and medical journals, Johns Hopkins University had 54 and the University of Melbourne's Centre for Eye Research Australia had 33.

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# Professor Arthur Lim

## A giant ahead of his time

Highlight

# 6

Much of SNEC's success is credited to Professor Arthur Lim, a true visionary who had laid the groundwork that would put SNEC on the world map.

In a special ceremony on 20 January 2014, SNEC and Duke-NUS Graduate Medical School Singapore launched the \$5 million prestigious *Arthur Lim Professorship in Ophthalmology* to recognise Professor Lim for his lifelong dedication and commitment to developing quality eye care, education

and research in Singapore and in the region. Guest-of-Honour, Minister Vivian Balakrishnan gave a personal tribute to his mentor.

The first *Arthur Lim Professorship in Ophthalmology* has been conferred on Professor Donald Tan, Senior Consultant Ophthalmologist, Corneal and External Eye Disease Department, SNEC, and Senior Principal Clinician Scientist at SERI in October 2014.

Excerpts from Dr Vivian Balakrishnan's speech highlighted Professor Lim's seven outstanding attributes:

**1. His ability to dream big**

For him, life isn't about counting a few pennies, timid plans, or lowering your ambition in order to improve your chances of success. It's always been about the big really difficult and massive challenges out there.

**2. He translated dreams into reality**

He was able to translate dreams into reality by his sheer force of personality, his great persuasiveness, and his ability to make things happen.

**3. He asserts moral authority**

It is not just about legislation or policy or grants, but that all of us feel the need to follow someone because he appeals to this innate desire in all of us to do something worthwhile, something bigger and larger than ourselves.

**4. His steadfast belief that patients deserve the best**

Because he believed that patients deserve the best, he insisted on structured, rigorous training for ophthalmologists and for surgeons. You had to train properly, you had to learn to stitch in the lab, learn how to use a microscope, work on animal eyes, slowly move your way up so

that by the time you reached a patient, you were sharp, and able and could honestly say you're doing the best for the patient.

**5. His investment in research**

He was a man ahead of his time and persuaded the Ministry of Health and the National University of Singapore, probably against their own conventional thinking at that point in time, "take a bet, invest more money into research".

**6. His devotion in nurturing his juniors**

He was a tough boss to work under. He would never suppress or keep down a junior because he was worried that you would compete or surpass him. He had this generosity of spirit, born out of confidence in his own ability and the keenness to make sure that his subordinates could go beyond him.

**7. Professor Lim – An exemplary life to emulate**

The most important measure of a man's lifetime achievements is actually not just the sum of all the work that he himself has done – of the thousands of cataracts that he has removed, or the hundreds of thousands of patients that he has seen. The real test of man's legacy is who are the people and the institutions, and the systems that will persist, after that giant is no longer in the scene. That he has given us so much and it is our duty to emulate him by paying it forward and to make sure that this legacy grows.



# 7

## Towards zero infection

As eye care providers around the world grapple with infection rates, SNEC has proven that it is possible to achieve a zero infection rate by adopting an 'obsessive-compulsive' approach to delivering clinical services.

Every major operation is recorded for the monitoring of results and an independent Clinical Audit Department has been set up to evaluate surgical outcome data of all the various subspecialties and to benchmark to the 'best-in-class' internationally. A comprehensive infection prevention programme is also in place with an annual seminar which requires compulsory staff attendance.

In 2007, the press highlighted SNEC's record of zero infection rate for 17,000 operations, which included cataract and refractive procedures. A zero infection rate is considered rare, as one out of a thousand cataract patients may develop post-operative infection, according to the American Academy of Ophthalmology.



### Zero infections at SNEC last year

By ANANDH GUJANANIGAM

THE Singapore National Eye Centre (SNEC) is making waves for its efforts of keeping infections at bay.

Last year, it recorded a zero infection rate for nearly 17,000 operations, including cataract surgery and Lasik to improve vision.

The majority of these - 10,000 - were operations to remove cataracts that cloud vision and can cause blindness.

The centre does half of all cataract operations in Singapore, which involves replacing the faulty lens with a synthetic one.

A zero infection rate is rare, said experts.

According to a study listed by the American Academy of Ophthalmology, the world's largest association of eye physicians and surgeons, one in every 1,000 cataract patients worldwide is known to develop post-operative infection.

Dr Wong Hin Tyn, head of ophthalmology at Tan Tock Seng Hospital, described SNEC's low infection rates as a "laudable

achievement that placed it "very well" on the global scale.

Dr Chan Tat Keong, a senior consultant at the centre, added that the prevention of infection from cataract surgery is considered the "gold standard" internationally for measuring eye surgery success, because many more such procedures are done than any other eye operations.

Cataracts are the leading cause of blindness worldwide, according to the World Health Organisation, which estimates that 15 million cataract procedures are performed yearly.

Age-related cataracts, for example, are responsible for 18 million people going blind every year. This makes such cataracts responsible for just under half of the cases of blindness worldwide.

Last year's record is in contrast to 2007, when the eye centre imposed a two-month ban on Lasik operations after 17 patients developed an inflammation over two days.

The cause was later pinned down to a dye used in a new pen to mark the patients' eyes before

surgery. The dye was found to be toxic.

Last year, the centre performed 5,000 Lasik operations without incident.

Professor Donald Tan, the centre's medical director, attributed the low infection rates to an "obsessive-compulsive" approach adopted in the areas of clinical services, education and research.

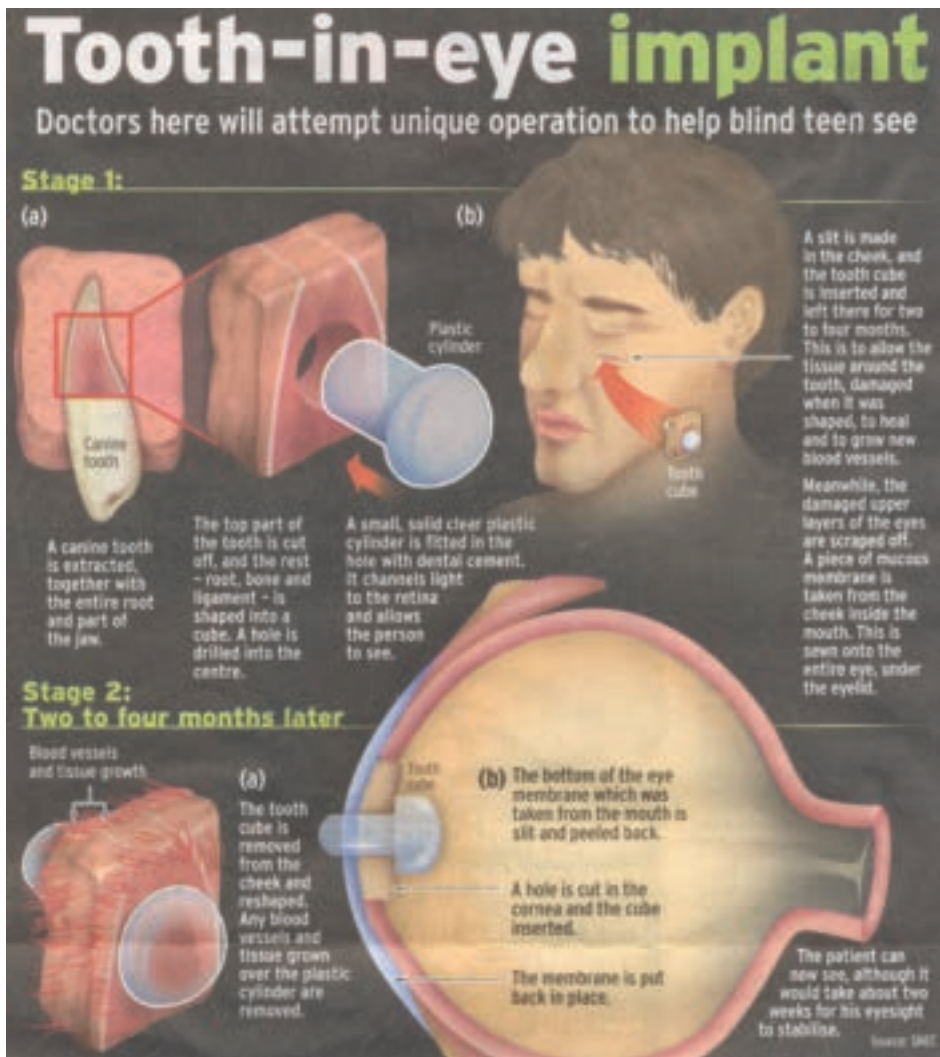
For example, the centre, which is staffed by 50 senior specialists and 110 nurses, was among the first in the world to film all its operations, a practice to help identify lapses in infection prevention.

"Many doctors initially felt disconcerted about having 'big brother' watching over their shoulder," Prof Tan said. "But now it is routine for us."

Renowned ophthalmologist Arthur Lim, who now chairs the Singapore Eye Research Institute, said a stringent infection prevention programme and state-of-the-art research facilities had enhanced the centre's reputation as a world leader in the field of ophthalmology.

But Prof Tan conceded that maintaining zero infection rates, while ideal, would not be achievable every year given the high volume of operations performed.

"The more practical aim is to ensure an absolute minimum number of infections occur every year, which surpasses international standards."



The Straits Times 25 May 2005

## Restoring sight with tooth in the eye



Luck Pewnual, a 19-year-old boy from Thailand, completely lost his sight in both eyes from a rare allergic reaction. But thanks to a team of SNEC eye surgeons and a dental team from the National Dental Centre that successfully performed a 'tooth-in-eye' surgery in 2004, Pewnual is able to see again.

The surgery was the first successful case of Osteo-odonto-keratoprosthesis (OOKP) surgery in Singapore, and the first of its kind in the region. The procedure involves removing a canine tooth from the patient, shaping and drilling it to allow implantation of an artificial plastic corneal device (optical cylinder), and ultimately implanting it back into one eye a few months later.

Since then, 51 more OOKP surgeries have been successfully performed for patients from Australia, Indonesia, Malaysia, Sri Lanka, Thailand, Vietnam and Singapore.

The SNEC's leadership in OOKP surgeries was recognised at the American Society of Cataract and Refractive Surgery Annual Meeting in 2005, when the SNEC's OOKP surgical team won the First Place Film Award under the new techniques category – the first for Singapore surgeons. Several countries in the region have also initiated their own OOKP programmes, and have approached SNEC to assist with training.

Highlight

9

# Nanomedicine: the new frontier

In Singapore, about three per cent of people over the age of 50 years have glaucoma, an eye condition caused by high intraocular pressure in the eye that could damage the optic nerve.

This percentage increases with age — from two to three per cent among those 50-60 years of age to 10 to 12 per cent for those over the age of 70 years. The SNEC receives up to 40,000 glaucoma patients each year.

With advancements in nanomedicine, administering eye drops to lower the high pressure in the eyes will become easier. In 2014, Associate Professor Tina Wong, Senior Consultant, Glaucoma Department, SNEC, who is also Head of Ocular Therapeutics and Drug Delivery Research Group and Principal Clinician Scientist at SERI, worked together with Nanyang Technological University to successfully develop a new nanomedicine that is delivered to the front of the eye via a painless injection.

The nanomedicine will stay and release anti-glaucoma drugs slowly over the next six months, helping patients, especially the elderly, do away with daily eye drops which will greatly improve compliance and preservation of vision.

At least 10 per cent of blindness from glaucoma is directly caused by poor patient adherence to their prescribed medications, due to reasons such as forgetfulness, finding it too troublesome, or a lack of understanding of the disease.

# Researchers come up with jabs for glaucoma treatment

By GRACE CHUA

GLAUCOMA sufferers who forget to take their eyedrops have been given new hope, thanks to a slow-release technology developed by a new Singapore research unit.

A team at the Ocular Therapeutic Engineering Centre (OTEC), opened on Tuesday at Nanyang Technological University, wrapped an existing anti-glaucoma drug in tiny nanocapsules which can be injected painlessly into the eye's surface.

A single injection can deliver drugs for up to three months.

The technology is expected to be more effective than current eyedrop treatments, which patients can forget to take. The eyedrop also tends to flow out of the eye.

Glaucoma causes pressure to build up in the eye and destroy the optic nerve. It leads to gradu-

al blindness over many years and affects 6 per cent of Singapore's population.

Because glaucoma is a chronic disease, patients stay on medication for life.

But some 90 per cent fail to continue their eyedrops for more than two years, said adjunct associate professor Tina Wong, co-director of the centre and senior consultant at the Singapore National Eye Centre.

As they have to visit the doctor for regular check-ups anyway, the injection can be administered there, she said.

Now, human trials of the technique are about to begin and, if successful, it could be on the market in as soon as a few years' time, said NTU Provost Freddy Boey, who has invented medical technologies such as heart stents that slowly let drugs into the bloodstream.

The centre will also develop

methods to treat other eye conditions such as cataracts and retinal diseases. For example, it could load cataract-replacement lenses with antibiotics to prevent infections after cataract surgery.

OTEC is also looking for ways to better deliver drugs to the hard-to-reach back of the eye, which becomes damaged in retinal diseases like macular degeneration. It will work closely with NTU's new Lee Kong Chian School of Medicine, which opens in July.

Previously, Dr Wong and centre co-director Subbu Venkataraman also developed a drug-releasing gel that stays in the eye for a few days instead of leaking out, helping to prevent scarring after glaucoma surgery.

Prof Boey said: "Taking the right drug is one thing but taking the right drug and releasing it in a timely way is very important."

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The Straits Times 31 January 2013

## 解决病人忘记滴药水问题 南大研发青光眼药物输送法

青光眼药水新输送方式，是把含有药物的纳米大小胶囊，注射到眼结膜。胶囊会在接下来几周慢慢释放药物，一次注射相当于三个月的滴眼药水疗效。

王琪琪 报道  
wqg@nsh.com.sg

不少青光眼病人会忘记每天滴眼药水来控制病情，若情况严重，可能导致失明。南开理工大学研究人员就研发出治疗青光眼的药物新方式，让医生与三个月为病人注射药物，克服病人忘记滴的问题。

南大眼药治疗研究中心 (Ocular Therapeutic Engineering Centre) 最近正式开幕，以上是中心目前进行的研究项目之一。

### 九成人应在时用药

据青光眼病人每天滴眼药水的频率显示，有超过九成病人没有按时用药。南大眼药治疗研究中心联合主任兼首席教授指出，全国眼科中心普遍进行一项研究结果显示，有超过九成病人没有按时用药。南大眼药治疗研究中心联合主任兼首席教授指出，全国眼科中心普遍进行一项研究结果显示，有超过九成病人没有按时用药。

对眼药水的。目前仍是全国眼科中心眼科高级研究员，以及新加坡眼科研究所的助理研究员。

眼药治疗研究中心研发的输送方式，是把含有药物的纳米大小胶囊，注射到眼结膜。胶囊会在接下来几周慢慢释放药物。中心之前进行的研究显示，一次的注射相当于三个月的滴眼药水疗效。

中心已进行了动物试验，并获得了生物医学伦理委员会的批准。在人体试验前，他们将通过全国眼科中心的眼科研究所进行人体试验。

他指出，新的药物输送方式不会刺激现有的滴眼药水方式，而是由于青光眼病人另一个可能配合他们的生活方式而进行的选择。

眼药治疗研究中心位于南大材料科学与工程学院内，由四十名全职研究人员。中心建立后，该学院已属新加坡眼科研究所合作进行不



南大新成立的南大眼药治疗研究中心，由材料科学专业系主任王琪琪（右）和眼科高级研究员兼新加坡眼药研究所所长王琪琪（左）。

少研究项目。研究中心目前进行的研究项目主要计划开发一种以普通眼药水的输送方式和新的注射器。中心主任王琪琪教授 (Subbu Venkataraman) 指出，中心的目标是开发材料和设计新方法。他是材料科学与工程学院院长。

南开理工大学材料科学与工程学院于去年下半年开课。王琪琪，他们期待南大眼药治疗研究中心。上海开泰仪式的南大教授

# Eye-drops for kids with severe myopia

Drug which slows down condition available only at SNEC for now

By SALMA KHALIK  
SENIOR HEALTH CORRESPONDENT

CHILDREN who suffer from rapidly deteriorating myopia can now turn to a new treatment offered by the Singapore National Eye Centre (SNEC).

Its low-dose atropine eye-drops, which cost less than \$20 for a month's supply, can slow down short-sightedness by as much as 60 per cent, said Professor Donald Tan, the SNEC's

medical director. "It would be fantastic if a child who would normally end up with myopia of 800 degrees is able to keep it to 400 degrees or less," he added.

The SNEC will provide the drops to a number of children here as possible, but if its paediatric clinics cannot cope with the expected high demand, Prof Tan said the centre will open more clinics.

About one in six children here suffer from severe myopia of 600 degrees or more by the time they

are in their late teens. This puts them at risk of getting cataract at an early age as well as other eye problems like macular degeneration and retinal detachment.

SNEC's five-year trial of 400 children, which began in 2006, found that the daily use of low-dose atropine showed no noticeable side effects.

Instead the drops, which retard the elongation of the eyeballs which leads to myopia, proved a success in slowing down the condition. For some children, it even arrested the short-sightedness from getting any worse.

Prof Tan's wish is to see the drug become widely accessible, but there are regulatory hurdles to overcome.

The SNEC tried to interest pharmaceutical companies to produce the eye-drop, but with no success. Prof Tan said this is because the company would need to carry out expensive trials to get regulatory approval.

But because it is an old drug that is no longer under patent, once a company has obtained approval, others could simply produce and sell similar eye-drops.

SNEC finally decided to pay a company to make the eye-drops. But until large-scale trials are conducted to meet regulatory demands, these drops can be dispensed only by SNEC's pharmacy, and all patients have to be logged.

Prof Tan hopes to be able to conduct trials that will satisfy health regulators within a few years - together with eye centres in other Asian countries facing a high incidence of myopia, such as China.

When that happens, the eye-drops can then be dispensed by any doctor. Until then, SNEC will be the only place supplying these eye-drops to patients in general to prevent worsening of myopia.

About 85 per cent of teens here are myopic, with the condition generally starting when a child is five or six years old.

## Fighting myopia, 1 eye drop a night



Several eye operations are carried out simultaneously in different theatres at the Singapore National Eye Centre, where doctors can do about 275,000 patients a year.

### Global leader in eye research

Founded in 1987 with just 10 employees, the Singapore Eye Research Institute (SERI) has grown to 200 staff and plans to double its strength over the next five years.

SERI is one of the few eye research centres in the world that has a dedicated research building. It is also the only eye research centre in the region to have a dedicated research building.

According to Prof Tan, SERI is a global leader in eye research. It is the only eye research centre in the region to have a dedicated research building.

### Solution with tweaked dosage of atropine causes myopia in kids to slow and improve

Myopia researchers have found a way to slow the progression of myopia in children, and even improve it, says Prof Tan.

Prof Tan said the drops are designed to be low-dose atropine, which will slow down the progression of myopia in children, and even improve it.



Prof Tan said the drops are designed to be low-dose atropine, which will slow down the progression of myopia in children, and even improve it.

### OTHER BREAKTHROUGHS

**Controlled surgery**  
A new treatment to correct near-sightedness in children is being developed by Prof Tan and his team.

The treatment involves laser surgery to reshape the cornea of the eye. It is a controlled procedure that allows the child to see clearly without the need for glasses.

Prof Tan said the drops are designed to be low-dose atropine, which will slow down the progression of myopia in children, and even improve it.

The drops are designed to be low-dose atropine, which will slow down the progression of myopia in children, and even improve it.

The Straits Times 13 November 2012

## Highlight



# Leading the fight against myopia

Myopia has plagued Singapore for years, with eight in 10 people afflicted with the condition by the time they reach adulthood. While reducing near-work activities might slow down its progression, more effective measures were needed to nip the problem in the bud.

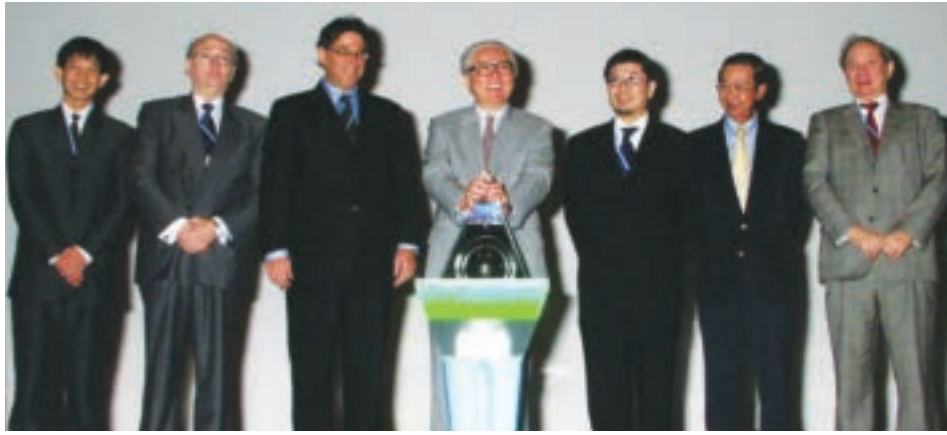
After more than 15 years of clinical trials, researchers and clinicians at SERI and SNEC have

discovered that eye drops with low-dose atropine of 0.01% could slow down the progression of myopia in children by up to 60 per cent with minimal side effects.

Their findings have evolved into an eye drop, which can be administered for children in a dedicated myopia clinic. Produced and made available in SNEC, the atropine eye drop, called Myopine™, is suitable for children

between the ages of six and 12 years with progressive myopia.

Meanwhile, community-based clinical trials are underway to address the lack of physical and outdoor activities which are also thought to be a major cause of myopia. Together with low-dose atropine, this major national problem may be addressed in the near future.



Highlight

11

## Ushering the largest eye research meeting to Singapore

For the first time, Singapore played host to one of the largest gatherings of top ophthalmic minds, through the inaugural SERI-ARVO (The Association for Research on Vision and Ophthalmology) Meeting on Vision and Ophthalmology in February 2003. This is the first time an ARVO meeting, which is the largest research meeting with annual attendance of over 10,000 participants, is held outside the United States.

More than 600 speakers and delegates from 37 countries attended the outstanding programme, packed with keynote lectures and symposia covering myopia and physiological optics, glaucoma, stem cell biology, genetics and ocular inflammation, among other subspecialties.

Singapore researchers also presented the results of eye stem cell culture and transplants, as well as clinical trials of low-dose atropine to slow down myopia progression. The participants also took part in workshops covering areas such as designing and conducting clinical research, as well as writing successful grant and scientific papers.

Highlight

# 12

## The Eye Ball

To meet the increasing competitive landscape for government grants and funding, SERI had to develop innovative ways to raise funds to support its research efforts and hence *The Eye Ball* was conceptualised.

For the past three years, SERI has been organising *The Eye Ball*, a gala fundraising dinner to raise awareness of eye research, and to support SERI in its effort to perform impactful research that directly benefits the community. It has raised \$1.3 million so far.

The most recent *Eye Ball* was held at the Fullerton Hotel on 24 October 2014 where an auction of previous jewellery and art pieces was conducted.

Supported by *Singapore Tatler* magazine, the event made it possible for SERI to grow its profile. Other initiatives are being planned to build up its fundraising capability in a sustained manner.





Highlight

# 13

## Eyes that tell stories

The public had a chance to peer into the eyes of 14 of Singapore's iconic personalities in the *Eyes that Tell Stories* exhibition held at the Red Dot Museum in June 2011, as part of SERI's efforts to create awareness of eye diseases and vision loss, and the importance of eye research.

The exhibition featured eye images taken using cutting-edge ophthalmic equipment. The personalities' images — including Singapore's founding Prime Minister, the late Mr Lee Kuan Yew and film director Royston Tan — reflected how their eyes have played an integral role in the pursuit of their respective passions.

Also showcased at the exhibition were poignantly 'beautiful' images of damaged or diseased eyes from patients that reveal the fragility of eyesight and vision, which is often taken for granted. Through the 10-day exhibition, the public also got a chance to learn more about how photographic images of the eye can be used in the diagnosis and management of eye disease.



## Highlight

# 14

## SNEC wins multiple presidential honours



SNEC has the distinctive honour of winning the highest presidential honours in science and technology four times over the years. This sterling achievement is unmatched by any other healthcare institutions in Singapore.

### 2009

Professors Donald Tan, Roger Beuerman and Aung Tin were the pioneer recipients of the prestigious President's Science Award for their innovative breakthroughs in 'bench-to-bedside' medical research in blinding corneal diseases and glaucoma, leading to major advancements in scientific knowledge and the treatment of these diseases.

### 2010

Professor Wong Tien Yin, then SERI Director, was awarded the President's Science Award 2010 for the development and use of novel retinal imaging to understand pathways in cardiovascular and metabolic diseases.

### 2014

SNEC received double honours winning the highest national research awards – the President's Technology Award (PTA) – for two cutting-edge research projects that underscored the centre's commitment to clinical innovation.

The first PTA was presented to a team comprising Professor Wong Tien Yin, Medical Director of SNEC and Professor Wynne Hsu and Professor Lee Mong Li from the National University of Singapore, in collaboration with SERI and A\*STAR's Institute for Infocomm Research (I2R). The team had developed an eye image analysis platform to help doctors detect and track the progression of three major eye diseases such as glaucoma, diabetic retinopathy and age-related macular degeneration, as well as to study the onset of systemic vascular diseases such as stroke, heart disease and diabetes.

Another PTA was conferred on a team comprising SNEC's Associate Professor Tina Wong, Senior Consultant, Glaucoma Department, Head of Ocular Therapeutics and Drug Delivery Research Group and Principal Clinician Scientist, SERI, as well as Professor Subbu Venkatraman and Professor Freddy Boey of Nanyang Technological University. They found a way to enable sustained release of glaucoma medication, by using a single injection of nanomedicine for the delivery of medication for up to six months. Their work will go a long way to prevent blindness caused by patients' non-compliance with daily eye drop treatment.



Highlight

15



## Honouring Southeast Asia's father of ophthalmology

Without the leadership and vision of the late Professor Arthur Lim, Singapore would not have achieved its world-class status in ophthalmology, which roots could be traced back to Professor Lim's inauguration of the Singapore Eye Foundation in the 1980s.

In August 2014, we mourned the passing of Professor Arthur Lim, Southeast Asia's father of ophthalmology. Numerous tributes came from all corners of the world reflecting the indelible mark Professor Lim has made in ophthalmology influencing not only Asia but the world.

"Arthur was a visionary and a giant in Singapore medicine. He was a world leader in clinical and academic ophthalmology and made substantial contributions to the field. He founded the Singapore National Eye Centre, which is now one of the world's leading eye hospitals. He also conceptualised the Singapore Eye Research Institute, which has over the last two decades made discoveries that advanced the diagnosis and treatment of major eye diseases, such as myopia, glaucoma, and diabetic retinopathy. He put Singapore medicine on the world map, serving as President of the World Ophthalmology Congress and Secretary General of the Asia Pacific Academy of Ophthalmology, which he helped set up."

**Lee Hsien Loong**  
*Prime Minister of Singapore*

"He will be remembered for setting up the Singapore National Eye Centre, and serving as its founding Medical Director. It was also through his vision that the Singapore Eye Research Institute was set up, at a time when there was hardly any research on ophthalmic vision in Singapore. He was also instrumental in setting up the Department of Ophthalmology at the National University Hospital and National University of Singapore. Over the years, he mentored several generations of eye surgeons in Singapore, due to his generosity to teach and impart knowledge to others."

**Gan Kim Yong**  
*Minister for Health*

## Tributes from around the world

“Very few of us can be said to have had a transformative impact. Prof Lim had that kind of impact on global ophthalmology. He will be sorely missed.”

**Dr David W. Parke II**  
*Executive Vice President & CEO  
American Academy of Ophthalmology*

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“He was a giant in ophthalmology and a world leader with a profound and worldwide influence.”

**Professor Hugh R Taylor**  
*President, International Council of Ophthalmology*

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“The passing away of Prof Arthur Lim marks the end of an era for Ophthalmology in the region. His dynamism and ability fuelled the growth of the specialty in the region and brought the Ophthalmologists in the region together.”

**Dr Ashok K Grover**  
*Past President  
All India Ophthalmological Society*

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“Arthur was my friend, mentor, colleague, and inspiration for 40 years. He was a rare visionary who never wavered in his dream to make Singapore a global leader in ophthalmic care, education, and later, research. This he extended to the whole Asia-Pacific region and especially China.”

**Ian Constable**  
*Professor of Ophthalmology  
University of Western Australia, Australia*

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“I was greatly saddened when I received your e-mail informing me of Arthur’s death. I knew Arthur for so many years and was well aware of the great debt owed to him by so many people. As you know neither the SNEC nor SERI would have been in existence without his foresight and his energy in promoting world class ophthalmology in Singapore. He will be missed by many.”

**Professor Wallace Foulds**  
*Senior Consultant Advisor  
Singapore Eye Research Institute*

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“Prof Lim made significant contributions to the development of ophthalmology in China and Asia. We have lost a giant in ophthalmology, a great teacher and mentor of thousands of ophthalmologists in Asia and beyond.”

**Li Xiaorong**

*Director, Tianjin Medical University Eye Hospital, China*

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“He was tireless in his efforts to teach younger ophthalmologists, creating a unique community of experts in the region, and a great friend to many of us.”

**Fang Seng Kheong**

*President, Malaysia Society of Ophthalmology (MSO), Malaysia*

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“I was profoundly saddened to hear the sad news of the passing of Prof Arthur Lim. We have lost a great ophthalmologist, a great man, and I have lost a great friend.”

**Ningli Wang**

*President, Chinese Ophthalmological Society*

*Vice President, Beijing Tongren Hospital*

*Chief Ophthalmologist and Director, Department of Ophthalmology,  
Beijing Tongren Eye Center, China*

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“I vividly recall the first time I met Arthur when he first established the Asia Pacific Intraocular Implant Society in the 1980s. His vision of the importance of a regional group focused on cataract surgery and intraocular implants like so many of his insights proved to be correct and that small group has grown into APACRS and all its associated activities. Similarly, he planted the seed for many other societies, which now contribute to education and training in the Asia-Pacific region.

“He entrusted me with the future of the Asia Pacific Intraocular Implant Association and therefore changed my life as he did for so many others whom he met, guided, and invested time in their future and careers. He achieved all this with an enthusiasm and engagement with life that was truly inspirational.

**Graham Barrett**

*President, Asia-Pacific Association of Cataract & Refractive Surgeons*

*President, Australasian Society of Cataract & Refractive Surgeons*

*Consultant Ophthalmic Surgeon, Sir Charles Gairdner Hospital,*

*Western Australia*

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(Left to right): SNEC Chief Operating Officer, Ms Charity Wai; Professor Donald Tan, then Medical Director of SNEC; Professor Arthur Lim; Mrs Lim and Professor Wong Tien Yin, present Medical Director of SNEC.

Attracting the best talent to the centre was a priority that Professor Arthur Lim had advocated. In honour of his visionary contributions to ophthalmology, the \$5 million *Arthur Lim Professorship in Ophthalmology* was launched in January 2014.

“This Professorship will focus on attracting top talent locally and around the world to help us advance the frontiers of ophthalmology,” said Professor Donald Tan, then Medical Director of SNEC. “Enshrining this professorship is also a lasting tribute from all of us in SNEC and SERI to thank Professor Lim for his significant legacy he has left us as our Founding Father, Leader, Advocate, Teacher and Mentor.”

Highlight

# 16

**Standing  
tall among  
the best**



Three 'visionary' doctors from SNEC and SERI made the headlines in 2014 for making it into a list of the world's most influential people in ophthalmology compiled by the British journal, *The Ophthalmologist*.

Professor Donald Tan is third among the Who's Who list and only the top 20 ophthalmologists are ranked. Professor Tan was recognised for his roles in myopia trials, and cornea surgery and transplant, while Professor Aung Tin, Executive Director of SERI, was lauded for his insights into angle closure glaucoma. Professor Saw Seang Mei, who is an epidemiologist with Saw Swee Hock School of Public

Health and also the Co-head, Myopia Research Group at SERI, has worked extensively in the area of myopia, including environmental factors that affect short-sightedness. She is one of only 13 women to make the list.

The ranking was compiled from nominations from the journal's readers, who mostly hail from Germany, Australia and the United States.

The journal also highlighted Professor Wong Tien Yin, Medical Director of SNEC as the most prolific author in the area of diabetic macular edema, a major cause of vision loss in diabetics.



## Striving for organisational excellence

# Highlight 17

Over the years, in tandem with outstanding clinical accomplishments, SNEC has also attained various accolades for achieving organisational excellence.

In 2005, SNEC achieved accreditation for ISO 9001:2000 which affirmed that the organisation has maintained high standards in quality management system and all areas of the business, including: facilities, people, training, services and equipment. It also calls for continual improvement in work practices throughout the entire organisation. In the same year, SNEC was also accorded the Singapore Quality Class award which is a national recognition for organisations with management systems and processes in place to achieve all-round business excellence.

SNEC went on to achieve the Servicert™ accreditation in 2007 and further the ISO UKAS (United Kingdom Accreditation Service) 9001:2000

certification in 2008. Additionally, the centre has also accomplished the People Developer Standard which recognised SNEC for its high standard of practice in human resource management and the Business Continuity Management award certifying SNEC's attainment in risk management system and processes.

SNEC also became the first ambulatory eye institution in Singapore to achieve the Joint Commission International (JCI) accreditation in 2009, and subsequently, a re-accreditation in 2012. This international endorsement for quality patient care and safety as well as organisational management excellence has helped SNEC to be continually focused on delivering high quality patient-centric care without compromise. The process encompasses the entire organisation and requires senior management involvement and not just a function of the Quality Service Department.

# 18

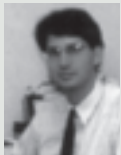
## Nurturing human resource: SNEC fellowship programme

With education as one of the key pillars of SNEC’s development, it is no surprise that much emphasis has been placed throughout its history to teach and nurture a new generation of ophthalmologists in various subspecialties.

Since 1990, over 100 international fellows from all over the world and another 130 local fellows have been trained through SNEC’s highly sought after fellowship programmes. One in two ophthalmologists in Singapore has received training in SNEC.

During a typical one-year fellowship, fellows would see patients with the full-time faculty and conduct surgical procedures. They would also participate in continuing medical education programmes and teaching rounds within the clinical departments.

Many senior consultants who completed their fellowships in SNEC have become experts, heads and mentors to fellows in their respective subspecialties. Some have even gone on to become leaders in ophthalmology in their own countries and have set up their own eye centres. The SNEC also works with the Asia Pacific Academy of Ophthalmologists, Fred Hollows Foundation and Commonwealth Eye Consortium under the Queen Elizabeth Diamond Jubilee Fund to offer SNEC fellowships in selected specialties.



**Dr Marc Lawrence Weitzman**  
First fellow (1992)

SNEC accepted its first overseas fellow, Dr Marc Lawrence Weitzman. He had completed his residency and served three years in Mt Sinai Hospital in New York. Dr Weitzman did a six-month overseas fellowship in vitreo-retina during his attachment in SNEC. He then spent three months in China teaching general ophthalmology before returning to the US to take up another fellowship in glaucoma.



**Dr Grace Gray Mugume**  
Second fellow (1993)

The second doctor from overseas to be attached for six-month attachment in SNEC was Dr Grace Gray Mugume from Mbuya Hospital in Kampala, Uganda. Sponsored by the Uganda government, Dr Mugume, a general ophthalmologist, started his fellowship programme in micro-surgery in July, 1993. Upon completion of his fellowship programme, Dr Mugume resumed his duties as a general ophthalmologist in Mbuya Hospital with the experience gained here.



**Dr Zhao Shao-Zhen**  
Third fellow (1994)

Dr Zhao Shao-Zhen, a senior resident from the International Intraocular Implant Training Centre in Tianjin, China, became SNEC’s third overseas fellow when she accepted a one-year fellowship programme. Besides upgrading her knowledge in intra-ocular implant surgery and other eye surgical procedures, she also participated in excimer and glaucoma clinical research projects. She completed her fellowship in May 1995.



**Dr Paul Foster**  
Fourth fellow (1995-1997)

Dr Paul Foster, from the United Kingdom, was a glaucoma fellow at SNEC from 1995 to 1997. During his first two years he was attached to the glaucoma service as a research registrar, where he participated in the multicenter randomised trials on 5-FU for filtration surgery. During his third year he took an active role in our Tanjong Pagar Community Survey for glaucoma in the elderly. He also took time off to observe the prevalence of glaucoma in Mongolia.

# 减缓近视眼药水待批准 近视儿童“救星”在望



安潘在使用0.01%的阿托品眼药水后，顺利将近视度数维持在200度。（李天麟摄）

全国眼科中心从2006年至2012年对400名近视儿童展开的研究发现，0.01%浓度的阿托品眼药水，能有效减缓儿童近视加深的速度。中心正与一家机构合作配制这种眼药水。

黎选渊 报道  
yuanyy@sph.com.sg

研究发现，每晚滴一滴浓度稀释至0.01%的阿托品眼药水，能有效减缓儿童近视加深的速度。

新加坡全国眼科中心从2006年至2012年对400名6岁至12岁的近视儿童展开的Atropine for the Treatment Of Myopia 2, 简称ATOM2研究，发现了上述显著成果。

领导调查的新加坡全国眼科中心院长陈长慧教授指出，眼科中心正与一家机构合作配制这一浓度稀释的阿托品（Atropine）眼药水，希望能在未来三至六个月，待眼药水获得卫生科学局批准后推出，让眼科医生能根据近视儿童的情况，开方使用。

## 第二阶段研究 使用不同浓度眼药水

陈长慧昨天在记者会上介绍这个对患有近视儿童来说，属“突破性”的医

学研究成果。

他解释：“早在2006年之前，已展开ATOM第一阶段研究，当时的研究成果证实，使用1%浓度的阿托品眼药水能有效避免近视恶化，不过这个浓度的眼药水会产生副作用，例如瞳孔扩张使得对光特别敏感，以及在看近距离事物时会变得视物模糊。”

全国眼科中心于是在展开第二阶段ATOM研究时，安排这400名儿童使用不同浓度的阿托品眼药水，即0.5%、0.1%与0.01%浓度的阿托品眼药水，来了解哪个浓度的眼药水为最佳剂量。

研究结果显示，每晚使用不同浓度阿托品眼药水的儿童在两年后，近视加深的速度有减缓的迹象。

同时，不同浓度眼药水对减缓近视加深的速度差别并不显著，但使用较稀释的眼药水，即0.01%浓度的阿托品眼药水与较高浓度的相比，所导致的副作用少之又少。

陈长慧说：“研究显示，使用0.01%浓度的阿托品眼药水能减缓近视

恶化的速度，例如在一段时间内，若不使用眼药水，儿童的近视程度可能会是600度，但回使用了眼药水，近视程度就可能只在350度左右。”

“研究也发现，停止使用浓度较高的阿托品眼药水后，会出现较明显的近视加深反弹，反观使用0.01%浓度的阿托品眼药水，反弹较不显著。此外，停止使用眼药水后，再次使用这眼药水也同样有助控制近视继续加深。”

17岁的学生安潘是其中一名参与这项研究计划的儿童。他10岁参与计划时，近视度数在175度左右。

安潘说：“医生当时给我使用浓度为0.5%的阿托品眼药水，使用后我的近视确实没有再加深，但却出现了对光特别敏感的问题。我是名橄榄球运动员，经常在户外接受训练，因此这个副作用让我时常觉得阳光太刺眼，眼睛睁不开。”

“使用0.5%的阿托品眼药水两年后，我停止使用一年时，近视增加了25度左右，之后我改用0.01%的眼药水约两年，近视度数维持在200度左右，一直到现在也没再加深。而且这副作用也没了，能有这样的效果，我很高兴。”

陈长慧透露，他有意发展一个近视临床治疗策略框架来更有效地使用稀释到只有0.01%的阿托品眼药水，协助儿童控制近视加深。

# 19

## Fostering a culture of academic medicine

Academic medicine demands a spirit of inquiry, bringing questions from bedside to the bench and back to the bedside for the right solutions. It is about harnessing the synergies of education and research to innovate and meet the future needs of patients.

In March 2012, SNEC launched the Ophthalmology and Visual Sciences Academic Clinical Programme with our academic medicine partner, Duke-NUS. Under a culture of innovation, our doctors and staff on the ground are continuously involved in addressing clinical problems and identifying gaps that exist in a systematic way in search of the right solution that is evidence-based.

Realising 15 to 20 years ago that myopia was going to be a huge problem in Singapore, a series of clinical studies and trials were pursued to find a solution which eventually led to the finding that low dose atropine could reduce myopia progression by up to 60 per cent. The eye drop, Myopine™ is now in production to serve our patients.



Highlight

20

## Going international: SNEC AHP training programme

The Business Times, Friday, May 30, 2014

SINGAPORE NEWS 11

### SNEC gets global accreditation

SINGAPORE National Eye Centre (SNEC) is the first in Singapore and South-east Asia to be accredited by the International Joint Commission on Allied Health Personnel for Ophthalmology (IJCAHPO).

IJCAHPO provides international accreditation by setting academic standards for ophthalmic training programmes to enhance the quality and availability of ophthalmic patient care.

IJCAHPO is the international division of the Joint Commission on Allied Health Personnel for Ophthalmology (JCAHPO), which offers certification and continuing education opportunities to ophthalmic allied health personnel.

The need for well trained and well qualified allied health professionals (AHPs) has not been more acutely felt as the ageing population and ever increasing eye care demand place severe pressure on the existing staff force.

In May 2014, SNEC partnered Duke-NUS Graduate Medical School Singapore to develop its first formal training programme offering different levels of training and certification for AHPs such as ophthalmic technicians and ophthalmic nurses.

The programme has further been accredited by the international division of the US-based Joint Commission on Allied Health Personnel for Ophthalmology (IJCAHPO), making SNEC the first institution in Southeast Asia to receive the recognition.

Participants who complete the programme will receive course certificates endorsed by the three organisations — IJCAHPO, SNEC and Duke-NUS. With the certification programme in place, the SNEC is poised to become a regional training and examination centre for IJCAHPO certificate programmes and hopes to fulfil its role as the regional training hub for ophthalmic staff at all levels.



## SNEC's New Mobile App Achieves Gold

Singapore National Eye Centre (SNEC) clinched a Gold Award at the Asian Hospital Management Awards 2013 for the MyEyeDrops mobile application in the 'Marketing, PR or Promotional Project' category.

The Asian Hospital Management Award recognises and honours hospitals in Asia that implement best hospital practices. This year, 300 entries from 78 hospitals entered for the awards in various categories.

The MyEyeDrops app, launched in February 2013, helps glaucoma patients track their medication. It also allows users to set up medication lists and appointment reminders for different people, a convenient feature for those who are taking care of more than one patient. Video clips are also included to educate users on proper eye care and common eye conditions.



Mr Lee Kai Yin (right), SNEC Chief Projects Officer, receiving the award at the award ceremony in Bangkok



### SNEC Mobile App Team

Front row (from left): Lai Hwei Ching, Belinda Toh, Margaret Tan, Dr Jocelyn Chua, Rosalie Lim, Wendy Wong, Tang Jia Yng, Cindy Tan, Oh Chin Guan (TechStudio)  
Back row (from left): Dr Daniel Su, Lee Kai Yin, Sylvester Lee (TechStudio)  
Not in photo: Ang Cheng Hian, Chiang Fi Li, Ngo Lay Harn, Priscilla Lim

## MyEyeDrops & MyEyeMatters Apps



An informational brochure on SNEC mobile apps



### Highlight

# 22

## Enabling patient care, one app at a time

Leveraging on mobile technology, SNEC is on the constant lookout for opportunities to meet patients' needs. In February 2013, SNEC launched *MyEyeDrops*, a mobile app that reminds glaucoma patients to apply eye drops and medication according to the prescribed regime, with an accompanying tagline: Put the right drops in your eyes, at the right time!

Regular compliance with the use of eye drops in controlling eye pressure is critical to prevent deterioration of the glaucoma condition but over 70 per cent of patients tend to miss their medications. With *MyEyeDrops*, forgetting to apply eye drops will be a thing of the past. Besides providing pre-set reminders, the app, which won an award in the Asian Hospital Management Awards in 2013, offers other useful features such as a calendar of educational eye

events and a medical diary for patients to document their medical history and drug allergies.

That same year, SNEC also unveiled *MyEyeMatters*, an app that provides comprehensive information on various eye conditions and symptoms, as well as useful eye care tips. Through the app, patients and their caregivers can now better understand their eye conditions, why they are receiving certain procedures and medications, and how to take care of their eyes after an operation.

Another app in that series, *MyEyeGym* — a stimulating and interactive eye exercise app with creative animations and cartoons — was also launched to encourage people with squints (strabismus) to do their eye exercises daily to achieve better control of certain type of squints.

# Early detection is better than cure

One of the holy grails in the healthcare sector is how to harness telemedicine, that is, to deliver healthcare information, data and services remotely using information technology (IT).

In 2012, the SNEC partnered with Tan Tock Seng Hospital to pilot the Singapore Integrated Diabetic Retinopathy Programme (SiDRP) which was funded by the Ministry of Health that allows general practitioners, nurses and even opticians to capture eye images of diabetic patients as part of an annual eye screening process.

Using a standardised protocol, retina images are sent via an IT system to be graded by trained technicians thus saving the time and resource of eye

specialists who hitherto had to juggle this task amidst their busy clinical and surgical schedules. The trained technicians/graders will now read the retinal images and recommend further investigation by an ophthalmologist, if the images were found to be abnormal.

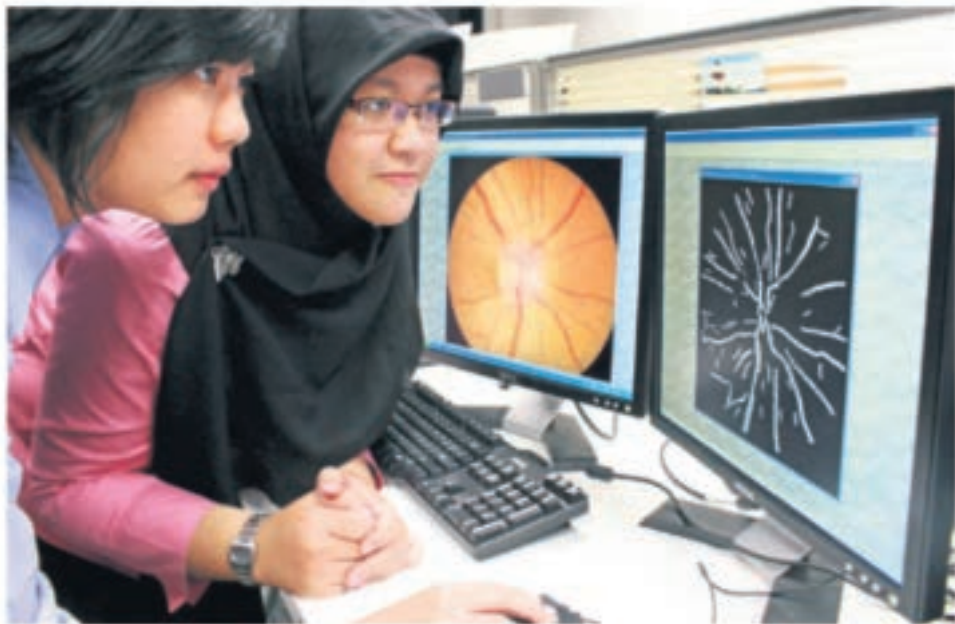
Diabetic retinopathy, a disorder of the blood vessels in the retina of diabetic patients, affects one in three patients with diabetes. The SiDRP facilitates the early detection of the condition, enabling early intervention and the prevention of vision loss. It has also eliminated inefficiencies in the screening process and delivered improved productivity and cost savings to the healthcare system.

04 SINGAPORE HEALTH JUL/AUG 2012

News

## More than meets the eye

With new technology, clearer pictures of the eye help doctors detect cardiovascular and other major diseases



**Pilot project on glaucoma**

Starting later this year, retinal imaging will be used to help detect glaucoma, an eye condition affecting 3 per cent of Singaporeans above 40 years of age and 10 per cent of those above 70. Glaucoma is the leading irreversible cause of blindness worldwide.

A recent Singapore Eye Research Institute (SERI) study revealed that up to 90 per cent of those with glaucoma are unaware they have the condition as it is often perceived as a natural part of ageing. By making ocular imaging facilities easily accessible and affordable, doctors expect more individuals will be screened.

Said Professor Wong Tien Yin, Director, SERI and Singapore Advanced Imaging Laboratory for Ocular Research: "Glaucoma is the silent 'thief of sight'. By the time patients have visual symptoms, they would have lost more than 80 per cent of their vision. This is why early screening is vital."

Experts hope to provide an effective risk-free monitoring method for people whose glaucoma is stable and who may not require immediate treatment.

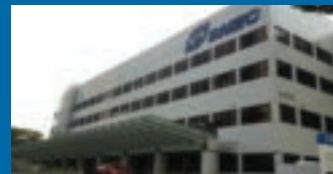
Retinal imaging enables quick generation of reports in the laboratories, which help clinicians make timely diagnoses.

THROUGH THE LENS

### Designed with the Elderly in Mind

With more than half of the patients in the Singapore National Eye Centre (SNEC) being elderly, our facilities and services have been improved for patients' safety, ease of access, and comfort.

Since 2013, we have been working on key initiatives to build a sustainable age-friendly environment and promote practices that allow elderly patients to navigate and use our healthcare services in a more efficient and effective manner.



#### ACCESSIBILITY & COMFORT

A clearly marked reception area fitted with low-height counter at the lobby to allow wheelchair users smooth access and communication with staff.



#### SAFE ENVIRONMENT

An extended driveway specially caters to more cars and longer duration for elderly patients to board or disembark from vehicles.



#### IMPROVED PATIENT FLOW

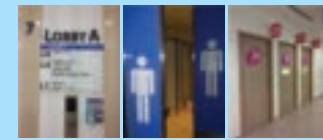
Rearrangement of key services in close proximity to reduce walking distance (from 163 to 126 metres), save effort and time for patients.

#### SAFE WALKING

Handrails are fitted along both sides of walking areas and at shuttle bus point for safe movement.

#### EASY READING

A magnifying glass at the information desk to aid elderly or low-vision patients to read the fine-print.



#### CLEAR SIGNS

Signs in clinics and lift lobbies are in large, bold fonts and accompanied by non-reflective raised letters and pictograms to help elderly patients with poor eyesight. Key signage and directories are in English, Chinese, Malay and Tamil.

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With the increasing volume of elderly patients accessing the healthcare system, who usually suffer from physical weakness as well as reduced visual, hearing, and cognitive abilities, age-friendly features have become a necessity at many clinics and hospitals to ensure a safe and pleasant experience for seniors.

At SNEC, some key services commonly used by the patients were identified and rearranged in close proximity to enable patients to get from one point of service to another within a shorter distance (actual distance travelled measured and reduced from 163 metres to 126 meters) — and with less effort.

Other elderly-friendly features in the centre include handrails along walking areas, non-slip flooring, coloured signs with large font, hot beverage options for the elderly in waiting areas and wheelchair-friendly counselling rooms.

A magnifying glass is also thoughtfully placed at the information desk to aid the elderly or low-vision patients in reading the fine print.

For such efforts, the SNEC was recognised by SingHealth for its sustainable age-friendly initiatives for patients in November 2013.

## SNEC Receives SingHealth Age-Friendly Award



SNEC team with Professor Ivy Ng, Group CEO, SingHealth (centre) at the award presentation ceremony

Singapore National Eye Centre (SNEC) was recognised by SingHealth for its sustainable age-friendly initiatives for patients in an award ceremony held on 19 November 2013.

Elderly patients suffer from physical weakness and reduced visual, hearing, and cognitive acuity, besides their medical conditions. Age-friendly features are hence essential in ensuring safety and creating a pleasant patient care experience for the elderly.

At SNEC, some of the key services commonly needed by the patients have been identified and arranged in close proximity so that patients can get from one point of service to another to reduce walking distance, effort and time.

Other elderly-friendly features in the centre include handrails along walking areas, non-slip flooring, distinctly-coloured signs with large font, hot beverage option for the elderly in waiting areas and wheelchair-friendly counselling rooms.

# SNEC to raise \$25m for research and outreach through Vision Fund

THE Singapore National Eye Centre (SNEC) hopes to raise \$25 million for a new Vision Fund over the next five years to support its community outreach and research activities.

The fundraising effort, says Adjunct Associate Professor Lee Shu Yen (right), who is SNEC's deputy head and senior consultant, Surgical Retina Department, Retina Centre, is necessary as more research institutions compete for limited funds from the government.

"In the past, there were fewer research institutions competing for the same pool of funding and that translated to a higher success rate in securing grants," she says. "But the current funding landscape is much more competitive as more institutions realise the importance of research to enhance healthcare delivery."

SNEC plans to tap the Vision Fund to support research in areas such as health sciences, medical technology, retinal diseases and myopia.

"Atropine eyedrops have already been extensively researched by the Singapore Eye Research Institute (SERI), and now it's available to children to prevent the progression of myopia," says Prof Lee.

"We're looking to further our research on the effects of atropine in reducing the progression on myopia over the years — that has direct impact on the local community," she adds.

SNEC also hopes to utilise the Vision Fund to help needy patients, raise public awareness of eye care and groom more subspecialists in fields such as paediatric retina and ophthalmic oncology.



## Culture of philanthropy

To meet its funding goal, SNEC will reach out to corporations and individuals.

Over the past three years, it has raised \$1.3 million through The Eye Ball, an annual fundraising dinner to create awareness of eye care research, and to support Seri in its efforts to perform impactful research that directly benefits the community.

The most recent Eye Ball was held at the Fullerton Hotel in October last year, where an auction was conducted to raise funds for eye research and improve awareness of eye care.

"Eye care is often taken for granted, and people often don't see a need for it until something happens," Prof Lee says. "Over the years, we've been reaching out to the public to create awareness of eye diseases, vision loss and the fragility of sight."

To that end, the Singapore Society of Ophthalmology (SSO) has partnered with Standard Chartered Bank to provide eye care for underprivileged communities and senior citizens through mobile eye clinics, says Prof Lee, who is also president of the SSO.

The two-year initiative, which began last year, aims to bring eye care to those who are unable to have access to healthcare due to physical constraints or logistical barriers.

The mobile clinics are set up in various nursing homes, community centres and void decks of HDB blocks. SNEC has also been running some of these mobile clinics.

"The bank funds the initiative and ropes in volunteers while our researchers collect community data about the level of vision impairment that is undiagnosed," Prof Lee says. "We are also conducting a research study to see what we can do to encourage these patients to seek treatment."

SNEC also organises a National Eye Care Day each year, to provide eye screening to the public and to promote eye health awareness among Singaporeans.

She credits the success of SNEC's outreach programmes to the dedication of its staff and nurses, who spend their weekends setting up the mobile clinics.

Through the Vision Fund, SNEC is keen to build a culture of philanthropy among its staff who will be equipped with "tools of engagement" to approach individuals and patients who have benefited from eye treatments, to contribute to the fund.

"Healthcare employees not only serve on the frontlines of care but also on the frontlines of philanthropy," Prof Lee says. — Aaron Tan

The Sunday Times 19 April 2015

## Highlight

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## On the frontlines of philanthropy

On the special occasion of the centre's 25th anniversary, the SNEC has embarked on an ambitious effort to raise \$25 million over five years to support needy patients, community outreach and research activities through the establishment of the Vision Fund.

The new fundraising initiative will support SNEC's various research areas such as health sciences research, medical technology development, retinal diseases and myopia. For example, with the additional funding, SNEC will be able to further its research on the effects of atropine in reducing the progression on myopia over the years.

The Vision Fund can also be used to help needy patients, raise public awareness of eye care and in training grants that will support subspecialists identified to further specialise in fields such as paediatric retina and ophthalmic oncology.

The Vision Fund is also expected to instil a culture of philanthropy at SNEC. Many clinics and frontline counter staff will be trained and equipped with tools of engagement to empower them. They will be part of a team working on the frontlines of philanthropy approaching potential donors and creating opportunities for them to contribute towards the meaningful causes.

# From Vision to Reality

**Professor Wong Tien Yin**

*Medical Director, SNEC*

The 25 highlights of this book have vividly traced the development of the SNEC, from what was at that time a bold, “risky” idea to an internationally-leading institution that it is today.

We remain conscious that we cannot rest on our laurels; instead, we must continue to move forward, with our patients at the heart of all we do. Our key guiding principle must be to provide ‘best-in-class’ clinical service, supported by ‘best-in-class’ innovative research and ‘best-in-class’ training and education.

What does ‘best-in-class’ mean? What seems to be ‘best’ is seldom what is optimal and appropriate. For example, what may be touted as ‘best’ in the United States or in the private sector care may mean the more expensive treatment or surgery that provides either a cosmetic or incremental improvement in clinical outcomes. As the national eye centre in Singapore, we will need to focus on what is best for all Singaporeans, based on evidence and cost-effectiveness, rather than simply imitate what is done elsewhere.

How do we get there? Will we continue to grow in size so we can continue to keep up with increasing patient volume and demand? Perhaps not. Our bold vision is a SNEC that is lean, innovative and efficient. In fact, patients should not have to travel from all over

Singapore to receive treatment at SNEC. If we are truly successful in our mission – to prevent vision loss in the population – the needs of most patients should be attended to in the community and in primary care settings; patients would only need to come to SNEC for surgery or specialist procedures and quickly return to their primary care. Preventive care is our real future, not a sprawling, overloaded service that handles a high caseload.

Thus, we must aim to design new, perhaps disruptive models of care, ensuring that they are safe and with better outcomes, while continuing to make SNEC services accessible if needed. SNEC’s goal should not be to compete on metrics such as the size of our institution or the number of operations performed; we must aim to keep the population level of eye health high and vision loss low.

Improving eye health is intricately interwoven with improving the general health of our population. There is good evidence that people with vision problems are more likely to be depressed and suffer from higher mortality in general. It is my vision that we will reach the point where vision loss is no longer a major cause of morbidity in Singapore.

To do this, we will develop initiatives such as telemedicine, home monitoring, patient education and

screening programmes. Through coordinating such efforts, SNEC can lead the community in picking up early disease and reducing the number of major interventions required.

In fact, such activities are very much in line with the goals of our development of Academic Medicine, and as part of the SingHealth Duke-NUS Academic Medicine Centre. It also aligns with the Ministry of Health's (MOH) Healthcare 2020 Masterplan to tackle the problems of Singapore's changing demographics.

As part of our goal to be 'best-in-class', we will also focus on diseases that are relevant to our patient population. One good example is angle closure glaucoma, which is more prevalent in Asian populations. If we look at our publications in this field over the last ten years, SNEC and the SERI are top ranked, as are our individual researchers such as Professor Aung Tin, Executive Director of SERI.

Apart from putting Singapore on the map, SNEC must become the Moorfields Eye Hospital and the Wilmer Eye Institute of the East. In fact, we have the potential to be more. Our solutions for Asian-centric eye disease will not only help Singapore's 5.5 million population but make a direct impact on the 4.4 billion people living in Asia.

Finally, I would like to take this opportunity to

personally thank the people who have mentored me along the way. I am indebted to Professor Arthur Lim, the father of SNEC, but I also have had the benefit of being nurtured and supported by the late Professor Chew Sek Jin, and SNEC's Medical Directors Associate Professor Vivian Balakrishnan, Professor Ang Chong Lye and Professor Donald Tan. I have benefited from the advice and guidance from many others, including Professor Tan Chorh Chuan, Professor John Wong from the National University of Singapore, Professor Alfred Sommer and Professor James Tielsch from Johns Hopkins University, Professor Hugh Taylor from the University of Melbourne, and Professors Ronald and Barbara Klein from the University of Wisconsin-Madison.

I would also like to thank our SNEC pioneers. I am grateful to them for being teachers and senior consultants, for training me and many of us at SNEC, and for continuing to contribute alongside us today: Professor Chee Soon Phaik, Adjunct Associate Professor Seah Lay Leng, and Doctors Choo Chai Teck, Peter Tseng, Ronald Yeoh, Yvonne Ling, among many others.

The SNEC of tomorrow at 50 years will be and must be different from the SNEC of today at 25 years. Our vision, however, will remain the same.



## Acknowledgements

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*SNEC celebrates 25 years  
of service to the nation*

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**OPHTHALMOLOGY &  
VISUAL SCIENCES**  
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EYE  
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