

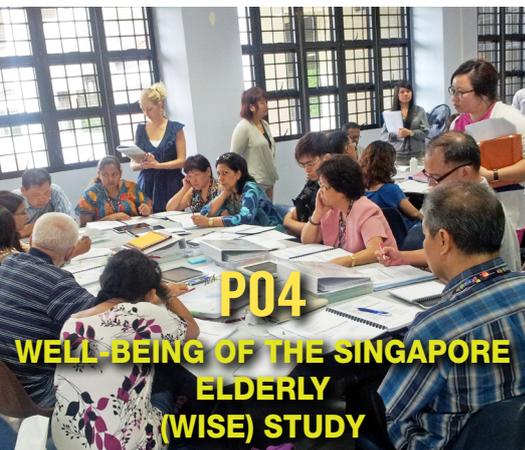


# e-catalyst

ACCELERATING RESEARCH



## Fostering a culture of **COLLABORATION & INNOVATION**



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## The SOpRaNo (not the tv show) Collaboration

**C**ollaborative research is important to bring research work to greater heights. Researchers with a common desire to develop some aspects of their research programmes can gather and engage in similar activities which allow better and more fruitful outcome.

SOpRaNo – Singapore Ophthalmology Research Collaborative Network, is a new collaboration amongst the major healthcare institutions with an eye department in Singapore. It is a consolidation of 6 different ophthalmology departments with Singapore Eye Research Institute (SERI) which is based at Singapore General Hospital's Outram Campus. This convergence of experimental researchers at a single hub allows for higher operational efficiency by pooling of resources and leveraging on the expertise of individual experts at their own clinical research site and draws on a larger patient pool for research.

The network serves as a platform to explore areas of synergies, and opportunities for collaborative research partnership, with special emphasis on clinical research. The objectives of this network are also to act as a melting pot of innovative research ideas, a conduit for the sharing of knowledge, and harmonisation of research ideas and processes, ultimately leading to innovation and excellence in clinical care and intervention strategies. It also facilitates the sharing of infrastructure and other resources, as well as the increase in efficiency and quantum of trial participant recruitment to facilitate the robust conduct of clinical research in Singapore.

National Healthcare Group Eye Institute's (NHGEI) researchers and clinicians already have ongoing collaborations with SERI and other institutes; this platform will further strengthen and facilitate these projects. Quoting A/Prof Wong Hon Tym (Director, NHGEI and Head, Department

of Ophthalmology, Tan Tock Seng Hospital), “by pooling talent, information and focus via SOpRaNo, ophthalmic research in Singapore will reach even greater heights. SOpRaNo will allow our professional fraternity to be far more competitive in grant acquisition and also more impactful in our efforts, as we continue to undertake research that improves the ophthalmic health of all Singaporeans.”

The signing ceremony for the memorandum of understanding took place on November 28, 2014. In addition to eye conditions such as glaucoma, age-related macular degeneration and diabetic retinopathy, the new network also aims to prioritise eye research in myopia amongst the young. This news was featured in the Straits Times on November 29, 2014.

**Dr Augustinus Laude**  
Consultant

**Dr Wong Hon Kiat**  
Registrar

NHG Eye Institute @ Tan Tock Seng Hospital

## Multimorbidity in Primary Care

**I**n modern society, life expectancy has increased and people are living longer, resulting in the increased likelihood of developing one or more chronic conditions. Multimorbidity is common in primary care but it has not been studied in Singapore to date. Self-management of multiple chronic conditions is very important, especially in Singapore with an increasing ageing population and a decreasing working adult to elderly ratio. Several studies have demonstrated the association of chronic conditions to depression, which may intensify the effect of chronic conditions by adversely affecting functioning and decreasing adherence to medical treatment protocols.

quality of life (MDAQ)”, is a collaborative effort between National Healthcare Group Polyclinics (NHGP) and the Institute of Mental Health (IMH). The Principal Investigator is Dr Lee Eng Sing of NHGP, and the co-investigators are Assistant Professor Mythily Subramaniam and Ms Janhavi Ajit Vaingankar of IMH. The study will investigate the prevalence and severity of psychological distress experienced by patients with multimorbidity in the primary care setting in Singapore. The study will also elucidate the association between multimorbidity and psychological distress, quality of life, and socio-economic status. Adult patients with the three commonest chronic conditions in Singapore – diabetes, hypertension and dyslipidaemia, seeking care at a polyclinic are randomly selected for the study, and interviewed using a battery of questionnaires that assess their medical history and psychological symptoms. Over 700 patients with multimorbidity will be interviewed for this study.

The findings of the study will help to influence priority setting and policy-making on how to better manage patients with multimorbidity in a primary care setting. The findings will also provide insight for future research studies on the management of patients under the Community Health



The IMH team – Asst Prof Mythily on the left and Ms Janhavi on the right

Assist Scheme (CHAS), and the planning of the infrastructure of future polyclinics for embracing team-based care. This study will serve as a good pilot study for future in-depth quantitative and qualitative studies on the impact of multimorbidity on healthcare utilisation and burden from the perspective of patients, health systems and their caregivers in Singapore.

Highlighting the importance of this study, Dr Lee says, “Multimorbidity signifies a challenge on healthcare delivery and a greater need for health care resources. Therefore, coordinated strategies for clinical care are necessary to improve clinical outcomes and reduce the burden of illness to both the patients and the society. To design these strategies, reliable information on the scale and impact of multimorbidity are needed, and the MDAQ study will address this need.”

Article contributed by  
the teams from NHGP and IMH



The NHGP team - Dr Lee on the left

The two-year cross-sectional study funded under the NHG Small Innovative Grant, “Multimorbidity in primary care and its association with depression, anxiety and

## Altered Vascular Function Is Associated With An Increased Risk For Dengue Haemorrhagic Fever

**D**engue fever is the most important vector borne infectious disease in Singapore and over 18,000 cases were reported in 2014. Most patients present with an uncomplicated febrile illness but a small percentage develop severe dengue or dengue haemorrhagic fever which is associated with an increased risk of developing complications such as shock, bleeding and death. A major hurdle in the clinical management of dengue is how to assess which patients are at higher risk of developing complications requiring inpatient management and those who will have a benign course. In addition, the pathogenesis of vascular leak in dengue is still unclear.

In a collaboration between Professor Leo Yee Sin, Associate Professor David Lye, Dr Tun Linn Thein, and Mr Joshua Wong

from the Communicable Disease Centre, Institute of Infectious Diseases and Epidemiology, Tan Tock Seng Hospital, Associate Professor Ooi Eng Eong, Duke-NUS and Assistant Professor Yeo Tsin Wen, Lee Kong Chian School of Medicine, the team conducted a pilot study to measure vascular function or vascular nitric oxide (NO) bioavailability in patients with dengue first presenting at an outpatient clinic with a technology termed reactive hyperaemic index. The team then followed up with the patients over the next few days to see who developed severe dengue or dengue haemorrhagic fever.

In this pilot study, the team found that an elevated reactive hyperaemic index was associated with a 4-fold increased risk of developing dengue haemorrhagic fever and was able to predict this with a reliable

sensitivity and specificity. The increased NO bioavailability observed in patients on enrolment who subsequently developed dengue haemorrhagic fever has also shed new light on the pathogenic mechanisms of vascular leakage in dengue fever but also opens up new translational approaches for therapeutic intervention by attenuating NO production in patients with severe dengue or dengue haemorrhagic fever.

This is the first study to use this vascular method in dengue and the findings were recently published in the peer-reviewed internationally renowned Journal of Infectious Diseases, and plans are now underway to validate the findings in a larger study.

**Asst Prof Yeo Tsin Wen**  
Assistant Professor of Infectious Disease  
Lee Kong Chian School of Medicine  
Nanyang Technological University

## Facilitation of Collaborations and Partnerships at NHG

**S**ince its inception in 2012, the NHG Collaboration and Partnership (C&P) Unit<sup>1</sup> under the Research & Development Office (RDO) has played an active role in facilitating collaborations and partnerships between NHG institutions and various external parties, ranging from academic institutions, research institutions, small and medium-sized enterprises (SMEs) as well as multinational companies. These efforts have translated into numerous projects, programme-level collaborations, as well as institution- and cluster-level partnerships. A relatively recent example of cluster-level partnership is the establishment of the Rehabilitation Research Institute of Singapore (RRIS) between Agency for Science, Technology and Research (A\*STAR), Nanyang Technological University (NTU) and National Healthcare Group (NHG).<sup>2</sup>

In fulfilling its mission, the C&P unit works seamlessly with the various innovation teams at NHG institutions, such as the team from TTSH Clinical Research & Innovation Office (CRIO). One recent example of such synergy is the collaboration between TTSH and Konica Minolta, a global leader in the field of imaging and printing products and services, to co-develop a novel mobile solution for the measurement and assessment of chronic wounds.

Today, wound measurements are still very subjective and fairly dependent on the skills of the nurses. This collaboration marries the clinical expertise of TTSH in this area and the imaging capabilities of Konica Minolta. It is anticipated that this interdisciplinary collaboration would result in a practical solution that can better meet the clinical need of having an objective and automated measurement. Once demonstrated, this development could potentially be applicable

outside of the hospital setting, thereby benefitting the wider community.

Besides playing the role of a matchmaker, the C&P unit also facilitates technology development and commercialisation of Intellectual Property (IP) that arise from research and innovation activities at NHG institutions. In this regard, the C&P unit works closely with various funding bodies, such as the SPRING Singapore in engaging SMEs to help translate identified clinical needs/ideas/concepts into relevant solutions that can benefit the wider population, and the National Health Innovation Centre (NHIC) in supporting healthcare institution-driven projects and in seeking patent protection for select inventions.

**Mr Louis Ang**  
Assistant Director

**Ms Heiny**  
Manager  
C&P Unit, Research & Development Office  
National Healthcare Group



**The signing of research collaboration agreement between TTSH and Konica Minolta on March 9, 2015.**  
Front row, from left to right: Ms Rachel Goh (Director, Konica Minolta Business Innovation Center AP), Mr Hiroshi Tomita (President, Konica Minolta Laboratory USA), Dr Leong Khai Pang (Clinical Director, Clinical Research & Innovation Office, TTSH), Mr Yong Keng Kwang (Chief Nurse, TTSH), Ms Betty Khong (Nurse Manager, Nursing Service, TTSH). Back row, from left to right: Ms Carol Ng (Manager, Clinical Research & Innovation Office, TTSH), Ms Hoi Shu Yin (Assistant Director, Nursing Service, TTSH), A/Prof Thomas Lew (Chairman, Medical Board, TTSH), Ms Zhang Qiu Ying (Services / Solutions Incubation Lead, Konica Minolta Business Innovation Center AP), Mr William Ng (Manager, Clinical Research & Innovation Office, TTSH), Ms Doris Tan (Assistant Director, Clinical Research & Innovation Office, TTSH), Mr Louis Ang (Assistant Director, NHG C&P Unit), Dr Christina Tiong (Admin Director, Clinical Research & Innovation Office, TTSH), Ms Wei Ming (Manager, Konica Minolta Laboratory USA), Mr Leni Chan (Business Development Manager, Konica Minolta Business Innovation Center AP).

1. NHG Collaboration and Partnership Unit, Research & Development Office.

URL: <https://www.research.nhg.com.sg/wps/wcm/connect/romp/nhgromp/clinicalresearch/ipropertymgmt>

2. Media Release: Launch of Rehabilitation Research Institute of Singapore, 26 September 2014.

URL: <https://corp.nhg.com.sg/Media%20Releases/LAUNCH%20OF%20REHABILITATION%20RESEARCH%20INSTITUTE%20OF%20SINGAPORE.pdf>

## Well-being of The Singapore Elderly (WiSE) Study

The Well-being of the Singapore Elderly (WiSE) study was initiated in 2012 to establish the prevalence of dementia in the older resident population of Singapore, to describe the extent and nature of care-giver burden as well as evaluate the economic burden among those with dementia. This is the most comprehensive study to date and the researchers used innovative technology to

capture the data in real-time. The field work of the study was completed in December 2013 with 2,565 older adults completing the study, giving a response rate of 65.6%.

The study provided insight into a number of health and social matters, such as 1 in 10 people aged 60 years and above in Singapore having dementia. The findings also showed that people who were educated up to primary level are 3.6 times more likely to have dementia than those with a tertiary education, while home makers and retirees are 25 and 30 times, respectively, more likely to have dementia as compared to those in paid employment. Information obtained from caregivers during

the study also showed that about 85% of people with dementia have care needs, and that caregivers of people with dementia experience significantly higher burden and psychological problems as compared to caregivers of people without dementia.

Establishing the prevalence of dementia and its impact on caregivers helps policymakers plan services, and raises awareness so people can recognise its symptoms and seek help early. Professor Chong Siow Ann, Vice Chairman, Medical Board (Research), who led the new study, said: "This is the most comprehensive, most rigorous study that we have done to date of this nature in Singapore. The concern is how we can use it to assess if we have adequate resources to meet the challenges now and those that will emerge."

**Mr Mark Alexander**  
Senior Executive  
Research Division  
Institute of Mental Health



WiSE Study - Team in action

## The TTSH Research Laboratory

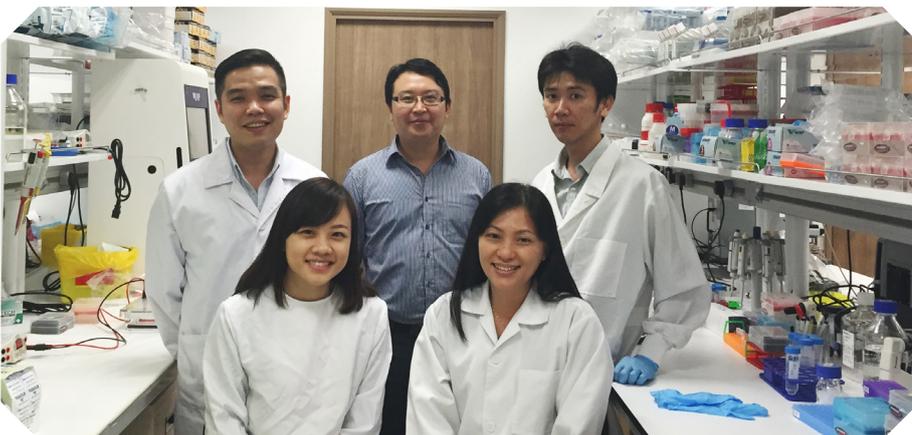
The TTSH Research Laboratory (TRL) was set up in March 2014 as part of the TTSH Centre Grant. It acts as a centralised platform to support basic and translational research activities in the hospital. The laboratory and storage facility located at TTSH CDC2 currently occupies 167.8 m<sup>2</sup> and the research team, led by senior scientist Dr Goh Liuh Ling, includes a research fellow, a bioinformatician and research assistants.

The core facilities include specimen processing, nucleic acid extraction, storage and specimen tracking.

Biological samples such as DNA, RNA, serum, plasma, white blood cells and tissues are stored at a variety of conditions including -20°C, -80°C or liquid nitrogen. All samples are barcoded with their locations tracked by our in-house developed Vial Tracker Management System. In 2014, the lab processed 20,000 vials of serum, plasma and DNA from ~1,500 healthy subjects in an effort to establish a healthy control biobank to support an extensive array of clinical research. The lab also provides a wide range of genomic services such as sequencing, genotyping and gene expression analyses. Given the major role of genomics in personalised medicine,

optimisation and deployment of novel tests using Next Generation Sequencing (NGS) is a priority for the TRL research team. The facility is equipped with a Covaris focused-ultrasonicator, an Agilent Bioanalyzer and an Illumina Miseq sequencer. Targeted sequencing in TRL includes library preparation and computational analysis. TRL research activities are focused on studies related to personalised medicine with the aim of delivering diagnostics and therapeutics into the clinic. Current projects conducted in the lab include identifying specific disease-associated gene variants in rheumatoid arthritis, developing urinary microRNA biomarkers for diagnostics in prostate cancer, evaluating protein biomarkers associated with metastasis in clear cell renal cell carcinoma, and studying the relationship of haptoglobin phenotype to vascular changes in patients with diabetes mellitus. The lab operates on a fee-for-service or collaborative mode. Training, instrument and facility access are also available based on the nature of the request.

**Dr Goh Liuh Ling**  
Senior Scientific Officer  
Clinical Research & Innovation Office (CRIO)  
Tan Tock Seng Hospital



## National Healthcare Group (NHG) Clinician Investigator (CI) Scheme

The Clinician Investigator (CI) Scheme is a research manpower development programme administered by the NHG Research & Development Office (RDO). The CI Scheme is designed for established clinicians who wish to incorporate research into their clinical expertise with the aim of improving healthcare. The CI Scheme aims to promote a culture of collaborative research among established clinicians to generate better research outcomes, groom researchers in the department/institution and develop them as international Key Opinion Leaders (KOLs) in their respective research areas.

For this issue, we spoke to Dr Lim Choon Guan (Consultant and Deputy Chief, Child & Adolescent Psychiatry, Institute of Mental Health) on his receiving of the award. Dr Lim is a FY2014 awardee.

For more information of the CI Scheme and the awardees, please visit [www.research.nhg.com.sg](http://www.research.nhg.com.sg) (Grants & Programmes → Research Career Development).



**Dr Lim Choon Guan**

Consultant

Department of Child and Adolescent Psychiatry  
Institute of Mental Health

### 1. What motivated you to apply for the CI Scheme?

Over the years, the hospital and my heads of department have been supportive of my research work and have provided me protected time. The Clinician Investigator (CI) Scheme has permitted me a means to ensure that the hospital is paid for my time spent on research. This is important as research grants do not fund the clinicians' time.

### 2. What are some of the challenges faced when embarking on your research journey?

Starting out as a newbie researcher is daunting. It can be difficult to plan the best way to design a study in order to answer a research question. Thereafter, planning

how to put together the resources from time, finance to manpower to carry out the project seems like an uphill task: back in those days, research was like a co-curriculum activity (CCA) on top of regular work.

### 3. On a lighter note, what do you like most about research?

I enjoy accomplishing a project to answer a clinical a clinical question which has been bugging me. Sharing local data during clinical work helped some patients or their parents to make decisions about treatment. Working with a motivated team of researchers and meeting researchers from other institutions and fields both locally and internationally helped me to learn much more than the usual reading.

### 4. Being awarded the CI Scheme, what are some of your research plans moving forth?

I have currently 2 projects involving a brain-computer interface game system for treating Attention Deficit Hyperactivity Disorder (ADHD) which will be completed within another year. I am currently planning with a bigger team to develop a new game system for children with autistic spectrum disorders. I also hope to have time to enthuse more clinicians to dabble in research.

### 5. Any word of advice for aspiring Clinician-Scientists out there?

Research work is laborious and requires perseverance to see projects through to completion. There are hurdles such as the 'tedious' process of writing proposals for grant applications and ethical board approval, not to mention the amount of time needed for the research activities. Be realistic about what can be realistically accomplished given the available resources. It is helpful to get a mentor to guide you. Networking is important to open up new ideas for research. I learned from watching a senior clinician researcher that sometimes one may help a fellow researcher without any upfront benefit but investing in relationship building may be the bridge to a future successful collaborative research work.

Investing in  
relationship  
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research work

## NHG RDO Congratulates the FY2015 Awardees of the Small Innovative Grant (SIG) & Clinician Leadership in Research (CLR) Programme!

Visit NHG Research Website [www.research.nhg.com.sg](http://www.research.nhg.com.sg) ("Announcements") for full information of these awardees and their projects, and stay tuned to (Grants & Programmes → Research Career Development) for the FY2016 Call for Applications in for SIG (July 2015) and CLR Programme (October 2015).

## The Art and Science of Medicine – Prof James Best

**T**he Lee Kong Chian School of Medicine (LKCMedicine) welcomed Professor James Best, a well-known and respected medical teacher, researcher, clinician and leader, as its first resident dean in July 2014. The former head of the Melbourne Medical School was drawn to LKCMedicine by the unique opportunity to help shape the new medical school, which is a joint partnership between NTU and Imperial College London.

Besides spearheading the School's innovative research and teaching programmes, Prof Best sees one of his major roles in developing a new curriculum in clinical teaching, an area he was heavily involved in at the Melbourne Medical School. For his contributions to the School, he was recently honoured with the prestigious Brownless Medal. The medal is given to eminent individuals who, through their diligence and leadership, have ensured the growth and positioning of the medical school. Working with clinician-educators from the School's primary healthcare

partner, the National Healthcare Group (NHG), and its international faculty, Prof Best hopes to teach LKCMedicine students the art of medicine, helping them become good, caring doctors.

After graduating from the University of Melbourne in 1972, Prof Best practised endocrinology in Australia, Hong Kong, the USA and the UK. He joined the University of Melbourne first as Deputy Head of the Department of Medicine, before rising through the ranks to become Head of the Melbourne Medical School in 2007. As Head, he was responsible for medical education at the School as well as health and biomedical research.

The discovery of a new glucose transporter protein – GLUT12 – is one of the key highlights of Prof Best's research in glucose and lipid metabolism. Prof Best also led epidemiological and clinical studies of risk factors leading to cardiovascular disease in diabetes patients. He also oversaw studies of healthcare delivery for diabetes prevention and management, an area he will continue to work on at LKCMedicine.



**Prof James Best**

Prof Best currently serves on the NHG and National Medical Research Council (NMRC) Boards as well as on NMRC's Translational Research Investigator & Clinician Scientist Awards Panel.

He is the author of more than 200 publications, mainly in the field of diabetes, and holds an h-index of 42. He received an Honorary MD from St Andrews University and is a Fellow of the Royal Australasian College of Physicians, the Royal College of Pathologists, and the Royal College of Physicians of Edinburgh.

## Research - A Continual Learning Journey



**Ms Mabel Leow**  
Staff Nurse  
National Skin Centre

**After graduation, I joined the National Skin Centre where I got the chance to explore a new speciality in dermatology.**

**I**'ve always enjoyed two things since my childhood days – playing the piano and assembling jigsaw puzzles. I credit these two activities for teaching me the value of patience and perseverance, and for imparting in me the curiosity and courage to explore new boundaries, traits which I believe are fundamental to a life in research.

It was therefore of no surprise that I felt an immediate affinity with the intensity of this life when I first embarked on my Honours research project as a final year student in the National University of Singapore (NUS) while reading towards a degree in Nursing – it felt almost as if a puzzle piece had fallen correctly into place.

Thereafter, I was offered a scholarship to pursue a PhD in Nursing Research which was an opportunity I leapt at and accepted without hesitation. I have enjoyed every moment of it and for all that I have achieved so far in my young research journey, I would like to thank A/Prof Edward Poon (Director of Nursing, Ang Mo Kio-Thye Hua Kwan Hospital) and Prof Sally Chan (Head of School of

Nursing and Midwifery, The University of Newcastle, Australia) for their continual support and encouragement.

My previous research was focused on palliative care and psychosocial care. After graduation, I joined the National Skin Centre where I got the chance to explore a new speciality in dermatology. The quantitative and qualitative research methodologies honed over my years as a student helps me in my current studies on diverse dermatological conditions. My current research studies include exploring the quality of life of patients with viral warts; the experiences of patients with alopecia areata; and efficacy of iontophoresis treatment for patients with palmar hyperhidrosis.

This famous quote from Hippocrates has been my guiding principle for both patient care and research – “Cure sometimes, treat often, comfort always”. Having focused mainly on psychosocial care, I endeavour to explore clinical and basic sciences research to be part of the advancing medicine to discover new ways of treating and hopefully, curing patients.



## The NHG Human Research Protection Programme has successfully obtained



# AAHRPP Re-accreditation!

The Association for the Accreditation of Human Research Protection Programmes, Inc. (AAHRPP) was established to promote high quality research through an accreditation process that helps organizations worldwide strengthen their human research protection programmes (HRPPs).  
To find out more about NHG's re-accreditation journey, please [click here](#).

## Research Training Courses

Date	Training Programme	Venue	Course Provider
Ongoing	Proper Conduct of Research Online – Basic I, II & III (PC101, PC102 & PC103) Workshop	<a href="http://www.elearning.nhg.com.sg">http://www.elearning.nhg.com.sg</a>	NHG Research & Development Office
Ongoing	Singapore Guideline for Good Clinical Practice (SGGCP) Course Online	<a href="http://www.elearning.nhg.com.sg">http://www.elearning.nhg.com.sg</a>	
18 May 2015	Research Governance and Monitoring, Audits & Inspections Workshop	NHG College, Training Room 2, Level 3, Nexus@one-north	
4 June 2015 (AM)	Informed Consent and Documentation in a Clinical Trial Seminar	NUH, Advanced Surgical Training Centre (ASTC) Lecture Room	
4 June 2015 (PM)	Subject Recruitment & Follow-up and Safety Reporting Seminar	NUH, Advanced Surgical Training Centre (ASTC) Lecture Room	
23 June 2015	Understanding Study Designs	TTSH Seminar Room 2	TTSH CRIO
1-2 July 2015	Project Management for Clinical Research Professionals Workshop	NHG College, Skills Lab 1, Level 3, Nexus@one-north	NHG Research & Development Office
23 July 2015	Manuscript Writing and Poster Presentation Seminar	TTSH Annex 2: L1-W-T014	
28-30 July 2015	Biostatistics Workshop (Basic & Intermediate)	To be confirmed	

\*Dates are subject to changes without prior notice

For registration and full details on courses by **NHG Research & Development Office**, please visit [www.research.nhg.com.sg](http://www.research.nhg.com.sg) (Training & Education → Register for a Course)  
For registration and full details on courses by **Tan Tock Seng Hospital (TTSH) CRIO**, please kindly contact the course coordinator, Ms Jennifer Teo ([jennifer\\_hp\\_teo@tsh.com.sg](mailto:jennifer_hp_teo@tsh.com.sg))

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