



A Newsletter For The Research And Innovation Community In Singapore • Issue 45 • May - Jun 2022



Red No More: A Cluster Randomized Controlled Trial to Evaluate Enhanced Skin Cleanser and Protectant Regimens in the Management of Incontinence Associated Dermatitis

[View more](#) >>

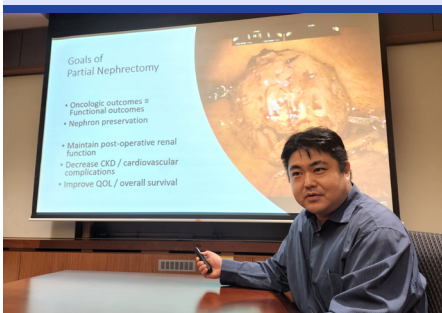


Collaborative Initiatives in Translational Research

A sneak peek into ongoing research initiatives in wound care, skin health and rehabilitation, and the establishment of a brain tissue repository.

[View more](#) >>

Come Meet The NHG innovators: Dr Shum Cheuk Fan



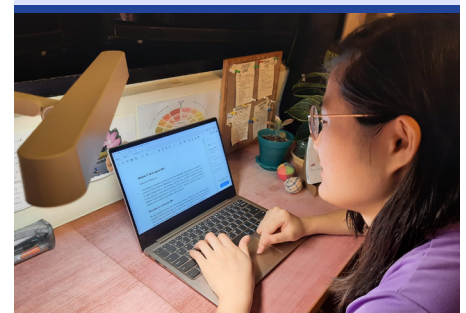
[View more](#) >>

Bench to Bedside: Journey to Discover the Achilles' Heel of Cancer Cells



[View more](#) >>

Breaking the Barriers: The Rise of Internet-based Cognitive Behavioural Therapy (iCBT) for Obsessive- Compulsive Disorder (OCD)



[View more](#) >>



LATEST NEWS

- NHG-LKCMedicine Joint Research Symposiums
- Not a Marathon and Not a Hackathon, but a Datathon!
- Caritas iCommunity@north
- Patients at the Driver's Seat of Service Delivery



RESEARCH AND INNOVATION

- Mobile App for Local Informal Caregivers of Persons with Dementia
- From Waving the Lightsabers to Surgical Training in Virtual Reality - My Meta-Fantasy
- Early Oral Stepdown Therapy for Uncomplicated Gram-negative Bacteraemia: Yay or Nay?



CAREER DEVELOPMENT

- My Patients Drive My Research Journey
- Optimizing Mobility and Function Through Rehabilitation
- Training Calendar
- Chicken Soup for the Busy Coordinator



NHG-LKCMedicine Joint Research Symposiums on Skin (15 Nov 2021) & Mental Health Research (29 Mar 2022)

Skin diseases and Mental Health are two of the niche focus areas shared by NHG and LKCMedicine. Both organisations are committed to inter-disciplinary translational research in these areas to advance knowledge, address unmet clinical needs and achieve better health outcomes for patients.

Jointly organised by NHG and LKCMedicine, the [symposium on Skin research](#) featured a series of talks by exemplary clinicians and scientists who shared insights on topics ranging from itch

in dermatology, immunology of hair cycling, pathogenesis-based treatment of acne as well as the development of wound models. Likewise, the [symposium on Mental Health research](#) explored topics including local perspectives of youth mental health and positive mental health, as well as mental health during the COVID-19 pandemic.

Missed the symposiums? Click on the respective links above to view the Zoom recordings.

Our Heartiest Congratulations to the NHG Recipients of the National Medical Excellence Awards (NMEA) 2021!

The NMEA recognises outstanding clinicians, clinician scientists and other healthcare professionals for their contributions in advancing healthcare, improving the standards of patient safety, and driving research and education. Congratulations to the following recipients:

National Outstanding Clinician Scientist Award

Prof Chong Siow Ann, Senior Consultant / Research Division and Department of Psychosis, IMH

National Clinical Excellence Team Award

COVID-19 Research Workgroup

Assoc Prof David Lye, Director, Infectious Disease Research and Training Office, NCID/TTSH
Dr Barnaby Young, Head, Singapore Infectious Disease Clinical Research Network, NCID/TTSH
Prof Lisa Ng Fong Poh, Principal Investigator / Singapore Immunology Network, A*STAR
Dr Chia Wan Ni, Research Fellow, Duke-NUS

For more information about the awards, please click [here](#).

FY2021 NHG-LKCMedicine Clinician Scientist Fellowship (CSF) Awardees

The [NHG-LKCMedicine Clinician-Scientist Fellowship \(CSF\)](#) is a joint programme that aims to nurture and develop Clinician Scientists with a formal research training programme leading to PhD.

Ms Julia Zhu and Dr Dinesh Sirisena have both enrolled into the [LKCMedicine PhD by Research Programme](#) in Aug 2021 and Jan 2022 respectively. We wish them the best in their research and academic endeavours!



Ms Julia Zhu Xiaoli

*Nurse Clinician, Nursing Services
NHG Polyclinics*

Project Title:

Assessing the feasibility and acceptability of a personalised behavioural educational intervention for patients with diabetic foot ulcer in primary care: a pilot study using mixed method approach



Dr Dinesh Sirisena

*Consultant, Sports Medicine
Department of Orthopaedic Surgery
Khoo Teck Puat Hospital*

Project Title:

An epidemiological, structural and functional evaluation of the muscle-tendon unit amongst an elderly population with knee Osteoarthritis

Dr Dinesh is also a recipient of the [NMRC Research Training Fellowship \(RTF\)](#).



Results for the FY2021 NHG-LKCMedicine Clinician-Scientist Preparatory Programme (CSPP) Call for Applications

The NHG-LKCMedicine Clinician-Scientist Preparatory Programme (CSPP) is a joint programme between NHG and Lee Kong Chian School of Medicine (LKCMedicine) that aims to provide clinicians with **an exposure to research in the early phase of their careers** through **research training** and **project experience**.

The programme is open to **doctors** enrolled in the NHG Residency Programme; or with primary appointments as Associate Consultants at NHG institutions, and other **health science / healthcare professionals**.

The FY2021 Call for applications I was open from 27 April 2021 – 08 June 2021, and the FY2021 Call for applications II was open from 19 October 2021 to 30 November 2021.

Congratulations to the following FY2021 awardees! For more information about the NHG-LKCMedicine CSPP, please click [here](#).

| Name of PI/ Designation/ Department | Institution | Project Title |
|--|-------------|--|
| Ms Cherie Choo Senior Occupational Therapist Occupational Therapy | IMH | The effectiveness of telerehabilitation in vocational rehabilitation: A randomized control trial. |
| Dr Natalie Wee Resident Geriatric Medicine | KTPH | Associations of accelerometry-measured physical activity and sleep with functional decline in hospitalised elderly patients: a prospective observational pilot study |
| Ms De Roza Jacqueline Giovanna Advanced Practice Nurse Senior Nurse Clinician Geylang Polyclinic – Nursing | NHGP | Multi-component Intervention for Reducing Fear of Falling in Community-dwelling Older Adults |
| Dr Wei Xin Resident Ophthalmology | TTSH | Exploring choroidal angiostructure in a large population-based study - HELIOS (Health for Life in Singapore) |
| Ms Yong Pay Wen Senior Dietician Nutrition and Dietetics Services | WH | Using Bedside Ultrasound for Sarcopenia Screening in Older Adult Patients in Acute Care Settings |
| Dr Sze Kai Ping Family Physician Geylang Polyclinic | NHGP | Exploring healthcare professionals' perceptions of digital tools utilisation in clinical consultation: a qualitative study in Singapore |
| Ms Wei Shan Senior Occupational Therapist Rehabilitation Service | KTPH | A pilot study to explore the feasibility and effectiveness of a Virtual Reality (VR) cognitive rehabilitation programme to stroke survivors in Singapore |

Outcomes of the Nov 2020 & Jun 2021 NMRC Calls for Applications

Congratulations to the NHG clinicians who have received the National Medical Research Council (NMRC) Talent Development Awards and Research Grants during the following Calls for Applications.

To find out more about the NMRC Talent Development Awards and Research Grants, please click [here](#).

November 2020 Call

| Name of PI/ Designation/ Department | HI | Project Title | Grant/Award |
|---|---------------|--|---|
| Assoc Prof Tey Hong Liang Senior Consultant Dermatologist | NSC | Pathogenesis and novel preventive treatment of pathological cutaneous scarring: role of SPARC and TH2 immunological milieu and treatment with siRNA-embedded dissolving microneedles | Clinician Scientist Award - Investigator (CSA-INV) |
| Assoc Prof Lim Su Chi Senior Consultant, General Medicine | KTPH | Prospective study of biomarkers for diabetic kidney disease (DKD) progression in younger-onset type 2 diabetes - from biology-informed targeted proteomics to trans-omics | Clinician Scientist Award - Investigator (CSA-INV) |
| Dr Barnaby Young Senior Consultant, Infectious Disease | NCID/ TTSH | A Multicenter, Adaptive, Randomized Blinded Controlled Trial of the Safety and Efficacy of Investigational Therapeutics for Hospitalized Patients with COVID-19 (ACTIV3) | Clinician Scientist/ Clinician Investigator Salary Support Programme (CS/CISSP) |
| Assoc Prof David Lye Senior Consultant, Infectious Disease | NCID/ TTSH | A Multicenter, Adaptive, Randomized Blinded Controlled Trial of the Safety and Efficacy of Investigational Therapeutics for the Treatment of COVID-19 in Hospitalized Adults | Clinician Scientist/ Clinician Investigator Salary Support Programme (CS/CISSP) |

June 2021 Call

| Name of PI/ Designation/ Department | HI | Project Title | Grant/Award |
|--|------|--|--|
| Dr Udawattage Dinesh Chaminda Sirisena Consultant, Sports Medicine | KTPH | An epidemiological, structural and functional evaluation of the muscle-tendon unit amongst an elderly population with knee Osteoarthritis | NMRC Research Training Fellowship |
| Dr Bryan Tan Consultant, Orthopaedic Surgery | WH | Collaborative Model of Care between Orthopaedics and Allied Healthcare Professionals (CONNACT) | NMRC Research Training Fellowship |
| Dr Shum Cheuk Fan Consultant, Department of Surgery | WH | Leveraging Artificial Intelligence for Risk Assessment of Renal Masses in Radiologic Images | Clinician Innovator Award-Investigator (CIA-INV) |
| Dr Chan Lai Gwen Consultant, Psychological Medicine | TTSH | Exploring Sleep As A Therapeutic Target For Improving Outcomes After Acquired Brain Injury | Clinician Scientist Individual Research Grant New Investigator Grant (CS-IRG-NIG) |
| Assoc Prof Angela Chow Senior Consultant, Clinical Epidemiology | TTSH | Understanding the Psychosocial, Cultural, and Systemic Determinants of Antibiotic Use and Utilizing a Multilevel Approach to Address Inappropriate Antibiotic Use | COVID-19 Top-Up Grant June 2021 Grant Call |
| Assoc Prof Angela Chow Senior Consultant, Clinical Epidemiology | TTSH | Patient, Physician, and Organizational Factors Influencing Decision-Making for Antibiotic Use, and N-of-1 Trials of Interventions to Improve the Decision-Making | COVID-19 Top-Up Grant June 2021 Grant Call |
| Assoc Prof Melvin Leow Khee Shing Senior Consultant, Endocrinology | TTSH | Brown fat activation and browning Efficiency Augmented by Chronic COLD and Nutraceuticals for Brown adipose tissue-mediated Effect Against Metabolic Syndrome (BEACON BEAMS Study) | COVID-19 Top-Up Grant June 2021 Grant Call |
| Assoc Prof Rinkoo Dalan Senior Consultant, Endocrinology | TTSH | Effects of Dapagliflozin and Metformin on Vascular Function in Newly-Diagnosed Treatment-Naive Type 2 Diabetes - A Randomized Controlled Trial (DMVascular Study) | COVID-19 Top-Up Grant June 2021 Grant Call |
| Dr Hum Yin Mei Allyn Senior Consultant, Palliative Medicine | TTSH | Predicting Survival in End Stage Organ Disease: Developing and Validating Prognostic Models | COVID-19 Top-Up Grant June 2021 Grant Call |
| Assoc Prof Tan Ern Yu Senior Consultant, General Surgery | TTSH | Clinical evaluation of a novel 20-gene signature as a biomarker and metabolic target in breast cancer stem cells | COVID-19 Top-Up Grant June 2021 Grant Call |
| Assoc Prof Lim Su Chi Senior Consultant, General Medicine | KTPH | Novel genetic and non-genetic risk factors for endothelial dysfunction and diabetic micro-angiopathies - meeting future challenges | COVID-19 Top-Up Grant June 2021 Grant Call |
| Dr Tor Phern Chern Senior Consultant, Mood & Anxiety | IMH | A pilot study of intermittent accelerated burst transcranial magnetic stimulation (atBS) to treat depression: a randomized, single-blind, delayed-start trial | COVID-19 Top-Up Grant June 2021 Grant Call |
| Assoc Prof Jimmy Lee Senior Consultant, North Region | IMH | Evaluating the Clinical Utility of Immune Phenotypes in Schizophrenia | COVID-19 Top-Up Grant June 2021 Grant Call |
| Dr Edimansyah Abdin Principal Biostatistician, Research | IMH | Validation of the World Health Organization Disability Assessment Schedule 2.0 among those with mental and physical illness in Singapore | COVID-19 Top-Up Grant June 2021 Grant Call |



Results for the 3rd NHG Centre for Medical Technologies and Innovations (CMTi) – National Health Innovation Centre (NHIC) Singapore Joint Medtech Grant Call

In July 2021, the 3rd NHG CMTi-NHIC Joint MedTech Grant Call co-funded by NHIC was opened.

It was opened to staff with primary appointments in and salaried by an NHG institution. The grant aims to **fund development of technological solutions** that are commercially viable to **resolve unmet needs in healthcare**, and to **leverage on the outcomes of this seed funding** to seek further competitive funding at the national level to bring the solutions to implementation.

After a rigorous evaluation by the panel, a total of 5 applications were selected for funding.

Congratulations to the following successful grant awardees!

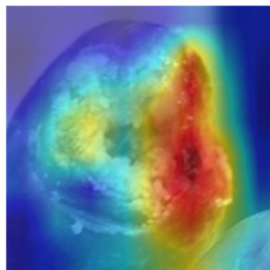
| Project Code | Project Title | Principal Investigator | Institution |
|---------------------|---|-----------------------------------|-------------|
| CMTi-NHIC3-21-01-02 | Applying Virtual Reality in Cognitive Rehabilitation for Stroke Survivors | Ms Wei Shan | KTPH |
| CMTi-NHIC3-21-01-03 | 3D-printed Rapidly Administrable Microneedle Patch for Acne Scar Treatment | Dr Cheng Hui Mei | NSC |
| CMTi-NHIC3-21-01-04 | 3D Knitted Prosthetic Socket with Integrated Liner | Mr Trevor Binedell | TTSH |
| CMTi-NHIC3-21-01-06 | Rapid and Accurate Genomic Data Interpretation for Personalized Medicine | Adj A/Prof Leong Khai Pang | TTSH |
| CMTi-NHIC3-21-01-07 | Algorithm for Diagnosis of Peripheral Blood Films via Deep Learning and Computer Vision | Dr Fan Bingwen Eugene | TTSH |

Not a Marathon and Not a Hackathon, but a Datathon!

Similar to hackathons, a datathon is an event where participants gather to solve practical problems through the application of data science tools and techniques, by working together in teams to generate insights and potential solutions. **Dr Joseph Lo (Woodlands Health)** and **Dr Sadhana Chandrasekar (Tan Tock Seng Hospital)**, in collaboration with **Artificial Intelligence (AI) company AITIS**, was second runner-up in the recently concluded SG Healthcare AI Datathon 2021, for their project on **“Using Explainable AI for Image Analysis in Diabetic Foot Ulcers”**.

Using open source real-world diabetic foot wound dataset from Manchester, the team used **explainable AI methods in the analysis of diabetic foot ulcer images (Figure 1)** so as to **improve and understand model performance, with the eventual aim to support clinical practice by improving interactions**

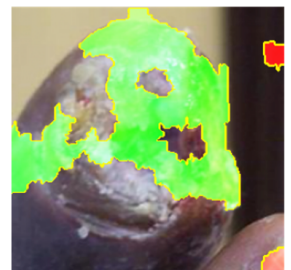
GradCAM Output



Original Output



LIME Output



Explainable AI using GradCAM and LIME outputs in wound image analysis

between medical professionals and patients. The intense datathon period over the weekend of 3 to 5 December 2021 allowed both Joseph and his data scientists collaborators to propose a problem statement and address an actual clinical pain point in a cross-disciplinary fashion. This serves as a useful foundation

as they embark on a collaborative research **to develop an AI image analysis algorithm for Asian wound images.** (NHG DSRB 2020/01062), with results expected in the fourth quarter of 2022.

[Click here](#) to view their winning presentation.

Contributed by:

Dr Joseph Lo, Consultant, Department of Surgery, WH

On behalf of the clinical team members and AITIS:

Dr Sadhana Chandrasekar (TTSH), **Mr Chan Yam Meng** (TTSH), **Ms Sylvia Smit** (AITIS), **Mr Tillman Weyde** (AITIS), **Mr Alex Gregory** (AITIS), **Mr Anton Vdovenko** (AITIS), **Ms Fajilatun Nahar** (AITIS) and **Mr Andrew Chou** (AITIS)

NHG Awarded the OpenGov Recognition of Excellence 2021

At the 6th Annual Singapore OpenGov Leadership Forum in February 2022, NHG received the OpenGov Recognition of Excellence 2021, in recognition of its launch of an **Open Innovation Challenge (OIC)** which NHG Centre of Medical Technologies and Innovation (CMTi) and Enterprise Singapore (ESG) had jointly organised.

[OpenGov](#) is a content platform focused on Information and Communication Systems (ICT) in the context of government, healthcare and education sectors in the Asia-Pacific region. The [Recognition of Excellence award](#) is to recognise healthcare sectors, who have achieved excellence in using ICT, to make healthcare smarter, more agile, efficient and transparent.

The OIC saw the development of [Radlogic](#), Singapore's first Chest X-ray artificial intelligence-powered tool that is able to detect abnormal X-rays. It has been deployed in the COVID-19 screening centres since May 2021. Thru the OIC, NHG had also spun off **2 MedTech startups with Trendlines Medical Singapore**. They are:

1. Ayzer Sense Technology, a collaboration with Tan Tock Seng Hospital (TTSH) and National Skin Centre to co-develop a Smart Automated Body-Pressure Redistributor (SABR) for pressure injury prevention
2. Medulla Pro Technology, a collaboration with Khoo Teck Puat Hospital and TTSH to co-develop a lumbar puncture needle guide



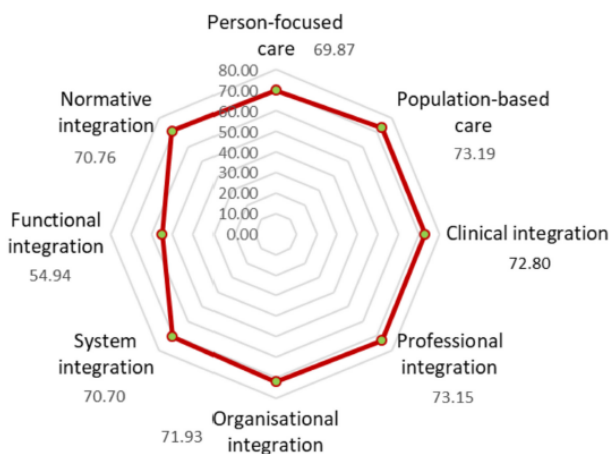
Caritas icommunity@north Integrated Care for persons with Dementia and their Caregivers

CARITAS (Comprehensive, Accessible, Responsive, Individualised, Transdisciplinary, Accountable and Seamless care) is an **integrated care initiative for dementia that extends hospital care into the community** through partnerships with organisations providing services such as day care, case management, and caregiver support. Care is delivered through a patient manager who draws on the team's expertise while tele-medicine is used to provide support for patients and community care partners.

We found that **CARITAS significantly reduced caregiver burden and ameliorated patients' behavioural problems pertaining to "memory", "disruptive behaviours" and "depression"**. The benefits were comparable to well evidenced interventions for dementia, and at a cost of SG\$133,056.69 per quality-adjusted life years gained. This yielded a **favourable incremental cost-effectiveness** ratio of 1.31 and 1.49 respectively against the cost of donepezil in mild Alzheimer's disease patients and Singapore's Gross Domestic Product per capita in 2019.

We used the **Rainbow Model of Integrated Care-Measurement Tool (RMIC-MT)** to examine the quality and extent of CARITAS' integrated care network and understand the factors underpinning its workings on a macro-level, meso-level and micro-level. We found that all domains (e.g. clinical, professional, organizational) but one achieved a commendable score of 70. Only functional integration, which pertains to mechanisms by which information and management modalities are linked, achieved a modest score of 55. Overall, **CARITAS achieved maturity in micro-levels and meso-levels of integration**, while macro-integration could benefit from increased engagement with stakeholders via a shared information system.

Amid the COVID-19 pandemic, we sought to find out how persons with dementia (PWD) and their caregivers coped. Sixty-five per cent of the caregivers reported worsening of caregiver stress. Multivariate analysis revealed that **factors related to the PWD and accessibility to services significantly correlated with caregiver stress** (OR=4.07, 95%CI 1.57-10.51; OR=6.70, 95%CI 1.69-26.55) respectively. Caregivers expressed the need for respite support and engagement programmes for the PWD. Given the emotional and physical repercussions on caregivers, we need to devise strategies that are responsive to the needs of PWD and their caregivers in these pandemic times.



Scores of RMIC's eight dimensions of integration.

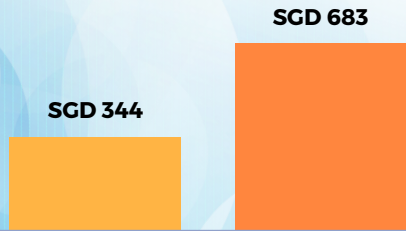


Contributed by: **A/Prof Philip Yap**, Senior Consultant (image on left) and **Dr Rachel Cheong Chin Yee**, Consultant (image on right), Geriatric Medicine, KTPH

Did You Know?

That the median annual healthcare cost for patients with multi-morbidity doubled compared to those without multi-morbidity? (SGD 683 vs SGD 344)

Click [here](#) to find out!



Patients at the Driver's Seat of Service Delivery



Team photo of Dr Lee Ying Ying (centre) and her team



It has been more than a year since a FY2020 National Healthcare Group Population Health Grant was awarded to Research Officer, Dr Lee Ying Ying, and her team to design and deliver **co-production workshops with persons in recovery from psychosis to aid their recovery and empowerment.**

Dr Lee is leading this project **in collaboration with the Early Psychosis Intervention Program** to perform an outcome evaluation of co-produced workshops. To date, more than 10 online workshops have been facilitated with the help of like-minded volunteers, consisting of persons in recovery, mental health professionals and supporters of the recovery movement. The volunteers were involved throughout the process of

co-production. **They were empowered to make decisions on topics they deemed pertinent for recovery from psychosis, and could decide how best to convey their insights on recovery in these workshops.**

The participants' response has been overwhelming. More than 400 people took part in these co-produced workshops and planning sessions cumulatively. The average attendance for every online workshop was around 40 people, from all walks of life. **Despite the organisers' initial worry about not being about to build a safe psychological space on a virtual platform, participants' feedback about being able to share freely in these online sessions proved otherwise.** A reason for success in this area could be

that onboarding phone calls were made with every participant to ensure that they were aware of the nature of the workshops and what to expect during the online sessions.

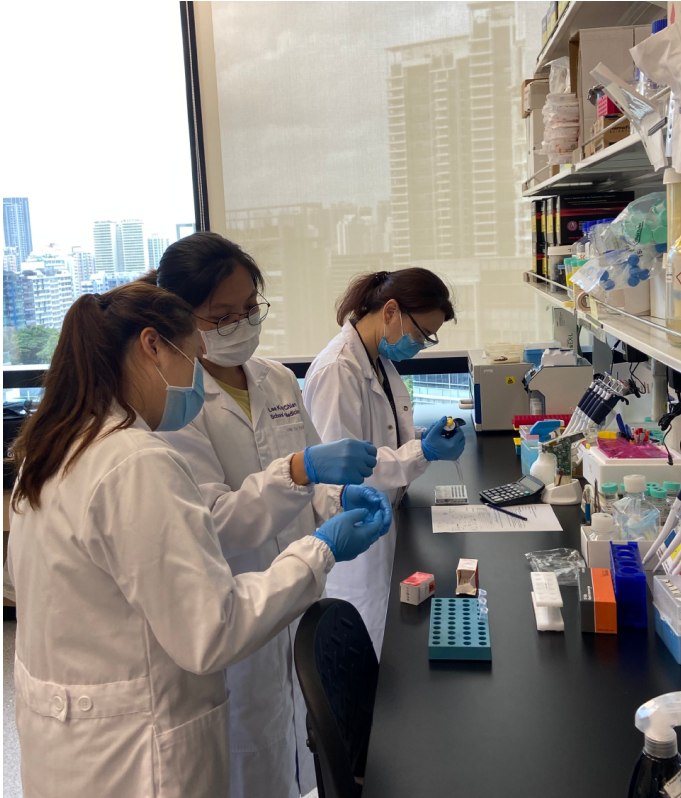
Moving forward, the team is currently organising the workshop series, **Broken Crayons 2.0.** This workshop series was developed in 2019 with the help of a group of peer and staff volunteers that ran in-person. **With the support of the volunteers, staff and sponsors, we are working to repurpose the in-person sessions into online sessions.** Panel discussions, interactive online plays are in the makings. Workshops are slated to begin at the end of March 2022.

Contributed by: **Dr Lee Ying Ying**, Research Officer, Research Division, Institute of Mental Health





Bench to Bedside: Journey to Discover the Achilles' Heel of Cancer Cells



Team effort: Collaborating with LKCMedicine lab team to understand resistance mechanisms in breast and ovarian cancer



Preparation for in vitro experiments

My journey as a medical oncologist started when I obtained my medical degree from the University of Adelaide, Australia and was inspired to undertake medical oncology training due to the constant evolving nature and multi-disciplinary/ collaborative approach of the specialty.

During my training, I worked at various hospitals throughout the state of Victoria, treating cancer patients at various stages of their disease and became increasingly frustrated at, not only the limited treatment options available, but the significant side effects of chemotherapy treatments on their well-being. **The one size fits all approach of chemotherapeutic options regardless of individual tumour biology or underlying biomarkers was not ideal and contributed to the low response rates.** The experience left me feeling like I was "arranging deckchairs on the titanic". **It was then that I made the transition to basic research in order to improve effective treatment options for these women.**

My PhD in molecular biology focused on improving personalized cancer treatment through development of novel therapeutic agents and biomarker discovery. **Since then, my research has been aimed at identifying aberrant molecular pathways in breast and ovarian cancer**

that may potentially be exploited and targeted for therapeutic development to improve patient outcomes.

Genes are made of DNA – the chemical structure that carries your genetic information and provides the biological instructions that determines many human characteristics, such as the color of your eyes or hair. We all inherit a set of genes from each parent. Sometimes there is a fault in one copy of a gene which stops that gene from working properly - called a mutation.

Cancer cells may carry many mutations that can sometimes make them more sensitive or resistant to certain drugs.

DNA in human cells may break for various reasons (i.e., environmental stressors, radiation). DNA double strand breaks are normally repaired by a process called homologous recombination (HR) repair which results in error free cell repair. However, certain genes in the cancer (i.e., BRCA1/BRCA2 etc.) can result in defective HR repair which results in error prone DNA repair and DNA instability. **About 50% of ovarian cancer and around 15 - 20% of breast cancers have defective HR repair, which may make certain types of treatment (i.e., PARP inhibitor, platinum-based chemotherapy) more effective in these patients.**

Our research through collaboration with LKCMedicine via the NHG-LKCMedicine Clinician Scientist Career Scheme (CSCS), is currently aimed at **understanding how to exploit the HR pathway in breast and ovarian cancer and individualizing treatment approaches.** By understanding the drivers and susceptibilities of this pathway, we hope to accurately identify patients with defective HR who are likely to benefit from PARP inhibitors and to sensitize patients who are HR proficient to PARP inhibitors via combination strategies with strong underlying scientific rationale. In doing so, we hope to **deliver personalized cancer care for women suffering from this horrendous disease.**

Dr Heong is an FY2020 awardee of the NHG-LKCMedicine CSCS. Click [here](#) to find out more about the programme.



Contributed by: **Dr Valerie Heong**, Consultant, Department of Medical Oncology, TTSH





Breaking the Barriers: The Rise of Internet-based Cognitive Behavioural Therapy (iCBT) for Obsessive-Compulsive Disorder (OCD)

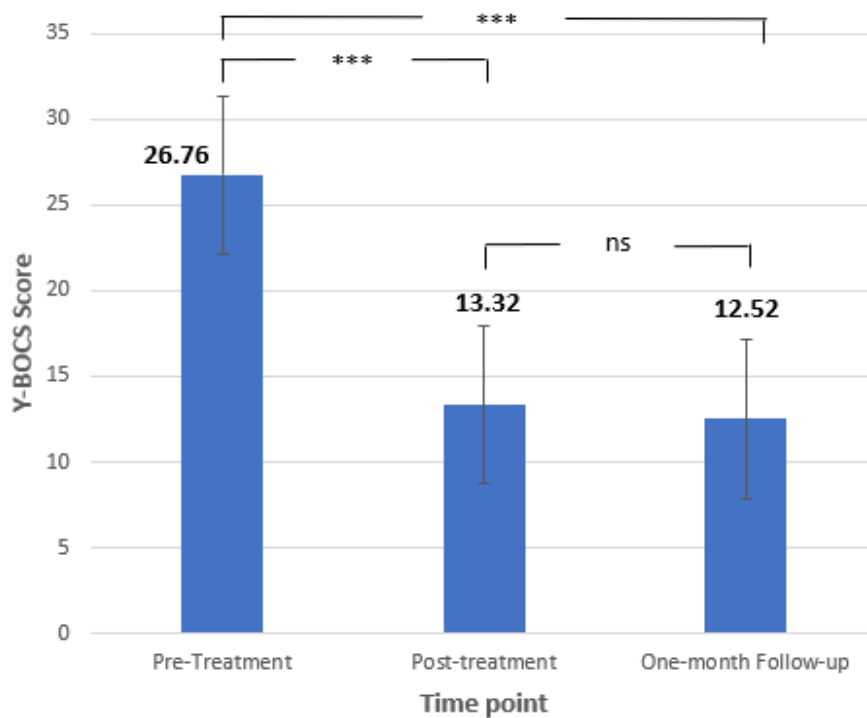


Figure 1: Treatment efficacy on OCD symptoms, based on Y-BOCS scores

Note. Means and 95% confidence intervals of OCD symptoms, measured using Y-BOCS at three different time points, pre-treatment, post-treatment and one-month follow-up.

OCD, a disabling mental health condition, is the third most common in Singapore. **iCBT is increasingly being used to improve treatment access for mental health conditions, including OCD.** However, little is known about the efficacy of such interventions for treating individuals with OCD in Singapore.

Collaborating with the Karolinska Institutet in Sweden, the Anxiety Service and the Psychology department at the Institute of Mental Health (IMH) conducted a pilot study to investigate the feasibility and effectiveness of iCBT in treating adults with OCD in Singapore. This study was funded by the National Medical Research Council (NMRC) under the Centre Grant (Ref No: NMRC/CG/M002/2017_IMH).

25 participants with moderate to severe OCD participated in the 10-week therapist-

supported iCBT programme, including psychoeducation, cognitive restructuring and exposure and response prevention. **After completing the treatment, participants showed significant improvement in OCD symptoms (see Figure 1), reduction in depressive symptoms and an enhanced quality of life.** Patients rated the programme as highly effective and were satisfied with it. The findings from this study suggest that **iCBT may be a viable treatment option in helping individuals with OCD gain access to effective treatment,** thus potentially increasing health care in multiple contexts.

Currently, the **team is working with the Ministry of Health Office for Care Transformation (MOHT) to host and pilot this programme on their national platform as a clinical service for local patients.**



“

iCBT could significantly increase access to evidence based treatment so more people can get the help they need and deserve.

Dr Jackki Yim,
Principal Clinical Psychologist
and one of the study's investigators

”



“

Offering treatment digitally means that individuals don't have to take time off from school and work to travel to a mental health care facility, and this may incentivize people to seek help earlier.

Ms Tammie Kwek,
Senior Clinical Psychologist
and one of the study's investigators

”

Contributed by: **Dr Jackki Yim**, Principal Clinical Psychologist, Department of Mood and Anxiety, Department of Psychology, IMH and **Ms Tammie Kwek**, Senior Clinical Psychologist, Department of Psychology, IMH



Mobile App for Local Informal Caregivers of Persons with Dementia

Taking care of persons with dementia (PWD) is demanding and stressful, and it can lead to stress and even depression among informal caregivers. However, since caregivers are often highly occupied by daily caregiving tasks, and especially during the COVID-19 pandemic, it is challenging to get them into face-to-face interventions. **The Research Division, Institute of Mental Health (IMH) proposed to develop a multi-component mobile platform (i.e. an App) to provide daily support to local informal caregivers of PWD and to explore its potential effectiveness.** This 2-year project is led by **Dr. Yuan Qi** from the Research Division IMH, and it is supported by the National Healthcare Group Population Health Grant.

The project team is currently working with a vendor to develop the app. **The proposed app will have key features including knowledge/education, a networked peer-supporting forum, a positive reflection journal, self-monitoring questionnaires, and a list of local resources.** It will also have a private chat function to enable caregivers to exchange information.

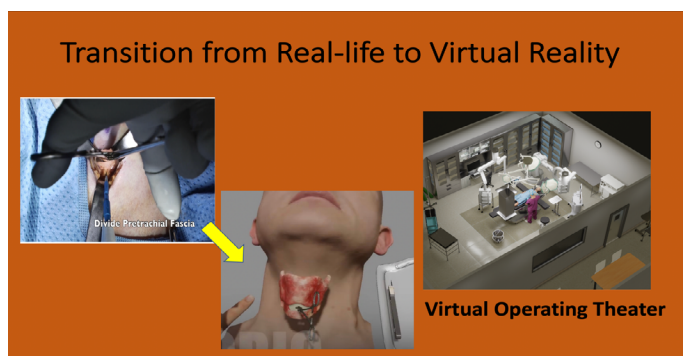
Once the app is ready, the project team will conduct a pilot randomized controlled trial to explore the feasibility and potential effectiveness of this mobile app intervention against a waiting-list control group. A target of 100 participants will be recruited and

randomly allocated into the intervention and the control group. Both groups will need to fill in baseline and post-intervention assessments to determine the effectiveness. The experimental part is expected to start during May – June 2022. The project team also plans to apply for larger grants to run large scale studies if the findings from the pilot are promising.



Contributed by:
Dr Yuan Qi,
Research Fellow,
Research Division,
IMH

From Waving the Lightsabers to Surgical Training in Virtual Reality – My Meta-Fantasy



VR environment and case simulation

The VR-Jedi members



Dr. Tay Kon Voi
"Jedi Padawan"



Dr. Li Hao
"Obiwan Kenobi"



Dr. Kenneth Lim
"Master Yoda"

As an avid gamer, I like to play video games on different consoles like PlayStation 5, PC computer and Oculus Quest 2. Virtual reality (VR) gaming has opened my eyes to experience immersive environments and interactions like in the Beat Sabers where you can wave lightsabers and dance in a virtual world. **An opportunity came by to realize my fantasy to perform surgical training in VR when the Games for Health Innovations Centre (ALIVE) Serious Games Grant opened for application.**

I am fortunate to meet my **Jedi master in research, "Obiwan-Kenobi"- Dr Li Hao** from the ENT department in Tan Tock Seng Hospital while doing COVID-19 screening duty in the National Centre for Infectious Diseases (NCID) during the pandemic. **We had an in-depth discussion about research interest that led us to kick-starting a few cross-departmental collaborations. One of them is to co-develop a VR surgical training programme.**

We realized that surgical airway training is paramount for junior doctors to handle life-threatening airway emergency as the COVID-19 pandemic had severely limited the training opportunities for the junior doctors in clinical hands-on and physical workshops. We applied for and eventually won the ALIVE grant by pitching the **potential of VR surgical training - it can help to enhance performance, shorten the learning curve, faster hands-on and potential cost effective and with zero harm to patients.** The realistic environment would provide reduced psychological distance and allow repetitive simulations to supplement clinical trainings.

With help from NHG Centre for Medical Technologies & Innovations (CMTi), we managed to find a **prominent VR research scientist, Dr Kenneth Lim - our "Master Yoda"** from the National Institute of Education (NIE). He is an expert in VR game-based learning in pedagogy and

practices and has won multiple grants in VR-related projects. We engaged a **local VR builder company, Axension Studio** to create a VR Operating Theatre (OT) and build the storyboard and art assets. We are in the midst of phase 1 of our 2-year study with the aim **to create a VR simulation in OT to practice surgical airway creation for juniors.** We hope to implement the user testing phase soon to allow us to refine the process before letting the juniors to try it out. We foresee that this project has potential applications in surgical education and training or trauma simulation in advanced trauma life support course.

Dr Tay and his team received the ALIVE Serious Game Grant in 2021 for the project 'Virtual Reality Surgical Airway Training (VSaT) in COVID-19 pandemic'. Click [here](#) for more information about ALIVE.

Contributed by: **Dr Tay Kon Voi,** Consultant, Department of Surgery, WH



Early Oral Stepdown Therapy for Uncomplicated Gram-negative Bacteraemia: Yay or Nay?

Intravenous (IV) administration is widely regarded as the optimal route to achieve instant therapeutic concentrations to treat Gram-negative bacteraemia, as patient factors such as impaired levels of consciousness and gastrointestinal dysfunction may render administration and absorption of oral antibiotics unreliable. However, **IV administration has several disadvantages, including risk of catheter-associated complications, inconvenience to the patient, and high healthcare cost and resource utilisation.**

For these reasons, there is interest in whether treatment courses can be safely and effectively completed with oral antibiotics after a short period of IV therapy (i.e. early oral stepdown) in appropriately selected patients with satisfactory clinical response. **The pharmacokinetic/pharmacodynamic characteristics of numerous antibiotics allow drug concentrations adequate for treatment of Gram-negative bacteraemia to be achieved by the oral route.** These high-bioavailability antibiotics (e.g. fluoroquinolones such as ciprofloxacin) have excellent absorption

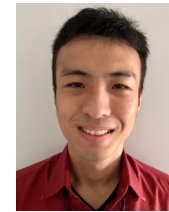
and penetration – meaning that oral administration may achieve plasma and tissue concentrations comparable to IV administration.

The **Singapore ID Clinical Research Network** will lead an international, multi-centre, phase III randomised controlled trial to **evaluate the clinical efficacy and economic impact of early stepdown** to oral fluoroquinolones or trimethoprim-sulfamethoxazole (within 72 hours from index blood culture collection) versus continuing standard-of-care IV therapy (for at least another 48 hours post-



Thrombophlebitis caused by IV catheter insertion and prolonged IV drug administration.

randomisation). Clinically stable or non-critically ill patients with uncomplicated Gram-negative bacteraemia will be recruited from six local hospital sites (i.e. NCID/TTSH, NUH, SGH, CGH, NTFGH, SKGH) and six overseas sites in Australia, Malaysia, Korea and England. The Principal Investigator for this study (the INVEST trial, ClinicalTrials.gov identifier: NCT05199324; funded by NMRC Clinical Trials Grant – Investigator-Initiated Trial from Oct 2021 to Sep 2024) is **A/Prof David Lye from NCID/TTSH.** Outcomes will be assessed for up to 90 days post-trial enrolment, including all-cause mortality at various time points, health economic evaluation, patient quality of life, adverse events, and length of stay in hospital. This trial will answer an important clinical question to inform medical practice.



Contributed by:
Dr Russel Lee,
Senior Research Fellow,
NCID/TTSH and Global
Project Manager,
INVEST trial

Red No More: A Cluster Randomized Controlled Trial to Evaluate Enhanced Skin Cleanser and Protectant Regimens in the Management of Incontinence Associated Dermatitis

Incontinence-associated dermatitis (IAD) is a painful affliction affecting older adults with urinary and faecal incontinence, its red welts present in nearly one out of five incontinent patients. This is a concern in nursing care, with IAD contributing towards **patient distress, prolonged hospitalisation, and higher healthcare costs.**

Pursuing an effective treatment, Assistant Director of Nursing Dr Chan Ee Yuee, Nurse Researcher George Glass and Senior Staff Nurse Cheong Run Qi from Tan Tock Seng Hospital's Nursing Research Unit **collaborated with wound nurse specialists to evaluate three different treatment regimens for IAD care.** This was the **first such clinical trial in South-East Asia.** The researchers focused on the introduction of pH-balanced, no-rinse skin cleansers - designed to maintain the natural healthy state of skin while loosening incontinent debris for easier removal from.

Supported by the A*STAR Skin Innovation Grant, they found that **patients with IAD who were started on a combination of skin cleansers and skin protectants were 50% more likely to experience skin healing within seven days of treatment** compared to standard care. Feedback from nurses applying the products was positive, with many appreciating the cleansers for their ease of debris removal.

Building this discovery into an evidence-based care bundle, the team's findings were subsequently translated into clinical practice, with **cleansers and protectants being made standard care for incontinent patients.** The translation from research findings into clinical practice was accomplished within a year.

*This project is supported by the Skin Innovation Grant under the Industry Alignment Fund Pre-Positioning (Health & Biomedical Services Domain) Project (H17/01/a0/004), Agency for Science, Technology and Research (A*STAR) – Reference SIG18037. Awarded to **Dr Chan EY.***

This project has been published in May 2021 in the International Wound Journal: Glass GF Jr, Goh CCK, Cheong RQ, Ong ZL, Khong PCB, Chan EY. Effectiveness of skin cleanser and protectant regimen on incontinence-associated dermatitis outcomes in acute care patients: A cluster randomised trial. Int Wound J. 2021 Dec;18(6):862-873. doi: 10.1111/iwj.13588. Epub 2021 May 7. PMID: 33960676; PMCID: PMC8613386.

Findings from this project were presented at the 2021 Singapore Health and Biomedical Congress: Cheong RQ, Glass GF Jr, Goh CCK, Ong ZL, Khong PCB, Chen EY. Effect of Skin Cleansers and Protectants in Preventing Skin Breakage in Incontinence Associated Dermatitis – A Cluster Randomized Controlled Trial. Singapore Health and Biomedical Congress. 2021. Recipient, Silver Award, Best Poster Award (Nursing)



Zoom team photo. Clockwise (from top left):
Cheong Run Qi, George Glass, Dr Chan Ee Yuee.

Contributed by: **Mr George Glass,** Nurse Researcher, TTSH and **Dr Chan Ee Yuee,** Asst Director, Nursing, TTSH



Come Meet The NHG innovators



Dr Shum Cheuk Fan is a urologist with sub-specialty interests in kidney cancer and laparoscopic / robotic surgery. His daily clinical work allows him to identify gaps in the management of urology patients, while specialty training in laparoscopic / robotic surgery puts him at the forefront of medical technologies. Dr Shum is currently working on two key innovation projects:

In collaboration with InterVaal Pte Ltd, a NHG spin-off company with Trendlines Medical Singapore, Dr Shum is the lead clinical PI on a project to “re-design the urinary catheter to reduce the risk of catheter-associated urinary tract infections in male patients”.

Dr Shum is embarking on a new project with an industry partner to “develop an AI algorithm for prediction of cancer risk from CT appearance of renal masses and to provide quasi-histologic information non-inferior to an actual biopsy”.



Ms Hannah Chong is a project manager at NHG CMTi. With a background in chemical engineering and management of technology, she has experienced first hand the medical device development process from the perspective of a R&D engineer. Since 5 years ago, she has transitioned from developing medical implants to supporting the work of NHG CMTi, assisting clinicians and driving innovation activities for the cluster.

Hannah speaks to Dr Shum Cheuk Fan, recipient of the NMRC Clinician Innovator Award (CIA). Read on to find out more about Dr Shum’s experience in applying for CIA, his innovation experience and motivations, which will serve as an inspiration to all!

Hannah: NHG CMTi has worked with over 200+ clinicians from various institutions with differing backgrounds and medical specialties. It’s always interesting to learn about what got them into the innovation scene. Tell us your story, what got you started?

Dr Shum: I was very fortunate that upon my return to Singapore several years ago, NHG CMTi was looking for urology collaborators to develop a new urinary catheter. I took up the challenge and this was my first step in entering the local innovation scene. Last year, the WH Research Office supported my application for the NMRC CIA, which gave me another opportunity to put forth my idea of using artificial intelligence in kidney cancer patients.

Hannah: So what motivates you to innovate?

Dr Shum: The satisfaction from being able to conquer a problem. Innovation is a very strategic process, from the point of idea generation, advocacy, experimentation to eventual implementation.

“
Every step brings me closer to my goal of improving the clinical outcomes of those I take care of, and every step brings me joy and fulfillment.
”

When an idea of mine finally gets accepted and implemented, I know I have risen above the problem to the next level.

Hannah: Congratulations on receiving the NMRC Clinician Innovator Award! Can you share your experience in applying for this award?

Dr Shum: Preparation for the NMRC CIA did give me a few sleepless nights because I knew that it is a very prestigious award with a stringent selection criteria.

I started illustrating a big mind map with the central idea of developing an AI algorithm that will fill the current gaps in kidney cancer management. Then I listed the various resources I would need, from project team manpower, IT support from potential collaborators and expenditures. This was expanded to include the job scopes and responsibilities of each team member and collaborator, an itemized budget estimation, as well as the endorsements and supports needed to obtain funding from various sources. All these details were plotted along a reasonable timeline. The last step was to convert this mind map on a mahjong

paper into a typed-out project proposal and that was the easy part.

As a clinician, I did not have sufficient knowledge to formulate a plan on product commercialization and regulatory approval. I also needed help on IP and patent management. These are necessary details in applying for the NMRC CIA. This was the time when NHG CMTi weighed in and gave me a personalised step-by-step coaching, tailored to the specific context of my innovation project. They also shared with me the experience from many other NHG innovators.

The **NMRC Clinician Innovator Award** provides salary and funding support to clinician innovators, with a view to help bring their innovative ideas a step closer towards implementation.

Contact NHG CMTi at innovate@nhg.com.sg for support and guidance if you are keen to apply!



Follow NHG CMTi on LinkedIn to learn more about NHG Group Research’s latest research & innovation highlights!



Hannah: Sounds like you went through a very meticulous preparation process, but glad to hear that you felt supported throughout this journey. Would you encourage others to follow in your footsteps and apply for CIA?

Dr Shum: I think any clinicians who would like to actualize their various ideas to improve clinical outcomes should seriously consider applying for the NMRC CIA. It provides substantial support in protected time and funding for innovation, beyond the accolades. It is very important to engage the institution's research office and CMTi early for a smooth application process.

Hannah: Describe your mental model for innovation. What is important to you when it comes to creating new ideas?

Dr Shum: There have been many technological advancements in the last few decades, from the tiniest molecular diagnostics to the widely distanced trans-continental robotic telesurgery. In many cases, each advancement focuses on a very specific clinical need. But many of these new advancements can be modified to improve the clinical outcomes of many other patients in a more generalized manner. The key is to know what the technology is about and what is missing in current clinical care, then take a step back to look at the bigger picture and try to link them together.

Hannah: Can you share your thoughts on how research and innovation differs and how they may relate to each other?

Dr Shum: In my opinion, research is the systematic process to finding answers to various questions, leading to an increase in knowledge. Innovation is the practical utilization of such knowledge to improve our current situation. Before

any innovation, research must be done to understand the problems at hand. After any research, innovation should take place to overcome these problems.

Research and innovation are interdependent for scientific advances.

Research without innovation is empty talking; innovation without research is madness.

Hannah: Do you feel that being an innovator creates an added burden to your role as a clinician?

Dr Shum: The short answer is no. It is all in the mindset. The traditional role of the clinician is to make diagnoses and to treat diseases with herbs, medications or surgeries. This is something that every Daejanggeum K-drama fan in the streets can tell you. In the last century, it was obvious that such role was expanded to health promotion, disease prevention and quality of life improvement. Not so obvious was that many advances in modern medicine came along because clinicians have been constantly innovating, by coming up with solutions to difficulties they encounter during clinical work.

The first step in healthcare innovation is to identify the clinical areas that are deficient, and the clinician is the best person to do so. Being an innovator is part of the role of any clinicians, otherwise surgeries would still be performed with stone tools and boiling oil would remain as the only antiseptic option today. It is just that some clinicians innovate more

than others, but every clinician plays a part in medical innovation.

Hannah: Is there a role model innovator that you look up to or has made an impact to your experience as an innovator.

Dr Shum: Dr Chandru Sundaram was my mentor during my overseas fellowship in minimally invasive urology. He is an inspirational figure who sparked my interest in medical innovation and provided me with the opportunity to join his research teams in various experimental surgical concepts, from fluorescent imaging ligands in diagnosis to high intensity focused ultrasound in treatment for kidney cancers. Besides medical technologies, he also trained me to question contemporary surgical techniques. He revolutionized the renorrhaphy techniques in partial nephrectomy and improved nephron-sparing by 200%. Many urologists worldwide have switched to his techniques ever since.



Dr Shum's Words Of Encouragement For All Innovators

"The beginning of every innovation process always appears more daunting than it is, but once started it will become a rewarding experience. Just like a small boy contemplating his first roller coaster ride with fear and anxiety, but he will keep looking for the next ride after the first time. There are lots of support out there, such as the institution's research office and CMTi, who are always happy to accompany this small boy on his ride."



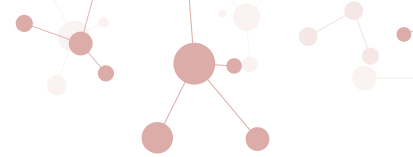
The Centre for Medical Technologies and Innovations (CMTi) is NHG's primary engine that drives innovation through the translation of ideas into implementable products, bridging the gap between unmet clinical needs, MedTech development, and innovative healthcare solutions.

Share your clinical needs, innovative ideas, or questions about innovation here!



**Speak to us
today.**

We welcome you
to connect with us.



Collaborative Initiatives in Translational Research

The **Translational Research Office (TRO)**, part of NHG Group Research, facilitates and supports translational research initiatives at NHG, including those with partners such as the NTU Lee Kong Chian School of Medicine.

Some ongoing initiatives include the Skin Research Institute of Singapore (SRIS), the Rehabilitation Research Institute of Singapore (RRIS), the Palliative Care Centre for Excellence in Research and Education (PaC), the Games for Health Innovations Centre (ALIVE), the Centre for Primary Health Care Research and

Innovation (CPHCRI), Brain Bank Singapore (BBS), the Wounds iCare Collaborative Research and Clinical Workgroup (WiCC), the early disease and disease cohort studies in collaboration with the Health for Life in Singapore (HELIOS) Study.

These programmes **leverage the clinical strengths of NHG and institutions as well as complementary capabilities of our partners**, so as to gain new insights and seek new solutions towards better prevention, diagnosis, treatment and management of diseases as well as maintenance of health.

Development and Clinical Trial of the MRBA (Mobile Robotic Balance Assistant) at RRIS and TTSH

The MRBA has been developed under the "Development and POC of Care Assistant & Rehabilitation Enabling (CARE) Robots" project, funded by a S\$2 million grant under the SG Health Assistive & Robotic Programme (SHARP), since 2019.

The 2.5-year project is jointly led by **A/Prof Ang Wei Tech** (Executive Director, Rehabilitation Research Institute of Singapore, RRIS-NTU) and **Adj A/Prof Dr Chua Sui Geok Karen** (Senior Consultant, TTSH Rehabilitation Centre).

MRBA is a **balance assistive robot** for users with walking and balance impairments and falls risk, with 2 operating modes:

- (i) **Wheelchair mode**, similar to a powered wheelchair, using a joystick handle,
- (ii) **Walking mode**, providing user-activated sit-to-stand assistance, follow-me features provide balance assistance via a variable stiffness assistive robotic arm, reducing the chance of falling.

Novel model-based and learning-based algorithms are developed to estimate the state of balance of the user in real-time, by computing information from a suite-of-force sensors and encoders in the arm, and a camera to measure the gait. **The robot is capable of learning the balance ability and gait level of the user** and adjusts its controller to provide an optimal human-robot collaborative performance.

The current MRBA prototype is at Technology Readiness Level (TRL) 6 and a multi-centre clinical feasibility trial (NHG DSRB 2019/01015, NCT 04316389) at TTSH rehabilitation centre, Centre for Advanced Rehabilitation Therapeutics (CART) and acute stroke unit has shown **high safety levels and acceptability**. A total of 25 participants (21 Stroke, 1 Traumatic Brain

Functions of MRBA



Balance Training



Instrumental ADL Training



Injury and 3 Spinal Cord Injury) have completed 3 days of supervised training using MRBA for level ground ambulation, basic Activities of Daily Living (ADLs), instrumental ADLs and challenging balance exercises with a physiotherapist.

All patients were able to complete the training protocol and potential falls were averted. Future plans include recruiting 75 more participants from day rehabilitation centres.

Contributed by: **Ms Vera Yang**, Assistant Manager, RRIS





Hope through Brain Donation

The **Brain Bank Singapore (BBS)** is a **national initiative** between the NTU Lee Kong Chian School of Medicine, National Neuroscience Institute, National Healthcare Group and NUS Yong Loo Lin School of Medicine. As a brain donation programme and tissue repository, it is **vital for future biomedical research** to delve into the patho-etiology of



Brain Bank preparation room for the collection, dissection and processing of brain and cerebrospinal fluid donation.

neurodegenerative disorders like Dementia and **neuropsychiatric conditions** like Schizophrenia. In cancer and virology research, relevant biological materials are readily available. Although it is possible to test hypotheses in animal models, the **human brain physiology and disease mechanisms are unique and complex**.

Since the official launch in November 2019, BBS has successfully **recruited more than 150 pledged donors and collected 3 brain and cerebrospinal fluid donations** into the repository. It is a remarkable feat at such an early stage of the Brain Bank tissue donation programme under the restrictions of the COVID-19 situation. This is **achieved through extensive outreach** to various healthcare institutions including hospitals, patient support groups, community organisations, hospices, government organisations including the National Organ Transplant Unit (NOTU) and My Legacy. The Brain Bank has also **received positive feedbacks through**

national media such as published articles in The Straits Times and Zaobao, and through interviews on tv/radio. One hemisphere of the whole brain will go through the **histopathological procedures in the laboratory** where paraffin embedded tissue blocks corresponding to the different brain anatomical regions are characterized to provide the **neuropathology report** for confirmation of diagnosis (absence for control and presence for patient sample). The other brain hemisphere is **snap-frozen into tissue blocks** and stored long term at -80°C for **supply to researchers** in ethics-approved studies.

Brain tissue donation is **leaving a legacy** to better understand the link between clinical profile and molecular mechanisms to **develop better treatments for future generations**.

*Contributed by:
Dr Joan Sim, Manager, BBS*

NHG Wounds iCare Collaborative (WiCC) Research and Clinical Workgroup

The Wounds iCare Collaborative (WiCC) Research and Clinical Workgroup is a **NHG-level initiative to consolidate efforts and resources in the area of wound management and wound-related research, innovation and healthcare implementation**. Our primary aim is to **identify strengths and capabilities** pertinent to wound-related research, innovation and healthcare implementation at NHG and serves as the coordinating platform for collaboration opportunities with academia, research institutions such as the Skin Research Institute of Singapore (SRIS) and/or industry. Our secondary aim is to **improve measurement of healthcare outcomes** through implementation of output from research and innovation in wound care management.

Since August 2020, the WiCC workgroup has had bi-monthly meetings, with invited speakers from NGEMR Wound Module Leads, Skin Research Institute of Singapore (SRIS), NHG Centre for Medical Technologies and Innovations (CMTi), Welsh Wound Innovation Centre (WWIC), Singapore Bioimaging Consortium (SBIC), Singapore National Biofilm Consortium (SNBC), Advanced Intelligence and Technology Innovations (AITIS) and Trendlines Medical Singapore.

Members from WiCC Workgroup had also explored **various collaborations with industry partners** (Kronikare, Tetasyu, AITIS) and applied for competitive grants (Temasek Foundation, Biomedical Engineering Programme [BEP]) with Singapore Institute of Manufacturing Technology (SIMTech), culminating in a **BEP grant award for a study to develop a "Non-woven tissue regenerative dressings for chronic wound management"**, a collaboration between investigators from Institute of Materials Research and Engineering (IMRE), National Skin Centre (NSC) and Woodlands Health (WH).

Through the NHG-LKCMedicine Joint Strategic and Implementation Committee (JSIC) for Research and Education, WiCC Workgroup will continue to **explore collaborations with various LKCMedicine Research Programmes** to synergise efforts and improve healthcare outcomes through research and innovation in wound care management. We are pleased to share that 2 members of the WiCC Workgroup (Joseph Lo and Julia Zhu) had been awarded NHG-LKCMedicine Clinician-Scientist Fellowships and in addition for Dr Lo the NMRC Research Training



A wound care nurse educating a patient on preventing new / recurrent diabetic foot ulcers.

Fellowship to **pursue wound-related PhD projects**. We will continue to engage wound care professionals within NHG through WiCC Research and Clinical Workgroup in consolidating efforts and resources in the area of wounds-related research, innovation and healthcare implementation.

Our heartfelt gratitude to all WiCC Workgroup members for their collaborative efforts in advancing wound care in NHG:

Advisors: Prof Keith Harding (SRIS), Prof Zee Upton (SRIS), Dr Cheong Ee Cherk (TTSH)

Co-chairpersons: A/Prof Steven Thng (NSC), Dr Joseph Lo (WH)

TTSH: A/Prof Tan Ern Yu, Dr Yong Enming, Dr Ng Hui Wen, Dr Mohd Fadil Muhammad Farhan, Sis Tina Lai, Ms Tiffany Chew

KTPH: Dr Leong Chuo Ren, Dr Pek Chong Han, Dr Derek Park, Ms Wong Wan Mun

NHGP: Dr Jonathan Chong, Sis Julia Zhu

WH: Dr Wu Yijun, Dr Lai Jen Ming, ANC Malini d/o Kalaivarnan

HSOR: Dr Yap Chun Wei

Secretariat: Translational Research Office (TRO), Group Research, NHG

Contributed by: A/Prof Steven Thng (Senior Consultant, NSC) and Dr Joseph Lo (Consultant, Surgery, WH), Co-chairs, WiCC



Singapore Wound Registry - A Collaboration Between Skin Research Institute of Singapore, SingHealth, National University Health System and National Healthcare Group

Chronic wounds including diabetic foot ulcers, leg ulcers and pressure injuries pose a **significant economic and clinical burden** on the healthcare system globally. However, the exact incidence remains uncertain due to the lack of a systematic way of collecting and collating such data.

A study conducted by Dr Joseph Lo (Consultant, Surgery, Woodlands Health)



The Wound Care Innovation for the Tropics team at their booth at the the 6th congress of World Union Wound Health Societies (WUWHS) 2022

reported that the incidence rates of their inpatients with chronic wounds doubled from 2013 – 2017. **The total gross healthcare costs for all inpatient wounds in 2017 stood at SGD 293 million which equates to almost 3% of the annual national healthcare budget.** With an ageing population in Singapore, the incidence of chronic wounds and related healthcare costs is bound to increase.

The Singapore Wound Registry (WR) is a **major initiative led by physicians from 3 tertiary care hospitals in Singapore – TTSH (National Healthcare Group), SGH (SingHealth) and NUH (National University Hospital)** in collaboration with researchers from SRIS (Skin Research Institute of Singapore). The key objective of the WR is to devise a systematic way to collate, amalgamate and analyze real-world de-identified clinical data **to ascertain the severity of the wound problem in Singapore’s multi-ethnic Asian population in the Tropics.**

The WR has enrolled more than 800 subjects with chronic wounds since its inception in Nov 2019. The database houses de-identified key clinical data of the patients with venous leg ulcers, neuro-ischemic ulcers and pressure injuries. At the end of 6 monthly longitudinal follow up, it was seen that 49% of the chronic wounds had healed, 32% were still ongoing and a significant percentage (2%) of patients underwent major lower extremity amputation. The results so far have been **extremely helpful in identifying trends in the rate and outcomes of patients with chronic wounds.** This pilot registry demonstrates the power and value of a Wound Registry at the national level.

Contributed by:

Dr Joseph Lo (Consultant, Surgery, WH), **Dr Ng Yi Zhen** (Programme Manager, SRIS), **Dr Priya Bishnoi** (Senior Research Fellow, SRIS), and **Prof Keith Harding** (Senior Clinical Research Director, A*STAR),

Skin Tech for Smart Skin Health Interventions

Skin conditions such as cancer and Atopic Dermatitis (AD) are increasing among Singaporeans, resulting in rising demand for dermatological treatment and services. The **Skin Health Monitoring Centre (SHMC) was set up to conduct investigational clinical trials and supports the translational focus of the Skin Research Institute of Singapore (SRIS).** It is located at the P.H Feng Research Centre at Tan Tock Seng Hospital and is led by **A/Prof Steven Thng**, Chief Dermatologist of SRIS, in collaboration with **Prof Malini Olivo** from the Institute of Bioengineering and Bioimaging (IBB), A*STAR. It primarily focuses **on “Clinical Testing and Validation” of next-generation AI-assisted imaging technologies in healthy and diseased Asian populations, as well as conducting clinical trials for novel skin therapeutics developed by SRIS Principal Investigators (PIs) or local companies.**

Developing, Testing, and Validating Skin Imaging Devices

SHMC houses state-of-the-art infrastructure for non-invasive skin imaging systems, such as the handheld “Confocal Raman Spectroscopy” and “Photoacoustic Imaging” for fast and accurate depth profiling of biochemical changes in the human skin and visualization of the skin microvasculature, respectively. This is instrumental in conducting proof-of-concept studies on next-generation skin imaging devices. Photoacoustic imaging helps capture three-dimensional images of



Professor Steven Thng performing skin imaging with his team at SHMC

skin architecture, while handheld confocal provides biochemical composition within layers of skin. **Both are useful in the management of skin cancers and inflammatory skin diseases such as AD.**

Leveraging on the clinical network and access to patients, **SHMC uses photoacoustic imaging at the National Skin Centre (NSC) to manage skin cancer.**

“In the past, we had to cut off a piece of skin to diagnose skin cancer. This was a surgical process requiring post-operative recovery, but now, we have a technology that can look into the skin and take photographs to diagnose skin cancer instantly and map out its margins.”, says Prof Steven Thng, Chief Dermatologist, NSC.

Another notable study at NSC was to characterise skin biomarkers between AD patients and healthy subjects with the help of these two advanced technologies only available at SHMC. In this study, clinicians could get a clear view of distinct vascular structures within the

skin of AD patients with **photoacoustic imaging and biochemical composition of the patient’s skin with confocal Raman spectroscopy at point-of-care and in real-time**, which in turn help them plan long-term management of the AD condition. The chief advantage of these imaging devices is that **they are flexible handheld probes providing better sensitivity than currently available table-top imaging devices and support diagnosing inaccessible body sites and providing in-depth skin profiling.**

Clinical Trials at SHMC

The SHMC team also collaborates to study disease pathophysiology and comorbidities, responses to therapeutics and conducts clinical trials. Currently, **SHMC is involved in a Phase-1 clinical trial in collaboration with US-based ASLAN Pharmaceuticals for testing a novel monoclonal antibody targeting the IL-13 immune receptor as a treatment for AD.** The initial cohort of AD patients recruited in Singapore was given monoclonal antibody treatment all did well with many in the active arm of the trial reporting dramatic improvements in their condition.

Conclusion

With its twin focus of med-tech/skin imaging development as well as clinical evaluation trials, SHMC is poised to plan an instrumental role in the translation of skin research in Singapore.

Contributed By:

Dr Roopa Rajashekar, Research Impact Manager, Business Development & Strategic Partnerships, SRIS



My Patients Drive My Research Journey

As a clinician who treats people with obesity, I see the **impact of obesity on individual lives**. Mdm A, for example, was referred to me in 2016 with a weight of 79.5kg (BMI 32.7), poorly controlled diabetes and low self-esteem. Over 2 years, a combination of lifestyle management and change in her medications saw her lose 16.4kg to 63.1kg (BMI 25.9), and her diabetes improved so much that she exclaimed that her sugars have never been this low since she had diabetes. She looks good and feels good now. "Thank you, doctor", she gushed. **These 3 words are what drives me to persevere** despite the long hours and unrelenting workload, and they also **motivate me to understand obesity better, so that I can help my patients better**.

In Singapore, obesity affects 24.0% of Malays and 16.9% of Indians, but just 7.9% of Chinese, based on the 2010

National Health Survey. **The mechanisms underlying the differences in the burden of obesity amongst Asian populations are not well understood** and hence, I decided to make this my research focus. My PhD, with NTU Lee Kong Chian School of Medicine (LKCMedicine), entitled 'Investigation of mechanisms underlying obesity amongst Chinese, Malays and Indians in Singapore', aims to investigate **whether lifestyle, genetic and gut bacterial factors account for the differences in obesity between the three major ethnic groups in Singapore**. I am using the **data and samples from the Health for Life in Singapore (HELIOS) study**, a prospective cohort study started in 2017 by LKCMedicine in partnership with NHG and Imperial College London.

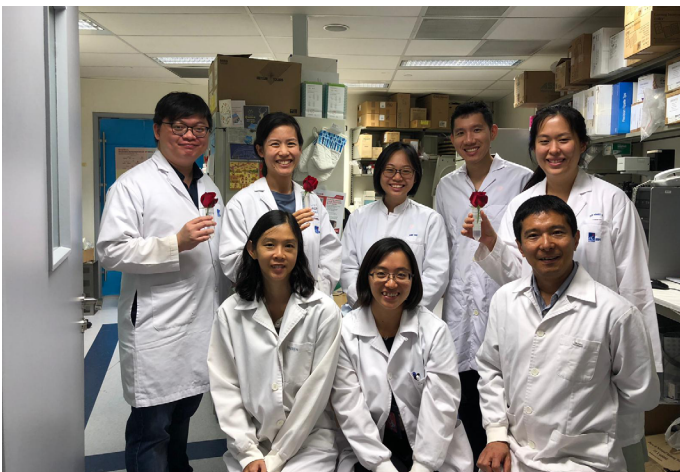
I hope my PhD can provide insights into the causation of obesity in Singapore. Moving forward, I hope to fully utilize

my training, resources and experience gained from my research journey to **further advance obesity research and treatment in Singapore**.

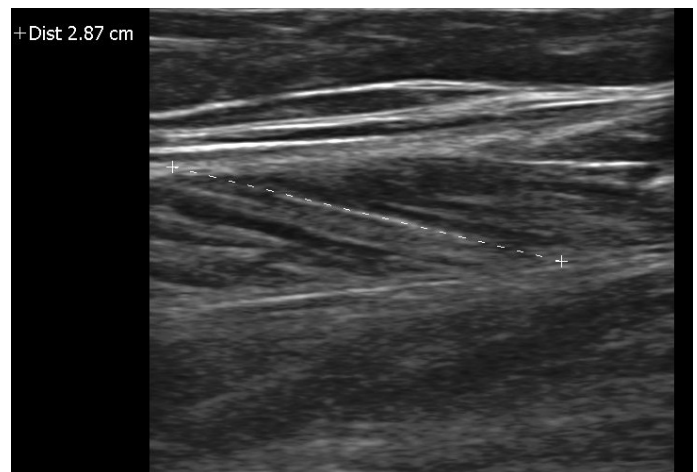


Contributed by: **Dr Benjamin Lam**, Senior Consultant and Clinical Director, Integrated Care for Obesity & Diabetes, KTPH

Optimising Mobility and Function Through Rehabilitation



Dr Tay (back row, second from right) with several of his coursemates during a 1-day attachment at A*STAR.



An illustration of some of the ultrasound parameters obtained in the study.

I had the privilege of being selected for the **Masters of Clinical Investigation 2019** intake. This was an eye-opening educational experience, covering **various topics including epidemiology, pharmacokinetics, bioethics, study design, clinical trial registration and molecular biomarkers**. In addition, there were regular assignments and tests, to ensure we understood the research concepts taught, and knew how to apply it in clinical research. All of the candidates also had to submit a research project in collaboration with a research mentor. Despite the intensive coursework, it was an opportunity to meet with other **like-minded clinician-researchers** and bounce off ideas. We also benefited from the expertise of the various lecturers and research mentors.

My research project involved **using muscle ultrasound to investigate various clinical phenotypes in neurologically impaired patients** undergoing rehabilitation. I am also studying how we can employ **healthtech solutions** to improve musculoskeletal and physical fitness.

What's next? With an aging population that is increasingly burdened by multiple morbidities, healthcare professionals are increasingly seeing more patients with **degenerative and overuse musculoskeletal disorders**, which puts them at risk of frailty, falls and impaired mobility. I hope to extend my research in musculoskeletal disorders which will allow a deeper understanding of the **relationship between disease and human performance**. This will allow clinicians to design, and trial **individualized**

rehabilitative interventions and non-surgical musculoskeletal therapies in a holistic and effective manner. The aim, hopefully, is to cut down on unnecessary hospital visits and healthcare utilization, and enable patients to **maintain their health in the community**.



Contributed by: **Dr Matthew Tay**, Consultant, Rehabilitation Medicine, TTSH



Training Calendar

| Date | Training Courses | Course Provider |
|-------------------|--|--------------------|
| Monthly / Ongoing | Good Clinical Practice (Online) | NHG Group Research |
| | (PCR 100) Study Start Up: Case Report Form Design, Database Design, Using RedCap and Budgeting (Online)* | |
| | (PCR200) Study Conduct I: Subject Recruitment and Informed Consent (Online)* | |
| | (PCR300) Study Conduct II: Documentation, Safety Reporting and Investigational Products (Online)* | |
| | (PCR400) Monitoring, Audits and Inspections (Online)* | |
| 10 May 2022 | Research Preparatory and Study Design | NHG Group Research |
| 24 May 2022 | Prognostic Model | |
| 5 Jul 2022 | Manuscript Writing and Poster Presentation | |
| 20 Jul 2022 | Grant Writing and Management | |
| 21 Jul 2022 | Clinical and Epidemiological Study Designs | TTSH CRIO |
| 4 Aug 2022 | Questionnaire Design | NHG Group Research |
| 12 Aug 2022 | Basic Biostatistics | TTSH CRIO |
| 26 Aug 2022 | Basic SPSS | |
| 30 - 31 Aug 2022 | Project Management for Clinical Research Professionals | NHG Group Research |
| 15 Sep 2022 | Basic Grant Writing | TTSH CRIO |
| 12 Oct 2022 | Basic SPSS | |
| 16 May 2023 | Manuscript Writing and Poster Design | |

* For PCR Courses: NHG Staff may directly self-register on [eLEARN Marketplace](#).

Dates are subject to changes without prior notice.

For registration and full details on courses by:

NHG Group Research

Please visit www.research.nhg.com.sg (Training & Education → Register for Courses and Other Events)

TTSH CRIO

Please contact Ms Ng Hwee Cheng Hwee_Cheng_NGI@ttsh.com.sg

Chicken Soup for the Busy Coordinator

Education to facilitate high standards of research conduct

[Click on the respective issues to find out more!](#)

Oct 2021:
When Is Re-consenting of Research Subjects Needed?

>>

Nov 2021:
Common Findings related to Investigational Product (IP) Management

>>

Dec 2021:
When and How to Register for a Standing Database

>>

Jan 2022:
Safety Event Reporting Guidelines to DSRB

>>

Feb 2022:
Informed Consent Process During COVID-19 Period

>>

Mar 2022:
Responsible Conduct of Research (RCR) - Research Misconduct

>>