



A Newsletter For The Research Community In Singapore • Issue 43 • May - Jun



## COVID-19 to the Under 19

COVID-19 has greatly impacted the mental health of many individuals worldwide, including children and adolescents. The COVID-19 pandemic poses many disruptions and challenges to the usual operations of Singapore's schools and REACH services...

[View more](#) >>



## Come Meet The NHG Innovators: NHG's First Singapore Biodesign Innovation Fellow

Amanda and Irene speak to Dr Chen Kok Pun about his experience in the Singapore Biodesign (SB) Innovation Fellowship Programme...

[View more](#) >>

## COVID-19 Vaccines: Preparing for the Next Wave



[View more](#) >>

## MOU Signing with Fourier



[View more](#) >>

## NHG Clinician Scientist Resident Dr Xu Chuanhui receives the National Outstanding Clinician Scientist Resident Award 2020



[View more](#) >>



### RESEARCH NEWS

- Holmusk, National Healthcare Group (NHG) and Institute of Mental Health (IMH) Partnership to Develop Innovative Solutions for Mental Healthcare in Singapore
- Outcomes of the NMRC November 2019 Call for Applications
- Outcomes of FY20 NHG Joint Grants



### RESEARCHER'S FEATURE

- Correlating Metabolic Disorders and Psoriasis
- Validation of Vancomycin Dosing Guidance during Transition of Care
- Cannabis Use in Singapore: Who and Which Drug Next?



### RESEARCH EDUCATION

- Training Calendar
- NHG-LKCMedicine Joint Population Health Symposium
- Chicken Soup for the Busy Coordinator
- Do you know what is Responsible Conduct of Research?



## COVID-19 to the Under 19

The 2019 novel coronavirus (COVID-19) pandemic poses many challenges globally on economic, sociopolitical, and healthcare fronts. COVID-19 has greatly impacted the mental health of many individuals worldwide, including children and adolescents. The COVID-19 pandemic poses many **disruptions and challenges to the usual operations of Singapore's schools and Response, Early Intervention and Assessment in Community Mental Health (REACH) services** due to safe management measures imposed. This article seeks to describe the impact of the COVID-19 pandemic on Singapore's schools and the response and adaption of the school community mental health services. REACH was conceived in 2017 to support students with mental health issues.

For REACH, the pandemic meant adapting to the evolving situation promptly to ensure continued services and support to students. Initially, **face-to-face community and home visits were postponed to minimise exposure to COVID-19** for both clients and clinicians. Then, majority of **face-to-face services moved to telehealth means. Teams then continued to work in split-team mode and a two-week rotation basis between working from home and the hospital.** Figure 1 shows an increase in new referrals at the height of the pandemic and decline when 'circuit-breaker' began. Following the easing of national level restrictions and with **schools back in session, an increased number of students reported to have coping and adjustment difficulties. At REACH, an increase in consultations and referrals was seen, thus resulting in increased waitlist for interventions.** Other child and adolescent mental health providers and social welfare agencies also report similar concerns. In view of the impact of the pandemic, **promotion and prevention efforts to increase the capacity of the school and youth mental health services** needs to be afforded. Telehealth may continue to be beneficial beyond the pandemic.

Contributed by:

**Ms Vidhya Renjan**

Senior Clinical Psychologist  
Department of Developmental  
Psychiatry  
IMH

**A/Prof Daniel Fung**

Chief Executive Officer  
IMH



Photos of the REACH teams (North & South)

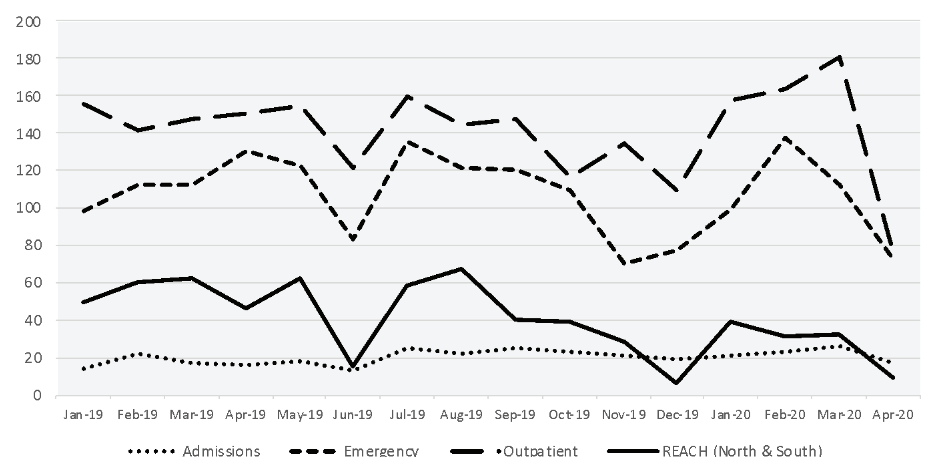


Figure 1. New referrals increased across services in February 2020 (the height of the pandemic) and declined when the stay-at-home order/circuit-breaker period was instated in April 2020.





## Congratulations to Assoc Prof David Lye and Prof Chong Siow Ann!

**Assoc Prof David Lye** (Director, Infectious Disease Research and Training Office, TTSH/NCID) was awarded the NMRC Clinical Trial Grant-Investigator Initiated Trials (CTG-IIT) for the study titled: Early Oral Step-Down versus Continued Intravenous Antibiotic Therapy for Uncomplicated Gram Negative Bacteraemia, in the NMRC November 2019 Call for Applications.

**Prof Chong Siow Ann** (Senior Consultant, Research Division and Department of Psychosis, IMH) was awarded the NMRC Health Services Research Grant, Community Mental Health Theme (HSRGMH) for the study titled: Mind Matters: A Study of Mental Health Literacy 2020, in the April 2019 Call for Applications.

The list of other researchers who have received NMRC awards are also featured in older e-Catalyst issues. Please click [here](#) to view the past issues.

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

## Results for the FY2020 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 **practising healthcare professionals**.

The FY2020 Call for applications I was open from 01 October 2019 – 12

November 2019, and the FY2020 Call for applications II was open from 01 July 2020 to 26 August 2020.

Congratulations to the following FY2020 awardees!

For more information about the NHG-LKCMedicine CSPP, please click [here](#).

Name	Designation/Department	Institution	Project Title
Dr Tan Hann Yee	Associate Consultant/ Acute and Emergency Care	KTPH	Evaluating LRINEC and SIARI Score for Early Diagnosis of Necrotising Fasciitis in the Emergency Department
Dr Gabriel Ding	Family Physician - Associate Consultant/ Geylang Polyclinic	NHGP	Factors Associated with Family Caregiver Burden among Frail Older Persons with Multimorbidity
Dr Tricia Chang	Family Physician - Associate Consultant, Deputy Head/ Ang Mo Kio Polyclinic	NHGP	Evaluation of Team Culture, Team Development and its Associations to Staff Burnout and Outcomes in Patients with Multimorbidity : The TURBO Study
Ms Winnie Choo	Senior Pharmacist/ Pharmacy	NSC	Improving the Skin Permeability and Pharmaceutical Stability of Topical N-Acetylcysteine Formulation using Polylactideglycolic Acid Polymer as Drug Delivery Carrier
Dr David Mathew	Resident/ Anaesthesiology, Intensive Care & Pain Medicine	TTSH	Agreement in Energy Expenditure Measurements between Harris Benedict Equation and Indirect Calorimetry for Critically Ill Patients with Moderate to Severe Traumatic Brain Injury
Dr Sharlene Ho	Resident/ Respiratory and Critical Care Medicine	TTSH	Sepsis and Long-Term Cardiovascular Complications
Dr Sean Ong	Resident/ Infectious Diseases	TTSH	Characterisation of Nosocomial Transmission of Carbapenem-Resistant <i>Acinetobacter baumannii</i> (CRAB) using Whole Genome Sequencing (WGS)
Dr Camelia Tang	Resident/ Hand & Reconstructive Microsurgery	TTSH	Non-styloid Distal Ulnar Fractures: A Biomechanical study
Mr Ng Chuan Guan	Senior Podiatrist/ Podiatry	TTSH	Effectiveness of Specifically Optimised Off-The-Counter Foot Orthosis for the Management of Mechanical Foot Pains in the Subtle Cavus Foot Type: A Pilot-Controlled Study
Ms Quek Mei Sing	Senior Physiotherapist/ Physiotherapy	TTSH	Prognosticating Prosthetic Ambulation Ability in People with Lower Limb Amputation in Early Post-Operative Phase
Dr Lim Dwee Wee	Associate Consultant/ Occupational Health Services	TTSH	Multicomponent Dermatitis Prevention Program among Healthcare Workers
Mr Jayachandran Balachandran	Principal Physiotherapist/ Rehabilitation	WHC	Functional Outcomes of a Combined Early Mobilisation and Structured Exercise Program (Resistance and Endurance) in a Mechanically Ventilated ICU Patient – a Pilot Study



## Holmusk, National Healthcare Group (NHG) and Institute of Mental Health (IMH) Partnership to Develop Innovative Solutions for Mental Healthcare in Singapore

On 13 January 2021, Holmusk has signed a Memorandum of Understanding (MOU) with NHG and IMH to co-develop digital tools and leverage on data and predictive analytics to help improve the mental health and well-being of the population. These include

**identification and validation of novel digital biomarkers for a more objective measure of an individual's mental wellness as well as mental health conditions** such as depression and schizophrenia. The solutions are **targeted at applications across healthcare continuum**, from tertiary care setting to primary care and community settings.

The partnership **combines deep clinical expertise and translational research capabilities of IMH and NHG, as well as advanced analytics and digital technology capabilities of Holmusk**, on such as its evidence generation platform (NeuroBlu) and digital therapeutics platform (mConnect).

The COVID-19 pandemic has highlighted the importance of mental health, with more people seeking help for mental health issues such as anxiety and depression. By identifying and validating novel digital biomarkers for mental health through the use of integrated and protected data from clinical records and smartphones, it can **provide a more objective measure of an individual's mental state**, including depression and schizophrenia.

For more information, please refer to the [press release here](#).

Contributed by:

**CMTi and TRO**, Group Research. NHG

## Congratulations to all the successful grant awardees for the following FY20 joint NHG Grant Calls!

### Results for the 2nd NHG Centre for Medical Technologies and Innovation (CMTi) – National Health Innovation Centre Singapore (NHIC) Joint Medtech Grant Call

In July 2020, NHG CMTi launched the 2nd NHG CMTi-NHIC Joint MedTech Grant Call, co-funded by NHIC.

It is open to staff that hold a primary appointment in and are salaried by an NHG institution. The grant aims to **fund development of technological solutions** that is 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.

Project Code	Project Title	Principal Investigator	Institution
CMTi-NHIC2/2003	Formulation of a Safe and Effective Silver Containing Antimicrobial Moisturiser for Concurrent Emollient and Prolonged Anti-Septic Effects	Dr Lim Ziying Vanessa	NSC
CMTi-NHIC2/2004	Prediction of Body Composition Using 3D Optical Imaging and Machine Learning in an Asian Population	Dr Danson Yeo	TTSH
CMTi-NHIC2/2006	Automation of Tissue Optical Clearing Processes	Dr Tan Yingrou	NSC
CMTi-NHIC2/2010	Application of Artificial Intelligence in Detection of Red Reflex for the Grading of Cataracts	Dr Hah Yan Yee	KTPH
CMTi-NHIC2/2012	Anti-inflammatory Moisturiser Cream Containing Oligonucleotide for Management of Atopic Eczema	Assoc Prof Tey Hong Liang	NSC

### Rehabilitation Research Institute of Singapore (RRIS) 4th Rehabilitation Research Grant Call (RRG4)

RRIS is a partnership between A\*STAR, NHG and NTU. RRG4 focuses on **Ability Data** – a database of normative and patient kinetic & kinematic movement data. The grant promotes the **collaborative multi-disciplinary research work** and each application must be submitted by a Clinical Lead Principal Investigator (PI) and a Technical Lead Principal Investigator (PI).

Project Title	Clinical PI	Technical PI
Psychosocial Prognostic Factors in Knee Osteoarthritis	Dr Tan Yijia Bryan WHC	Assoc Prof Konstadina Griva LKCMedicine
SPASM (Soft Pressure sensor Actuator Strain Measuring device) for Precise Measurement of Spasticity	Adj. Assoc Prof Kong Keng He TTSH	Prof Lee Pooi See NTU
Multimodal EEG and NIRS-based BCI with Assistive Soft Robotics for Stroke (MBCI-SR)	Ms Chloe Chung Lau Ha TTSH	Dr Ang Kai Keng A*STAR / NTU
Combining Wearable Inertial Sensors and Pressure Mapping Insoles for Effective Gait Training in Trans Tibial and Trans Femoral users	Dr Wong Chin Jung TTSH	Dr Chiam Keng-Hwee A*STAR



## The Palliative Care Centre for Excellence in Research and Education (PaIC) 2nd Research Grant Call

PaIC is a research and education centre jointly set up by NHG, LKCMedicine and Dover Park Hospice (DPH). It aims to **promote research and education in palliative and end-of-life care**.

The PaIC Research Grant funds projects with the following research focus:

**End organ diseases, Models of care, Community palliative care, Caregiver needs, Ethical issues in end-of-life care and Education.**

Project Title	PI/Institution	Site PI/Institution	Site PI/Institution
HALO Trial: Haloperidol vs Olanzapine in Hyperactive Delirium in Advanced Cancer Patients; A Multi-Centre, Randomised-Controlled Trial	Dr Mervyn Koh TTSH	Assoc Prof Pang Weng Sun LKCMedicine	Dr Mervyn Koh DPH
Chronic Obstructive Pulmonary Disease Frailty Intervention trial - A Randomised controlled study (COFI Study)	Dr Raphael Lee WHC	Assoc Prof Tham Kum Ying LKCMedicine	Dr Ong Yew Jin DPH
End-Of-Life Outcomes of Patients on Home Ventilation and Respiratory Support.	Dr Michelle Jessica Pereira NHGHQ	Assoc Prof Konstadina Griva LKCMedicine	Ms Tay Ri Yin DPH

## Disease Cohort Grant (DCG) Call in Collaboration with the Health for Life in Singapore (HELIOS) Study

DCG is intended to **support and build up disease case-cohorts** conducted in conjunction with the HELIOS study. HELIOS is a prospective population cohort study spearheaded by the LKCMedicine in collaboration with NHG and Imperial College London.

The collaboration with HELIOS provides an opportunity for disease cohorts to be referred to HELIOS for **deeper phenotyping** and for the **rich datasets to be linked back with**

**clinical data.** Data and findings from such studies could offer new insights into **risk factors** and **possible disease-modifying factors** that could help **improve disease prognostication** and

prioritise intervention. The support would go towards disease areas with significant disease burden in the Singapore population, matched with NHG's key research foci.

Project Code	Project Title	Co- Principal Investigators	Institution
DCG/19007	INDEPTHOS: Investigating the Diagnostic, Epidemiologic and Predictive measures that define OsteoSarcopenia	Dr Lee Eng Sing Dr Alvin Tan Dr Michael Yam	NHGP TTSH TTSH

## LKCMedicine-NUSMed-NHG Collaborative Mental Health Research Pilot Grant Call 2020

LKCMedicine, NUS Yong Loo Lin School of Medicine (NUSMed) and NHG jointly funded the LKCMed-NUSMed-NHG Collaborative Mental Health Research Pilot Grant Call 2020. The 2020 Pilot Grant Call in Collaborative Mental Health Research aims to **provide seed funding** for Co-Principal Investigators (Co-PIs) from LKCMedicine, NUSMed and NHG to **explore novel research ideas** and/or **support exploratory efforts for early-stage projects** that have **translational potential in mental health**. Projects must generate data that are aimed towards securing eventual external funding at a larger scale.

Project Title	Co-Principal Investigators	Institution
Cerebellar Calcium Channel Defects in Psychiatric Disorders	Prof George Augustine Prof Soong Tuck Wah Dr Sim Kang	LKCMedicine NUSMed IMH
Investigating Common Neuroanatomical and Genetic Underpinnings of negative syndrome and cognitive function in schizophrenia	Asst Prof Jia Nee Foo Assoc Prof Helen Juan Zhou Dr Jimmy Lee Chee Keong	LKCMedicine NUSMed IMH
The Role of Cholinergic Dysfunction in the Progression of Depression	Prof George Augustine Assoc Prof Sanjay Khanna Dr Geoffrey Tan Chern-Yee	LKCMedicine NUSMed IMH
Pharmacological Subtypes in Schizophrenia: Investigating the Molecular Distinctions using iPSC Neurons	Asst Prof Ch'ng Toh Hean Asst Prof John Chua Jia En Dr Jimmy Lee Chee Keong	LKCMedicine NUSMed IMH
Revealing Therapeutic Targets for Fragile X Syndrome using Forward Genetics in Human Neural Cells	Asst Prof Sarah Raye Langley Asst Prof Mahmoud Pouladi	LKCMedicine NUSMed



## Congratulations to Dr Xu Chuanhui on receiving the National Outstanding Clinician Scientist Resident Award 2020!

In April 2021, NHG Clinician Scientist Resident Dr Xu Chuanhui received the **National Outstanding Clinician Scientist Resident Award 2020** from the National Medical Research Council (NMRC).

This annual award honours and recognizes Residents who excelled in clinical training and made significant research contributions with actual or potential clinical translational

applications to improve clinical care. Up to two awards are given out each year, following rigorous review by a panel with members from the SAB Research Committee (SRC) and Research training Review Panel (RRP).

Dr Xu is currently pursuing the NHG Rheumatology Residency Programme and is the first resident in NHG to receive this prestigious award.



## First Experimental Medicine Building (EMB) Open Day 2021 Launched to Great Success

On 27 January 2021, LKCMedicine organised the Experimental Medicine Building (EMB) Open Day. The aim of the EMB Open Day is **to introduce the School's state-of-the-art EMB core facilities and platform technologies** to the wider research community.

The EMB Open Day, which was held online and on-site at the Learning Studio and Seminar Room simultaneously, was fully registered and attracted 65 faculty members and researchers from various NTU schools and healthcare institutions.

Click [here](#) to read more.



## MOU Signing with Fourier

Shanghai-based Fourier Intelligence has signed a Memorandum of Understanding (MOU) with the National Healthcare Group (NHG), a leader in public healthcare in Singapore, and recognised locally and globally for the quality of its medical expertise and facilities, **to co-develop novel rehabilitation technology and robotics innovations.**

This partnership, facilitated by NHG Centre for Medical Technologies and Innovations (CMTi), aims to address the unmet clinical needs in rehabilitation. By leveraging on the clinical expertise and translational research capabilities of NHG and the global research network of Fourier Intelligence, it strives **to create accessible, affordable and efficient rehabilitation technology and solutions for patients, the population and**

**healthcare professionals.** The NHG and Fourier Intelligence collaboration will focus on these key areas: Mobility, Frailty, and Falls Prevention.

Building upon Fourier Intelligence's **RehabHub™ concept**, both parties will co-develop home-based rehabilitation technologies and devices that will help improve patients' accessibility to care and therapy outside the hospital, as well as reduce the

manpower required in community settings. Clinical validation and trials to evaluate the safety and efficacy of such technologies and devices will be carried out as both Fourier Intelligence and NHG seek to establish a regional rehabilitation centre of excellence.

*Contributed by:*

**CMTi**, Group Research. NHG



*From left to right: Mr Louis Ang (NHG HQ), Mr William Ng (NHG HQ), Dr Loh Yong Joo (TTSH), Mr Zen Koh (Fourier Intelligence), Ms Sandra Lee (Fourier Intelligence), Prof Benjamin Seet (NHG HQ), Mr Low Choo Chye (Fourier Intelligence)*

## Perceived Stress and Associated Factors among Healthcare Workers in a Primary Healthcare Setting: the Psychological Readiness and Occupational Training Enhancement during COVID-19 Time (PROTECT) Study

The COVID-19 pandemic has significantly heightened the psychological stress of healthcare

workers. A study was conducted to investigate the factors contributing to the perceived stress levels including

their training, protection and support, job stress, perceived stigma and interpersonal avoidance of healthcare workers during this pandemic.

Click [here](#) to read more about the study!



**Good to Read!**





# Come Meet The NHG innovators

## NHG's First Singapore Biodesign Innovation Fellow



**Dr Chen Kok Pun** is an Associate Consultant Gastroenterologist from Tan Tock Seng Hospital. He is NHG's first Innovation Fellow from the Singapore Biodesign Innovation Fellowship Programme. In 2021, Dr Chen graduated from an intensive 10 months hands-on team-based training, focused on the biodesign process in developing new health technologies for unmet clinical needs in Asia.



**Ms Amanda Kooi** is an assistant project manager with NHG CMTi. Formerly a Senior Speech Therapist from Tan Tock Seng Hospital, Amanda has been involved in the creation of food technology-related products. Her latest innovation in dysphagia-friendly ready-to-serve pureed food, helps improve the quality of life for patients.



**Ms Irene Ng** is the newest member of the NHG CMTi team. Apart from work experience as a research assistant in the National University Health System, Irene has also worked for innovative companies such as Singapore Airlines and SEA Ltd. She is excited to learn about the different perspectives in healthcare innovation.

Amanda and Irene speak to Dr Chen about his experience in the Singapore Biodesign (SB) Innovation Fellowship Programme, and the enablers in supporting clinicians on their innovation journey. Together with the NHG Centre for Medical Technologies and Innovations (NHG CMTi), he hopes to drive the development of innovative medical technologies that can help contribute to NHG's Vision of 'Adding Years of Healthy Life'.

**Irene: Hi Dr Chen! We're keen to hear more about the SB Innovation Fellowship Programme. Tell us about your experience and why you applied for it.**

Sure! My first thoughts about healthcare innovation occurred during ward rounds when I was a first year Medical Officer back in 2013. There were complaints from inpatients that they were unable to sleep due to auditory disturbances from call bells and agitated patients. My first thought back then was, why don't we develop noise-cancelling headphones for our inpatients? It was then I realised that I didn't know how to bring an idea forward into a viable product that can benefit patients.

A few months later, an email came from Gastroenterology, that I was a



successful applicant for the Singapore Biodesign Innovation Fellowship 2020 program. It was an intense 10-month programme that brought a team of people from different backgrounds to come up with solutions to address the needs of the stakeholders in the healthcare ecosystem. The program was fun and enlightening. We had the opportunity to speak to clinicians, engineers and venture capitalists from Singapore and Stanford while practicing the Biodesign methodology to implement the invention that the team had come up with to solve the clinical need that we had identified.

**Irene: Did you encounter any challenges during the course of the fellowship? What helped you persevere to the end?**

There were many challenges that the team encountered and the biggest

one was of course the pandemic that prevented us from having a full clinical immersion in Singapore, China as well as in Stanford. We still wish to visit China and Stanford once the pandemic settles down in the near future. The other challenges that we had were finding out whether the clinical need that we had identified was a real issue faced by patients and whether the solution we were trying out could work. We persevered after finding out that the clinical need was a real problem and there was certainly a demand for a solution. Of course, the words of encouragement and advice by the mentors played a huge role as well.

**Amanda: Dr Chen, what about your most enjoyable and memorable moments throughout your 10 months journey?**

Definitely the virtual tour of Stanford! Our early morning Zoom sessions with experts from the medical device scene in the Bay area, and not forgetting our weekly sessions with industry mentors who provided invaluable inputs to ensure that we have a higher chance of success. Working with people from different backgrounds was truly refreshing and provided new perspectives in approaching problem solving.

**Irene: Would you recommend your NHG colleagues to apply for the SB fellowship programme?**

Definitely! If I had a chance to reapply again, I would do so in a heartbeat.

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





### Amanda: So, what actually inspired you to be a clinician innovator?

When I was a junior clinician, there were many clinical needs or problems that were left unsolved which added to the frustrations of patients and clinicians, and eventually leading to wastage of medical resources as well as adverse outcomes for patients. One thing that was always going through my mind was 'isn't there a solution out there?' especially with the advancements of technology around us and this was the driving force that inspired me.

### Irene: What motivates you to keep innovating?

Passion in problem-solving, and the desire to be an inventor.

### Amanda: As a fellow clinician, I've learnt that there are many unmet clinical needs on the ground that innovation could potentially address. What do you think is the best way to encourage clinicians to start innovating?

Speak to NHG CMTi! And feel free to buy me a coffee to chat! I believe innovation comes from the strong desire to improve upon current practices with inputs from multiple domains such as engineering and data science – doing it alone is tough and it may be best to find out the roadmap or recipe early on in the process to ensure the highest chance for success.

### Amanda: Having an innovative idea in mind is great. I've personally experienced and observed that it can be daunting for clinicians to navigate the innovation process. How do you think this can be improved?

I'd say that this should go both ways from both the innovator and the work environment. We should have a structure and network of experts for innovators to tap on to seek advice, and to iterate safely and cheaply. There are bound to be "failures" in the journey

of innovation and innovators generally should have a growth mindset and be open to ideas and people from other domains.

### Amanda: It can also sometimes be challenging to juggle innovation with clinical work. How have you been managing this?

For me, clinical work takes precedence as I enjoy what I am doing in my daily clinical practice. From my perspective, innovation is complementary to clinical work – similar to medical education and research, and I manage it by surrounding myself with the latest updates as well as people who are innovators. Nevertheless, having protected time for innovation-centric activities will definitely encourage more innovators to come forward.

### Irene: On the CMTi front, we try to make our facilitation process as seamless as possible for clinicians from needs mining all the way to supporting commercialisation and implementation efforts. However, we do hear the struggles of clinicians along their journey. Do you have any advice for them?



Seek advice and be acquainted with the available resources early in the journey. NHG CMTi is here to provide training, resources in terms of access to the network of collaborators from other institutions as well as personnel familiar with the innovation journey, and coaching advice from the people in the healthcare innovation ecosystem.

In addition, do have a vision of how the product or solution will be implemented and then develop a plan on how to reach there.



My last piece of advice would be to embrace 'failures' and learn from them as healthcare innovation is truly an iterative process requiring innovators to be agile and creative.



### Irene: Finally, can you share your thoughts on the importance of healthcare innovation in transforming the delivery of care?

Value-based healthcare is key to having a sustainable landscape for the delivery of care and there has always been a need to find cost-effective solutions to support the stakeholders in this complex ecosystem. Healthcare innovation is crucial as once we stop innovating, we become less competitive and more reliant on solutions that may not be relevant for the local ecosystem.



In the last few years, NHG CMTi has supported clinicians in over 100 projects, secured more than \$28 million in industry funding and filed over 87 patents. Together with our clinicians, we are proud to have created 20 products that are readily available for commercial use. The outcomes of our collaborative innovation projects have also resulted in 11 spin-off companies.

NHG CMTi plays an integral role in the innovation ecosystem by helping clinicians translate their ideas into innovative MedTech solutions.



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



**Speak to us today.**

We welcome you to connect with us.





## Correlating Metabolic Disorders and Psoriasis

There are 2 recent studies by National Skin Centre (NSC) on psoriasis and metabolic disorders.

**The first study is the largest cross-sectional study of metabolic syndrome among patients with psoriasis in Singapore.** This showed that the prevalence of metabolic syndrome by the modified NCEP-ATP III guidelines in patients with psoriasis was high at **45.1%**.

Within the metabolic syndrome components, the **most common**

**risk factor** was elevated blood pressure (present in 63.1%), followed in decreasing order by **obesity, low HDL-cholesterol, raised triglycerides and elevated fasting glucose.** This provides compelling data for screening patients with psoriasis for metabolic disorders. Lifestyle and cardiovascular risk reduction are important issues that should be addressed in the holistic management of psoriasis.

Please [click here](#) to read more about the study.

**The second study looked at genetics involved in metabolic disorders in our Singaporean psoriasis patients.** This study found that amongst the susceptibility loci, the **human leucocyte antigen (HLA) A\*02:07** was a **possible risk factor for hypertension**, and **HLA C\*01:02** was linked with **high cholesterol levels.**

Please [click here](#) to read more about the study.

Contributed by:

**Dr Hazel Oon**  
Senior Consultant  
NSC

## COVID-19 Vaccines: Preparing for the Next Wave

**"It is good to have hair- splitters and lumpers"** said Charles Darwin in a letter describing his efforts to place various flora and fauna into their taxonomic box.

Clinical research is also often a case of lumping or splitting – using ever larger datasets to understand diseases on a larger scale, while also categorising with an ever finer distinction the myriad of different ways in which a disease can manifest.

Arrival of the COVID-19 vaccines raises many questions whether we are lumpers or splitters. **How would increasing immunity to the SARS-CoV-2 affect the virus and the pandemic?** Is this really the beginning of the end or is it

just another step in a long road? And for the individual receiving the vaccine, how does their unique circumstances (age, ethnicity, gender and other illnesses) determine whether they will experience side effects and how well they will be protected against infection?

Participants in the SCOPE study (Singapore COVID-19 Vaccine Immune Response and Protection study) will be helping to answer these questions. This multi-centre study will **enrol up to 1000 individuals** who are receiving a COVID-19 vaccine, including older adults, healthcare workers, immunocompromised individuals, and those previously infected with COVID-19. It brings together clinicians from all the health clusters and polyclinics groups in Singapore while **detailed profiling of the humoral and cellular immune response to vaccination** will be performed by a team of immunologists

from A\*STAR Singapore Immunology Network (SigN), Duke-NUS and NUS.

This study aims to contribute to an **evidence-based COVID-19 vaccination policy** by measuring how long immunity lasts, and thus **whether some people will require repeated doses** after 6 months or 1 year. We also want to be ready for SARS-CoV-2's version of the Galapagos finches: immune escaped variants that have emerged in response to the immune memory from prior infection or vaccination. These are disturbing threats and data from vaccinated individuals is critical to understanding their potential impact.

Contributed by:

**Dr Barnaby Young**  
Head (Infectious Diseases  
Research Clinic),  
Consultant  
TTSH/NCID

## Validation of Vancomycin Dosing Guidance during Transition of Care – Can Pharmacokinetic Models Replace Clinicians in Therapeutic Drug Monitoring

Vancomycin is an antibiotic commonly used to treat serious gram-positive infections. Patients requiring prolonged vancomycin therapy in Singapore routinely receive intermittent infusion in the hospital, and are switched to continuous infusion for outpatient parenteral antibiotic therapy. During this transition of care, there may be a risk of not achieving therapeutic targets. We evaluated the **performance of a model-based dosing algorithm in achieving the vancomycin therapeutic target within 7 days of care transition.** The primary outcome measure was the proportion of patients who achieved vancomycin steady-state concentration (20-25 mg/L) by Day 7.

**A published population pharmacokinetic model of vancomycin was used as the foundation to guide dosing when discharging inpatients on intermittent infusion to continuous infusion.** Selected demographic variables (age, weight, and creatinine clearance) were used to devise the initial dosing. Supplementary decisions were implemented by a clinical pharmacist in adjusting the modelling terms (e.g. setting the maximum daily vancomycin continuous infusion dose at 4 g daily, or 1.5 times the last daily intermittent infusion dose if the last vancomycin trough was >10 mg/L). Where necessary, dosing was adjusted in collaboration with the clinical pharmacist.

17 patients on model-guided dosing were compared to 19 historical controls (dosing by clinicians alone). **Compared to historical controls, a significantly higher proportion of patients in the model-guided dosing group attained the therapeutic target by Day 7 (31.6 % vs. 70.6 %, P = 0.04).** None of them developed acute kidney injury. 1 patient (5.9%) had clinical failure (re-

admission for a viral-related illness), while another developed rashes after 7 days of continuous infusion, necessitating vancomycin discontinuation.

Although our model-based approach outperformed historical controls in achieving the vancomycin therapeutic target within the 1st week of continuous infusion therapy, and had a low incidence of adverse events, **further validation of the model in a larger patient cohort is warranted.**

Contributed by:



**Dr Ng Tat Ming**  
Principal Pharmacist  
(Specialist)  
Department of  
Pharmacy  
TTSH



**Dr Monica Chan**  
Senior Consultant  
Department of  
Infectious Diseases  
TTSH



## Cannabis Use in Singapore: Who and Which Drug Next?

Cannabis is the second most commonly abused drug among newly arrested drug abusers in Singapore over the past few years. The rates of cannabis abuse, coupled with its risk of drug progression, led to a need to understand the profile of cannabis users and to explore the effect of cannabis use on drug progression.

450 participants who had used cannabis at least once in their lifetime were recruited from the National Addictions Management Service, Prisons, Community Rehabilitation Centres, and halfway houses from August 2017 to May 2018. A face-to-face questionnaire was administered and descriptive analyses were conducted.

The mean age of the participants was 40.9 years old (SD = 14.51), and majority were males (93.1%). **The participants generally initiated cannabis use during adolescence at a mean onset age of 16.5 years old (SD = 4.46). The majority were introduced to cannabis by their friends (89.6%). Their main reasons for trying cannabis were curiosity (83.1%), followed by peer influence (43.8%), and easy availability (25.6%).** During the time when participants used cannabis the most, 62.2% reported using the drug daily, with an average dosage of 1.3 sticks (SD = 1.31) per day. **About half had used cannabis before the use of other illicit drugs (46.9%) and 42.1% of them used heroin as the succeeding drug.**

In Singapore, cannabis use is often initiated during adolescence, largely under peer influence. This calls for early preventive and intervention efforts in helping at-risk adolescents build healthy social relationships. Cannabis users may also progress to use other illicit drugs, particularly heroin, which provides an indication of a downstream risk of using other drugs which may have adverse impacts. Future studies may further examine the role of cannabis in drug progression through longitudinal studies, so that the sequencing of drug use and the specified workings can be explored.

\* Manuscript has been accepted for publication by the Singapore Medical Journal in October 2020.

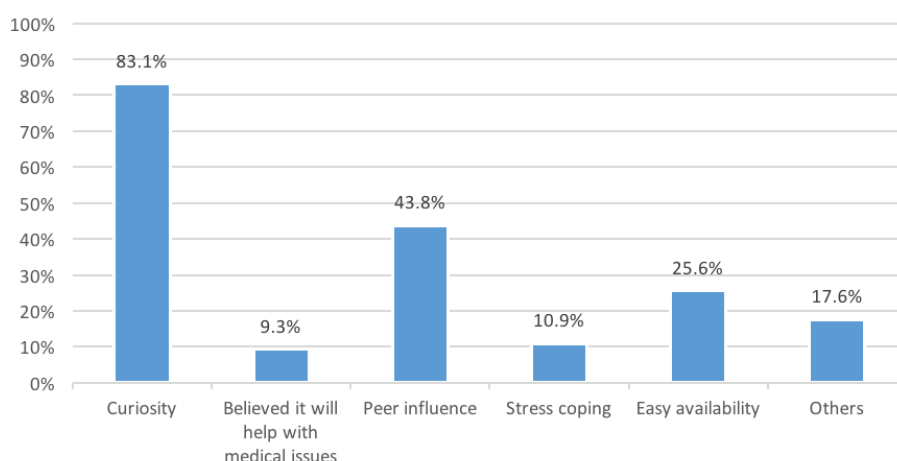
Chia DXY, Ng CWL, Nair APV, Au Yong S, Tan JW, Zainuldin NA, Chua SKG, Kandasami G. Understanding Cannabis Use in Singapore: Profile of Users and Drug Progression. Singapore Medical Journal. In press.

### Cannabis Preceded Other Drugs Group - Succeeding Drug After Cannabis (n = 209)

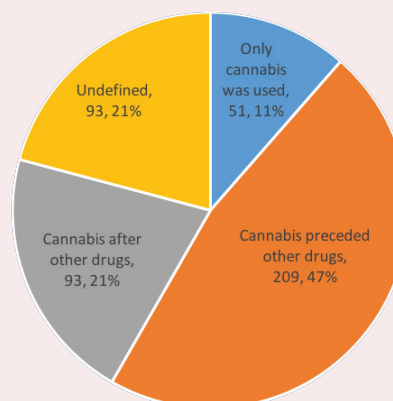
Drug Type	No. of Respondents (n)	Valid Percentage (%)
Heroin	88	42.1
Other Sedatives/Hypnotics/Tranquilisers	16	7.7
Benzodiazepines	12	5.7
Amphetamine-type Stimulants	11	5.3
New Psychoactive Substances	10	4.8
Hallucinogen	6	2.9
Other Opiates/Opioids	4	1.9
Inhalants	4	1.9
Ketamine	3	1.4
Barbiturates	1	0.5
Cocaine	1	0.5
Other Drugs	1	0.5
Undefined*	52	24.9

\*Undefined group refers to those who had more than one succeeding drug identified based on onset ages which could not provide information on the specific time sequence.

### Reasons for Using Cannabis



### Drug Progression



Undefined refers to those whose drug progression sequence could not be differentiated as they had initiated cannabis and one or more drugs at the same age of onset

Contributed by:

**Ms Charis Ng**

Assistant Manager (Research)  
National Addictions Management  
Service (NAMS)  
IMH

## Training Calendar

Date	Training Courses	Course Provider
Monthly	Good Clinical Practice (Online)	NHG Group Research
	(PCR100) Study Start-Up: Budgeting, Case Report Form Design and Database Design*	
	(PCR200) Study Conduct I: Subject Recruitment and Informed Consent*	
	(PCR300) Study Conduct II: Documentation, Safety Reporting and Investigational Products*	
	(PCR400) Monitoring, Audits and Inspections*	
8 Jul 2021	Research Preparatory & Study Design	TTSH CRIO
15 Jul 2021	Clinical & Epidemiological Study Designs	
12 Aug 2021	Manuscript Writing and Poster Presentation	NHG Group Research
18 Aug 2021	Prognostic Model Course	
1 Sep 2021	Grant Writing and Management	TTSH CRIO
16 Sep 2021	Basic Grant Writing	
22 Sep 2021	Questionnaire Design	NHG Group Research
20 – 21 Oct 2021	Project Management for Clinical Research Professionals	
11 Nov 2021	Intro to Evidence in Healthcare	

\*Blended learning courses involving Online Lectures coupled with a Classroom Workshop on a stipulated date.

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](http://www.research.nhg.com.sg) (Training & Education → Register for Courses and Other Events)
- TTSH CRIO, please contact Ms Siti Aisha Binte Jaffar ([Siti\\_Aisha\\_JAFFAR@ttsh.com.sg](mailto:Siti_Aisha_JAFFAR@ttsh.com.sg))







### NHG-LKCMedicine Joint Population Health Symposium

Addressing the current and future needs of our population amidst the ageing population, surge in frailty and rising demands for healthcare is a key motivation for research and innovation.

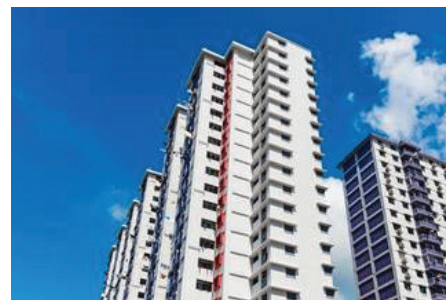
On 31 Mar 2021, the Population Health Symposium, jointly organized by NHG and LKCMedicine, brought together a stellar cast of clinicians and academics who shared insights on research in primary care, measuring multi-morbidity, as well as how to leverage on stratified medicine and digital technologies to pursue productive longevity.



Primary care plays a fundamental role in population health where NHG's focus for research in primary care aims to improve patient care, Beyond Hospital to Community, Beyond Quality to Value and Beyond Healthcare to Health.



**- A/Prof Tang Wern Ee**  
*Director of the NHG Polyclinics  
Clinical Research Unit and Family  
Physician Senior Consultant*



Missed the symposium? Fret not as you can now view the recording of the symposium [here](#).



#### Do you know what is Responsible Conduct of Research (RCR)?

RCR aims to uphold professionalism and integrity of research. It involves equipping researchers with the knowledge to identify and respond appropriately to ethical dilemmas which may arise during the course of the research.

To find out more about RCR, click [here](#).

### Chicken Soup for the Busy Coordinator

Education to facilitate high standards of research conduct

Nov 2020: Informed Consent:  
When is an Impartial  
Witness Needed? >>

Feb 2021: E-investigator file-  
How & where to maintain it  
(Before/ During/ End of study) >>

Dec 2020: Pointers for Electronic  
Consent (e-Consent) >>

Mar 2021: Mentor & Trainee  
Relationship (RCR) >>

Jan 2021: Study Data Collection  
and Database Maintenance >>

Apr 2021: Biological Specimen  
Management >>



Click on the respective issues to find out more!