

ADVANCING AS ONE

MEDICINE ACADEMIC
CLINICAL PROGRAMME 2021



Singapore
General Hospital



Changi
General Hospital



Sengkang
General Hospital

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DEAR COLLEAGUES,

It has been more than a decade since Medicine ACP was launched. Being the pioneer of the ACPs, we have made outstanding progress and have been a role model for other ACPs. I am grateful for all the support and generosity extended by our colleagues, strategic partners such as Duke-NUS, our sister institutions and all other ACPs across the SingHealth cluster.

I am sure we agree that the onset of the COVID-19 pandemic at the end of 2019 threw us off course, and the year 2020 was extremely challenging for all of us. However, I would like to point out that amid all the challenges, our thirst for greater academic achievement remains strong.

In Research, early-stage clinical trials have commenced for two COVID-19 vaccines in SGH which received approval from the Health Sciences Authority. Led by Assoc Prof Jenny Low, Senior Consultant, Infectious Diseases, the trials will evaluate the vaccines' safety and immune response against the Alpha, Beta, Gamma and Delta variants, and as possible booster shots for vaccinated people. This trial is significant for Singapore. If the vaccine is efficacious, Singapore would have played a key role in the global search for a COVID-19 vaccine.

Medicine ACP was presented with 2 National Medical Research Centre (NMRC) Clinician Scientist Awards (CSA), 2 NMRC Transition Awards (TA) and 6 Nurturing Clinician Researcher Scheme (NCRS) awards between 2019 and now. This is strong recognition of the role that our Research Office has played and I hope their achievements inspire you to take up more research initiatives.

The COVID-19 pandemic has affected and disrupted the education of our medical students and residents. However, our education office remains dedicated to plan and build an education curriculum that helps our students and residents. Tapping on technology, virtual ward rounds were conducted, many workshops were conducted over Zoom, and other resident-led initiatives such as Cadence continue to prepare our residents for their PACES exams. The office also launched the Medicine ACP Faculty Development dashboard in November 2020, which provides an overview of the educational activities, commitments and achievements of our educators.

With our growing nation and ageing population, it is vital for healthcare to continuously seek quality improvement and innovative solutions to meet the needs of our nation. I am heartened to see an increasing number of faculty participating in the clinical systems and innovation grants. Recently, a new Innovation Seed Grant was added to support translation of new ideas into working prototypes.

At Medicine ACP level, through the support of philanthropic funds, we also launched the Senior Residents QI Project Fund in 2020 to provide funding to our residents embarking on their QI projects. We have been on the improvement journey for a couple of years, and our QI projects have gained national recognition in recent years.

At the last SGH Quality Convention in 2020, Clin Asst Prof Kang Mei Ling won the QI Star of the Year award and all the Medical projects swept the Top 3 prizes. I would like to congratulate all the QI champions for working tirelessly to promote and champion quality initiatives.

Clin Assoc Prof Chow Wan Cheng introduced the Office of Medical Humanities in 2018. Medical Humanities rides on a conscious awareness that the practice of Medicine cannot be viewed solely as a biomedical enterprise but rather an interaction between physicians and patients. By recognising the patient as a living individual instead of a composite of body parts, and tackling challenges with greater empathy and ingenuity, we can better understand the work of the Humanities in Medicine and our daily work.

I hope we can grow this office to become an important strategic area in Medicine ACP together with the offices of Research, Education and Clinical Services Improvement & Innovation.

I would also like to thank everyone in Medicine ACP for being at the forefront of the fight against COVID-19. Many of you were directly responsible for managing the isolation wards and caring for COVID-19 patients. This is in addition to looking after the high number of non-COVID patients. The total number of patients under your care was high, and yet you have persevered and displayed exceptional professionalism despite being stretched. Your efforts were monumental in ensuring our patients received optimal care.

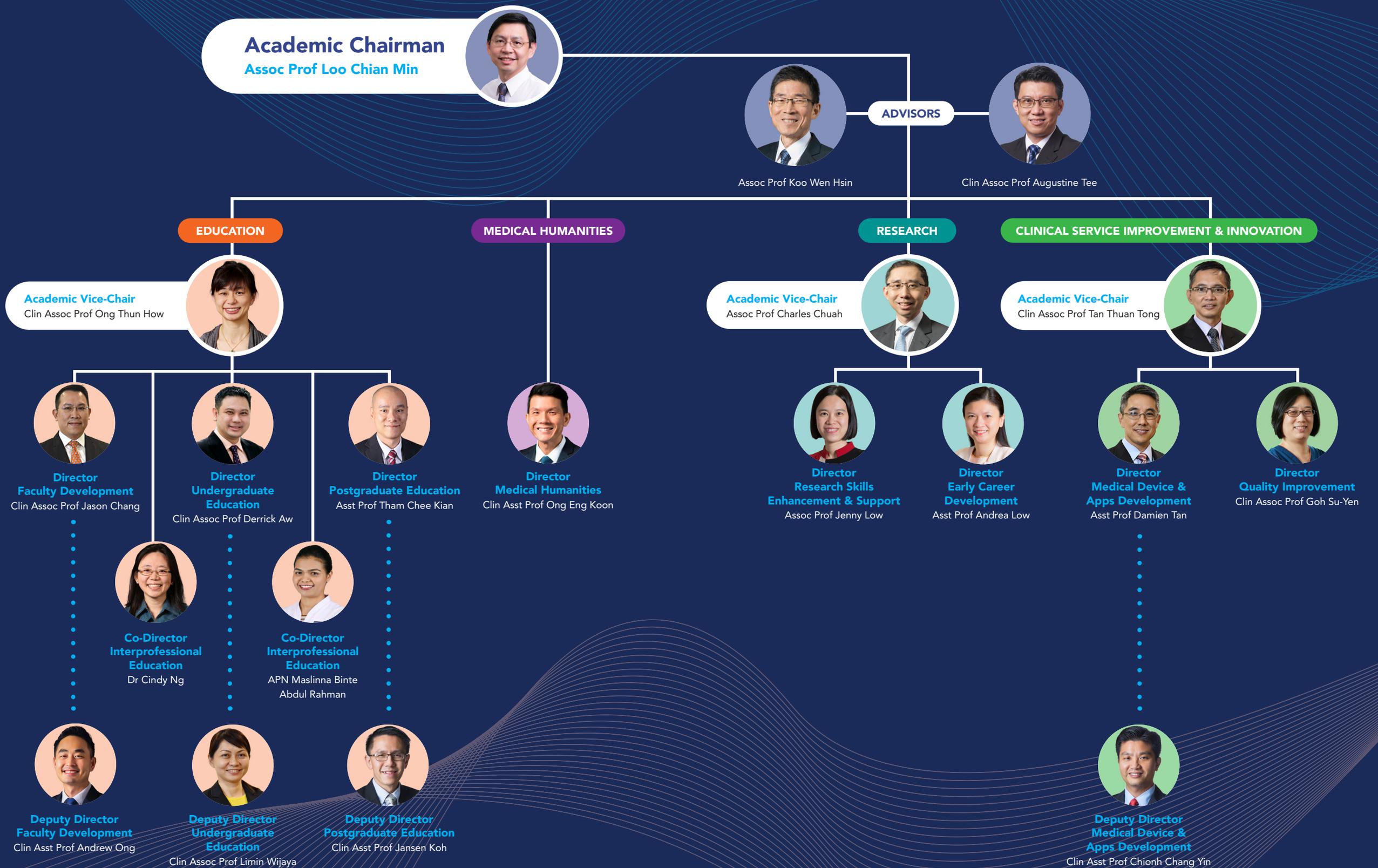
With that being said, there are unforeseen challenges and tribulations in the road ahead, but I am sure that by retaining and strengthening our teamwork and camaraderie, we will be able to face and conquer any adversity. As we continue our fight against COVID-19, please take the utmost care to ensure your safety.

Yours Sincerely,

Assoc Prof Loo Chian Min

Academic Chairman
Medicine ACP





Ward@Bowyer



It only took 50 days to turn a carpark into a ward. Ward@Bowyer opened its doors on 15 July 2020, increasing hospital capacity with 50 purpose-built isolation units in response to COVID-19. These patients filled every bed during the pandemic's peak. In addition to caring for non-COVID-19 patients, our medical teams were also deployed to helm these newly converted isolation wards. Later, the ward became a vaccination centre for our staff and patients.

Empower to Connect

Patients admitted to the isolation ward during the first months of the COVID-19 outbreak were often mentally unprepared. They were anxious over contracting a new infectious disease, and having limited access to their healthcare team. Being quarantined, too, meant major disruptions to their lives.



We stepped in to allay the fears of these COVID-19 patients and manage their physical and psychological needs. A team of doctors, nurses, psychologists, medical social workers and administrators from SGH's Division of Medicine, led by Clin Assoc Prof Chow Wan Cheng, provided them iPads preloaded with curated medical humanities content and treatment information.

These digital efforts complemented our conventional ones. By April 2020, foreign workers made up most of our COVID-19 cases and were housed at the EXPO Hall. Our team, working with the external NGO HealthServe, produced orientation booklets and instructional videos in multiple foreign languages for these patients. We also facilitated multilingual peer counselling sessions for these patients.

SGH Division of Medicine, Emergency Preparedness and Response Team

Milestones

THE CALM BEFORE THE STORM



The Division of Medicine had its first Town Hall on 23 January 2020, hours before the official announcement of the first COVID-19 case in Singapore.



CHINESE NEW YEAR 2020, DAY 3

How do we move forward? Senior Leaders, Senior Residents' committee members, Chief Residents and administrators gathered to refine our pandemic response.



WHITEBOARD PICASSOS

Multiple brainstorming sessions to develop plans for all possible scenarios were carried out at the Medical Command Post in meeting room AC 4-1. Progressively, ward changes and action plans became too complicated to be contained in our 11-inch Lenovos and we filled up the whiteboard at the Medical Command Post.



ENCOURAGING FRONTLINE STAFF



Isolation Ward 68, the Department of Emergency Medicine (DEM) and the Staff Clinic are at the very frontline of our pandemic response. Assoc Prof Loo Chian Min, Division Chair, conducted a walkabout there to boost staff morale.



THE END ...NOT EXACTLY

Medical Command Post at AC 4-1 stood down in October 2020. The next wave started and our planning continued in SingHealth Tower 5.

Hope in the Times of Covid

She brought out the best in us

She brought out the worse

Tiny but potent, all dressed to kill

Masked heroes we become, building barriers to stop her in her tracks

But we had casualties

We lost the ability to comfort with our touch

We lost the ability to move freely

Screen time increase, disruptions created bondages

Technology chasing up to break these chains

I miss the ones who have left and those of us who are left behind

Let's continue to hope for a ray to shine amongst the darkness

Dr Cindy Ng Li Whye

Senior Principal
Physiotherapist, SGH

Cumulonimbus.

Also abbreviated as CB.

This cloud, too, shall pass.

Dr Cheong May Anne

Associate Consultant, SGH



"The common operating language and tacit understanding within the task force greatly facilitated the rapid setup—from infrastructure to plans and SOPs. The strong mission focus and our mutual understanding also carried us through numerous challenges even as we shouldered the expectations of the nation."



Dr Gan Wee Hoe

Head and Senior Consultant,
Department of Occupational and
Environmental Medicine, SGH

"I spoke to Mr Vellaichamy Periyakaruppan, my patient and a tile fitter who happened to lay the tiles in the very room he was warded in. I felt humbled and thankful to give back to him and his colleagues. They've built this place for us, now let us take care of them."



Dr Ng Yi Kang

Associate Consultant,
Department of General Medicine
—Gastroenterology, SKH

"Patients not only need to be treated medically, but also come with emotional care needs. It is the role of the multidisciplinary team of doctors, nurses, therapists, dietitians and Medical Social Workers (MSWs) to work together in ensuring that the patient has a pleasant experience and a better outcome during discharge."



Dr Lee Kin Mun

Junior Resident,
Internal Medicine Residency

I AM HOPE

Hope amplifies the positive and silences the negative.

Embracing it does require a suspension of logic and an acceptance of the improbable.

It has the power to make the impossible possible.

All of us have it in us—we only need to allow it to work its magic.

Assoc Prof Soh Chai Rick
Chairman,
Division of Anaesthesiology &
Perioperative Medicine, SGH

Hope is the strongest force in the world. It can outlast the longest despair and break through the deepest fears.

Just an ounce of it is enough to overcome darkness. Hope can be inside each of us.

You are hope. I am hope. We are hope.

Hope Alessandra Tan
Pharmacy Technician, SKH



The passion for teaching runs deep in our clinicians. The genuine desire to groom the next generation of doctors, and to advance the practice of medicine, drives them. In this, they are supported by networks and programmes that encourage knowledge-sharing and collaboration.

Undergraduate Programmes

Our clinicians are committed in teaching clinical knowledge, mentoring relevant skills and imparting right values to medical students, to ensure that the highest quality of training is delivered to achieve medical excellence.

JUNIOR MEDICAL STUDENTS' TEACHINGS DURING DORSCON ORANGE



1 Virtual Ward Round

Twelve students learnt how to accurately upload patient records into Sunrise Clinical Manager, and tutors were assigned to conduct case discussions. This ensured that virtual ward rounds did not compromise learning and practical sessions.



2 History-Taking & Physical Examination Workshop

With clinical area postings cancelled, this collaboration between Medicine ACP and Duke-NUS enabled students to get in-person experience handling patients. These workshops were held three to four times per posting with one carousel of four stations: two for History-Taking with surrogate patients, and the remaining ones for Physical Examination with real patients.

SENIOR MEDICAL STUDENTS' TEACHINGS

1 Combined Lectures

A combined cohort of Year 4 Duke-NUS and Year 5 NUS Yong Loo Lin School of Medicine students have taken these lessons since 2020. Over 40 lectures were conducted within six weeks per posting. Online tutorial platforms had to be used this year due to safe-distancing restrictions.

2 Round Robin Bedside Tutorials

The Division of Medicine engaged faculty from various subspecialties to assist with these tutorial sessions. Each group of students attended at least two tutorials weekly, with each session lasting between 30 to 45 minutes.

Internal Medicine and Senior Residency Programmes

SingHealth Residency Programmes are committed to nurture each Resident. Our programmes equip the residents with leadership skills, provide the opportunity to be at the forefront of biomedical research and increase their zest for teaching. There are 11 Residency Programmes under Medicine.

PROJECT HOPE

This Resident-led initiative prepares new House Officers (HOs) for their housemanship postings. Internal Medicine (IM) Residents share their experience and provide tips to guide HOs during the triannual workshops. The workshops are now conducted virtually, but HOs still find them helpful for navigating their posting duties.

#1 – First get past 'survival mode'

- It's hard to learn if you are struggling to survive.
- This will get better with time. Speed it up by
 - Learn to manage workload – know what is important.
 - Have a system to organize your work.
 - It's okay to work a bit harder.
 - To become good, you first have to do a lot of 'scut work'.
 - Take initiative to learn – do not wait to be taught.



VIRTUAL CADENCE+

In this programme, Residents prepare their peers for the MRCP PACES examinations. Residents were previously taught patient examination techniques during in-person workshops. However, COVID-19 safe distancing measures means that remote Zoom sessions currently substitute for these workshops.

ZENITH+ (RESIDENT EDUCATOR TRACK)

Residents who want to become educators thrive under this track. It pairs them with Education mentors and provides supplementary courses from the Academic Medical Education Institute (AMEI). It lets them lead teaching programmes within SingHealth.



Dr Eugene Gan
Resident,
Internal Medicine
Residency Programme



Dr Trishpal Kaur Dhaliwal
Senior Resident,
Geriatric Medicine Senior
Residency Programme



Dr Grace Fong
Senior Resident,
Advanced Internal
Medicine Senior
Residency Programme



Dr Edmund Neo
Senior Resident,
Rehabilitation
Medicine Senior
Residency Programme



Dr Felix Maverick Rubillar Uy
Senior Resident,
Cardiology Senior
Residency Programme

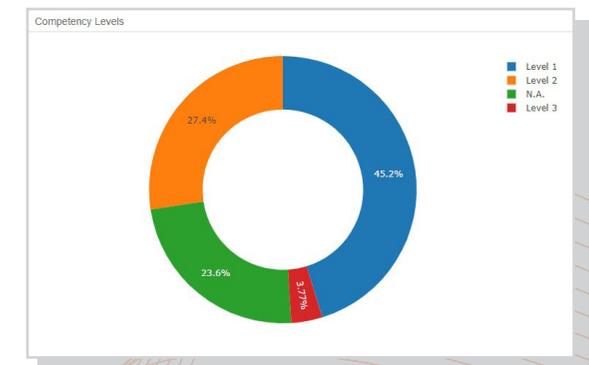
Faculty Development

Building capabilities of our educators is one of the key missions of the faculty development office. We regularly partner the Academic Medicine Education Institute (AMEI) in conducting workshops on key education principles, tools and best-shared practices. All educators must have at least Level 1 competency, while the core of residency programmes are expected to attain Levels 2 and 3 competency. There is also funding support to encourage our faculty to attend various types of medical education conferences and forums. An educator roadmap was also crafted to ensure that the junior faculty members are aware of the opportunities for them as they embark on the clinician educator path.

FACULTY DEVELOPMENT DASHBOARD

In 2020, an all-new Faculty Development Dashboard was launched. This digital initiative leverages on R programming and data visualisation capability to enhance the presentation of information. The dashboard include information on educational projects, teaching commitments and achievements of Medicine ACP faculty. It aims to help HODs and Education Leads to:

- ▶ Recognise staff contributions, educational involvement and personal career development
- ▶ Keep abreast of KRA assessment
- ▶ Develop plans for staff educational progression
- ▶ Help staff develop educational portfolios



Awards and Achievements

Our educators and clinicians adapted their pedagogies and curriculums this past year, equipping our students with healthcare skills for the pandemic and beyond. These honours recognise their dedication and diligence, as well as our commitment to rewarding excellent medical educators.

SINGHEALTH RiSE AWARD - AY2020/2021



Most Improved Medical Subspecialty Programme
Respiratory Medicine Senior Residency Programme



Best Medical Subspecialty Programme
Endocrinology Senior Residency Programme

AMEI GOLDEN APPLE AWARD 2020

Outstanding Educator Award

Clin Assoc Prof Warren Fong
Senior Consultant,
Department of Rheumatology
and Immunology, SGH



TEACHING AWARDS BY NUS YONG LOO LIN SCHOOL OF MEDICINE (YLLSOM)

NUS Dean's Award for Teaching Excellence: This recognises excellent teaching by outstanding clinical faculty who are on the Clinical Faculty Scheme or Clinician Educator Scheme.

AY2020/2021

- Clin Assoc Prof Derrick Aw, SKH
- Prof C Rajasoorya, SKH
- Dr Kan Yin Li, Juliana, SGH
- Dr Shaik Abdul Matin Bin S A M Mattar, SGH

Special Recognition Award: This recognises faculty members whom NUS YLLSoM Medical Undergraduates have mentioned as their role models in the Graduate Exit Questionnaire.

AY2020/2021

- Prof C Rajasoorya, SKH
- Clin Assoc Prof Dennis Seow, SGH

MEDICINE ACP EDUCATION AWARDS 2021

Education Leader Award

- **Asst Prof Tham Chee Kian**
Senior Consultant, Department of Medical Oncology, NCCS

Senior Educator Award

- **Dr Loh Wann Jia**
Consultant,
Department of
Endocrinology, CGH
- **Dr Yee Xianguang Joel**
Associate Consultant,
Department of
Internal Medicine, CGH
- **Dr Mok Jialing Tabitha**
Consultant,
Department of
Psychological Medicine, CGH
- **Dr Tan You Jiang**
Consultant,
Department of
Neurology, SGH
- **Dr Poon Yi Ling Eileen**
Consultant,
Department of
Medical Oncology, NCCS
- **Dr Raymond Ng Chee Hui**
Senior Consultant,
Department of Medical
Oncology, NCCS

Junior Educator Award

- **Dr Tan Wen Hao**
Medical Officer,
Department of
Dermatology, SGH
- **Dr Kennedy Ng Yao Yi**
Senior Resident,
Medical Oncology,
Senior Residency Programme
- **Dr Lee Sze Yi**
Resident Physician,
Department of Supportive
and Palliative Care, NCCS
- **Dr Tan Zhi Chien Joshua**
Senior Resident,
Medical Oncology,
Senior Residency Programme
- **Dr Jiang Bochao**
Senior Resident,
Gastroenterology
Senior Residency Programme
- **Dr Lim Shu Wei**
Resident,
Internal Medicine
Residency Programme

Team Educator Award

Emergency Endotracheal Intubation (EEI) Champion

Dr Ng Kangqi, Dr Louis Ng Xiang Long, Dr Clara Seah Yi-En, Dr Orlanda Goh Qi Mei, Dr Toh Yen Ni, Wee Jingyi Adelia

*Team comprises a multidisciplinary team from CGH

Projects and Initiatives

Principal Investigator

 Clin Assoc Prof
Ong Thun How

Cycle

 FY 2020
Cycle 2

Project Duration

 3 years

Funding Amount

 \$26,950



TECHNOLOGY-ENABLED CLINICAL BEDSIDE LEARNING

When clinical bedside teachings were curbed and students needed safe distancing from patients during the pandemic, Clin Assoc Prof Ong Thun How piloted the use of digital stethoscopes for training her students. These Littmann CORE stethoscopes transmit auscultatory findings to large groups of students through Eko teleconferencing software. With this technology, students and patients reduce their risk of exposure to each other, even while gaining real-life clinical insights.



JUNIOR EDUCATORS DEVELOPMENT INITIATIVE (JEDI)

Residents who would like to embark on education initiatives or be involved in teaching programmes should join the JEDI. This programme is for residents who have completed their postgraduate exams and the residency programme within the year. Each trainee must commit to attend all the modules and finish a project. A mentor will be assigned to each trainee to help them plan and execute their projects.

This programme will:

- ▶ Ensure that resident-led education initiatives follow sound and sustainable educational principles
- ▶ Build a community of practice for clinical educators across SingHealth institutions

Plan and Priorities

The past year has been a wild journey with the COVID-19 pandemic, as education has had to meet the challenges and adapt like all of us in every area of medicine. We are proud that in spite of the challenges, the Medicine ACP Education Office has garnered many achievements in areas of teaching medical students and residents, as well as spearheading many educational initiatives.

For our residents, several initiatives are underway to help improve their education. Clin Assoc Prof Warren Fong is spearheading the development of an online platform to house and administer MCQ question banks for our residents; hopefully, this will allow the different programmes to develop their own knowledge assessments that will align with their curriculum. He is also leading another exciting initiative—developing an online gaming platform that aims to help residents learn the core procedures.

Another exciting initiative in Medicine ACP is the digital stethoscope project, where we have acquired some digital stethoscopes that allow the simultaneous broadcast of auscultatory findings to a large group of learners in real-time.

Under Medicine ACP leadership, two other initiatives will help develop the next generation of educators. The first is the Junior Educator Development Initiative (JEDI

programme)—a bespoke programme aiming to mentor and guide junior residents who are planning education projects, and hopefully, help them to develop further into bona fide educators.

For newly-minted associate consultants, the Guiding New faculty Onwards as Medical Educators (GNOME) programme spearheaded by Clin Asst Prof Dr Andrew Ong aims to provide a structured roadmap to help them in their career paths as future educators.

The future has never been more exciting and these plans and programmes will put us in good stead going forward to meet the challenges that come.



Clin Assoc Prof Ong Thun How
Academic Vice-Chair, Education

The goal of Medicine Academic Clinical Programme (ACP) Research Office is to nurture clinician researchers in a holistic and conducive environment to become thought leaders in their area of research and to ultimately improve patient outcomes through their research. Medicine ACP helps to foster a culture of inquiry and continuous improvement to develop high-impact healthcare-related research, as well as facilitate the integration of research with medical education and clinical services within the ACP. We believe in moving beyond frontiers and discovering scientific breakthroughs in medicine so that we can build a better tomorrow for our patients.

COVID-19 Vaccines Clinical Trials

The COVID-19 pandemic has highlighted the vital importance of clinical trials for drug and vaccine development. Clinical trials led by Assoc Prof Jenny Low and administered by SingHealth Investigational Medicine Unit, are now ongoing for ARCT-154 and ARCT-165, two new COVID-19 variant vaccines, which were developed by Arcturus Therapeutics.

The Arcturus vaccine platform is different from that of existing mRNA vaccines being used worldwide. It is a self-transcribing and replicating mRNA vaccine that can lead to smaller vaccine doses being administered, so a limited vaccine supply can reach far more people than previously possible.

The ARCT-154 vaccine targets the more common D614 spike protein mutation, while the ARCT-165 vaccine targets a wider range of viral mutations.

The new vaccines will be tested together with the original ARCT-021 vaccine, which was co-developed by Arcturus Therapeutics and Duke-NUS Medical School. All three vaccines will be compared against one another for their safety and immune responses.

The original ARCT-021 vaccine, previously known as the Lunar-CoV19 vaccine, targets the original or wild-type SARS-CoV-2 virus and is still undergoing late phase clinical trials.

The Phase 1 variant vaccines clinical trial (which also has 2 other recruitment sites in the US), began in early 2021 with 72 participants, all of whom were healthy men and women between 21 and 65 years old.

36 of them had yet to be vaccinated, and another 36 received the second dose of their Pfizer jab at least six months earlier.

Participants were given one of the three ARCT vaccines, which were administered in two doses, one month apart. Those who were vaccinated received only one dose of either ARCT-021, 154 or 165.

Once the safety of the vaccines has been ascertained, the trial will move on to Phase 2, which will involve more volunteers and focus on participants' immune responses.

This involves measuring the level of neutralising antibodies level elicited and T-cell responses to ensure that the vaccine can confer long-lasting immunity to the virus and its variants.

Phase 3, which involves thousands of volunteers, can then conclusively determine the vaccines' efficacy against the variants.

Assoc Prof Jenny Low

Senior Consultant,
Department of Infectious
Diseases, SGH
Recipient of 2017 National
Medical Research Council
(NMRC) Clinician Scientist Award



The phase one trial tests for the vaccines' safety, to ensure that there are no severe side effects. The immune response of the participants will also be measured



This will involve a larger cohort of volunteers—usually a few hundred—with a focus on the participants' immune response



Conclusively determines the vaccines' efficacy against the virus variants

Volunteers with underlying chronic medical illnesses will be evaluated by the study team before they are allowed to be enrolled. The volunteers must have no history of severe allergic reactions to other vaccines, and no previous diagnosis of COVID-19.

As the novel vaccine development has reached the clinical evaluation stage, this trial is significant for Singapore. If the vaccine is efficacious, Singapore would have played a key role in the global search for a COVID-19 vaccine, and hopefully be able to help find a solution to the current pandemic.

Precision Medicine Interventions for Systemic Sclerosis and Gut Fibrosis

Systemic sclerosis (SSc) is a prototypical fibrotic multi-systemic disease characterised by immune dysregulation, vasculopathy and fibrosis. This project applies clinical translational research to the gut and its ultimate impact on nutrition and survival. Gut failure leads to malnutrition, requiring costly long-term parenteral nutrition. Despite being one of the earliest manifestations of disease, gut involvement is often diagnosed late, after fibrosis has occurred and is largely irreversible by that stage. The dearth of non-invasive gut investigations has hampered evaluation of existing and new therapies specifically to treat gut complications.

The unmet needs in SSc-gut management include the availability of non-invasive biomarkers for (i) early diagnosis; (ii) differentiation of SSc-gut stages; and (iii) treatment response.

Asst Prof Andrea Low

Senior Consultant,
Department of Rheumatology
and Immunology, SGH
Recipient of 2020 National
Medical Research Council
(NMRC) Clinician Scientist Award

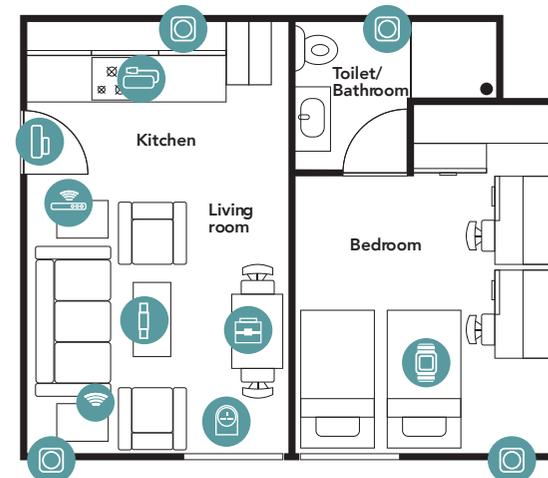


We hypothesised that gut fibrosis is preceded by an early inflammatory stage that represents a window of opportunity for immunosuppressive treatment. We aim to use novel non-invasive imaging methods and stool biomarkers of the gut microbiome to address these needs.

The project was delayed due to the COVID-19 pandemic and multicentre nature, but recruitment has resumed and the team has met one third of the target numbers. Next steps include validation of the biomarkers and imaging techniques to external cohorts and better stratification and application of precision medicine and targeted therapies.

Monitoring Dementia Early

As a dedicated research clinician, Clin Asst Prof Iris Rawtaer has studied dementia for years and realised that it is a global epidemic. There is hence the need to grasp a window of opportunity to detect the pre-dementia stage known as Mild Cognitive Impairment (MCI).



GET SMART—SENSING SENIORS' SITUATION

- Contact Sensor**
Placed at the home's main door to detect if it is closed or left open
- Sensorise Medication Box**
Determines how frequently medicine is—and is not—taken
- Gateway**
Aggregates data from non-gateway devices and sends them for analysis
- Motion and Environmental Sensor**
Detects suspicious collapses and extended periods of immobility
- Tap Usage Sensor**
Detects if tap has been left running
- Smart Plug**
Connects to, and monitors, usage of an appliance
- Wearables**
Activity bands measure heart rates
- Bed Occupancy Sensor**
Placed under the mattress and provides data on length and quality of sleep
- Beacon Tag**
Attached to keychain and wallet to determine if senior has taken them out when leaving home

Early MCI detection can aid individuals in seeking services promptly that may delay onset dementia. With the rise in the ageing population, solely relying on next-of-kin to monitor our seniors' well-being is not sustainable. Clin Asst Prof Rawtaer thus aimed to harness technology to identify and measure changes in behavioural patterns, which could identify individuals whose cognitive abilities were likely to deteriorate over a short time.

The project engaged seniors over the age of 65, who had their personal items tagged and missed doses of medications tracked. Researchers installed sensors in the seniors' flats to track their memory, movement and sleep patterns over time. Through the initial pilot study which engaged 49 community-dwelling elderly, activity pattern differences between those who were cognitively healthy and those with MCI were identified.

The study was positively received by over 60% of the participants and many requested for the system to be deployed permanently. Moving forward, Clin Asst Prof Iris Rawtaer hopes to further integrate the use of technology to harvest crucial and clinically impactful information to support public health.

Clin Asst Prof Iris Rawtaer

Consultant,
Department of Psychiatry, SKH
Recipient of 2020 Nurturing
Clinician Researcher Scheme
(NCRS) Clinician Scientist Award



Gentamicin: An Antibiotic Response to Viral Outbreaks

Viral epidemics continually threaten global health, universally have no effective treatments and development of new therapeutics cannot keep pace with outbreak emergence. A potential solution is to exploit licensed drugs that exhibit off-target antiviral properties as a first-line pharmacological response during viral outbreaks. One such class of drugs are aminoglycoside antibiotics. In mouse models of mucosal infection, topical aminoglycosides exerted antiviral effects by stimulating toll-like receptors to induce interferon-stimulated gene (ISG) expression, with ISGs affecting antiviral responses in cells.

The overall goal of this study is to show proof of concept that parenterally administered gentamicin, an aminoglycoside, can generate a systemic-level antiviral state. The specific aims are to: (1) Define *ex vivo* the effects of gentamicin on the innate immune transcriptional response in different subsets of peripheral blood mononuclear cells; (2) define the optimal dose of intramuscular (IM) gentamicin required to elicit an

Asst Prof Shirin Kalimuddin

Consultant,
Department of Infectious
Diseases, SGH
Recipient of 2020 National
Medical Research Council (NMRC)
Transition Award



innate immune transcriptional response in whole blood of healthy adults; and (3) determine the efficacy of prophylactic intramuscular gentamicin in reducing live attenuated yellow fever virus (YF17D) infection in a placebo-controlled trial. If successful, this study would demonstrate the impact of gentamicin on systemic-level antiviral response, and pave the way to translate a pharmacological approach as an emergency response to viral outbreaks.

Stopping Liver Damage with Rifaximin

Small bowel bacterial overgrowth (SIBO) is associated with a higher risk of liver decompensation among patients with advanced liver cirrhosis. In advanced cirrhosis, gut bacteria sneak through the 'leaky gut' and accelerate liver damage by causing further liver decompensation and death.

As SIBO is potentially reversible, the team's aim is to establish if antibiotic prophylaxis among advanced cirrhosis featuring SIBO can prevent further liver decompensations and death. The findings of this study will provide a personalised and novel treatment approach among advanced cirrhosis patients.

Clin Asst Prof Eugene Wong

Consultant,
Department of Gastroenterology
and Hepatology, CGH
Recipient of 2020 Nurturing
Clinician Researcher Scheme
(NCRS) Clinician Scientist Award



Irisin Levels in Primary Hyperparathyroidism Patients

Primary hyperparathyroidism (PHPT) is a common endocrine disorder characterised by too much parathyroid hormone (PTH). This excess PTH has a detrimental effect on bone health. Patients with this condition may have other non-skeletal problems that affect muscle and fat, which in turn may worsen their bone health.

For example, muscle-wasting has been observed in PHPT in animal studies but not characterised objectively in humans. The muscle, fat and bone compartments are co-related and can influence each other, though their hormonal pathways have not been fully illuminated. There is a lack of knowledge on the clinical effects of PHPT on muscle and fat, and the management for such effects.

Clin Asst Prof Tay and his team theorised that patients with PHPT have lower muscle mass, strength and lower fat mass, which are associated with low irisin. Through their project, they

aim to conduct a study to determine these differences between subjects with and without PHPT. They also hope that their findings can provide a basis to recommend parathyroidectomy and explore whether irisin can be a complementary biomarker for these non-skeletal adverse effects.

Clin Asst Prof Donovan Tay

Senior Consultant,
Department of Endocrinology,
SKH
Recipient of 2021 Nurturing
Clinician Researcher Scheme (NCRS)
Clinician Investigator Award



Immune Responses to the Herpes Zoster Vaccine in Seniors

Over the last century, human lifespan has increased significantly. However, with increasing age, the risk of acquiring infections and developing more severe disease is also higher, as underscored by the outcome of COVID-19. Coupled with slower and incomplete recovery, infections lead to deconditioning and loss of independence. Vaccination to prevent infection in the elderly population is vital, but the efficacy of vaccines in this age group is lower compared to younger individuals due to 'ageing of the immune system', also known as immunosenescence. Understanding how immunosenescence alters both the innate and adaptive immune response to vaccination would be important to guide the development of vaccines for the elderly.

A new adjuvanted recombinant zoster vaccine (RZV), Shingrix, containing the glycoprotein E (gE) sub-unit, combined with the AS01B adjuvant, has shown remarkable long-lasting efficacy (>90%) that is preserved along with the age of the immunised individual. This finding contrasts with the live-attenuated zoster vaccine (Zostavax), the efficacy of which declines with age. The superior outcome raises the possibility that vaccine efficacy can be optimal despite immunosenescence. Understanding the molecular underpinnings of the differences in efficacies

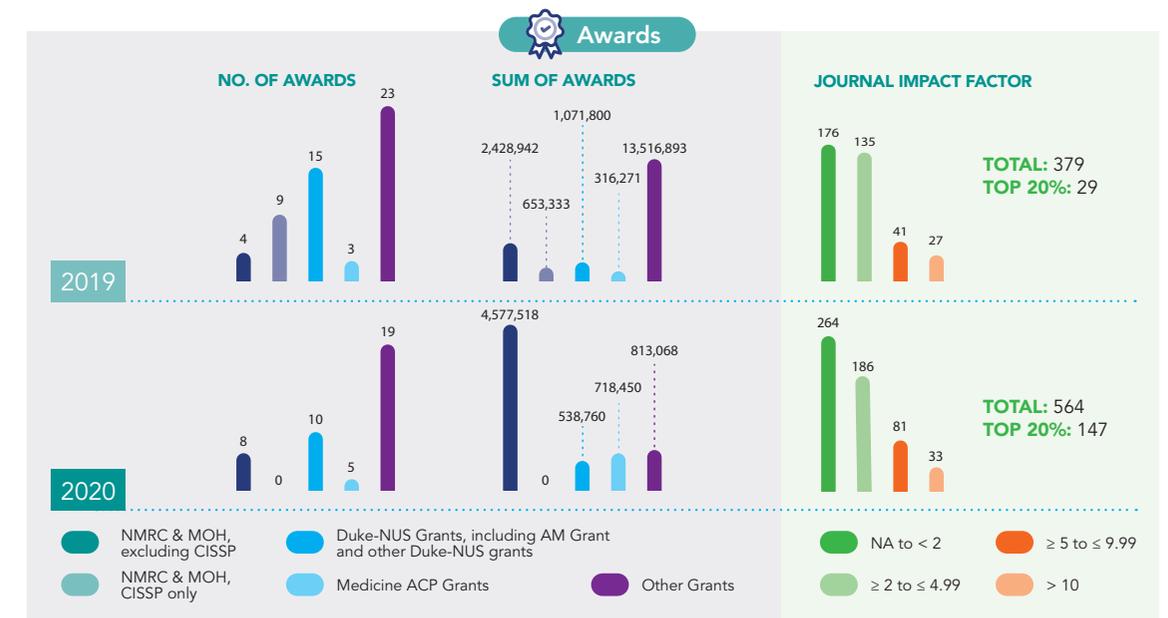
Clin Asst Prof Candice Chan

Consultant,
Department of Infectious
Diseases, SGH
Recipient of 2020 Nurturing
Clinician Researcher Scheme
(NCRS) Clinician Scientist Award



of RZV and Zostavax could provide unique insights into the critical processes of vaccine efficacy in the elderly.

This NCRS grant application thus seeks to unravel the molecular underpinnings of vaccine-induced immune responses in the elderly. The goal is to compare and identify the host response to vaccination with RZV and Zostavax. I will adopt an experimental medicine approach combining a healthy elderly volunteer clinical study with state-of-the-art laboratory tools to understand the host response to vaccination in the elderly. If successful, this study will advance our understanding and current strategies to prime the immune system in older adults for optimal vaccination outcome.



Plan and Priorities

2020 was a remarkable year for research in Medicine ACP. Despite the COVID-19 pandemic and its challenges, we produced 1.5 times more publications than in 2019 with more than 4 fold increase in the top 20% journals.

Two of our clinician scientists were also awarded the NMRC Clinician Scientist Award. In the next three years, we will focus on developing world-class research peaks with high impact on health and economic outcomes. Here we will harness new strategies for innovation and digitalisation, and fostering fruitful collaborations. In all this, we will keep building upon our bedrock—our people.



Assoc Prof Charles Chuah
Academic Vice-Chair, Research

CLINICAL SERVICE IMPROVEMENT & INNOVATION

As healthcare evolves with today's increasingly complex technologies and treatments, it is necessary for healthcare professionals to continuously seek solutions to improve the delivery of healthcare services to patients. In this spirit of continuous improvement, projects ventured by our clinicians have brought about significant changes and benefits to the healthcare sector.

Community Acquired Pneumonia and COVID-19 AI Predictive Engine (CAPE)

CAPE is an artificial intelligence (AI) imaging tool for predicting the possible progressions of a patient's pneumonia. With CAPE, clinicians can receive early warning for possible deterioration. They can prescribe interim measures for their patients such as the implementation of sepsis bundles and early access to critical care support.

CAPE readings also allow for the prioritisation and allocation of critical care resources. This is an important intervention for our pandemic era. Where pneumonia remains a leading cause of death worldwide, it is now also the main cause of deterioration in COVID-19 patients.

CAPE was developed by a research team including Clin Asst Prof Jessica Quah (Respiratory & Critical Care Medicine, CGH), Dr Charlene Liew (Diagnostic Radiology, CGH), and Dr Goh Han Leong (Integrated Health Information Systems).

The team will validate CAPE's usefulness in an upcoming multicentre study.



Clin Asst Prof Jessica Quah, Consultant of Respiratory & Critical Care Medicine, and Dr Charlene Liew, Consultant of Diagnostic Radiology, Changi General Hospital, were part of the team that developed CAPE.

Code Blue Workgroup

A patient's chance of survival drops by 10% with each minute without oxygen, or without their heart pumping blood to their body. It is critical that the patient be resuscitated as soon as possible; SGH experiences roughly 22 of these Code Blue life-saving calls monthly.

A 2017 Joint Commission International (JCI) audit showed that SGH's average Code Blue response time from 2015 to 2017 was slower than the five-minute JCI benchmark. The audit also found that improvements could be made to our manpower, skill sets and equipment for Code Blue response.

The SGH Medical Board tasked a multidisciplinary team led by Clin Asst Prof Carrie Leong, Consultant, SGH Respiratory & Critical Care Medicine, and Dr Claudia Tien, Consultant, SGH Surgical Intensive Care, to redesign the process of response. The team sped up SGH's Code Blue response time to less than five minutes within a mere six months. This response time is commendable considering that SGH has 1,700 beds spanning six blocks.



For their efforts, the Code Blue Workgroup was awarded the SGH QI Project of the Year Award in 2020 and National Healthcare Innovation and Productivity Award (Best Care Redesign) 2021.

MyVisit Mobile Application for Diabetes Patients

The MyVisit mobile application, launched by SGH's Department of Endocrinology, helps patients keep track of instructions from their doctor and what they need to prepare prior to their appointment. It also includes features such as a pre-appointment questionnaire, a consultation summary and test results history.

Not only does it help patients to plan their visit, it also allows them to take charge of their own health. In doing so, the growing number of active users face less stress in their outpatient visit.

"Our goal is to empower patients and give them greater knowledge and confidence in managing their own health"

Clin Asst Prof Amanda Lam
Department of Endocrinology, SGH

Patients can now access and track their test results at their convenience through the MyVisit app, which can be accessed via SingHealth's HealthBuddy application.



Hypoglycaemia Prevention Taskforce

Managing hypoglycaemia has been a pertinent challenge in acute hospitals. To improve care to inpatients, the Hypoglycaemia Prevention Taskforce set as its priorities the prevention of inpatient hypoglycaemia and reduction of time in hypoglycaemia. This would in turn reduce patients' length of stay in hospital and healthcare costs.

Led by Dr Tay Tunn Lin and Dr Eberta Tan, Senior Consultants at CGH's Department of Endocrinology, the project aimed to reduce inpatient hypoglycaemia in patients on medications for Diabetes Mellitus and recurrent hypoglycaemia without a concomitant increase in hyperglycaemia rates. It also aimed to shorten the time to recover from any hypoglycaemia episode.

Thus far, the team has spread their hypoglycaemia rescue and prevention bundles hospital-wide and have managed to achieve a hospital-level reduction of hypoglycaemia from 20% to 12%. The recurrent and severe hypoglycaemia episodes were also reduced to 6% and 1.4% respectively.



Medicine ACP Quality Improvement Awards



Best QI Project Team Award

This award recognises QI project teams that have demonstrated the use of Quality Improvement structured methodology and displayed positive innovative solutions.

2020



Providing Timely Rescue for Hypoglycaemia Events—Hospital-Wide and Prevention Bundle for Hypoglycaemia Episodes
Department of Endocrinology, CGH



Keeping Gout in the Community—Making Patient Education an Integral Part of Standard of Care for Patients with Gout Flares
Department of Internal Medicine, SGH



Systems Thinking Approach to Gastroenterology & Hepatology Specialist Out-patient Clinic (SOC) Waiting Time to Appointment (WTA)
Department of Gastroenterology and Hepatology, SGH

2021



To improve vitamin D screening in patients with SLE
Department of Rheumatology and Immunology, SGH



To achieve more than 80% of medical reports completed within 20 days
Department of Gastroenterology and Hepatology, SGH



Streamlining of thoracoscopy in Inpatient and Lung Endoscopy Centre
Inpatient and Lung Endoscopy Centre, SGH



QI Mentor Award

This award recognises individuals who have shown excellence in their efforts to promote and champion quality initiatives.

2020



Clin Asst Prof Kang Mei Ling
Head and Senior Consultant,
Department of Internal Medicine, SGH



Clin Assoc Prof Lina Choong
Senior Consultant,
Department of Renal Medicine, SGH



Clin Asst Prof Li Weiquan James
Consultant,
Department of Gastroenterology
and Hepatology, CGH

2021



Clin Assoc Prof Warren Fong
Senior Consultant,
Department of Rheumatology and
Immunology, SGH



Clin Asst Prof Gan Shien Wen Sheryl
Senior Consultant,
Department of Renal Medicine, SGH



Dr Stanley Angkodjojo
Consultant,
Department of General Medicine—
Rheumatology, SKH

Plan and Priorities



Clin Assoc Prof Tan Thuan Tong
Academic Vice-Chair,
Clinical Service
Improvement & Innovation

The healthcare sector has transformed in recent years through the pursuit of improvement and innovation excellence. From the initial concerns brought on by the pandemic, we improvised and adapted our processes to find novel ways of delivering the best patient care. A united and galvanised Medicine ACP paves the way for scaling up good initiatives geared at enhancing clinical service. In the midst of the pandemic, we formed our QI Committee involving not only representatives across the three sites, but also our nursing and allied health colleagues fostering multidisciplinary collaboration. Furthermore, the pandemic has surfaced budding innovators whom we hope to nurture towards the forefront of improving clinical care. We need to continue future-proofing our capabilities by empowering and equipping the next generation as they solve tomorrow's problems.

We live in an era where technology has the potential to create experiences to enhance life and clinical care. At the core of technology is the people driving the ideas and creating the innovations that enable transformative care. Our focus is to develop Clinician Innovators by identifying their talents and matching them to appropriate mentors from the pool of seasoned innovators in our interest groups. Leveraging on cluster and institutional resources, we hope to develop sustainable career pathways for innovators.

The pandemic has highlighted the importance of strengthening our healthcare system to ensure sustainability in the long term. We recognise the value of equipping each staff with the appropriate QI skills that empower them to effect change in their spheres of influence. To better support our faculty, we are developing a QI Curriculum that hopes to encourage personal and academic growth in the spirit of continuous improvement. This curriculum will complement existing efforts through improvement offices across different sites and clusters. There will be greater opportunities in the coming year to learn best practices from each other, and enable better project outcomes for all. As we progress from strength to strength, we hope to see more impactful projects that can be spread across different departments and clinical sites.



Asst Prof Damien Tan
Director,
Medical Device
& Apps Development



Clin Assoc Prof Goh Su-Yen
Director,
Quality Improvement

What is the goal of medicine? How should it be practiced? The field of medical humanities combines the experiences of patients and caregivers with art, poetry and drama to answer these fundamental questions about a doctor's role. It educates the next generation of doctors through professional identity formation and by developing a shared value system.

Introductory Course in Medical Humanities

The inaugural Introductory Course in Medical Humanities was conducted jointly by Yale-NUS and SingHealth Duke-NUS Medicine ACP on 28 May and 11 June 2021.

These virtual sessions integrated the study and practice of medicine with key disciplines in the humanities—art, philosophy, music, film and literature. There, nine Yale-NUS College faculty members paired up with nine SingHealth Duke-NUS Medicine ACP faculty members, led 20 participants in team-based teaching, experiential interactions with film and art, and faculty networking.

Assoc Prof Anantham Devanand, the former Director of Medical Humanities, Medicine ACP, kickstarted this course. Discussions are ongoing for a second run in 2022.



A Night to Remember

Fine art and fine music came together at the third A Night to Remember (ANTR), SingHealth's annual charity event centred around the medical humanities.

ANTR provides a platform for doctors, nurses and allied healthcare workers to candidly share their inspirational stories and experiences. As such, 2021's iteration included a month-long Art Expression showcase beginning 16 August—populated with art pieces donated by healthcare professionals and Our Art Studio—and finishing with an online concert by SingHealth staff and students on 17 September.

Dr Marc Lai and Dr Charlotte Choo from Internal Medicine Residency Programme, worked with the SingHealth President's Challenge 2021 committee for ANTR 2021 to raise more than \$50,000 in fund for five beneficiaries: the SingHealth Fund, Metta Welfare Association, Rainbow Centre, South Central Community Families Service Centre and Yong-En Care Centre.



Medical Humanities Webinar Series



Our colleagues and patients shared their diverse perspectives on social issues in the third iteration of this annual series, which welcomes frank conversations between speakers and audiences.

INEQUALITY IN SINGAPORE

Not everyone, whether because of individual or community circumstances, accesses healthcare equally in Singapore. This webinar, through sharing stories about delivery of care, explained why and when—and how improving access to essential facilities and services can resolve this inequality. It also underscored how inequality affects our approach to population and individual health in Singapore, including the health of migrant workers.

FOOD AND MEDICINE

This webinar explained why food insecurity affects even people living in countries where cheap takeaway options abound. In doing so, it proposed targeted food distribution networks as a solution. It also told the origin stories of Singapore's hawker centres and iconic dishes, as well as their implications for public health.

THROUGH THE CLINICAL PASTORAL CARE LENS - WHAT DOES IT MEAN TO BE HUMAN?

The warmth and compassion of clinical pastoral care services give patients and their families comfort and consolation. This ethnographic webinar illustrates how the Clinical Pastoral Care services at Mt Alvernia Hospital and Assisi Hospice has been there for patients and their family members.

In 2022, these medical humanities webinars will include more diverse areas pertinent to the ethical and social development of their participants.

Art Exhibitions

Art exhibitions were held throughout the year as a way to thank, encourage and inspire our healthcare community while they care for patients and families.

LIVING WELL EXHIBITION

What does it really mean to live a life well? Our fellow healthcare professionals explore this fundamental question through this curated collection of their photographs, paintings and stories.



PORTRAITS OF HEALTHCARE WORKERS



Ms Tang Yaling, founder of the Art Remnant studio, sees healthcare workers as heroes of our time. Her naturalistic and realistic portraits of nurses, doctors, therapists and radiologists working at different hospitals and clinics across Singapore took centrestage in this pop-up exhibition.

VISUAL ARTS HUB ARTS EXHIBITION - ADORNING THE DREAM



The theme of "Dreams and Inspiration" united these 10 art pieces by artists celebrating SG200. This exhibition, which began on 19 April 2021, was a Medicine ACP Medical Humanities Office collaboration with the Singapore Prison Service and the Visual Arts Hub.

Plan and Priorities

Moving forward, the Medical Humanities office will build on our achievements over the past three years. Four sub-committees will be formed, namely (1) Events, which increases awareness about the humanities through regular engagement programmes and activities; (2) Education, which develops and implements pilot programmes in medical education; (3) Clinical Interventions, which develops clinical interventions based on the humanities in order to improve patient care outcomes. This includes the upcoming plans for a new microsite with curated content for inpatients; (4) Social Media, which explores how the power of various online platforms can be harnessed to support the various endeavours of the Office.



Clin Asst Prof Ong Eng Koon
Director, Medical Humanities

Philanthropy is vital for Medicine ACP's Education, Research and Clinical Service Improvement and Innovation initiatives. The continued support from our donors lets us discover new interventions and raises our standards of patient care.



Seah Cheng Siang Professorship

The late Prof Seah Cheng Siang was a dedicated physician, passionate educator and a well-respected pioneer who pushed for clinical excellence in Singapore. Throughout his career, he laid strong foundations for medicine and public healthcare. He mentored many doctors who continue his legacy in universities, hospitals and clinics across Singapore. To honour his name, Medicine ACP established the "Seah Cheng Siang Professorship in Medicine" so as to continue his legacy and spirit towards Medicine.

In 2019, Prof Fong Kok Yong was awarded the Seah Cheng Siang Professorship in Medicine. Just like the late Prof Seah, he is a strong advocate for educating the next generation of competent and compassionate clinicians. His project "Defining Clinical Skills in the Digital Age" aims to identify gaps between the current clinical skills taught in medical schools and the clinical core skills needed in actual clinical practice in a digitally-connected Singapore. With funding from the Seah Cheng Siang Professorship in Medicine, Prof Fong hopes that his project can develop a core set of skills and incorporate digital technology in today's healthcare setting.

Prof Fong Kok Yong
Seah Cheng Siang Professor in Medicine



Defining Clinical Skills in the Digital Age

This project explores the type of skills that medical doctors need today and in the future, in light of the digital transformation of healthcare. It is important to ensure that medical students will be equipped with the relevant digital skills by the time they graduate. Studies have shown that equipping young medical trainees with the necessary skills in the earlier years of their education increases their confidence and competency in coping with electronic health records, as well as optimising advanced technologies such as Artificial Intelligence, machine learning and the Internet of Things.

By conducting extensive literature reviews and interviewing multiple stakeholders such as clinical practitioners and educators, clinical leaders, medical technopreneurs, medical students and patients, the study aims to identify potential facilitators and barriers to incorporating digital topics within the medical school curricula, as well as the core clinical skills and digital competencies that would be relevant for current and future clinical practice. Findings from the study have been presented at academic conferences and will also be shared widely via scientific publications.



The Hour Glass Virology Research Fund

"The Hour Glass Virology Research Fund" is a generous S\$2 million donation from Dr Henry Tay, founder of The Hour Glass, to the Viral Research and Experimental Medicine Centre (ViREMiCS) under Medicine ACP. ViREMiCS specialises in developing molecular indicators which accelerate the clinical development of new drugs and vaccines for various infectious diseases such as yellow fever, dengue and SARS-CoV-2. In particular, the Fund bolsters the expertise and efforts in the development of COVID-19 vaccines and in obtaining ISO-accreditation for COVID-19 related tests. It helps to accelerate the development of medical interventions against the devastating global pandemic. Part of the Fund will also provide the necessary training required to nurture a team of promising clinician scientists and scientific talents.



Goh Cheng Liang Rheumatology ARISE (Advancing Research and Innovation with Synergistic Expertise) Programme Fund

In 2020, the Goh Foundation pledged a donation of S\$4 million over 4 years to establish the Goh Cheng Liang Rheumatology ARISE (Advancing Research and Innovation with Synergistic Expertise) Programme Fund under the auspices of Medicine ACP.

Together with a previous S\$1 million donation, the Goh Foundation has contributed a total of S\$5 million in support of rheumatology research and initiatives to improve the lives of our patients.

This fund will provide the support in research innovations and education initiatives. We will also build capacity and hope to empower our patients in managing their conditions. Asst Prof Andrea Low, Head of SGH's Department of Rheumatology and Immunology, expresses her heartfelt gratitude to the Goh Foundation for their unstinting support.



Future of Medicine Fund

We have, since the start of Medicine ACP, been fortunate to have donations as seed funding for kick-starting some of our academic initiatives. These projects have let us deliver innovative care to our patients, educational programmes and research discoveries for Singapore. Funding is always limited, however, and we would like to sustain all these efforts.



Scan the QR code on the donation form at the end of this Yearbook. And join us in shaping the future of medicine.



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