SPHERiC NEWSLETTER

Singapore Population HEalth impRovement Centre

Issue 06 - August 2020

Director's Message

Dr Sue-Anne Toh
Centre Director,
Singapore Population Health impRovement Centre (SPHERiC)

DEAR COLLEAGUES

The COVID-19 pandemic is a global health crisis which has resulted in unprecedented impact on population health and healthcare systems. It has also upended our daily lives and thrown the global economy into disarray. Now, more than ever, research is critical in helping us to understand and respond to a crisis as it enfolds - from identifying the most effective therapeutics, to understanding its mode of transmission and the effectiveness of different population-based interventions, as well as evaluating its longer-term impacts on society.

I am pleased to report that our Centre has contributed actively to these research efforts, with key outputs that are helping to shape national policy and support implementation.

A/Prof Alex Cook and the Population Health Analytics Core team has used mathematical modelling to forecast and analyse the impact of the pandemic. Their work is supporting the Ministry of Health in designing and implementing effective control policies.

A/Prof Helena Legido-Quigley and the Health Systems Core team have studied the resilience of Singapore's health system in responding to the pandemic, and their research have provided perspectives on potential gaps in our healthcare system, which could help to further strengthen policies to respond to future public health emergencies.

Healthcare professionals at the frontline of health crises often bear a heavy burden, whether in the form of increased risk of exposure to the disease or having to endure severe work-related physical and mental stress. Recognising this, the Implementation Science Core team has studied this issue from different perspectives. A/Prof Tan Ker Kan's study provided insights on perceived pandemic preparedness and impact of the pandemic on primary care physicians. Prof Gerald Koh contributed articles to guide healthcare workers on navigating the pandemic.

The fight against the COVID-19 pandemic will be a long-drawn one, and I thank you for your dedication in this battle. I am proud of the SPHERiC team's many contributions so far to our national response, and I know they will continue their efforts with unwavering commitment and enthusiasm.

Let me also take this opportunity to congratulate A/Prof Helena Legido-Quigley, PI of our Health Systems and Models of Care Core, for being awarded the SSHSPH Outstanding Researcher Award AY2018/2019. A/Prof Legido-Quigley was also profiled in the Lancet in May 2020 as a proponent of health systems strengthening and has recently been appointed Editor-in-Chief of Elsevier's new Journal of Migration and Health. These achievements are testimony to her excellence in research and the positive impact her work has had on health systems and global health issues.

Wishing everyone good health.

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Population Health Analytics Core

TO FACILITATE COLLECTION AND ANALYTICS OF DATA ON HEALTH, SOCIAL AND BEHAVIOUR THROUGH DEVELOPING CAPABILITIES TO POLL A READY PANEL TO OBTAIN REPRESENTATIVE DATA, AND PERFORM AND VISUALISE POPULATION LEVEL ANALYTICS LAYERED WITH DETERMINANTS OF HEALTH.

Full Focus on COVID-19

A Modelling Study on the Interventions to Mitigate Early Spread of SARS-CoV-2 In Singapore[1]

Senior research fellow Dr Borame Dickens and Core PI A/Prof Alex Cook published one of the first individual-based models of COVID-19 spread and prevention methods, in The Lancet Infectious Diseases in March 2020, with a follow-on paper in The Lancet in April 2020, titled "**Institutional, not home-based, isolation could contain the COVID-19 outbreak**"[2].

The papers demonstrated the importance of layering multiple interventions to slow down the pandemic, and of isolating cases at community facilities, such as China's Fangcang hospitals, instead of isolating at home, which has been the norm in Europe, for reducing COVID-19 spread. The findings have been covered in 200 news articles, and used to support the control measures implemented by the Ministry of Health.

For more information:
[1] **https://doi.org/10.1016/S1473-3099(20)30162-6**
[2] **https://doi.org/10.1016/S0140-6736(20)31016-3**

A Systematic Review of COVID-19 Epidemiology Based on Current Evidence

In another well-cited paper published in March 2020, research fellow Dr Minah Park led a systematic review of the epidemiology of the COVID-19 outbreak. The review summarised the current epidemiological evidence from multiple early studies, to inform policymakers in formulating healthcare guidelines, and to provide directions for future research.

The findings suggested that the true size of the epidemic is much larger than what has been reported worldwide, and the outbreak was increasing rapidly, doubling in size every 3 to 7 days, with an infected individual infecting two to three other persons on average.

For more information:
https://doi.org/10.3390/jcm9040967

Estimating the Size of a COVID-19 Epidemic from Surveillance Systems

A paper was published in April 2020 describing Core PI A/Prof Alex Cook and team's methodology to estimate the size of the COVID-19 outbreak from surveillance data streams, such as unlinked pneumonia cases in hospitals or samples from networks of general practitioners' clinic.

The estimation of the local outbreak size has allowed the Ministry of Health to make timely decisions on outbreak control, instead of relying on passive surveillance streams to infer the size of the outbreak.

For more information:
https://doi.org/10.1097/ede.0000000000001202

Developing Online Tools for COVID-19 Projections

Several online tools have been developed to forecast and analyse the outbreak and impact of control scenarios for the Ministry of Health and the public.

Online tool- COVID-19 Forecast

One of the tools is a **COVID-19 forecast**, which provides real-time forecasting in Singapore, by generating estimates of how different data streams may evolve over the subsequent few weeks.

Another tool, an **online compartmental model** was developed to generate long term projections of epidemic behaviour under different scenarios for how the reproduction number changes over time. This tool has been used by the Ministry of Health to plan for the bed capacity in hospitals, and NUHS to plan for personal protective equipment utilisation for healthcare workers, as well as by the World Health Organisation in planning for the response to the pandemic in Yemen.

> The Centre has proven to be really useful in providing flexibility to redeploy expertise to cope with the challenges of the pandemic.
>
> ***Associate Professor Alex Cook - SSHSPH, National University of Singapore***

PHAC Population Health Analytics Core

Health Systems And Models Of Care Core

ENABLES BETTER UNDERSTANDING OF CURRENT CARE MODELS AND THEIR GAPS, HOW HEALTH SYSTEMS AFFECT ACCESS, DELIVERY AND EFFECTIVENESS OF CARE AND ITS IMPACT ON HEALTH, AS WELL AS FACILITATES THE TRANSLATION OF THIS UNDERSTANDING TO DESIGNING, IMPLEMENTING AND EVALUATING INNOVATIVE CARE MODELS, WITH A FOCUS ON CARE INTEGRATION AND COMMUNITY CARE.

Are High-Performing Health Systems Resilient against the COVID-19 Epidemic?

The raging COVID-19 pandemic in Asian countries during the first quarter of 2020 provided an opportunity to examine the mitigation strategies from the public health perspective. Together with public health experts from Hong Kong and Japan, A/Prof Helena Legido-Quigley, A/Prof Alex Cook, A/Prof Hsu Li Yang and Prof Teo Yik Ying, Dean of the Saw Swee Hock School of Public Health, published a paper in The Lancet, in March 2020. The paper aimed to provide an initial analysis of how Singapore, Hong Kong and Japan were responding to the pandemic, as well as elucidate key lessons for other high-income countries.

The paper examined the resilience of health systems in these countries in light of the COVID-19 pandemic along eight core dimensions, namely, surveillance capability and laboratory testing capacity, intragovernmental coordination, adaptation of health financing measures, sustenance of regular healthcare services, availability of critical care and medicines, infection control management, information management and risk communication, and the prevailing political environment and resultant social ethos.

Singapore, Hong Kong, and Japan were discussed in the paper owing to their perceived 'resilient' health system. It was noted that the three countries had introduced appropriate containment measures and governance structures, taken steps to support healthcare delivery and financing, and developed and implemented plans and management structures. However, their response was vulnerable to shortcomings in the coordination of services, access to adequate medical supplies and equipment, adequacy of risk communication and public trust in the government.

Three important lessons emerged. Firstly, integration of services in the health system and across other sectors strengthens the ability to absorb and adapt to shock. Secondly, the spread of fake news and misinformation is a major challenge that remains unresolved. Finally, the trust of patients, the healthcare professionals, and the society in the government is critical in overcoming the crisis.

For more information:
https://doi.org/10.1016/s0140-6736(20)30551-1

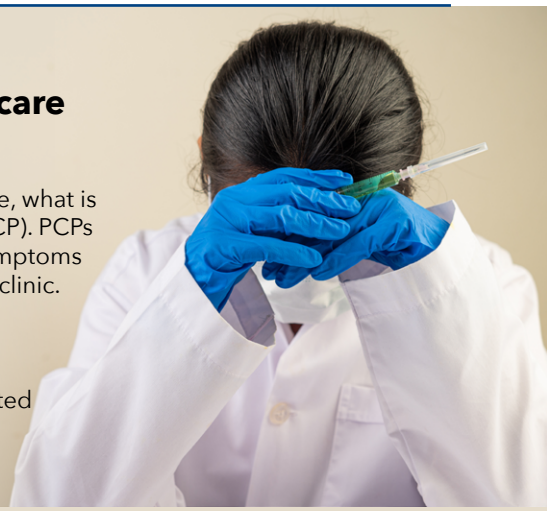
> COVID-19 has reminded us of the importance of taking care of the most vulnerable and those who take care of us. It has also highlighted the need to further invest in our health systems and specially in Public Health. Looking into the future, we have the opportunity to build more inclusive societies and to protect those who are most in need.
>
> ***Associate Professor Helena Legido-Quigley – SSHSPH, National University of Singapore***

HSMCC
Health Systems and Models of Care Core

Implementation Science Core

PROVIDES A MULTI-DISCIPLINARY APPROACH TO TEST NEW APPROACHES TO IMPROVE HEALTH PROGRAMMING; INVESTIGATES AND ADDRESSES MAJOR BARRIERS THAT IMPEDE EFFECTIVE IMPLEMENTATION. EVALUATIONS WILL ALSO EMPHASISE A MIXED METHODS PERSPECTIVE, INTEGRATING QUALITATIVE RESEARCH, ECONOMIC EVALUATION AND DECISION ANALYSIS, TO PROVIDE INSIGHT AND DEPTH OF UNDERSTANDING.

Prepared and highly committed despite the risk of COVID-19 infection: A cross-sectional survey of primary care physicians' concerns and coping strategies in Singapore



As the battle against the COVID-19 pandemic continues both globally and in Singapore, what is often unseen and underemphasised is the crucial role of the primary care physician (PCP). PCPs are at increased risk of COVID-19 exposure as individuals with a fever or respiratory symptoms are likely to seek a consultation at their nearest polyclinic or general practitioner (GP)'s clinic.

In this study led by A/Prof Tan Ker Kan (Core PI, Implementation Science Core) and Dr David Tan (Senior Consultant, Pioneer Polyclinic; Programme Director, NUHS Family Medicine Residency Programme), we aim to understand PCPs' work and non-work-related concerns, the impact of COVID-19 on their personal and professional lives, as well as the perceived pandemic preparedness. The study also compared and evaluated these aforementioned concerns between the public and private PCPs.

Two hundred and sixteen PCPs from NUHS Primary Care Network, National University Polyclinics, and the College of Family Physicians Singapore were recruited via one-stage cluster sampling and to complete an anonymous online questionnaire between 6 March to 29 March 2020.

Common concerns and perceptions of pandemic preparedness
The findings suggested that nine in ten PCPs from the public and private sectors acknowledged their high exposure risk to COVID-19 and the likelihood of being infected as part of the job. The majority were also stressed at work, and concerned about putting their loved ones at increased risk of COVID-19. We also found that pandemic preparedness was high, with nearly all reporting that they had received training in the use of personal protective equipment (PPE) and that they were personally prepared for the COVID-19 outbreak.

Differences in challenges faced by both groups
However, private sector PCPs were four times more likely than public sector PCPs to feel that they had an unacceptable level of exposure risk, with people avoiding their loved ones because of their job as a physician. From a preparedness standpoint, significantly more public sector PCPs agreed that they had received infection control training, and were also more confident that their workplaces were prepared with an outbreak preparedness plan.

Implications of our findings
As a novel survey focusing specifically on primary care in Singapore during COVID-19, our study demonstrates the high personal readiness and sense of duty that both groups of PCPs embody as medical professionals. Our findings acknowledge the increased pressure and workload experienced by PCPs, as well as their concerns about how serving on the front lines of the pandemic might negatively impact their family.

The differences between both groups of PCPs are understandable when taken in context with the experiences of GPs and family physicians around the world. As small or medium-sized businesses, private sector PCPs have suffered losses in revenue with patients' deferment of non-essential visits, and may lose their livelihoods if infected with COVID-19. Older PCPs in the private sector could have also had vivid memories of the experience with severe acute respiratory syndrome (SARS), and hence were more aware of mortality or disability risk due to their increased age.

As Singapore's ability to manage infectious disease outbreaks will undoubtedly be crippled without an effective primary care sector, we hope that this study sheds some light on the challenges that our GPs and family physicians face in these difficult times.

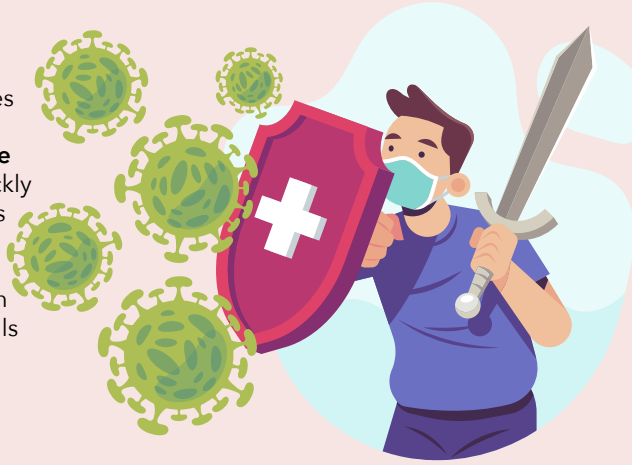
ISC Implementation Science Core

Implementation Science Core

PROVIDES A MULTI-DISCIPLINARY APPROACH TO TEST NEW APPROACHES TO IMPROVE HEALTH PROGRAMMING; INVESTIGATES AND ADDRESSES MAJOR BARRIERS THAT IMPEDE EFFECTIVE IMPLEMENTATION. EVALUATIONS WILL ALSO EMPHASISE A MIXED METHODS PERSPECTIVE, INTEGRATING QUALITATIVE RESEARCH, ECONOMIC EVALUATION AND DECISION ANALYSIS, TO PROVIDE INSIGHT AND DEPTH OF UNDERSTANDING.

Empowering Healthcare Professionals Globally for the COVID-19 Fight

When the COVID-19 reached Singapore's shores in early February 2020, Prof Gerald Koh wanted to warn and help the global rehabilitation and primary care community to prepare for the eventual pandemic. He and his long-term collaborator, Prof Helen Hoenig wrote a Special Communication for the Archives of Physical Medicine and Rehabilitation (APMR, the most highly cited journal in rehabilitation field) titled, "**How Should the Rehabilitation Community Prepare for 2019-nCoV?**" which was rapidly published online by 17 March 2020. It quickly became the most read APMR article, and was tweeted and retweeted 261 times and cited 3 times as of 4 June 2020.



AMPR has since uploaded an audio interview of Prof Gerald Koh and Prof Helen Hoenig about their paper onto RehabCast, a podcast service for all professionals in rehabilitation medicine led by Dr Ford Vox, Digital Media Editor for APMR.

For more information: https://doi.org/10.1016/j.apmr.2020.03.003

> I was waiting for #directives to the #rehabilitation community to deal with #COVID19 and (was) delighted to see that @ArchivesPMR is taking the charge! Informational, to the point, lifesaving.
>
> ***Twitter User***

> Thank you to the scientists who have worked so efficiently to collate the available evidence in order to provide practical guidelines for #healthcare workers on the frontlines!
>
> ***Twitter User***

Prof Gerald Koh also collaborated with Prof Trish Greenhalgh (Professor of Primary Care Health Sciences and Fellow of Green Templeton College at the University of Oxford, United Kingdom) and A/Prof Josip Car (Founding Director of the Centre for Population Health Sciences and Chair, Health Services and Outcomes Research Programme at Lee Kong Chian School of Medicine, Nanyang Technological University) to write a 10-minute consultation paper for the Practice section of the British Medical Journal (BMJ).

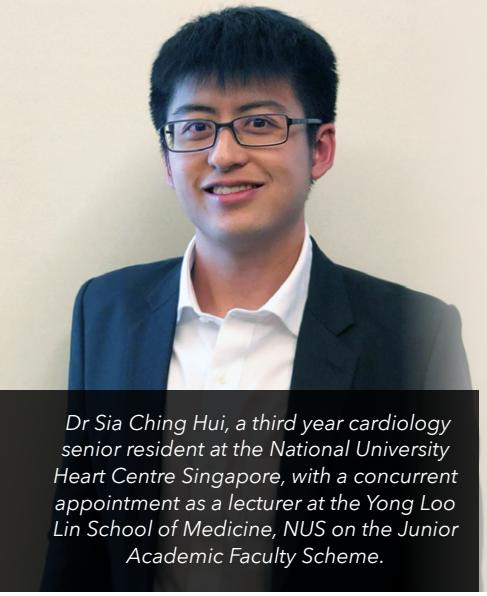
The paper, entitled "**Covid-19: a remote assessment in primary care**", is a guide for conducting remote consultation of suspected COVID-19 patients in primary care. It was rapidly published online in BMJ by 25 March 2020, and includes a useful one-page infographic for general practitioners (GPs) on how to perform remote video or voice call consultations during COVID-19. This paper has since been incorporated in the UK-based National Institute for Health and Care Excellence (NICE, an agency of the National Health Service (NHS) responsible for promoting clinical excellence within NHS service providers) rapid guideline on managing suspected or confirmed COVID-19 pneumonia in adults in the community.

For more information: https://doi.org/10.1136/bmj.m1182

> To all my fellow healthcare staff at the frontlines and supporting at the rear: Stay strong and united!
>
> ***Professor Gerald Koh***
> ***– SSHSPH, National University of Singapore***

ISC Implementation Science Core

Enhancing Capabilites In Population Health



Dr Sia Ching Hui, a third year cardiology senior resident at the National University Heart Centre Singapore, with a concurrent appointment as a lecturer at the Yong Loo Lin School of Medicine, NUS on the Junior Academic Faculty Scheme.

Focus on SPHERiC Fellow

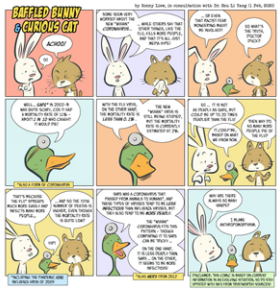
How do you feel about being awarded with SPHERiC Fellowship?
It has been nothing short of a fantastic experience being awarded the SPHERiC Fellowship. As a cardiology trainee, I am always on the lookout to see how best to push the boundaries of knowledge to improve patient care.

How has the SPHERiC Fellowship supported your research achievements?
The fellowship has given me the opportunity for me to pursue my interest in studying the epidemiology and clinical outcomes of acute myocardial infarction patients in Singapore. I have been provided the chance to share my work using a national-level myocardial infarction registry in Singapore, at the European Society of Cardiology Congress 2019 in Paris, and subsequently publish the results in a peer-reviewed journal.

What do you hope to achieve next, in the area of population health research?
This support has provided the foundation for me to aspire to want to continue this work, and hopefully to continue highlighting gaps in care of myocardial infarction patients in Singapore. I hope that one day, the work from this project will be able to inform policy and change practice of myocardial infarction patients locally as well as abroad.

Sharing Knowledge

SPHERiC RESEARCH CORE PRINCIPAL INVESTIGATORS SHARED THEIR KNOWLEDGE AND EXPERTISE WITH THE RESEARCH COMMUNITY AND THE PUBLIC THROUGH VARIOUS PLATFORMS.



Public Education Materials on COVID-19, February 2020
A series of educational illustrations on the COVID-19 outbreak – "**Baffled Bunny & Curious Cat Seeks Advice from Doctor Duck**", was produced in collaboration with award-winning comic artist Mr Sonny Liew, in consultation with A/Prof Hsu Li Yang, SSHSPH Programme Leader (Infectious Diseases), and supported by SPHERiC. These have been shared widely on various social media platforms and well-received by the public.

The Straits Times, Doctors feel 'Supported, Safe' in Fight against Coronavirus, May 19, 2020
A recent study conducted by **A/Prof Tan Ker Kan** and Dr David Tan examined the psychological and social impact of COVID-19 on primary care physicians. This study was the first to be done in South-East Asia, and revealed that of the 216 polyclinic doctors and general physicians surveyed, 9 in 10 feel safe with the support and equipment given, and have accepted infection risk as part of the job.

The Lancet, Helena Legido-Quigley: Proponent of Health Systems Strengthening, May 2020
A/Prof Helena Legido-Quigley was profiled in The Lancet. In the article, she commended Singapore's fast and efficient response to the COVID-19 outbreak, but highlighted that Singapore's second wave of COVID-19 has revealed the need to address the circumstances of vulnerable populations, such as migrant workers. With her recent appointment as Editor-in-Chief of Elsevier's Journal of Migration and Health, she plans to dedicate a special issue later this year, to migrant health and the impact of COVID-19. She also envisions a new dialogue on global health governance as a priority, in light of the COVID-19 outbreak. "How we redefine global health architecture will have enormous implications for how health systems worldwide can be resilient to future public health emergencies", she emphasised.

For more information: https://doi.org/10.1016/S0140-6736(20)31138-7

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