

SPHERiC NEWSLETTER

Singapore Population Health Improvement Centre

February 2019

Director's Message

DEAR COLLEAGUES

SPHERiC is now into its second year, and I would like to thank everyone for their contributions towards making 2018 a fruitful year for our Centre.



We are proud to continue working on our objectives of developing capabilities and sharing knowledge in population health research, as well as fostering collaboration with policy makers, national agencies, communities, and other Regional Health Systems.

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



In the past year, the Centre supported three research fellows and contributed to 16 publications in peer-reviewed journals, of which three were in the top 10% journals in their respective fields. A/Prof Helena Legido-Quigley of SPHERiC's Health System and Models of Care Core also co-edited the book "Resilient and people-centred health systems: Progress, challenges and future directions in Asia", published by WHO and successfully launched at the 3rd Raffles Dialogue.

Our Centre experienced some transitions in 2018, with the departure of A/Prof Joanne Yoong. I would like to take this opportunity to thank A/Prof Yoong for her leadership and invaluable contributions which were instrumental in the formation of our Implementation Science Core. The Centre would also like to extend a warm welcome to Dr Tan Ker Kan, a clinician scientist, and holds the appointment of Senior Consultant with the Division of Surgical Oncology (colorectal surgery) at the National University Cancer Institute, Singapore and an Assistant Professor in the Yong Loo Lin School of Medicine. We are delighted to have him as part of the team and look forward to working together.

In 2019, SPHERiC will further develop and support population health researchers through courses, workshops, collaborations, partnerships and research seed funding. We have launched our second seed funding grant call with strategic focus in three population health areas: Ageing and Frailty, Primary Care, and Technology-enabled Healthcare. This will help to support high potential early-career investigators in their exploratory studies that can provide preliminary data to vie for national grants. We look forward to an exciting and productive year ahead as we continue to advance efforts in multi-disciplinary population health research, and to catalyse enhancements in the Singapore healthcare system.

IN THIS ISSUE

1. Director's Message

2. Population Health Analytics Core

- Neighbourhood level real-time forecasting of dengue cases in tropical urban Singapore

3. Health Systems and Models of Care Core

- 3rd Raffles Dialogue 2018: Launched a Global Health System book titled "Resilient and people-centred health systems: progress, challenges and future directions in Asia"

4. Implementation Science Core

- Healthcare utilisation and cost trajectories post-stroke: role of caregiver and stroke factors

5. Enhancing Capabilities in Population Health

- Learning from International Experts
- Sharing Knowledge

6. Contact Us

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.

Neighbourhood level real-time forecasting of dengue cases in tropical urban Singapore

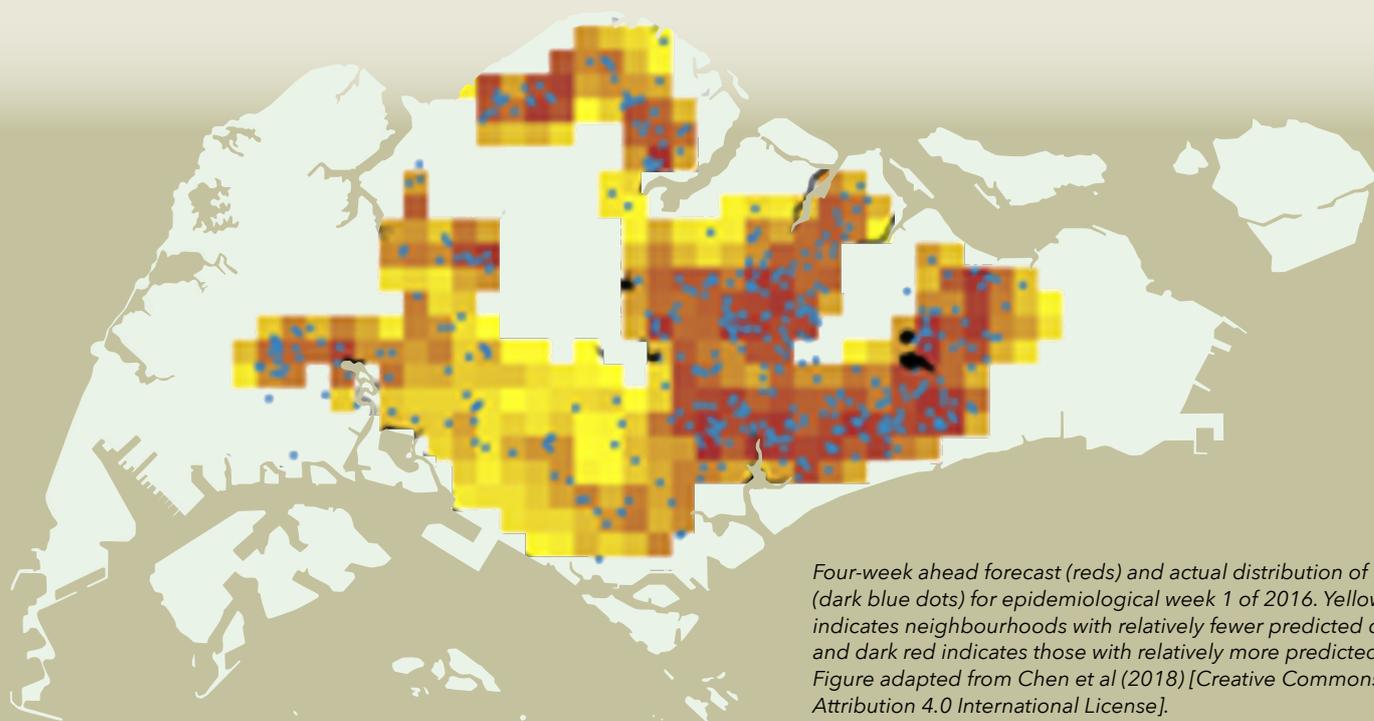
Dengue in Singapore is endemic and epidemic, with year-round transmission at endemic levels yielding to occasional epidemics. Although a vaccine is available, concerns have been expressed about the efficacy and safety of the vaccine, and so prevention currently revolves around vector control. Singapore's vector control programme involves both community engagement such as the '5-Step Mozzie Wipeout' campaign (pictured right) and public health officers dedicated to finding and eradicating breeding sites.

Although Singapore is considered to have one of the world's best vector control programmes, this comes at some cost, and being able to target vector control at areas of greatest immediate risk of transmission within the following weeks could help make the programme more efficient.

DO THE 5-STEP MOZZIE WIPEOUT. Get rid of stagnant water.



Singapore's vector control programme involves both community engagement such as the '5-Step Mozzie Wipeout' campaign



Four-week ahead forecast (reds) and actual distribution of cases (dark blue dots) for epidemiological week 1 of 2016. Yellow indicates neighbourhoods with relatively fewer predicted cases and dark red indicates those with relatively more predicted cases. Figure adapted from Chen et al (2018) [Creative Commons Attribution 4.0 International License].

To this end, we collaborated with the Environmental Health Institute (EHI) to develop a new analytical method to make spatial forecasts of immediate dengue incidence. This approach marries multiple streams of real-time spatial data, including mosquito breeding, dengue incidence, climatological data and other rich data sources including mobile phone motion. These data were synthesised using a model based upon the least absolute shrinkage and selection operator (LASSO), which is a form of machine learning optimised for out-of-sample performance. We assessed the performance of the approach and found that a good level of accuracy could be obtained in predictions over the next month and tolerable accuracy beyond that window.



In on-going work between the PHAC team and EHI, we are working to operationalise these forecasts so that they may become part of our routine vector control.

Associate Professor Alex Cook - SSSHSPH, National University Singapore



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.

3rd Raffles Dialogue 2018 - Launched of Global Health System book "Resilient and people-centred health systems: Progress, challenges and future directions in Asia"



From the left: Dr Nima Asgari-Jirhandeh, Madam Halimah Yacob, A/Prof Helena Legido-Quigley

In conjunction with this year's Raffles Dialogue, the Asia Pacific Observatory (APO) on Health Systems and Policies, NUS Medicine International Council and the National University Health System (NUHS) collaborated to publish a foundational book on health systems in Asia titled, "Resilient and people-centred health systems: Progress, challenges and future directions in Asia".

Bringing together input from 45 authors across 13 countries, the book highlights both progress made as well as challenges of the health sector in Asia. Despite the differing contexts of various Asian countries' health systems, this new comparative country study, published by APO, highlights future opportunities and threats that they all have in common. The central aim of this book is to build a strong and robust evidence base that can be of assistance in developing local expertise in health systems and to generate innovative and effective solutions to enhance health systems in Asia. The book assesses health system performance along three elements of people-centeredness, system resilience and quality. It comprises four cross-country chapters focusing on regional governance, non-communicable diseases, infectious diseases and planetary health, followed by a summary of the health systems from seven countries in Asia: Cambodia, Indonesia, Japan, Singapore, Sri Lanka, Thailand and the Philippines.

Several key findings in the book include stressing the need for stronger cross-border collaboration, for health systems to put primary healthcare at the forefront, and for sustainable financing to be strengthened, so as to address spiraling healthcare costs.

The book was launched at the 3rd Raffles Dialogue Gala Dinner on 27 November 2018 in Singapore. Madam Halimah Yacob, President of the Republic of Singapore who was the Guest-of-Honour for the 3rd Raffles Dialogue, and Mr Gan Kim Yong, Minister for Health, received the first copies of the book during the Gala Dinner. Copies of the book were also distributed to over 200 participants.



On the need to focus on developing primary healthcare, Associate Professor Helena Legido-Quigley of NUS Saw Swee Hock School of Public Health, who is the Co-Editor of the book, said, "Family doctors and polyclinics will play increasingly crucial roles in health systems, whether they are in large countries where they can increase accessibility to healthcare, or in smaller nations where they act as the first line of care in chronic disease management, closer to patients' homes. The latter is already a part of Singapore's health system strategy."



HSMCC
Health Systems and
Models of Care Core

Implementation Science Core

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

Healthcare utilisation and cost trajectories post-stroke: Role of caregiver and stroke factors

Globally, about 16 million stroke cases occur annually resulting in 5.7 million deaths. Stroke also taxes economies worldwide, accounting for almost 4% of direct healthcare costs in developed settings. Advancements in medical management strategies have led to greater number of survivors, resulting in an increased use of healthcare services.

Stroke as an illness also leads to increased dependency on family members who adopt the caregiving role and become intimately involved in caring for the stroke patient. Therefore, it is essential to study post-stroke healthcare utilisation from a stroke patient-caregiver dyadic perspective to improve healthcare delivery and eventually long-term outcomes. To address the existing literature gap in this area, our study described the trajectory of healthcare service utilisation by stroke patients and associated costs over a 1-year post-stroke period, and examined the association with caregiver identity and clinical stroke factors.

592 patient-caregiver dyads from our prospective study were included in the analysis. Healthcare data were obtained from the national claims database. We found that the highest

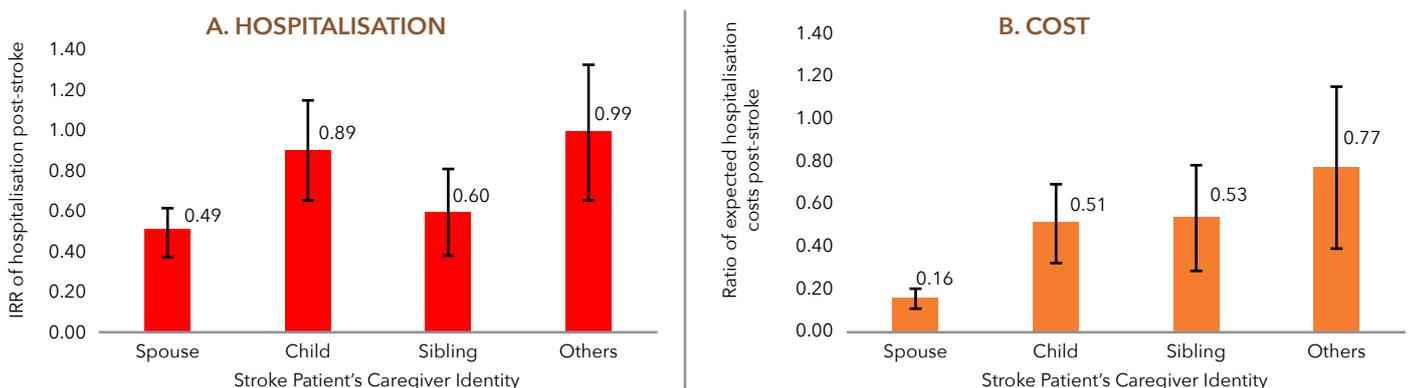
utilisation occurred in the first three months post-stroke across all services (i.e. inpatient, emergency, specialist outpatient and primary care services) and decreased with time. Having a caregiver (i.e. a family member or distant relative or friend) was associated with decreased risk of hospitalisation and associated costs post-stroke. Interestingly, hospitalisation risk and associated costs varied across caregiver identities, with a decrease of 51, 40, 11 and 1 percent in hospitalisation risk for patients having a spouse, sibling, child and others respectively as caregivers, compared to not having a caregiver. We did not find any significant association between caregiver availability and type with utilisation of outpatient services; these trajectories were driven more by clinical and functional stroke variables.

Our results have potential implications, since acute hospitalisation constitutes the bulk of the financial burden related to stroke. Caregiver availability reducing hospitalisation supports revisiting caregiver's role as potential hidden workforce, incentivising their efforts by designing socially inclusive bundled payment models for post-acute stroke care and adopting family-centred clinical care practices.



Our results suggest that studies on post-stroke healthcare utilisation need to take the role of caregivers into account. We see this as a dual opportunity to not only highlight the role of caregivers in optimising healthcare utilisation post-stroke, but also to support and empower them in fulfilling their caregiving responsibilities.

Dr Shilpa Tyagi PhD Candidate - SSHSPH, National University Singapore



LEGEND

(A) Incidence risk ratio of hospitalisation by caregiver identity (B) Multiplier of hospitalisation associated costs by caregiver identity.

Abbreviation: IRR = incidence rate ratio.

Estimates are taken from the final model adjusted for age, gender and ethnicity of stroke patient. Reference group for caregiver identity variable is stroke patients with no caregiver. For hospitalisation cost, the y-axis is the ratio of expected cost from quarter 2 to quarter 4 post-stroke to the reference quarter (quarter 1) respectively.

Enhancing Capabilities In Population Health

Learning from International Experts

Prof Martin McKee, Professor of European Public Health at the London School of Hygiene & Tropical Medicine, Founding Director of the European Centre on Health of Societies in Transition, and scientific advisor to SPHERiC, was in Singapore from 5 to 11 August 2018. During his visit, Prof McKee met with NUHS SPHERiC senior management and team, to share insights on population health challenges in United Kingdom, and how they could be applicable in Singapore.

Prof McKee provided valuable inputs into Singapore's population health challenges that required national level action, such as the prevention and management of diabetes, and ways to control tobacco use. He suggested that the food industry could be a partner in reducing and managing diabetes in Singapore, by reformulating foods to create healthier options, and by increasing consumer awareness of nutritional content. He also supported the ban on e-cigarettes, as evidence in Europe had shown that e-cigarettes reduced the probability of a smoker quitting smoking.



Prof Martin McKee (fourth from the left) with the SPHERiC team

He suggested studying similar challenges in regional areas like Hong Kong and Japan, and global cities like London and Paris, to understand and incorporate relevant ideas appropriately into Singapore's context. Additionally, Prof McKee discussed the importance of frailty and its associated health and social costs, and how primary care physicians could play a significant role in preventing and screening for frailty. Lastly, Prof McKee will collaborate with SPHERiC to jointly design and develop a population health course, as part of shaping our future research direction.

Sharing Knowledge

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



Alvin Teo, Research Associate presenting at the 22nd International AIDS Conference in Amsterdam, Netherlands. Mr Teo presented his work on 'Size estimation of key populations for HIV in Singapore using the network scale-up method', at a session titled 'New tools, old trick: Innovative methods for understanding the epidemic'.



A/Prof Alex Cook presenting on 'Modelling the Future of the HIV Epidemic in Singapore' at the 11th Singapore AIDS Conference 2018 at Lee Kong Chian School of Medicine, co-organised by AFA, NCID and TTSH. Dr Amy Khor (Chairman of the National AIDS Policy Committee; Senior Minister of State, Ministry of Health and Ministry of the Environment and Water Resources) was the Guest of Honour



A/Prof Alex Cook presenting at the Public-Private Partnerships Forum on Healthcare - PPPs for Eldercare and Noncommunicable Diseases held at Washington, D.C. in October 2018

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