Overarching Focus: Population Health

Population Health is the health of a population as measured by health status indicators and as influenced by social, economic and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, and health services. As an approach, population health focuses on the interrelated conditions and factors that influence the health of populations over the life course, identifies systematic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well-being of those populations. A population health approach addresses the entire range of individual and collective factors that determine health. Population health strategies are designed to affect whole groups or populations of people. The overarching goals of a population health approach are to maintain and improve the health status of the entire population and to reduce disparities in health status between population groups.

As we aim to develop an integrated ecosystem that anchors preventive health efforts in primary care and care in the community with good system linkages to support citizens at different life stages, novel strategies and approaches will be needed to drive sustained behavioural modifications for individuals to adopt healthier behaviour and habits. This would include new 'Precision Health' models that shift away from broad-based interventions to interventions that are tailored to maximise impact on high-risk groups (e.g. by combining clinical/phenotypic data, genetic data, behavioural data, digital data). To achieve this, the Population Health Research Grant will fund research proposals that seeks to improve health outcomes through a population health approach under the following Research Areas.

Research Areas

Health Promotion and Preventive Health (HP/PH)	Health Services Research (HSR)
Singapore's rising chronic disease burden threaten the long-term sustainability of the country's healthcare system. Upstream investment in health promotion and preventive health is a key move that would decrease the incidence and/or delay the onset of non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, and diabetes, and reduce the burden on Singapore's healthcare system and finite resources. This area encompasses research devoted to the building of the scientific and economic evidence base for health promotion and disease prevention in the Singapore context. This includes applied etiological or determinant research, field or community-based research, and cost-effectiveness/ analysis research that are collaborative, interdisciplinary/multidisciplinary, problem-solving and solution-oriented, and translatable to practice for implementation. The research proposals submitted under this research area must lead to a better understanding of actionable, cost-effective and sustainable drivers of physical and mental health in the following areas of interest to promote healthy behaviour and address modifiable health risks across different life stages.	Health Services Research is the "multidisciplinary field of scientific investigation that studies how social factors, financing systems, organisational structures and processes, health technologies, and personal behaviours affect access to healthcare, the quality and cost of healthcare, and ultimately our health and well-being. Its research domains are individuals, families, organisations, institutions, communities, and populations". Given our population ageing resulting in increasing prevalence of chronic diseases, multi-morbidity and demand for healthcare services, rising costs and manpower demand, there is a need to transform our care delivery model and enablers (e.g. financing approach, data sharing services across settings) to anchor care in primary care and community care, to operate a more sustainable and manpower-lean healthcare system. We should also continue to leverage on digital technologies to improve health delivery (e.g. to prevent disease by empowering consumers to make better-informed decisions about their health, tailor medicine/treatment to individual needs, and lower the cost of healthcare provision), and enable new ways (e.g. through inter-disciplinary application) of intervening to effect behaviour changes whilst allowing rich data to be collected. The Population Health Research Grant could contribute to this effort by supporting a) rigorous real-world evaluation of promising interventions and/or models of care, and b) research into Implementation Science to better understand and implement effective methods to bring about widespread transformation.

Research Themes

1) Mental Health

As the demands of modern life have increased, particularly in the face of an ongoing COVID-19 pandemic, the issue of mental health is on the forefront. This theme will fund research catering to the spectrum of patients with mental health conditions, from children and adolescents in schools, to working adults, to elderly patients. Particular attention will be given to research that improves access to mental healthcare in the community and supports the integration of primary and specialist mental healthcare.

HP/PH	HSR
- How can we further promote and support mental well-being among Singaporeans?	- Proposing new models for screening and detection of mental health conditions. - Studies assessing feasibility and effectiveness of community mental health services.

Research Themes

2) Care for Mothers and Children

This theme spans the continuum of care from pre-conception, pregnancy and childbirth to infancy, childhood, and adolescence, and research should address metabolic health, mental health and cognitive development of children and their mothers.

HP/PH	HSR
- How do we optimise maternal health in order to achieve better child development outcomes? - How do we optimise child health to ensure good development outcomes? - What is the impact of the role of fathers in child development/health outcomes?	- Research into models of care that 'right-sites' maternal and child health conditions within primary care. - Research on primary care initiatives for maternal and child health, such as mother-child dyad model, contraception counselling in polyclinics. - Implementation research on adoption and scaling up of successful initiatives.

Research Themes

3) Population mobilisation and improved access in the "War on Diabetes" and other common chronic diseases

Since declaring a "War on Diabetes" in 2016 to rally the entire nation to tackle diabetes, a range of initiatives and programmes have been implemented as part of the strategy to beat diabetes. While headway has been made in early detection and intervention, more upstream challenges remain to be addressed, including patient education and awareness of disease course, patient ownership of disease management, and socioeconomic barriers to good diabetes control. Besides diabetes, the burden of other chronic diseases will also continue to rise as our population ages. To address these issues, proposals for research submitted under this theme can cover new models of care, strategies, and research pertaining to patient behaviour and education, as well as to create change and societal shifts in enabling access to healthcare for patients with diabetes or other common chronic diseases.

HP/PH

- How can we better instil and/or sustain healthy eating behaviour among Singaporeans?
- What influences consumer purchasing behaviour and choice of healthier foods?
- How can we better motivate and sustain interest among Singaporeans to engage in active lifestyles and/or physical activity, at various settings (e.g. workplaces, schools, homes)?
- How can we leverage on primary care as a community base to promote healthy behaviour and address modifiable health risks (including social and environmental factors) at different life stages to prevent or delay the onset of chronic diseases?
- How can we enhance our tobacco control measures that can lead to further reduction in smoking rates?
- How can we motivate smokers to quit smoking and/or remain smoke-free?
- How can we better encourage Singaporeans to undergo health screening regularly?
- Research into the impact and effect of upstream interventions such as proactive lifestyle modifications in driving better health outcomes (e.g. in chronic diseases prevalent in primary care).

Research Themes

3) Population mobilisation and improved access in the "War on Diabetes" and other common chronic diseases

Since declaring a "War on Diabetes" in 2016 to rally the entire nation to tackle diabetes, a range of initiatives and programmes have been implemented as part of the strategy to beat diabetes. While headway has been made in early detection and intervention, more upstream challenges remain to be addressed, including patient education and awareness of disease course, patient ownership of disease management, and socioeconomic barriers to good diabetes control. Besides diabetes, the burden of other chronic diseases will also continue to rise as our population ages. To address these issues, proposals for research submitted under this theme can cover new models of care, strategies, and research pertaining to patient behaviour and education, as well as to create change and societal shifts in enabling access to healthcare for patients with diabetes or other common chronic diseases.

HSR

- Studies looking at current patient knowledge and health literacy regarding diabetes and/or other common chronic diseases.
- How to motivate patients diagnosed early in their disease course (e.g. asymptomatic diabetics).
- Larger-scale initiatives to address difficulties with healthcare access and compliance (e.g. patients with poorly controlled diabetes also tend to be patients with lower socioeconomic status).
- Implementation research on adoption and scaling up of successful initiatives.

Research Themes

4) Effective Use of Technology to Improve Health

What started out as an alternative for patients who prefer a tele-consult in the comfort of their own homes has become increasingly relevant in a post-pandemic world. The use of apps to monitor health and fitness have also become increasingly popular. However, recent incidences of data breaches have also highlighted the need for enhanced cyber-security. This theme will fund research that seeks to identify and create innovative models of care in the areas of telehealth and telemedicine, including for health promotion and preventive health, systems integration and databases, and privacy protection and data security.

HP/PH	HSR
- Ideas that leverage on advances in technology and data science, e.g. to provide customized just-in-time feedback/nudging, that lead to greater ownership of healthy behaviour by individuals.	- Quantitative or qualitative research on provider and patient factors and experiences pertaining to telemedicine. - Research into cost-effective, operable telehealth/telemedicine solutions that meet security and confidentiality considerations while improving care delivery. - Implementation research on adoption and scaling up of successful telemedicine initiatives.

Research Themes

5) Prevention and Preparedness for Healthy Ageing

This theme seeks to fund research into ideas that can extend healthy and functional lifespan and reduce the impact of disability, with a view for translation or application of solutions that can have a positive impact on our seniors.

HP/PH

- Study of risk factors for diseases (e.g. malnutrition, lack of social support).
- Approaches for eliminating/reducing risks at an earlier age before manifestation of diseases, and early detection and treatment of diseases.

Research Themes

6) Care for Complex Patients

With the increasing chronic disease burden, patients with multiple morbidities have become the norm and often have poor clinical outcomes. They often require care across multiple care sites (e.g. SOCs, home-based care), and face significant challenges navigating the healthcare system. Research submitted under this theme should address the needs of this patient population, including healthcare access, self-management, and care coordination. This theme will also support research targeted towards allied health and multi-disciplinary team-based care pertaining to the delivery of integrated care, including both medical and non-medical professionals. Strategies that have a community-based focus will be prioritised.

HSR

- Research on challenges faced by complex care patients (e.g. polypharmacy) and innovative ideas on how to better coordinate their care.
- Studies on care models with increased focus on allied health professionals and nursing professionals, e.g. effectiveness of a community pharmacy.
- Evidence of integrated care (IT systems, data registries, shared care plans, care coordinators, multi-disciplinary teams, telemonitoring etc.) and their qualitative and/or quantitative impact on our local healthcare system.
- Studies evaluating the strengths and weaknesses of current transitional and home care services and recommendations on improvements.
- New models for how to integrate home care with existing tertiary and primary care structures.
- Implementation research on adoption and scaling up of successful initiatives.

Research Themes

7) Sustainable and Efficient Care Delivery

This theme addresses the need to improve the sustainability and efficiency of our healthcare delivery system through improving resourcing and allocation, and approaches such as **Value-Based Care**. This theme will support research that seeks to optimize resource allocation, improve healthcare manpower productivity, and increase the efficiency of healthcare delivery without compromising quality.

HSR

- Research into **Value-Based Care** initiatives, and/or models for implementing **Value-Based Care** (e.g. bundled payments, structures).
- Research to explore new manpower deployment models and improve efficiency of the healthcare workforce e.g. in primary care.
- Research on how to attract and retain manpower in areas of need (e.g. primary care) by addressing factors for attrition such as burn-out.
- Research on improving education and training programmes for family medicine.
- Research on strategies to broadly standardise the quality of care delivery in primary care in Singapore.
- Implementation research on adoption and scaling up of successful initiatives.

Research Themes

8) Palliative Care

As our population ages, palliative care will become increasingly important as we seek to enable patients to live out their final days in a dignified manner. Over the years, Singapore has been enhancing the quality, affordability and accessibility of palliative care services. We have a variety of palliative care options such as the inpatient hospice palliative care, home palliative care and day hospices to cater for different needs and preferences of treatment and places of death. However, with evolving palliative (and end-of-life (EOL)) care models, in addition to challenges such as the current COVID-19 pandemic significantly altering traditional views on care delivery, we are keen on exploring how we can adopt and/or adapt existing palliative care models to offer more holistic, person-centric and cost-efficient options.

HSR

- Innovative palliative care models which emphasise an integrated, patient-centred approach, involving cross-agency collaboration whilst also allowing patients to transit seamlessly across different settings (e.g. from institutions to the community) and providers according to their individual needs. These approaches should demonstrate cost-effectiveness, as well as sustainability and scalability to deliver holistic, person-centric palliative and EOL care.
- Improved methods of identifying and supporting persons who can benefit from early introduction to palliative care approach. This may include proposals on training or equipping generalist health and social care professionals with skills to identify persons who can benefit from the palliative care approach.
- New models of palliative care that employ approaches which optimise utilisation of local assets (including the strengths, skills and resources of the community and family).
- Scaling up existing models of care including home palliative services in a sustainable manner, leveraging technology where possible, while ensuring sufficient flexibility to cater to patients' preferences.
- New models of engagement and communication with staff, patients and their families to enable a more person-centric EOL care, including encouragement of early consideration/thinking about palliative care. It can also include new engagement modes in reaching out to the public on having more open and meaningful dialogue about issues surrounding the end of life and palliative care.
- Implementation research on adoption and scaling up of successful initiatives.

Research Themes

9) Traditional and Complementary Medicine (T&CM)

As a multi-racial, multi-cultural society, Singapore remains home to individuals of different ethnicities and religions. This diversity plays out in health seeking behaviours as well, with the presence of traditional Chinese medicine (TCM), traditional Malay medicine (TMM), and traditional Indian medicine (TIM), although only TCM practitioners are statutorily regulated. This theme will fund research that seeks to understand the prevalence, attitudes and health seeking behaviour of our population with regard to T&CM, with a focus on how Western medicine and T&CM can be used safely together.

HSR

- Studying the prevalence of T&CM use together with mainstream healthcare services.

Research Themes

10) Health Systems Research

Besides improving various care models serving different groups of patients, research at a health systems-level could potentially yield important insights into system-level interventions or policies that may impact health on a wider or deeper scale.

HSR

- Efficacy of system-level outcome indicators to measure population-level interventions such as vaccinations and health screening.
- What does an integrated population health ecosystem look like in Singapore's context, and what are its components?
- Analysis on whether a community with better support in wider determinants of health (such as socioeconomic status, environmental factors, accessibility to health and healthcare facilities/programmes etc.) achieve better health outcomes as a community, and would have reduced social and health inequalities.

Research Themes

11) Rehabilitation (Rehab) ***New***

Disability is an important and common Health and Social Determinant in Population Health impacting significantly on outcomes such as Disability and Quality Adjusted Life Years, morbidity, institutionalisation and mortality. The prevalence of severe disability, such as stroke, OA and hip fractures will increase with the aging population and better medical care. Rehabilitation is the principal core intervention for disability. MOH has launched the National One-Rehab Framework aimed at enhancing patient outcomes for six major rehab conditions. PH Research is a key component to evaluate the characteristics, systems, outcomes and trajectories to develop precision-guided PH. HSR will encourage cross-collaboration between the acute, primary and community care providers to develop novel ways of improving rehabilitation care across the care continuum including Interprofessional Care, Extended and Expanded Care provision, Rehab Outcomes Research, Pre-Habilitation in the Healthier SG construct, Early Supported Discharge, Return to Employment, Technology leverages and Telerehabilitation.

HP/PH	HSR
- Research on National Rehabilitation and Disability Frameworks in the context of Disability as a important Health Determinants. - This includes study on rehab outcomes, tiering (siting) and diagnostic coding systems, cost-effectiveness and care trajectories to develop Precision directed Population Health.	Innovative and improved interdisciplinary models of care that evaluate interventions to support the population including Persons with Disability (PwD) who may be undergoing rehab to improve function and prevent future or recurrent rehab episodes. - Research on patient-centric, innovative, cost-effective, sustainable and scalable rehab care models that: (a) adopt a goal-oriented approach, and involve cross-agency collaborations that enable patients to transit seamlessly across different settings (e.g. from public healthcare institutions to the community) and providers; OR (b) optimise utilisation of resources; OR (c) leverage technology (e.g. deep learning, machine learning and predictive analytics). - Quantitative or qualitative research on provider and patient factors and experiences pertaining to improving effectiveness of rehab. - Quantitative or qualitative research on patient motivations pertaining to improving patients' adherence to rehab programmes (e.g. gamification and motivational psychology). - Implementation research on adoption and scaling up of successful initiatives.