



CHAPTER

01

THE THREE WAVES

Since the beginning of the 21st Century, health systems around the developed world have been trying to adapt to the challenges posed by ageing populations, such as a rise in the incidence and prevalence of chronic diseases. There is evidence that in most populations, the increase in longevity outpaces the increase in healthy life expectancy, with the consequence that a greater proportion of one's lifespan is spent with disability. Singapore is no different. Its population began greying as the economy bloomed; by the year 2000, some 220,000 people were aged 65 and above. Today, that number has doubled to 440,000, and is expected to increase to 900,000 by 2030.

With this ageing of our population, we have identified three key waves as the main drivers of healthcare utilisation and costs — **Frailty**, the rising prevalence of **Chronic Diseases**, and the impact of **Poor Lifestyle Habits**.

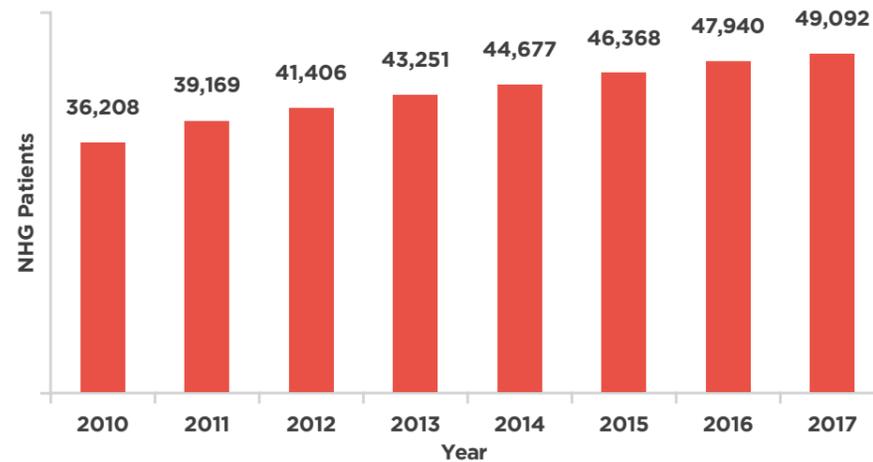
FIRST WAVE: FRAILITY

It is increasingly clear that for the elderly (aged 65 and above), the most important consideration for health is not the absence of disease but functional ability – which is affected negatively by Frailty. Frailty is defined as a geriatric syndrome characterised by the loss of the body’s ability to function normally, which increases the vulnerability of the older adult following trivial stressor events (such as a fall), and leads to a higher risk of negative health-related outcomes¹. Frailty is the most imminent challenge to the healthcare system because those who are Frail are high utilisers of healthcare, particularly hospital

care. In Singapore, 28 per cent of frequent high utilisers of public healthcare services are Frail. In our Central Region catchment, the 20 per cent of our patients who account for 84 per cent of our healthcare costs are more likely to be Frail and many have chronic conditions.

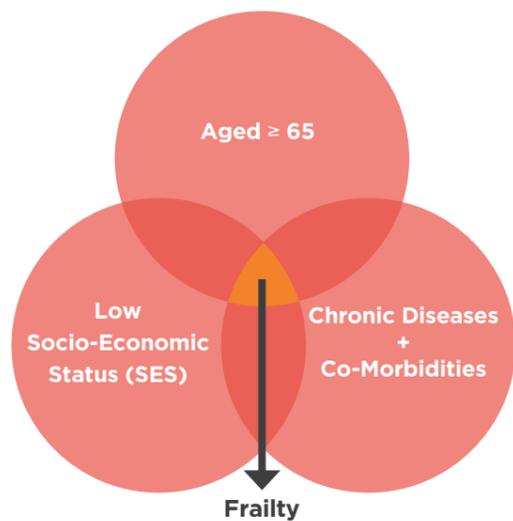
The risk of Frailty increases with age, and is therefore climbing as our population greys. As a corollary, the number of Frail patients seen at NHG Institutions is rising at the same rate (see Figure 1).

Figure 1: Rising Trend of Frail Patients across NHG Institutions



WHO ARE THE FRAIL?

Besides age, other factors that affect Frailty include chronic diseases and socio-economic status (SES). Among the top five per cent of high utilisers of NHG’s services, the majority have diabetes, hypertension and/or dyslipidaemia. Patients with chronic disease who have lower SES may also be over-represented, particularly in terms of Emergency Department (ED) attendances and hospital admissions.



ADDRESSING FRAILITY

Frail patients in older age often present with health states that are not easily captured by traditional disease classifications, and they often have functional, psychological, and social issues. The fight against Frailty is thus multi-pronged. We have developed a **Frailty Framework** to address the burden of Frailty across care settings and Institutions within our three zones (for more information, see p.82). Other measures include specialised geriatric assessment clinics that provide comprehensive geriatric evaluations, particularly in the ED. This helps identify and manage geriatric syndromes, sensory impairment, functional disability, and psycho-social issues, thereby reducing hospital re-admissions. Deploying nurses into the community to manage Frailty is another key strategy.

SECOND WAVE: CHRONIC DISEASES

Patients with chronic diseases represent the Second Wave that significantly impacts the healthcare system. Chronic diseases are defined as medical conditions that persist for a long time and are progressive. Examples include diabetes, heart disease, and hypertension. According to the World Health Organization (WHO), chronic diseases contribute to about 70 per cent of deaths worldwide and about 43 per cent of the global disease burden. In Singapore, the prevalence of chronic diseases is increasing. As an example, the number of people living with diabetes is projected to increase from 450,000 today to one million by 2050, if left unchecked.

Predictably, NHG Institutions in the Central Region, which has a population that is older than the national average, have seen a rise in the number of patients with chronic conditions over the past decade. At our polyclinics, for instance, there has been a rise of such patients by about 56 per cent from 2008 to 2017 (see Figure 2). Between 60 and 80 per cent of top utilisers of our services have a chronic condition. These numbers are projected to increase further; the number of stroke and diabetes patients is expected to increase by about 109 per cent and 87 per cent respectively by 2050 (see Figures 3 and 4). If we do not take transformative measures in the way we deliver care, this population segment will become Frail in the future and add to the First Wave’s impact on healthcare.

Figure 2: Increase in Number of Patients with Chronic Conditions Seen in NHGP

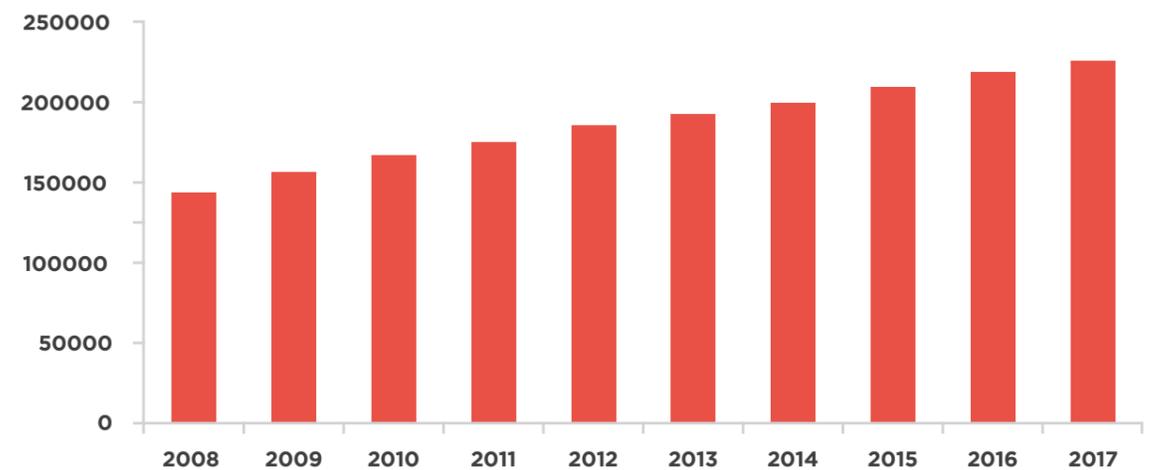


Figure 3: Projected Increase in Number of Patients with Stroke in the Central Region

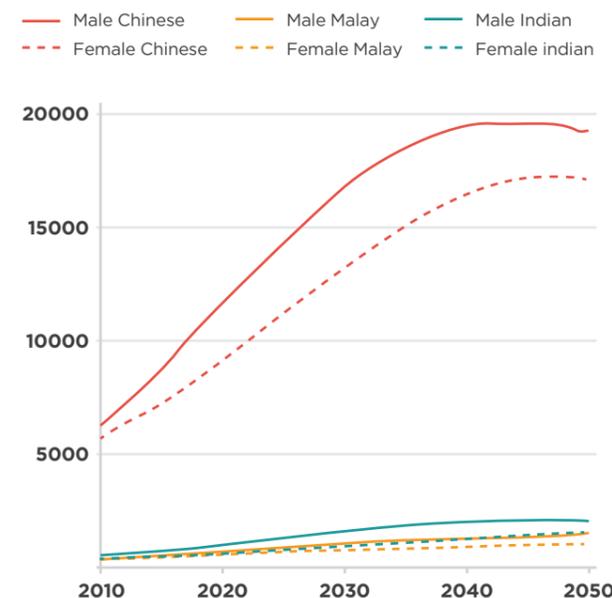
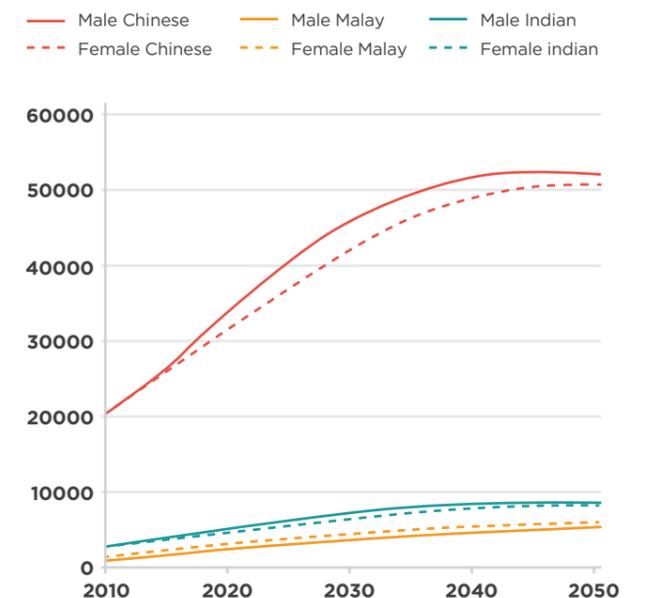


Figure 4: Projected Increase in Number of Patients with Diabetes in the Central Region



¹Lim, Wee Shiong, Wong Sweet Fun, Ian Leong, Philip Choo, and Pang Weng Sun. "Forging a Frailty-Ready Healthcare System to Meet Population Ageing." *International Journal of Environmental Research and Public Health* 14, no. 12 (2017): 1448. doi:10.3390/ijerph14121448.

ADDRESSING CHRONIC DISEASES

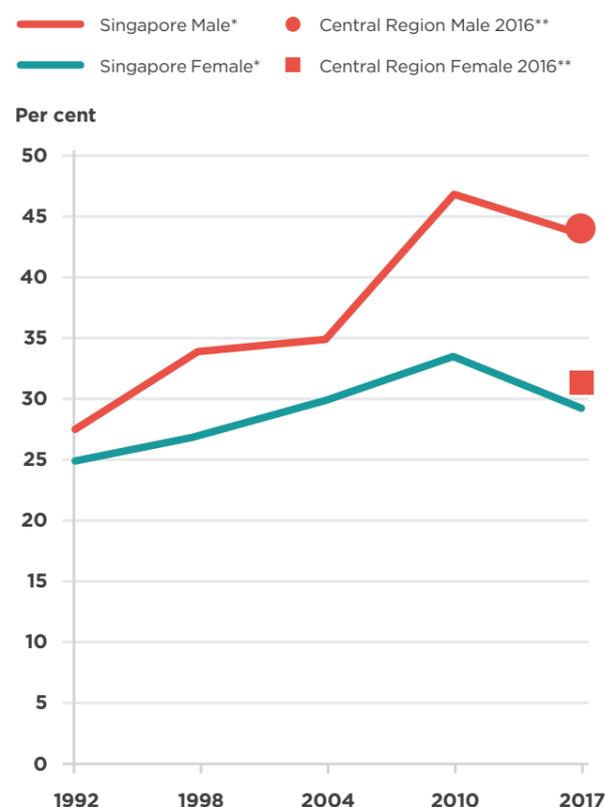
Many patients with mild to moderate chronic diseases are seen in our polyclinics, while those with more severe complications are managed by our Specialist Outpatient Clinics (SOCs). To mitigate this wave successfully, we need to focus on delaying the onset and progression of chronic conditions. This involves developing chronic care plans that incentivise behaviour modification and ownership of health to help patients manage their conditions effectively in the community outside of the healthcare setting. Another approach is to institute and enhance shared care models between our SOC and Primary Care such that care teams in polyclinics can handle more complex cases with specialist input, minimising the need for SOC referrals and hospitalisation, and enabling right-siting of care. To facilitate the expected increase in demand for Primary Care services, we are increasing capacity by partnering private General Practitioners (GPs) and Family Medicine Clinics (FMCs) through the Primary Care Networks (PCNs). This strategy is further supported by the use of tele-collaborations and tele-consultations to ensure appropriate, effective, and seamless care that is centred around our patients.

THIRD WAVE: POOR LIFESTYLE HABITS

The Third Wave we expect to encounter in healthcare is a population who indulges excessively in poor lifestyle habits, such as poor diet, lack of physical activity, chronic stress, and smoking; these are significant risk factors for chronic diseases, such as diabetes, hypertension, hyperlipidaemia, and cardiovascular disease. Such unhealthy behaviours can shorten one's lifespan by as many as 12 years. It is especially worrying because with Singapore's growing affluence, there has been a concomitant rise in such behaviours, and a corresponding increase in our obesity and overweight rates (see Figure 5). This population, therefore, carries a higher risk of having multiple (and/or more severe) chronic diseases. Overweight people, for example, are 1.8 times as likely to develop Type 2 Diabetes within six years as those with normal Body Mass Index (BMI), while obesity increases that risk to three times as those within the normal range. Smoking is the single biggest modifiable risk factor for heart disease. Lifestyle thus plays a key role in the development of Frailty among the elderly. A healthy lifestyle that includes regular physical and cognitive activity, and eating sensibly helps to delay the onset of Frailty and slow its progression.

Although this Third Wave will take the longest to manifest its impact on the healthcare system, it is the one likely to inflict the most damage as it is projected to compound the First and Second Waves in the long term. It is also the most challenging because it cannot be addressed by the healthcare system alone, and needs to harness Whole-of-Nation efforts to cover interventions and support in areas such as education, urban physical infrastructure, and employment.

Figure 5: 1992 to 2017 Trend in Obesity and Overweight Rates in Singapore



* National Health Surveys/National Population Health Survey, Ministry of Health (MOH)

** Population Health Index Survey 2016

ADDRESSING POOR LIFESTYLE HABITS

Many chronic diseases are described as lifestyle diseases because they are highly influenced by behavioural choices. Therefore, the adoption of healthy lifestyle choices can prevent or delay the onset of chronic disease. For individuals who already have a chronic disease, lifestyle modification programmes can significantly improve their health and psycho-social outcomes.

NHG is pursuing a number of upstream preventive care measures to tackle the risks of poor lifestyle choices, such as working with schools and employers to promote healthy behaviours early. We are also strengthening Primary Care as it plays a critical role in combatting this wave through health promotion, systematic screening of at-risk residents, health coaching for behaviour modification, early identification of Frailty, and early lifestyle interventions. To address the Third Wave holistically, we are coordinating with our social care partners to help patients manage their socio-economic issues to prevent potential medicalisation downstream. Through these multi-directional efforts, NHG seeks to establish community conditions that support healthy behaviours and promote the effective management of chronic illnesses to help create a nation of healthier students, healthier workers, and a healthier population.

“We intend to move beyond the walls of our hospitals and clinics, and integrate the whole community into one system where we address prevention, early detection, care for acute illnesses, and continuing care. Every unit in the healthcare ecosystem needs to work together to enable good physical, mental, and social health for our population.”

PROFESSOR CHUA HONG CHOON, DEPUTY GROUP CEO (CLINICAL), NHG & CEO, INSTITUTE OF MENTAL HEALTH

“The *River of Life* framework is designed to meet evolving healthcare needs now and into the future. We go beyond an individual's health status and take into account the various determinants of health to predict risks, care needs, and resource utilisation of the population under our care. Through greater integration of health and social services, we design targeted programmes and timely interventions to serve our population in the different stages of their life journey.”

PROFESSOR PHILIP CHOO, GROUP CEO, NHG

A MULTI-PRONGED APPROACH TO THE THREE WAVES

NHG is transforming its care to combat the Three Waves and deliver value-based healthcare for our population sustainably. This is encapsulated by our **River of Life (ROL)** philosophy that aims to enable our population to live well across the **Five Segments of Care**: Living Well, Living with Illness, Crisis and Complex Care, Living with Frailty, and Leaving Well. Our ROL Blueprint is being implemented through a zonal approach in our three geographic zones – Central, Yishun, and Woodlands – led by their respective **Integrated Care Organisations (ICOs)**: Central Health, Yishun Health, and Woodlands Health. This multi-dimensional and holistic strategy, which involves working closely with our healthcare and social care partners in the community for place-based care, serves to meet the evolving needs of our population and patients effectively and efficiently.

The chapters that follow provide for a deeper understanding of NHG's efforts in mitigating and managing the challenges posed by the Three Waves.