

Population Health



NHG has taken its expanded mission as NHG Cares to support the national *Healthier SG* strategy in caring for the population residing in Central and North Singapore. We are effectively shifting healthcare beyond the walls of our Institutions, as we aim to attain a longer-term sustainable model that addresses not just health, but social drivers, and a holistic perspective of how we invest in the well-being of our population.







POPULATION HEALTH



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ENABLING HEALTH TOGETHER

NHG Cares Membership

Residents living in Central and North Singapore who have enrolled with National Healthcare Group Polyclinics (NHGP) or an onboarded General Practitioner (GP) under *Healthier SG*, are automatically registered as NHG Cares members. Launched in tandem with the *Healthier SG* initiative to support residents in their lifelong journey in healthy living, NHG Cares membership enables residents easy sign-up to the suite of population health programmes and services offered by NHG, our community partners, and other national agencies. This free-of-charge membership allows residents to utilise innovative subscription plans, rewards, and incentives, designed to drive preventive health behaviours. Residents can also tap on NHG Cares health concierge and nurse telehealth services to make more informed choices about their personal health and care.

Launch Of *Health Kampung*

Unveiled by Minister of Health Ong Ye Kung at the NHG POPCollect Annual Workplan Seminar on 14 April 2023, *Health Kampung* is a community-building initiative that connects the 1.5 million residents in



Central and North Singapore to a 'marketplace' of more than 1,000 health and social programmes, accessible across 365 sites through the NHG Cares app. The programmes cater to the diverse interests and intensity levels of customised care plans of our residents, based on their health and social needs. They are broadly categorised into seven interest areas — 'Move &

Exercise', 'Buy, Cook & Eat', 'Stay Mentally Fit & Active', 'Live, Learn & Laugh', 'Equip & Support Caregivers', 'Manage Your Health & Life', and 'Volunteer & Contribute'. Residents may consult their polyclinic physician or *Healthier SG*-onboarded family physician on appropriate programmes to sign up either via the NHG Cares app or by contacting the organisers listed in the app.





ENHANCING PATIENT CARE THROUGH DIGITAL TRANSFORMATION

NHG adopts a Digital Health Master Plan and actively works with strategic partners to remain at the forefront of innovation and technology adoption in implementing faster, better, more competitive, and safer business solutions to improve the overall quality of patient care.

NGEMR Go-Live, Go-Right!

Next Generation Electronic Medical Record (NGEMR)

The Next Generation Electronic Medical Record (NGEMR) is an advanced, integrated medical record system put in place by the Ministry of Health (MOH) for the Singapore population, which amalgamates sub-systems and functions across participating institutions. This key digital transformation project continued another year of its roll-out to NHG Institutions.

February 2023 saw NGEMR Go-Live in Yishun Health, which comprises Khoo Teck Puat Hospital (KTPH) and



Yishun Health celebrating the immense effort put in as an institution, in collaboration with the NGEMR project team, comprising Group Health Informatics, Synapxe Pte Ltd, and EPIC.

Yishun Community Hospital (YCH). Close to 5,400 staff onboarded the system and underwent stipulated hours of training and assessments to ensure their competency.

The following NHG Institutions are slated to Go-Live on NGEMR by the end of 2024: Integrated Care Hub managed by Tan Tock Seng Hospital (TTSH), Sembawang Polyclinic, Woodlands Health, Institute of Mental Health (IMH), Khatib Polyclinic, and National Skin Centre (NSC).

The NGEMR does not serve as an end to the digital transformation journey at NHG, but rather lays a foundation to make way for digital initiatives that will further enhance efficiency for care teams in their delivery of patient care, while preserving security and integrity in the systems. NGEMR paves the way for users to incorporate the multitude of functionalities into their clinical and operational duties, that would lead to better service delivery, higher

efficiency, and facilitate seamless communications, as well as reduce our carbon footprint.

National Billing System And National Harmonised Integrated Pharmacy System

The National Billing System (NBS) and National Harmonised Integrated Pharmacy System (NHIPS) are two up-and-coming initiatives that will augment NGEMR in the aspects of billing and medication supply. They are targeted for a phased roll-out from 2023.

NHG Cares App In App Store And Google Play

Rolled out as a resident's health companion as well as a digital 'front door' to NHG's suite of services, the NHG Cares app was first made available on App Store and Google Play in Q1 of 2023. The app was subsequently refined for its soft release in July 2023 to coincide with the launch of *Healthier SG*. The NHG





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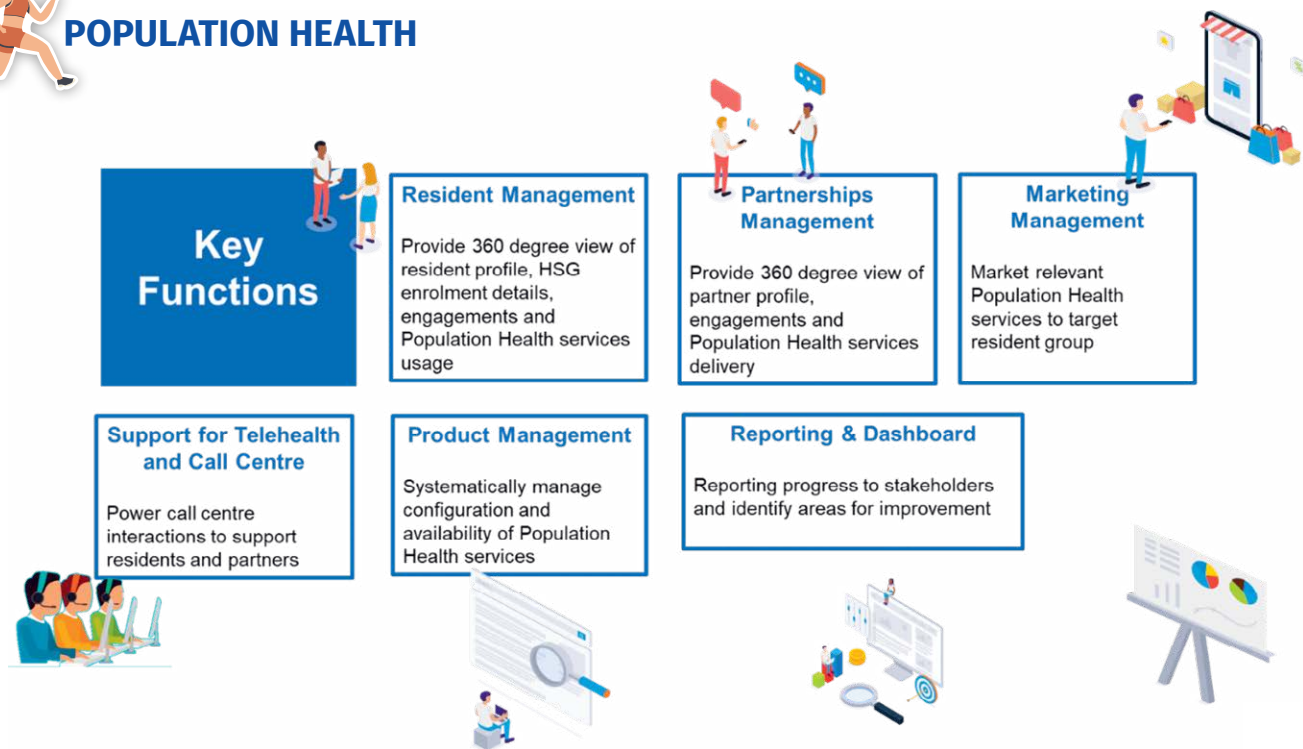


Figure 1: Overview of NHG Population Health CRM Key Functionalities

Cares app encourages residents to set their own health goals and targets to cultivate a sense of health ownership. As NHG Cares members, *Healthier SG*-enrolled residents of Central and North Singapore have access to the NHG Telehealth Call Service and enjoy perks offered by partnering retail merchants. With *Health Kampung* within the NHG Cares app, residents can also search and register for a wide range of healthy lifestyle activities in a community near them. The app also offers educational materials

to raise residents' standards of health literacy so that they can be empowered to live well.

New NHG Population Health CRM System To Power Population Health

In FY2023, NHG achieved several milestones with the NHG Population Health Customer Relationship Management (CRM), an enterprise digital solution that has enhanced our population health management. From the conceptualisation phase in January 2022 to the commencement of development in December 2022 and system go-live in April and July 2023, concerted efforts culminated in the creation of a comprehensive, one-stop system designed to support population health efforts and *Healthier SG* operations.

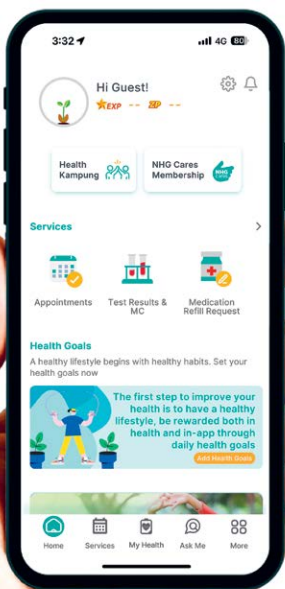
The NHG Population Health CRM is a pivotal tool in our pursuit of improved population health outcomes. By seamlessly integrating various modules, including Resident Management, Partners Management, Marketing Management, Support for Telehealth and Call Centre,

Product Management, and Reporting Dashboard, new dimensions of planning efforts and organisational efficiency have been unlocked (see Figure 1 for key details of each module).

Moving forward, NHG will continue to harness the power of NHG Population Health CRM to support population health and *Healthier SG* operations, cultivate stronger relationships with our residents and partners, as well as drive meaningful change in the pursuit of a healthier nation for all.

Digital Transformation Governance And Protection

An Audit and Compliance function was set up in 2022 to support the NHG Audit and Risk Board Committee and NHG to strengthen its corporate governance through the reviews of NHG's systems, processes, and policies. These reviews are essential tools to enable NHG to deliver reliable services to the public. Additionally, a Control Self-Assessment System was developed in 2022 as a tool to support compliance assessment across NHG.



Enhancing Risk Identification And Safety Management

Launched in June 2022, the incident reporting module of PRISM@NHG supports the identification of hazards, safety, and risks. The system strengthens the foundation of our healthcare services by enabling the early detection and mitigation of safety issues, and the cultivation of a culture of continuous improvement. Incident reviews are conducted in confidence, thereby protecting the privacy of staff and institutions, as well as promoting open communication. Besides actual mishaps, the system also captures near-miss incidents, enabling timely interventions.

NHG Pharmacy Revamped Website

NHG Pharmacy launched its newly revamped website (www.pharmacy.nhg.com.sg) on 31 March 2023 with an improved design to facilitate easier navigation. With more appealing visuals and an improved menu



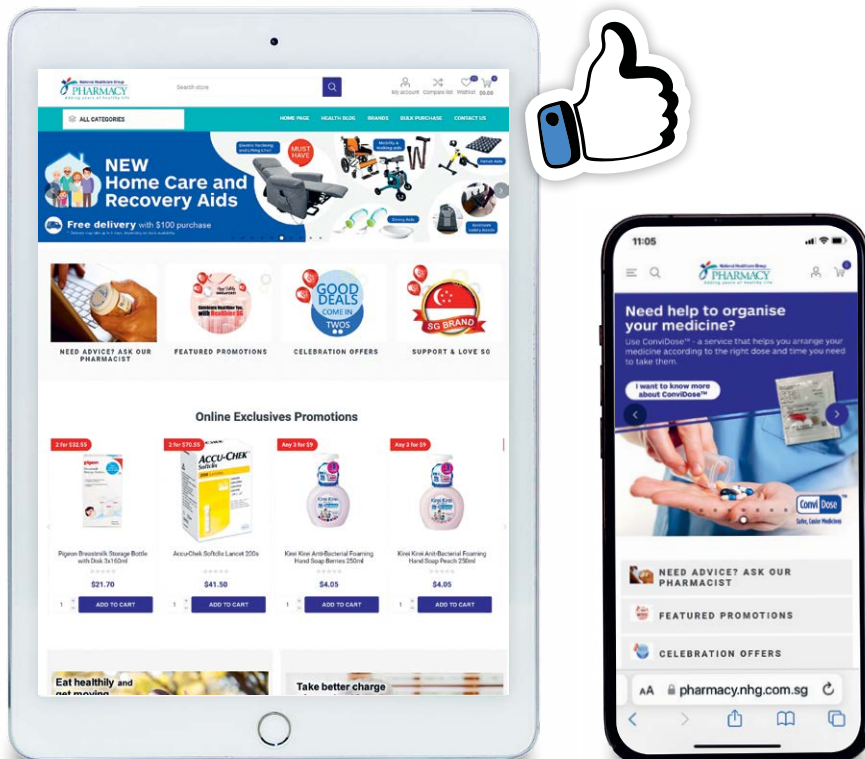
structure, the website is now more user-friendly for users to make online purchases of healthcare products and to access pertinent healthcare information. Separately, access to the online retail pharmacy is also linked to the NHG Cares mobile app, which allows NHG Cares members to seamlessly view and purchase products that support their health and well-being. Members will also be able to access

exclusive retail promotions and carton deals for those who require nutritional feeds to be delivered to their doorstep.

Medication Information On NHG Chatbot

Access to reliable medication information plays a crucial role in supporting patients in their medication management. As part of the strategic workplans by Group Pharmacy Council, an initiative was rolled out in March 2023 to incorporate nationally harmonised medication information into the existing Chatbots across NHG Institutions. The medication-search feature has continued to see an increase in its engagement, reaching a total of over 1,500 sessions of searches by June 2023.

The Chatbots are readily available to answer medication-related queries succinctly with guided navigation to help facilitate users' access to the relevant details about medications. By providing patients with a convenient channel to access reliable medication information anywhere, and at any time, the Chatbot service enables a wider outreach to increase the population's health literacy and empower individuals to play an active role in managing their health and medications.





A Study To Identify Factors Impacting Chronic Diseases

NHG collaborates closely with Lee Kong Chian School of Medicine (LKCMedicine) on the Health for Life in Singapore (HELIOS) study, which aims to identify environmental, lifestyle, and genetic factors that cause heart disease, diabetes, cancer, and other chronic diseases in Singapore. Through HELIOS, new evidence has emerged to support the association between excess amount of visceral fat in Asian population and cognitive performance. The study was published in *The Lancet Regional Health – Western Pacific* medical journal in April 2023. The research team analysed health data of about 8,700 multi-ethnic Singaporeans and Permanent Residents, aged 30 to 84 years old, and observed a link between excess visceral fat and poorer cognitive performance, which was subsequently confirmed with a statistical analysis of global genetic data. These findings highlighted the impact that the prevention and control of obesity in Asian populations could have in maintaining cognitive function and protecting against the future risk of dementia. The study team aims to further examine how excess visceral fat across Asian ethnicities contributes to traits related to one's metabolism, as well as understand the impact of metabolic traits on specific areas of cognition.

New Molecular PCR Testing Capability

The National Healthcare Group Diagnostics (NHGD) introduced Molecular Polymerase Chain Reaction (PCR) testing for Human Papillomaviruses (HPV) DNA in its backend laboratory. The insourcing initiative negates hardcopy orders and results, by allowing results to be viewable on both the software platform EPIC and the National

Electronic Health Record (NEHR). It also enhances the technical competency of the NHGD laboratory team.

BRINGING CARE INTO COMMUNITIES

Building A Healthier SG In Central Singapore

To support *Healthier SG*, Central Health launched numerous partner and resident engagements to envision a healthier community, as well as to identify key areas for improvement. In FY2022, four engagement sessions were organised with 76 Central zone GP clinics to gain insights to augmenting support GPs so that they can better enable their patients to take on more proactive steps to improve health. A one-off focus group discussion was held with 120 residents of Central Health to understand what health and a healthy community meant to them, their loved ones, and those around them in the community.

As the anchor hospital for the Central Health Network in Singapore, TTSH plays a strong role in supporting onboarded GPs in the Central region of Singapore for *Healthier SG*. Working closely with community partners and national agencies like the Health Promotion Board (HPB) and AIC, the Central Health team aims to better integrate health and social care programmes to provide comprehensive holistic support to residents in the communities where they live.

- **Fostering Community Support Networks**

As at 31 October 2023, 270 GP clinics have been onboarded to become *Healthier SG* clinics that support national enrolment initiatives. In preparing GPs to be aligned with *Healthier SG*, Central Health provided them



A Community Health Team from Tan Tock Seng Hospital demonstrating some exercises on fall prevention to GPs.

with NHG-wide cluster support to encourage collaboration with local community partners, such as social service agencies, national agencies, and active ageing centres.

TTSH Community Health Teams (CHTs) have been working closely with community partners to strengthen relationships for the integration of health and social care, including establishing care linkages with one another, for each of Central Health's 49 Community of Care (CoC) networks. A collaborative culture is fostered and cultivated to ensure that community support is enhanced for residents, and that the community support network could facilitate interventions to empower residents to take charge of their own health and improve health outcomes.



Group coaching to better manage metabolic disease held at Jalan Kayu Community Health Club.

- **Facilitating Social Prescribing In Jalan Kayu**

As the regional health manager for the Jalan Kayu constituency, TTSH CHTs participated in the *Healthier SG* pilot programme in the Jalan Kayu neighbourhood in May 2023. TTSH CHTs identified workflows and established care link-ups between participating GPs and community partners. Residents who have developed their health plan with their *Healthier SG*-onboarded GP could have direct access to social and community programmes within their neighbourhood. CHTs also prescribed social needs of GP-referred residents who were presented with complex needs or required closer social support. Establishing the link between GPs and Central Health are GP relationship managers who are the single point of contact to support family doctors in their referral pathway for social prescription and tertiary care.

- **Community Of Care At Ang Mo Kio To Better Support Residents With Preventive Screening**

Preventive health screenings were brought closer to the residents of Ang Mo Kio in March 2023 through a community-



A Community Health Team from Woodlands Health conducting its first health screening, HEALTH, at its Community Health Post situated within the Care Corner Active Ageing Centre in Marsiling.

led initiative. A CoC network comprising AWWA, HPB, PanCare Medical, Silver Generation Office, TTSH & Central Health, and Yio Chu Kang Grassroots Organisation, co-organised 'Health Fiesta: Meet a Healthier You!'. The two-day event saw multiple key stakeholders and volunteers collaborating in multiple areas to provide preventive care services,

which included chronic illness screening, dementia screening, fall risk screening, functional screening, and adult vaccinations. Additionally, PanCare Medical Clinic provided post-event health counselling to all participants on how to keep themselves healthy. Similarly, AWWA and the Yio Chu Kang Grassroots Organisation further complemented their efforts by rallying the interest groups to introduce their activities to residents, who can then participate in to stay active and healthy.

Forming Communities Of Care In Woodlands Health

Woodlands Health (WH) stepped up efforts to move care upstream by fostering strong networks of partners that form CoCs. WH's efforts resulted in the establishment of six Community Health Posts (CHPs) in the northwest region of Singapore. Nestled at Active Ageing Centres, CHPs serve as touchpoints within the neighbourhood to support residents in managing their



GPs visiting a Care Corner Active Ageing Centre in Toa Payoh.



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health. Each CHP is managed by WH's multidisciplinary CHT comprising community nurses and health coaches, and care coordinators. Since the launch of its first CHP in September 2022, WH has supported more than 450 residents by guiding them to manage their health more effectively through lifestyle changes and/or better management of their chronic conditions.

WH also introduced its first community-based screening programme, *Helping Everyone Achieve Lifelong Health (HEALTH)* in October 2022. HEALTH is targeted at residents aged 40 years and above, who do not have any diagnosed chronic conditions and have not gone for health screening in the past three years. Between October and December 2022, WH screened about 200 residents within three community health screenings. This was achieved through resident engagement and close collaborations with multiple community partners. Residents with borderline or abnormal results were followed up by GPs within the vicinity of the CHPs, which WH actively engages, for post-screening care.

Launch Of Interact Club Of Sembawang

In June 2022, the Interact Club of Sembawang (ICS) was launched at the Admiralty Medical Centre (AdMC) through a partnership between Yishun Health, the Rotary Club of Singapore, and Sembawang Grassroots Organisations (GROs) to strengthen community health in Sembawang. Graced by Health Minister Mr Ong Ye Kung, Grassroots Adviser to Sembawang Central GRO, ICS was hailed as the first Interact Club to service public health



(L-R) A/Prof Steven Ooi (Interact Adviser, Rotary Club of Singapore and Senior Consultant, Executive Director's Office, NCID), Prof Chua Hong Choon (CEO, Yishun Health), Ms Poh Li San (Grassroots Adviser, Sembawang West GRO), Mr Anson Koh (President, ICS), Mr Ong Ye Kung (Grassroots Adviser, Sembawang Central GRO), Mr Louis Lim (President, Rotary Club of Singapore), Dr Lim Wee Kiak (Grassroots Adviser, Canberra GRO) and Dr Chan Siew Luen, Rotary Adviser (Rotary Club of Singapore).

needs in the community, designed to encourage 15- to 19-year old youths to participate in community health promotion and education. With guidance from Yishun Health's Population Health and Community Transformation (PHCT) team, ICS programmes centred on four main areas: metabolic, mental, psychosocial, and environmental health. To kick-start the initiative, Yishun Health facilitated youth attachments to serve in community programmes, such as CHPs and door-to-door outreach, where youths personally connect with residents to understand their strengths and needs, as well as learn about the community support resources available in Sembawang.

PACT Programme To Empower Patients With Diabetes

NHGP's Patient Activation through Conversations (PACT) framework includes one-on-one health coaching for patients with poorly-controlled diabetes;

Group Education and eMpowerment (GEM); and the Bringing about Optimal Outcomes through Self-care and Technology (BOOST) app.

- **One-on-one Health Coaching**
As at 31 March 2023, there were over 600 patients who had completed one-on-one Health Coaching with NHGP Care Coaches over three months. Interim results showed that patients gained significant



Youths in Sembawang participating in community health promotion and education efforts to better understand the needs of residents in their community.

improvements in their blood glucose (HbA1c) levels, mental well-being, and self-care behaviours, such as diet, exercise levels, and medication adherence. Additionally, patients' improved HbA1c levels were sustained 12 months after the programme ended. These results were achieved through patient empowerment, with Care Coaches helping patients to improve self-care behaviour goal-setting, continued motivation, and support.

- **GEM**

NHGP led the development of **Group Education and eMpowerment (GEM)** – a group-based diabetes self-care programme targeted at patients with newly-diagnosed diabetes or poor diabetes literacy, within NHG. Through close partnerships with Yishun Health and TTSH, GEM provides group diabetes education to improve patient outcomes. With support from the Care Manager, Dietitian, Pharmacist, and Care Coach, patients improved their understanding of how to give better care to diabetes through setting health goals, improving lifestyle behaviours, receiving peer support, and having follow-up care with Care Coaches. As of 31 March 2023, NHGP had conducted 18 runs of GEM across its polyclinics for nearly 170 patients.

- **BOOST**

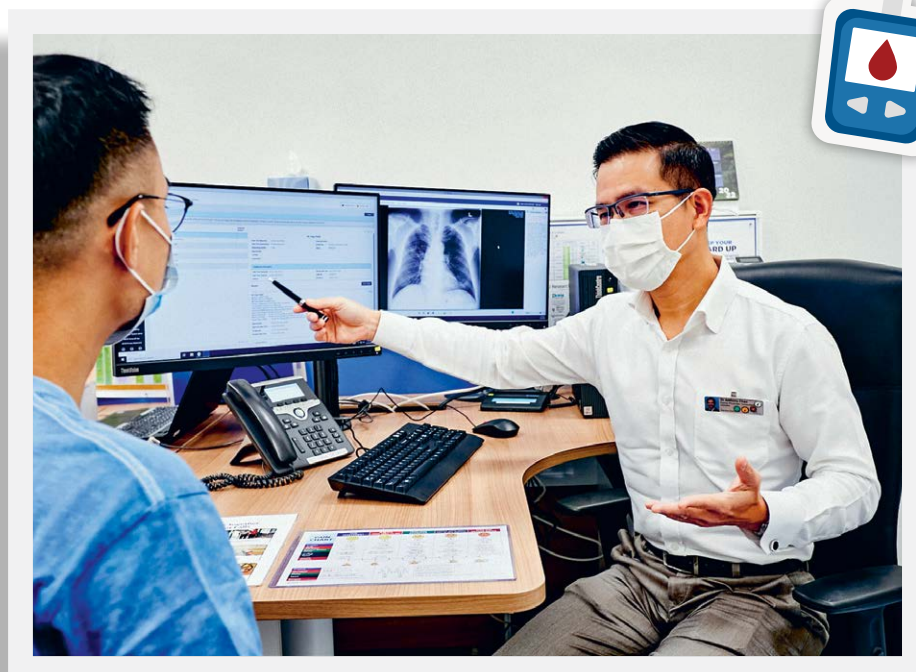
Implemented in September 2023, **Bringing about Optimal Outcomes through Self-care and Technology (BOOST)** is an app-supported PACT programme that provides an alternative mode of

intervention for patients with suboptimal control of diabetes. The app generates a self-care report that facilitates self-reflection and identifies areas for improvement. BOOST-enrolled patients will enjoy access to a curated diabetes education plan. They are also able to set individualised goals and monitor parameters, such as blood glucose, blood pressure levels, weight, and number of daily steps to achieve. Patients' goals and parameters are remotely monitored by their care team. A BOOST pilot has kick-started in Woodlands and Hougang Polyclinics, and there are plans to introduce BOOST to the other polyclinics in FY2024.

Diabetes Mellitus Shared Care Programme

The Diabetes Mellitus (DM) Shared Care Programme at the AdMC Diabetes Centre identifies suitable outpatients to be

co-managed with partnering GPs or Family Physicians, who are the patients' existing primary care doctors or located near the patients' residential addresses. Enrolled patients alternate between visits to partner GPs and their specialists at AdMC. The timely launch of the programme facilitated an avenue of medical support during the COVID-19 restrictions where many outpatient appointments at AdMC were suspended or rescheduled. Patients with DM were heavily impacted by longer windows between specialist follow-ups. The DM Shared Care Programme provided an important way forward to minimise care disruptions and prevent complications and right-site patients to receive appropriate levels of care. This team-based approach optimises the control of chronic conditions in partnership with a Family Physician, who provides preventive care for a holistic approach to disease management and healthcare.



A partnering GP attending to a patient with diabetes mellitus.



Pharmaceutical Care Services

Aligned with MOH's directive, National Healthcare Group Pharmacy (NHGPh) provides community-based Pharmaceutical Care Services (PCS) to empower and support seniors with polypharmacy. The initiative enables this group of seniors to manage their medications independently in the community. This service is specifically offered to seniors who are prescribed more than five medications and have medical appointments with more than three healthcare providers. Upon referral by the centre staff, the PCS pharmacist will visit the centre to conduct an in-depth face-to-face review to identify medication-related problems (MRP), and to co-develop the Pharmaceutical Care Plan with the resident and caregiver. This will also be conveyed to the patient's multidisciplinary care team, including the care centre staff for necessary follow-up actions. Thereafter, the pharmacist will follow up monthly, either via face-to-face consultation or phone call, to determine if a change of care plan is needed.

In FY2021, PCS pharmacists underwent a tailored clinical training and onboarding programme designed by MOH. To-date, NHG successfully rolled out the PCS programme to three day-care centres in June 2022, and another in February 2023. In FY2022, 19 seniors were recruited into the PCS programme. 122 PCS sessions, comprising a mixture of face-to-face consultations and tele-sessions were provided. During these sessions, the PCS pharmacists identified a total of 145 MRPs, of which 77 were resolved during the programme



Through in-person workshops, GPs and their Clinic Assistants learnt and verified essential skills and knowledge to manage the requirements of *Healthier SG*.

period. NHGPh will continue to collaborate with MOH and PCS partners to explore the expansion of coverage and access points to further provide convenience to seniors, in a most cost-effective model.

INTEGRATING CARE FOR BETTER QUALITY OF LIFE

NHG *Healthier SG* Primer For General Practice

The Primary Care Academy (PCA), led by Dr Irwin Chung, Director of PCA, developed the *NHG Healthier SG Primer for General Practice* to equip GPs and their Clinic Assistants (CAs) with the knowledge and skillsets to provide holistic care to patients. The topics include chronic disease management, preventive health initiatives, and health planning, which are delivered through hybrid learning with both online modules, as well as face-to-face round-robin case scenario discussions facilitated by clinicians and allied health professionals. Since its launch in November 2022, PCA has conducted three runs of the workshops, training at least 200 GPs and CAs.

Raising Mental Health Literacy Of Our Population

In 2021, the IMH's Office of Population Health developed a mental health literacy series for IMH staff, comprising five modules with topics, such as understanding and achieving mental wellness; and how to communicate with persons with mental health issues. In 2022, the series was developed into e-Learning modules for self-directed learning with the option to participate in interactive focus group sessions. IMH will progressively streamline the curriculum to be made accessible to community partners, volunteer groups, and other healthcare organisations.

Community Education And Prevention

As part of the NSC's efforts to empower Singaporeans to take charge of their health, the nursing department held several talks in the community in 2023. On 3 September 2022, NSC's Nurse Clinician Norlaila Kamarudin addressed a group of 30 participants at a skin care talk organised by the Toa Payoh West-Thomson Citizen's Consultative Committee at Muhajirin Mosque.



NSC Nurse Clinician Norlaila Kamarudin sharing skin care tips at Muhajirin Mosque.

Ms Norlaila provided practical tips on caring for skin conditions commonly seen in the elderly, and spread the message to seek advice from dermatologists on skin issues. Six other NSC nurses volunteered to give skin care advice and perform blood pressure measurements. NSC Nursing also organised a skin care education session at Toa Payoh West–Thomson Active Ageing Committee on 25 February 2023, where Staff Nurse Wang Danling shared the importance of self-care to prevent skin conditions in the elderly. During the hands-on segment, residents learnt proper techniques in emollients application, as well as to recognise signs and symptoms of various skin conditions.

Roles Of Social Support In Health Resilience

A study was conducted by NHG’s Health Services and Outcomes



Research (HSOR) to understand the social support individuals received when they experienced health adversities. Fifty-one individuals and 14 caregivers across various age groups participated in the study. Based on the interviews, four main pillars of support were identified. Firstly, family played a vital role by providing practical support and companionship, and by actively making family-level lifestyle adjustments to support them. Secondly, peers with similar shared experiences helped



NSC Staff Nurse Wang Danling (left) and Nurse Educator Ms Kong Kim Yoke (above), speaking to residents of Toa Payoh West-Thomson Citizen’s Consultative Committee.

participants feel encouraged and understood during a period of increased vulnerability. Thirdly, workplace support, such as flexible work arrangements, gave participants time to balance the need to attend to their medical appointments while maintaining their jobs. Lastly, participants’ spiritual and religious beliefs helped them come to an acceptance of their illness, and to manage their stress and anxiety. Together, these four pillars of support and the roles each played created an environment conducive for individuals to adapt and overcome challenges caused by health adversities. The findings will support public health professionals to design programmes that strengthen and build social support networks to further enhance health resilience.

Table 1. Four Themes Describing Roles Of Social Support In Health Resilience

| Themes | Description | Sub-themes |
|--------------------------------|---|--|
| Family as anchor | Information, instrumental, and emotional support provided by family facilitated adoption to health challenges | 1. Practical support and companionship 2. Empathetic support 3. Family lifestyle adjustment |
| Peer group encouragement | Encouragement and being understood during a period of increased vulnerability provided a sense of comfort and assurance | 1. Companionship and encouragement 2. Shared perspective on health adversity 3. Privacy concerns |
| Workplace empathy and security | Job security and flexibility in work arrangements allowed recovery with a peace of mind | 1. Support from colleagues 2. Job security 3. Flexibility in work arrangements |
| Spirituality and religion | Spirituality and religious teachings provided solace and solutions during a period of uncertainty | |