Provision of Services of the Monitoring and Evaluation Study of Kwai Tsing District Health Centre

Executive Summary

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Executive Summary

Background

To strengthen district-based primary healthcare (PHC) development, the then Chief Executive, Mrs. Carrie Lam announced in her Policy Address in 2017 the plans to establish district health centres (DHCs) as healthcare service hubs in local communities, known as the DHC Scheme. These centres are run by non-governmental organisations in the community and their operation is fully funded by the Government. These service hubs have multiple access points, through its core and satellite centres and their networks, to offer a range of coordinated care and support services at the community level that can be convenient alternatives to frequenting a hospital, thereby relieving pressure on specialist and hospital services. The concept of a network of providers is fundamental for the DHCs, under which services will be procured from organisations and healthcare personnel serving the district so that the public can receive necessary care relating to primary, secondary and tertiary prevention in the community. This care model organised at the district level is aimed at better responding to the needs and characteristics of the district.

The Food and Health Bureau (FHB), now the Health Bureau (HHB), invited tenders for the operation of the first DHC in Hong Kong, located in Kwai Tsing (K&T) district, for a period of 3 years as a pilot in 2018; the contract was awarded to Kwai Tsing Safe Community and Healthy City Association (KTSCHCA). The Kwai Tsing DHC (K&T DHC) was put into operation in September 2019. Following the launch of the pilot in Kwai Tsing, the administration continued the rollout of the Scheme. By the end of 2022, all 18 districts in Hong Kong had a DHC or DHC Express (DHCE), with the expectation

that the DHCEs will become full-fledge DHCs in the future.

The DHC provides a variety of service programmes targeting primary, secondary, and tertiary prevention. Their scope of services includes health promotion, health assessment, chronic disease management, and community rehabilitation. Health promotion is mainly conducted in the form of health education programmes. The health assessment adopts a stepwise approach involving initial screening for health risk factors (i.e., basic health risk factor assessment (BA)), and if indicated followed by screening for diabetes mellitus (DM) and hypertension (HT) with a general practitioner (GP) in the community participating in the programme. The BA is repeated annually for health monitoring. Chronic disease management and community rehabilitation programmes (CRP) are tertiary level prevention programmes that cover seven diseases/conditions. Chronic disease management programmes offer care to patients with DM, HT, and musculoskeletal disorders (i.e., low back pain, osteoarthritic knee pain); community rehabilitation programmes serve patients with post-stroke, post-hip fracture and post-acute myocardial infarction.

Users can receive services under the screening and management programmes from the core team in the DHCs, which consists of nurses, physiotherapists, occupational therapists, dietitians, pharmacists and social workers. They can also choose to receive care from the network medical practitioners (NMPs) / healthcare service providers (NSPs) who have enrolled in the Scheme but located in their own practices in the community. The Scheme aims to incorporate concepts of medico-social collaboration and public private partnership (PPP) through a multi-disciplinary care approach in enhancing public awareness, promote self-management of care, provide support for chronic disease patients and their caregivers, and facilitate rehabilitation in the community setting.

Purpose of Study

This new model of primary healthcare service delivery is a complex intervention that requires evaluation of its performance outcomes and impact on all the key stakeholders including the users in the model and the community in general.

The Jockey Club School of Public Health and Primary Care of The Chinese University of Hong Kong was awarded by tender for a study to monitor and evaluate the DHC Scheme in Kwai Tsing District on 19 August 2019. This study was subsequently extended to include the second DHC in Sham Shui Po (SSP) in a contract variation.

Objectives of the Monitoring and Evaluation Study

The study aimed to examine the overall performance of the DHC Scheme by studying its structure, processes, outcomes, impact and cost-effectiveness. These five domains formed the focus of assessment by the tender, and key items assessed included:

A. Quality, quantity and range of services provided by the Core Centre and five Satellite Centres in both DHCs in the study, network healthcare professionals and local partners;
B. Effectiveness and efficiency in delivery of each type of services, including but not limited to coverage/penetration of programmes/services, outcome of programmes/services;
C. Feedback from service users; and
D. Cost-effectiveness / economic evaluation of the DHC Scheme.

Evaluation Design

The DHC Scheme is considered a complex intervention with multiple interacting

components relating to different levels of the preventive programmes. The implementation involves a wide range of stakeholders including target service beneficiaries, participating healthcare professionals and community organisations. The team took reference to the literature in designing and evaluating this complex intervention and selected the relevant outcome measures through a good theoretical understanding of the intervention. A programme logic model which marked the structure/input, process/activities, outputs and outcomes/impact of the DHC scheme was used to guide the design of our research process for this complex intervention (i.e., the DHC Scheme). Both formative and summative approaches were applied to provide timely appraisal of the Scheme. Assessment was conducted through five domains, as per the service tender: structure, process, intended outcomes, impacts, and cost. A mix of quantitative and qualitative methods were used in the evaluation process to study the experiences of different stakeholders in the Scheme. As the opening of the K&TDHC as well as our Monitoring and Evaluation study coincided with the three-year worldwide COVID-19 pandemic, the territory-wide effort in the control of the pandemic had significantly impeded the implementation progress of the K&TDHC. To enhance the validity of the evaluation, a contract variation of the original proposal to include the second DHC at Sham Shui Po (SSP) as an additional study site was proposed and approved on 19 April 2021. The numbers presented in the Main Findings Section are those from both sites combined.

At the beginning of the study, key informant interviews were conducted with a wide range of key stakeholders, the government officials at the then FHB to understand the policy objectives and direction of the Scheme; the management team of the DHC to inquire about their operation and service delivery process, and other potential community service partners to obtain their understanding and expectations of the

Scheme. Other qualitative methods included an ethnographic multiple case study of DHC users (K&T: n=2, SSP: n=2), focus group interviews (minimum n=54), in-depth interviews with DHC users and non-users (minimum K&T: n=18; SSP: n=9), and interviews with staff of different positions (minimum K&T: n=50; SSP: n=47).

On the other hand, quantitative methods included two-wave longitudinal population surveys in Kwai Tsing with a control site of Kwun Tong (n=750 per district in first survey, and n=300 in second survey), two cross-sectional DHC user surveys in Kwai Tsing and Sham Shui Po (n=875 each site), and social network analysis in the staff surveys (minimum K&T: n=50; SSP: n= 47). A two-stage stratified sample design was adopted for the population surveys, with the records in the frame of living quarters first stratified by geographical area and then by type of living quarters. Kwun Tong was chosen as a control group for two reasons. First, as our study commenced after the establishment of the DHC, we were not able to study the prior status of Kwai Tsing District before the services of DHC for comparison. We hypothesised that Kwun Tong could provide a proxy of baseline characteristics of the Kwai Tsing district because the two districts shared similar characteristics. Second, there was a relatively new community health centre (CHC) in Kwun Tong district that incorporated concepts on integrated care in public healthcare services. Comparison on indicators between sites were analysed. In the user surveys, users from the three levels of prevention programmes were sampled. The key areas of information collected in the population and user surveys included general experiences at the DHCs, satisfaction with DHC services, health-related quality of life, health status, health seeking behaviour, and the willingness to pay (WTP). In addition to primary data sources, secondary data analyses on the operation data collected in the DHC Scheme and a matched case-control study using secondary data from the Hospital Authority (HA) were conducted.

The evaluation study also included a structured organisational survey with an onsite visit to both K&TDHC and SSPDHC to meet with the DHC staff and understand the actual operations of each centre. The research team also assessed the implementation aspect of the DHC Scheme guided by the Implementation Outcomes Framework (IOF) and the Consolidated Framework of Implementation Research (CFIR) (Appendix A).

Data Analysis and Interpretation Methodology

In all qualitative studies, a description of the characteristics of the participants was provided. Qualitative content analyses, facilitated by NVivo – a widely used qualitative data analysis software, were applied in all studies based on the synthesis of texts of transcription. For the quantitative studies, we described the socio-demographic characteristics of the participants with frequencies and percentages for categorical variables or means and standard deviations for continuous variables. All significant results were based on p-values < 0.05. Software packages of Excel, SPSS, R, UCINET, ArcGIS, Nvivo and Remark Office OMR were used for the analyses. We applied methods triangulation and investigators triangulation to synthesize all the findings with the guidance of the study frameworks. The synthesized results identified good practices and areas for improvement in the design of the DHC Scheme and inform recommendations and implementation strategies in the evaluation of the DHC.

Main Findings

Key Operation Statistics

Four years into operation, the uptake of DHC membership in the district population had

been slow. Secondary data analyses showed that 49,675 residents, or 4.6%[1] of the combined population from Kwai Tsing and Sham Shui Po registered with the DHCs as members in the period from September 2019 to June 2023. Approximately, 13.2% of the current registered total users were younger than 50 years of age. The age profile of users in both sites was significantly older than that of the general population in the respective districts. Most users from both study sites were female and from lower income households.

Key operation statistics by programmes of different prevention levels showed that service targets for primary prevention programmes were met, but those for secondary and tertiary prevention programmes were not. A total of 40,377 members who did not have a history of DM completed a BA. Among them, 32,996 (81.7%) had at least one risk factor for DM identified, and of those, 3,493 (10.6%) enrolled into the screening programme with a network medical practitioner (NMP) in the community. During the study period, 254 (7.3%) members were diagnosed to have DM from the screening programme.

About a third (32.6%) of the members were screened positive for risk factors for HT; among which 2.6% (n=252) went onto further screening from both sites combined. After screening, about half (130 out of 252 members) were diagnosed to have hypertension. These were lower than the service targets specified in the original tender. The same was observed for other tertiary programmes targeting musculoskeletal and community rehabilitation.

[1] When the DHC Scheme was first piloted in the district of Kwai Tsing, there was no intention that the DHC membership would eventually cover the entire district population, nor were there clear milestones set on the percentage of population to be engaged at different time points. The percentage here is a reference to indicate the interest of the population.

Positive Impacts

The findings from our focus group studies, user in-depth interviews, multiple case study as well as the community stakeholder interviews showed great enthusiasm and high acceptance toward the DHC Scheme. The studies demonstrated consensus among respondents that this prevention-focused and community-based initiative was an important step in the paradigm shift towards primary and community care and had the potential to bring about a positive impact on population health.

For population health, longitudinal data from the population survey showed that the respondents from Kwai Tsing reported significant improvement in mental health and overall well-being over time than their counterparts in Kwun Tong. No significant improvement over time was found in the community awareness of personal health, capacity in self-management of health problems, or social cohesion over time in both sites, and the changes were not different between the two sites.

Among the respondents of the Kwai Tsing and Sham Shui Po user surveys, 77.4% agreed that they had changed to a healthier diet, and 83.7% performed more exercises after becoming DHC members. For those with smoking and drinking habits, 55.4% of respondents agreed that they smoked less, and 53.5% drank less after becoming members.

A high proportion (over 80%) of the users agreed that DHC activities helped improve their physical and psychosocial health in both study sites. Almost all of them thought the positive changes were sustainable over the months since they joined DHC. These were echoed in the qualitative studies.

Overall, users of DHC services were satisfied with the services they received in the core

and satellite centres as well as with the network healthcare professionals. The overall satisfaction scores ranged from 7.8 to 8.5 out of 10 in both centres. Most users also found the locations and operation hours convenient and the centre environment pleasant.

The overall pattern of health seeking behaviours remained the same over time among those with chronic diseases in the districts. Among the respondents who were enrolled in the DM/HT management programmes, nearly half reported a decrease in the number of visits to healthcare providers, including GPs and specialists from the public and private sectors, where they were receiving care prior to joining the programmes. Further, among the respondents at the SSPDHC who had received care for chronic diseases through the NMPs or NSPs in the respective SSPDHC network (n=23) (where detailed data was available), 26.1% reported reduced utilisation of services from the public healthcare sector for chronic diseases, and 43.8% from other private health services.

There has been an increase in uptake of preventive measures among users after joining the DHCs, with the most prominent being in self-health monitoring (78.6%) and health checks at providers in both sites (74.3%). The increase in uptake in the two screening programmes subsidised by the Government was also significant (colorectal cancer screening: 32.1% and cervical cancer screening: 13.5%).

Key Issues

Coverage of DHC Services

The coverage and penetration of DHC services in the community remained limited based on the operation statistics in the earlier section. The proportion of members in the community was less than 6 % in both Kwai Tsing and Sham Shui Po, with lower

participation observed among men and the working population (footnote i, page vi). The enrollment numbers of secondary and tertiary prevention programmes did not meet the targets. For example, the proportions of people assessed to have risk factor(s) moving on to further screening for DM was about 11%, and the percentages for HT were less than 3%.

Role of DHC Services and Programmes

While most felt positive about the intended goals of the DHC Scheme, many from the qualitative interviews wondered about its position in relation to other existing services and programmes in the current primary healthcare landscape. These included those offered by the General Out-patient Clinic (GOPC) of HA (e.g., the Risk Assessment and Management Programmes (RAMP)), Department of Health (DH) (e.g., elderly health centres, school health services), other non-governmental organisations (NGOs), and the extensive rehabilitation programmes of HA. Clarity was needed around how the DHC stood apart from the existing players in the community and how its services connected both vertically and horizontally cutting across sector boundaries, or how it could improve and streamline the existing care pathways for residents in the community.

Network Engagement

Despite the network design being a key feature of the DHC Scheme, the DHC had yet to demonstrate how its use could be optimised in the local community and its impact on multidisciplinary care. We observed during the study period that there was no structured programme for multidisciplinary care, and interprofessional referrals were limited. Most of the referrals in physiotherapy, occupational therapy, and dietetics services were clustered around in-house staff instead of network service providers.

Close to 60% of the NMPs registered since the commencement of the Scheme had received referrals. This was due partly to the fact that a small number of members participated in the screening programmes for DM and HT by NMPs, and the practice locations of some NMPs were situated outside the two districts, which for Sham Shui Po district amounted to 70%. This might be inconvenient to users. Study data also showed the engagement with NMPs and NSPs needed to be enhanced to optimise their functions. There were also discussions amongst stakeholders over the need for co-locating some of these services to facilitate multidisciplinary care and referrals.

Medico-social Collaboration

Although the DHC Scheme advocates medico-social collaboration in its provision of services, it remains pre-dominantly a healthcare service point without actively addressing the social factors that influence health and health seeking behaviour and the key social determinants of health. There were a minimal number of cases being referred to social service providers in the community. Challenges existed in building sustainable relationships between the DHC and the community organisations. As guidelines, protocols and channels for referrals to other social service providers in the community were not as developed as for medical referrals, there were situations in one of the centres where the staff just wrote the address and telephone of the social organisation and asked the user to make the connection themselves. The high staff turnover adversely affected the networking arrangement.

Co-paid Programmes

Secondary prevention services in the DHC Scheme encompassed a two-stage screening for two common chronic diseases (DM/HT). The first stage was an assessment of risk

factors, followed by stage-2 disease screening with a NMP of choice in the community if risk factors were identified. The service data reflected that the proportion of people going onto stage-2 screening remained low in both study sites for DM (10.6%) and HT (2.6%). Based on input from the DHC staff, some of the reasons for not following through with screening included lack of interest, preference for self-management of risk factors and preference for follow up in public sector (i.e., HA).

During the initial study period, subsidies were not provided for consultation sessions or drugs for patients who were diagnosed through the DHC DM and HT screening programmes. This was not conducive to encouraging these patients to receive care in the community, and was one of the barriers to the uptake of the screening programmes. Having made this observation in the interim report, the Government responded by piloting new subsidised treatment sessions (PPP 2.0) in the SSPDHC, where an annual subsidy of $2,000 was provided to participants for consultations and medications when receiving treatment with providers in the private sector in the community. The users and NMPs from SSPDHC staff survey found the Scheme good but questioned whether the subsidy was sufficient. Users of the PPP 2.0 shared the same view during in-depth interviews and the multiple case study, that they had used up all the subsidies in just over 6 months. Around a year after the pilot started, only 20% (24 out of 119) of eligible people diagnosed with DM or HT through the SSPDHC joined this PPP 2.0 programme. The low enrolment rate might be attributed to the fact that only 15 (31%) registered NMPs in the SSP district participated in the PPP 2.0 programme.

It was found that the willingness to pay (WTP) for NMP services was generally higher than that for Chinese Medical Practitioner (CMP) services and individual healthcare services (i.e., physiotherapy, occupational therapy, dietetics, optometry, podiatry, and speech therapy). The WTP amount for NMP services was primarily associated with

socio-economic status of the respondents. The HK$250 subsidy for each NMP visit was found useful in enabling more people to pay for NMP services in DHC only when the price for NMP service was lower or equal to HK$700 per visit, while the impact was not significant when the price was higher or equal to HK$800 per visit. Price sensitivity is a critical consideration for the future uptake of the new co-care scheme.

Sustaining Engagement with Users and Persistence of Health Risk Factors

After the initial screening for health risk factors on joining the DHC, the member is asked to return to DHC annually for the follow-up basic health risk factor assessment for monitoring. The proportion of members who completed these follow-up assessments every year was about 50-60% in the K&TDHC and SSPDHC. Among those with repeated assessments, a significant proportion of members with obesity identified at the initial assessment remained in the same weight category during follow-up.

Community Participation

While community involvement was key in needs-based planning for the district, this was limited in the DHC Scheme so far. The research team found no systematic needs assessment mechanism in either study site that would help the DHC to stay informed about the dynamic and evolving health needs of the community. Needs assessment currently relied mainly on the biannual community engagement exercises the DHC holds with local organisations and stakeholders, and the staff's impression of working with clients who accessed the DHCs. Some of the population needs captured in our population survey, such as high blood cholesterol, eye diseases and dementia, had not been covered by the DHC services.

Involvement of users in co-production of services (e.g., providing inputs for service design) was still at an early stage based on the data collected. Less than 10% of the users surveyed reported ever being invited to participate in the process of designing services in both sites. Mobilisation of community resources such as volunteers remained a low priority.

Infrastructure

The governance structure of the DHC Scheme had undergone changes since its inception, which worked better ever since to support the dual reporting line of the Executive Director (ED), and the governance function of the Scheme. The Executive Committee was co-chaired by the Director of the DHC Team (PHO) and a representative from the Operator. Further transformational changes to the governance structure with the establishment of the Primary Healthcare Commission which focuses on planning, implementation and quality assurance can provide a foundation for a management structure better suited for coordinating the overall primary healthcare development in Hong Kong. The governance structure in the DHC will need to be re-defined in the transformation.

The staff turnover rates were high at both sites. There was sufficient standard training on the job during orientation for staff, for infection control and occupational health and safety, but little on primary healthcare and the DHC Scheme. There was no structured training on health promotion models nor behavioural modification approaches that would facilitate effective health promotion and sustainable lifestyle changes.

At the time of study, the K&TDHC performed regular evaluation for the programmes it offered as shown in the organisational survey. Outcome monitoring of the Scheme

was also based on a set of KPIs that were regularly reported to the PHO. These numbers revolved around the number of registrations of new members, basic health risk factor assessments and their annual follow-ups and events completed by staff, and number of users joining health education classes. Inevitably any set of KPIs that drove changes in behaviour and culture sometimes had unintended consequences, especially on the services not captured in the performance indicator. The set of KPIs needed to be designed to truly reflect the vision, goals and objectives of setting up the DHCs including for example, the promotion of community health through the community-based primary healthcare system, medico-social collaboration, public private partnership and serving as a resources hub.

The eHRSS and clinical management system (CMS) On-Ramp were reported to be great information sharing platforms during care delivery, but they were not designed as operation systems for an organisation to facilitate its daily operational needs including ad hoc data retrieval by the DHC staff such as to analyse the geographical distribution of members in the sub-districts, or for trend analysis and reporting. They were slow to run, unstable, disruptive for workflow and not conducive for service monitoring and planning. Staff also reported duplication between systems causing inefficiency in operation.

Cost

The Primary Prevention Programme demonstrated reasonable costs per attendance, number of attendances, and number of sessions held. However, the cost of DM and HT screening was significantly influenced by the health risk factor assessment component. Exploring alternative assessment formats, such as self-management or online assessment, could potentially reduce screening costs. Significant improvements were

observed among participants in the post-stroke and post-hip fracture community rehabilitation programme (CRP). However, there was insufficient evidence from the data to support improved patient health outcomes for post-acute myocardial infarction (AMI) patients, as measured by modified functional ambulatory classification (MFAC). Given the substantial costs incurred, a comprehensive evaluation of the cost-effectiveness of CRPs and the impact of DHC, from randomized control trials with appropriate control groups should be considered.

Summarising through the Lens of Implementation Outcome

DHC is a complex intervention comprising multiple programmes involving multitudes of stakeholders that makes implementation challenging. Using the Implementation Outcome Framework, our study showed the DHC Scheme was highly *acceptable* in the community who agreed with the importance of primary healthcare and the prevention-based approach as well as supported the district-based organisation of health services. *Adoption* of the Scheme had been limited but had seen an increase since inception. However building sustainable partnerships in the community remained a challenge, as many felt the services provided were very similar to the existing ones and not entirely aligned with the local needs, making differentiation and positioning difficult. A number of issues arising from the *characteristics of intervention* such as the absence of subsidies for treatment sessions in the community for cases screened positive for DM and HT and the later debate over the sufficiency of $2,000 annual subsidy in the PPP2.0 being piloted at the SSP all affected buy-in. This partly contributed to the low uptake of screening programmes. Infrastructure issues like IT platform limited the *feasibility* of the implementation; Organisational issues such as high turnover of staff and organisational culture that affected means of communication and team stability within

the organisation had an impact on *implementation climate* for the DHC Scheme. The *coverage* of people who could potentially benefit from the Scheme was low based on membership data, covering mainly women aged fifty and above and from lower socio-economic background. Hard-to-reach groups also needed more attention. Strong commitment from the government with secured funding, especially now with the Chronic-Disease Co-Care Pilot Scheme (CDCC) as an addendum, forming a core component in the latest Primary Healthcare Blueprint released by the current administration could make the Scheme *sustainable*.

Recommendations

In relation to the DHC, **key issues** have been identified as follows:

A. There is a need to redesign the current services in the DHC Scheme to attract, facilitate and incentivise intended users, community health service providers and other social service providers to join, participate and stay engaged in the Scheme.
B. The roles and functions of the DHCs need clarification in the current landscape of community care spanning both the health and social sectors.
C. Community involvement was observed to be minimal in the operation of the DHC Scheme.
D. The infrastructure of the current DHC Scheme should be enhanced to support efficient service delivery and planning, and the long-term development of the Scheme.

These key issues, along with the envisaged primary healthcare ecosystem outlined by the Primary Healthcare Blueprint, the repositioning of DHC's roles in this ecosystem, and the international literature on District Health Systems and integrated care for

chronic disease management, serve to inform and consolidate the ensuing recommendations of the Final Report.

Recommendation 1: The DHC Scheme Builds on the Momentum and Experiences in the Community to Broaden Coverage and Deepen Collaboration to Develop Community-based Primary Prevention of Diseases and Health Promotion

Facilitation of Individual Health Behaviours

Now that the DHC model has been rolled out in all 18 districts of Hong Kong, it is important to work on clarifying pathways for seamless coordination, collaboration, and integration between the different sectors in the community to support health development. This work should not only focus on knowledge dissemination through health education but also on motivating and promoting lifestyle changes and individual behaviours enabling health. The operators need to (i) stock take and map health education and promotion programmes in the district and (ii) strategize engagement with the district health advocates and health promotion contributions from the analyses of the health education programmes in the district. A redefined programme of health education and promotion should target all population groups and could be conducted in the district socio-economic settings such as the workplace and schools. The DHC should reposition as a community resource hub and work in partnership with the community.

Community Health Promotion and Infrastructure Development

Community health promotion can serve as a vehicle for engagement of multiple sectors and individuals in the district, generate better health awareness and highlight the role of the DHC, facilitating participation, and channeling community resources into

improving health. Furthermore, community engagement infrastructure will be necessary to enable and reinforce sustainable health lifestyle changes in self-management programmes.

Recommendation 2: The DHC Scheme Should Review and Revisit the Operation Issues Identified in the Current Evaluation Study

Membership

A review of the membership and proof of address requirement, as well as performance indicators based on volume of membership and basic health risk factor assessments, would help the move towards facilitating access and collaboration with external players, and monitoring, respectively.

Service Needs of Different Groups

The service needs of different age groups, especially those younger and working in the district and including residents with higher capacity to pay, should be considered in order to provide more accessible, targeted and tiered services.

Public-Private Partnerships and Co-payment

The DHC Scheme should also continue its efforts in building up public-private partnerships (PPP). There is a need to study how individuals with new or existing diagnoses of chronic health conditions can be incentivised to participate in chronic disease management offered by community NSPs and remain with the community provider for long term management of these conditions. Co-payments for services should align with those offered in the public sector and be informed by the willingness-to-pay studies of different socio-economic groups for different types of care. Further

study is also required on how best to motivate those identified with risk factors for common chronic illnesses like DM and HT to be screened and subsequently treated in the community upon diagnosis.

Recommendation 3: Clarify and Streamline the Roles, Functions and Areas of Service of the DHC as part of the Community-based Primary Healthcare System for a Coherent Primary Healthcare Ecosystem

In the context of the transformed governance and organisational changes proposed in the Blueprint, the roles and functions of the DHC in a district-based primary healthcare system should be reviewed and redefined. The provision of district healthcare services is a role and function of the district healthcare system.

DHC's multiple roles and functions in the community healthcare system could be visualised as

(1) A coordinator of community PHC services

(2) A care navigator to support chronic disease management

(3) A resource hub

(4) A connector of network among the public and private services

(5) A developer of connectivity between PHC and social service providers

In a district community healthcare system, the following three components are considered essential to the ecosystem:

A. Policies, systems, and mechanisms for integration within and between (a) primary, secondary and tertiary services (b) public and private healthcare providers and (c) health and social services
B. An infrastructure for engaging the community in multi-sectoral collaboration for health promotion and disease prevention in the community informed by

knowledge of the modifiable behavioural, social, and environmental factors and interventions that can promote health

C. A conduit to generate connectivity between the community primary prevention and health promotion infrastructure with the district community healthcare system

For each of these components, there are further recommendations on points to consider when crafting the roles and functions of the DHCs.

A. Policies, systems, and mechanisms for integration within and between (a) primary, secondary and tertiary services (b) public and private healthcare providers and (c) health and social services

Systems and Mechanisms of Integration

It is important to map out the organisational and functional forms and service design necessary to define how the DHC supports, coordinates, complements, and supplements key healthcare providers in the public and private sectors and social service providers in the transformed primary care ecosystem. The strategic purchasing office's commissioning of the Chronic Disease Co-Care (CDCC) Scheme intends to make inroads into creating a coordinated, horizontally and vertically integrated primary healthcare system. This will require an evaluation of the capacity and capabilities of the private sector, and of the gaps in the service provision and co-ordination. Systems and mechanisms and instruments for integration will also need to be designed, developed and evaluated for strategic purchasing decisions.

Mapping of the Primary Care Ecosystem

DHC's coordinator role will be critical to service delivery, and an initial task is the mapping of the primary care ecosystem (including public and private healthcare providers and facilities; services and roles of social and long-term care service

providers, NGOs and civil society organisations; roles of the new District Councils and committees, district officers and relevant government departments) for each district.

Bidirectional Referral System & Coordination of Patient Empowerment Programmes

Serving as an interface between primary, secondary, and tertiary care, the DHC would be in an ideal position to support the coordination of a bidirectional referral system with the public sector. Furthermore, the DHC could facilitate the linkage of post-hospital discharge patients with appropriate district-based primary healthcare services in rehabilitation and palliative care, and social services for social and personal care. DHC should also be the hub for development and coordination of patient empowerment programmes on self-management of chronic conditions. In this way, DHC's role as a strong service hub nested within the designated district would be enhanced.

Co-location of Multidisciplinary Teams

Primary healthcare professionals in integrated care models are known to work in multidisciplinary teams, and if this concept is to be considered for DHC, potential sites for co-locating these teams could be the consolidated resources of DH's elderly health care units, the DHC or its satellite centres, or the premises of network providers. For chronic disease prevention and management, one-stop services with co-located network doctors and multidisciplinary teams and multidisciplinary care protocols are needed. Appropriate models should be considered and piloted.

Building a Network among Public and Private Services

Looking at the care pathways involving the private sector, DHC's connector role could provide an excellent vehicle for direct access to the private sector as an alternative to services provided in the public sector and as a care navigator for chronic disease

management. This is in keeping with DHC's role in building a network among the public and private services and would be a step towards addressing the fragmentation of the primary healthcare system.

Strategic Alliances of Primary Healthcare Professionals

The integration among healthcare professionals, network providers, community partners, and the DHCs could be strengthened through formation of strategic alliances of primary healthcare professionals. When strategic alliances are formed between professionals and providers, there is the potential to achieve long-term strategic purposes that might otherwise not be achievable for individual organisations working on their own. Individual healthcare professionals could reach agreements amongst themselves to form strategic alliances. Hybrid forms could also be options, where strategic alliances of provider organisations with individual practitioners enable network arrangements. The benefits of such alliances might include increased accessibility and quality of care for patients and their communities, economies of scale and cost control, gain in resources, and risk sharing. Despite a higher degree of organisational interdependence, organisations may still maintain substantial independence and autonomy. With the establishment of a common vision agreement and organisation, the primary healthcare professionals can be engaged or contracted to function as multidisciplinary clinical teams, and utilise clinical protocols for multidisciplinary care, and have the potential to enable delivery of coordinated, efficient and effective care to their district population. DHC could play a vital role in real-time monitoring and contribute in terms of evaluation.

In the formation of the strategic alliance, a key factor is partner selection and this should involve looking at their compatibility, complementarity and commitment. When establishing the governance and design of the alliance, equity ownership and

contractural provisions should be considered. Moreover, following alliance formation, ongoing management should include the continued development of trust between partners and the refining of activity coordination amongst alliance members. The details and logistics of developing these strategic alliances need to be studied further in the context of the primary healthcare ecosystem.

B. An infrastructure for engaging the community in multi-sectoral collaboration for health promotion and disease prevention in the community informed by knowledge of the modifiable behavioural, social, and environmental factors and interventions that can promote health.

Medico-social Collaboration

Health promotion includes not only health education, but also enabling individuals to better control the social, environmental and economic influence on health and health seeking behaviours. Health promotion cannot be carried out solely by the healthcare sector. Medico-social collaboration should be implemented with reference to health behavioural models which delineate the pathways for behavioral changes. Enabling and reinforcing factors in the social and healthcare environment need to be targeted to motivate individuals and provide opportunities for screening and lifestyle changes.

Conduit for the Needs of the Community

As a community-based health service at the district level, the DHC should act as a conduit for the needs of the community. Operators with existing extensive social networks would have the advantage of being better equipped with mature connections and knowledge regarding the needs of the communities they serve. DHCs should conduct detailed intervention and implementation mapping rooted in socioecological model of health, as well as facilitating effective and sustainable lifestyle changes. In relation to the role of IT in the DHC Scheme, its expansion will require infrastructure

development.

Community Participation

Community participation, especially from end users, is key in making services responsive to community needs in a timely manner, important for the relational approach in system changes, and crucial in empowering service users to take on a more active role in self-management of chronic conditions at the district level.

Connectivity with the Wider Community

Connectivity to community and community resources and the engagement of the wider community (including NGOs, the business sector, religious bodies, civil society and patient groups, and minority and vulnerable populations) is critical for effective and sustainable multi-sectoral strategies and programmes for health promotion and disease prevention. DHCs need to develop mechanisms for engagement, progress monitoring and evaluation.

Information Flow in the Community

To gradually change the entrenched perception of healthcare as treatment-oriented, public education regarding the role and benefits of prevention in primary healthcare and self-management should be intensified. A community-based scheme should be aware of and able to leverage on the existing information and information sources in the community. As well as increasing DHC's use of social media, other means of communication should also be considered for those who are not on the grid. Irrespective of the dissemination platform, expert advice should be sought, and in-house expertise developed on how to craft messages to enhance uptake and behavioural change.

C. A conduit to generate connectivity between the community primary prevention and health promotion infrastructure with the district community healthcare system

Health Promotion Network

It is important for DHC to leverage on the district's existing services in primary prevention and health promotion to achieve wider coverage of the population. Thus, in addition to providing in-house health assessment and health education and promotion, DHC can facilitate such activities both through training professionals or lay persons to conduct health promotion and assessment in their own centres, and through establishing partnerships with social and other health centres operating accredited programmes enabling access to subsidised health screening and continued support for lifestyle changes and self-management. In this way, the current NSP network for medical services can be supported with health promotion and self-management programmes which could also be integrated with patient empowerment programmes. The goal of formation of health promotion networks in each district will allow connection with the available community resources.

Co-production of Health

The DHC could serve as a two-way conduit channeling persons identified to have health risks by the network of NGOs and social services for chronic disease detection and management, and connect chronic disease patients with NGOs for programmes on patient empowerment and sustainable lifestyle changes. Such programmes can be produced and conducted through co-production of health with the community, and delivered by lay persons trained to deliver structured patient education programmes.

Mobilisation of Community Resources

For its role as a resource hub for health and wellness services, the DHC should achieve

this through identifying, mobilising and leveraging community health resources. A starting point for the DHC would be the mapping of its roles in the context of an integral part of the community care system, followed by matching and realigning its existing programmes and services to better facilitate mobilisation of community resources for care.

Recommendation 4: Enhance the Infrastructure and Capacity Supporting Operation and the Long-term Development of the Scheme

Operator Requirements

With regard to the operators of the DHC centres, there should be reviews on what kind of organisations would be the most suited to balancing an ability to engage the community in health development efforts with operational efficiency. Since operators may be from different organisations, it would be beneficial for all operators to receive standard management training to ensure quality and consistency of services across districts. In addition to the usual management skills training, an understanding of concepts such as social capital, network theory, social behavioural theories, and the socioecological model for planning health behaviour would enhance the skills of those tasked with designing suitable interventions in response to health needs, facilitating their successful implementation and the eventual improvement in community and primary health. Training for staff who implement DHC services is also important. They should also be well-equipped with the knowledge and skills of health promotion. In fact, this would be applicable to anyone involved in delivering primary healthcare services.

Primary Healthcare Manpower for a Community-based Primary Healthcare System

Reinforcement of the primary healthcare manpower requires consideration of the range

and types of primary care workforce in the settings of primary care. Other than family doctors, a range of other primary healthcare professionals have the capacity to contribute to the community-based primary healthcare system.

Strengthening the Role of Technology in Service Delivery, Monitoring and Evaluation

The role of technology in service delivery and monitoring should be strengthened in view of its potential to facilitate participation of service end users, to alleviate some of the staff burden related to communication, and to assist programme planning. In addressing the Blueprint's recommendation for improvement in data connectivity and health surveillance, standardised data collection across districts, for example from mobile Apps, would be crucial in monitoring community needs. Similarly, data consistency would be critical in enhancing its usability.

Key Performance Indicators

Lastly, the current set of KPIs should be revisited and revised to maximise incentives for service improvement and collaboration. They should be reflective of the achievement of key intermediary outcomes that are clearly linked to concrete expected outcomes in the long run so that those implementing the Scheme remain engaged and focused during the implementation process. Tools such as logic models and intervention and implementation mapping could be useful in deriving these KPIs.

Strategic Purchasing and Instruments for Integrated Care for a Sustainable Healthcare Ecosystem

For the aforementioned recommendations, the concept of integrated care for chronic disease management cannot be overstated. According to the WHO global strategy on

people-centred and integrated health services, continuity, comprehensiveness, co-ordination and access to care are goals for integrated care in a people-centred, primary care integrated health system. Integration involves "methods and models on the funding, administrative, organisational, service delivery and clinical levels designed to create connectivity, alignment and collaboration within and between the cure and care sectors". Integrated care seeks to connect the healthcare system with other human service systems with the aim of improving outcomes.

To meet the complex needs of those with chronic disease and allow for efficient and effective healthcare, coordination of the different types and levels of healthcare minimises service gaps and unnecessary duplication of healthcare, improves efficiency and is essential for integrated seamless delivery of care and sustainability of the healthcare ecosystem. The ensuing connectivity and interaction needed between the individual or population, the healthcare system, and the socio-economic-environmental arena can be enabled through policy levers in particular governance system and strategic purchasing and a variety of instruments of integration working along and among the interdependent macro, meso and micro levels of the healthcare system. Integration needs to occur at system, organisation, professional and clinical levels, as well as functionally, normatively, horizontally, vertically and temporally through various modalities and mechanisms including coordination within and between different types, settings and levels of care, and within and between public and private healthcare sectors. Moreover, the connectivity between the healthcare system and the individual or population must be strengthened to address health needs and achieve the desired health outcomes.

Appendix A. Consolidated Framework for Implementation Research