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PII: S0168-8510(18)30048-4
DOI: https://doi.org/10.1016/j.healthpol.2018.02.005
Reference: HEAP 3862

To appear in: *Health Policy*

Received date: 28-4-2017
Revised date: 11-1-2018
Accepted date: 10-2-2018

Please cite this article as: Ong Suan Ee, Tyagi Shilpa, Lim Mingjie Jane, Chia Seng Kee, Legido-Quigley Helena.Health Systems Reforms in Singapore: A Qualitative Study of Key Stakeholders.*Health Policy* https://doi.org/10.1016/j.healthpol.2018.02.005

Revisions: 11 January 2018

HEALTH SYSTEMS REFORMS IN SINGAPORE: A QUALITATIVE STUDY OF KEY STAKEHOLDERS

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HIGHLIGHTS

- The RHS is a national-level move towards caring for the patient holistically across the care continuum.
- The RHS's key principles are integration, innovation, and people-centeredness.
- Strengths of the RHS include a shared understanding of the RHS's goals and objectives and strong leadership.
- Some challenges to RHS implementation are alignment of actors, healthcare financing, evaluation, and manpower.

Abstract (218 words)

In response to a growing chronic disease burden and ageing population, Singapore implemented Regional Health Systems (RHS) in 2008. In January 2017, the MOH announced that the six RHS clusters would be reorganised into three in 2018. This qualitative study sought to identify the health system challenges, opportunities, and ways forward for the implementation of the RHS. We conducted semi-structured interviews with 35 key informants from RHS clusters, government, academia, and private and voluntary sectors. Integration, innovation, and people-centeredness were identified as the key principles of the RHS. The RHS was described as an opportunity to

holistically care for a person across the care continuum, address social determinants of health, develop new models of care, and work with social and community partners. Challenges to RHS implementation included difficulties aligning the goals, values, and priorities of multiple actors, the need for better integration across clusters, differing care capabilities and capacities across partners, healthcare financing structures that may not reflect RHS goals, scalability and evaluation of pilot programmes, and disease-centricity, provider-centricity, and medicalisation in health and healthcare. Suggested ways forward included building relationships between actors to facilitate integration; exploring innovative new models of care; clear long-term/scale-up plans for successful pilots; healthcare financing reforms to meet changing patient and population needs; and developing evaluation systems reflective of RHS principles and priorities.

Keywords

Healthcare reform; Health systems research; Singapore; Integration; Ageing population; Qualitative research

1. Introduction

Singapore is a high-income, densely-populated Southeast Asian island city-state. Between the nation's inception in 1965 and today, Singapore's health system has seen the expansion and consolidation of healthcare services into a network of government health clinics, public hospitals, tertiary-care specialist centres, primary care providers, private hospitals, and non-government entities (1). Singapore's public hospitals have been 'restructured' to operate as government-owned corporations (2); meanwhile, much of primary care and intermediate and long-term care (ILTC) is delivered by the private and non-profit sectors (1). Singapore's public healthcare system is staffed by a body of healthcare professionals that includes 12,459 doctors, of which 7,909 are in the public sector and 4,788 are specialists; 39,005 nurses and midwives, of which 24,000 are in the public sector; and a smaller group of allied health professionals (967 occupational therapists, 1,550 physiotherapists, 474 speech therapists) (3). The Ministry of Health (MOH) takes a health systems design, development, and stewardship role across system design and governance, national healthcare services planning, structuring healthcare financing, and healthcare regulation. Singapore's health expenditure as a total percentage of GDP rose from 3.93 per cent in 2011 to 4.92 per cent in 2014 (4), but this remains low relative to the Organisation for Economic Co-operation and Development (OECD) average of 9 per cent in 2015 (5).

Healthcare financing in Singapore rests on the twin philosophies of affordability of basic healthcare services for all and individual responsibility (6). A proportion of public sector healthcare costs are covered by the government, and remaining co-payments in the public and private sectors come from other sources, including statutory financing schemes, opt-out public schemes, private voluntary health insurance, employer medical benefits, and out-of-pocket (OOP) payments. The OOP health expenditure as a percentage of total expenditure on health was 54.83 per cent in 2014 (7), which is high in comparison to the OECD average of 13.6 per cent in 2014 (8).

Singapore's healthcare system uses a multi-payer financing framework comprising government subsidies and the 3M Framework. The 3M Framework comprises Medisave, a national medical savings account which combines savings from payroll deductions to help meet future personal or immediate family members' hospitalisation, day surgery, and certain outpatient expenses (9); Medishield Life, a universal, mandatory coverage plan which was grown out of its predecessor, Medishield, and is designed to help pay for large hospitalisation bills and selected costly outpatient treatments (10); and Medifund, a government-established endowment fund to help those who cannot afford subsidised medical bill charges. Other support schemes are available, including Medifund Silver, which assists needy, elderly patients (1); the Community Health Assist Scheme (CHAS), a portable subsidy scheme that subsidises medical and dental care for lower- and middle-income at participating providers (10); and Pioneer

Generation benefits to assist with the lifetime healthcare costs of those aged 16 and above in 1965 and obtained citizenship on or before 31 December 1986 (11).

In 2000, the Ministry of Health (MOH) organised its restructured hospitals and polyclinics into two clusters in order to facilitate referrals, coordinate chronic disease care for patients post-hospital discharge, and encourage competition between clusters towards better care provision at a lower cost (12). In 2007-2008, the MOH saw an opportunity to restructure healthcare institutions with the promise of working with providers in the region to provide patient-centred care. This resulted in the formation of six public healthcare clusters named the Regional Health Systems (RHS). In January 2017, the MOH announced that the six clusters would be reorganised into three integrated clusters by early 2018. These three new clusters would offer a more comprehensive suite of healthcare services, encompassing acute hospital care, primary care, and community care (13).

While there is a body of academic literature addressing Singapore's health systems reform and looking at specific areas of interest within the Singapore health system (e.g. health services and utilisation) (14-19), at time of writing, there was no qualitative study on Singapore's most recent health systems reform. This study fills a gap in this body of research by addressing Singapore's health system reforms and how they develop at the nexus of complex social, political, and economic interactions.

The study aimed to identify the health system challenges, opportunities, and ways forward for the implementation of the RHS in Singapore. The objectives of this study were to identify the contextual factors that influence the design and implementation of the RHS; to explore the perspectives and positions of the actors involved in introducing and implementing the RHS; to describe the content of the RHS's principles, arrangements, and policies; to describe the processes that led to the initiation and implementation of the RHS; to identify health system barriers and facilitators to RHS implementation (including health systems hardware and software); and to identify possible ways forward. This paper is important and timely in the context of re-clustering, as its findings will help inform and guide the reorganisation process.

2. Conceptual Framework

This study is grounded in an expanded version of Walt and Gilson's Triangle Framework (20), which was adapted according to analysis of interviewees' responses. It incorporates elements of Sheikh et al's concept of health systems hardware and software (21). It is underpinned by the understanding that the RHS is policy, based on policy as "decision-making processes at all levels of the health system and the wider influences that underpin the prioritisation of policy issues, the formulation of policy, the processes of bringing them alive in practice, and their evaluation" (6). The framework is shown in Figure 1 below.

FIGURE 1 HERE

The 'Context' theme examines structural, cultural, and historical factors that have influenced the evolution of Singapore's health system and policies. The 'Content' theme describes interviewees' accounts of the RHS and its strategic vision, key principles, and implementation. The 'Actors' theme discusses the actors that populate Singapore's health system and their roles and "ways of working" within the RHS context. 'Processes' discusses the health system's hardware components crucial to developing and implementing the RHS: human resources, healthcare financing, service delivery, and information systems. This section also looks at software factors that affect RHS implementation: power relations, leadership, and "ways of working", including alignment, collaboration, competition, and values. The conceptual framework will look at systems-level factors that affect how the RHS upholds its fundamental principles of integration, innovation, and people-centeredness.

3. Methodology

3.1. Sampling

We undertook a qualitative study of 35 semi-structured key informant interviews with stakeholders throughout Singapore's health system, including representatives from all six RHS clusters, government agencies, and the private and voluntary welfare sectors. The study used two methods to sample key informants. Purposive sampling was used to identify informants in key roles across sectors relevant to the RHS. Informants were selected based on their expertise and their position within the RHS, with interviewees having a wide range of responsibilities at all levels. Further respondents were recruited through snowball sampling techniques, which involved asking interviewees to nominate other people they knew who might have knowledge and experience relevant to the study. Interviewees came from tertiary care, secondary care, primary care, intermediate and long-term care, policymaking, healthcare management, clinical practice, health promotion, and academia.

Interviews were conducted from August 2015 to August 2016 and were guided by a semi-structured interview guide (see Supplementary Materials). This guide was developed with health policy and health systems frameworks in mind:

- The Triangle Framework (20), which examines four interrelated components of policy: actors, content, processes, and context.
- The WHO Building Blocks of Health Systems Framework (22), which describes health systems as comprising six key components: leadership/governance, healthcare financing, health workforce, medical products and technologies, information and research, and service delivery.

The average length of each interview was an hour. All interviews were conducted in English by one member of the research team, with at least one other member of the research team present to take detailed notes. All interviews were conducted in a quiet space convenient to the interviewee. Interviewees were not compensated for their time.

3.2. Ethical approval

All interviewees were invited to participate in the study via introductory e-mail stating the aims and objectives of the study. None of the interviewees refused to participate when approached. Each interviewee was given an information sheet in English and was asked to sign and date a consent form. Consent was also obtained for audio recording of interviews. All interview materials were stored securely. Ethical approval was obtained from the National University of Singapore Institutional Review Board (NUS-IRB).

3.3. Analysis

This qualitative study is grounded in interpretative approaches, where interviews provide access to accounts of how respondents understand, perceive, and describe the world. Thematic analysis was used to inductively identify themes from the data. All members of the research team coded a portion of total transcribed interviews using QSR NVIVO 10 software. Themes and subthemes were induced from the data, with the WHO Building Blocks and the Triangle Framework in mind. While coding, the authors drew on techniques from grounded theory, including line-by-line analysis of early interviews, using the constant comparative method, and discussing deviant cases and emergent codes. Coding was finished when all data were accounted for in core themes and subthemes. Regular team meetings were held to discuss progress and findings, explore deviant cases, and identify emergent themes. Recruitment of new interviewees was stopped when authors agreed that thematic saturation had been reached, and that new data collected or discovered would not necessarily lead to more information. Based on the data that emerged, the authors adapted and expanded the Triangle Framework and used it to organise study results. All interviews were transcribed verbatim. In this paper, all identifying data have been removed to maintain confidentiality. To enhance study credibility and participant involvement, all interviewees were approached for a

member check in the final stage of manuscript preparation to validate researchers' interpretations of the data and verify accurate representation of participants' perspectives (23).

4. Results

4.1. Contextual Factors

4.1.1. Structural and cultural factors: the ageing population, Singapore's demographic transition, and changing family conventions

It was reported explained that the ageing population influences the evolution of the healthcare system. The young population of Singapore's earlier years gave rise to the development of a healthcare system more focused on looking after diseases. However, over the last decade, the system has seen symptoms of strain, including longer hospitalisation periods and higher admission rates for the elderly, and longer wait times in emergency departments.

While it was acknowledged that the government had done long-term, active planning for increasing the acute sector's capacity and capability to cope with the ageing population, broader implications were suggested. Examples reported included concerns around the system's capacity to manage the volume and complexity of elderly patients, how elderly patients' longer hospitalisation creates a bed crunch in inpatient care facilities, and care integration to prevent unnecessary hospital readmissions.

Looking forward, concerns were raised around how demographic challenges of a continued low birthrate and a rising age dependency ratio would impact the healthcare system. Increased longevity was cited as a reason for the health system receiving older patients with more chronic diseases and related complications. A reduction in family size, leading to the duty of care of elderly parents resting on fewer working adult-aged children, was also reported as a concern.

"Those with their direct caregivers are the families, there's a lot of stress because […] it ends up being the challenges of handling their work, their income, their children, versus caring for their older next-of-kin." (ID 011)

Cultural factors impact Singapore's healthcare system. It was argued that the conventional belief that patients with families will be financially and socially supported by their families does not always apply. Another emergent issue was social isolation. It was reported that on average, one or two per cent of hospital clientele consumes about 30 per cent of hospital inpatient services, and that these consumers typically face complex psychosocial, family, and caregiver challenges that influence their health and ability to seek care and self-manage.

4.1.2. Historical factors: the healthcare system pre-RHS

In describing the healthcare system before the RHS, several key points were raised. Firstly, the gap in capacity and capability between acute hospitals and other healthcare providers. Various explanations for this were put forward, including the Singapore government's 2000 'Many Helping Hands' approach, which left the provision of non-acute tertiary services to the voluntary welfare, non-governmental, and private sectors; and the channelling of resources to acute tertiary hospitals and specialist doctors. Secondly, the historical evolution of Singapore's primary care sector on the coattails of specialist medicine and the fact that approximately 80 per cent of today's primary care is provided by the private sector. This is consistent with accounts in published literature (24). It was reported that private primary care largely provides episodic care. Meanwhile, chronic disease management is provided by polyclinics and specialist outpatient clinics, and this setup is perpetuated by existing healthcare financing structures.

"[…] polyclinics are seeing many more chronic disease patients, compared to the private GPs, partly because of the way we're funded. So the drugs are way cheaper, and patients […] still come into polyclinics, […] especially if you've got chronic diseases." (ID 026)

Thirdly, it was reported that pre-RHS, the system worked in silos and there was inadequate healthcare provider accountability for the patient beyond the healthcare institution.

Several reasons for the introduction of the RHS were reported. It was reported that the RHS was encouraged by the urgency of Singapore's ageing population and its sequelae. However, it was mentioned that six clusters may be too many, due to Singapore's population homogeneity and the challenge of finding the balance between centralisation and decentralisation. Other reasons revolved around the weaknesses of the two-cluster model introduced in 2000, such as unhealthy rivalry between the two clusters causing duplication; two clusters being unconducive for horizontal and/or vertical integration; and the sense that an RHS model might better serve population-level needs. Additionally, regional health system models from other countries worldwide, like Sweden (25), Canterbury in New Zealand (26), and Geisinger in the United States were cited as inspirations for RHS development and implementation in Singapore.

4.2. Content

4.2.1. Defining the Singapore RHS and its strategic vision

The RHS in its six-cluster permutation was described as an evolution of the health system where Singapore's restructured public hospitals were asked to care for patients within their direct geographical regions and tasked with integrating care between the hospital and other providers in the community, such as nursing homes and private general practitioners. Four central concepts that emerged from the data as central to the RHS's strategic vision. The RHS envisions a network of healthcare services across the healthcare continuum, provided within a geographical region. The RHS also seeks to address population health challenges, which requires addressing social determinants of care and building partnerships between healthcare and the social and community care sectors. Additionally, the RHS "revolves around a person", with a network of care and connectivity surrounding them and meeting their needs as they go through different stages of life. Lastly, it was reported that all RHS clusters should be united under the umbrella of Singapore's public healthcare system.

"It doesn't matter that we are six separate names; we are one public health system." (ID 003)

An exceptional account reported decentralisation as a core strategy of the RHS, noting that decentralisation might increase the health system's capacity, time, and effort to engage with ground-level actors.

4.2.2. Key principles of the RHS: integration, innovation, and people/patient-centeredness

Integration was reported as a key principle underpinning RHS implementation. It was mentioned as crucial across multiple settings, including between tertiary and community care, and between tertiary and primary care.

"So the value is […] the idea of the seamless integration and the idea that now, the hospital really needs to get out of its comfort zone and work with the community." (ID 006)

Innovation was mentioned as a guiding principle of RHS implementation. Innovation was viewed as largely positive, as it drives the development of new models of care which improve efficiency and performance, generates evidence to support improvement of programmes and policies, and fosters a culture of challenging conventional ways of doing and thinking. Innovation was primarily mentioned in the context of pilot programmes, which are new projects, designed, conceptualised, and implemented by individual clusters and evaluated by MOH. See Box 1 for examples of on-going pilots at time of writing.

BOX 1 HERE

The RHS was reported as an opportunity to shift towards a more patient/people-centric approach to health. Examples included considering the value of care from a patient perspective, measuring outcomes that matter to the patient, and streamlining and optimising care processes.

"There are many different services and many, many different proprietors all the way, and RHS is supposed to […] bring them all together, […] build patient-centred care around the patient and […] allow patients to transit seamlessly across different services within the RHS." (ID 009)

An exceptional report suggested that patients could be involved in health decision-making on as part of raising standards of chronic care, using the example of the United Kingdom's EuroCare platform, which facilitates shared goal-setting and care planning processes between GP and patients.

4.2.3. How the RHS is being implemented

We found accounts of how the RHS is being rolled out nationwide. It was explained that although each RHS office is affiliated with an acute hospital, it is functionally distinct from the hospital, as it carries out the aims and objectives of the RHS. The primary functions of the RHS office were reported as encouraging the population in the region to take greater responsibility for their health and well-being, cultivating engagement between the patient/population and healthcare service providers that meet their needs, aligning the goals of healthcare providers in the region to meet patient/population needs, and devising the best way for providers in a region to organise themselves to meet RHS aims.

To guide monitoring, evaluation, and funding of RHS activities and initiatives, the MOH established six RHS priorities. These priorities are addressing the needs of frequent admitters to hospitals, timely discharges from acute hospitals and specialist outpatient clinics, delivering seamless person-centred care, health promotion and education, and developing capabilities in primary and community care partners (27). It was reported that these priorities are useful in guiding prioritisation of clusters' initiatives, but remain subject to revision and refinement.

4.3. Actors

A number of healthcare system actors were reported as key within the RHS-structured Singapore health system. The most frequently mentioned actor was the MOH, explained as having an agenda-setting, governance, accountability, or funding role within the system. The role of national health agencies in the RHS-structured system also emerged - the Agency for Integrated Care (AIC) supports integration across the ILTC sector and between primary care and step-down care with hospital services, and the Health Promotion Board (HPB) drives national health promotion and disease prevention programmes (28). Three primary care actors were mentioned: polyclinics (publicly-run primary care clinics), Family Medicine Clinics (FMCs, a public-private primary care partnership focused on care of complex chronic disease patients), and private-sector general practitioners. Secondary and tertiary restructured public hospitals were also reported as key actors. The role of private acute secondary or tertiary hospitals did not emerge from the data. Voluntary welfare organisations (VWOs), which are non-profits that provide welfare services or services that benefit the community, were mentioned chiefly in the context of institutions operating within the ILTC space, like community hospitals, rehabilitation centres, home care/home nursing providers, and nursing homes. Social and community partners were reported as actors, while health system beneficiaries were the 'population', 'community', and 'patient'.

Figure 2 represents the key actors in the implementation of the RHS, and where each actor is positioned along the healthcare continuum.

FIGURE 2 HERE

Each identified actor's strengths and the key challenge/s they face as the RHS is implemented was also reported; this is summarised in Table 1.

TABLE 1 HERE

Based on the data gathered, a basic stakeholder analysis was undertaken. This analysis was done with Varvasovsky and Brugha's key dimensions in mind (29). The time focus of this stakeholder analysis was 'present' to 'future', with emphasis on policy implementation in the short- to medium-term (29). Although all stakeholder analyses are subjective to a degree as they rely on qualitative data and perceptions, we sought to limit bias by drawing on interviewees from across diverse backgrounds, experiences, and roles (30). Our stakeholder analysis findings are available in the supplementary materials.

4.4. Processes: Policy implementation

Several key insights on the health systems components crucial to RHS implementation were reported. They comprise two categories: hardware and software. The emergent hardware components were human resources, healthcare financing, service delivery, and information systems. The software components that arose were power relations and leadership, alignment, collaboration, competition, and values. Within each of these components, findings fell into one of three subcategories: conceptual drivers, challenges to implementation, and positive facilitators.

4.4.1. Health systems components: hardware

4.4.1.1. Human resources

Two key positive human resources-related developments that facilitate the implementation of the RHS were reported. Firstly, innovative new initiatives by individual clusters to optimise the use and increase efficiency of available human resources in healthcare – for example, the development of a central manpower pool that can be deployed to partner institutions in the community when needed. Secondly, that MOH's active support for the education and training of future healthcare workers at individual RHS level has grown over time.

However, several challenges were mentioned as significantly influencing RHS implementation. There is a need for greater investment in manpower development and training programmes developed specifically with the purpose of enabling healthcare professionals to deliver care to patients in a manner which maximises the utility of their professional qualifications, described as "practice at the top of [their] license". Alongside, there are concerns around manpower shortages across the healthcare continuum and competition among different healthcare institutions and groups for a limited pool of manpower, with institutions needing to "poach" manpower from one another. Related to manpower shortages, there are also disquiets around finding a critical mass of the "right people", retaining them, giving them job stability, and ensuring they do not suffer from burnout.

"Can we find enough of the right people? […] Can we try and keep them sane long enough? […] Making sure that as we grow, […] we can give enough stability that staff will think that, "Okay, this is something that I can do for a long time," vs. "I'm worn out."" (ID 022)

4.4.1.2. Healthcare financing

In healthcare financing, the implementation of new healthcare financing reforms was reported to have helped facilitate the process of RHS rollout nationwide. An example of reform is how private GPs' referrals are now recognised as subsidised referrals for certain beneficiaries of the Community Health Assist Scheme (CHAS), a scheme which entitles Singapore citizens from lower- and middle-income households to subsidies at GPs, dental

clinics, and certain public hospital specialist outpatient clinics. However, most healthcare financing structures still encourage an episodic relationship between the patient and the healthcare system. An example is how hospital bill subsidies are higher compared to those of other healthcare services such as community hospital care, which incentivises patients to seek care where subsidies are highest and out-of-pocket contributions are lowest.

"The subsidies at the hospitals are actually the highest compared to the community hospital, the GP, or even home care […] So how do you encourage the patient to choose home care vs. staying in a ward, where they have to pay more for home care?" (ID 007)

Moving forward, key challenges highlighted focused on reforming healthcare financing in Singapore towards the goals of better serving the patient's healthcare needs, enabling patients to make prudent healthcare choices, and ensuring that seeking appropriate care is affordable for the patient. These financing reforms are especially important in the context of patients and their conditions becoming increasingly complex, multi-comorbid, and heterogeneous. Examples of suggested new models of healthcare financing included a capitated model for private GPs and incentivising patients to visit GPs before seeking acute care.

Alongside healthcare financing reforms, it was reported that there is still a need to incentivise patients to seek care within the RHS cluster areas in which they reside, as many patients seek healthcare across clusters. To address this, it was suggested that more effort be invested in understanding the factors that drive healthcare-seeking behaviours (e.g. convenience, familiarity, habits) and increasing patients' awareness of the benefits of seeking care within an RHS.

4.4.1.3. Service delivery

Reports on how health services are delivered drives RHS implementation fell into two subcategories: patient-centricity and care optimisation. Patient-centricity in service delivery was reported as delivering the care that the patient wants and values, and that it was a shift away from the disease- and provider-centricity of the past.

"Care that revolves around you, care that meets your needs, rather than you go and look for care [and] end up finding the wrong care or […] waiting in the ER […] to get admission to hospital." (ID 002)

The importance of care optimisation in service delivery was also reported. Two strategies for optimising care and ensuring the appropriate expertise and resources are delivered to patients were explained: delivering care through multidisciplinary teams (described as "a team let of healthcare professionals") and patient stratification. Service delivery was also described as evolving to incorporate novel ways of caring for patients as part of RHS implementation, for example the establishment of an "emergency day surgery service" as an alternative to admission.

4.4.1.4. Information systems

Health information systems was reported to be a vital part of RHS implementation. The importance of robust health information systems was cited as important to develop a better understanding of the health system's beneficiaries and their needs, to drive evidence-based decision-making, and to enable information-sharing between and among providers along the care continuum.

"A very key thing that we need is actually [a] computerised, integrated view of the customer. Basically, by pulling all the information real-time when we need it […] – just critical information." (ID 001)

Numerous information systems-related challenges were reported, such as difficulties integrating the National Electronic Health Record (NEHR) system across clusters and providers, taking a long time to link all providers up to the NEHR, and reconciling the "islands of automation" of competing IT platforms across the healthcare system.

4.4.2. Health systems components: software

4.4.2.1. Power relations and leadership

It was reported that the power within the RHS lies with the senior management and leaders within each RHS. However, the clear infrastructure for leadership was developed gradually. It was noted that the leadership succession plans within some clusters lacked formal structures, and it took time and effort to finalise these structures and invest in talent, infrastructure, and leadership development. Other challenges included how many who undertook leadership positions within clusters were improperly trained for the role and had to learn on the job.

It was reported that the acute hospital has enduring dominance in the healthcare system. Manifestations of this dominance cited included strong long-standing MOH relationships with acute hospitals, acute hospitals receiving large proportions of funding, acute hospitals' leading roles in programme implementation, existing healthcare financing arrangements favouring acute hospital subsidies, and Singapore's historical focus on acute care. It was reported that this acute hospital-centricity needs to change in order to meet RHS goals, as patients require more than just hospital care and that the acute hospital may not be the best care setting for all patients. However, it was mentioned that acute hospitals' high burden of care raises challenges around carving out financial and manpower resources to build relationships with other care partners.

4.4.2.2. Alignment

Alignment across the Singapore health system as a whole was reported as a factor driving RHS implementation. For the purposes of this manuscript, we define alignment as a position of agreement among and across actors in the system because of shared interests or aims – therefore, alignment is mindset-focused. The necessity of alignment at national level was discussed in the capacity of patient care and enabling various subsystems to work together for the common patient. This was crucial in the context of the ageing population and the realisation that no patient could be comprehensively cared for by a single sector or provider. It was agreed that the motivation and goals of various organisations and stakeholders must be aligned to facilitate equal partnerships and shared understanding of one another's missions and agendas. However, there was general consensus that this would be challenging due to the organisations' differing motives, priorities, and philosophies.

4.4.2.3. Collaboration and competition

Collaboration between different stakeholders was reported as an organic outcome of alignment. Collaboration is defined here as two or more parties or actors working together to achieve a goal or outcome – therefore, collaboration is process-focused and action-oriented. Some reasons for collaboration mentioned included decreasing duplication and increasing efficiency in the patient care process, thereby enabling the patient's seamless care journey across organisations along the care continuum. An exceptional case mentioned that national-level initiatives, such as the recently-declared War on Diabetes (31), are paving the way for increased collaboration between clusters.

"[…] the efforts are a lot more collaborative now […] on the War on Diabetes, we talk about multi-cluster effort. Different RHSs coming together, and seeing […] what could actually work." (ID 035)

However, it was noted that while several platforms exist to facilitate information-sharing among clusters, there are tensions between expectations of collaboration vs. competition between actors. Here, we define competition as parties striving to gain something by establishing superiority over others. As with collaboration, competition is process-focused and action-oriented, with tangible results. These tangible results are reported as benefits of competition, including the flourishing of innovation through RHS pilot programmes. However, some downsides of

competition also emerged, like the futility of competition in Singapore's small landscape and concerns that competition may perpetuate fragmentation and rivalry in the system.

"[The competition] was unwholesome on several fronts. There was duplication, there was lack of integration, and just unhelpful rivalry." (ID 034)

Interviewees suggested that competition exists not only between and among clusters, but also between clusters and national health agencies. For example, it was highlighted that prevention activities, like population-level screening programmes, are traditionally under the purview of the Health Promotion Board. As such, RHS implementation raises questions around clear delineation of responsibilities to minimise duplication of services and inadvertent competition between actors.

4.4.2.4. Values

The importance of values was reported as a key factor driving RHS implementation. In this manuscript, we define values as guiding principles or standards that govern behaviours and actions. As with alignment, values are mindset-focused. The critical role of strong organisational culture at both RHS and healthcare institution levels was emphasised, alongside the need to foster an organisational culture with clear values to enable and empower staff.

"[…] one big transformation is to really organise the inside. […] you have doctors, nurses, therapists, and care staff. You can organise them, empower them, support them, set them free. They will do what you need them to do." (ID 033)

Another factor reported was robust leadership based on credibility, shared values and philosophy, and the "human factor" – fairness, opportunity, and inspiration. Enlightened leadership at the MOH level was mentioned, with appreciation for MOH's support of new initiatives, encouragement of innovation, and open attitude towards learning from mistakes made.

5. Discussion

5.1. Summary of findings

The Singapore RHS was introduced to cope with the challenges of an ageing population, a demographic transition, changing family and care conventions, and a historically acute tertiary-focused, somewhat siloed health system. The RHS was described as an evolution of the health system where restructured public hospitals would care for patients within their geographical regions, integrate care between hospital and other care providers, and that the RHS's strategic vision was focused on comprehensive care across the continuum, population health, and person-centricity under the banner of a unified public healthcare system. By exploring the concepts of health systems actors, context, content, and processes, this qualitative exploration of Singapore's RHS contributes to understandings of health systems-level challenges, opportunities, and ways forward. Understanding the uniqueness of Singapore's modern Southeast Asian city-state context highlights the challenges of an ageing population and chronic disease burden, but also accompanying opportunities to transform the health system to more effectively meet the population's needs. Mapping the actors involved in RHS introduction and implementation sheds light on the multitude and diversity of players in Singapore's healthcare landscape and the inherent challenges around harmonising different actors' values, missions, and practices towards achieving a shared vision of the RHS. Exploring the process components of the system illustrated the simultaneous, shared, and synergistic importance of both hardware (e.g. manpower, financing) and software (e.g. power relations, leadership, values) components to facilitate RHS implementation and development.

5.2. Positive developments in the Singapore healthcare system

Singapore's healthcare system has proactively instituted necessary reforms in response to changing context and circumstances. This reform process – the development and implementation of the RHS - has been enabled by the system's numerous strengths. The actors in the system are diverse and highly skilled in their areas of expertise, both at institutional and human resource levels. The MOH's leadership and agenda-setting role is well-defined and widely accepted. Our data suggested that across the spectrum of interviewees working within the RHS, there was a shared sense of the importance and urgency of the health and healthcare challenges that come with an ageing population and a changing national demographic profile, and a shared commitment to delivering good care to patients and the population. Alongside, there appears to be an understanding of what an RHS is, what it seeks to achieve, and what its fundamental principles are. Existing healthcare financing structures protect citizens from bill shock in the event of catastrophic illness. The health system leverages on technology and innovation to develop new pilot programmes and improve service delivery and information systems. Further, Singapore's RHS clusters have drawn on elements from different international models such as Sweden and New Zealand, and tailored them to fit the Singapore setting. The Singapore healthcare system is also nimble and decisive in effecting new policies, as evinced by the recent decision to reorganise the system into three integrated clusters. A reduction in the number of clusters may facilitate collaboration and clearer delineation of responsibilities between RHS and national agencies.

5.3. Major areas of concern

Despite the system's strengths, three areas of concern remain: the enduring prominence of population healthcare, fragmentation, and alignment. Although our findings note the centrality of population health to the RHS, *population healthcare* remains a major RHS focus. Our findings indicate that at practice-level, there remains a culture of disease-centricity, provider-centricity, and medicalisation in health and healthcare which affects how care is delivered to patients. At policy-level, three of the six MOH RHS priorities (i.e. managing frequent flyers, timely discharges from acute hospitals, timely discharges from specialist outpatient clinics) remain healthcare-focused. It is critical to consider how these priorities will influence RHS implementation, development, and innovations over time. Moving ahead, might clusters be more inclined to grow and innovate in the direction of priorities with healthcare targets that they can tangibly meet? How can these six priorities' outcomes be benchmarked in a way that resonates with the RHS's population health mission?

Fragmentation across the system is a cause for concern. Our findings indicate that fragmentation persists among the many actors who operate in their own ways across the healthcare space, have their own goals and objectives to meet, and have differing resources, capacities, and capabilities. Fragmentation exists in information systems, with "islands of automation" operating across clusters. At service delivery level, fragmentation among and across clusters and their care partners hinders care integration and optimisation. For example, the differing capabilities and capacities of public and private primary healthcare sectors to deliver comprehensive care to chronic disease patients has implications for quality of care, patient experience, and health outcomes. At macro-level, fragmentation over time may occur as each RHS is guided by its own values and leadership, despite emphasis on each RHS being part of Singapore's public healthcare system. An important subtheme was the need for integration to take place across all clusters, or risk of causing greater fragmentation across the system. The potential ramifications of health system fragmentation include service delivery inefficiency, system-level ineffectiveness, inequality in care access and distribution, commoditisation resulting in devaluation of healthcare, service commercialisation, de-professionalisation of healthcare professionals, de-personalisation of patient experience, and patient dissatisfaction with healthcare experience (32). Against the backdrop of six clusters merging into three, it is crucial to consider the extent to which fragmentation-related challenges will be overcome with the mergers, and which will require continued attention.

Our study findings point to the need for greater clarity of governance both within and outside the RHS. For example, our data indicates that the MOH is regarded as the primary authority for governance, decision-making,

funding, and agenda-setting in the healthcare system. However, our data also describes RHS clusters as having a certain amount of decision-making authority and autonomy within their regions. The need for alignment and clarity of actors' roles, responsibilities, and decision-making ambits is especially important as the six RHS, with their six individual hubs of authority and autonomy, transition to become three RHS between now and early 2018. Furthermore, while the mindset-focused software components - namely values and alignment - are essential to the success and effective functioning of the RHS, the everyday work and practices of the clusters must be underpinned by the process-oriented software components - collaboration and competition – to achieve and sustain the RHS's aspirations of providing holistic care across the care continuum, addressing social determinants of health, developing new care models, and working with social and community partners.

5.4. Steps ahead: healthcare financing, integration, innovation, and data-driven decision-making

As the RHS clusters continue to develop and evolve, both as individual regional units and as three parts of the Singapore healthcare system, it is essential to ponder steps forward. Four key areas to consider are healthcare financing, integration, innovation, and data-driven decision-making.

A key emergent theme was the need for healthcare financing reforms to be more relevant to Singapore's evolving population profile and its changing needs. However, no one clear solution emerged from the data as to what the best step forward might be. The data suggests that a mindset shift from population healthcare to population health is already in motion, but that current healthcare financing structures do not yet fully enable the achievement of population health goals. Although some promising reforms have taken place, like the introduction of Medishield Life, more needs to be done in healthcare financing reform to ensure that healthcare financing structures respond to the population's ageing and chronic disease challenges and enable the achievement of population health goals.

Integration in RHS implementation emerged as a critical theme, especially in the context of service delivery and ensuring that patients and the population receive seamless, appropriate care. Our findings showed that integration was considered important within RHS clusters and externally (e.g. between MOH and RHS clusters; between MOH and social/community partners; between clusters and social/community partners; and between primary and secondary care). Moving forward, we must consider how to enable the translation of the concept of integration into everyday practice. Although Singapore's health system already has many pieces of the health system that are critical to successful integration processes (e.g. comprehensive services across the care continuum, a patient/person-focused mindset, strong leadership and governance mechanisms), there needs to be greater focus on strengthening the software components that sustain integration processes and practices over time, namely trust and relationship-building, collective capacity-building, and open information-sharing. Building the robustness of these components is critical against the backdrop of complexities of reorganisation into three integrated clusters; efforts towards delivery of seamless, person-centred, integrated care between the primary and secondary care sectors; and policy-level prioritisation of population health approaches, principles, and outcomes.

The role of innovation driving RHS implementation emerged as a major theme. The system's culture of innovation, supported by the MOH, has fostered the development of pilot programmes, facilitated competition, and opened doors for information-sharing between clusters. However, this innovation culture must be accompanied by clear but flexible blueprints for scale-up of pilot programmes, an explicit understanding of what scaling up entails, sustainability plans, and pilot evaluation underpinned by transparent, appropriate outcome indicators. As six clusters transition into three and more pilot programmes are rolled out, it is critical to reflect on the complexities of innovation. They include the potential for rapidly-diffused new innovations to have only limited value or pose risks, slow uptake of useful innovations, questions around scalability and sustainability of successful innovations, and how innovations play a role in generating new challenges while attempting to solve existing ones (33).

The importance of data-driven, evidence-based healthcare and research in health systems and healthcare reform has gained traction in recent years in the United States (34-36) and Europe (37). The literature shows growing use of electronic records from healthcare institutions being collected and analysed for service utilisation (15, 17), economic impact, and cost-effectiveness (38) outcomes, and to streamline and optimise care processes (24). However, our findings indicated that using a data and evidence-driven approach to healthcare was mostly emphasised among interviewees from clusters with a dual academic-health focus. However, moving forward, all three clusters will each have a medical school (13) and will arguably be driven by a degree of academic-health focus. Additionally, decisions will need to be made around the use of information systems at RHS-level as the six clusters merge into three, in order to streamline data collection and records within and across clusters. Looking ahead, it may be useful to consider the extent to which a data-driven, evidence-based approach will shape the development and growth of the RHS. Such an approach, applied across the board, could encourage and enable more informed and robust decision-making across all RHS-related domains: clinical, operational, managerial, population health, and policy.

Table 2 provides a summary of key policy and practice recommendations arising from the data.

TABLE 2 HERE

5.5. Study strengths and limitations

This study has several limitations. This study's interviewees were predominantly from the public sector. Over two-thirds of interviewees were clinicians, and most interviewees worked at an RHS or in tertiary care, or both. We recognise that having interviewees predominantly from the public sector limits this study's ability to pick up on divergences between public and non-public (e.g. private, voluntary welfare organisation) sector interviewees' positions and perspectives on the RHS. Social desirability bias may have encouraged interviewees to present their experiences or perspectives of the Singapore health system and the RHS in a more positive light. Furthermore, this study was based on a sample of individuals who were interested in participating and agreed to speak to the research team.

Additionally, given our interviewees were mostly from within the clusters we do not have enough information in this study to explore differences and divergences in the values and organisational culture perspectives and experiences of those working within vs. outside of the RHS. However, our data suggests that interviewees at the chief executive-level tended to speak about values and organisational culture in a broader way, with a focus on inculcating values and creating a positive work culture by changing mindsets and ways of thinking and working, inspiring and empowering staff, and leading by example. Meanwhile, interviewees at director-level tended to couch values and culture in an organisation-specific context (e.g. reporting on values and culture in relation to the RHS within which they work) and mention examples of demonstrating good values and culture (e.g. standing up and protecting staff). Also, we only had two junior/middle management-level interviewees (e.g. deputy director). Their concerns were less focused on values or culture, and instead more geared towards operational/workflow issues, including services and resources needed to integrate care or shift care into the community, rethinking healthcare financing mechanisms, and execution, monitoring, and evaluation of pilot programmes. We posit that this operational focus is reflective of junior/middle management-level job scope and day-to-day tasks.

However, this study has several key strengths. It is the first known qualitative study on health systems reform in Singapore. The use of semi-structured in-depth interviewing allowed for detailed exploration of emergent issues that went beyond the scope of the interview guide alone. Conceptually, this is the first known attempt at using the Triangle Framework in combination with elements of health systems hardware and software, with a clear focus on policy implementation processes. This has been found to be a useful approach to analyse a context within

which health system reform is taking place in real time, with many on-going initiatives (e.g. RHS pilots) and reform processes being implemented.

6. Conclusion

The current RHS reorganisation appears to be an opportunity to redefine the perceptions, practices, and priorities of health and healthcare in Singapore. The RHS was widely understood to be a national-level, concerted attempt to move towards caring for the patient/person holistically across the care continuum, address social determinants of health, and provide care alongside partners from the social and community care sectors. Alongside, the key challenge to RHS implementation that arose from the data was the need for actors within the health system to share the principles of integration, innovation, and people-centeredness central to the RHS. There is a sense that common understanding of these principles will hopefully lead to a unified mind-set among actors, which will then guide RHS implementation across the board, re-emphasise the notion that Singapore operates one healthcare system, and reduce fragmentation of initiatives across clusters. Moving forward, several key suggestions emerged: cultivate relationships between actors in the health system to facilitate integration, explore innovative new models of care, clear long-term/scale-up plans for successful models, develop healthcare financing reforms to meet the changing needs of the patient and population, and create evaluation systems that reflect the goals, aims, principles, and priorities of the RHS. Many challenges raised in this study remain relevant even as the six RHS clusters reorganise into three. Furthermore, new and unforeseen challenges may emerge during the re-clustering process. It is therefore urgent to identify both existing and new challenges, prioritise them, and work towards solutions to ensure a seamless transition from six to three.

Funding Sources

This research received funding from Helena Legido-Quigley's Start-up Grant granted by the Ministry of Education (WBS Number R-608-000-130-133).

Conflicts of Interest

We are not aware of any relationships or support which might be perceived as conflict of interest.

Acknowledgments

We thank all interviewees for their participation in this study.

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Box 1: A sampling of RHSs' pilot programmes

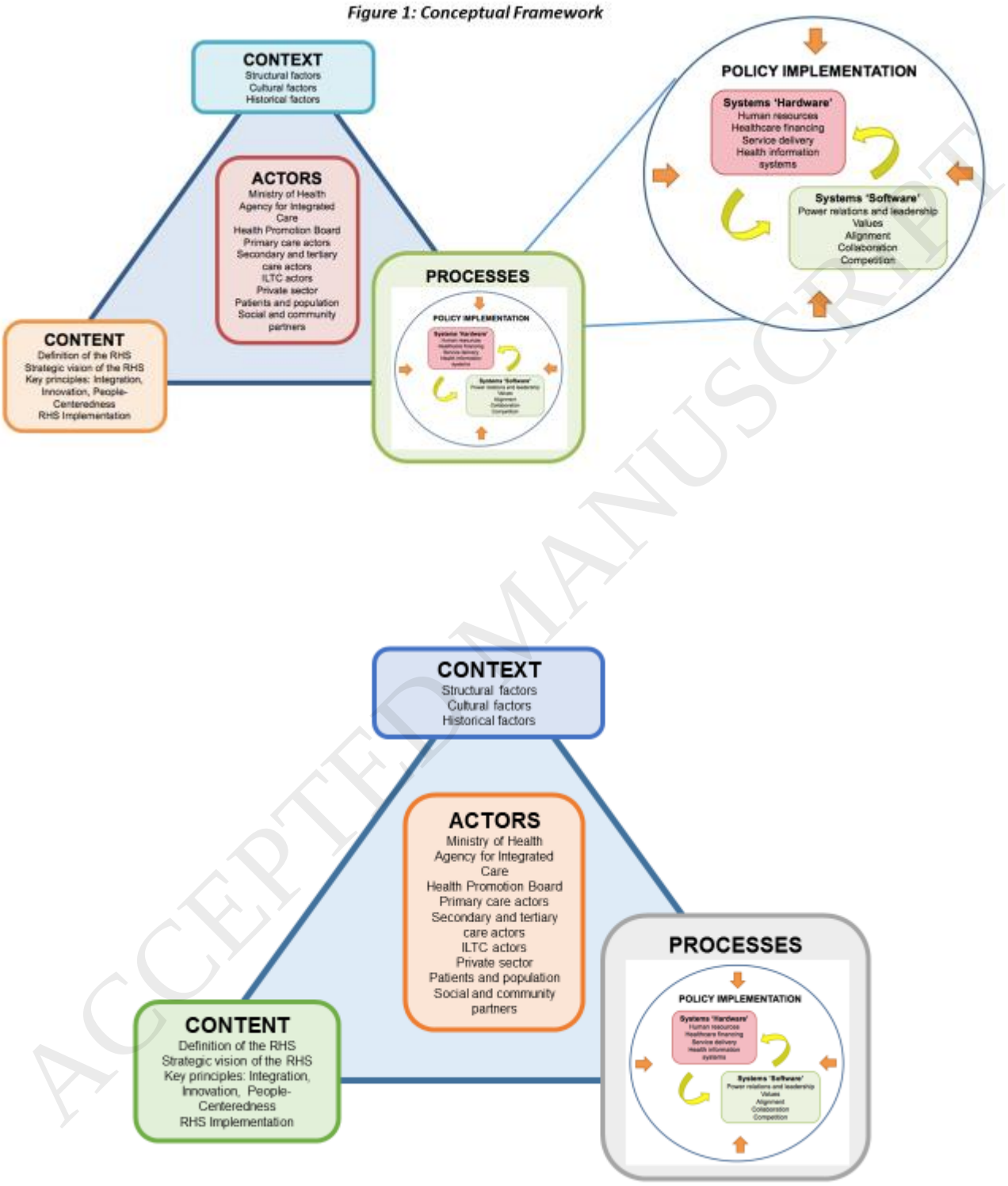
Pilot #1: A collaborative primary care-based chronic disease management pilot by a hospital's nephrology department and a polyclinic group to optimise utilisation of ACEi and ARB drugs among diabetics to delay the progression of diabetic nephropathy

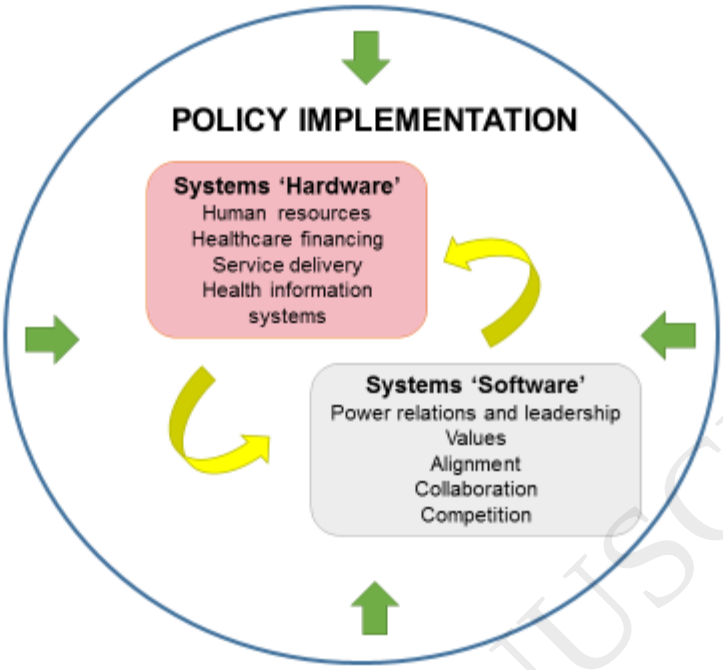
Pilot #2: a pilot programme that incentivises patients to see their GP before going straight to the hospital's Accident and Emergency (A&E) Department; if the GP refers the patient to the A&E, the patient receives a $50 discount on their A&E fee and is given higher priority in A&E as a referred patient

Pilot #3: a pilot programme targeted at reducing readmissions of patients with multiple admissions who may be socially vulnerable. These patients are assigned a care navigator/nurse concierge to help them navigate the health system so that they receive the care they need at the appropriate level, and to help the patient be cared for in their home as much as possible.

Pilot #4: a pilot programme that links a network of over 100 private GPs nationwide to an RHS to manage and refer patients, and track outcomes

Figure 1: Conceptual Framework





Revisions: 11 January 2018

FIG 2

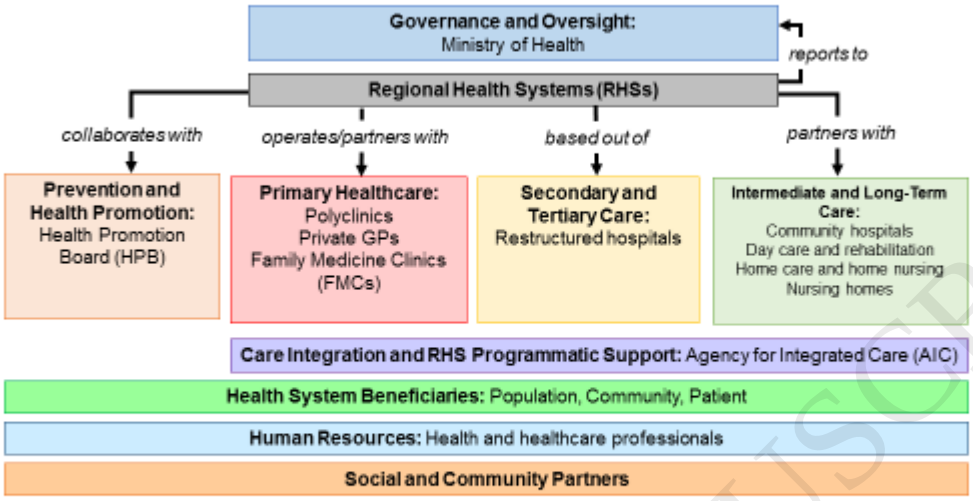


Table 1: Actors in the RHS-structured health system, key strengths, and key challenges

Actor	Key strength/s	Key challenge/s
Ministry of Health (MOH)	Established leadership role in the healthcare system	Perception that MOH is "fairly directive" because they are funders; monitoring and evaluation of RHSs
Agency for Integrated Care (AIC)	Helps to integrate care across the ILTC sector and cultivate cooperative, collaborative relationships between healthcare system actors	Unclear delineation of responsibilities within RHS context
Health Promotion Board (HPB)	Acts as national driver for population-level health promotion and disease prevention efforts; important RHS partner	Unclear processes/structures within which health promotion work can and should be done within RHS context despite shared sense of population health mission; potential for duplication/competition between RHS and HPB in some areas
Polyclinics	Established and well-equipped public primary care institutions	High patient load; limited human resources
Family Medicine Clinics (FMCs)	Shows promise as a new model of delivering primary care to the population	No established long-term track record
Private general practitioners (GPs)	Recognised important role in the Singapore healthcare system	High market share of primary care; difficult to engage with public healthcare system; working in silos
Restructured public hospitals	Well-established acute secondary/tertiary care institutions in Singapore; strong relationship with MOH	High patient volume; challenges breaking the existing hospital-centric mode and sharing the load with community partners
Other private sector (specifically - primary care groups, ILTC. Does not include acute hospitals)	Offers choices to the patient/population	Independent operators with their own priorities (i.e. does not necessarily share RHS priorities)
Voluntary welfare organisations	Long history of serving the population; good reach into the community	Many and varied independently-operating players in a complex and fragmented ILTC landscape; challenges cooperating and collaborating with public-sector players and RHSs
Social and community partners	Recognised as important care partners	Unclear from the data who they were; not explicitly mentioned although recognised as important partners
The 'Population'/'Community'	Emphasis on caring for the health of the people at all stages of life and catering to needs across the care continuum	Continuing efforts to encourage the population to take greater ownership for their own health and seek appropriate care
The 'Patient'/'Person'	The patient/person and their needs as central to RHS reform processes	How to gear the health system towards what the patient values; how to get the patient to understand and access the RHS as intended

Table 2: Summary of key policy and practice recommendations

Framework Component	Strengths	Challenges and Risks	Policy and Practice Recommendations
Actors	Many actors in the system, each with different expertise Enlightened leadership from MOH; role of the MOH as agenda-setter, funder, evaluator	Fragmentation and duplication due to too many actors operating in their own ways across the healthcare space Concerns around collaborating with many partners of differing capabilities, capacities, and strengths Collaborating with social and community care sector Need for MOH to develop greater trust in non-public sector players	MOH to proactively seek and build greater trust partnerships with private-sector players, esp. private primary care RHSs to seek and build trust partnerships with other actors in the health system, esp. private primary care, community and ILTC RHSs to invest in public-private partnerships with likeminded partners (exploring options beyond the FMC model)
Content	Well-defined concept of what an RHS is, its strategic vision, and its key principles	Difficulty of multiple actors with differing goals, values, and priorities achieving a shared RHS vision and how this vision should be carried out	Continued engagement between MOH and RHSs to reinforce shared challenges, priorities, goals, and responsibilities Within individual RHSs, build and reinforce shared mission and vision across all levels; from top leadership to ground-level staff
Context	Clear understanding of challenges that come with an ageing population, changing demographics Good preparation for ageing and demographic challenges at policy level and from an infrastructural standpoint (i.e. building	More attention may be needed to address socio-cultural challenges that affect health (e.g. social isolation, changing family conventions) Persistent primacy of acute/specialist care over family medicine/primary care; ILTC sector	Greater engagement and relationship-building between MOH and RHSs with social sector partners, e.g. Ministry of Social and Family Development Link-ups of health and social care organisations to maximise collaboration, minimise duplication RHSs to work on incorporating population

		more healthcare facilities) Clear understanding of the need to shift towards a more population health-based approach and away from disease-centricity, provider-centricity, and medicalisation	largely run by VWOs/private sector	health and health promotion strategies into care plans at relevant and appropriate junctures
Processes: Hardware	*Human resources*	Many highly-qualified healthcare professionals in the system	Manpower shortages, esp. in allied health, ILTC, and primary care Disproportionate appeal of acute care sector over other healthcare sectors Retention and burnout problems Need for more training to maintain healthcare professionals' capabilities, knowledge, and skills	Develop strong leadership in tandem with strong operational care teams Invest in manpower training, education, and development to ensure up-to-date skill sets Develop ways to incentivise healthcare professionals to work in understaffed settings, e.g. primary care and ILTC Harnessing and optimising existing manpower potential in large healthcare organisations/systems (e.g. central manpower pool) Harnessing manpower potential beyond healthcare professionals and into community (e.g. lay persons, retirees)
	Healthcare financing	Existing structures protect patients from bill shock from acute illness Comprehensive 3M system and government subsidies for hospital bills	Existing structures may not be adequate to meet the needs of an ageing population with chronic diseases	Review and revise healthcare financing structures to meet the needs of an ageing population facing predominantly chronic disease challenges Ensure that healthcare financing reforms are aligned with health policies that are moving towards improved chronic disease care

	Information systems	High-tech, sophisticated information systems are currently being used across RHSs Existence of National Electronic Health Records (NEHR)	Fragmentation of information systems; different RHSs using different systems Lack of information sharing between public and private actors due to lack of shared information system Not all RHSs seem to have the same attitude to a data-driven, evidence-based approach to health/healthcare	Develop policies that work towards the goal of "one patient, one medical record" Develop mechanisms to obtain buy-in and linking up of private primary care providers to NEHR Explore the possibility of a more uniform data-driven approach across all RHSs
	Service delivery	Healthcare institutions and RHSs are committed to delivering quality care to patients and population Shared priorities of patient-centricity and care optimisation, guided by the MOH RHS 6 priorities Ongoing MOH investments in improving service delivery capabilities and quality among other providers (e.g. Enhanced Nursing Home Standards, training programmes)	Need for integration of service delivery to take place across all the RHSs in order to prevent fragmentation and optimise care for patients Continued gaps between differing care quality, capabilities, and capacities among and across RHSs' partners	RHSs and MOH to work together to develop new ways of delivering accessible care that meets needs of ageing population Invest in design thinking to develop and operationalise new models of care Invest in proactive and preventive care models Develop a stronger primary care network Invest in care coordination for patients as a critical piece of integrating care Develop multidisciplinary care teams that revolve around patients' needs Explore new models of care (e.g. task-shifting) to optimise care delivery Greater investments by both RHSs and MOH to build partners' capacity
Processes: Software	*Power relations*	Leadership role of MOH Clear understanding that senior management and leadership of RHSs	RHSs are relatively new; many who took leadership positions within RHSs were not properly trained for their roles and	Develop talent and leadership development policies and schemes within RHSs Simultaneous and sustained financial and

		have authority and degree of autonomy Enduring acute hospital dominance despite high awareness of need to shift away from this	leadership planning within RHSs is not fully developed Acute hospitals overloaded; difficult to allocate financial and manpower resources to reach out to and build relationships with care partners in the community	manpower support (possibly incentives?) for decongestion of acute hospitals and for RHSs and hospitals to build relationships and integrate service delivery with care partners in the community
	Alignment	Strong organisational cultures exist within individual RHSs	Need to improve alignment at national level, towards working together to care for common patient Need to align motivation and goals of stakeholders within RHSs	Develop stronger trust relationships between RHSs, spearheaded by MOH RHSs to proactively reach out to stakeholders/partners to build shared motivation and goals
	Collaboration	Existence of formal and informal channels for collaboration and information/knowledge sharing	Tensions between expectations and collaboration and competition	MOH to develop and enforce policies that actively encourage collaboration and information/knowledge-sharing between RHSs
	Competition	Healthy competition breeds innovation (i.e. RHS pilots)	Competition causing greater fragmentation and/or duplication Potential for innovation's unintended consequences, e.g. rapidly-diffused new innovations to have limited value or pose risks	Clarify roles, responsibilities, and work scopes of different actors in the system working on similar programmes, projects, areas Develop clear implementation plans, monitoring and evaluation, scale-up, sustainability frameworks for RHS initiatives
	Values	Strong leadership within RHSs Strong organisational culture guiding RHSs	Different RHSs guided by different principles can cause fragmentation despite Singapore having "one healthcare system"	Greater emphasis from MOH to all RHSs that they are parts of a national healthcare system and should ensure their priorities and values are in sync with national-level

				health priorities and values