Resilient and people-centred health systems: Progress, challenges and future directions in Asia

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Chapter 8. Singapore

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8.1 Introduction

8.1.1 Economic context

The Republic of Singapore is an island state in South-East Asia, with a short history of 53 years following full independence in 1965. It is home to 5.61 million people, 100% of whom live in urban areas (World Bank, 2018). From a GDP of US$ 7.4 billion in 1965, Singapore's GDP reached US$ 295.0 billion in 2016 (Table 8.1), with a high GDP per capita (constant local currency unit) of S$ 71 720 and an average GDP growth of 5% per annum over the past 10 years (Lim et al., 2016; World Bank, 2018).

Following the aftershocks of the 2008 financial crisis, Singapore's GDP shrunk 0.6% from 2008 to 2009 but quickly recovered, growing by 15.2% in 2010, 6.2% in 2011 and 3.9% in 2012 (World Bank, 2018). Unemployment rates increased to 4.4% in 2009 but have since returned to relatively low levels, at 2.0% in 2017 (ILO, 2018).

Median monthly income per household member grew from S$ 1235 in 2005 to S$ 2699 in 2017 among resident households. From 2012 to 2017, growth in average household income from work per member was faster among the lower 50% of households (4.2–4.6% per annum) than the higher 50% (2.2–4.2%). In 2017, the Gini coefficient was 0.459 (0.401 after taking into account government transfers and taxes), the lowest in a decade, although higher than the reported OECD 2014 average of 0.318 (Department of Statistics Singapore, 2018; OECD, 2018a).

Table 8.1 Singapore: Socioeconomic indicators, 1980–2017

Indicators	1980	1990	2000	2010	2015	2017
Population, total (in millions)	2.4	3.0	4.0	5.1	5.5	5.6
Population density (people per sq.km of land area)	3602.9	4548	6011.8	7231.8	7806.8	7915.7
Fertility rate, total (births per woman)	1.8	1.8	1.6	1.2	1.2	1.2 (2016)
Birth rate, crude (per 1000 people)	17.6	18.2	13.7	9.3	9.7	9.4 (2016)
Death rate, crude (per 1000 people)	4.9	4.7	4.5	4.4	4.8	4.8 (2016)
Population growth (annual %)	1.3	3.9	1.7	1.8	1.2	0.1
Population ages 65 and above (% of total)	4.7	5.6	7.3	9.0	11.7	12.9

Table 8.1 Singapore: Socioeconomic indicators, 1980–2017 (contd)

Indicators	1980	1990	2000	2010	2015	2017
Age dependency ratio, old (% of working-age population)	6.9	7.7	10.3	12.2	16.0	17.9
Age dependency ratio, young (% of working-age population)	39.6	29.4	30.1	23.5	21.3	20.8
GDP (current US$, billions)	11.9	36.2	95.8	236.4	304.1	323.9
GDP per capita (current US$)	4927	11 864.3	23 792.6	46 569.7	54 940.9	57 714.3
GDP growth (annual %)	10.0	10.0	8.9	15.2	2.2	3.6
Gross national expenditure (% of GDP)	106.9	89.9	87.7	73.9	74.3	75.7
Tax revenue (% of GDP)	17.0	14.5	14.9	13.0	13.3	13.7 (2016)
Central Government debt, total (% of GDP)	..	77.8	84.1	102.9	104.6	112.3 (2016)
Industry, value added (% of GDP)	34.9	30.8	32.5	26.1	24.2	23.2
Agriculture, forestry and fishing, value added (% of GDP)	1.5	0.3	0.1	0.04	0.03	0.03
Services, value added (% of GDP)	59.9	64.2	60.6	68.3	69.9	70.4
Labour force, total (in millions)		1.5	2.0	2.8	3.2	3.3
Unemployment, total (% of total labour force) (modelled ILO estimate)	..	..	3.7	3.2	1.7	2.0
Current health expenditure (% of GDP)	..	..	3.4	3.2	4.3	..

Key: GDP: gross domestic product; ILO: International Labour Organization
Source: World Bank, 2018

8.1.2 Political context

The history of modern Singapore is marked by the establishment of a trading port by Stamford Raffles in 1819. Following the Anglo-Dutch Treaty of 1824, Singapore was established formally as a British colony; subsequently it developed into a major regional port. In 1959, following a wave of nationalism, Singapore was granted self-government and held its first general election. In 1963, Singapore joined the Federation of Malaya, Sarawak and North Borneo to form Malaysia, but this arrangement was short-lived, leading to its independence as a sovereign democratic republic in 1965.

As a former colony, Singapore's legal system is based on English common law and a unicameral parliamentary system modelled after the Westminster system. Elections are contested within constituencies in general elections,

and the winners of each contest become members of Parliament for that constituency. Currently, there are 36 political parties registered in Singapore (Singapore Elections, 2018). However, every election since 1959 has been won by the main political party, the People's Action Party (PAP). Other notable parties include the Worker's Party and the Singapore Democratic Party.

8.1.3 Natural and human-induced disasters

Singapore is located at the tip of the Malay Peninsula in South-East Asia. Among 38 small island states, Singapore is an exception to not have recorded natural or human-induced disasters (Pelling and Uitto, 2001). The country is considered seismically safe as it is situated on a stable part of the Eurasian plate away from major fault lines. Exposure to other physical risk is relatively low due to its geographically favourable location between Malaysia, Sumatra and Borneo. Disaster resilience is also favourably shaped by a generally stable economy and political climate, as well as the establishment of good working relationships with key global actors, including the UN, WTO, Asia-Pacific Economic Cooperation (APEC) and ASEAN.

8.2 Health status and risk factors

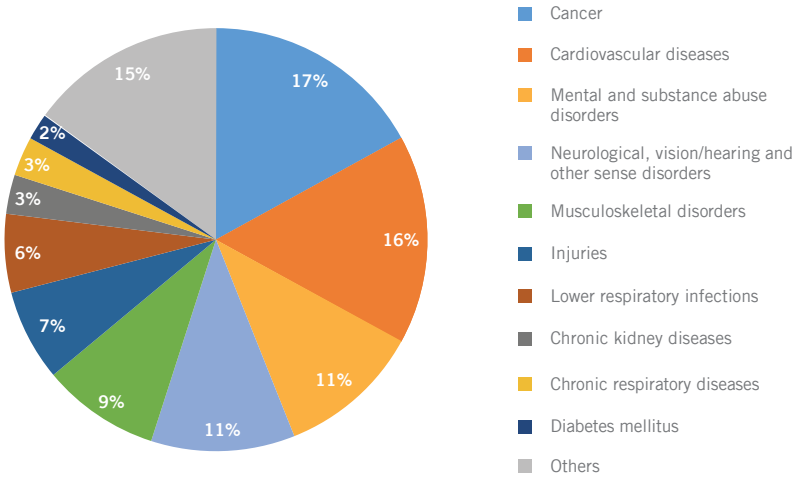
8.2.1 Health status

Life expectancy at birth has increased from 65.8 years in 1970 to 82.9 years for both genders in 2016, with women enjoying a higher average life expectancy of 85.1 years and men, 80.6 years (Department of Statistics Singapore, 2017; WHO, 2018). Significant improvements made in the areas of MCH have kept infant and under-five mortality rates low. The IMR per 1000 live births was 2.4 in 2016, compared to 20.5 in 1970. Similarly, the under-five mortality rate per 1000 live births decreased from 7.7 in 1990 to 2.8 in 2016 (World Bank, 2018).

In 1940, mortality due to communicable diseases was the leading cause of death (57%) but this was reduced to 37% in 1960, and further to 15% in 1980, suggesting completion of its epidemiological transition (Lim et al., 2013). Mortality due to NCDs steadily increased to represent 80% of all deaths in 2013 (MoH, 2017a). In 2017, the leading causes of mortality were

cancer, pneumonia and ischaemic heart disease (IHD), which together account for 67.7% (two thirds) of deaths (MoH, 2017a). In 2015, the disease burden was a total of 705 071 DALYs lost to mortality and morbidities, of which more than half (55%) were contributed by cancers (17%), CVDs (16%), neurological, visual/hearing/sense disorders (11%), and mental and substance abuse disorders (11%) (Fig. 8.1) (MoH, 2017b).

Fig. 8.1 Singapore: Distribution of DALYs by major disease groups, 2015



Source: MoH, 2017b

A total of 64 341 incident cases of cancer were diagnosed among the resident population during the period 2011–2015 (National Registry of Diseases Office, 2017). Of these, 31 284 (48.6%) were men and 33 057 (51.4%) women. The age-standardized incidence rate for all cancers in 2015 based on the most recent GBD Study was 305.5 per 100 000, faring well in comparison to the OECD average of 444.1 per 100 000 (Melaku et al., 2018). Of all cancers, colorectal, lung and prostate cancers were the three leading cancers diagnosed among men. Among women, breast, colorectal and lung cancers were the most common. The highest mortality rates were recorded for lung cancer among men and breast cancer among women (National Registry of Diseases Office, 2017).

While IHD is OECD's leading cause of all deaths, IHD is the third most common cause in Singapore (National Registry of Diseases Office, 2018; OECD, 2017). Mortality rates for coronary heart disease have shown consistent declines in Singapore over the past 15 years, although men still have almost twice the death rate of women, a difference that has remained constant over the years (National Registry of Diseases Office, 2018). The incidence of events of AMI among adults has also decreased since 1990. Similar to the general population's ethnic distribution, most of the episodes of AMI occurred among the Chinese, followed by the Malays and the Indians. The age-standardized mortality rate declined significantly from 33.5 per 100 000 in 2007 to 17.0 per 100 000 in 2016 (National Registry of Diseases Office, 2018).

8.2.2 Risk factors

Singapore is a tropical climate in close proximity to the equator, with no natural seasons in terms of moisture and thermal changes. The island has high humidity, abundant rainfall and relatively constant temperatures between 24 °C and 31 °C throughout the year. These particular conditions mean that Singapore is susceptible to mosquito-borne diseases, including dengue fever, malaria and chikungunya fever. As a major global trade and travel hub, Singapore is well connected to many cities around the world, and remains vulnerable to outbreaks and importation of communicable diseases (MoH, 2017c).

The prevalence of lifestyle factors that predispose to cancer and CVDs is higher among men than women in Singapore. The 1992–2010 National Health Surveys show that men have a consistently higher prevalence of smoking, hypertension, consumption of daily alcohol, and hyperlipidaemia than women. The prevalence of obesity has grown from 5.1% in 1992 to 10.8% in 2010 (MoH, 2017b), and is a major concern in Singapore as in other parts of the world. A total of 81.0% of the adult population between 18 and 69 years of age reported no regular physical activity in 2010 (MoH, 2011). Separately, the prevalence of diabetes mellitus increased from 8.6% in 1992 to 11.3% in 2010 (MoH, 2011). It has been estimated that one in three Singaporeans will develop diabetes over their lifetime, with a projected 1 million persons with diabetes by 2050, prompting the country's declaration of a whole-of-nation campaign called the "War on Diabetes" (MoH, 2017d).

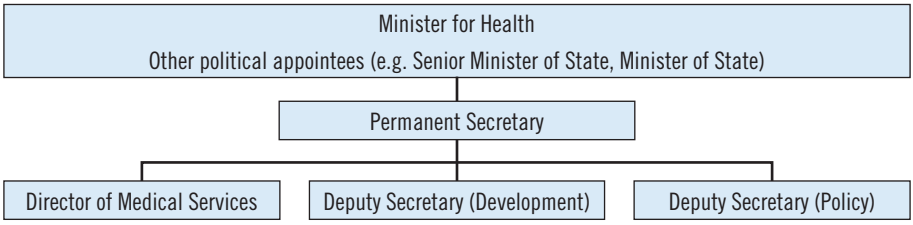
Singapore also faces new challenges with a rapidly ageing population. Total fertility (births per woman) is steadily decreasing, from 3.1 in 1970 to 1.2 in 2016, below the replacement level of 2.1 (Department of Statistics Singapore, 2017). At the same time, the percentage of the population aged 60 years and above is projected to increase from 19.5% in 2017 to 30.6% by 2030, and to 40.1% by 2050 (United Nations Population Division, 2017). As this demographic shift increases the dependency ratio, it is expected that the burden of chronic diseases and contributions to health-care cost will continue to grow. The health workforce also faces the challenges of an ageing population and the swiftly changing expectations of medical care. One challenge is to ensure that adequate numbers of health-care professionals are trained in the areas of elderly care such as geriatric medicine, and intermediate- and long-term care (ILTC). With the demands of chronic and multiple comorbid conditions, the health-care system has to fundamentally change the way services are organized and delivered. Many of the reforms are aimed at addressing these challenges; which is discussed in the subsequent sections.

8.3 The health system

8.3.1 Organization and governance

The MoH has overall regulatory powers, and is led by the minister, the permanent secretary and senior civil servants. The two key functional arms of the MoH are the Policy and Corporate Group, led by two deputy secretaries for health, and the Professional Group, led by the director of medical services (Fig. 8.2).

Fig. 8.2 Singapore: Leadership structure and organization of the MoH



Source: By the authors

Singapore has a mixed service delivery model. Prevention services are primarily provided through the MoH's statutory boards – the Health Promotion Board and the Health Sciences Authority. Public providers deliver 80% of acute care services; in primary care, 80% of the demand is met by private providers, while 20% is delivered through 20 government polyclinics (Haseltine, 2013; Lim et al., n.d.). The government has emphasized the importance of ILTC (e.g. nursing homes, community hospitals and hospices), especially for the elderly and those suitable for home care. Community hospitals focus on inpatient rehabilitative or convalescent care and are mostly run by not-for-profit voluntary welfare organizations (VWOs). Other services, such as day-care centres and nursing homes, are run by both for-profit companies and VWOs. In addition to facilities, the MoH provides development grants for providers of ILTC (Lim et al., n.d.).

Following the 1983 National Health Plan, public hospitals were "corporatized" or "restructured", i.e. hospitals remained publicly owned but run as private enterprises, which would provide autonomy to the management and flexibility to respond to patient needs. Introduction of competition was also intended to increase choices and cost-sharing for consumers (Lim et al., n.d.). Today, all public hospitals are managed by a holding company for public health-care assets called MoH Holdings (MoHHs) and are overseen by and coordinated through the MoH. Unlike private hospitals, they receive government funding for providing subsidized medical services. An MoHH develops and builds the physical and information technology (IT) infrastructure as well as the recruitment and human resource management framework for the entire public health-care sector, and performs selected systems-level finance, advisory and support functions. The MoH as regulator ensures standards for patient safety, welfare and continuity of care by drafting and effecting laws pertaining to health-care standards, enforcement and audit to ensure compliance, influencing the conduct of health-care professionals and establishing national standards of care provision.

In 2000, public health-care institutions were concentrated in two clusters – Singapore Health Services and the National Healthcare Group – but these were lacking in adequate step-down care, ILTC and community-based

care services. To better integrate partner networks and providers, a regional health system concept was implemented in 2009, resulting in six geographically defined regional health systems – Singapore Health Services, the National Healthcare Group, National University Health System, Alexandra Health Pte Ltd, Jurong Health Services and the Eastern Health Alliance (Lim et al., n.d.; Ong SE et al., 2018). In 2017, it was announced that the six regional health systems would be further reorganized into three integrated clusters – Singapore Health Services, the National Healthcare Group and National University Health System – each offering a fully comprehensive suite of services encompassing acute, primary and community care (Hui, 2017).

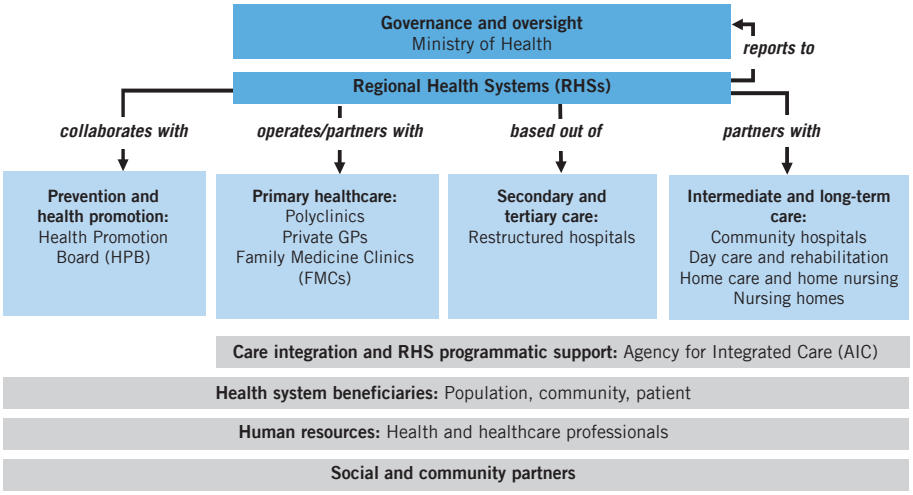
8.3.2 Patient-centredness

The initial concept of the regional health systems was intended to enable patient-centred care, promote newly integrated clinical pathways and care coordinators who work with multidisciplinary teams over the patient's lifetime. Subsequent strengthening of enablers and linkages between providers have furthered this aim (Saxena, 2009), including efforts to integrate specialist outpatient clinics and primary care providers to improve chronic disease management and community-based care. For example, the Frontier Family Medicine Clinic and the National University Hospital (NUH) formed a partnership to allow follow up of chronic and specialist outpatient care at clinics rather than hospitals. Supported by data linkages, primary care physicians of the Frontier Family Medicine Clinic were able to access appropriate patient information of the NUH and facilitate shared care, resulting in fewer appointments, more continuous care and system-level savings (MoH, 2015a). Similarly, under Khoo Teck Puat Hospital's Ageing-in-Place programme, community nurses are deployed to manage patients at home, serving as a single point of contact for health-care services (e.g. home care and specialist appointments) as well as non-medical services (e.g. befriending, wellness and home help). Over 3000 patients have benefited from the Ageing-in-Place programme and similar islandwide programmes, and readmission rates have fallen by 61% (Hui, 2013; MoH, 2015a). Other cluster-led efforts have focused on inpatient and ILTC services, such as the co-location of community

hospitals for rehabilitation with acute hospitals, and linkages with other community-based post-discharge/step-down services.

The Agency for Integrated Care plays a key role at the national level (Fig. 8.3). The Agency for Integrated Care began as a division of the MoH, responsible for coordinating placements for ILTC services, but is now an independent corporate entity (Agency for Integrated Care, 2018) stewarding the VWO-driven ILTC sector. The Agency coordinates referrals to ILTC services, facilitates discharge planning for patients from acute-care hospitals and disburses grants directly to patients on behalf of the MoH and Temasek Cares, such as the Senior Mobility Fund and the Caregivers' Training Grant. The Agency for Integrated Care also fosters the progress of the ILTC sector by promoting human resource development, developing service standards, piloting new programmes in partnership with providers, building institutional capabilities and educating patients (Saxena, 2009).

Fig. 8.3 Singapore: Key actors in service integration



Source: Adapted from Ong SE et al., 2018

8.3.3 Financing

Singapore's financing system is motivated by the twin philosophies of individual responsibility while safeguarding basic, affordable health care for all (Republic of Singapore Ministerial Committee on Health Policy,

1993). Health expenditure rose from 3.93% of the GDP in 2011 to 4.92% in 2014, but this remains low relative to the OECD average of 9% in 2015 (OECD, 2018b; WHO, 2018). Health-care costs are typically covered by a mix of government subsidies, statutory financing schemes, private voluntary insurance, employer medical benefits and OOP payments (Ong SE et al., 2018). Public health-care services are subsidized up to 80%, depending on means-testing. Three statutory financing mechanisms (the "3Ms") are central to financing the remaining portion – Medisave, MediShield Life and Medifund. Implemented in 1984, Medisave is a mandatory medical savings account financed from payroll deductions, which can be used by an individual or their immediate family to pay for hospitalization, day surgery and approved outpatient expenses. MediShield Life is a universal health insurance scheme that provides lifelong catastrophic cover for large hospitalization bills and selected specialist outpatient treatments (e.g. chemotherapy, kidney dialysis); supplemental coverage can be purchased in the form of private integrated shield plans and riders. Premiums for MediShield Life and integrated shield plans can be paid using Medisave (Khalik, 2016). Finally, the Medical Endowment Fund or Medifund is an endowment set aside to support those in financial difficulty even after subsidies, Medisave and Medishield are exhausted (MoH, 2018a).

OOP expenditures were 54.8% of the total spending on health in 2014, higher than the OECD average of 13.6% in the same year (OECD, 2018b; Ong SE et al., 2018). Recent initiatives to lower OOP payments include the Community Health Assist Scheme, which comprises means-tested subsidies for private primary care and subsidies for lower-income households. These are provided for ILTC services at MoH-funded institutions as well as day rehabilitation, home medical, home nursing and home palliative services).

8.3.4 Physical and human resources

In 2017, there were 2102 registered private primary care clinics and 20 public polyclinics, and 250 public and 861 private dental clinics (MoH, 2018b). There were nine public and nine private acute hospitals; and an additional eight national specialist centres providing cancer, cardiac, eye, skin, neuroscience and dental care. Patients requiring intermediate care

were discharged to eight community hospitals. Seventy-three nursing homes and two inpatient hospices met demands for residential long-term care (MoH, 2018b). In the same year, there were 2.4 doctors, 0.4 dentists, 0.5 pharmacists and 7.4 nurses per 1000 population (MoH, 2018c). These ratios are low compared to other developed countries with generally older populations (Lim et al., n.d.). Efforts are being made to increase local training capacity and facilitate mid-career conversions, as well as respond to changing population needs. The number of trainees in family medicine is set to increase by 30% while those for internal, geriatric and rehabilitation medicine will increase by 93% in 2019 compared to 2015. By 2020, 92% more advanced practice nurses will be registered, with their professional capabilities expanded to oversee nurse-led primary and community care clinics, and implement evidence-based care programmes (MoH, 2016).

8.3.5 Provision of services

Management of NCDs

The Health Promotion Board was established in 2001 to drive national health promotion and disease prevention, especially to address smoking, obesity, physical inactivity and poor nutrition. Some key initiatives of the Health Promotion Board include the 2014 Healthy Living Master Plan to facilitate nationwide healthy living; the Healthier Dining programme, which identifies and labels healthier eating options in 2700 outlets at over 60 hawker centres and 450 coffee shops (Lai, 2017), and the National Steps Challenge. The Health Promotion Board also works with the regional health systems to conduct community health screenings and intervention programmes.

Recognizing that a strong primary care sector is critical to managing NCDs in an ageing population (MoH, 2017e), the Chronic Disease Management Programme was first introduced in 2006 for diabetes, hypertension, hyperlipidaemia and stroke. Today, the programme covers 20 chronic diseases (MoH, 2015b). The Programme coordinates systematic, evidence-based chronic disease management programmes across 700 general practice clinics and groups, and enables the use of Medisave to cover these conditions (MoH, 2015b).

As mentioned earlier, a national strategy focused specifically on arresting the rise of diabetes and related complications, the "War on Diabetes", was announced in 2016 (MoH, 2017d), with a dedicated S$ 15 million injected into Health Promotion Board's efforts towards diabetes prevention in addition to an existing S$ 20 million grant in 2015 (Choo, 2018).

A National Mental Health Blueprint was first collaboratively developed in 2007 by the MoH, the Institute of Mental Health, Health Promotion Board, various hospitals, the Ministry of Education and the Ministry of Community Development, Youth and Sports. This plan proposed a holistic approach from screening to treatment, and focused initiatives on children and youth, working adults and the elderly. In response to anticipated national demand in an ageing population, the MoH launched a Community Mental Health Masterplan in 2012 with additional funding, and further committed to another five-year plan in 2017 (MoH, 2017e).

Management of communicable diseases including emerging diseases

Singapore's Infectious Diseases Act was promulgated in 1976 and is jointly administered by the MoH and the National Environment Agency. It empowers the Director of Medical Services and the Director-General of Public Health from the National Environment Agency to implement measures for outbreak prevention and control, and to prevent the introduction of disease. The agency also formulates guidelines for reporting and notification (Lim et al., n.d.).

Childhood immunization programmes date back to BCG in the mid-1950s, and today cover hepatitis B; diphtheria, pertussis and tetanus (DPT); poliomyelitis; Hib; measles, mumps and rubella; pneumococcal disease; and human papillomavirus (HPV), although only DPT and measles, mumps and rubella are compulsory (MoH, 2017c). By 2016, the programme achieved 99.2% coverage for BCG, 96.1% for hepatitis B, 97.0% for DPT, 91.8% for Hib, 94.7% and 88.2% for the first and second doses of measles, mumps and rubella, and 80.6% for pneumococcal disease (MoH, 2017c).

The burden of malaria, TB and HIV/AIDS has been kept relatively low. Despite being in a malaria-endemic region, Singapore has remained malaria-free by WHO standards since 1982 (Lim et al., n.d.), with a 2016

incidence of 0.4 per 100 000 (of which 95.2% of cases were imported). An Advisory Committee on AIDS was formed by the MoH in 1985, soon after the first reported case. Under the current National HIV/AIDS Control Programme, Singapore reported 408 notifications for HIV infection in 2016. However, sustained declines in the cases of TB after the introduction of the Singapore Tuberculosis Elimination Programme (STEP) in 1997 are possibly in reversal. In 2016, 2310 new cases of TB were reported (up 15.5% from 2015), including three new cases of drug-resistant TB, which is of concern (MoH, 2017c).

Dengue fever is endemic, with severe outbreaks in 2005, 2007 and 2013 (the worst year, with 22 170 cases) (Lim et al., n.d.). The surveillance programme was enhanced in 2015 to include samples from polyclinics and private laboratories, in addition to an islandwide network of general practitioners (Ong SE et al., 2018). The year 2017 saw a lull, consistent with an historical trend where the predominant serotype switches to one for which local seroprevalence is high, perhaps contributing to the currently low number of dengue cases. There are no signs of an outbreak in 2018 (Ong J et al., 2018).

Hand, foot and mouth disease is also endemic and is legally notifiable by medical practitioners, child-care centres or kindergartens (MoH, 2017c). A total of 42 154 cases of hand, foot and mouth disease were reported in 2016, with an incidence of 751.7 per 100 000 (MoH, 2017c). The protocol for response includes viral isolation and, since 2010, child-care centres or kindergartens with prolonged transmission of hand, foot and mouth disease are identified on the website of the MoH, followed by mandatory 10 days' closure if disease transmission exceeds 16 days. These measures continue to be enforced along with public education.

In 2016, Zika virus disease was declared a Public Health Emergency of International Concern. The first case imported from Brazil was reported in May 2016; the first local cluster was reported in August 2016. An epidemiology team was formed to enhance response capabilities and the outbreak (298 cases) was contained four weeks after coordinated national action (MoH, 2017c).

Management of MCH

Singapore's 2016 MMR was 4.8 in 100 000 (MoH, 2017c). Childhood mortality is very low and mainly associated with conditions such as stillbirths of unknown cause, genetic disorders and serious accidents (Department of Statistics Singapore, 2017; Ho, 2009). Medisave may be used to cover maternity care (including assisted reproduction), as well as health-care services for children. All Singaporean newborns receive an immediate Medisave grant of S$ 4000 as well as a Baby Bonus (a cash transfer of S$ 6000–S$ 8000 and a matched savings account that can be used for health care and early childhood interventions).

8.4 Performance of the health system

8.4.1 Effectiveness and quality

Singapore has seen a rapid convergence to world standards in health outcomes such as life expectancy (currently 83 years) as well as infant mortality and under-five mortality. Performance indicators such as vaccination coverage, cancer survival and 28-day survival from AMI are comparable to and often better than those for other developed countries. Health-care costs are low compared to other high-income countries, but with better or similar outcomes. In 2014, the efficiency of Singapore's health system was ranked first of 51 countries by Bloomberg; and its health-care outcomes second in the world (Bloomberg, 2014; The Economist Intelligence Unit, 2014).

Singapore is committed to and has done well with respect to the SDGs (Lim et al., 2016). In the Global Burden of Diseases, Injuries, and Risk Factors Study 2016, Singapore scored the highest among 188 countries evaluated on 37 of 50 health-related SDG indicators monitored over 1990–2016, with a score of 86.8 out of a possible 100 (followed by Iceland with 86.0 and Sweden 85.6, and relative to a global median score of 56.7) (Fullman et al., 2017).

In areas such as performance monitoring and public availability of these data, Singapore is making good progress. The effectiveness and quality of health care for Singaporeans are regularly tracked and reported to Parliament as key performance indicators of the MoH. Hospital-related

data are collected and monitored, including financial data (such as costs to patients) and hospital utilization data (such as the number of surgeries, bed occupancy rates, waiting times, discharge diagnoses, inpatient and outpatient numbers). The list of indicators also includes many tracer indicators for the health-related MDGs/SDGs (e.g. vaccination coverage) and chronic conditions as recommended by WHO and the World Bank (e.g. premature mortality from cancer) (Tan et al., 2014). Recent quality improvement initiatives include the development of the National Standards for Healthcare to ensure that the health-care delivered is appropriate to the patient's needs based on current evidence and clinical knowledge across the continuum of health care (Scheutz, 2013). These standards are also used to benchmark health-care providers in Singapore against others around the world. To promote greater transparency, hospitals are encouraged to publish the clinical outcomes of common procedures on the Internet (MoH, 2018a). The MoH also conducts regular national surveys to monitor the health status of Singaporeans, and commissions independent patient satisfaction surveys to monitor the patients' perception of care and providers (Scheutz, 2013).

Realizing that the effectiveness of initiatives and novel technology should be evaluated against the availability of financial resources, the MoH set up the Agency for Care Effectiveness in August 2015. The Agency for Care Effectiveness was established as a national HTA agency to drive better decision-making in health care in future, and to support care that offers better value (i.e. effectiveness per unit cost) (Agency for Care Effectiveness, 2018).

8.4.2 Accessibility

Singapore has been actively broadening its safety nets for financial protection in healthcare, including schemes such as the Pioneer Generation Package (benefits for cohort of Singaporeans born in/before 1949), MediShield Life, and improvements to the Community Health Assist Scheme. The redesigned MediShield Life scheme that was introduced to the public in 2015 has also helped to improve accessibility of basic health insurance to those who were previously too old or too ill to be insured. MediShield Life is universal, covering all Singapore Citizens and Permanent

Residents on a mandatory basis, including the elderly (no maximum age) and those with pre-existing conditions or congenital abnormalities. In the first 10 months of its implementation, MediShield Life paid out $102.5 million in 65,000 claims to people who previously had not been insured (Khalik, 2016). Singapore was among the top Asian and ASEAN countries on the Healthcare Access and Quality Index based on the 2015 Global Burden of Disease studies (Barber et al., 2017).

One common criticism is that the profusion of new schemes, subsidies and exemptions has resulted in a system that is in principle more accessible, but in practice overly complicated and challenging to navigate for the ordinary consumer (Lim et al., n.d.), which strengthens the case for integration and simplification (Ong SE et al., 2018).

8.4.3 Resilience

The outbreak of SARS in Singapore in 2003 was a watershed event that led to significant strengthening of health systems related to the surveillance and containment of emerging infectious diseases. Post-SARS, health-care policy-makers have continued to invest in building a health-care system with the capacity to respond pre-emptively and decisively to contain the threat of new outbreaks, including the commitment to establish a new 330 bed National Centre for Infectious Diseases by end of 2018.

As Singapore prepares for the impact of ageing, the definition of resilience has widened to include efforts to build capacity to address the long-term threat of chronic diseases. Efforts at prevention are being scaled up to reduce future downstream costs. This includes large-scale efforts at health promotion, such as the continuing commitment to the "National Steps Challenge", the War on Diabetes, and Screen-for-Life, the national screening programme. While continuing to upgrade its hospital infrastructure (including the recent addition of new co-located general and community hospitals), Singapore is refocusing on primary and community-based care, building family medicine clinics and community health centres, and increasing nursing home beds and places for centre- and home-based care.

In addition to physical infrastructure, these future needs imply necessary growth in other pillars of the health-care system. While the government has

begun to work towards a "future-ready health-care workforce" through initiatives such as skills training and re-training courses, there is growing recognition that with Singapore's limited local labour pool, this growth will be unsustainable without structural changes in the deployment of human resources or increased dependence on foreign skilled labour. Singapore thus looks towards technology as a primary driver of gains in efficiency and future sustainability. New models of care are being piloted, which rely heavily on technology to enable more effective and cost-efficient service delivery outside the traditional labour-intensive, hospital-based setting, such as tele-monitoring for patients with stable chronic disease in the community. From the IT perspective, national electronic medical records – a key backbone for integration and coordination of care – remain a work in progress. Steps have been recently taken towards having disparate institutions link their records, including making it compulsory for private facilities to provide patient data, and grants to help nursing homes and private clinics develop their systems. To remain committed to UHC requires balancing efforts at financing and managing the attendant fiscal pressures from increases in government health-care spending. These include recent changes that prevent first dollar cover, even under private medical insurance.

Most notably, at the highest-level of policy-making, Singapore has taken the explicit step of setting up an Office of Healthcare Transformation, led by a chief scientist with the mandate of test-bedding innovations to support a long-term vision of the future health-care system, through collaborations across the government as well as the private sector. The Office of Healthcare Transformation began operations in January 2018.

8.5 Conclusions

Looking ahead, the MoH has espoused a strategic vision based on three key shifts that will drive the health-care sector in the coming years. The first of these is to go "beyond hospital to community", bolstering the full spectrum of service delivery outside acute care towards not just primary care but a robust long-term care sector as well as community-based models of care. The supply-side expansion of primary and community care, as mentioned above, will continue under the Healthy Workplan 2020 and beyond, and

be supported by the planned roll-out of a national community nursing programme. Other future developments that will enable broader access to care include the redesigning of the existing long-term care insurance financing framework, to be renamed CareShield. While details of the new scheme are yet to be finalized, the financing of long-term care will be expanded in a manner similar to MediShield Life, providing universal lifetime coverage at the cost of increased premiums, although with significant subsidy support for smooth transition.

The second thrust is to go "beyond quality to value", driving innovations towards cost efficiency. In addition to the establishment of Agency for Care Effectiveness, the MoH is currently engaged in discussions around value-driven outcomes or efforts to implement reporting frameworks that increase transparency with respect to quality and cost indicators to activate change. Pilots of value-driven outcomes are in their initial stages across the major health-care clusters, but future developments are likely to see expansion of scope throughout the public health-care system as well as the range of quality indicators to include patient-reported outcomes. The MoH is also examining the feasibility of using mechanisms of bundled payments in the near future.

Finally, the third shift envisions going "beyond health-care to health", underlining the importance of healthy living and preventive care at home, in the community and the workplace. Efforts to coordinate stakeholders and empower individuals will strongly leverage technology as part of Singapore's Smart Nation platform. Future plans are likely to build upon the recently launched consumer-facing gateway, HealthHub, an integrated platform that enables Singaporeans to access their own records and other online services. This third shift implicitly acknowledges the role of the social determinants of health, and a greater recognition of the importance of integrating not just health-care services but health and social care more broadly. In 2018, as part of efforts to further bring health and social care together for the ageing population, the MoH announced a merger between the Agency for Integrated Care and the Pioneer Generation Office, to be renamed the Silver Generation Office, with an expanded mandate to coordinate care for seniors and their caregivers.

Key challenges will continue to emerge due to the rapid transition to a super-aged society, coupled with inflation of health-care costs. Given the strong past performance of the health-care system, and despite the large strides made in the past towards greater efficiency, capturing incremental value in a mature health-care system will become increasingly difficult. Singaporeans now hold higher expectations of quality of service and scope for co-managing their health, which sets a high bar for patient satisfaction. Finally, while chronic diseases loom large in the planning of health services, emerging communicable diseases remain an important threat, including the rising background spectre of drug resistance. Meeting these challenges will require continuing innovation, collaboration and commitment from all stakeholders.

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