



Healthy Aging in Asia

Edited by Karen Eggleston



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Stanford | Walter H. Shorenstein
Asia-Pacific Research Center
Freeman Spogli Institute

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Abbreviations

ACSC	ambulatory care-sensitive condition
AMED	Agency for Medical Research and Development
AMI	acute myocardial infarction
AOD	age-of-death
ASIRC	age-standardized incidence rate
BKPAI	Building Knowledge Base on Population Ageing in India
CCSV	Community Care Service Voucher
CDC	center for disease control
CDM	chronic disease management
CDR	cancer detection rate
CGAT	Community Geriatric Assessment Teams
CHARLS	China Health and Retirement Longitudinal Study
CHC	community health center
CHCC	Community Health Call Centre (Hong Kong)
CI	confidence interval
CIR	cancer incidence rate
COPD	chronic obstructive pulmonary disease
CSIRO	Commonwealth Scientific and Industrial Research Organization
CSSA	Comprehensive Social Security Assistance (Hong Kong)
CVD	cardiovascular disease
DALYS	disability-adjusted life-years

DM	diabetes mellitus
DRAH	diabetes-related avoidable hospitalization
EHCv	Elderly Health Care Voucher (Hong Kong)
EHI	Employees' Health Insurance (Japan)
GDHP	Global Digital Health Partnership
GP	general practitioner
HAQ	Healthcare Access and Quality (Index)
HBV	hepatitis B virus
HCV	hepatitis C virus
HIRA	Health Insurance Review & Assessment Service (Korea)
HMD	Human Mortality Database
HPV	human papilloma virus
HRS	Health and Retirement Study
HTA	Health Technology Assessment
JDS	Japan Diabetes Society
JMA	Japan Medical Association
JMPT	joint management by three professionals
KAM	Korean Academy of Medical Sciences
KCDC	Korea Centers for Disease Control and Prevention
KDA	Korea Diabetes Association
KDB	Kokuho Database
KNHANES	Korea National Health and Nutrition Examination Survey
KPI	key performance indicator
LDP	Liberal Democratic Party (Japan)
LMIC	low- and middle-income country
LYG	life-years gained
MCI	mild cognitive impairment
METI	Ministry of Economy, Trade and Industry (Japan)
MEXT	Ministry of Education, Culture, Sports, Science, and Technology (Japan)
MHLW	Ministry of Health, Labour and Welfare (Japan)
NATCM	National Administration of Traditional Chinese Medicine (China)
NCD	noncommunicable (chronic) disease

NCMS	New Rural Cooperative Medical System (China)
NCSP	National Cancer Screening Program (Korea)
NDB	National Insurance Claim and Health Checkup Database (Japan)
NGO	non-governmental organization
NHC	National Health Commission (China)
NHI	National Health Insurance (Taiwan and Japan)
NHIS	National Health Insurance Services (Korea)
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
OECD	Organisation for Economic Cooperation and Development
OOP-PD	out-of-pocket expenditure for prescription drugs
OWPH	One-way Permit Holders
P4P	pay-for-performance
PC-CDM	Primary Care-Chronic Disease Management
PEP	Patient Empowerment Programme (Hong Kong)
PMDA	Pharmaceutical and Medical Device Agency (Japan)
PPM	personalized and precision medicine
PPP	public-private partnerships
QALY	quality-adjusted life-years
RAMP	Risk Factor Assessment and Management Programme (Hong Kong)
RCHE	residential care home for the elderly
RCSV	Residential Care Service Voucher (Hong Kong)
SD	standard deviation
SES	socioeconomic status
SHC	specific health checkup
SHG	specific health guidance
SHCSHG	specific health checkups and specific health guidance
UEBMI	Urban Employee Basic Medical Insurance (China)
URBMI	Urban Resident Basic Medical Insurance (China)
WHO	World Health Organization

Contributors

Chapter 1

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Preface

As this book goes to press in April 2020, the world is in the midst of pandemic COVID-19 (coronavirus disease caused by SARS-CoV-2, a new coronavirus identified in 2019 with similarities to the SARS virus). First identified in Wuhan, People's Republic of China, other parts of Asia and the rest of the world have been dealing with the pandemic, along with the social and economic costs of the measures needed to control its spread. While such a crisis may overshadow any of the more mundane and humdrum topics of healthy aging, it actually accentuates many of the themes highlighted in the chapters of this book: the importance of strengthening health systems, especially primary care; the need for policies across multiple sectors (e.g., public health, urban planning, transportation, education) that support healthy aging; the imperative of supporting the vulnerable and addressing disparities so that the blessings of longevity can be equitably enjoyed. Since those with chronic conditions and the frail elderly are most susceptible to severe disease or death from COVID-19 or other pathogens, including the seasonal influenza, societies need to focus on healthy aging to build resilience to the periodic threat of epidemics and pandemics, as well as to the day-to-day killers such as cardiovascular disease, stroke, and cancer. Moreover, measures to ensure social connectedness and civil society support for the vulnerable, whether during mandatory social distancing or not, can support mental health and healthy aging.

Only in the coming years will the health impacts of current crisis become evident, from the lives saved by proactive responses, to the numbers who suffered acute myocardial infarction, stroke, and other events from not keeping up with routine anti-hypertensive and anti-diabetic medications during “lockdown”; from the lessons learned in governance and public-private

partnerships for future crises, to the festering weaknesses in health financing and delivery never addressed; from the reduced traffic accidents from less commuting and reduced ill health from air pollution, to those who suffered catastrophic social and economic consequences from loss of livelihood or mental strain; from the many lives improved from better handwashing (perhaps fewer influenza deaths in future flu seasons?), to those lost from reversion to poorer hygiene when everyday life resumes its rush and complacency. May the suffering from this pandemic in Asia and beyond reinforce the interconnections between effective health systems and resilient civil society; the importance of transparent, scientific leadership that embraces Li Wenliang's message that "there should be more than one voice in a healthy society";¹ and the prudence and humanity of equitable investments in healthy aging, based on scientific analysis of the "value for money" spent on alternative policies or interventions. Perhaps from this crisis will emerge new ways of using telemedicine and leveraging other technologies to support the health of the rural, poor, and vulnerable; innovative protocols for bringing together resources in a public health emergency; and a renewed conviction that investment in strong health systems undergirds the very social and economic fiber of our societies.

We dedicate the research in this volume to all those suffering from COVID-19, especially those who have been denied the possibility of healthy aging.

I thank all the authors who contributed their research and policy expertise to the chapters of this book. I acknowledge and thank the numerous Stanford research assistants who assisted with various stages of the research included in this volume, including Pedro Gallardo, Rebecca Spencer, Karissa Dong, Helen Chen, Janice Zhang, Renata Starbird, Yanghe Iven Sha, Jillayne Ren, and others noted in the respective chapters. I extend special thanks to George Krompacky for his professionalism and patience during the editing and production work for this volume.

Finally, many thanks to my loving family for all your support. I dedicate my work on this volume to Adrian and Alanna: may you continue to thrive and cultivate healthy habits to enjoy long, full lives; and with love to Chris 可思, looking forward to healthy aging together.

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1 Gao Yu, Ding Gang, Dave Yin, Qin Jianhang, and Timmy Shen, "Chinese Coronavirus Whistleblower Li Wenliang Dies of the Disease," *Caixin*, February 7, 2020, accessed 20 March 2020, <https://www.caixinglobal.com/2020-02-07/chinese-coronavirus-whistleblower-dies-101512456.html>.

Healthy Aging in Asia

1 Healthy Aging in Asia

Introduction

Karen Eggleston

Population aging and the economic (re)emergence of Asia—two of the most important phenomena of the twenty-first century—converge in the challenges Asian economies face in promoting healthy aging. The demographic transition from high to low fertility and mortality has been more rapid in much of Asia than in Europe and North America, and high-income East Asia leads the world in life expectancy and proportion of elderly, with middle-income China rapidly catching up at lower per capita income. Will most of the population benefit from longevity? And will these longer lives be healthy ones?

Much research reinforces the conclusion that investing in health brings economic benefits, when focused on priority health investments (Jamison et al. 2016). The probability that newborns will survive to age 90 has increased dramatically—in high-income countries from 4.8% in 1950 to 26.7% today and 50% by 2060, according to United Nations (UN) data (Eggleston and Mukherjee 2019). This triumph of longevity, along with low (frequently below-replacement) fertility, has important social and economic implications. Families, communities, and policies must adjust in ways that support healthy aging throughout the life course. For example, gains in longevity are increasingly accumulating at the end of life in conventional retirement years, rather than by reducing infant mortality (Eggleston and Fuchs 2012); therefore, working to older ages will be necessary. But extending work-lives is feasible only if the added years are healthy ones, and equitable only if the least advantaged also benefit from healthy aging. The great blessing of longer lives dims when later years are clouded by pain, disability, and loss of dignity.

How are health systems in Asia promoting evidence-based policies for healthy aging? What strategies have been tried to prevent noncommunicable

chronic diseases (NCDs), screen for early detection, raise quality of care, improve medication adherence, reduce unnecessary hospitalizations, and increase “value for money” in health spending? The chapters of this book contribute to the literature on how diverse economies of Asia are preparing for older population age structures and transforming health systems to support patients who will live with chronic disease for decades. Fourteen concise chapters are arranged by country and topic. Authors are social scientists and policymakers (e.g., Daejung Kim from Korea, and Maigeng Zhou, Min Yu, and colleagues from the central and provincial centers for disease control [CDCs] in China) sharing their empirical evidence and policy insights from recent and ongoing programs in each country or jurisdiction covered. They include experts in multiple disciplines and from multiple generations—from Professor Victor R. Fuchs, the “Dean of Health Economics,” now in his ninth decade, to students and recent graduates with fresh perspectives (Pedro Gallardo, Jason Li, Christina Ping, Zhi Ping Teo). Topics include precision health and personalized medicine in Japan; China’s evolving family doctor system and its national demonstration areas for chronic disease control; cancer disparities and public-private roles in Taiwan; and policies for healthy aging in Korea and India. Several chapters draw on research led by the Stanford Asia Health Policy Program on the net value of chronic disease management programs throughout Asia, starting with analysis of detailed longitudinal, patient-level data on diabetes management as a lens for understanding the net value of medical spending for patients with complicated chronic diseases across diverse health systems.

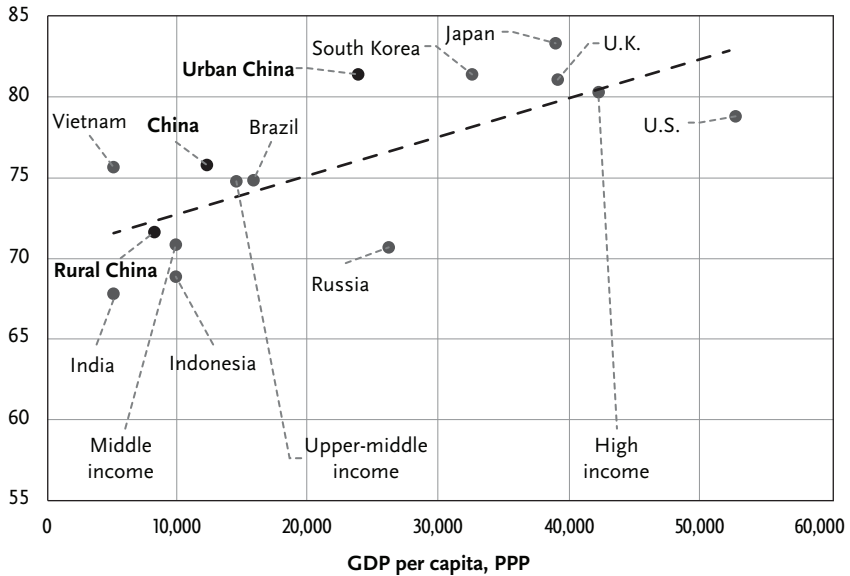
In this brief introduction to the book, I discuss patterns of demographic and epidemiologic change in the region and the contributions of each chapter, while highlighting the importance of addressing disparities in healthy aging.

Aging Asia

Regions vary in their historical experience of demographic transition. Some areas, such as the former Soviet Union or Eastern Europe, experienced a prolonged stagnation or even dramatic decline in life expectancy during the transformational recession accompanying the demise of socialism, followed in some cases by rapid improvement and greater variation in life span (Kornai and Eggleston 2001; Aburto and van Raalte 2018). In contrast, the Asian economies undergoing systemic transformation from central planning to market-based economies, China and Vietnam, have seen steady increases in life expectancy. Among high-income countries, Case and Deaton (2015) highlight “deaths of despair” (such as opioid overdoses) among the middle

class and middle-aged in the United States and their relationship to the recent U.S. decline in life expectancy. Japan, meanwhile, has achieved world-leading longevity, and South Korea also exceeds the average for high-income countries, as shown in figure 1.1.

FIGURE 1.1 Life expectancy at birth, 2013 (in years)



SOURCES: World Development Indicators, World Bank, and Global Burden of Disease estimates in Zhou et al. (2016).

NOTE: Horizontal axis shows per capita gross domestic product (GDP) in purchasing power parity (PPP).

Chapter 2 explores inequality in these longevity trends. Victor Fuchs and co-authors describe the distributions in age of death and their changes over time in three high-income countries of East Asia—Japan, South Korea, and Singapore—and the United States, compared with other high-income countries. The authors show that differences in life span between advantaged and disadvantaged groups generally decrease over time and with economic development, but remain large, especially among men. This greater survival gap among men echoes findings from many other studies. In Europe, for example, Permanyer et al. (2018) find that in Spain between 1960 and 2015 life expectancy increased for all, but with differences between the low and highly educated, especially among men. Chapter 2 concludes with a discussion of how policy might address inequalities by focusing on the causes of

death among youth and the middle-aged. Clearly, to support healthy aging, policymakers must pay attention to the entire life course.

Research can help to inform policy, not only by understanding patterns of change, but also by helping to monitor how societies adapt to aging along multiple dimensions. Some studies propose individual-based measures of healthy aging, while others focus on societal adaptation. For example, Chen et al. (2018) develop an “Aging Society” index that assesses the status of older populations across five specific domains, including productivity and engagement, well-being, equity, economic and physical security, and intergenerational cohesion, using data from the Organisation for Economic Cooperation and Development (OECD). They find that Japan lags behind Norway and Sweden, according to their index.

In this book, chapters 3, 4, and 5 explore dimensions of Japan’s policies for healthy aging, followed by expert accounts of South Korea and Hong Kong, all high-income economies with rapidly aging populations. The next five chapters provide different perspectives on China’s demographic change and health system reforms. As evident in figure 1.1, China truly embodies “multiple countries within one,” at least in terms of health. In figure 1.1, I disaggregate urban and rural China as if they are two separate countries. I illustrate internal disparities by showing the average life expectancy (with data from Zhou et al. [2016]) for the top four provinces (Shanghai, Beijing, Tianjin, and Zhejiang)—labeled “urban China”—compared to the average for the lowest four provinces (Tibet, Xinjiang, Qinghai, and Guizhou), which are labeled “rural China.” A few conclusions are inescapable. The 2013 gap in life expectancy between these proxies for urban and rural China—almost 10 life years—is equivalent to the gap between high- and middle-income countries. Residents of the top four provinces enjoy first-world health outcomes, virtually a different country from that of their compatriots in the lowest four provinces.

The Social Determinants of Health and Disparities in Healthy Aging

These wide regional and urban-rural disparities in health outcomes stem from a plethora of factors; access to healthcare is one, but much previous research (e.g., Fuchs 2004; Marmot 2015) highlights the importance of many (often highly correlated) non-medical factors, termed “social determinants of health,” including poverty, low educational attainment, and lack of local public goods (such as clean water, modern toilets, protection from harmful toxins, and community-wide control of vectors for infectious disease). Income, education, occupation, age, sex, marital status, and ethnicity are all correlated with health (Fuchs 2004). Moreover, the direction of causation is two-way: poor health can interfere with schooling and earning income, while poor education and low income can contribute to ill health and premature mortality. The virtuous cycle between better health and socioeconomic status has as its counterpart the vicious cycle of “illness-induced poverty” from causes ranging from childhood malnutrition to catastrophic medical spending.

To lay the foundation for healthy aging, societies must address these social determinants of health. Chapter 13, for example, discusses the many infection-caused cancers prevalent in China that contribute to urban-rural health disparities. Screening, as discussed in multiple chapters, can be effective in catching cancer at stages early enough to treat, as well as detecting other chronic diseases and avoiding disabling complications. But screening can also lead to false positives and over-treatment, as is potentially the case with the rapid increase in the incidence of thyroid cancer and its treatment (Vaccarella et al. 2016).¹ Chapter 3 speaks to this theme by discussing Japan’s screening program for metabolic syndrome and other policies within the Healthy Japan 21 (2013–22) plan, as well as the importance of tobacco control.

Several chapters in this book describe policies aimed at promoting healthy behaviors and addressing the non-medical determinants of health. For example, chapter 4 discusses the political economy of “precision health” and its prospects in Japan. Chapter 8 discusses how China seeks to promote local innovations for control of risk factors leading to chronic disease. Here, Jianqun Dong and colleagues from the China National Center for Disease Control and Prevention describe China’s efforts to motivate local government

1 Du et al. (2018, 291) discuss the experience of Zhejiang Province, showing rapid increase in diagnosis of thyroid cancer with low and stable mortality, concluding “this increase in incidence might be due to increased diagnosis with advanced technology.” These trade-offs, as well as public and private roles, feature in chapter 13.

responsibility in the prevention and control of NCDs with inter-sectoral coordination and by promoting multi-department cooperation in the construction of national demonstration areas and National Health Cities.

Managing Chronic Disease

In addition to the social determinants of healthy aging, the role of appropriate healthcare remains quite important, especially in managing patients with chronic disease. Several chapters discuss economic research on diabetes and hypertension, two increasingly prevalent conditions in aging Asia.

In chapter 9, Min Yu of the Zhejiang provincial CDC and co-authors note that diabetes poses a critical public health issue in many countries, especially for health systems ill-prepared to manage chronic disease within primary care. China's efforts to strengthen population health and primary care management for diabetes, especially in rural areas, deserve careful study and benchmarking to international experience to inform further progress. Improved prevention and control may not only improve patients' quality of life, but also potentially save resources by reducing avoidable hospital admissions. The authors propose age- and sex-standardized medical expenditures on avoidable admissions, alongside the more standard metric of number of admissions, as a new way of measuring primary care management of diabetes and comparing progress over time and across regions.

Chapter 11 provides empirical evidence about hypertension control in China and its relationship with the country's expansion of health insurance. Here, Jason Li argues that, given China's growing elderly population and chronic disease burden, controlling hypertension has been called the most urgent and cost-effective public health strategy the country could pursue, and shows through his analysis of the "care cascade" that China still struggles with poor hypertension management: 59.7% of all hypertensives were diagnosed, 51.4% were treated, and only 22.3% achieved effective control. Insurance coverage depth remains shallow for many citizens; increased insurance generosity was associated with a higher likelihood of treatment but not of diagnosis and control. Thus, Li suggests that factors beyond insurance may be limiting the positive effect of insurance generosity on hypertension management, an area for evidence-based policy to contribute to better chronic disease control.

Confronting the challenges of aging societies will require thinking carefully about the value of investments in methods for managing chronic conditions. Several chapters in this book showcase careful empirical research on this theme. For example, chapter 3 summarizes research on the net value of

diabetes management in Japan; and the appendix provides detailed methods for others to consult in providing research evidence for other patient populations. This net value approach seeks to measure the productivity of resources devoted to chronic disease management, with detailed patient-level data to include the monetary value of improved health outcomes. As Dunn and Fernando (2019) argue, “a complete understanding of the growth trends in the medical care sector, as well as our overall economy, hinges on properly accounting for quality alongside costs.” Eggleston, Grossman, and Cutler (2004) suggest that productivity research could be considered the “genome” of healthcare delivery innovation, given its foundational role in guiding reforms of healthcare delivery systems to achieve quality and efficiency.

Indeed, careful research can help society to avoid across-the-board cost control measures that stifle healthcare innovations that would deliver health improvement at a reasonable cost, or even cut cost. Chapter 7 provides another valuable perspective in this line of research.

Healthcare Access and Quality: Raising Averages, Addressing Disparities

The contributors to this volume also point to health system innovation beyond specific chronic disease control measures—innovation aimed to improve healthcare more generally and to reduce inequality. Disparities in healthcare access and quality remain vital policy priorities, especially for large, diverse countries such as India and China.

Ethical challenges are the focus of several studies of health sector reforms. For example, Kornai and Eggleston (2001) argue that reforms of health sectors in transition economies should promote individual sovereignty and choice, on the one hand, while assuring social solidarity—i.e., helping the suffering, the troubled, and the disadvantaged—on the other. These two ethical principles have their counterparts in the phenomena of innovation and shortage (or access): can a health system sustain both choice (i.e., allowing the wealthy to purchase health improvements) *and* solidarity to provide access to those same health improvements for those less fortunate?

Science, population health, and economic development, although uneven, have expanded the possibilities for all; social policies determine how soon and how completely those same possibilities for healthy longevity are made available to those less fortunate. Angus Deaton (2013) emphasizes a similar point: innovations, first in population health and later in medical care, increased inequality but also brought progress with “trickle down” access

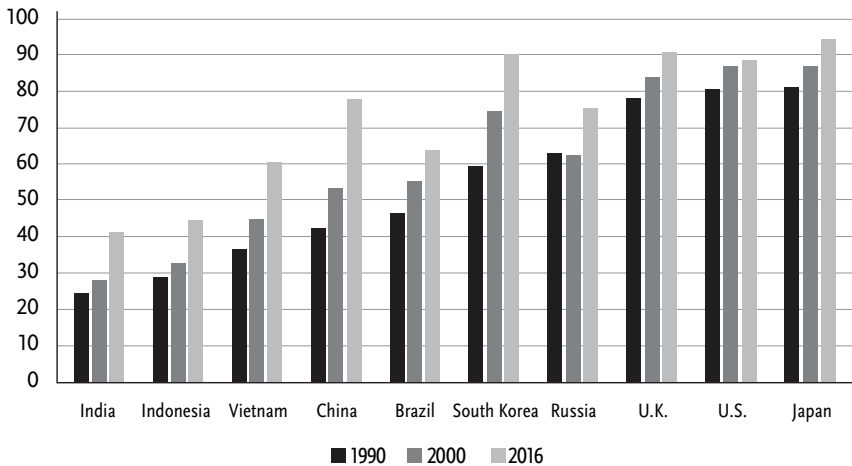
for the poor. Indeed, this idea that innovations first accessed by the rich eventually diffuse to the poor has been called the “inverse equity hypothesis,” and seems to apply to multiple cases (e.g., Lee et al. [2015] on cancer screening). Vaccines are one of the most cost-effective technologies for health over the life course (Bloom 2018), yet the net benefit of their use for specific populations remains a critical policy question.

Policies to assist countries in responding effectively to population aging should give disproportionate weight and financial support to speeding up the inverse equity diffusion process to narrow health and healthcare inequalities, such as between rural and urban areas or between the poor and the non-poor. This lesson is highlighted in multiple chapters of this book, with detailed experiences and policies in various Asian economies illustrating progress and the challenges of equitable access to technologies for healthy aging, especially acute for low- and middle-income countries.

For measuring disparities, new metrics have also been developed that could be refined and extended over time. For example, a recent study develops the “Healthcare Access and Quality” (HAQ) index, which measures premature mortality from causes preventable by access to high-quality healthcare (Fullman et al. 2018). According to this metric (figure 1.2), India improved significantly between 1990 and 2016, but is still working to catch up with Indonesia, Vietnam, and Brazil. China’s rapid improvement in access and quality is evident from the fact that even China’s *lowest* region in 2016 was above the 1990 national median. Among 195 countries and territories, China shows the highest absolute change in the HAQ Index during 2000–16, overtaking Brazil and approximating South Korea in 2000. China’s HAQ index in 2016 was the highest among all countries with the same or lower medical spending per capita.

Despite this progress, sizable disparities remain in both health and healthcare within large low- and middle-income countries such as China and India. For example, although China achieved universal health coverage and improved healthcare utilization in both rural and urban areas over the past two decades, there are still substantial inter-regional gaps in service coverage, availability, and affordability. To illustrate, the 43-point regional disparity in HAQ within China (i.e., between Beijing and Tibet) is the equivalent of the difference between Iceland (ranked highest in the world) and North Korea. India also exhibited huge disparities—between Goa and Assam is a 30.8-point difference—whereas Japan recorded the smallest range in subnational HAQ performance in 2016 (a 4.8-point difference). Fullman et al. (2018) also note fast improvements in healthcare access and quality in southeast Asia.

FIGURE 1.2 Changes in the Healthcare Access and Quality (HAQ) Index, 1990–2016



SOURCE: Data extracted from Fullman et al. (2018).

To improve healthcare access and quality, health system innovations play an important role. Several chapters discuss such efforts in aging Asia. For example, chapter 10 on the family doctor system in China describes the many efforts to re-orient China's health service delivery system away from crowding at tertiary hospitals and establish reliable systems for community-based care.

Another aspect of health system adjustment to aging involves the role of the public and private sectors in delivering health services and providing long-term care to the frail elderly. Public needs far outstrip the abilities of the government alone to deliver, including the broad array of social services that support healthy aging. These are the topics of two chapters. In chapter 12, Donahue and co-authors report results from a survey of 17 medium-sized cities in China on how local governments are seeking ways to create public value through contracting with the private sector and collaborative arrangements with some shared discretion, what the authors label "collaborative governance." The chapters on Hong Kong, Korea, and India all touch upon different roles of public and private actors in each system. And in chapter 13 Eggleston, Lu, Ping, and Zhang discuss how government and private actors take on complementary roles in addressing cancer as a leading cause of death, from drug discovery and development, to negotiating drug prices on insurance formularies, to delivering innovative target therapies.

Demographic changes interact with new technologies, such as personalized medicine therapies, to challenge the sustainable financing of medical care. Hokuto Asano, in chapter 5, focuses on this issue. He explains Japan's

policies regarding personalized and precision medicine, including data collection, policy support, and how insurance coverage for new therapies works in Japan, comparing four drugs and companion diagnostic tests to their coverage and pricing in the United Kingdom. He also notes the importance of cost-effectiveness analyses in this process. Cautious optimism could be warranted regarding the power of innovation to produce both “miracle drugs” and the new approaches to financing and payment that will spread their benefits more widely (Eggleston 2018).

In sum, the contributors to this volume provide detailed empirical evidence and rich policy experience, covering multiple aspects of policy initiatives for healthy aging in health systems as diverse as those of the cities Singapore and Hong Kong to large economies such as Japan, India, and China. I thank the authors for their contributions and hope you, the reader, will find our work useful.

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