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# **THE COST OF INACTION: SECONDARY PREVENTION OF CARDIOVASCULAR DISEASE IN ASIA-PACIFIC**

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## About this report

*The cost of inaction: Secondary prevention of cardiovascular disease in Asia-Pacific* is a report by The Economist Intelligence Unit. This research project follows on from the 2018 Economist Intelligence Unit report *The cost of silence: Cardiovascular disease in Asia*.

It describes findings of the *Secondary Prevention of Cardiovascular Disease in Asia-Pacific Scorecard*, created by EIU Healthcare along with in-depth interviews with 15 regional experts. The scorecard was developed to assess the burden and health system response to secondary cardiovascular events in eight Asia-Pacific economies: Australia, Mainland China, Hong Kong, Japan, Singapore, South Korea, Taiwan and Thailand.

We would like to thank the following (listed alphabetically) for contributing their time and insight:

- Hiroyuki Daida, dean of faculty of health science, Juntendo University, Japan
- Ngai-Yin Chan, president, Hong Kong College of Cardiology, Hong Kong
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**Box 1: Findings in context—cardiovascular disease and covid-19**

The covid-19 pandemic which emerged at the end of 2019/early 2020 has drastically impacted how life, business and healthcare are conducted. While the situation is fast evolving, and data are in the preliminary stages of collection, the impact on cardiovascular disease (CVD) patients appears to be substantial.

Individuals with pre-existing medical conditions, such as CVD, are more vulnerable to covid-19. Around 10% of CVD patients who contract covid-19 will die (compared with around 1% of non-CVD patients), and as many as 20% of hospitalised covid-19 patients will experience myocardial injury as a result of infection.<sup>1</sup>

CVD patients are not only at higher risk of covid-19 complications, but face additional challenges in accessing health services during the pandemic.

Health-seeking behaviours appear to be changing as people practise physical distancing and avoid healthcare settings for fear of contracting covid-19. Early data from Hong Kong have shown that 20% fewer people experiencing stroke are presenting to hospital during the therapeutic window, on average presenting one hour later than pre-pandemic.<sup>2</sup>

These vital minutes early in a stroke can have disproportionate impact on long-term outcomes. Similarly, patients experiencing ST-segment-elevation myocardial infarction (STEMI) from late January 2020 had a median 318 hours between symptom onset and first medical contact, compared with just 82.5 hours in 2018-2019.<sup>3</sup>

In Singapore, noncritical outpatient visits, clinical services and elective surgeries have been postponed, and cardiac rehabilitation services have been adjourned for up to six months.<sup>4</sup> This has resulted in a more rapid uptake of technology to deliver these services, according to Dr Tee Joo Yeo.

This is a rapidly evolving environment—as reflected by the suite of ‘living consensus statements’ issued by the Cardiac Society of Australia and New Zealand.<sup>5</sup> Whether the structural changes being implemented now will become permanent fixtures in the management of CVD, remains to be seen.

Taken together, this emerging situation further emphasises the need for better, coordinated preventive care for CVD with the goal of keeping people healthy and out of hospital settings as much as possible.

<sup>1</sup> Kevin J. Clerkin, *et al.* “Coronavirus Disease 2019 (COVID-19) and Cardiovascular Disease”, *Circulation*, 2020.

<sup>2</sup> HKUMed. “HKUMed research shows that stroke patients are presenting to hospitals one hour later during COVID-19, potentially jeopardising the patients’ eligibility for treatments and affecting the outcome” Available from: [www.med.hku.hk/en/News/stroke-patients-are-presenting-to-hospitals-one-hour-later-during-COVID-19](http://www.med.hku.hk/en/News/stroke-patients-are-presenting-to-hospitals-one-hour-later-during-COVID-19) (Accessed May 2020).

<sup>3</sup> Chor-Chum Frankie Chan, *et al.* “Impact of Coronavirus Disease 2019 (COVID-19) Outbreak on ST-Segment–Elevation Myocardial Infarction Care in Hong Kong, China”, *Circ Cardiovasc Qual Outcomes*, 2020.

<sup>4</sup> Tee Joo Yeo, *et al.* “Have a heart during the COVID-19 crisis: Making the case for cardiac rehabilitation in the face of an ongoing pandemic”, *European J Preventive Cardiology*, (2020).

<sup>5</sup> Cardiac Society of Australia and New Zealand. “COVID-19 Resources”. Available from: [www.csanz.edu.au/covid-19/](http://www.csanz.edu.au/covid-19/) (Accessed May 2020).

## Executive summary

The burden of cardiovascular disease (CVD) across Asia-Pacific varies by country, but is nonetheless substantial. Collectively CVD is the leading or second-leading cause of death across the region and the prevalence continues to rise. Further, shifting demographics in the region—with both an increase in younger people experiencing CVD and ageing populations with multiple comorbidities—are putting health systems under increasing pressure.

Progress in tackling the problems associated with CVD has focussed in the primary prevention space, and age-standardised incidence of CVDs are beginning to fall. However, undermining this progress, there is still an unacceptably high recurrence rate of heart attack and stroke with associated economic and human cost. As more patients now survive an initial heart attack or stroke, the secondary event burden is likely to increase. This demands urgent attention but also represents an eminently realisable opportunity to improve care and outcomes in this group.

This analysis by the Economist Intelligence Unit explores the policy response to managing secondary cardiovascular events in eight Asia-Pacific economies: Australia, Mainland China, Hong Kong, Japan, Singapore, South Korea, Taiwan and Thailand.

Key findings of the research include:

**While CVD policies do exist, some are more comprehensive than others.** All of the study economies have some form of CVD policy, either as a standalone document or as

part of a non-communicable disease strategy. Few policies make explicit provision for secondary prevention, with only South Korea and Australia demonstrating this (the latter is yet to be implemented). The extent to which plans are followed and the process for timely updates both remain unclear.

**The success of translating policy on modifiable risk factors into legislation and action, along with measuring impact, is yet to be defined.** Lifestyle modification is a

building block for CVD prevention that must be continually prioritised. All economies have policies on achieving healthy diet, have a harmful alcoholic consumption policy, and a physical activity policy. Improvements are required for tobacco control. Estimating the impact and effectiveness of these policies is not clear cut. Tobacco use is declining across the region, however obesity is on the rise. While short-term lifestyle modification is achievable, especially in engaged patients who have recently experienced a cardiovascular event, long-term change remains challenging.

**Government audits are lacking.**

The existence of government audits and the availability of this audit data in the public domain is needed to assess the implementation of policies which aim to improve service delivery of CVD using outcomes data. Only two economies in this study, Australia and South Korea, report any form of audit, and government audits against quality standards are severely lacking. There is an overall lack of information on how CVD implementation plans are measured.

**Primary care systems, a key component for integrated care, are evolving.**

Integrated primary care is a relatively new concept in many economies, and uptake of services remains slow. In Asia particularly, this is further complicated by provision of care split between private and public health systems. Primary care services can be a key contributor to managing non-communicable diseases and must be strengthened in order to realise true integration of care for secondary prevention of CVD.

**Rehabilitation services exist but coverage is limited, and they struggle to recruit and retain patients.**

Most economies in this study have rehabilitation programmes in place, but the coverage and accessibility of these vary. Referral to rehabilitation services is inconsistent, especially outside of large population centres, and the ability to share patient information is hindered without electronic health records. Attendance for rehabilitative services may be as low as 6% of eligible patients.

Individual economy-level responses must be based on the local situation and priorities, and it is up to each to develop a strategy that meets the needs. However, policymakers looking to tackle this issue may well consider some of the key priorities identified in this research:

**Integrated, coordinated patient-centred care is a necessary goal:** While policy does seem to recognise the importance of high-quality integrated care, the lack of examples in

the region reflects the challenges of achieving this goal. Building on data, the use of electronic health records, and implementing individualised care plans are the first steps towards addressing structural barriers within health systems. The interface between primary and specialist care is a priority area to address for most economies.

**Patient empowerment is essential for**

**success:** Lack of patient participation in rehabilitation programmes and adherence to medication are two of the biggest issues that must be addressed in secondary prevention of CVD. Evidence-based patient education and empowerment initiatives appear to be lacking across the region and therefore should be prioritised. The use of technology may offer opportunities in this area.

**Maximising data and measuring progress:**

Improving and expanding registry data coverage is vital to understand the true picture and inform policy. Integration of data through electronic health records is currently lacking, but may contribute towards this goal. Strengthening monitoring of secondary prevention goals in non-communicable disease or CVD plans, and auditing service delivery based on establishing quality standards and patient outcomes should be considered a high priority for study economies to refine their healthcare offerings and ensure patient needs are met.



## Chapter 1. The nature and extent of the CVD challenge in Asia-Pacific

### Getting to grips with cardiovascular disease

The huge size of the health burden imposed by cardiovascular diseases (CVDs) is undeniable. In 2017, 483m people, or around 6.4% of the world's population, were living with one such condition. That year, they were responsible for 17.7 m deaths, or 32% of the global total.<sup>1</sup>

In the eight economies covered in this study—Australia, Mainland China, Japan, Hong Kong, Singapore, South Korea, Thailand and Taiwan—the exact scale of the burden varies. For example, CVDs account for 22% of deaths in South Korea and Thailand and as much as 42% in Mainland China.<sup>2</sup> They are collectively the leading or second leading cause of death in each economy.

Just as clear as the extent of the problem is the evidence of progress. Primary prevention efforts have had a generally positive impact in study economies over the years. The two deadliest forms of CVD, ischaemic heart disease (within which myocardial infarctions—commonly called heart attacks—are the big killers) and stroke (the most common type being ischaemic stroke where a blood vessel to the brain is blocked) provide the best evidence of health gains.

Beginning with age-standardised incidence, between 1990 and 2017 Australia made substantial progress in reducing the rate of

new cases, while Singapore had a notable rise (Figure 1). Most of the other economies saw a decline, albeit a slow one. The age-standardised incidence figures for stroke show that South Korea and Singapore had the biggest drops. Once again, most of the other study economies saw steady improvement, though Mainland China is the exception here.

The general decrease in the incidence of CVDs reflects the aggregate impact of various underlying risks. There are numerous modifiable risk factors for CVD, but the most important include hypertension (high blood pressure), high cholesterol, tobacco use, diabetes and obesity.<sup>3</sup> The battle against tobacco, for example, is the biggest relevant public health success: smoking prevalence between 1990 and 2015 declined in all study economies,<sup>4</sup> reducing CVD risk. The same period, however, saw a noticeable rise in the percentage of the population who are overweight in these economies, except for Japan and South Korea, where the opposite was seen.<sup>5</sup> The specific combination of risks may differ, but a study from Japan illustrates a common dynamic. It sought to quantify the contribution of various drivers to Japan's long-term drop in mortality from heart disease after 1980. The researchers calculated that 35% of the improvement should have come from lower blood pressure and decreased smoking prevalence. At the same time, greater risks related to increasing levels of cholesterol, weight, and type II diabetes prevalence reduced this gain by around a quarter.<sup>6</sup>

<sup>1</sup> Disease incidence, mortality, and prevalence data in this section are from Global Burden of Disease project data, available at: Institute for Health Metrics and Evaluation, GBD Compare Data Visualization, 2018.

<sup>2</sup> Global Burden of Disease data do not include Hong Kong. Information used in this analysis are from the heart disease and stroke pages of the "HealthyHK - Public Health Information and Statistics of Hong Kong" website of the Hong Kong government.

<sup>3</sup> Centers for Disease Control and Prevention. "Know your risk for heart diseases". Available from: [https://www.cdc.gov/heartdisease/risk\\_factors.htm](https://www.cdc.gov/heartdisease/risk_factors.htm) (Accessed Feb 2020).

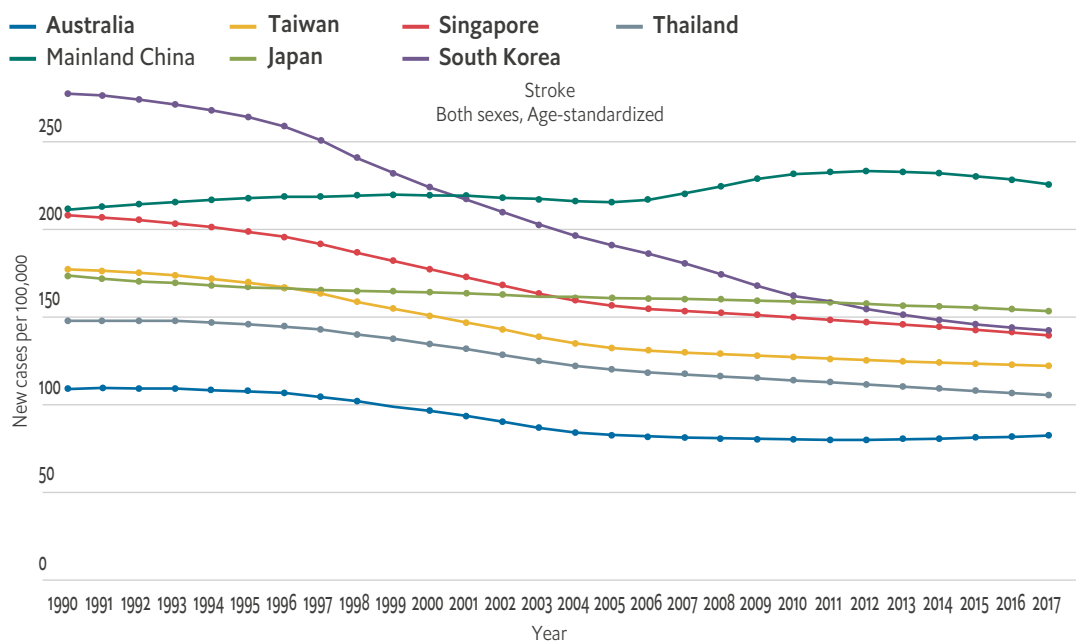
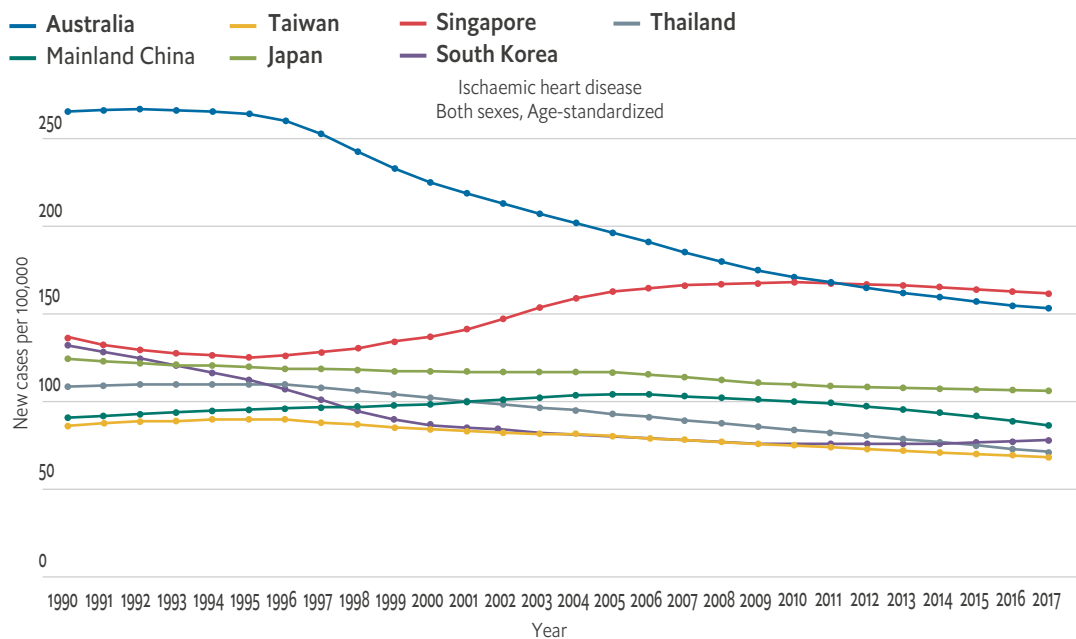
<sup>4</sup> GBD 2015 Tobacco Collaborators, "Smoking prevalence and attributable disease burden in 195 countries and territories, 1990–2015," *Lancet*, 2017; "Smoking Prevalence for Males and Females in Hong Kong," Hong Kong Council on Smoking and Health web sites, accessed 29 January 2020.

<sup>5</sup> NCD Risk Factor Collaboration, "Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016," *Lancet*, 2017.

<sup>6</sup> Soshiro Ogata, "Explaining the decline in coronary heart disease mortality rates in Japan: Contributions of changes in risk factors and evidence-based treatments between 1980 and 2012," *International Journal of Cardiology*, 2019.

**Figure 1**

Age-standardised incidence of ischaemic heart disease and stroke per 100,000 population



Source: Global Burden of Disease study 2017

Dr Ngai-Yin Chan, president of the Hong Kong College of Cardiology, believes that too close a focus on behaviour might mean analysts are missing the impact of other risks. He explains that Hong Kong has seen a measurable decline in the prevalence of behaviour-driven risk, yet has a relatively stable age-standardised incidence of heart disease. He posits as a possible explanation that unmeasured environmental dangers such as air pollution, or psycho-social ones such as stress may be involved. Whatever the combination of risks the net effect is a positive, albeit limited, change in most of the study economies.

Age-standardised figures strip out the impact of demographic change. Health systems, however, need to face the challenges presented by populations as they really are. Age is arguably the most important non-modifiable risk factor for CVD. Crude incidence data from the economies of study show that benefits observed from reducing the incidence are offset by the ageing population. What Dr Carolyn Lam—senior consultant at the National Heart Centre and professor at Duke-NUS in Singapore—says of her country applies to a majority of study economies: “Our society is ageing extremely quickly, among the fastest rates in the world, so our epidemiology is changing rapidly.” Measurements of ageing vary, but one of the simplest is the expected change in the percentage of the population aged over 65 years. By this metric, according to UN Population Division data, between 2020 and 2030, Singapore, South Korea, Hong Kong, Taiwan, and Thailand will become five of the seven fastest ageing societies in the world. Japan already has the world’s oldest population and will continue to age faster than the global pace.

Mainland China and Australia also have an above-average percentage of the population over 65 years, with proportional growth also above the global mean in the coming decade.<sup>7</sup> In Japan, where the world’s oldest population has seen the largest increases in the incidence of ischaemic heart disease and stroke, leading medical experts are speaking openly of an impending cardiovascular disease pandemic.<sup>8</sup> Similarly, in Mainland China, such individuals write of how CVD has, in just two decades, gone from a relatively uncommon condition to an epidemic.<sup>9</sup>

Health outcomes data paint a different picture. Age-standardised mortality for ischaemic heart disease and stroke has dropped noticeably more than incidence levels (Figure 2). For both conditions, the downward trend is clear across the region, with the exception of ischaemic heart disease in Mainland China. Once again, crude figures are less encouraging and show very little change over time.

### **Success brings a new challenge: Increasing burden of secondary cardiovascular events**

The gains against CVD, in particular the impact of better intervention, are certainly good news. At the same time, they give rise to a new issue. Dr Tee Joo Yeo—director of the cardiac rehabilitation unit at the National University Heart Centre Singapore—explains, “simply put, there are more people who are now survivors of heart attacks and strokes. The more survivors there are, the more likely it is that there will be recurrence.” Data describing the prevalence of ischaemic heart disease and stroke certainly tell a story of long-term growth (Figure 3).

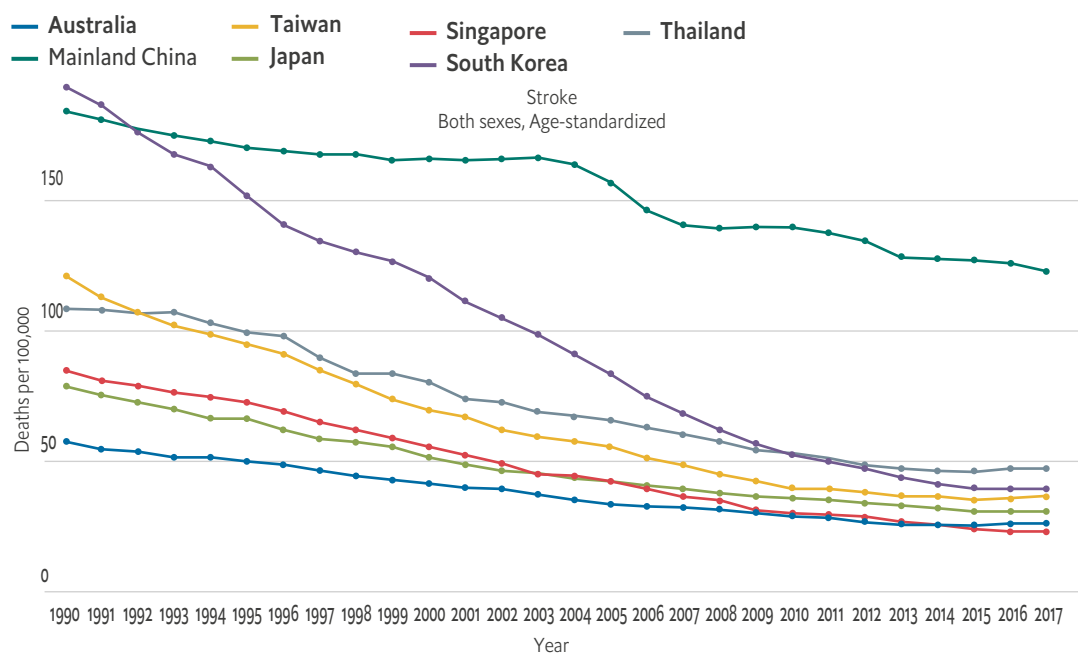
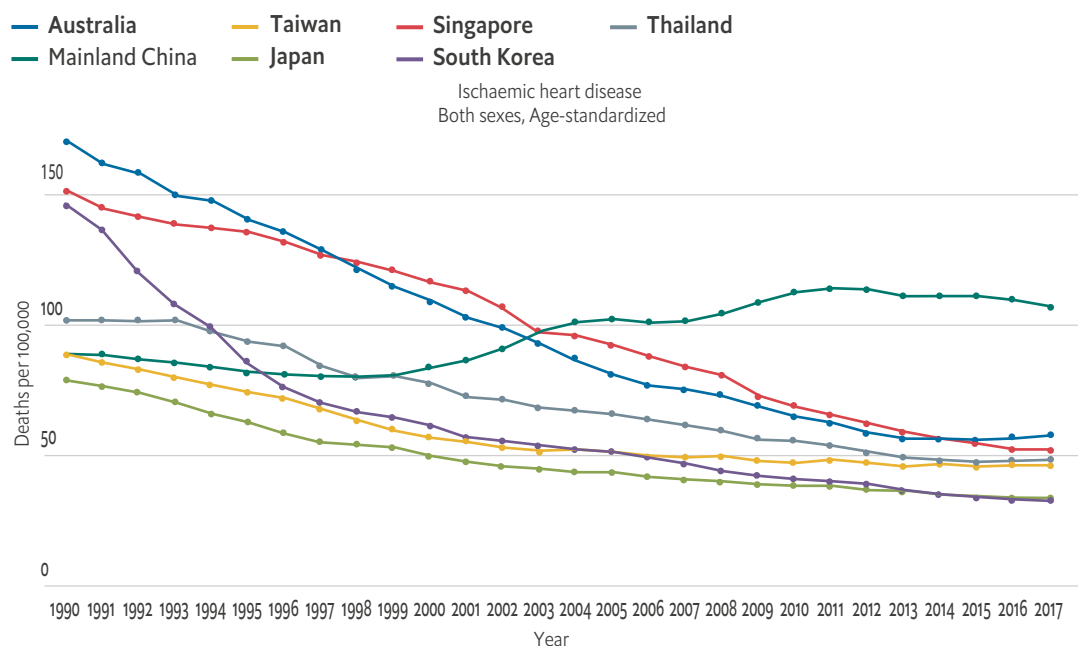
<sup>7</sup> Economist Intelligence Unit calculations based on United Nations Population Division, *World Population Prospects 2019*.

<sup>8</sup> Issei Komuro *et al*, “Nationwide Actions Against Heart Failure Pandemic in Japan: What Should We Do From Academia?” *Circulation Journal*, 2019.

<sup>9</sup> Chengxing Shen and Junbo Ge, “Epidemic of Cardiovascular Disease in China: Current Perspective and Prospects for the Future,” *Circulation*, 2018.

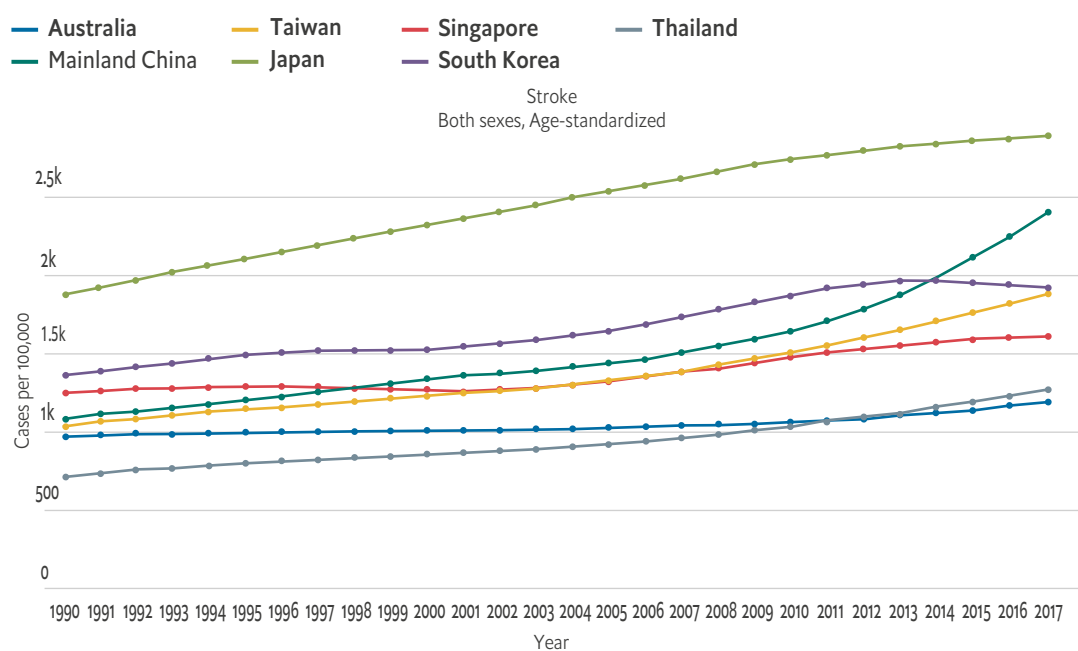
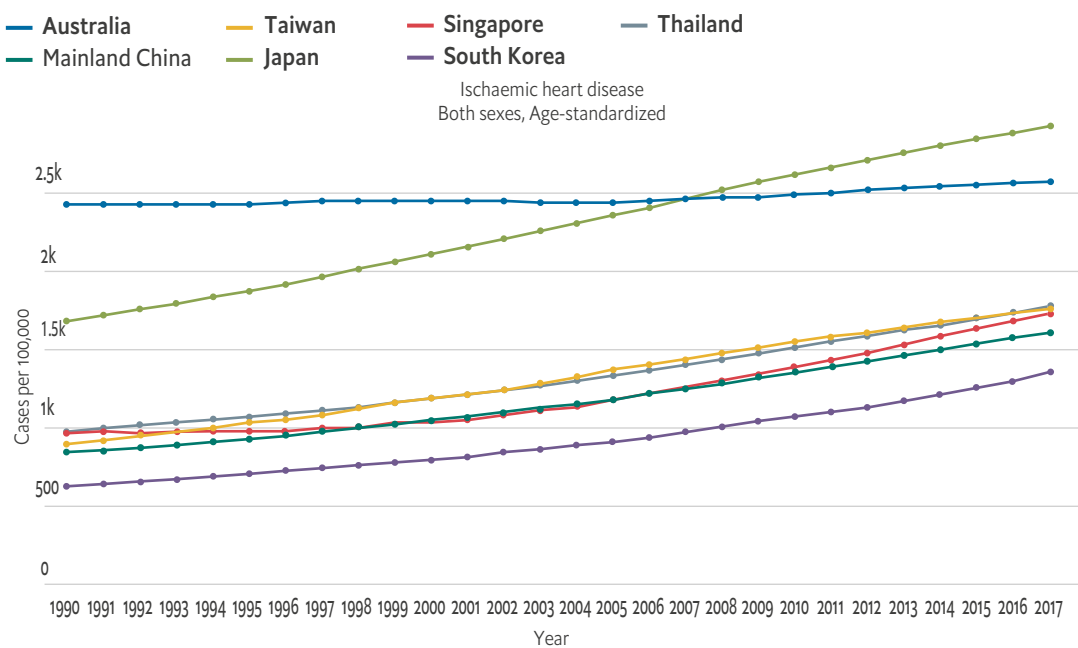
**Figure 2**

Age-standardised mortality for ischaemic heart diseases and stroke per 100,000 population



Source: Global Burden of Disease study 2017

**Figure 3**  
Crude prevalence of ischaemic heart disease and stroke per 100,000 population



Source: Global Burden of Disease study 2017

Numerous studies have repeatedly shown that individuals experiencing CVD events have a significantly elevated risk of further events. The likely extent of this increased danger, varies by country and even by study. The one-year recurrence of stroke among survivors in most research falls between 5% and 15%,<sup>10</sup> although outliers exist in both directions, particularly in Mainland China where data are less comprehensive. For heart attacks the range in findings is again substantial. In Singapore, a registry study estimates that around 7% of those with a heart attack suffer another one within a year.<sup>11</sup> Meanwhile, unpublished registry data from Western Australia show that of those discharged from hospitals with acute cardiac syndrome—which includes both infarctions and unstable angina—57% are readmitted within a year.<sup>12</sup>

The first year after an initial event is the most dangerous period for a recurrent heart attack or stroke, but the risk remains elevated for many years thereafter.<sup>13</sup> A literature review of stroke recurrence rates found that, in high quality studies going back several decades, the figure after five years was at least double that after one year.<sup>14</sup> Similarly, a 2011 Japanese publication found a one-year stroke recurrence rate of 19%, but put the three-year figure at 29%.<sup>15</sup>

A Korean analysis of national health insurance data provides the most detailed recent

figures from the region. It reported that the mean period between a first and second heart attack and a first and second stroke were both around two years. This on its own indicates that one-year recurrence rates give a low impression of the volume of follow-on CVD events. The study further calculated that the accumulated recurrence rate over the next decade for those who suffered a heart attack was 21%, with an additional 4% experiencing a stroke. For an initial stroke, the recurrence rate was 19%, with a further 4% having a heart attack.<sup>16</sup>

In addition to the time scale, the variations in recurrence figures almost certainly reflect differences in secondary treatment quality. Recent Chinese research looked at 4,001 patients who had left hospital after a heart attack. Among those from this group who received good, drug-based treatment to which they adhered, only 7% experienced another infarction, stroke, heart failure or death in the following 12 months. Among those receiving no treatment, 25% had one of these follow-on events.<sup>17</sup>

In short, an ever-growing part of the population is known to have a CVD and may well survive a heart attack or stroke. This demands urgent attention but also represents an eminently realisable opportunity to ensure these individuals receive appropriate care.

<sup>10</sup> Chin Yi Ying *et al.*, "Prevalence, risk factors and secondary prevention of stroke recurrence in eight countries from south, east and southeast Asia," *Medical Journal of Malaysia*, 2018.

<sup>11</sup> Khung Yeo *et al.*, "Comparative analysis of recurrent events after presentation with an index myocardial infarction or ischaemic stroke," *European Heart Journal*, 2017.

<sup>12</sup> Baker Heart and Diabetes Institute, *No Second Chances: Controlling Risk in Cardiovascular Disease*, 2019.

<sup>13</sup> For myocardial infarction, see Saga Johansson *et al.*, "Mortality and morbidity trends after the first year in survivors of acute myocardial infarction: a systematic review," *BMC Cardiovascular Disorders*, 2017; Sameer Bansilal *et al.*, "Global burden of CVD: focus on secondary prevention of cardiovascular disease," *International Journal of Cardiology*, 2015.

<sup>14</sup> Keerthi Mohan *et al.*, "Risk and Cumulative Risk of Stroke Recurrence: A Systematic Review and Meta-Analysis," *Stroke*, 2011.

<sup>15</sup> Chin Yi Ying *et al.*, "Prevalence, risk factors and secondary prevention of stroke recurrence in eight countries from south, east and southeast Asia," *Medical Journal of Malaysia*, 2018.

<sup>16</sup> Kang Jae Jung *et al.*, "Onset, Time to Recurrence, and Recurrence Risk Factors of Myocardial Infarction and Ischemic Stroke: 10-Year Nationwide one-Million Population Database," preprint posted online 2018.

<sup>17</sup> Pu Shang *et al.*, "Association Between Medication Adherence and 1-Year Major Cardiovascular Adverse Events After Acute Myocardial Infarction in China," *Journal of the American Heart Association*, 2019.

## The aggregate human and economic cost of secondary cardiovascular events

As discussed earlier, CVD overall is a leading cause of mortality in the study economies and an increasing driver of morbidity. As for the economic burden, last year's Economist Intelligence Unit study, *The Cost of Silence*, reviewed a large number of studies in order to make an estimate. It included both direct costs—hospitalisation, medication, rehabilitation, and outpatient care—as well as indirect costs including productivity losses, informal care, as well as costs due to early retirement or mortality. In every economy the 2016 economic burden came somewhere in the billions of dollars. Figures presented here break down these costs between the key drivers ischaemic heart disease and stroke (see Figure 4, and the amounts are substantial. To put this in perspective, these figures represent on average about 0.9% of GDP, ranging from 0.2% in Mainland China to 2.6% in Singapore.

The more difficult question is what proportion of this mortality, morbidity, and economic cost can be laid at the door of CVD events that occur in patients who have suffered a heart attack, a stroke, or are known to have a serious heart condition. A firm number is difficult to calculate at the country level but available data suggests that repeat events represent a substantial burden. The Singapore Myocardial Infarction Registry's report for 2016, for example, says that 33.4% of those presenting with such a condition that year had previously either had a heart attack or surgery on blood vessels to prevent one (revascularisation).<sup>18</sup>

An analysis published in the same year of data in Taiwan's registry for acute heart failure also found that a quarter of those who came to hospital with this condition had a previous heart attack in their medical histories.<sup>19</sup> Singapore's Stroke Registry report does not give data on previous strokes but notes that 15% of those experiencing such an event in 2017 had previously had a transient ischaemic attack—similar to a mild stroke—and 46% had some form of heart disease.<sup>20</sup> In Hong Kong, meanwhile, data from 2007 indicate that 27% of strokes were experienced by patients who had already had at least one.<sup>21</sup> This is consistent with data in other countries which puts this proportion for stroke at around 30%.<sup>22</sup>

In short, around a quarter to a third of heart attacks and strokes might occur among those who have already had one; a proportion far higher than the prevalence of these individuals within the overall population. Several factors further elevate the likely importance of secondary prevention to curbing the overall human and economic costs of CVD in the study economies. First, because these follow-on events tend to do more health damage—including having a higher mortality rate<sup>23</sup>—they likely account for an outsized percentage of deaths as well as direct and indirect economic burden. Second, although little data exist, the figures from the Hong Kong study of stroke showed a marked increase in the ratio of recurrent to initial strokes over time. One would expect such a change as the high-risk survivor population grows.<sup>24</sup>

<sup>18</sup> Health Promotion Board, *Singapore Myocardial Infarction Registry Annual Report 2016*, 2018.

<sup>19</sup> Chun-Chieh Wang, "TSOC-HFrEF Registry: A Registry of Hospitalised Patients with Decompensated Systolic Heart Failure," *Acta Cardiologica Sinica*, 2016.

<sup>20</sup> Health Promotion Board, *Singapore Stroke Registry Annual Report 2017*, 2019.

<sup>21</sup> Jean Woo et al., "Stroke incidence and mortality trends in Hong Kong: implications for public health education efforts and health resource utilisation," *Hong Kong Medical Journal*, 2014.

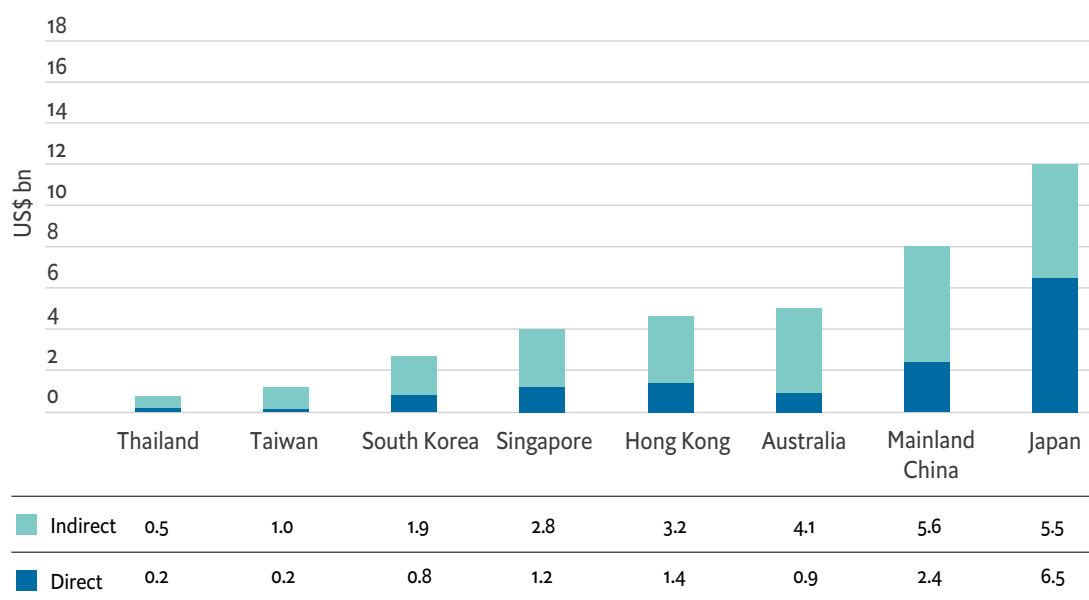
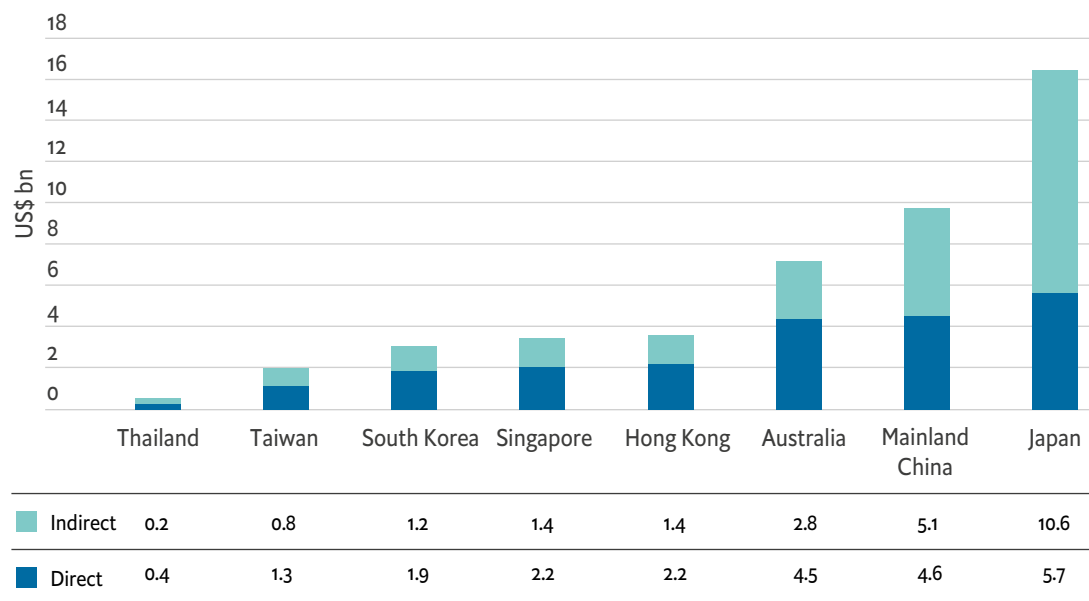
<sup>22</sup> See references in Stroke Association, "State of the Nation: Stroke statistics," 2016.

<sup>23</sup> Jens Thune et al., "Predictors and prognostic impact of recurrent myocardial infarction in patients with left ventricular dysfunction, heart failure, or both following a first myocardial infarction," *European Journal of Heart Failure* 2014; Karoliina Aarnio et al., "Long-Term Mortality After First-Ever and Recurrent Stroke in Young Adults," *Stroke*, 2014.

<sup>24</sup> Jean Woo et al., "Stroke incidence and mortality trends in Hong Kong: implications for public health education efforts and health resource utilisation," *Hong Kong Medical Journal*, 2014.

**Figure 4**

Estimated annual indirect and indirect costs of ischaemic heart disease (top panel) and stroke (bottom panel) in selected Asia-Pacific economies (US\$bn)



Source: EIU calculation



Finally, some economies are starting to see a trend toward a higher number of younger people being affected. Dr Chan reports that in 1995, only 8% of patients presenting with a heart attack in Hong Kong were aged under 50. By 2010, this had risen to 17%. Similarly, in Taiwan, the number of people aged under 55 experiencing heart attacks rose by 30% between 2009 and 2015 according to the Ministry of Health and Welfare.<sup>25</sup> Gary Chih-Sheng Chu, a cardiologist at Kaohsiung Municipal Ta-Tung Hospital, Taiwan, attributes this to the prevalence of cigarette smoking, familial hypercholesterolemia and increasingly Western diets and lack of exercise. Singapore also sees younger patients presenting with heart failure—roughly ten years younger than their European counterparts<sup>26</sup> and partially attributable to diabetes, according to Audry Shan Yee Lee, associate consultant, National University Heart Centre, Singapore. Unless these patients receive good post-event care, the resultant indirect economic costs will be far higher than for those affected at an older age. An Australian study modelling the indirect costs of ischaemic heart disease in working adults (aged 45–64 years) estimated a loss of AU\$785m (US\$755m) in GDP in 2015 attributable to reduced income, increased welfare payments and lost income tax revenue.<sup>27</sup> This loss in GDP was projected to increase to AU\$1125m (US\$1082m) by 2030.

### The possibilities of secondary prevention

“Because of the high social and economic costs of stroke and recurrence of myocardial infarction, the importance of secondary prevention is increasingly being emphasized in clinical settings in Korea” says Won-Seok Kim—associate professor of Rehabilitation Medicine, Seoul National University Bundang Hospital, South Korea. This is equally true across the region.

Once cardiovascular disease has become apparent, further deterioration is not inevitable, even for those who have already had heart attacks and strokes and therefore live with particularly elevated risks. As a result, with the growing prevalence of these conditions, Dr Yeo sees an increased “focus on better control of risk factors in order to prevent recurrent events.” Shoukat Khan, national program manager and senior clinical scientist for Heart Support Australia says that in his country, “there is a big understanding now of the importance of secondary prevention. We need to look into a national approach.” Dr Lee adds that the impact of thinking about prevention has changed the standard care model. “When people present at an emergency room, we are not just trying to help people survive, but to survive longer. We start secondary prevention right away.”

<sup>25</sup> “Younger people suffering heart attacks, doctors say,” *Taipei Times*, 28 April 2019.

<sup>26</sup> JJ Atherton, *et al.* “Patient characteristics from a regional multicenter database of acute decompensated heart failure in Asia Pacific (ADHERE International Asia Pacific),” *Journal of Cardiac Failure*, 2012.

<sup>27</sup> Deborah Schofield, *et al.* “The indirect costs of ischemic heart disease through lost productive life years for Australia from 2015 to 2030: results from a microsimulation model,” *BMC Public Health*, 2019.

Effective secondary CVD prevention is far from simple. It requires a range of sometimes interlocking activities rather than a few small steps. It also needs to occur within a functioning health system and be undergirded by appropriate government policies. Indeed, it is best thought of as the sum of interventions, whether medical or social, to minimise or eliminate additional damage as time goes on.

In many ways, secondary prevention “overlaps with primary,” says Dr Yeo. “Lifestyle measures—maintaining a normal BMI, exercise, quitting smoking, eating a balanced diet—are important to both.” Indeed, adds Lisa Studdert, chair of the Expert Steering Committee for the National Preventive Health Strategy in Australia’s Department of Health, “it is likely there will be increased interest on the part of individuals in healthy eating and exercise when they have been diagnosed with chronic disease. The building blocks of primary prevention are still included in CVD management. We are not talking about something wholly different.”

Even while maintaining the interventions and policies associated with primary prevention, secondary efforts typically go further, including “adequate medication and intensive care” notes Dr Tomonori Okamura, a professor in the Department of Preventive Medicine and Public Health at Japan’s Keio University. Clara Chow, professor of Medicine and academic director Westmead Applied Research Centre, University of Sydney, Australia explains. “The patient populations [for primary and secondary prevention] are different in terms of risk. If the chances of a heart attack are 10% or 2%, that is quite different in terms of how intensively you treat.” In particular, risk-benefit calculations

for things like aspirin use and anti-platelet therapy point much more clearly toward the beneficial side for those at higher risk. “This can be said for a lot of medical preventative treatments,” such as blood pressure and cholesterol reduction drugs she says. “It is quite clearly more correct to put people on these medications and to more closely manage targets.” Similarly, exercise-based heart rehabilitation programmes have shown an ability to reduce risk for those with CVD. Dr Yeo adds a final difference of secondary prevention from primary: “treatment does not stop once the patient leaves the hospital, it has to be maintained for rest of the patient’s life.”

Fortunately, one characteristic of secondary CVD prevention is the breadth of options available. A recent literature review listed over two-dozen studies which had found at least one intervention—often several—to be cost-effective or cost saving for secondary CVD prevention. These range from health education via the media, through to general tobacco control, use of drugs (including aspirin, statins, beta blockers, and ACE inhibitors), and even influenza vaccinations for those with heart disease.<sup>28</sup> This research focussed on low- and middle-income countries. In high-income ones, like six of the eight economies in this study, cost-effective options would be even more numerous.

The problem is that these interventions are too often underused. To cite just two examples, a recent survey of cardiac rehabilitation facilities worldwide found that no country had as many places for rehabilitation as patients who needed them (in Thailand, the ratio was 1:200, the worst among the study economies<sup>29</sup>).

<sup>28</sup> Leopold Aminde *et al.*, “Primary and secondary prevention interventions for cardiovascular disease in low-income and middle-income countries: a systematic review of economic evaluations,” *Cost Effectiveness and Resource Allocation*, 2018.

<sup>29</sup> Karam Turk-Adawi, “Cardiac Rehabilitation Availability and Density around the Globe,” *E Clinical Medicine*, 2019.

In Mainland China, meanwhile, Jiapeng Liu of the National Clinical Research Centre for Cardiovascular Diseases notes recent research showing that fewer than 3% of individuals at high risk of CVD are on aspirin or statins and about 34% of patients with ischaemic heart diseases or ischaemic stroke are taking antiplatelet drugs or statins.<sup>30</sup> Here again, population ageing may also be complicating matters. Hung Fat Tse—a professor in the cardiology unit of the University of Hong Kong’s Department of Medicine—says that often elderly patients “who have experienced multiple events present late and are not receiving optimal medical care. Physicians tend to be less aggressive in managing them.”

The situation is ultimately untenable. As the prevalence of those living with cardiovascular conditions continues to rise and strain medical resources and workforce, health systems will need to apply this range of tools more successfully in order to stop a growing challenge from becoming a preventable crisis. Often, the implementation of evidence-based, cost-effective interventions represent low-hanging fruit in the effort to control the human and economic costs of CVD.

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<sup>30</sup> Jiapeng Lu *et al.*, "Secondary prevention of cardiovascular disease in China," *Heart*, 2020.

## Chapter 2. Measuring up: The secondary prevention of cardiovascular disease in Asia- Pacific scorecard

This study introduces the Economist Intelligence Unit's scorecard of secondary prevention of CVD in the Asia-Pacific region. Its development of the scorecard framework was informed by a review of existing global, regional or national frameworks for CVD prevention and control and a thematic analysis of topics emerging from selected research reports. The choice of the three domains and twenty-two indicators was guided by the work conducted by the WHO, other international organisations, government agencies, professional societies and voluntary organisations [see Appendix for methodology and scoring].

In order to interpret the findings from the scorecard research, some important limitations should be considered:

- For each domain, available data were collected to best reflect the local situation while allowing for standardisation and comparison across economies. In aiming for comparability, some specificity and context may be lost.
- In relying on data available from international bodies, not all elements are covered for every market. For example Hong Kong and Taiwan are not represented individually at the WHO and therefore are not eligible signatories to standardised tobacco control commitments, one of the things scored in this analysis.
- Measuring policy or plans has inherent difficulties: policies may not last long or be insufficiently implemented to have an impact.
- The quality of implementation matters greatly, however data describing implementation are rarely available and this can only be assessed to a limited degree.
- The scorecard does not aggregate scores to rank economies either in each domain or overall; scores can only be compared with caution across indicators.

### **Key insights**

- CVD policies do exist in some form in all economies studied, however there is substantial room for improvement.
- Policies on modifiable risk factors exist but the success of translating these into legislation and action, along with measuring impact, remains to be defined.
- Only one market (Australia) has a comprehensive public health awareness campaign.
- Clinical practice guidelines for CVD secondary prevention, myocardial infarction and stroke vary substantially across economies.
- Audits of care quality are lacking, only two economies in this study, Australia and South Korea, report any form of audit.
- Primary care systems are evolving in many Asian economies, and integration of services is a work in progress.

Very High High Moderate Low

Domain	No.	Indicator	Unit	Year	Australia	Mainland China	Hong Kong	Japan	South Korea	Singapore	Taiwan	Thailand
1. Strategic plans and public health policies	1.1	Non-communicable diseases (NCD) plan	yes/no	2017	no	yes	yes	yes	no	no	yes	yes
	1.2	CVD plan	0-4		3	2	1	1	3	1	1	1
	1.3	Healthy diet policy	yes/no	2017	yes	yes	yes	yes	yes	yes	yes	yes
	1.4	Harmful alcohol consumption policy	yes/no	2017	yes	yes	yes	yes	yes	yes	yes	yes
	1.5	Physical activity policy	yes/no	2017	yes	yes	yes	yes	yes	yes	yes	yes
	1.6	Tobacco control	0-5	2018	3	2	3	3	2	2	3	2
	1.7	Public health awareness campaigns	0-3		3	2	1	1	2	2	2	1
	1.8	Economy-wide/Regional patient registries	0-2		2	2	0	2	2	2	2	2
2. High quality care for CVD secondary prevention	2.1	Evidence-based guidelines for NCD management through a primary care approach	yes/no	2017	yes	yes	not reported	not reported	no	yes	not reported	yes
	2.2	Clinical practice guidelines for CVD	0-3		3	2	0	3	3	1	2	1
	2.3	Policy for integrated and coordinated care provision	0-3		2	3	1	2	1	2	2	2
	2.4	Referral systems for rehabilitation	0-1		1	1	1	1	1	1	1	1
	2.5	Electronic health record	0-4	2015	4	4	1	0	4	4	4	1
2.6	Patient empowerment	0-2		1	0	2	1	1	1	1	1	
2.7	Government audits for implementation of secondary prevention care	0-2		1	0	0	0	1	0	0	0	
3. Health system capacity and access to medicines and services	3.1	Access to medicines for secondary prevention	0-2		2	1	1	2	1	1	2	1
	3.2	Access to innovative technology in healthcare	0-2		2	1	1	1	2	1	1	1
	3.3	Rehabilitation programmes availability	0-2		2	1	2	2	2	2	2	1
	3.4	Smoking cessation programmes	0-3	2018	3	2	3	2	3	3	3	3
3.5	Cardiovascular specialists density (per 1000)	number		0.06	0.02	0.06	0.10	0.03	0.04	0.04	0.07	0.05
3.6	Generalist medical practitioners density (per 1000)	number	2015-2017	1.06	not reported	not reported	not reported	not reported	1.41	1.41	not reported	not reported
3.7	Nursing personnel density (per 1000)	number	2016-2018	115.00	27.30	76.13	112.2	72.34	65.18	65.20	27.59	

### Chapter 3. Responding to the challenges of secondary prevention of cardiovascular disease in Asia-Pacific

As CVD is a leading cause of death in Asia-Pacific, it is reassuring to see efforts to respond to this area of health, and the formulation of strategic planning and health service delivery across the study economies. In this chapter we assess the progress of this response in terms of developing plans for high-quality care, capacity to deliver care, and access to core services and medicines.

#### Planning high-quality care for secondary prevention of CVD

##### *Cardiovascular disease plans*

Measuring whether economies have an NCD plan is a proxy for measuring preparedness for CVD prevention, given CVD is one of the main NCDs.<sup>31</sup> All economies in this study have a either an NCD plan, or a specific CVD plan in the case of Australia, South Korea and Singapore. Australia had an NCD plan until 2015 and in 2017 the Department of Health launched the National Strategic Framework for Chronic Conditions which provides guidance for the development and implementation of policies, strategies, actions and services to reduce the impact of chronic conditions including CVD. Plans specifically focusing on CVD are frequently part of the overall NCD plan or are less comprehensive. Australia and South Korea both have up-to-date CVD plans explicitly covering secondary prevention (although Australia's plan has not yet been implemented).

Mainland China has an operational policy for CVD according to 2017 data from the WHO. Hong Kong, Japan, Singapore, Taiwan and Thailand all have a CVD plan, but these may not have been updated in the last five years, do not cover secondary prevention and cardiac and stroke rehabilitation, and have no further sub-plans for stroke or heart attacks.

In Taiwan, there is a CVD strategy, but it only includes top-level objectives, with little detail regarding the plan's scope. In Hong Kong, as part of a territory NCD plan, there is mention of a strategy to prevent heart attacks and strokes through drug therapy and counselling. Meanwhile, renewed action is being seen in Japan. "A new law [the Stroke and Cardiovascular Disease Control Act] was introduced supporting cardiac and stroke care," says Hiroyuki Daida—professor emeritus at Jutendo University. "Japan will establish a new patient care and prevention strategy [including] a system to improve acute stroke care and also a new system to care for heart failure patients, especially the elderly."

Those interviewed for this research were unanimous in recognising the benefit of plans to tackle cardiovascular diseases. "There is no doubt," says Dr Khan, "having an overarching plan will be win-win for [both] government and community [at primary and secondary risk]". How these policies are designed, however, is highly dependent on local needs and health system complexity. Indeed, the history of such policy in economies where they are long established hints at a move towards more detailed, disease-specific strategies. Lessons learned from the cancer control space suggest this may translate to improved implementation versus a broader NCD plan.<sup>32</sup>

<sup>31</sup> WHO. Global Action Plan for the Prevention and Control of NCDs 2013-2020. Geneva: World Health Organization, 2013. Available from: [www.who.int/nmh/events/ncd\\_action\\_plan/en/](http://www.who.int/nmh/events/ncd_action_plan/en/) (Accessed Feb 2020)

<sup>32</sup> EIU, *Cancer preparedness around the world: National readiness for a global epidemic*, 2019

Various models of care have been trialed on a limited basis for secondary prevention of CVD (see Box 2). Finally, these plans take various forms, and are not always single documents. “We do not refer to any CVD plan among healthcare providers [in Singapore]”, says Dr Yeo. “The Ministry of Health has a set of clinical practice guidelines that cover various

risk factors and their management, such as lipids, hypertension, obesity. In terms of a national plan, we have all these strategies in place to help healthcare providers standardise treatment.” The utility of any plan depends on its continual relevance, and the process for timely updates should be considered.

### Box 2: Models of care for secondary prevention of CVD in Asia-Pacific

Specific models of care have been implemented in Asia-Pacific in an attempt to find a workable solution within the local health system. One example is the general practice programme for chronic disease management of coronary heart disease in Australia. This secondary prevention programme involves initial assessment, followed by 3-monthly review, optimising of pharmacotherapy and lifestyle modification, supported by a disease registry and financial incentives for quality of care and outcomes achieved. A cost-effectiveness analysis found that the program was “likely to be cost-effective and provide substantial and sustainable benefits.”<sup>33</sup> A 2019 randomised controlled trial examined a model of care for stroke survivors returning to primary care focused on vascular risk factor management to prevent stroke recurrence. This study found that the ICARUSS (Integrated Care for the Reduction of Secondary Stroke) model was “superior to usual care with respect to best-practice recommendations for traditional risk factors as well as behavioural and functional outcomes.”<sup>34</sup>

The implementation of the Regional Comprehensive Stroke Centre (CSC)

programme in Korea between 2008 and 2011 resulted in significant improvement in acute stroke care. A 2014 study that assessed a range of performance metrics reported a decrease in door-to-needle time for intravenous thrombolysis, as well as a decrease in time of intra-arterial thrombolysis. The only indicator that did not improve over this period was the onset-to-door time, which actually increased from 20 to 24 hours, emphasizing the need for ongoing stroke education programmes. The second phase of this programme (2014-2018) involves the establishment of two new regional CSCs as well as primary stroke centres (PSCs) in rural areas and creating a network among all of these units.<sup>35</sup> The establishment of this network can enable the identification of patients registered with a stroke centre and facilitate their participation in secondary prevention programmes such as lifestyle modification coaching programmes delivered by nurses.<sup>36</sup>

In 2014 Taiwan launched a Post-Acute Care Cerebrovascular Disease (PAC-CVD) programme rolled out in 129 community hospitals.

<sup>33</sup> Chew DP, et al. “Cost effectiveness of a general practice chronic disease management plan for coronary heart disease in Australia”. *Australian Health Review*, 2010

<sup>34</sup> Joubert J, et al. “ICARUSS: An effective model for risk factor management in stroke survivors”. *International Journal of Stroke*, 2019

<sup>35</sup> Kim J, et al. “Establishment of government-initiated comprehensive stroke centers for acute ischemic stroke management in South Korea”. *Stroke*, 2014

<sup>36</sup> Kim H, Kim O. “The lifestyle modification coaching program for secondary stroke prevention”. *Journal of Korean Academy of Nursing*, 2013

A controlled study including over six thousand patients enrolled consecutively over a period of two years, found that the PAC-CVD coordinated approach to care with multidisciplinary teams involving “intensive inpatient rehabilitation” led to better functional outcomes, fewer readmissions and reduced mortality compared with usual care.<sup>37</sup> In the context of low and middle-income countries various WHO programmes have been set up to facilitate the development of national secondary prevention programmes for community-based and health service interventions.” The WHO South-East Asia Regional Office (SEARO) coordinated the development of national CVD control programmes that focus on secondary

prevention in community and primary care settings in countries such as Indonesia, Nepal and Thailand.<sup>38</sup> The 2011 global CVD atlas report describes a list of “best buys” or highly cost-effective policies, strategies and interventions for CVD prevention and control that can be feasible to implement in low- and middle-income countries.<sup>39</sup> These include public health strategies addressing behavioural risk factors such as tobacco and alcohol use or unhealthy diets. Combined with individual interventions for secondary prevention such as use of “aspirin, beta-blockers, angiotensin converting enzyme inhibitors and lipid-lowering therapies” the risk of recurrent vascular events can be reduced by as much as 75%.<sup>40</sup>

### ***Policies on modifiable risk factors exist but translating these into legislation and action is challenging***

Experts interviewed point out that the overlap between strategy for primary and secondary prevention is extensive. While treatment and medication management may differ, the basic building blocks of lifestyle measures are the same. All economies in the scorecard have policies on achieving healthy diet, a harmful alcoholic consumption policy, and a physical activity policy. Tobacco control measures, on the other hand, are less clear cut as they involve multiple sectors. In terms of tobacco control, there are opportunities for improvement in all economies, although

data for Hong and Taiwan are limited due to their global and political status. All eligible economies are signatories of the WHO Framework Convention on Tobacco Control (FCTC). Australia, Hong Kong, Japan and Taiwan have implemented a range of tobacco control measures but even they have gaps in achieving optimal tobacco control in many areas. The area where all economies score unsatisfactorily is related to bans for tobacco advertisements (data are not available for Hong Kong and Taiwan).<sup>41</sup>

While the results of this indicator appear impressive, and the importance of lifestyle modification should not be downplayed, estimating the impact and effectiveness

<sup>37</sup> Hsieh CY, *et al.* "Three years of the nationwide post-acute stroke care program in Taiwan". *J Chin Med Assoc*, 2018

<sup>38</sup> WHO. Cardiovascular disease: Regional activities. Geneva: World Health Organization; [cited 18 September 2019]. Available from: [https://www.who.int/cardiovascular\\_diseases/region/en/](https://www.who.int/cardiovascular_diseases/region/en/). (Accessed Feb 2020).

<sup>39</sup> WHO. Global atlas on cardiovascular disease prevention and control: Policies, strategies and interventions. Geneva: World Health Organization, 2011. Available from: [http://apps.who.int/iris/bitstream/10665/44701/1/9789241564373\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/44701/1/9789241564373_eng.pdf?ua=1) (Accessed Feb 2020).

<sup>40</sup> WHO. Prevention of recurrent heart attacks and strokes in low and middle income populations: Evidence-based recommendations for policy makers and health professionals. Geneva: World Health Organization, 2003.

<sup>41</sup> WHO. WHO report on the global tobacco epidemic 2019. Geneva: World Health Organization. Available from: [https://www.who.int/tobacco/global\\_report/en/](https://www.who.int/tobacco/global_report/en/) (Accessed Feb 2020).



of these policies is not straight forward. Tobacco use has been decreasing in prevalence in the study economies, however the proportion of overweight or obese adults within the general population rose between 2005 and 2015 in all economies except Japan.<sup>42</sup> This may be unsurprising, and the difficulty in motivating lasting behavioural change is a continuing problem cited by interviewees (see also Chapter 4; Patient empowerment).

## Health system capacity and care delivery

### ***CVD management through a primary care approach***

The WHO prioritises NCD management through a primary care approach. This is measured in the scorecard by availability approved evidence-based clinical guidelines, protocols and/or standards for the management of the main NCDs (cardiovascular disease, diabetes and chronic respiratory diseases) in primary care setting. Only four economies in this study have these guidelines, including Australia, Mainland China, Singapore and Thailand. South Korea does not, and the rest of the economies report no data, which might largely be due to the recent evolution of primary care delivery from a hospital-based to a community-based model across the economies. The importance of primary care services with regards to secondary prevention is primarily in the provision of patient-centred integrated care (described in Chapter 4).

In Mainland China, there has been a huge policy shift in the last few decades towards developing a primary care model, as well as introducing national policies which are trying to create better primary care facilities. This includes the Healthy China 2030 plan, introduced by the government in October 2016, which recognises that primary care is the most efficient and cost-effective way to meet the needs of people.<sup>43</sup>

The South Korea health system is trying another integration strategy than using its still nascent primary care system. Dr Si-Hyuck Kang—professor of internal medicine at Seoul National University's College of Medicine—explains that the 2016 Act on the Prevention and Management of Cardio-Cerebrovascular Diseases, has led to the creation of one national and 14 regional CVD centres which provide all relevant interventions in one place, including secondary prevention. There remains limited evidence relating to how this approach might actually fit into the Korean healthcare system.<sup>44</sup> Japan, meanwhile, has seen some evolution in primary care. The Japanese Primary Care Association (JPCA) was established in 2010 as the certifying body for primary care physicians; however, it is still relatively new.<sup>45</sup> There are financial incentives in place in Japan, for coordinating care for patients with chronic diseases, which presumably includes people with CVD.<sup>46</sup> However, there is no clear distinction between primary and secondary care or a gatekeeper system, meaning similarly to Mainland China and South Korea, patients tend to still turn up at secondary care services.<sup>47</sup>

<sup>42</sup> Global Burden of Disease Study, 2016. Available from: <http://ghdx.healthdata.org/record/ihme-data/gbd-2015-obesity-and-overweight-prevalence-1980-2015> (Accessed Feb 2020).

<sup>43</sup> WHO. Healthy China [Internet]. Geneva: World Health Organization. Available from: <https://www.who.int/healthpromotion/conferences/9gchp/healthy-china/en/> (Accessed Feb 2020).

<sup>44</sup> Sung NJ, et al. "Higher quality primary care is associated with good self-rated health status". *Family Practice*. 2013

<sup>45</sup> Lee JY, et al. "Finding the Primary Care Providers in the Specialist-Dominant Primary Care Setting of Korea: A Cluster Analysis". *PLoS ONE*, 2016

<sup>46</sup> Matsuda R. The Japanese Health Care System. Washington, DC: Commonwealth Fund, 2014. Available from: <https://international.commonwealthfund.org/countries/japan/> (Accessed Feb 2020).

<sup>47</sup> Sakamoto H, et al. Japan Health System Review. New Delhi: World Health Organization, Regional Office for South-East Asia, 2018. Available from: <https://apps.who.int/iris/bitstream/handle/10665/259941/9789290226260-eng.pdf;jsessionid=CC185EE76875271C886DB0E0D0A98A1E?sequence=1> (Accessed Feb 2020).

Taiwan's health insurance programme includes a primary care system in which patients are not required to register with a family physician. There have been initiatives by the Government, albeit pilot programmes, to implement pay-for-performance models in primary care for certain chronic diseases, including diabetes and hypertension. Despite improvements in primary care in Taiwan, there has been poor attention paid to the provision of primary care with a focus on NCDs, which is essential for the management and prevention of CVD.<sup>48</sup> In Hong Kong, around 70% of primary care is provided by the private sector, patients generally shop around for the best service, and prevention remains a low priority. Older people, especially those with lower incomes, visit publicly-funded out-patient clinics to access primary care for chronic conditions such as hypertension and diabetes.<sup>48</sup>

### **The medical workforce varies widely across the region**

Among economies in this analysis, Japan has the highest density of cardiovascular specialists (per 1,000 population), followed by Taiwan, Australia and Hong Kong, while Mainland China and Korea have the lowest number of specialists. The number of nursing personnel varies across the economies. Only two economies report the number of available generalist medical practitioners, Australia and Singapore. There were no comparable data for the rest of the economies.

It should be noted that there is no defined optimum coverage of cardiovascular physicians, and the suitable number is

dependent on disease burden and health system efficiency. In addition, the extent to which general practitioners manage patients with CVD, and in particular the delivery of primary care services in a hospital versus community setting, differs across the region.

Nevertheless, Dr Chu says of Taiwan—which has roughly an average number of cardiologists per capita in our study economies —“the manpower is still relatively lower than needed, especially as the number of patients grow more and more.” Meanwhile in Korea, where the cardiologist density is about half of Taiwan's, Dr Kang reports that “the number of new cardiologists is decreasing while the need for cardiology [services] in Korean society is increasing. Cardiologists are overloaded and feel frustrated with these trends.”

Despite this, policy makers and health administrators will need comprehensive data in order to consider these aspects for future health workforce planning, given the increasing prevalence of cardiovascular diseases and need for coordinated care (see Chapter 4 in this report) which will continue to put pressure on health systems.

The need to balance other health priorities should also be recognised. As Dr Tse points out of Hong Kong, “the challenge is we're not talking just about increasing the number of cardiologists, but even if we have sufficient doctors to look after the elderly population more generally. One of the [other] challenges is that a lot of our cardiologists move out of the public service to the private service because of the financial incentive and [relatively lower] workload.”

<sup>48</sup> Wang Y-J, et al. "The Provision of Health Care by Family Physicians in Taiwan as Illustrated With Population Pyramids." *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*. 2019

<sup>49</sup> Griffiths SM, Lee J. "Developing primary care in Hong Kong: evidence into practice and the development of reference frameworks". *Hong Kong Med J*, 2012

## Availability and access to services

### Access to rehabilitation services is limited

Cardiac and stroke rehabilitation is a complex intervention which means the nature and quality of rehabilitation programmes can vary. “Rehabilitation is the cornerstone of secondary prevention” says Dr Khan. Dr Chan agrees, adding that “rehabilitation is very cost effective, but the major challenge is the low uptake”. Although most economies in this study have rehabilitation programmes in place, in Mainland China, the availability of these are fragmented. In Thailand, programmes exist, but it is not clear how many patients are referred to these programmes.<sup>50</sup> In a global study of cardiac rehabilitation programmes, the concerns were not with the quality of the services delivered, but gaps in the delivery of the services. There was a lack of tobacco cessation and return-to-work counselling, for example, and a need for certification systems to make sure all rehabilitation programmes meet minimum standards for delivery.<sup>50</sup>

Although all economies have some referral systems in place for patients requiring cardiac and stroke rehabilitation, they are far from perfect even in the most developed healthcare systems. Interviewees from Australia report that 40% to 50% of patients with a successful outcome post-event are not properly referred to rehabilitation services. There is some evidence to suggest a low uptake and poor patient access to cardiac rehabilitation in rural and remote parts of Western Australia.

Attendance rates to traditional cardiac rehabilitation programmes globally are estimated to be as low as 10% to 30%, and in Australia, rural, remote and Aboriginal populations are underrepresented.<sup>51</sup> Interviewees identified several barriers associated with rehabilitative services, and estimate that in reality only between 6% and 15% of eligible patients attend programmes. Older patients may lack caregiver support to attend rehabilitation sessions. Meanwhile, younger patients—particularly in Asian economies with long working hours—are often unable to attend the limited sessions most hospitals offer. Dr Lee explains the common patient dilemma: “it is a difficult job market, especially for the low-skilled. We have patients who say they would love to do this but if they don’t go to work for half a day, they don’t get food on the table. Or, if they take medical leave, other people are waiting in wings to take their jobs.”

Another issue is cultural says Dr Kang. In much of Asia, “people don’t see exercise and education as a treatment.” Finally, Dr Yeo points out that the efficacy of care is a double-edged sword. “Because of how straightforward coronary angioplasty has become, most people go home within a few days thinking that treatment is done, without realising the gravity of the situation”, he says. “They don’t see the importance of cardiac rehabilitation to improve their health”. Better uptake is often seen in patients undergoing open-heart surgery who are required to stay in intensive care units for several days.

<sup>50</sup> Supervia M, et al. "Nature of Cardiac Rehabilitation Around the Globe". *E Clinical Medicine*, 2019.

<sup>51</sup> Hamilton S, Met al. "Evidence to service gap: cardiac rehabilitation and secondary prevention in rural and remote Western Australia". *BMC Health Services Research*, 2018.

### **Access to medicines for CVD secondary prevention is limited in some economies**

The scorecard assessed reimbursement of medicines for CVD secondary prevention, in terms of whether public or social insurance exists, and whether this covers all the required medicines for patients. Australia, Japan and Taiwan, all have universal health insurance, which means most if not all medications are covered, with slight fluctuations between economies. In Australia, the public health system, Medicare, covers hospital treatment, but some medical costs in the form of co-payments are covered by patients. Despite this a government safety net exists which places a cap on out-of-pocket spending on medicines.<sup>52</sup>

In Japan, the public health system covers almost all primary and specialist care, with a monthly cap on out-of-pocket spending, which varies according to the household income.<sup>53</sup> Taiwan's universal health coverage covers 99.9% of the population, but the coverage is subject to limits and exemptions regarding medications. Co-payments are in place in Taiwan, which means some of the cost of medications are covered, to make them more affordable to certain population groups.<sup>54</sup>

In the other five economies, access to medicines is still an issue for some population groups. Australia, Hong Kong and Singapore's public health systems excel in providing affordable care, and financial provision was highlighted as a success by those interviewed.

These systems sometimes work less well for newer and non-standard procedures or medications. "It may take several years before those patients [in Hong Kong] can receive new, even evidence-based treatment" says Dr Chan. "For newer drugs, if they can pay, they can have them earlier, which brings up issues of equity."

<sup>52</sup> Australian Government Department of Health. The Australian Health System [Internet]. Canberra: Department of Health. Available from: <https://www.health.gov.au/about-us/the-australian-health-system#cost-of-health-care-in-australia>; Calder R, Dunkin R, Rochford C, et al. Australian health services: too complex to navigate. A review of the national reviews of Australia's health service arrangements. Melbourne: Australian Health Policy Collaboration, 2019. Available from: <https://www.vu.edu.au/sites/default/files/australian-health-services-too-complex-to-navigate.pdf> (Accessed Feb 2020).

<sup>53</sup> Matsuda R. The Japanese Health Care System. Washington, DC: Commonwealth Fund, 2014. Available from: <https://international.commonwealthfund.org/countries/japan/> (Accessed Feb 2020).

<sup>54</sup> Sinnott S-J, et al. "The effect of copayments for prescriptions on adherence to prescription medicines in publicly insured populations; a systematic review and meta-analysis". *PLoS ONE*. 2013.

## Chapter 4. Closing the gaps and priorities for improved care

When reviewing how economies are handling the burden of CVD and considering secondary prevention, three themes emerge as priority areas that should be addressed to improve the response to heart disease and strokes. These areas, which are discussed in detail in this chapter, are:

1. Collection and use of data to inform policy and interventions
2. Integrated, coordinated care
3. Patient empowerment

### Growing the evidence base to inform policy

#### Registries

Registries are essential for gathering important insights to help target patients at risk of secondary events and work on the prevention of CVD. “You need good data to see if a policy is working”, says Dr Khan. The economies in this study are all covered by some form of economy-wide or regional registry for stroke and myocardial infarction apart from Hong Kong which has hospital-based registries feeding up to the Health Authority.<sup>55</sup> What is apparent from this analysis is the variable coverage and quality of data collection across the region. Population-based, comprehensive CVD registries—that is those that offer the biggest utility for public health—are few and far between. Further, where data are collected, it is not clear how these are used to inform health policy or clinical practice. The progress in this area is in contrast to that seen with cancer, another important cause of death

in the study economies, and there could be lessons learned within economies that contribute to improving data collection.

An illustration on how limited registry data are being collected and can be used comes from Japan. Several smaller registries have been established including J-TRACE<sup>56</sup> (a registry of 8,093 patients with a history of stroke and/or myocardial infarction), JAMIR<sup>57</sup> (a prospective database of heart attack cases from 50 centres), and JSSRS<sup>58</sup> (which collected data from nearly 80,000 acute ischaemic stroke patients). These collate various data on risk factors, medication use and demographics and aim to provide information on the incidence of cardiovascular events, and current medical treatment for high-risk patients. With Japan’s 2018 Stroke and Cardiovascular Disease Control Act in Japan supporting cardiac and stroke care, there are ambitions to develop a true national registry which requires annual registration of patients by hospitals, says Dr Daida.

#### Audits for assessment of CVD policy implementation are rarely conducted

The existence of government audits against established quality standards and the availability of this audit data in the public domain are needed to assess the implementation of policies which aim to improve service delivery of CVD, using outcomes data. We did not identify any evidence of extensive monitoring in this area, suggesting study economies are missing a vital source of feedback to ensure patient needs are met. Only two economies in this study endorse any form of audit.

<sup>55</sup> Chau PH, et al. "Trends in Stroke Incidence in Hong Kong Differ by Stroke Subtype". *Cerebrovascular Diseases*, 2011.

<sup>56</sup> Origasa H, et al. "The Japan thrombosis registry for atrial fibrillation, coronary or cerebrovascular events (J-TRACE): a nation-wide, prospective large cohort study; the study design". *Circulation Journal*, 2008.

<sup>57</sup> Kojima, S, et al. "Nationwide real-world database of 20,462 patients enrolled in the Japanese Acute Myocardial Infarction Registry (JAMIR): Impact of emergency coronary intervention in a super-aging population". *Int J Cardiol Heart Vasc*, 2018.

<sup>58</sup> Kato Y, et al. "Cardioembolic Stroke is the Most Serious Problem in the Ageing Society: Japan Standard Stroke Registry Study". *J Stroke*, 2020.

In Australia, acute stroke clinical care standards are established by the Australian Commission on Safety and Quality in Healthcare, and state-level clinical audit programmes have been established.<sup>59</sup> A National Stroke Audit programme conducted by the Stroke Foundation also aims to highlight areas where the health system for stroke rehabilitation is working well and reports on areas for improvement or changes that need to be made.<sup>60</sup> In South Korea, there is a monitoring system which includes an audit of the treatment each patient receives for heart disease and patient outcomes.<sup>61</sup> Despite this, Dr Kim says the impact of this system may not be sufficient in the secondary prevention setting. “The enactment of the *Law for Cardio-cerebrovascular Disease Prevention and Control* has not had enough impact in daily clinical settings. In my opinion, it is necessary to better establish policy linkages such as auditing and evaluation of medical institutions [specifically] based on the results of effective secondary prevention programs.”

### **Evidence-based clinical practice guidelines**

Clinical practice guidelines for CVD, exist in all economies except Hong Kong, but differ in terms of their scope. Australia, Japan and South Korea all have clinical practice guidelines, Mainland China has a guideline on CVD which also focusses on secondary prevention of stroke but not heart attack. Singapore, Taiwan and Thailand, all have some form of guideline in place for stroke management and secondary prevention, but in Singapore’s case, this has not been updated since 2009.<sup>62</sup> In Taiwan, a guideline for the management of MI exists and elements of the

2012 stroke guidelines were updated in 2006 and 2019. In Thailand there are guidelines for stroke, but not heart attack or CVD secondary prevention as a whole. The lack of, or underrepresentation of all CVD complications in guidelines does not mean the economy does not follow guidelines from other economies. Developing high-quality evidence-based clinical practice guidelines takes a long time, and is a resource-intensive process, involving systematically reviewing all available evidence on the clinical issue in question, and doing so using a multi-professional review team, as well as members of the public and patients. Developed healthcare systems that on the whole exist in high-income economies are more likely to produce their own clinical guidelines. “The challenge for guidelines and people managing secondary prevention is that there are potentially a number of relevant guidelines,” says Dr Chow. “It is possible to focus on single disease guidelines, but in CVD prevention you need to take a multilateral approach. There is a bit of a tension in how to do better in this area: should we have secondary prevention guidelines, consolidate across guidelines or [rely] more on electronic decision aids?”

Where clinical practice guidelines are lacking, physicians often adopt international guidelines such as those of the ACC or ESC. “I don’t feel there is a lack of emphasis [on secondary and primary prevention due to a lack of guidelines]” says Dr Chan. “What I would love to see is more standardisation of care in Asia and coming together to decide what is feasible in our region” says Dr Lam. “Europe and the US have guidelines, why can’t we as Asia?”

<sup>59</sup> ACI NSW Agency for Clinical Innovation. “Stroke clinical audit process initial report”. 2016. Available from: [https://www.aci.health.nsw.gov.au/\\_data/assets/pdf\\_file/0005/360428/Stroke-Clinical-Audit-process-initial-report.pdf](https://www.aci.health.nsw.gov.au/_data/assets/pdf_file/0005/360428/Stroke-Clinical-Audit-process-initial-report.pdf) (Accessed Feb 2020).

<sup>60</sup> Stroke Foundation - Australia. National Stroke Week [Internet]. Melbourne: Stroke Foundation - Australia. Available from: <https://strokefoundation.org.au/How-you-can-help/Stroke-week>. (Accessed Feb 2020)

<sup>61</sup> Chun C-B, et al. “Republic of Korea health system review”. *Health Systems in Transition*, 2009.

<sup>62</sup> Ministry of Health Singapore. “Stroke and Transient Ischaemic Attacks, Assessment, Investigations, Immediate Management and Secondary Prevention”, Singapore: Ministry of Health, Singapore, 2009”. Available from: [https://www.moh.gov.sg/docs/librariesprovider4/guidelines/cpg\\_stroke-and-transient-ischaemic-attacks.pdf](https://www.moh.gov.sg/docs/librariesprovider4/guidelines/cpg_stroke-and-transient-ischaemic-attacks.pdf). (Accessed Feb 2020)

## Integrated, coordinated care

### **Implementation of integrated and coordinated care models is fragmented**

Integrated and coordinated care is essential for composite diseases such as CVD, which require the collaboration of multiple professionals to ensure the patient receives the most appropriate treatment. An integrated care approach helps improve the interface between primary, community and acute services. This can result in improved access to treatment and care and can help avoid unnecessary hospital admissions.<sup>63</sup> “A lot of integration relies on good old-fashioned medicine,” says Dr Chow. “The cardiologist and the general practitioner in the past would know each other. As systems become larger and more complex, this gets harder.”

Most economies have some sort of policy laying out the importance and the processes involved to achieve integrated care. Australia, Japan, Singapore, Taiwan and Thailand all have a policy on integrated care, for care delivered across all long-term conditions, which do not specifically relate to the field of CVD. Hong Kong and South Korea have mentioned the importance of integrated care within their wider health plans, but do not have any specific policies on integrated care for chronic diseases or CVD.<sup>64</sup> Mainland China is currently undergoing an integrated care reform and specific integrated care pathways exist for stroke and heart attack.<sup>65</sup> Despite this, the implementation of these policies across all Chinese provinces is not equal. Moreover, there are some major barriers for the implementation of integrated care models

including a lack of payment mechanisms and supporting information systems.<sup>66</sup>

The experts interviewed here paint a disparate picture in terms of implementing integrated care. True integrated care requires electronic health records to be fully functional to allow data sharing across disciplines, disease registries, as well as educating primary care practices to manage chronic diseases.<sup>67</sup> Structural health system challenges cited in Hong Kong, Mainland China and Australia are being overcome in Singapore (see Box 3). “One challenge [in Australia] is the different levels of government and their responsibility for funding different parts of the health system” adds Dr Studdert. “It is a legacy of our constitution and how our country was formed.” Efforts to bridge these gaps have included the creation of primary health networks, entities with a geographical focus across the country. Limited time with each patient is also an issue in Australia, points out Dr Khan. “We are getting towards a national digitised health programme [and] will look at integrating more and more.” Dr Liu points out that the capabilities to provide health services for secondary prevention of CVD in primary care settings is one of the leading challenges of secondary prevention in Mainland China. “Bidirectional referral mechanisms have been instituted in China since 2015, which could facilitate the patient referral between primary care institutions and upper level hospitals. But this is in the early stages of implementation.” The integration in Hong Kong also had problems. “In Hong Kong, most secondary health care is provided by public hospitals. When [patients] are stable we download them to a general outpatient clinic, and then don't

<sup>63</sup> British Heart Foundation. Integrated Care Best Practice [Internet]. Birmingham: British Heart Foundation. Available from: <https://www.bhf.org.uk/for-professionals/healthcare-professionals/innovation-in-care/integrated-care-for-long-term-conditions>. (Accessed Feb 2020)

<sup>64</sup> Ibid.

<sup>65</sup> Qian Y, et al. "Integrated care reform in urban China: a qualitative study on design, supporting environment and implementation". *International Journal for Equity in Health*. 2017.

<sup>66</sup> Meng Q, et al. "What can we learn from China's health system reform?" *BMJ*, 2019.

<sup>67</sup> Tham TY, et al. "Integrated health care systems in Asia: an urgent necessity". *Clinical Interventions in Aging*. 2018.

have any good connection with them for quite some time” says Dr Chan. “There is a weak linkage.”

In Japan, Dr Daida highlights the need for developing a systematic approach to moving patients from primary care to secondary and tertiary care. “The government wants to establish these kinds of regional systems across Japan”, he says. “A trial has been ongoing in Hiroshima prefecture for several years attempting to create a primary to tertiary care network”.

Meanwhile in South Korea, there is increasing interest in integrating long-term care and more effective management of comorbidities in reaction to the aging population, according to Dr Kim. “Policy efforts are being made such as support through Long-Term Care Insurance for the Elderly and the establishment of an efficient management system by linking community medical resources.”

### Box 3: Integrated cardiac care in Singapore

As the scorecard reveals, coordination of care around the patient is a common weakness in Asia-Pacific, even in more developed economies. Singapore’s substantial efforts toward improvement provide important lessons for ways to address this challenge.

The country’s health system already has various strengths which support care integration at different points. In particular, Dr Tee Joo Yeo – director of the cardiac rehabilitation unit at the National University Heart Centre, Singapore – points to the capacity and quality of primary care in the country. He uses treatment after a heart attack to illustrate this. Once a patient is stabilised and ready for discharge, primary care in Singapore is more than capable of providing the necessary ongoing CVD management “because it has a full set of drugs and measurement tools.

Secondary prevention there is well structured.” Moreover, if complications arise, notes Dr Yeo, it is straightforward to refer the patient back to the hospital for specialist care. Even where multiple clinicians and facilities are involved in treatment, he adds, Singapore’s integrated electronic health records enhance the sharing of test results and other information, contributing to the continuity of care.

The transition from hospital to primary care, however, has been a bigger problem. Dr Carolyn Lam notes that “there are people who fall through the cracks.” CareHub, a transition programme developed in the National University Health System (NUHS), has shown great promise in preventing this for those originally admitted to hospital for heart failure.



While still in hospital, each patient is assigned a coordinator, usually a nurse practitioner.<sup>68</sup> This person works with the patient and family members. The co-ordinator also leads a daily multi-disciplinary meeting with all relevant professionals working on the case, including doctors, nurses, pharmacists, dieticians, physiotherapists, and medical social workers. These meetings permit the creation of a comprehensive, tailored post-discharge care plan that takes into account the patient's medical as well as psycho-social needs. The discussions also allow the coordinator to decide on the relevant patient and caregiver education which doctors and nurses should provide before discharge for each individual.

After discharge, within the first 48 hours, the coordinator calls the patient and discusses any medical issues such as symptoms, medication, and functional issues. The coordinator can also refer the patient to non-medical service providers in the community where appropriate and, if the patient has more than one disease, is able to consolidate appointments to reduce the number of hospital trips needed. Within the following six months, the coordinator makes three to seven more such phone calls, depending on the severity of the case.

Home visits also take place which include vital sign, as well as symptom and medication management. The nurses

on the visit are also able to provide help with psycho-social issues. The patient or caregiver can also contact a 24-hour help centre at the hospital if questions arise that they would like help with outside of these meetings.

Any matters which the patient raises in any of these contacts are also discussed at a weekly multi-disciplinary meeting within the hospital. Finally, because the coordinator has oversight of all post-discharge services, the patient can use him or her as a single point of contact for all treatment and scheduling questions.

None of these arrangements are, strictly speaking, medical innovations. CareHub nevertheless brings substantial, measurable benefits for both patient long-term outcomes and the health system as a whole. CareHub is the cumulative result of ongoing innovations. In 2015, the NUHS conducted a trial of a system which included some, but not all, of CareHub's features. This showed a drop in emergency room visits among the enrolled heart failure patients of 27% after six months compared with the then average; a fall in the number of admissions to hospital of 38%; and a decline of 40% in unplanned days in hospital.<sup>69</sup> In 2017 and 2018, NUHS conducted a controlled trial to compare the results of CareHub to the already improved system from the earlier test. The result was that CareHub reduced unplanned cardiac-related re-admissions

<sup>68</sup> For details of the programme, see Yanying Chen *et al.*, "Can refinements to effective transitional care services improve outcomes? Results from a pragmatic, randomised controlled trial," *MSS* March 2018; Hospital Management Asia, "Nursing Excellence 2019 Gold Winner: National University Health System (Singapore) - *Improving health and anchoring care in the community through NUHS CareHub*," YouTube video, 2019.

<sup>69</sup> Wan Xian Chan, "Transitional Care to Reduce Heart Failure Readmission Rates in South East Asia," *Cardiac Failure Review*, 2016.

by a further 39% in the first six months after discharge. Unplanned, cardiac-related days in hospital, meanwhile, dropped by 56% compared with the previous, partly integrated arrangements. The system also led to reduced anxiety and depression scores among patients and was most effective for the most difficult cases, that is those with multiple conditions. Finally, CareHub is money-saving, with a reduction in costs of US\$950 per patient overall during the first months compared with the previous standard of care.<sup>70</sup>

Not surprisingly, the NUHS is now rolling out CareHub as a model for transitional care for a range of conditions, not just heart failure.<sup>71</sup> Integrated and co-ordinated care for those with cardiovascular disease should be a priority where it is weak. As Singapore's experience shows, it can provide better outcomes for patients even while saving health systems money.

## Patient empowerment

Many studies mention the need for introducing more patient-centred care approaches to improve patients' adherence to treatment, and organisations such as the American Heart Association have published guidance on measuring patient-reported health status for incorporation in electronic health records and national surveillance systems.<sup>72</sup>

The scorecard measures patient empowerment, in terms of whether healthcare systems use individualised care plans for patients and tools for patient activation, a process which enables unique care for the patient and also encourages the patient to manage their own condition. Mainland China is the only economy in this scorecard that does not use individualised care plans for patients.

This does not mean that they do not exist, but they are not used extensively across Mainland China. The European Society of Cardiology states that just one-third of Chinese patients with acute coronary syndrome, receive rehabilitation guidance.<sup>73</sup> In Hong Kong, however, individualised care plans have been developed by the Hospital Authority which also aims to empower patients to manage elements of their own care. Despite this, a report by the Our Hong Kong Foundation specifies that in order for these individualised plans to be effective, system-wide service integration is needed.<sup>74</sup> In the rest of the economies covered in the scorecard, individualised care plans are used, but it is not clear whether they also aim to empower patients to manage their own care.

<sup>70</sup> For details of the programme, see Yanying Chen *et al.*, "Can refinements to effective transitional care services improve outcomes? Results from a pragmatic, randomised controlled trial," MSS March 2018.

<sup>71</sup> "Initiatives to tackle frequent hospital admissions see results," *The Straits Times*, 10 March 2019.

<sup>72</sup> Koh JJK, *et al.* "Access and adherence to medications for the primary and secondary prevention of atherosclerotic cardiovascular disease in Singapore: A qualitative study." *Patient Preference and Adherence*, 2018; Su Q, *et al.* "Effects of a health promotion program on medication adherence to antiplatelet therapy among ischemic stroke patients in Hainan Province, China". *Vascular*, 2017; Rumsfeld JS, *et al.* "Cardiovascular health: the importance of measuring patient-reported health status: a scientific statement from the American Heart Association". *Circulation*, 2013.

<sup>73</sup> European Society of Cardiology. Just one-third of Chinese acute coronary syndrome patients receive rehabilitation guidance [Internet]. Sophia Antipolis: European Society of Cardiology. Available from: <https://www.escardio.org/The-ESC/Press-Office/Press-releases/just-one-third-of-chinese-acute-coronary-syndrome-patients-receive-rehabilitation-guidance>. (Accessed Feb 2020).

<sup>74</sup> Our Hong Kong Foundation. Fit for Purpose: A Health System for the 21st Century. Hong Kong: Our Hong Kong Foundation, 2018. Available from: [https://www.ourhkfoundation.org.hk/sites/default/files/media/pdf/ohkf\\_research\\_report\\_digital\\_1201.pdf](https://www.ourhkfoundation.org.hk/sites/default/files/media/pdf/ohkf_research_report_digital_1201.pdf). (Accessed Feb 2020).

The impact of culture on patient empowerment should not be overlooked. “I’ve practiced in the US, Europe, and Asia, and patient empowerment is strikingly different” says Dr Lam. “There is a different norm of aging. People feel like 60 is old and they start giving decision power to their children, but that is when chronic diseases set in.”

The role of patient groups is also valued. “Few doctors have experienced a stent or balloon in ourselves. Very few have had open heart surgery. As much as we want to preach to our patients, few have been in same boat and we don’t know how they feel, says Dr Yeo. “The only people who have done so are fellow patients.”

### **Public health campaigns are not comprehensive in many economies**

The importance of patient empowerment in secondary prevention is evident among those working in this field. “Patient empowerment is absolutely crucial”, says Dr Yeo. “Knowledge is power. If you provide a patient with knowledge of his or her condition, then they will understand the consequences of not taking medications or of doing exercise.” Therefore, a cornerstone of empowering patients is an informed and health-literate population, which is associated with improved secondary prevention.<sup>75</sup> Public health awareness campaigns are essential for the prevention of CVD, as many of the causes of are modifiable lifestyle factors which may be impacted with effective education.

Australia has the most comprehensive public health awareness campaigns found among study economies, including providing

physicians with teaching tools to further educate patients. The Chinese Centre for Disease Control and Prevention has drafted the Chinese National Plan for Non-Communicable Diseases Prevention and Treatment to increase awareness about non-communicable diseases, improve control of hypertension, diabetes, reduce smoking and salt consumption, as well as improve disease awareness.<sup>76</sup> Meanwhile, South Korea introduced a cardiovascular and cerebrovascular prevention programme in 2017 which was implemented by the Ministry of Health and Welfare and local governments. This includes a health promotion centre which targets people who were diagnosed with impaired fasting glucose or pre-hypertension following screening, and those who are suspected of hypertension or diabetes after first screening. These people will then be targeted for face-to-face consultation with a doctor, including a personalised prevention programme. Although the health promotion centre in Korea appears comprehensive in terms of what they offer, it is unclear whether they also include follow-up services for secondary prevention. There are further, intensive services available such as customised stop-smoking programmes and exercise programs, once a patient’s condition has been recognised, but these are not funded by National Health Insurance, therefore are at the patient’s expense.<sup>77</sup> In Singapore, there are also public health campaigns targeted at the general public, to raise awareness of stroke and heart attack, as well as encouraging the public to adopt healthy living lifestyles.<sup>78</sup>

<sup>75</sup> Heng-Hsin Tung, *et al.* “Health literacy impact on elderly patients with heart failure in Taiwan”. *Journal of Clinical Gerontology and Geriatrics*, 2014.

<sup>76</sup> Chinese Center for Disease Control and Prevention. China National Plan for NCD Prevention and Treatment (2012-2015) [Internet]. Beijing: Chinese Center for Disease Control and Prevention. Available from: [http://www.chinacdc.cn/en/ne/201207/t20120725\\_64430.html](http://www.chinacdc.cn/en/ne/201207/t20120725_64430.html). (Accessed Feb 2020).

<sup>77</sup> OECD. OECD Reviews of Health Care Quality: Korea: Raising Standards. Paris: OECD Publishing, 2012. Available from: [https://read.oecd-ilibrary.org/social-issues-migration-health/oecd-reviews-of-health-care-quality-korea\\_9789264173446-en#page3](https://read.oecd-ilibrary.org/social-issues-migration-health/oecd-reviews-of-health-care-quality-korea_9789264173446-en#page3). (Accessed Feb 2020).

<sup>78</sup> Health Promotion Board. Healthy Living [Internet]. Singapore: Health Promotion Board. Available from: <https://www.hpb.gov.sg/healthy-living>. (Accessed Feb 2020).

Despite these efforts, there are limited data describing the effectiveness of these programmes in Asia-Pacific. Worryingly, a 2015 survey in Australia—the highest scoring

economy in this analysis—found broad misconceptions and a lack of understanding around risk factors for heart disease.<sup>79</sup>

#### **Box 4: Making partnership possible: Patient health literacy, empowerment and working together on secondary prevention**

The management of chronic conditions cannot be left to medical practitioners alone, who inevitably have only limited contact with patients. Instead, effective long-term care requires the active participation of those living with the conditions. As a result, as Dr Chow notes “across all chronic health conditions, patients are increasingly encouraged to self-manage their own conditions. CVD is no different.” Rather than an object of care, the ideal is that patients act as active partners.<sup>80</sup>

In many cases, the level of patient engagement is worryingly low. Dr Lam explains that too often “once people have a heart attack, they glorify the person who saved them and underestimate the importance of all kinds of maintenance therapy. Once they have recovered, they tend to become complacent. For example, patients always quit smoking after a heart attack but then often start up again later.” Dr Chan agrees. All too frequently patients “believe that the procedures they have undergone are enough and they are ‘fixed.’”

Such attitudes help explain one of the great challenges of secondary prevention: medication adherence. Numerous studies have showed that somewhere between only 50% and 80% of those with CVD continue to take secondary prevention drugs just one year on from hospital discharge.<sup>81</sup> As Dr Khan puts it, “adherence of patients to treatment is sub-optimal. They are often not taking their medication. It is a huge problem.” Even the one-year hospital discharge data may paint too positive a picture. Dr Chow says that “we can do fairly well maintaining patients on effective secondary prevention in the first six to 12 months, but those patients on therapy for a long time tend to tail off.” Although diminishing adherence is not a simple issue, one contributing factor frequently cited in research into the problem is a lack of patient understanding about the medication and why they are taking it.

A fundamental requirement for changing these patient attitudes, and therefore a key building block of effective partnership,

<sup>79</sup> Erin Hoare, *et al.* “Australian adults’ behaviours, knowledge and perceptions of risk factors for heart disease: A cross-sectional study”. *Preventive Medicine Reports* 8, 2017.

<sup>80</sup> For a fuller discussion of the evolving patient role in healthcare, see The Economist Intelligence Unit, *Creating Healthy Partnerships: The Role of Patient Value and Patient-centred Care in Health Systems*, 2019.

<sup>81</sup> See, for example, Kathleen Packard and Daniel Hilleman, “Adherence to therapies for secondary prevention of cardiovascular disease: a focus on aspirin,” *Cardiovascular Therapeutics*, 2016; Amitava Banerjee *et al.*, “Health system barriers and facilitators to medication adherence for the secondary prevention of cardiovascular disease: a systematic review,” *Open Heart*, 2016; Rani Khatib *et al.*, “Adherence to coronary artery disease secondary prevention medicines: exploring modifiable barriers,” *Open Heart*, 2019.

is patient health literacy. Not surprisingly, a recent literature review found that lower levels of health literacy correlated with worse outcomes in congestive heart disease and heart failure.<sup>82</sup> Similarly, a 2014 Taiwan study showed that good health literacy among those who had experienced a heart attack increased their ability to self-care afterward by more than 10%.<sup>83</sup> Improving health literacy is not straightforward. “Patient education is a big problem,” explains Dr Tse. “It’s not only whether the doctor provides the care, it’s whether the patient accepts the care.”

Two indicators in the scorecard cover pathways to better patient education. For both, unfortunately, weak results are common.

The first such indicator is general health literacy promotion. Some effort in this area is universal. Every study economy has programmes to educate the public about basic risk factors for different kinds of CVD. Only half, though, go further and seek to raise awareness of symptoms, or when and how to seek help should those signs appear.

Moreover, even where health awareness efforts take place, their efficacy is open to question. Australia has one of the highest scores in the “Public Health Awareness Campaigns” indicator. Nevertheless, a 2015 study drawing on a representative survey of over 8,000 adults “revealed broad misconceptions with regard to the leading

cause of death and risk factors for heart disease among Australian men and women.” The “lack of understanding” extended to all sub-groups in the population.<sup>84</sup>

The general health promotion efforts identified by this research rarely address the particular risks of those who have already developed CVD. Dr Lam stresses that these individuals in particular need to be reminded of the importance of risk reduction by public campaigns. “I cannot overemphasise how important that is” for effective secondary prevention. Indeed, patients in this situation are often looking for answers to some substantial questions. Dr Khan explains that “the nature of disease is so huge. Once people are discharged, they have difficulty knowing what is the disease and what are the symptoms.”

Secondly, and arguable even more important for helping these patients is so-called “patient empowerment,” which the WHO defines as “a process in which patients understand their role, are given the knowledge and skills by their health-care provider to perform a task in an environment that recognizes community and cultural differences and encourages patient participation.”

Experts interviewed for this study repeatedly emphasise the essential role of patient empowerment in helping patients to become active partners.

<sup>82</sup> Jared Magnani *et al.*, “Health Literacy and Cardiovascular Disease: Fundamental Relevance to Primary and Secondary Prevention,” *Circulation*, 2018.

<sup>83</sup> Heng-HsinTung, “Health literacy impact on elderly patients with heart failure in Taiwan,” *Journal of Clinical Gerontology and Geriatrics*, 2014.

<sup>84</sup> Erin Hoare *et al.*, “Australian adults’ behaviours, knowledge and perceptions of risk factors for heart disease: A cross-sectional study,” *Preventative Medicine Reports*, 2017.

Empowerment, though, appears to be another area where study economies fall short. While individual care plans are common, there is a striking absence of patient activation or empowerment tools for secondary prevention, at least at economy-wide levels.

Such tools need not be complex. Dr Chow, for example, describes the Tobacco, Exercise and Diet Messages (TEXT ME) programme which she helped to trial with several hundred patients in Sydney. The experiment, in addition to the usual care for those with heart disease, sent patients four texts per week for six months. It then compared outcomes with those of a control group. The texts provided advice on reducing tobacco use, increasing exercise and eating better. Although each message was chosen from a general bank of pre-written advice, the specific selection was shaped by the patient's baseline characteristics.

By the end of the trial, compared to those in the control group, those sent the texts had seen significantly bigger reductions in cholesterol levels, blood pressure, BMI, and tobacco smoking. They also had higher levels of physical activity.<sup>85</sup> "We were excited," Dr Chow says, "that a simple but customised education programme was effective in modifying risk factors. We were also excited that patients liked the programme and said it helped to motivate them." She adds that in 2020, the scheme, in cooperation with the Heart Foundation will

be rolled out at multiple Australian hospitals as "a first step in providing a simple but digital secondary prevention support programme."

Perhaps the clearest negative impact of poor patient activation is in the area of cardiac rehabilitation. All too often, patients do not take part in an evidence-based rehabilitation programme. Again, the problem is a complex one. Even were patients interested in undergoing rehabilitation, every study economy lacks sufficient places to allow everyone who would benefit to do so.<sup>86</sup> Nevertheless, where space is available a lack of health education is an issue cited by many experts interviewed for this study. As Dr Daida puts it "patients do not realise importance of rehabilitation." This unwillingness to attend rehabilitation, in turn, exacerbates problems of health literacy. Dr Tse notes that "cardiac rehabilitation is important because it's not just exercise and drugs. It's also education, counselling and continued supervision."

In short, as Dr Chow puts it, "We have not yet properly tackled providing the tools people need to help and support them over the longer term." Patient education in various forms needs more attention in order to help those affected by cardiovascular diseases to become more engaged partners in secondary prevention. Until this occurs, unnecessary heart attacks, strokes and other CVD health damage will continue.

<sup>85</sup> Clara Chow *et al.*, "Effect of Lifestyle-Focused Text Messaging on Risk Factor Modification in Patients With Coronary Heart Disease," *JAMA*, 2015.

<sup>86</sup> Karam Turk-Adawi *et al.*, "Cardiac Rehabilitation Availability and Density around the Globe," *EClinicalMedicine*, 2019.

## Conclusions

The burden of CVD in Asia-Pacific is variable but substantial, accounting for between 22% and 42% of all deaths across the eight economies in this study. Collectively CVD is the leading or second-leading cause of death in each market. Progress in tackling the problems associated with CVD has focussed in the primary prevention space, and age-standardised incidence of CVDs are beginning to fall. Despite this progress, changing demographics, and unacceptably high recurrence rates of heart attack and stroke, means the remaining CVD burden and associated economic and human cost require urgent attention.

This analysis by the Economist Intelligence Unit explored the policy response to managing secondary cardiovascular events through the *Secondary Prevention of Cardiovascular Disease in Asia-Pacific Scorecard* and in-depth interviews with regional experts.

### Key findings of the research include:

- CVD policies do exist in some form in all economies studied; however, there is substantial room for improvement in providing explicit provision for secondary prevention and detailed implementation and monitoring plans.
- Policies on modifiable risk factors exist but the success of translating these into legislation and action, along with measuring impact, remains to be defined.
- Public health awareness campaigns are limited, and their impact is unclear.
- Clinical practice guidelines covering CVD secondary prevention, heart attack and stroke vary substantially across economies.
- Audits against quality standards are lacking: only two economies in this study have any form of audit in place, and their applicability to secondary prevention is limited.
- Primary care systems, a key component for integrated care, are still evolving in most Asian economies and in many cases uptake of services remains slow.
- Cardiac rehabilitation services exist, however places are limited and they struggle to recruit and retain patients.

Individual market-level responses must be based on the local situation and priorities, and it is up to each to develop a strategy that meets the needs. However, policymakers looking to tackle this issue may well consider some of the key priorities identified in this research:

**Integrated, coordinated patient-centred care is a necessary goal:** While policy does seem to recognise the importance of high-quality integrated care, the lack of example in the region reflects in the challenges of achieving this goal. Building on data, the use of electronic health records, and implementing individualised care plans are the first steps towards addressing structural barriers within health systems. The interface between primary and specialist care is a priority area to address for most economies.

**Patient empowerment is essential for success:** Lack of patient participation in rehabilitation programmes and adherence to medication are two of the biggest barriers in secondary prevention of CVD. Evidence-based patient education and empowerment initiatives appear to be lacking across the region and therefore should be prioritised. The use of technology may offer opportunities in this area, and engagement with patient groups in designing programmes is encouraged.

**Maximising data and measuring progress:**

Improving and expanding registry data coverage is vital to understand the true picture inform policy. The better integration of data through electronic health records may contribute towards this goal. Strengthening monitoring of secondary prevention goals in NCD or CVD plans, and auditing service delivery based on establishing quality standards and patient outcomes should be considered a high priority for study economies to refine their healthcare offerings and ensure patient needs are met.



## Appendix: Scorecard domains, indicators and scoring scheme

Domain	#	Indicator	Long name/ Definition	Scoring system	Score (range)	Source
1. Strategic plans and public health policies	1.1	Non-communicable diseases (NCD) plan	Existence of an operational, multisectoral NCD policy, strategy or action plan that integrates several NCDs and their risk factors	Categorical: Yes/No	Yes/No	WHO
	1.2	CVD plan	Existence of strategic plans to guide the control of cardiovascular diseases in general, or specifically for stroke or myocardial infarction. Ideally aligned to the economy's health strategic plan/NCD plan	0 = No plan; 1 = Plan exists for CVD as a whole +1 = Plan has been published or updated in last five years +1 = Plan covers secondary prevention and cardiac and stroke rehabilitation +1 = Further economy-wide plans/sub-plans exist for stroke or myocardial infarction (+1 for each)	0-4	EIU research - Policy documents, literature searches
	1.3	Healthy diet policy	Operational policy, strategy or plan to reduce unhealthy diets and/or promote healthy diets	Categorical: Yes/No	Yes/No	WHO
	1.4	Harmful alcohol consumption policy	Operational policy, strategy or plan to reduce harmful alcohol consumption	Categorical: Yes/No	Yes/No	WHO
	1.5	Physical activity policy	Operational policy, strategy or plan to reduce physical inactivity and/or promote physical activity	Categorical: Yes/No	Yes/No	WHO
	1.6	Tobacco control	Existence of policies and measures for tobacco control including: a) WHO Framework Convention on Tobacco Control (FCTC) b) Policies on smoke-free environments c) Bans on advertising, promotion and sponsorship d) Mass-media anti-tobacco campaigns e) Affordability of cigarettes, trend change 2008-2016	0 = market is not a signatory of the FCTC, has not implemented b), c) or d) and affordability of cigarettes has not been reduced between 2008-2016 +1 = Score for each of the 5 criteria under a); b); c); d) or e).	0-5	WHO

Domain	#	Indicator	Long name/ Definition	Scoring system	Score (range)	Source
	1.7	Public health awareness campaigns	Existence of public health initiatives/campaigns for raising awareness around stroke and myocardial infarction targeted at physicians, patients, and the general public.	0 = No campaigns +1 = Economy-wide campaign on risk factors +1 = Economy-wide campaign on seeking help and management +1 = Focussed campaigns exist for health professionals	0-4	EIU research - Policy documents, literature searches
	1.8	Economy-wide or regional patient registries	Existence of economy-wide or regional patient registries for stroke and myocardial infarction (MI).	0 = No registries in place 1 = Registry exists for one CV disease 2 = Registries exist for stroke and MI	0-2	EIU research - Policy documents, literature searches
<b>2. High quality care for CVD secondary prevention</b>	2.1	Evidence-based guidelines for NCD management through a primary care approach	Existence of government approved evidence-based guidelines/ protocols/standards for the management of major NCDs (cardiovascular disease, diabetes, cancer and chronic respiratory diseases) through a primary care approach.	Categorical: Yes/No	Yes/No	WHO
	2.2	Clinical practice guidelines for CVD	Existence of clinical practice guidelines for CVD: a. with a focus on CVD secondary prevention b. up-to-date (published in the last 5 years), evidence-based disease-specific guidelines (stroke or myocardial infarction guidelines) that include recommendations for secondary prevention interventions and cardiac rehabilitation.	0 = No guidelines exist +1 = Market has a guideline focused on CVD secondary prevention +1 = Up-to-date evidence-based guidelines for the each of following diseases cover the patient care continuum including secondary prevention, rehabilitation and long-term management: a) stroke b) myocardial infarction	0-3	EIU research - Policy documents, literature searches

Domain	#	Indicator	Long name/ Definition	Scoring system	Score (range)	Source
	2.3	Economy-wide policy for integrated and coordinated care provision	Existence of economy-wide policy for integrated care or pathways for integrated care provision with multidisciplinary teams.	0 = No integrated care policy exists and there are not pathways with multidisciplinary teams for CVD in general or for specific diseases. +1 = Economy-wide integrated care policy exists +1 = Integrated care pathways exist for each of: stroke, myocardial infarction	0-3	EIU research - Policy documents, literature searches
	2.4	Referral systems for rehabilitation	Existence of a system for referral to cardiac and stroke rehabilitation and long-term follow up.	0 = No referral system is in place 1 = Referral systems exist	0-1	EIU research - Policy documents, literature searches
	2.5	Electronic Health Record	Existence of economy-wide Electronic Health Record (EHR) system covering primary, secondary and tertiary health care facilities.	0 = No EHR system exists +1 = EHR system exists +1 = EHR in primary care facilities (e.g. clinics and health care centres) +1 = EHR in secondary care facilities (e.g. hospitals, emergency care) +1 = EHR in tertiary care facilities (e.g. specialized care)	0-4	WHO
	2.6	Patient empowerment	Provider use of individualised care plan and patient activation patient/ engagement measures with a focus on outcomes such as lifestyle/ behavioural modification and medication adherence.  <i>[Patient empowerment: A process in which patients understand their role, are given the knowledge and skills by their health-care provider to perform a task in an environment that recognizes community and cultural differences and encourages patient participation.]</i>	0 = No process for patient empowerment exists +1 = Use of individualised care plans by care providers +1 = Use of patient activation or patient empowerment measures by care providers	0-2	EIU research - Policy documents, literature searches

Domain	#	Indicator	Long name/ Definition	Scoring system	Score (range)	Source
	2.7	Government audits for implementation of secondary prevention care	Existence of government audits and availability of audit data in the public domain to assess the implementation of policies on NCDs/CVD and rehabilitation programmes in the primary and secondary healthcare	0 = No government audits exist +1 = Audits exist to assess the implementation of economy-wide policies and secondary prevention care programmes +1 = Audit data are available in the public domain	0-2	EIU research - Policy documents, literature searches
<b>3. Health system capacity and access to medicines and services</b>	3.1	Access to medicines for secondary prevention	Reimbursement of medicines for CVD secondary prevention through a public or social insurance health system	0 = No public or social insurance health system coverage for medicines 1 = Public or social insurance health system exists, but includes significant co-pays for some or all medicines 2 = Public or social insurance health system covers all needed medicines with no co-pay or a co-pay that doesn't put patients at financial risk	0-2	EIU research - Policy documents, literature searches
	3.2	Access to innovative technology in healthcare	Existence of mechanisms for sustainable introduction of innovative health technologies in the market	0 = There are no specific mechanisms for introduction of innovative health technologies in the market +1 = Existence of HTA or similar organisations with a remit to manage the sustainable access to health technology innovation +1 = Specific regulatory process or expedited regulatory approval programs are available for rapid introduction of health technologies when there is an unmet medical need	0-2	EIU research - Policy documents, literature searches

Domain	#	Indicator	Long name/ Definition	Scoring system	Score (range)	Source
	3.3	Rehabilitation programmes availability	Availability and use of cardiac and stroke rehabilitation programmes in the public health system	0 = Rehabilitation programmes are not available in the public health system 1 = Programmes exist but the majority of patients are not referred to the programmes 2 = Programmes exist and the majority of patients are referred to them	0-2	EIU research - Policy documents, literature searches
	3.4	Smoking cessation programmes	Availability of smoking cessation programmes in the public health system	0 = none of the following +1 = existence of toll-free help line to discuss cessation +1 = either nicotine replacement therapy/ Bupropion/Varenicline legally sold in market and partially covered by national health service +1 = existence of smoking cessation support in health clinics/primary care facilities	Yes/No	WHO
	3.5	Cardiovascular specialists density	Number of cardiologists per 1000	n/a	number	EIU research - Policy documents, literature searches
	3.6	Generalist medical practitioners density	Number of generalist medical practitioners per 1000  Note: Depending on the nature of the original data source may include practising (active) only or all registered in the health occupation.	n/a	number	WHO
	3.7	Nursing personnel density	Number of nurses per 10000  Note: Depending on the nature of the original data source may include practising (active) nursing personnel only or all registered nursing personnel	n/a	number	WHO

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