



MARSH & McLENNAN
COMPANIES

ASIA PACIFIC RISK CENTER

ADVANCING INTO THE GOLDEN YEARS

COST OF HEALTHCARE FOR ASIA PACIFIC'S ELDERLY



FOREWORD

“Advancing into the Golden Years – Cost of healthcare for Asia Pacific’s elderly” is the inaugural publication from Marsh & McLennan Companies’ Asia Pacific Risk Center (APRC). It is the first in a series of publications by APRC assessing the risks that societal ageing presents to societies, industries, and governments in the Asia Pacific region (APAC).

Asia Pacific is the fastest ageing region in the world and already has some of the oldest societies. However, APAC is also home to some relatively young populations, and there are many unanswered questions regarding the readiness for ageing of the region as a whole.

Governments need to understand how well prepared they and their citizens are to finance healthcare requirements for the elderly. Our findings will influence government policies and decisions on healthcare infrastructure spending. Individuals need to carefully consider how well prepared they are to fund their retirement healthcare needs, especially given the limited range of affordable insurance products. Insurers are searching for ways to price risk despite uncertainty over future increases in healthcare costs and lifespans. Companies seeking to provide the best employee benefits packages may start considering post-retirement offerings, but they need much more information and significantly more products than are currently available.

In our opening chapter we examine the speed of ageing in Asia Pacific compared to the rest of the world. In particular, this report focuses on 14 economies that generate a quarter of the global GDP, but house half of the world’s elderly population. In the body of the report, we assess the problems associated with rising healthcare costs in ageing societies through three lenses: i) the absolute size of the problem, ii) the complexity of factors involved, and iii) the urgency with which stakeholders in the elderly healthcare ecosystem need to take action. We quantify the financial impact of elderly healthcare between 2015 and 2030 in APAC countries, by modelling key drivers of direct healthcare costs. The report concludes with a summary of the key implications of rising elderly healthcare costs, and the identification of areas within the healthcare ecosystem, such as funding sources and workforce, that warrant urgent intervention. These will be the focus of subsequent research.

This report serves as a call to action for all parties in elderly healthcare ecosystems. The challenges are large, urgent and complex, but Marsh & McLennan is dedicated to working with a range of stakeholders to analyse the key risks and identify practical ways to build resilience and make the most of any new opportunities.



Wolfram Hedrich
Executive Director, Asia Pacific Risk Center, Marsh & McLennan Companies

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
1 ASIA PACIFIC – THE GLOBAL HOME OF THE ELDERLY?	12
1.1 THE UNPRECEDENTED PACE OF AGEING	13
1.2 AGEING RISK – A GROWING FINANCIAL THREAT TO HEALTHCARE ECOSYSTEMS	16
1.3 CAPTURING REGIONAL COMMONALITIES AND DIFFERENCES	18
1.4 THE SITUATION: AGEING ACROSS APAC	21
2 THE SPIRALLING COST OF ELDERLY HEALTHCARE	24
2.1 WHY ARE COSTS RISING?	25
2.2 ELDERLY HEALTHCARE: THE TRILLION DOLLAR CHALLENGE	31
2.3 PROBLEMS IN NEED FOR URGENT ACTION	34
2.4 MANY STAKEHOLDERS, COMPLEX SOLUTIONS	41
3 THE ROAD AHEAD: INNOVATIONS IN ELDERLY HEALTHCARE	48
3.1 FUNDING SOURCES FOR ELDERLY HEALTHCARE	49
3.2 EFFICIENCY IMPROVEMENTS IN HEALTHCARE DELIVERY MODEL	51
3.3 INFRASTRUCTURE DEVELOPMENT TO SUPPORT ELDERLY HEALTHCARE DEMANDS	53
3.4 HUMAN CAPITAL INITIATIVES	54
4 CONCLUSIONS	56
REFERENCES	57
GLOSSARY	61

EXECUTIVE SUMMARY

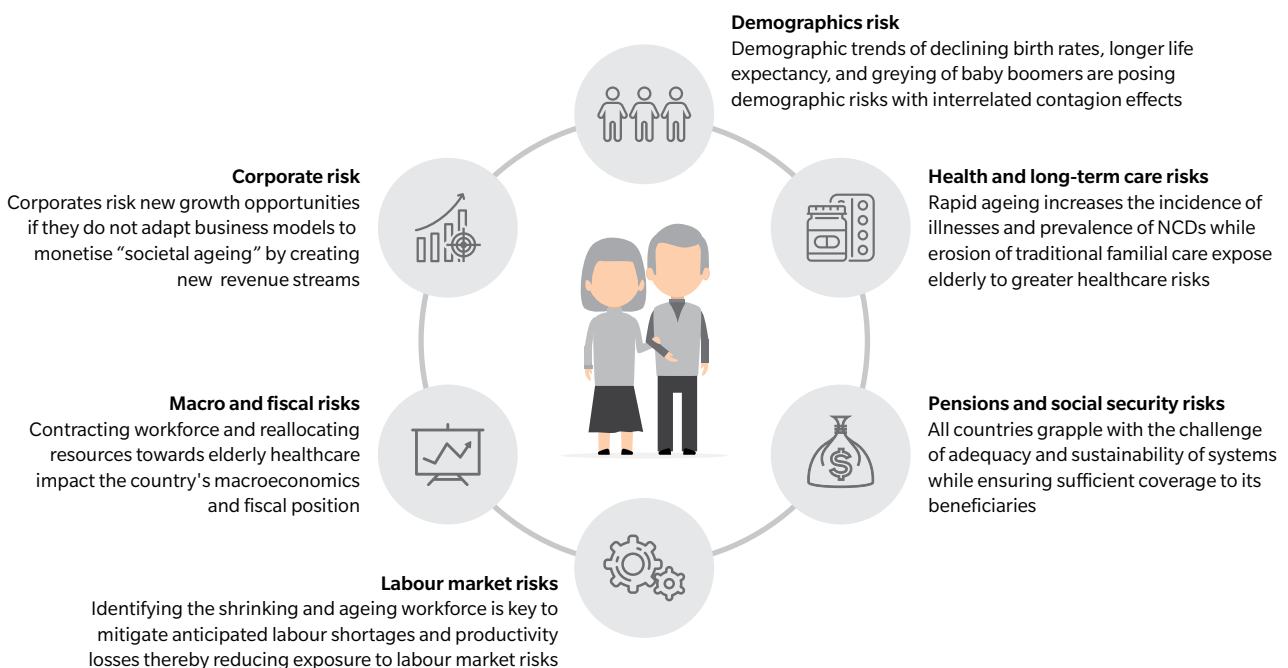
ASIA PACIFIC – THE GLOBAL HOME OF THE ELDERLY?

Asia Pacific (APAC)* is the fastest ageing region in the world with more than 200 million people expected to move into the ranks of the elderly (aged 65 years and above) between now and 2030. This represents an increase of 71 percent in the number of elderly people, compared to increases of 55 percent in North America and 31 percent in Europe over the same period.

Driven by improving socio-economic conditions and increasing life-expectancy, the speed at which societies in APAC are ageing poses an unprecedented challenge. For comparison, Singapore’s elderly population will rise from 11 to 20 percent in the next 15 years, while it took France 49 years to do the same. By 2030, Japan will become the world’s first “ultra-aged” nation, with the elderly accounting for more than 28 percent of the population, while Hong Kong, South Korea, and Taiwan will be considered “super-aged”, with more than 21 percent.

Many APAC countries are moving from a period when they reaped a “demographic dividend” to one where they face the prospect of paying a “demographic tax”. Such a significant demographic shift will be accompanied by a host of financial and socio-economic risks affecting multiple stakeholders, as shown in Exhibit A. Consequently, there is an urgent need to evaluate each country’s readiness to manage increasingly aged societies and to develop solutions that mitigate the associated risks. This report takes a deeper look into the **impact of societal ageing on elderly healthcare costs** in APAC.

EXHIBIT A: RISKS ASSOCIATED WITH SOCIETAL AGEING



Source APRC analysis adapted from World Bank and ADB

* For the purposes of this report we use a definition of Asia Pacific that includes East Asia, South Asia, South-East Asia and Oceania, but excluding central Asia and the countries of the Eastern Pacific (North and South America).

The APAC region as a whole faces a common challenge in societal ageing, however, due to the differences in demographics and epidemiological factors, and the level of healthcare and economic development, the nature and magnitude of the risks will vary. We define three broad groups within APAC, based on the extent of ageing and GDP per capita (Exhibit B).

As discussed in the full report, these three groups also show distinct patterns in the profile of healthcare cost drivers, infrastructure, and human capital. In turn, this allows the identification of key group-specific imperatives to manage the impact of societal ageing on elderly healthcare expenditure.

THE SPIRALLING COST OF ELDERLY HEALTHCARE

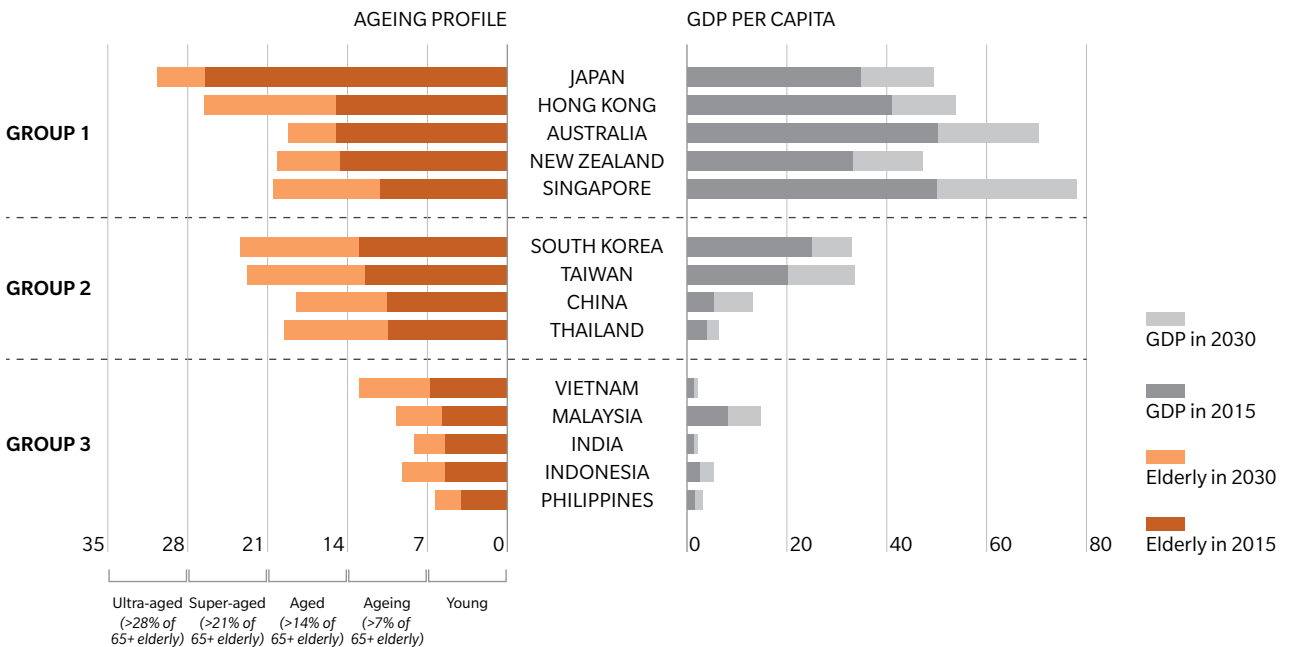
Societal ageing and the greater need for elderly healthcare poses significant risks to APAC countries for the following reasons:

US\$20 TRILLION IN HEALTHCARE EXPENDITURES

Elderly healthcare represents an immense financial burden and a risk to the fiscal health of countries. We estimate the cumulative elderly healthcare expenditure from 2015 to 2030 at over US\$20 trillion in APAC.

EXHIBIT B: AGEING GROUPS IN APAC ACCORDING TO ELDERLY PROPORTION AND GDP PER CAPITA*

PROPORTION OF ELDERLY VS. GDP PER CAPITA
% VS. US\$ THOUSANDS



Source: APRC analysis of data from Oxford Economics, World Bank, UN Population Division

* This approach serves as a useful tool for discussion of key challenges faced, however it does not fully capture many of the differences in health care provisions and level of preparedness for an ageing society that we discuss later in the report. Ultimately, solutions will have to be both country-specific, and involve cross-border collaborations.

NEED FOR URGENT ACTION GIVEN STRESS ON EXISTING INFRASTRUCTURE

Addressing the gaps in funding sustainability, efficiency of healthcare models, and workforce and infrastructure capacity will take time. Consequently, urgent action is needed on the part of governments, providers, insurers, and individuals.

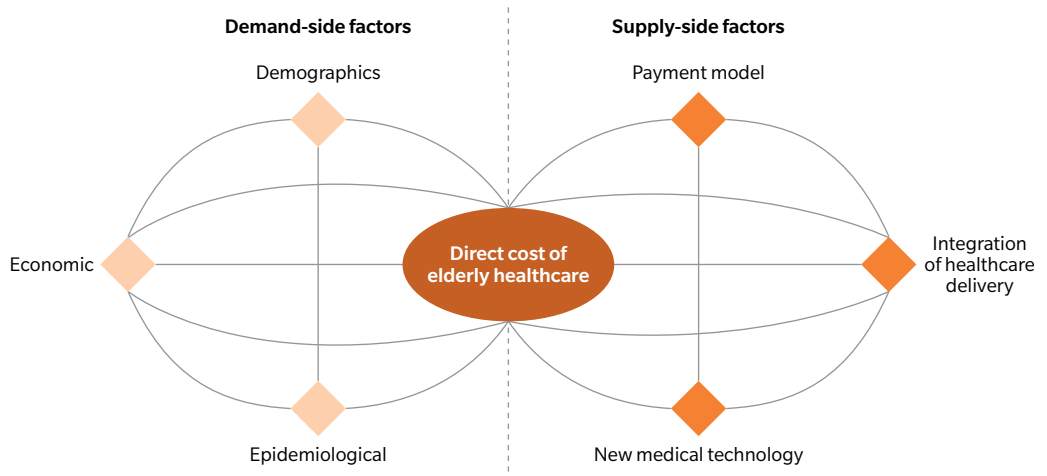
COMPLEXITY OF SOLUTIONS

Solving these challenges is complex and will require building a consensus among multiple stakeholders in the healthcare ecosystem, and taking into account the heterogeneity of the APAC region.

ELDERLY HEALTHCARE: THE TRILLION-DOLLAR CHALLENGE

Elderly healthcare expenditure is determined by multiple, interconnected supply- and demand-side cost drivers (Exhibit C).

EXHIBIT C: INTER-CONNECTION OF MULTIPLE COST DRIVERS OF ELDERLY HEALTHCARE



Source APRC analysis

In the present study, we have developed a macro-level projection model to estimate the potential cost of elderly healthcare in 14 APAC markets (which are home to half of the world's elderly population).

The factors considered in the model are:

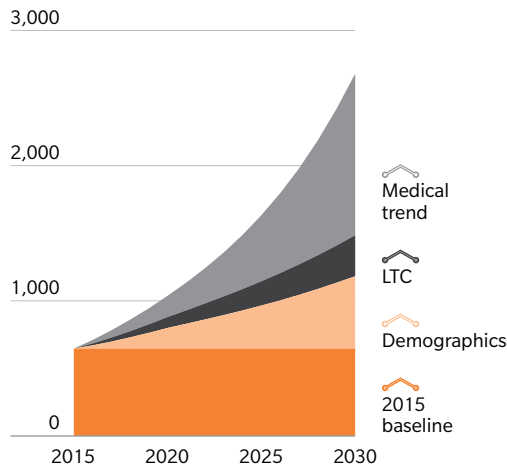
- Growth of elderly population (≥ 65 years)
- GDP growth rates
- Medical cost trends, which include demand- and supply-side drivers such as price inflation and utilisation patterns (such as changes in the incidence of non-communicable diseases (NCDs), and of regulations)
- Cost and growth in the utilisation of long-term care (LTC)

We estimate that the cumulative elderly healthcare expenditure from 2015 to 2030 will reach US\$20 trillion, which represents approximately half of region’s healthcare expenditure during that period. To put this into perspective, this amount is equivalent to the combined GDP of the 14 markets in 2015. The annual cost by 2030 is US\$2.5 trillion, five times the annual expenditure of US\$500 billion in 2015, representing a compound annual growth rate (CAGR) of 7-21 percent across the respective markets.

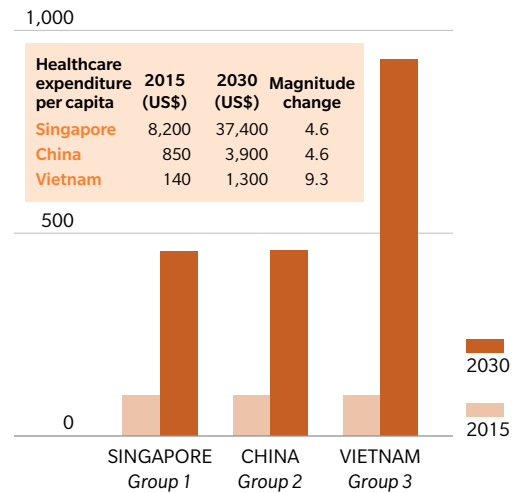
We believe these estimates are still conservative, as indirect costs (e.g., productivity loss by family carers) and capital costs (e.g., infrastructure construction) have not been included. The key driver in the growth of elderly healthcare expenditure is the medical cost trend, accounting for more than half of the incremental growth.

EXHIBIT D: ESTIMATION OF ELDERLY HEALTHCARE EXPENDITURE IN 14 APAC MARKETS FROM 2015 TO 2030

ELDERLY HEALTHCARE EXPENDITURE
BREAKDOWN BY COST COMPONENTS
US\$ BILLION



HEALTHCARE EXPENDITURE PER ELDERLY
INDEX TO 2015 = 100



Source APRC analysis

PROBLEMS IN NEED OF URGENT ACTION

As a result of the rising demand and cost of elderly healthcare, societal ageing poses three critical challenges that will significantly impact multiple stakeholders in the health ecosystem.

SUSTAINABILITY OF FUNDING SOURCES

The combination of increasing life expectancies, a sustained low-interest-rate environment, and growth in medical costs that exceeds growth in GDP present challenges to the following:



Insufficiency of government healthcare funds. Escalating elderly healthcare costs may force governments to reduce non-healthcare expenditure, increase taxation, expand borrowing and fiscal deficits, and/or shift the burden of financial support for the elderly more to the private sector and individuals.



Unviable medical insurance products for the elderly. The difficulty in accurately forecasting longevity risk and future medical costs results in premiums that are prohibitively expensive for most (if coverage is offered at all), who will also face steep increases in premiums as they grow older.



Inadequacy of personal retirement income. Elderly healthcare costs will place a strain on retirement savings due to the inadequacy of social security and pension systems, the decline in intra-family support, and the high out-of-pocket payments for healthcare in many APAC countries. This could force elderly individuals to choose between spending on health and other living expenses.

ADEQUACY OF HEALTHCARE CAPACITY

Our analysis shows there is a significant gap in healthcare capacity in most APAC countries and that significant investment in both infrastructure and human capital will be required to meet future demand.



Shortfall in human capital capacity. Long-term care is of particular importance to an ageing population. Our projections show that APAC will face a deficit of 18.2 million LTC workers, with China alone requiring 9.3 million more professional caregivers, by 2030.



Shortage of infrastructure. The shortfall in LTC workers is mirrored by a lack of LTC facilities. For example, we estimate that Japan and South Korea each require 100,000 or more LTC beds by 2030. In many developing countries, the poor “bankability” of healthcare infrastructure projects, due to the legal and financial uncertainty faced by foreign investors, results in an infrastructure gap. While healthcare capacity building is normally a natural consequence of economic development, due to the speed of ageing in APAC, many young and developing countries may not have sufficient time to achieve a high level of economic development before the detrimental effect of societal ageing occurs.

IMPACT ON ECONOMIC GROWTH



Excess healthcare expenditure risks diverting resources away from the rest of economy. Governments may be forced to increase access to healthcare, while relying on a shrinking workforce (and reduced income tax revenue). This could lead to increased fiscal deficits, which may trigger a rise in government borrowing and the diversion of funds from areas that can fuel economic growth, such as education, infrastructure, and R&D. The increase in debt might also necessitate an increase in taxes and interest rates, which could place further downward pressure on economic growth.

The above challenges highlight the need for radical changes to present public policy and business models of healthcare delivery and financing. However, solutions to tackle these issues are complex and need time to evolve. Consequently, there is an urgent need for countries to prioritise these issues and start to implement reforms now.

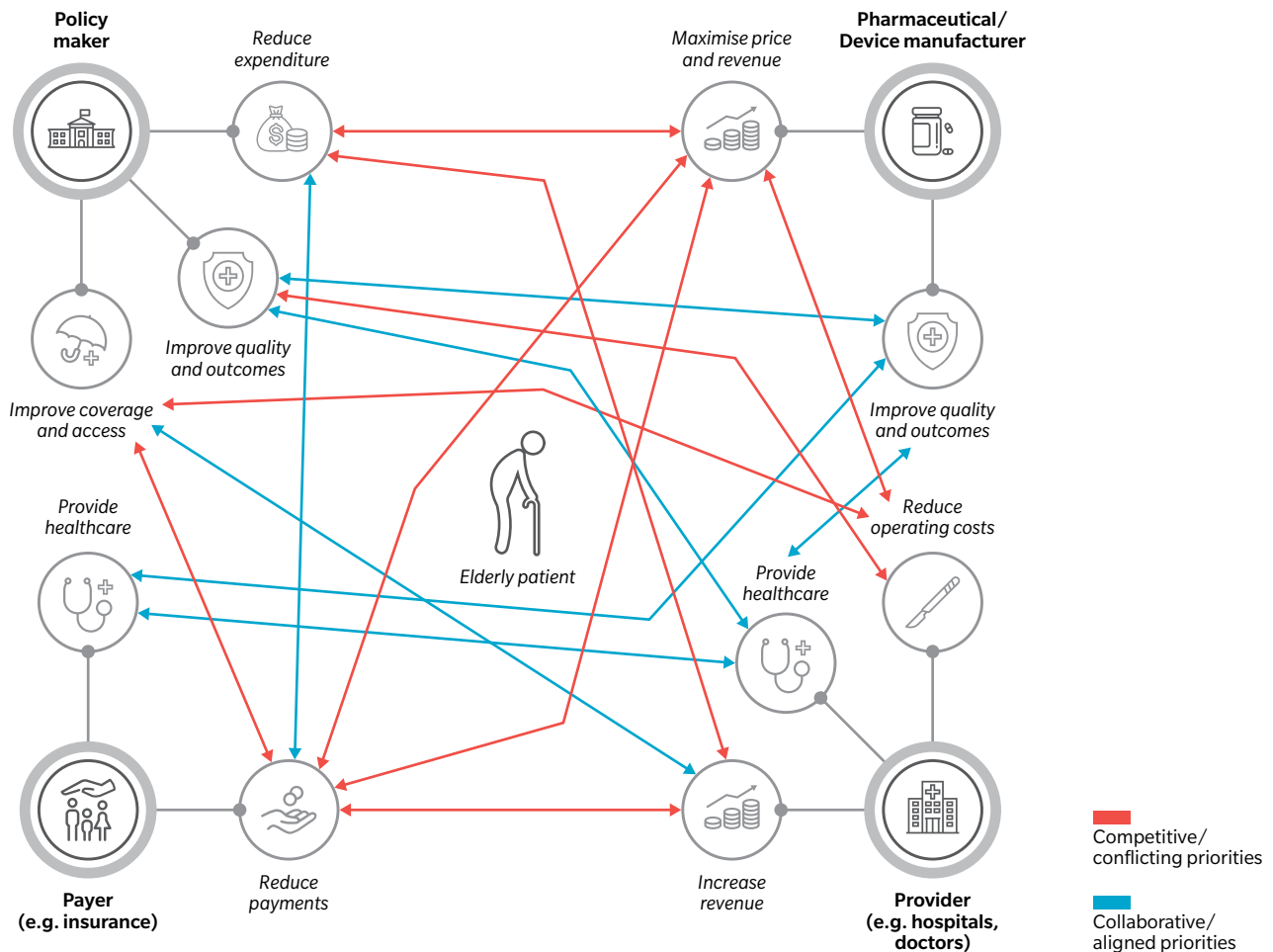
MANY STAKEHOLDERS, COMPLEX SOLUTIONS

The unsustainable increase of elderly healthcare costs highlights the urgent need for solutions. However, the healthcare ecosystem is complex, with multiple stakeholders, who often have conflicting priorities (Exhibit E). The elderly individual (patient) at the heart of the ecosystem bears a particular responsibility, since his/her physical and financial health ultimately drives the demand for healthcare services.

Consequently, solutions that align the objectives of multiple stakeholders (e.g., value-based healthcare) will be the most successful in effecting change.

Complexity in the healthcare ecosystem also extends across countries. Differences in the type and immediacy of ageing-related challenges mean that each country will need customised solutions to address its unique set of issues and constraints. These differences in demographics, epidemiology, and economic development also present opportunities for arbitrage in the form of cross-border solutions, including healthcare tourism and the migration of workers from Asia and beyond, such as Africa where half of the global population growth will occur through to 2050.

EXHIBIT E: INTER-CONNECTION OF STAKEHOLDER PRIORITIES



Source: APRC analysis

THE ROAD AHEAD: INNOVATIONS IN ELDERLY HEALTHCARE

Taking into consideration the cost drivers and stakeholders of elderly healthcare, we have identified four aspects of the ecosystem that most urgently require improvements. In this report, instead of discussing “traditional” strategies to combat societal ageing and healthcare costs, we discuss several “green shoots” – innovative solutions and concepts that could be cultivated to improve the sustainability of healthcare provision for the elderly in APAC.

FUNDING SOURCES FOR ELDERLY HEALTHCARE

- **Development of viable and affordable medical insurance for the elderly.** The “Internet of Things” and use of Big Data analysis (e.g., through telematics, wearable technologies, and online behaviour tracking) have the potential to improve the measurement of risk. This could allow more accurate insurance pricing that reflects the individual’s risk and the distribution of healthcare costs during a person’s later years. Together with innovative approaches to structuring premium payments (e.g., front loading of premiums during working years), this may enable insurers to offer insurance at lower premiums
- **Innovative reverse mortgages schemes.** Equity reverse mortgages are challenging for insurers due to the longevity risk, interest rate risk, and asset price risk that they have to assume. As a consequence, their products may not be financially attractive for consumers. In addition, there are cultural and social barriers to selling of family assets, particularly in Asia. Accordingly, innovative products are needed to improve the take-up rate. For example, hybrid products combining reverse mortgages with life- and non-life insurance products, minimising the inherent risks and providing an option for the asset to be retained by the borrower’s spouse (or heirs) at the termination of the loan period

IMPROVEMENTS IN EFFICIENCY OF THE HEALTHCARE DELIVERY MODEL

- **Integrated value-based health delivery models.** The introduction of integrated value-based health delivery models enabled by digital health technologies (e.g., electronic health records and remote patient monitoring) have shown promising initial results in bending the cost curve through lower utilisation of services and better clinical outcomes. These are achieved by improving the coordination of the care process, including both the prevention and the management of health conditions
- **Disruptors in healthcare.** The development of innovative digital healthcare technologies, such as wearable health trackers, have the potential to improve patient outcomes through greater adherence to treatments and timely access to care. With rapid advancements in this technology, an ever larger set of disruptors in the healthcare ecosystem will transform the management of elderly healthcare

INFRASTRUCTURE DEVELOPMENT TO SUPPORT ELDERLY HEALTHCARE DEMANDS

- **Closing the infrastructure financing gap.** The current period of low interest rates presents opportunities for more affordably tapping international funds and well-organised public-private partnerships. Consequently, it is imperative for governments in developing APAC countries to address the main obstacles impeding foreign investments, such as uncertainty in the legal and financial systems. This will mitigate the risks and uncertainty for private foreign investors, while upgrading and commoditising infrastructure investment as a viable alternative asset class
- **Crowdfunding.** In addition, the continued growth of crowdfunding opens its potential use in healthcare infrastructure projects (e.g., a multi-purpose community centre was successfully crowdfunded through Spacehive.com). However, the ability to scale up this approach to fund billion-dollar infrastructure projects will require further developments in regulation, technology and financing options

HUMAN CAPITAL INITIATIVES

- **Innovations to develop healthcare workforce.** Two such innovative human capital strategies are:
 - Human capital analytics (e.g., Mercer’s Strategic Retention Analysis platform) identify and quantify key drivers of employee retention, enabling the development of effective strategies that have been shown to reduce turnover rates and provide significant cost savings
 - The application of Uber-style collaborative consumption business models to home nursing and caregiving services could alleviate workforce shortages in LTC. Two start-ups (Homage.sg, Jaga-Me.com) in Singapore have started to offer on-demand, part-time professional nursing and caregiving services. Such services have the potential to be cost-saving through the avoidance of institutionalisation and reducing family carers’ opportunity costs
- **Robotic assistance to bridge workforce shortages.** The development of robotic technology that improves the mobility of the elderly, assists care workers, and monitors elderly patients is fast becoming a viable solution to fill gaps in elderly healthcare. For example, the Robear robot in Japan reduces the burden on caregivers by lifting patients onto their beds
- **Phone app-driven health and wellness.** The expanding applications and continued advancement in mobile phone technology, such as augmented reality (AR), offer a powerful medium for health promotion strategies for the general public. As evident from the success of Pokémon Go, phone apps have the potential to encourage physical activity, and AR can be used to educate people on healthy lifestyles. This can potentially result in improvements in the health of the population, reducing the strain on existing infrastructure and healthcare services

KEY TAKEAWAYS

- 1 US\$20 trillion between 2015-2030.** The annual cost of elderly healthcare in APAC is expected to increase five-fold from US\$500 billion in 2015 to US\$2.5 trillion in 2030. Key cost drivers are the increase in healthcare demand from an elderly population, poised to increase 71 percent, as well as medical cost inflation.
- 2 Current funding sources are unsustainable** due to escalating medical costs, increased longevity and pension schemes with poor adequacy, sustainability and integrity. Innovative products are required to address three major concerns of funding: i) affordability of elderly medical insurance, ii) low investment yield and inadequacy of retirement savings/pensions, and iii) lack of attractive reverse mortgage products to release equity from fixed assets.
- 3 Inefficiencies in healthcare models** threaten the long-term sustainability of healthcare provision. Three areas to focus improvements are: i) payment models such as fee-for-service that drive over-utilisation, ii) uncoordinated delivery of healthcare, and iii) pricing of new medical technology.
- 4 Inadequacy of long-term care capacity** in terms of infrastructure and workforce. Governments need to work with corporations to alleviate infrastructure financing gap, and develop cross-border solutions such as healthcare tourism and labour migration.
- 5 Customised solutions needed** for each country due to differences in demographics and healthcare models. This also presents the opportunity for young, developing countries to leapfrog to more efficient and sustainable healthcare models to mitigate the impact of societal ageing.
- 6 Improved data collection systems** are needed for the accurate and comprehensive collection and analysis of healthcare data in order to allow informed decision-making and development of actionable insights.

1 ASIA PACIFIC – THE GLOBAL HOME OF THE ELDERLY?

Asia Pacific (APAC) is the fastest ageing region in the world with more than 200 million people expected to move into the ranks of the elderly (aged 65 years and above) between now and 2030. While this fast-ageing phenomenon is accompanied and driven by many positive changes, such as improving socio-economic conditions and increasing life-expectancy, the speed at which Asian societies are ageing poses an unprecedented challenge.

Many APAC countries are transiting from a period when they reaped a “demographic dividend” to one where they face the prospect of paying a “demographic tax”. Such a significant demographic shift will be accompanied by a host of financial and socio-economic risks affecting multiple stakeholders.

An added complication to this growing issue is the heterogeneous nature of the APAC region, with countries facing inconsistent levels of change in workforce size, different sources of healthcare financing and varying levels of access to long-term care. These factors, coupled with other differences in demographics and epidemiological factors, level of healthcare and economic development, mean that the nature and magnitude of the risks these countries face will vary widely. In this section, we define three broad groups within APAC, based on the extent of ageing and GDP per capita, and briefly describe the challenges that are presented.

1.1. THE UNPRECEDENTED PACE OF AGEING

Asia Pacific* is the fastest ageing region in the world. Between 2015 and 2030, the number of elderly people (aged 65 years and above) who call the region home will increase by at least 200 million. This represents an increase of 71 percent in the number of elderly people, compared to increases of 55 percent in North America and 31 percent in Europe over the same period (Exhibit 1).

There are many positive reasons for these increases, including increased life expectancy, improved hygiene and sanitation, better nutrition, and advances in health care and education. These developments have also underpinned the region's general economic advancement and improvements in healthcare as seen

by the reduction in child mortality rates. Many developed countries have experienced rises in the proportion of elderly people in their populations over the last few decades.

What stands out in the APAC region is the speed at which this is happening (Exhibit 2). By way of comparison, in the 15 years from 2015 to 2030, China's elderly will rise from 11 percent to 18 percent of the population, according to World Bank data. However, it took Germany 25 years to make that leap. The elderly will rise from 11 percent to 20 percent of Singapore's population over this period, but it took France 49 years to do the same. South Korea will move from 13 percent to 23 percent, a rise that took Italy 40 years.

EXHIBIT 1: COMPARISON OF ELDERLY POPULATION ACROSS MAJOR REGIONS BETWEEN 2015 AND 2030

ELDERLY POPULATION PROJECTION FROM 2015 TO 2030
MILLIONS



Source: APCR analysis on UN Population Division dataset

* For the purposes of this report we use a definition of Asia Pacific that includes East Asia, South Asia, South-East Asia and Oceania, but excluding central Asia and the countries of the Eastern Pacific (North and South America).

Such a rapid demographic shift brings a host of financial and socio-economic risks and opportunities. Global studies suggest that without deliberate intervention by governments and industries, societal ageing will lead to a reduction in labour supply and a decline in individual savings,

which will impact investment and economic activity. Moody's estimates that societal ageing will reduce annual economic growth by 0.9 percentage point 2020-25¹.

However, if governments and industries can enable and support older workforces, then there could be potential economic gains.

APAC MARKETS INCLUDED IN PRESENT STUDY

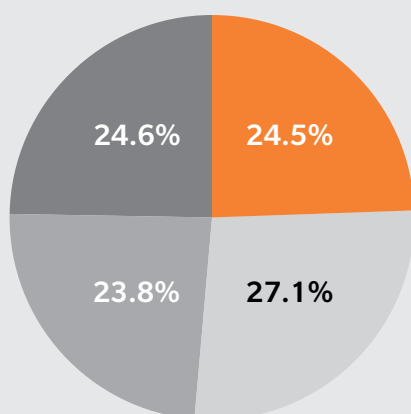
For this study we have selected a group of 14 markets from major regions within APAC to assess the escalating financial impact of healthcare expenditure for the elderly (Exhibit 3).

The aim was to cover both developed and developing markets with varying elderly population densities at different income levels (in terms of GDP), which are representative for each region. Thus, the analyses include a mixed group of markets with varying income levels and elderly composition in Southeast Asia, South Asia, East Asia, and the Oceania.

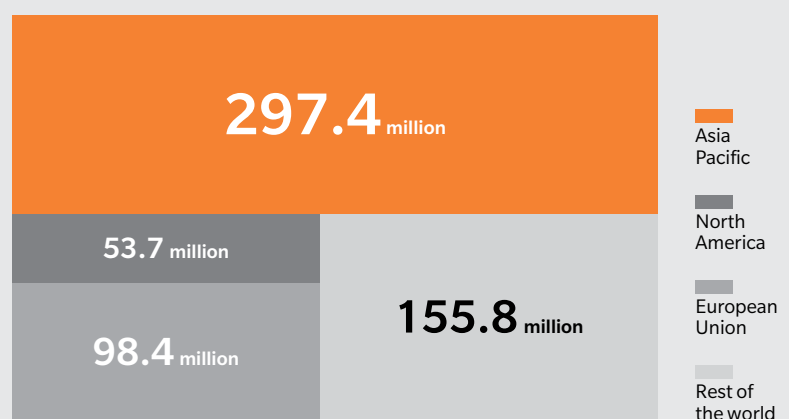
Today, these 14 markets collectively generate a quarter (24.5%) of global GDP but are home to almost half (49.1%) of the world's elderly population. By 2030, the 14 APAC markets under study are projected to continue to expand its share of elderly population at an annual growth rate of 2.6%, outpacing the global rate of 1.9%.

EXHIBIT 3: GLOBAL DISTRIBUTION OF GDP AND ELDERLY POPULATION

SHARE OF GDP BY REGION
%



ELDERLY POPULATION BY REGION
MILLIONS



Source: APRC analysis on data from Worldbank and UN Population Division

1.2. AGEING RISK – A GROWING FINANCIAL THREAT TO HEALTHCARE ECOSYSTEMS

Many APAC countries are transiting from a period when they reaped a “demographic dividend” to one when they are concerned about the prospect of paying a “demographic tax”. It’s clear that there is an urgent need to understand each country’s readiness to manage the increasingly aged societies and mitigate the associated risks.

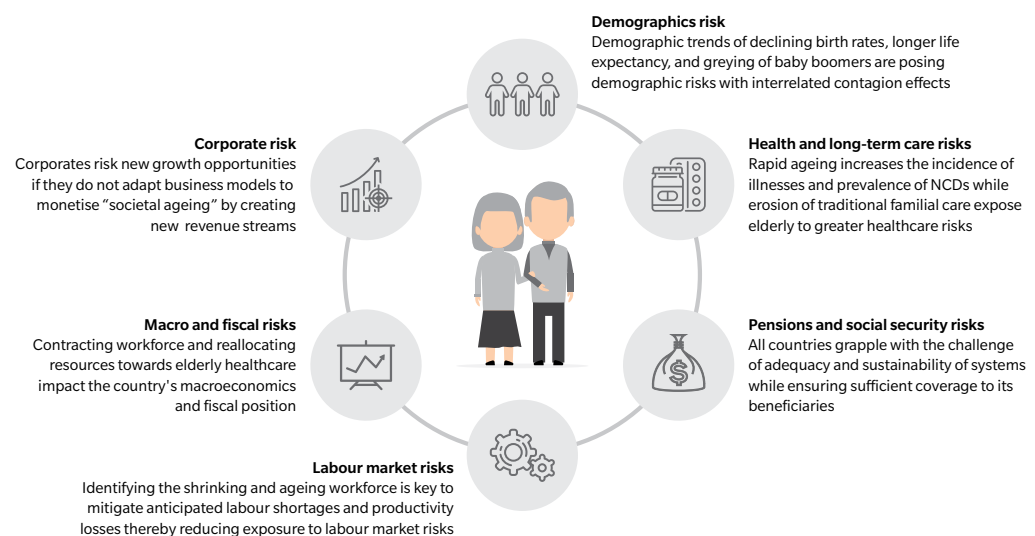
Many opportunities to capitalise on an ageing society depend on obtaining net positive economic contributions from elderly populations, or at least minimising the negative impacts.

Given the complex nature, there are many systemic risks associated with societal ageing that affect multiple stakeholders (Exhibit 4). Corporates need to consider whether there are potential business models that can benefit from both the growing elderly workforce and the growing demand for products marketed to the elderly. Governments need to manage

labour market risks, and consider whether they need to incentivise citizens to work beyond standard retirement ages, or to encourage migrant workers. Furthermore, the adequacy of pensions (or retirement income more broadly) is a key consideration for governments, corporates and individuals alike.

Another key consideration is the need to maintain a level of healthcare for the elderly population. Current data shows that increased longevity correlates directly with an increased prevalence of non-communicable diseases (NCDs) such as cancer and diabetes, and greater care dependency². The higher funding required to satisfy this rising need for social support comes simultaneously as more people leave the workforce and stop contributing to the economy. This creates a positive feedback loop that amplifies the pressures on elderly healthcare management. The problem is exacerbated if traditional familial care is eroded, alongside with its financing sources.

EXHIBIT 4: RISKS ASSOCIATED WITH SOCIETAL AGEING



Source APRC analysis adapted from World Bank

In a perfect world, elderly healthcare – in fact healthcare for everyone – would be available and affordable to all who required it.

For elderly healthcare there is a growing concern about the risk of unplanned increases in expenditure. The magnitude of this risk is determined by various factors that vary according to country, such as the pace of ageing, the rate of healthcare

cost inflation, and the degree of adequacy of the healthcare infrastructure.

Recent trends in APAC show that the medical cost inflation in medical healthcare costs far exceeds general inflation. This price increase indicates a potentially unsustainable level, especially when considered alongside the inability so far of healthcare infrastructure supply to match increased levels of demand.

CASE STUDY

AUSTRALIANS ARE GIVING UP ON HEALTHCARE DUE TO RISING MEDICAL COSTS

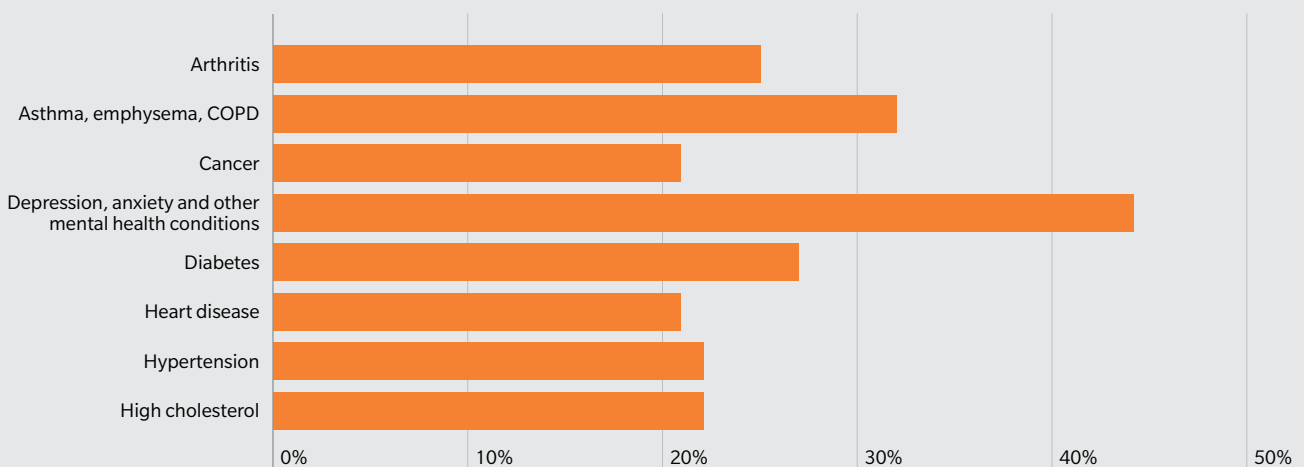
According to a recent 2016 study in Australia³, the need for significant out-of-pocket (OOP) payment is causing many Australians with chronic health conditions to skip necessary healthcare treatment because they simply cannot afford to.

This trend is worsened by a vicious cycle where people with chronic conditions are more likely to leave the workforce, and hence have lower income and savings to pay for rising medical costs.

Australian adults with chronic obstructive pulmonary disease and mental health conditions had double the OOP healthcare expenditure as compared to those without health conditions. In addition, these adults were at least six times more likely to skip their corresponding healthcare treatment than those without.

The exorbitant OOP cost of healthcare in Australia acts as a significant barrier to accessing treatment for people with chronic health conditions. This highlights the need for healthcare reforms and financing structures to ensure quality care for the chronically ill can be made available and affordable to all.

EXHIBIT 5: PERCENTAGE OF AUSTRALIANS SKIPPING TREATMENT BY CONDITION



Source APRC analysis on Callander E et al. findings

1.3. CAPTURING REGIONAL COMMONALITIES AND DIFFERENCES

While APAC countries are challenged critically by societal ageing, the heterogeneous nature of the region suggests there is no single strategy that can address the needs of all countries equally. In fact, there are many interlinked societal factors that make the challenge of ageing complex and nuanced, such as pension replacement rates and disease prevalence profiles, which vary across the region. Three examples of these differences are examined in more detail below.

such as the Philippines and Indonesia, modest rises in working population proportion are projected for the period to 2030. There is also a group of countries that will experience relatively modest falls in working population. Countries such as Malaysia and Vietnam may find that natural migration solves part of the workforce shortfall and that the effect is absorbed without noticeable impact. However, markets such as Hong Kong, South Korea and Singapore, will see much larger declines in workforce over the period, which are unlikely to be compensated by the arrival of migrant workers.

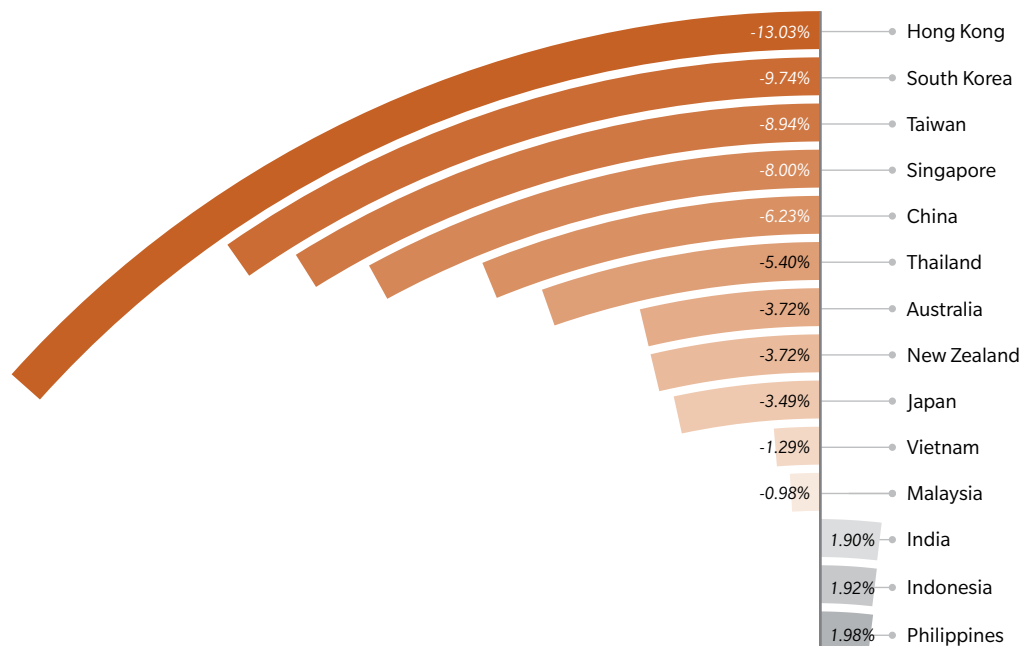
1.3.1. CHANGE IN WORKFORCE SIZE

Depending on the extent of societal ageing, it is expected that the size of workforce will change significantly over the next decades (Exhibit 6). For relatively young countries,

The impact on the dependency ratios in key APAC economies will be severe. In 2015 each elderly person in the region was on average supported by about eight working adults, but by 2030 this ratio will be 5:1.

EXHIBIT 6: SHRINKING WORKFORCE EXPECTED TO BETWEEN 2-13% OVER NEXT 15 YEARS

CHANGE IN WORKING POPULATION (15-64) BETWEEN 2015 AND 2030 IN ASIA-PACIFIC %



Source APRC analysis on data from UN Population Division

However, significant variations exist between countries: Japan's ratio will fall from 2.3:1 to 1.9:1, while that of the Philippines will fall from 15:1 to 10:1.

1.3.2. HEALTHCARE FINANCING SOURCES

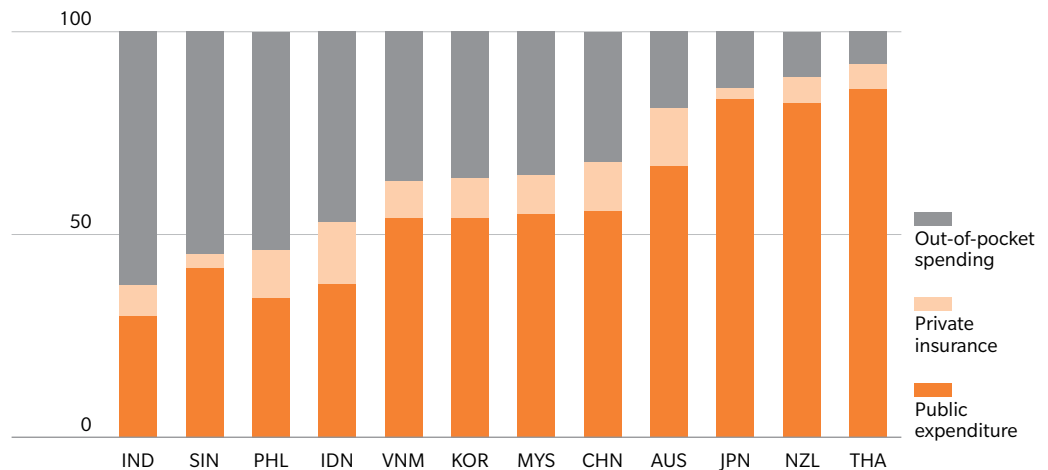
Healthcare in the APAC region is financed by a broad range of means. Healthcare coverage through personal insurance or corporate benefits plans is not always available, especially elderly healthcare coverage. Even where it is made available, it is often under-utilised in many developing countries due to issues of affordability, trust of financial institutions, as well as a culture where savings are seen as a valid alternative means of provision. However, this implicitly assumes that returns on savings will keep pace with inflation in

health costs – an assumption that does not currently hold in most countries.

For example, due to a lack of public financing for healthcare, India's healthcare provision is dominated by the private sector, and the majority of citizens pay more than 60 percent of their total health expenditure out-of-pocket (OOP). Exhibit 7 shows the total healthcare expenditure breakdown by financing sources, and in general the elderly are more likely to pay a greater proportion because of the limited availability of elderly healthcare insurance products. In contrast to India's example, Thailand established a universal healthcare coverage (UHC) scheme in 2002 after a public health financing reform. This proved to be extremely effective, as the Thais pay the least OOP (less than 10 percent), based on the 2014 data retrieved from World Bank.

EXHIBIT 7: HEALTHCARE FINANCING SOURCES

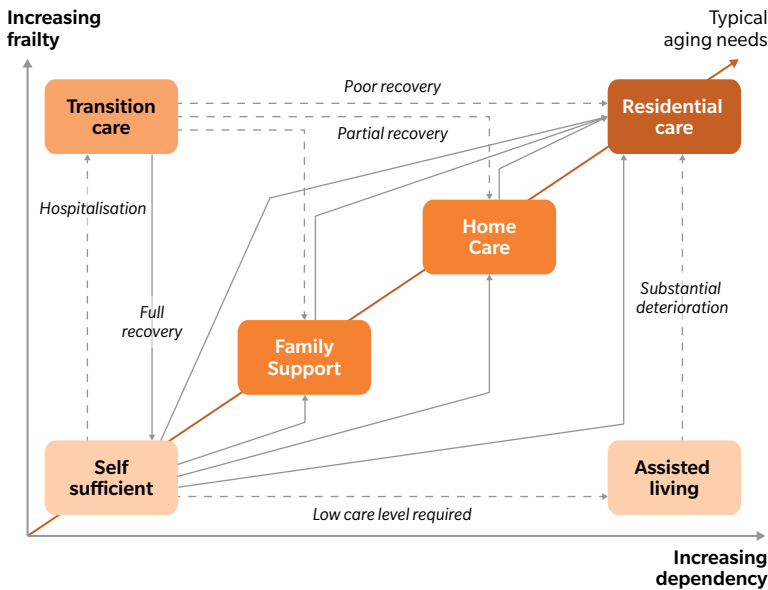
2014 TOTAL HEALTH EXPENDITURE %



Source: APRC analysis on data from World Bank

EXHIBIT 8: SIX GENERAL STAGES THE ELDERLY TAKE THROUGH THE CARE SYSTEM BASED ON THEIR HEALTH CONDITION

PROGRESSION BETWEEN LEVELS OF CARE



Source Oliver Wyman analysis

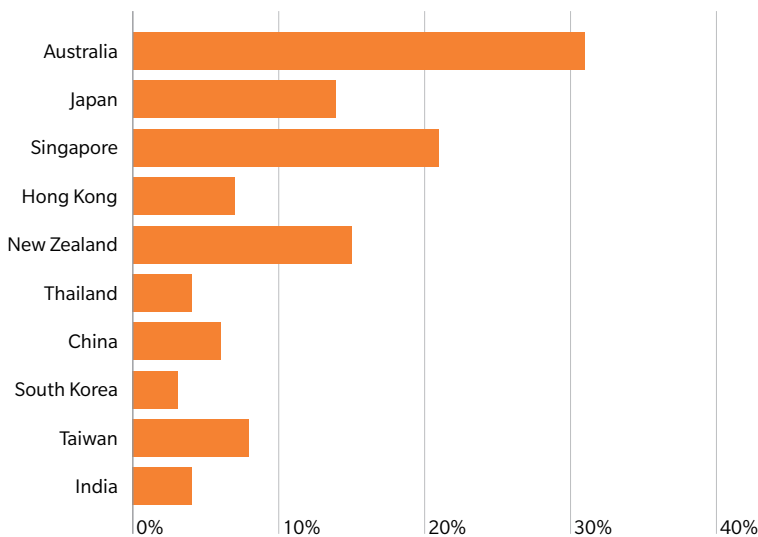
1.3.3. ACCESS TO LONG-TERM CARE

The third difference among APAC countries is the access to long-term care (LTC). Health status is one of the key drivers for the level of care required, as frailty and prevalence of NCDs are a direct function of age (Exhibit 8). While there are substantial proportions of *self-sufficient* seniors who are relatively mobile and can manage their activities of daily living (ADLs) independently, they are still expected to use some form of care during their lives.

Long-term care covers all care for the elderly, which are provided in different places by different caregivers (e.g., residential facilities or at home), depending on the elderly person's needs. Family support, provided by unpaid family members, or friends, is the most common type of personal care provision. Long-term care can also be given in home care (e.g., adult day-care centres) or residential care (nursing homes) when the elderly person experiences more severe and chronic health conditions, therefore increasing their levels of frailty and dependency.

The extent to which LTC is utilised varies significantly across the APAC region. Utilisation of LTC tends to be driven by the availability and affordability of LTC facilities and services. In addition, Asian cultural values are also a factor: There is often a filial duty to care for elderly relatives and a stigma associated with placing family members in care facilities. Consequently, in Australia, LTC coverage is as high as 31 percent, while in India, LTC is among the lowest at 4 percent (Exhibit 9).

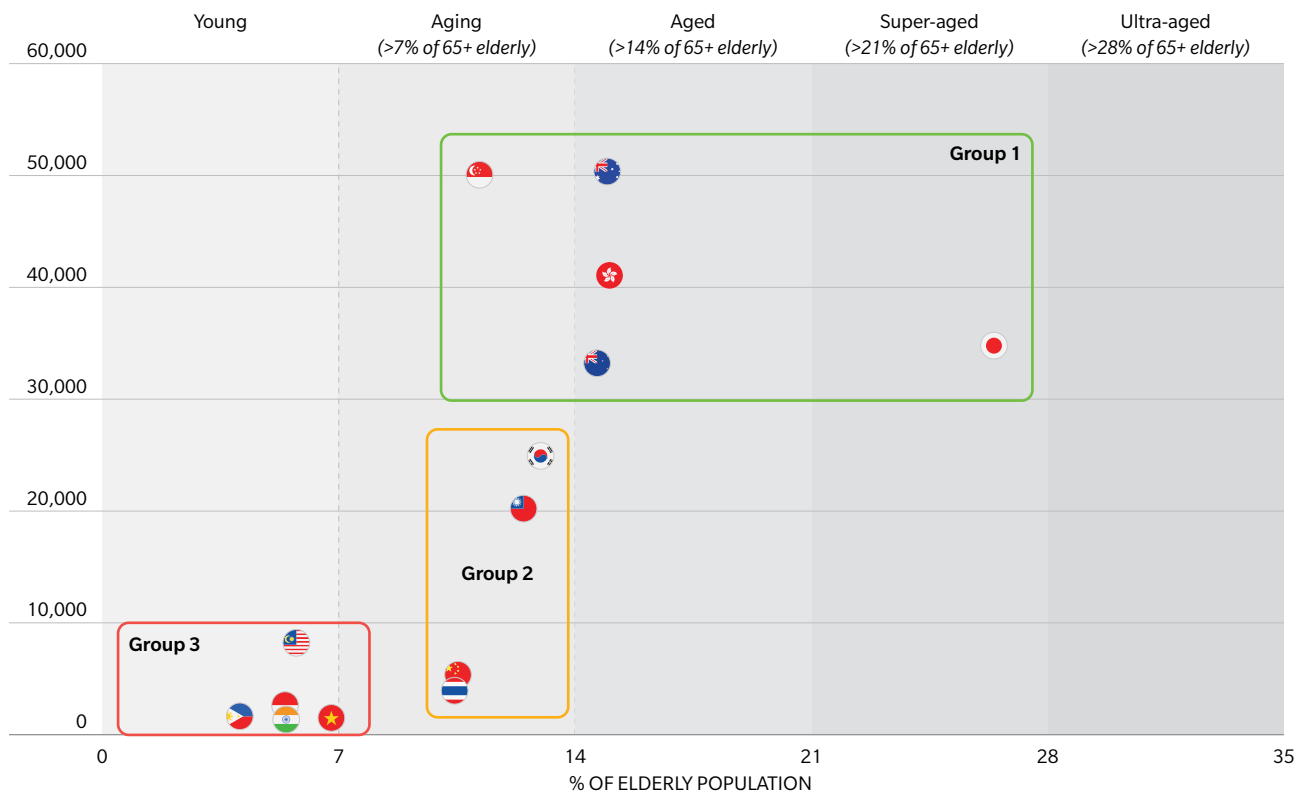
EXHIBIT 9: PROPORTION OF ELDERLY RECEIVING LTC



Source APRC analysis

EXHIBIT 10: AGEING GROUPS OF IN APAC REGION ACCORDING TO ELDERLY PROPORTION AND GDP PER CAPITA* IN 2015

US\$, 2015



Source APRC analysis on data from World Bank

1.4. THE SITUATION: AGEING ACROSS APAC

Differences in demographic and socio-economic conditions across APAC make it clear that no single solution is appropriate for the whole region. For example, countries with high GDP per capita and low current spend on healthcare may be in a better position to absorb the increased financial burden of societal ageing than countries with weaker economic development⁴. To test this hypothesis, we examined a number of economic and demographic measures to see if there were any clear groupings of markets in terms of ageing indicators.

Exhibit 10 shows that there are three key groups in terms of percentage of elderly people in the population and GDP per capita. The groupings still apply broadly

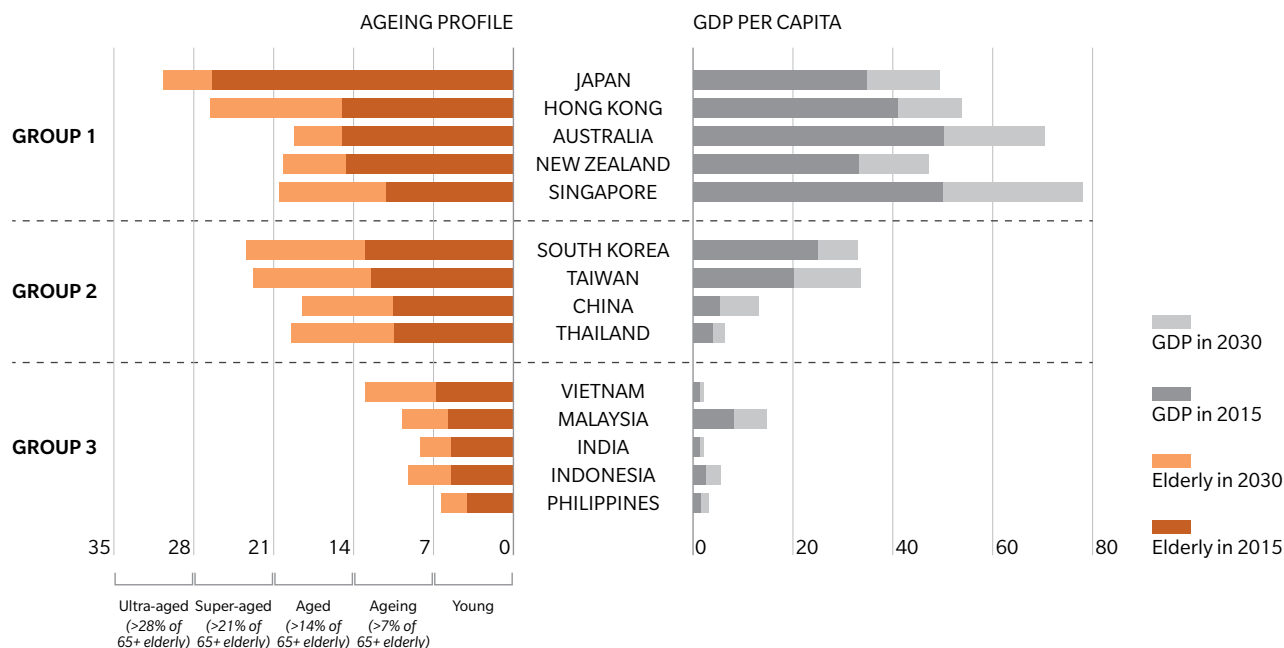
in 2030, with only limited transition between each group (Exhibit 11). There is however no doubt that all markets are ageing in this period, and that they are ageing faster relative to their growth in GDP per capita. Consistent trends across the three groupings in terms of percentage of elderly people utilising LTC, cancer incidence per 100,000 people, and total healthcare expenditure per capita (Exhibit 12). It should be noted that the rate of cancer incidence is reflective of both the actual cancer rate and its level of diagnosis.

These groupings can be viewed as distinct ageing groups, each with its own set of characteristics.

* This approach serves as a useful tool for discussion of key challenges faced, however it does not fully capture differences in health care provisions and level of preparedness for an ageing society that we discuss later in the report. Ultimately, solutions will have to be both country-specific, and cross-border.

EXHIBIT 11: TRANSITION OF ELDERLY PROPORTION AND GDP PER CAPITA* FROM 2015 TO 2030

PROPORTION OF ELDERLY VS. GDP PER CAPITA
% VS. US\$ THOUSANDS



Source: APRC analysis of data from Oxford Economics, World Bank, UN Population Division

GROUP 1 – MONEY-RICH, TIME-POOR

These are developed markets which benefitted from the post WWII baby boom, but are now the first to experience the challenge of ageing that follows the earlier demographic dividend. Though these countries face the largest challenge from ageing in relative terms, they generally benefit from high GDP per capita. Japan leads the ageing charge and will become the world's first ultra-aged by 2030.

Although not counted within this group in 2015, Taiwan and South Korea's fast-ageing societies will fall within it by 2030.

GROUP 2 – GOLDEN-PRESENT, GREY-FUTURE

This group consisted of a mixed bag of markets, but by 2030 a clearer picture of aged, developing nations will emerge.

China will have over 160 million additional elderly citizens by 2030. This is the largest absolute increase of any country in the world and will put significant strain on the country's elderly healthcare infrastructure. However, while China will see 150 percent growth in GDP per capita over this period, the other remaining country in the group, Thailand, will see growth of only 63 percent.

GROUP 3 – YOUNG, NEED TO GROW RICH BEFORE OLD

These countries have the youngest demographic profiles and are all developing economies with relatively low levels of GDP per capita. Levels of spend per capita on elderly healthcare are a fraction of those in more developed and more aged nations, reflecting these countries' current healthcare coverage and generally limited elderly healthcare infrastructure.

* This approach serves as a useful tool for discussion of key challenges faced, however it does hide many of the differences in health care provisions and level of preparedness for an ageing society that we point out later in the report. Ultimately, solutions will have to be both country-specific, and cross-border.

Many of these nations are still benefiting from a demographic dividend, and the needs of an ageing society may be low on their list of social priorities. However, even these countries are ageing quickly: Vietnam is forecast to have the greatest acceleration in ageing among the countries in this study over the period. Of concern is that, based on our projections, the ageing of these countries might not be accompanied by sufficient increases in GDP per capita.

Section 2 of this report will discuss how these three groups show distinct patterns in the profile of healthcare cost drivers, infrastructure, and human capital. In turn, this allows the identification of key group-specific imperatives to manage the impact of societal ageing on elderly healthcare expenditure.

EXHIBIT 12: COMPARISON OF SELECTED CHARACTERISTICS ACROSS AGEING GROUPS

	GROUP 1 (Money-Rich, Time-Poor)	GROUP 2 (Golden-Present, Grey-Future)	GROUP 3 (Young, Need To Grow Rich Before Old)
% OF ELDERLY IN POPULATION	>15%	~10%	~5%
GDP PER CAPITA	US\$30,000-50,000	US\$5,000-25,000	<US\$5,000
ELDERLY HEALTHCARE SPEND PER CAPITA	>US\$10,000	US\$1,000-5,000	<US\$500
% OF ELDERLY RECEIVING LONG TERM CARE	10-20%	4-8%	2-4%
CANCER INCIDENCE PER 100K (WHOLE POPULATION)	>200	150-200	<150

Source APRC analysis

2 THE SPIRALLING COST OF ELDERLY HEALTHCARE

As APAC countries progress up the ageing spectrum, elderly healthcare expenditure is certain to increase, representing a significant risk to their fiscal health.

Based on current trends, we estimate the cumulative expenditure on elderly healthcare to approximate US\$20 trillion over the next 15 years.

Without urgent improvements to contain the drivers of rising healthcare costs, societal ageing will challenge the capacity of current funding sources, healthcare infrastructure, and workforce.

Strategies to manage the escalation of elderly healthcare expenditure need a two-pronged approach:

- Alleviate the growing unmet healthcare demands of an ageing population. This includes the development of sustainable, long-term financing strategies and products, adequate infrastructure, and human capital strategies
- Overhaul current healthcare models to improve efficiency, reduce cost growth, and deliver better health to patients (e.g., value-based healthcare delivery)

Due to the complex nature of healthcare ecosystems, solutions will need to consider the inter-connections of multiple cost drivers, the motivations of and interactions between stakeholders, and the potential opportunities of cross-country initiatives.

2.1. WHY ARE COSTS RISING?

Elderly healthcare expenditure includes medical and non-medical costs (e.g., LTC), which are determined by multiple, inter-connected factors:

- **Demand-side drivers:** Demographic factors, economic, and epidemiological factors
- **Supply-side drivers:** Rising healthcare costs, driven by high prices of new medical technologies, and inefficient healthcare practices that drive up utilisation

We briefly discuss each of these drivers below.

DEMAND-SIDE DRIVERS OF HEALTHCARE EXPENDITURE

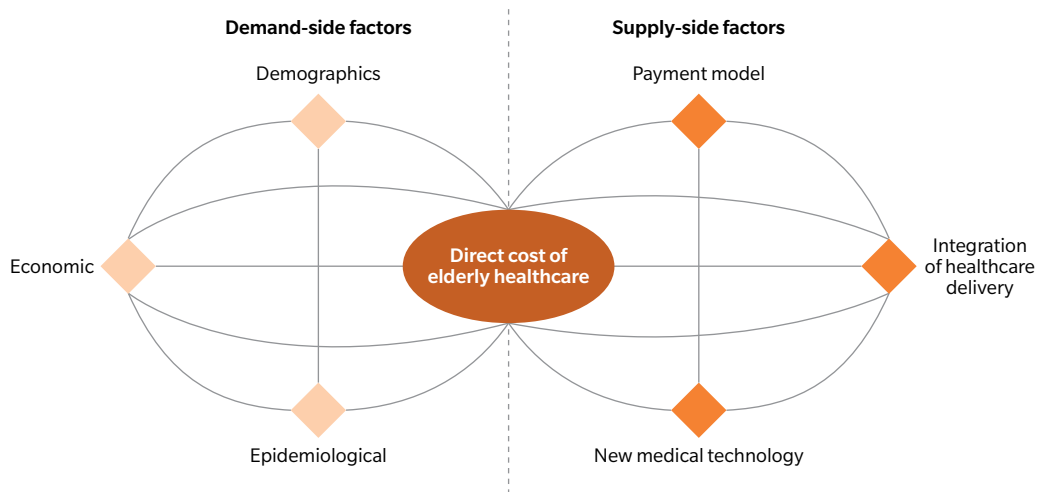
Demographic, economic and epidemiological changes associated with societal ageing are key drivers of healthcare demand.

DEMOGRAPHIC FACTORS

Ageing population. As discussed in the previous section, the proportion and size of the elderly population in APAC are growing at an increasing rate. In addition to the growing number of elderly people, life expectancy is increasing across the APAC region. The current median life expectancies in Groups 1, 2, and 3 are 82, 75, and 71, respectively. These are projected to increase to 85, 77, and 74, respectively, in 2030 (UN Population Division 2013⁵).

Falling fertility rates. Another key contributor to societal ageing is the decline in total fertility rate. An average of 2.1 births per female is required in order to maintain population size in developed countries⁶. With no countries in Group 1 and 2 meeting this level in 2015, and fertility rates projected to fall further by 2030, the extent of ageing and its social and economic impact will increase unless drastic action is taken.

EXHIBIT 13: INTER-CONNECTION OF MULTIPLE COST DRIVERS OF ELDERLY HEALTHCARE



Source APRC analysis

CASE STUDY

TRADITIONAL TIDES OF CHANGE: JAPANESE MEN AND ELDERLY CARE

Traditionally in Japan, the lion's share of elderly care responsibility falls on the shoulders of daughters or daughters-in-law, forcing more than a quarter of working women to sacrifice their careers to become full-time caregivers. Of late, this family care landscape is undergoing a subtle shift in the gender-role balancing act.

A 2011 survey¹¹ conducted by Japan's Institute for Research on Household Economics noted a trend for an increasing proportion of middle-aged Japanese men (13.4 percent) to quit their full-time jobs to care for elderly parents. This was attributed to the men remaining unmarried at a higher rate than women¹². On average, the value of care offered by family members is estimated at an opportunity cost of approximately US\$38,000 per elderly person¹³.

In the absence of urgent reforms, working Japanese will be further squeezed by higher taxation to address the declining fiscal health of the ageing country.

One consequence of a decline in fertility and an increasing life expectancy is an increase in the old-age dependency ratio (i.e., the size of the elderly population grows relative to that of the working-age population). Higher dependency ratios are generally associated with adverse socio-economic effects due to higher government spending (e.g., pensions, healthcare costs) and lower tax revenue because of the smaller number of working adults in the population^{7,8}.

Social changes. Declines in demographic measures such as the total fertility rate and the old-age dependency ratio also reflect the decline in availability of intra-family support. While filial obligation persists in many Asian cultures, these norms appear to have eroded along with economic modernisation.

Possible reasons for this include greater coverage of public welfare, increased female employment, migration resulting in the dispersion of families, and changes in social values (e.g., the unwillingness of children to make financial sacrifices or physically to support elderly parents)⁹. The weakening of filial norms, together with decreasing household size, leads to a decline in intra-family support for the elderly, which shifts the burden of old-age support (e.g., LTC) to public systems and individual retirement savings¹⁰. The latter is of particular significance in countries where public social support is low and out-of-pocket (OOP) payments are high.

ECONOMIC FACTORS

Growth in income (GDP). Another factor associated with the increase of healthcare demand and costs, is income growth as measured by GDP¹⁴. Healthcare displays a positive income elasticity of demand; income increase is associated with an increase in healthcare demand. Our analysis (Exhibit 14) show a strong correlation ($R^2=0.90$) between the compound annual growth rate (CAGR) healthcare expenditure with GDP growth (from 2000 to 2015) across the APAC region. Consistent with this, based on 2016 Mercer Marsh Benefits (MMB) Medical Trends Report¹⁵, medical costs in Asia grew by an average of 10.3 percent in 2015, which accounts for the increase in utilisation of medical products and services, as well as other factors such as price inflation and new medical technologies.

EPIDEMIOLOGICAL FACTORS

Non-communicable diseases (NCDs). The impact of societal ageing on healthcare demand is compounded by the epidemiological transition occurring

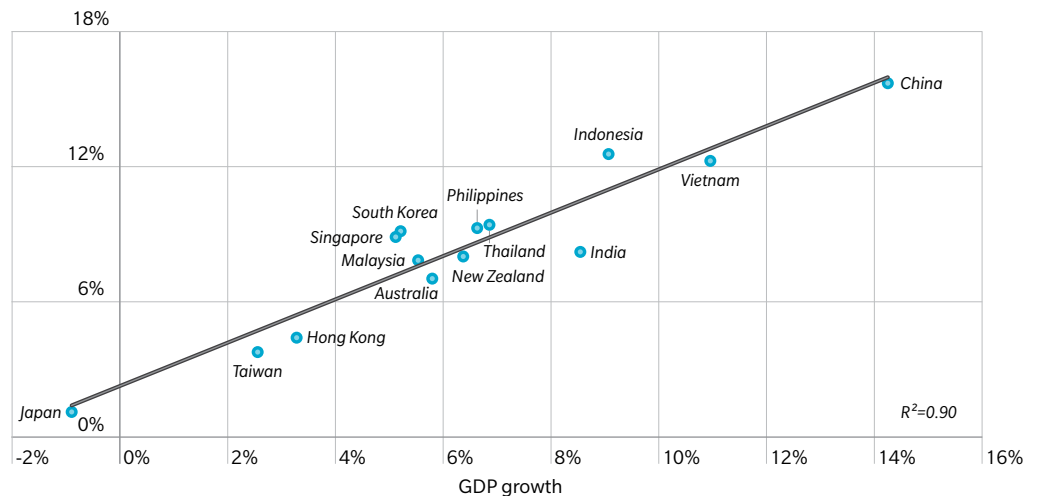
in APAC from infectious diseases to NCDs, due to improved access to medicine together with dietary and lifestyle changes. For example, in Australia, NCDs account for 82% of disease burden in the elderly. In comparison, in India, NCDs currently account for 55%^{16*}.

The interaction of societal ageing with the prevalence of NCDs is two-fold. As the incidence of NCDs increases with age, societal ageing leads to a greater number of people with NCDs. Secondly, as NCDs are typically chronic in nature, increasing life expectancy associated with societal ageing results in longer periods of exposure to NCDs, and a greater demand for healthcare services (e.g., medical treatment, LTC)¹⁷.

The cost of treatment to manage NCDs pose a significant financial burden to individuals and their families due to the high OOP payments present in many countries in Asia. A study¹⁸ in China found that the cost to manage chronic diseases accounted for up to 47% of households' non-food expenditure, which counts as "catastrophic" under WHO definitions¹⁹.

EXHIBIT 14: HEALTHCARE EXPENDITURE AND GDP GROWTH ACROSS THE APAC REGION (CAGR 2015-2030)

HEALTHCARE EXPENDITURE GROWTH



Source APRC analysis of EIU, WHO, BMI data

* Based on age-standardised Disability-Adjusted Life years (DALYs).

SUPPLY-SIDE DRIVERS OF HEALTHCARE EXPENDITURE

Inefficient practices within the healthcare system contribute to the increase in healthcare expenditure on the elderly (as well as on the broader population):

PAYMENT MODEL

Fee-for-service, where payment is dependent on quantity of care instead of quality or patient outcomes. This practice shifts the focus to maximising the volume of treatment and may incentivise over-servicing, with little attention paid to prevention programs that could reduce the need for medical interventions. For example, in an effort to reduce healthcare costs in Taiwan, the government reduced the reimbursed price of tests and treatments. In a study of stroke patients²⁰, this led to an increase in utilisation of tests and treatments (attributed to hospitals trying to preserve revenue) and poorer outcomes (attributed to a reduction in staffing as hospitals sought to lower operating costs).

INTEGRATION OF HEALTHCARE

Fragmented care pathways can result in uncoordinated care leading to duplication (or negligence) of healthcare services, and unnecessary referrals to tertiary hospitals for conditions that could be managed more cost-effectively at primary care facilities.

This is particularly pertinent in the management of complex conditions, which involve multiple healthcare professionals who may be operating in different institutions (e.g., family doctor, specialist, physiotherapist). One cause is that many countries lack the funds and infrastructure (e.g., electronic health records and integrated health services) to allow information sharing that would enable communication and coordination of patient care²¹.

NEW MEDICAL TECHNOLOGY

Pricing of new medical technology has been shown to be a key driver of rising healthcare costs^{9,22,23}. Pricing policies for new technologies (e.g., drugs, devices) need to recognise the value of innovative products to support advances in healthcare, while ensuring that price premiums are based on comparative effectiveness relative to current methods of care. The absence of a centralised pricing and purchasing agency in many countries reduces bargaining power of healthcare providers and permits unregulated mark-ups by wholesalers, distributors, and retailers.

COST DRIVER TRENDS ACROSS AGEING GROUPS

As shown in Exhibit 16, the three Groups show distinct patterns in the profile of ageing-related indicators and cost drivers. The differences in their characteristics illustrate the stepwise changes as countries transition along the ageing spectrum.

Group 1 is characterised by the highest healthcare expenditure per capita, dependency ratio, incidence of cancer and dementia, and LTC utilisation. This profile is a sign of future challenges for Group 2 and 3 countries. It thus provides an opportunity for pre-emptive action to ensure that sustainable systems (i.e., healthcare models, funding sources, and infrastructure) are established to support growing demands.

Notably, the prevalence of diabetes is at similar levels across all Groups. In part, this reflects the lifestyle and dietary changes associated with urbanisation in these developing countries. Importantly, due to the chronic nature of diabetes, the burden on the healthcare system will be compounded, because life expectancy increases are not accompanied by an equal increase in disability-free lifespan²⁴.

CASE STUDY

NON-COMMUNICABLE DISEASES IN ASIA PACIFIC

In a 2016 survey of 180 insurers across 49 countries undertaken by MMC’s Mercer Marsh Benefits (MMB)¹⁵, the key cause for the increased cost of employer health plans was attributed to NCDs. In particular, metabolic risk (which predisposes for NCDs such as cardiovascular disease, diabetes) was identified as the leading risk factor for rising healthcare costs in Asia.

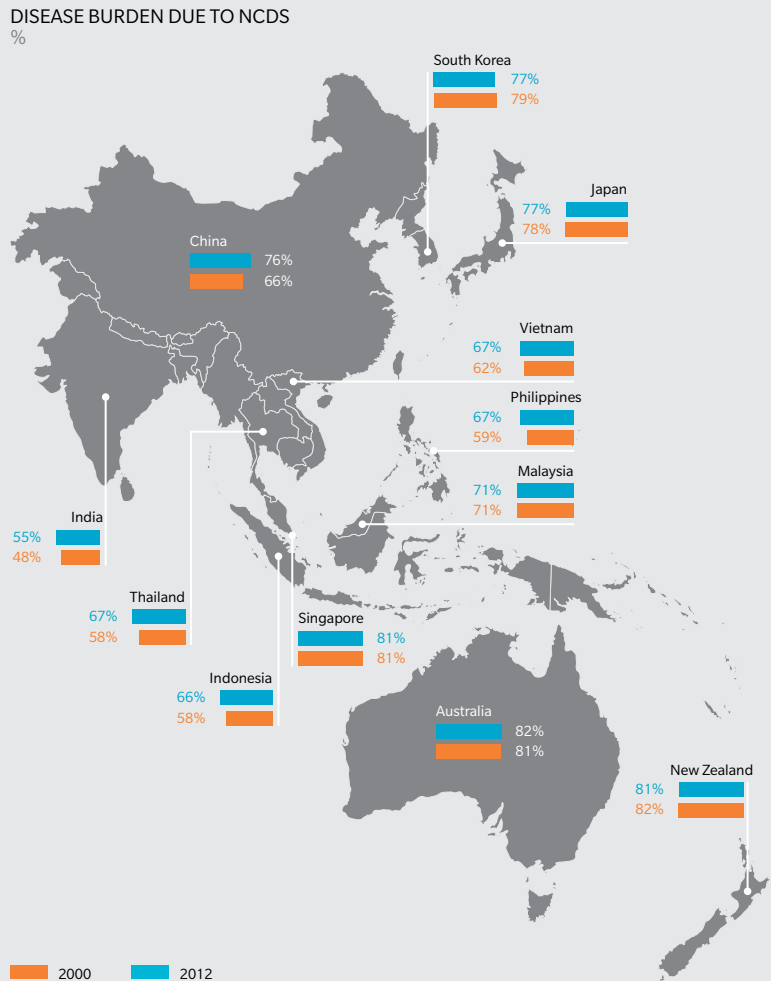
NCDs are chronic conditions that are not transmitted from person to person. The five main types of NCDs are cardiovascular diseases (e.g., heart attacks and stroke), diabetes, cancer, chronic respiratory diseases (such as asthma), and mental illness. Key risk factors for NCDs include ageing and urbanisation, and associated dietary and lifestyle changes.

Economic development is associated with improved access to healthcare and lifestyle changes (e.g., calorie-rich diets and decreased physical activity), which result in an epidemiological transition, as infectious diseases are replaced by NCDs.

Exhibit 15 shows the change in the proportion of the disease burden attributable to NCDs between 2000 and 2012¹⁶. The burden of disease due to NCDs is increasing particularly in countries such as China and India that underwent significant economic development during that period.

For example, as a consequence of socio-economic developments in China, the prevalence of diabetes has increased from 2.5 percent in 1994 to 11.6 percent in 2010²⁵. As with other NCDs, the incidence of diabetes increases with age. Among the elderly in China, the prevalence of diabetes is 23 percent²⁶. Alarmingly, only one-third of diabetes patients had adequate management of the condition, which predisposes patients to other health complications including cardiovascular disease, stroke, and blindness. The increasing financial burden of diabetes to the healthcare system in China will be compounded by societal ageing, further driving the increase in elderly healthcare expenditure.

EXHIBIT 15: INCREASED PREVALENCE OF NON-COMMUNICABLE DISEASES FROM 2000 TO 2012



Source: APRC analysis of WHO data

EXHIBIT 16: COMPARISON OF AGEING-RELATED INDICATORS AND COST DRIVERS

	DEMOGRAPHICS			ECONOMICS			SELECTED NCD PREVALENCE			HEALTHCARE TRENDS		
	HEALTHCARE EXPENDITURE PER ELDERLY (US\$, 2015)	DEPENDENCY RATIO (ELDERVS. WORKING)	% 65+ YR (2015)	% 65+ YR (2030)	FERTILITY REPLACE-MENT RATE	% REAL GDP CHANGE (PAST 5 YEARS)	% CPI CHANGE: INFLATION (PAST 5 YEARS)	DIABETES PREVALENCE (%)	CANCER INCIDENCE (PER 100K)	DEMENTIA PREVALENCE (PER 100K)	% OF LTC COVERAGE	MEDICAL COST INFLATION (% Y/Y)
ASIA PACIFIC												
AUSTRALIA	16,001	22.7	15%	19%	1.9	-4.4%	1.6%	5.1	323	1,372	31%	5%
JAPAN	6,675	43.3	26%	31%	1.4	-7.9%	0.8%	5.7	217	2,381	14%	2%
SINGAPORE	8,196	16.1	11%	21%	1.2	1.0%	1.5%	10.5	206	813	21%	10%
HONG KONG	7,318	20.6	15%	27%	1.3	2.0%	3.2%	8	241	1,578	7%	8%
NEW ZEALAND	11,772	22.9	15%	20%	2.0	-0.2%	0.7%	7.3	295	1,306	15%	3%
THAILAND	1,235	14.6	10%	20%	1.5	0.1%	1.2%	7.1	138	890	4%	9%
CHINA	846	13.0	11%	18%	1.6	5.2%	1.7%	9.8	174	778	6%	10%
SOUTH KOREA	4,023	18.0	13%	23%	1.3	1.9%	1.1%	7.2	308	919	3%	7%
TAIWAN	2,971	16.2	12%	23%	1.2	0.01%	0.7%	10	321	-	8%	9%
INDIA	233	8.6	5%	8%	2.4	0.7%	6.1%	9.3	94	307	4%	10%
INDONESIA	245	7.7	5%	9%	2.4	-4.3%	4.6%	6.5	134	404	2% (est.)	13%
MALAYSIA	783	8.5	5%	10%	1.9	-1.9%	1.8%	17.9	144	406	2% (est.)	14%
VIETNAM	139	9.6	7%	13%	2.0	3.2%	4.2%	6	140	-	2% (est.)	14%
PHILIPPINES	328	7.2	4%	6%	2.9	3.7%	2.3%	6.9	140	299	2% (est.)	9%

Source Dataset retrieved from BMI, UN Population Division, Oxford Economics, WHO, and MMB

2.2. ELDERLY HEALTHCARE: THE TRILLION DOLLAR CHALLENGE

In the present analysis, we have modelled the cost of elderly healthcare from 2015 to 2030 to estimate the potential financial impact in the APAC region. Our analysis includes 14 APAC economies that generate a quarter of global GDP but are home to almost half of the world's elderly population.

Previous studies have developed healthcare expenditure forecasting models of varying complexity depending on the research objectives and issues being examined²⁷.

In the present analysis, a macro-level projection model was developed to estimate the potential cost of elderly healthcare taking into account the following factors:

- Growth of elderly population (≥65 years)
- GDP growth rates
- Medical cost trend¹⁵, which include demand and supply side drivers such as price inflation and utilisation patterns (e.g., due to changes in the incidence of NCDs, regulations)
- Cost and growth in the utilisation of long-term care

The cumulative elderly healthcare expenditure from 2015 to 2030 is estimated at US\$20 trillion, which represents approximately half of the total healthcare expenditure during that period. We believe this estimate to be on the conservative side, as indirect costs (e.g., productivity loss by family carers) and capital costs (e.g., infrastructure construction) have not been included.

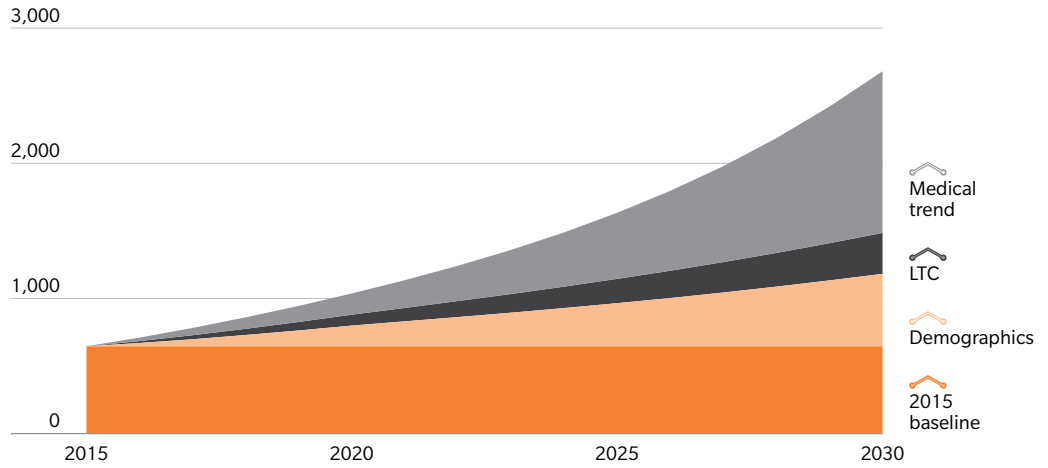
As shown in Exhibit 18 next page, the incremental growth in elderly healthcare expenditure (estimated at US\$11.8 trillion) is largely driven by medical trends (52 percent). This is consistent with previous studies that show new technology as the dominant driver of healthcare costs, comparable its effects to ageing itself^{22,28,29}. Subgroup analyses further reveal that medical trends are a greater cost driver in Group 2 and 3 than Group 1, where the dominant factor is a larger provision and utilisation of long-term care.

Projected cumulative elderly healthcare expenditure to 2030 – US\$20 trillion

- Equivalent to the combined GDP of the 14 economies in 2015
- Equivalent to the total value of assets of pension funds globally in 2015

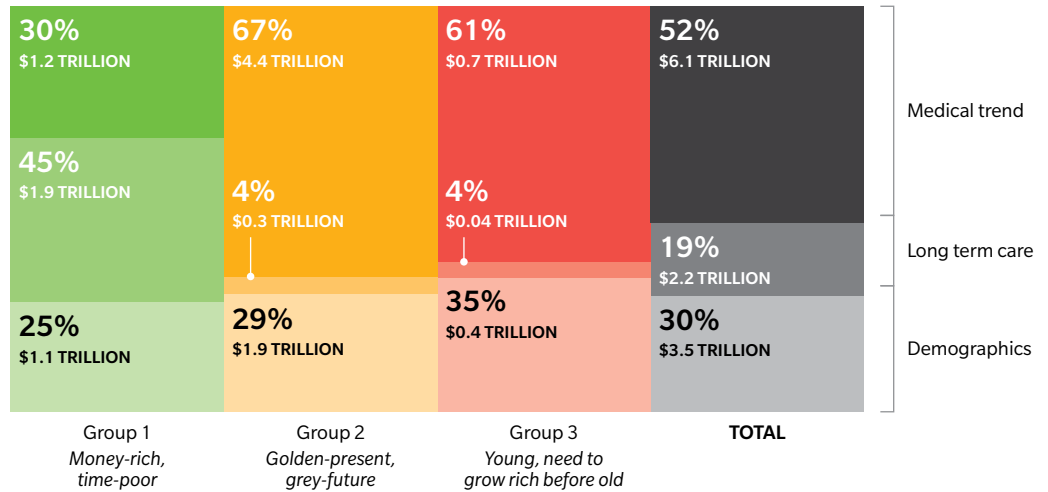
EXHIBIT 17: PROJECTED COST OF ELDERLY HEALTHCARE SHOWING THE CONTRIBUTION OF DEMOGRAPHIC, LONG TERM CARE AND MEDICAL TREND TO THE TOTAL COST

ELDERLY HEALTHCARE EXPENDITURE
BREAKDOWN BY COST COMPONENTS
US\$ BILLION



Source APRC analysis of EIU, WHO, BMI data

EXHIBIT 18: MODELLED INCREMENTAL ELDERLY HEALTHCARE EXPENDITURE BY GROUPINGS

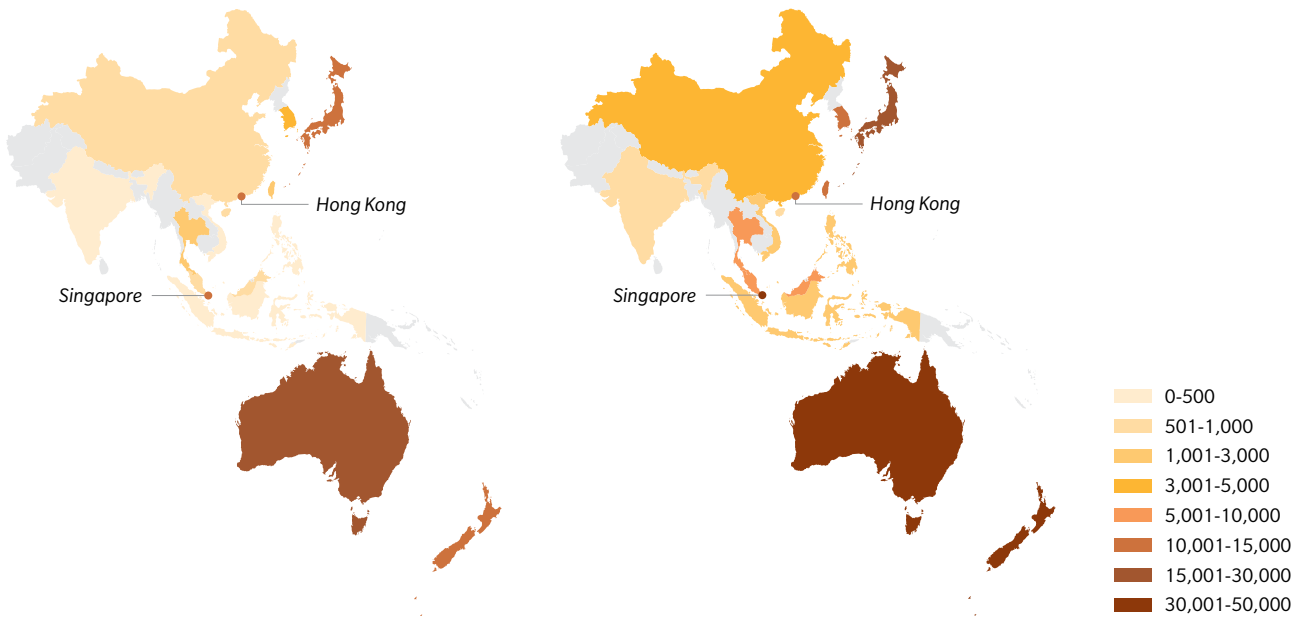


Source APRC analysis

EXHIBIT 19: ELDERLY HEALTHCARE EXPENDITURE PER CAPITA

2015 BASELINE
US\$

2030 PROJECTED
US\$



Source: APRC analysis

Exhibit 19 shows the elderly healthcare expenditure per capita modelled into 2030, which illustrates the variability in spending across APAC countries. The CAGR (recorded in percentages) of elderly healthcare expenditure ranged from 4-10%, 8-10%, and 9-15% in Group 1, 2, and 3, respectively.

The present model presents a “status quo” simulation, which assumes no changes to policies, if medical trends remain the same, and no limits to budgets or capacity to healthcare services.

Indeed if the projected costs over time exceed certain “limits” in reality, it indicates that current arrangements are not sustainable, and interventions are needed to reduce costs and/or increase capacity. For example, the Australian government’s spending on assistance to the elderly is estimated to increase by 3.9 percent between 2016 and 2017³⁰. In comparison, our model estimates a CAGR of 7.0 percent in elderly healthcare expenditure, which highlights the potential for a financing gap.

2.3. PROBLEMS IN NEED FOR URGENT ACTION

Based on the projected increase in cost and demand for elderly healthcare, current arrangements relating to funding, infrastructure capacity, and human capital are inadequate and unsustainable.

In particular, societal ageing poses **three critical problems** that resonate across all three Groups of countries. These will significantly impact multiple stakeholders in the health ecosystem:

1. Sustainability of funding sources for elderly healthcare
2. Inadequate healthcare capacity to cope with increasing demand
3. Diversion of funds into elderly healthcare that can impact economic growth

These challenges highlight the potential for revolutionary changes in healthcare delivery³¹ models to create a seismic shift in efficiency and patient outcomes (e.g., value-based healthcare delivery, and smart, integrated care teams). However, solutions to tackle these issues are complex, and will not bear fruit overnight. Consequently, there is an urgent need for countries to act now.

2.3.1. SUSTAINABILITY OF FUNDING SOURCES

The increase in healthcare demands from an ageing population is compounded by increasing medical costs, leading to a risk of exponential growth in elderly healthcare expenditure. The confluence of the following factors challenges the affordability and sustainability of funding sources:

- High growth rates in medical costs, which are expected to continue in the future, that exceed GDP and wage growth rates
- Sustained low interest rate environment, which translates to low returns on financial assets
- Longevity risk – The increase in life expectancies leads to longevity risks. These have been consistently underestimated by experts, and there is little consensus on future trends in life expectancy³²

The impact of these factors varies according to the source of funding for elderly healthcare, which fall into three broad groups:

1. **Government-funded Healthcare.** While government healthcare subsidies vary in terms of population and cost coverage³³, the increase in healthcare demands from an ageing population will strain all APAC government budgets, particularly when healthcare costs are rising faster than GDP. The current environment of sustained low interest rates affects the ability of individuals to accumulate sufficient retirement funds, and also makes annuity products seem excessively costly at the point of sale. This can lead to political pressure to weaken regulations: Australia and the UK³⁴ have abolished the obligation to hold pension savings as annuities, increasing the risk that individuals will consume their retirement savings prematurely and then require additional government support.

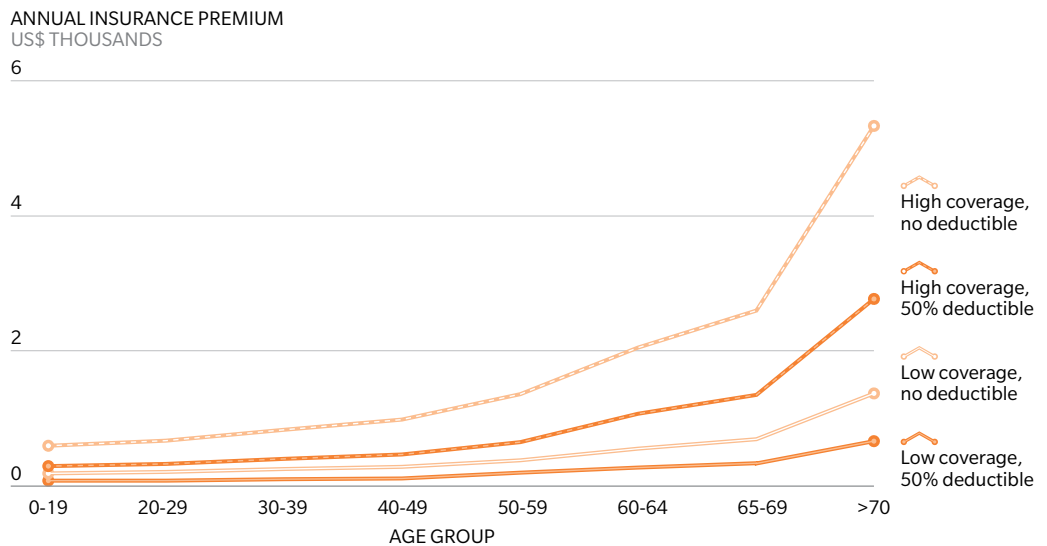
In addition, societal ageing may further impact government revenue due to an increase in the dependency ratio, which means that relatively fewer active workers pay tax. These financial constraints will pressure governments to reduce non-healthcare expenditure, increase taxation, increase borrowing and fiscal deficits. Alternatively, governments may default on their obligations (e.g., healthcare subsidies, pensions), due to the lack of public finances and unrealistic promises made in the past. This will shift the burden of financial support for the elderly to the private sector and individuals.

2. Medical Insurance. Insurers' role as providers of long term annuity and healthcare products will likely increase, bringing several serious challenges. The long term nature of the payments to policyholders coupled with the short term income the insurer receives introduces significant risk as insurers must predict mortality rates and

financial conditions over a payment period of several decades when pricing their products.

Insurance policies providing coverage for healthcare costs to the elderly are particularly difficult to price accurately. In addition to contending with longevity risks, healthcare inflation is currently outstripping the returns available on financial assets. This in effect leads to a negative discount rate for these products, whose costs increase as benefits are paid later in life. According to one study in the US³⁵, 30 percent of all Medicare expenditures in the US are attributed to the 5 percent of beneficiaries that die each year, with one-third of that spending occurring over the last month of life. The OECD³⁶ has warned that additional risk develops when insurance providers chase higher yields through higher risk assets that potentially jeopardise the solvency of investments and their ability to adequately meet future pay-outs.

EXHIBIT 20: ILLUSTRATIVE EXAMPLE OF THE INCREASE IN MEDICAL INSURANCE PREMIUM WITH AGE IN HONG KONG



Source APRC analysis of EIU, WHO, BMI data

As a result, medical insurance premiums for the elderly are often prohibitively expensive, increasing exponentially with age (see Exhibit 20). In addition to high premiums, these plans are often only available to existing insurance policy holders who enrolled prior to retirement, excluding uninsured elderly people. Furthermore, while annual renewal of policies is guaranteed, the premium rates at renewal are not, creating additional uncertainty over the ability of consumers to afford medical insurance coverage in their later years. Consequently, there is a significant need for insurers to develop products that can deliver competitive returns during working life, with flexible and affordable payment options at retirement.

3. **Personal Assets.** Personal retirement income has traditionally come from three sources: social security, employee

pensions, and personal savings. As evident from the Melbourne Mercer Global Pension Index³⁷, the pension systems in most APAC countries have fared poorly in terms of adequacy, sustainability and integrity (Exhibit 21). This implies a greater reliance on personal savings for the funding of healthcare, which represents a significant cost, as a large proportion of healthcare (particularly non-medical services such as LTC) is paid OOP in Asia³³.

Further challenges come from increasing life expectancy, healthcare cost increases that exceed wage growth, and low yields on financial assets, which impact savers' ability to accumulate adequate retirement income. At the same time, the decline in intra-family support for the elderly has led to a greater reliance on individuals' retirement savings.

EXHIBIT 21: ASSESSMENT OF RETIREMENT INCOME SYSTEM IN SELECTED APAC COUNTRIES

	GLOBAL PENSION INDEX GRADE	SUB-INDEX GRADES		
		ADEQUACY	SUSTAINABILITY	INTEGRITY
GROUP 1				
AUSTRALIA	B+	A	B	A
JAPAN	D	D	E	C+
SINGAPORE	C+	C	B	B+
GROUP 2				
SOUTH KOREA	D	D	D	D+
CHINA	D	C+	E	C+
GROUP 3				
INDONESIA	D	D	D	B
INDIA	D	E	D	C

Source 2015 Melbourne Mercer Global Pension Index

With the rapid economic growth in APAC over the past several decades, fixed assets (i.e., property) have come to represent a significant part of the wealth of many elderly people. Reverse mortgages are a mechanism for equity release, but uptake has been weak due to conservative attitudes towards family assets, the desire to provide an inheritance for descendants, and the potential impact on other family members living in the property. Furthermore, in pricing reverse mortgages, financial institutions need to account for longevity risk, as well as the uncertainty of interest rates and property valuations over a long time horizon. These may result in offerings that are financially unattractive for consumers. The increase in healthcare costs together with the inadequacy of pensions will exacerbate the growing inequality between the rich, who will be able to look after themselves in retirement, while individuals in the lower half of the income distribution may not have sufficient retirement savings.

As life expectancies and healthcare costs increase across all Groups, the risk to the sustainability of funding sources is not unique to countries with an aged population. Consequently, this highlights the urgent unmet need for sustainable funding sources, whether in the form of revenue-generating schemes for governments (e.g., a soda tax), or affordable and viable insurance products with long-term coverage for individuals.

2.3.2. INADEQUACY OF HEALTHCARE CAPACITY

In light of a significant projected rise in demand for healthcare services,

governments and healthcare administrators in the region are rightly concerned about their healthcare systems' ability to cope with capacity challenges.

Exhibit 22 presents the two key components of well-functioning healthcare systems: the capacity of the current healthcare infrastructure (i.e. hospital beds, LTC beds) and human capital (i.e. healthcare personnel, LTC workers). Other countries with well-developed healthcare systems are included for comparison.

While the number of hospital and LTC beds and doctors are common measures of healthcare capacity, we recognise that these indices (together with the paucity of data on LTC) may not fully capture the capacity of elderly healthcare for each country. It should also be noted that quantitative measurements of capacity (as shown in Exhibit 22) do not take into consideration efficiency or quality of healthcare systems and idiosyncratic, country-specific preferences or norms.

Nonetheless, comparison of capacity measurements in Exhibit 22 shows consistent trends within each Group. Group 1 countries such as Australia and Japan have greater infrastructure capacity (current hospital beds per 1,000 people) and human capital availability (doctors and nurses per 1,000 people) than Group 2 countries like China and Thailand. These, in turn, have superior capacity to Group 3 countries such as India and Indonesia.

Further analyses of capacity measurements reveal two key takeaways:

EXHIBIT 22: MEASUREMENTS OF HEALTHCARE INFRASTRUCTURE AND WORKFORCE CAPACITY

	INFRASTRUCTURE		HUMAN CAPITAL		LONG TERM CARE
	Hospital beds per 1,000 people ⁵¹	LTC beds per 1,000 people ⁵²	Doctors per 10,000 people ⁵³	Nurses per 1,000 people ⁵⁴	Formal workers per 100 elderly people ⁵⁵
ASIA PACIFIC					
GROUP 1					
AUSTRALIA	3.90	7.9	32.7	12.77	4.4
JAPAN	12.27	6.2	23.0	11.63	4.0
SINGAPORE	2.27	2.2 ⁵⁶	19.2	6.11	-
HONG KONG	4.44	-	-	4.87	-
NEW ZEALAND	5.97	8.3	27.4	11.39	4.3
GROUP 2					
SOUTH KOREA	8.82	3.0	21.4	6.68	1.9
TAIWAN	5.76	-	-	5.38	-
CHINA	3.32	-	14.6	2.48	1.1
THAILAND	2.24	-	3.9	2.30	0.7
GROUP 3					
INDONESIA	1.04	-	2.0	1.83	0.0
MALAYSIA	1.97	-	12.0	3.15	-
VIETNAM	2.89	-	11.6	1.24	-
INDIA	0.81	-	7.0	2.11	0.0
PHILIPPINES	1.07	-	11.5	7.80	-
REFERENCE COUNTRIES WITH WELL-DEVELOPED HEALTHCARE SYSTEMS					
NORWAY	2.56	8.0	37.4	18.86	17.1
SWEDEN	2.47	12.8	32.7	20.59	9.6
FINLAND	4.24	11.6	-	13.84	6.5
FRANCE	6.27	9.7	-	9.68	1.1
SWITZERLAND	4.39	11.7	-	8.32	5.2

Source Dataset retrieve from EIU, BMI, OECD (ILO estimates), UN Development Program, and Singapore Ministry of Health

1. Significant gap in medical capacity across APAC

An encouraging finding in this analysis is that Group 1 countries in Asia Pacific, especially Australia, Japan and New Zealand, have quantitative capacity measures that are comparable to those in global reference countries. These Group 1 countries will be able to serve as regional leaders and model systems for other APAC countries. Of notable exception in these quantitative measures is Singapore's lower number of hospital and LTC beds, as well as doctors and nurses, when compared to other Group 1 countries. Despite these lower estimates, Singapore's healthcare system is well-regarded, ranking 6th in WHO's global ranking of health system³⁸. This may indicate higher healthcare efficiency and productivity of healthcare resources. Nonetheless, further studies are needed to fully reconcile these differences.

The capacities in Group 1 make it clear that Group 2 and 3 will need significant improvements in infrastructure and human capital to meet future demand. This is, anyway, a natural consequence of economic development and the changing social and political priorities of these countries' populations: Healthcare expenditure rises as a percentage of GDP from Group 3 through to 1 (average for global: 10.9, Group 1: 8.0, Group 2: 6.2, Group 3: 4.6).

Even now, Asia Pacific countries such as India and Indonesia have inadequate healthcare infrastructure and human capital capacity. These are poor even in comparison to other countries within Group 3. (e.g., India

and Indonesia's respective 0.81 and 1.04 hospital beds per 1,000 people compared to the Group 3 average of 1.56). The findings are consistent with the widely recognised global shortfall in healthcare workers³⁹, particularly in India^{40,41} and Indonesia⁴², which have well-documented capacity issues.

In addition to workforce shortages, developing countries also often face an infrastructure financing gap⁴³ due to insufficient public and private domestic funds to accommodate the myriad of National spending priorities⁴⁴. This leads to a shortfall in infrastructure, including for healthcare.

Two key reasons for the infrastructure financing gap⁴⁵ are:

A. Legal and financial uncertainty

Infrastructure investments often generate cash flow after a significant period of time. Investments in developing countries come with high political, legal and economic risks, and infrastructure assets are illiquid. As a consequence, the risks and uncertainty over the "bankability" of such investments may be too large for private investors.

B. Lack of direct financial payoff for private investors

The positive, indirect benefits to society and the economy associated with infrastructure investments often do not result in direct payoffs for private investors, whose primary concern is an investment's profitability. Thus, many projects crucial for national development are unattractive to private investors.

2. Inadequate Long-Term Care Workforce and Facilities

Though it is pertinent to an ageing population, LTC provision is often given low priority due to a focus on primary healthcare. This problem is compounded by societal ageing, which is associated with a shrinking workforce and a reduction in informal family care due to a declining birth rate.

This is seen particularly in the low number of LTC workers (between 0 to 1.9 per 100 elderly persons) in Group 2 and 3 countries, compared to the International Labour Organization's (ILO)⁴⁶ defined benchmark of 4.2 formal LTC workers per 100 elderly persons. Furthermore, the LTC sector faces additional challenges due to a perception that it is a less-sophisticated and lower-status profession than other health roles, such as radiotherapist and dietician. The ILO estimates a deficit of 8.2 million formal LTC workers in APAC in 2015. As a consequence, 65 percent of elderly people in need of LTC have been deprived of it due to an insufficient workforce. Our projections show that APAC will face a deficit of 18.2 million LTC workers by 2030, with China requiring 9.3 million more professional caregivers⁴⁷. Other infrastructure inadequacies include LTC beds: Japan and South Korea require an additional 100,000 and 143,000 respectively. Such shortages are expected to grow as countries continue to age, human capital strategies, additional infrastructure investment and increased political awareness are crucial to meeting the needs of Asia Pacific's ageing society.

2.3.3. IMPACT ON ECONOMIC GROWTH

Access to good healthcare is a cornerstone of a country's economic development. However, with an estimated cumulative cost of US\$20 trillion over the next 15 years in Asia-Pacific, elderly healthcare costs amid societal ageing represents a significant

financial and social burden and risk causing fiscal crises and social instability – two of the top 10 global risks (in terms of impact) identified in the World Economic Forum's 2016 Global Risks Report⁴⁸.

Governments may be forced to increase access to healthcare, while relying on a shrinking workforce (and reduced income tax revenue). This would lead to an increase in fiscal deficit, which might cause a rise in government borrowing and the diversion of funds from other areas that can fuel economic growth (e.g., education, infrastructure, R&D). The increase in debt may cause higher taxes and interest rates^{14,49} which would place further downward pressure on economic growth. It is estimated that a 1 percent increase in the old-age dependency ratio (a proxy for a relatively lower labour supply) could reduce average savings rate by up to 1.2 percent, which could negatively impact investment¹.

In APAC where a significant proportion of healthcare expenditure is borne OOP, increases in healthcare costs will consume financial resources at the expense of other non-healthcare goods and services. This may also force elderly individuals to choose between spending on health versus other living expenses. In addition, the fear of potential catastrophic medical costs has been shown to result in an increase in precautionary savings by individuals. This leads to reduction in household consumption, which can dampen economic activity⁵⁰.

With a projected cost of US\$20 trillion over the next 15 years, elderly healthcare expenditure can represent a significant financial burden and a detriment to the fiscal health of countries in APAC. However, if expenditure on healthcare are used efficiently and invested in capacity building and sustainability, investments in elderly healthcare could be a potential driver for economic development and growth.

2.4. MANY STAKEHOLDERS, COMPLEX SOLUTIONS

The unsustainable escalation of elderly healthcare highlights the urgent need for intervention. However, the healthcare ecosystem is complex, with multiple stakeholders that often have conflicting priorities. Consequently, solutions that are able to align the objectives of multiple stakeholders will be the most successful.

Complexity in the healthcare ecosystem also extends across countries, as illustrated by the differences in demographics, epidemiology, and economic development between Groups. However, these differences present opportunities for arbitrage, in the form of cross-border solutions, including healthcare tourism and migration of workers.

Nonetheless, while there are common challenges faced by countries due to a growing elderly population, differences in their type and immediacy necessitate customised solutions for the issues and constraints of each Group.

2.4.1. MULTIPLE STAKEHOLDERS, MULTIPLE PRIORITIES

The elderly healthcare ecosystem comprises multiple inter-connected stakeholders with different individual objectives (Exhibit 23). Consequently, the overall success of the healthcare ecosystem is a function of the effectiveness of each stakeholder and their interactions. This also includes the elderly individual, who has a part to play their physical and financial health, which influences the demand for healthcare services. In addition, governments will need the resolve to make politically sensitive decisions (such as increasing retirement age, means testing of benefits) to ensure preparedness for societal ageing in the longer term.

These interactions can be collaborative or competitive depending on differences in their priorities and motivations, and on underlying policies and regulations (Exhibit 24). For example, policymakers and pharmaceutical companies have the common goal of improving healthcare for patients, but policymakers aim to reduce expenditure, while pharmaceutical companies aim to increase their revenues (by maximising price and volume). Therefore, imposing severe cost containment measures could impact the financial viability of a product to be launched, which might hinder the introduction of innovative new treatments.

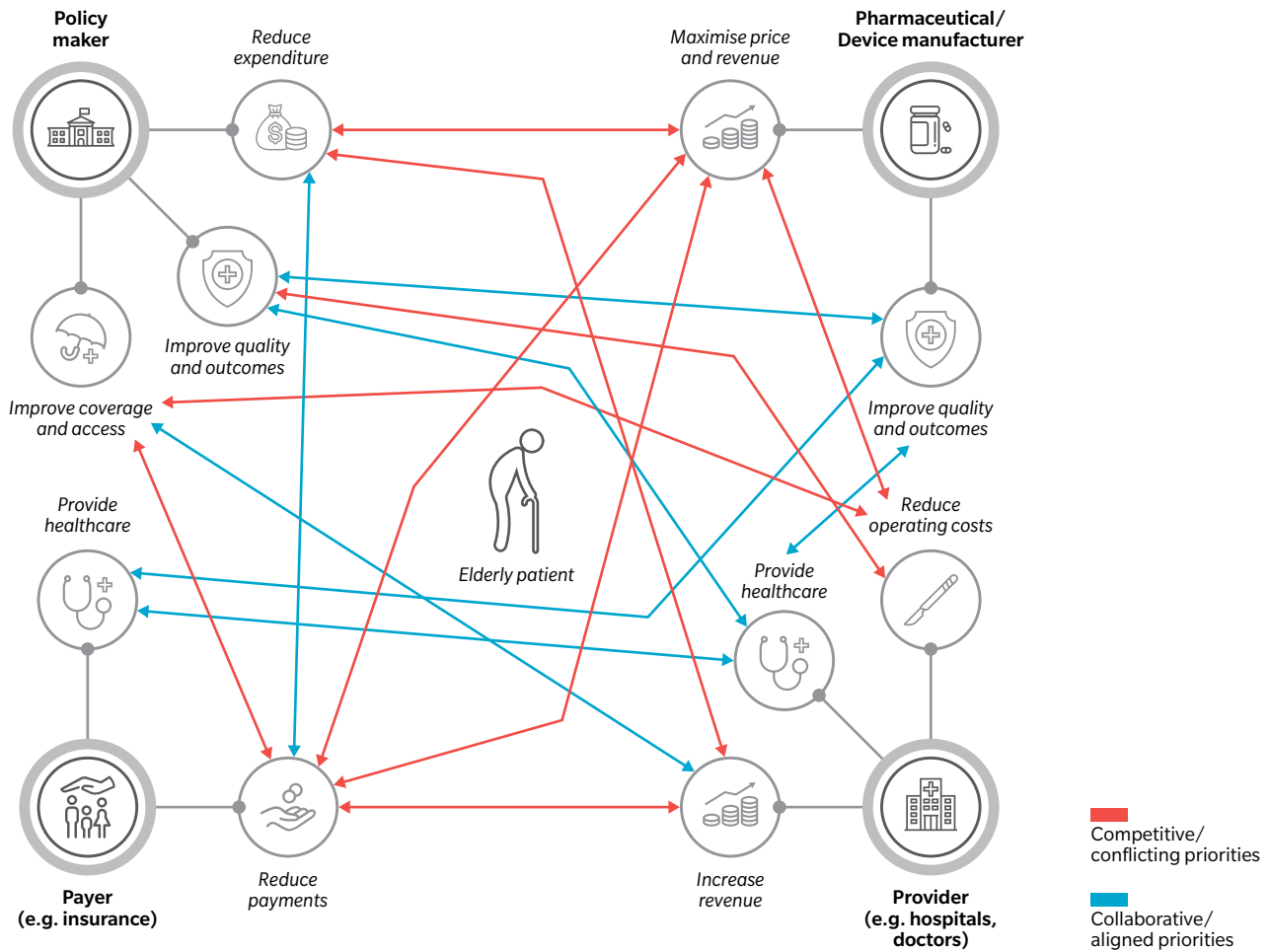
Consequently, the challenge of accommodating the increasing demand for elderly healthcare with limited resources cannot be solved by individual stakeholders. Instead, effective solutions will involve a multi-stakeholder approach, with the ability to align stakeholders' priorities towards a common goal (e.g., an integrated, value-based healthcare system).

EXHIBIT 23: ELDERLY HEALTHCARE STAKEHOLDERS ECOSYSTEM



Source APRC analysis

EXHIBIT 24: STAKEHOLDER COLLABORATIVE AND COMPETITIVE PRIORITIES



Source: APRC analysis

2.4.2. DIFFERENT STROKES FOR DIFFERENT FOLKS (AND GROUPS)

Taking an APAC regional perspective, it is important to recognise that each country and its healthcare system has varying priorities and challenges due to differences in economic development, type of healthcare model, social factors, and political ideology.

As described in Exhibit 11, the Groups defined in the present study are based on

the relative size of the elderly population in each country, and its GDP per capita. In turn, the Groups also correlate with other demographic, epidemiological, and economic factors related to healthcare. Accordingly, although managing the impact of ageing on healthcare costs will involve strategies to address cost drivers, the sustainability of funding, and the adequacy of infrastructure and human capital, customised solutions are needed for each country, based on the type and immediacy of the issues they face. The key Group-specific imperatives are summarised in Exhibit 25.

EXHIBIT 25: KEY GROUP SPECIFIC IMPERATIVES TO MANAGE ELDERLY HEALTHCARE EXPENDITURE

	GROUP 1 (Money-Rich, Time-Poor)	GROUP 2 (Golden-Present, Grey-Future)	GROUP 3 (Young, Need To Grow Rich Before Old)
KEY FEATURES OF GROUP	Aged to Super-aged (>15% elderly) Elderly healthcare costs >US\$10,000/capita	Ageing rapidly (~10% elderly) Elderly healthcare costs US\$1,000-5,000/capita	Young (~5% elderly) Elderly healthcare costs ~US\$500/capita
ELDERLY HEALTHCARE COST DRIVERS	Revamp of healthcare model to maximise value/productivity of current healthcare expenditure and ensure sustainable growth Programs for NCD prevention, screening, and management		Establish efficient, sustainable healthcare models, with opportunity to leapfrog outdated healthcare practices
HEALTHCARE FUNDING SOURCES	Improve adequacy, sustainability, and integrity of pension systems		
	Encourage personal retirement savings, and employer-based pension (e.g., tax incentives, improve financial literacy)		Improve coverage of government funded healthcare services (reduce OOP). Ensure policies are sustainable to minimise impact of future demographic debt
	Development of viable and affordable post-retirement medical insurance		
INFRASTRUCTURE	Increase capacity of healthcare infrastructure including LTC facilities to meet the needs of an ageing population	Improve and facilitate private investment to increase capacity of healthcare infrastructure to address present, as well as future demand	Initiate change to attract private investments to close financing gap
	Develop healthcare tourism services in lower-cost countries	Address rural-urban discrepancy in healthcare infrastructure	Utilise low-cost environment to offer medical tourism and long-term care
HUMAN CAPITAL	Encourage cross-border flow of migrant workers to address gaps in healthcare workforce		
	Improve attractiveness of working in elderly care sector	Develop elderly care workforce	Maximise demographic dividend by facilitating the development and migration of skilled healthcare workers
	Maximise productivity and extend working years of shrinking workforce	Improvement in intra-country rural to urban workforce distribution	

Source APRC analysis

COUNTRIES IN FOCUS

HETEROGENEITY IN HEALTHCARE POLICY AND PRACTICES ACROSS APAC

The Asia-Pacific region is highly diverse, and no one society, political system or economic activity level can adequately define it.

Australia. The Australian government spent almost 3.5 per cent of GDP in 2014⁵¹ on elderly healthcare expenditure alone. This benefitted almost 30 per cent of the elderly being looked after in the aged care sector – residential aged care and community-based aged care. However, the same policymaking outcome cannot be applied to countries in APAC that do not share the same income levels or socio-political beliefs.

India. Bedridden elderly people with severe chronic diseases are typically cared for by family members (82 per cent), while others are taken care of at home by caregivers hired. Care by family members is the norm due to strong traditional kinship ties⁵² and low public healthcare funding. However, the significant demographic shift currently underway will erode India's tradition of family care, in a similar change to that undergone in China.

China. Filial piety is considered the most fundamental of the Confucian values, and Chinese people are obliged to care for their elderly parents. However, economic changes in recent decades have diluted these traditional values. As a preventive measure, the Chinese government passed a law⁵³, imposing legal responsibilities on family members for the maintenance and financial support of elderly parents. Since May 2016, a new policy in Shanghai allows elderly parents to file lawsuits against children who fail to visit regularly. In the most severe scenarios, these absent children could face a downgrade of their personal credit ratings, adversely impacting their work and life prospects. A similar law had been instituted in Beijing since 2013, however the lack of specifics on the frequency of visits and difficulty in enforcement undermines the effectiveness of such policies⁵⁴. The obligations range from regular visits to paying monthly allowances or medical and care bills. Building on historical and cultural beliefs, the government can shift part of the growing healthcare expenditure onto the working population, without reweaving the social fabric.

While the impact of societal ageing imposes financial stress on governments and working populations around the region, reactions and strategies from country-specific decision makers could differ greatly. There is no silver bullet. Instead, customised solutions based on the type and immediacy of each country's issues are needed.

COUNTRIES IN FOCUS

HEALTHCARE TOURISM IN INDONESIA AND THAILAND

Bali has long been one of the top tourist destinations for Australians due to its close proximity to major Australian cities. In December 2015, the Indonesian government introduced new legislation relaxing foreign property ownership rules⁵⁶. Foreigners can now own a Balinese landed property, with the caveat that the property needs to have a minimum value of 3 billion rupiahs (US\$230,000)⁵⁷ and a lease of less than 80 years⁵⁸. Nonetheless, Bali is poised to become an even more attractive retirement destination for Australians and other foreigners seeking cheaper locations.











As the average cost of care increases in America and Europe, families are sending their elderly relatives to Asia, where care is more affordable and often better quality. Thailand, in particular has been a choice for many European citizens due to the availability of nursing homes with resort-like facilities, as well as its provision of specialised care for conditions such as dementia and Alzheimer's. Such facilities would cost upwards of US\$6,000 per month in the US, whereas in Thailand they are available for about US\$2,000 per month. Given the long-term nature of people's residence, the cost savings are substantial.

2.4.3. CROSS-BORDER INITIATIVES

While heterogeneity across APAC may limit the transferability of solutions between countries, differences in demographic and economic development across APAC also present potential solutions to societal ageing challenges, in the form of cross-border movement of labour and services:

- **Healthcare tourism.** In 2014, of the top 10 global healthcare tourist destinations by volume, five were APAC countries⁵⁵. While the initial interest for medical tourism was for expensive surgical procedures, providers in low-cost Group 3 countries have started to offer long-term care, and retirement housing communities at a fraction of the cost in more developed economies

EXHIBIT 26: TOP 10 MEDICAL TOURIST DESTINATIONS BY VOLUME OF CARE

1		THAILAND
2		HUNGARY
3		INDIA
4		SINGAPORE
5		MALAYSIA
6		PHILIPPINES
7		UNITED STATES
8		COSTA RICA
9		BRAZIL
10		MEXICO

- **Migration of workers.** This can help meet the increased healthcare labour demands in aged countries while providing additional employment opportunities to people in younger, developing countries where unemployment may be higher.

For example, the unemployment rates in labour-sending countries Indonesia and the Philippines are 6.0 percent and 6.6 percent respectively. In comparison, the unemployment rates in labour-receiving markets Hong Kong and Singapore are 3.3 percent and 1.9 percent respectively.

The Association of South-East Asian Nations (ASEAN) took a lead regionally by setting up multilateral Mutual Recognition Arrangements (MRAs) that aim to facilitate the mobility of professionals and skilled labour in the ASEAN region. In particular, MRAs have been signed between ASEAN countries for nursing professionals (2006) and medical practitioners (2009), promoting the exchange of information and expertise on qualifications, as well as the adoption and harmonisation of standards and procedures across national regulatory bodies^{59,60}. This collaboration has enabled greater movement of healthcare workers between ASEAN countries, alleviating both workforce shortages and unemployment issues across the region.

The flow of labour and provision of healthcare services between countries with young populations and those with aged societies appears synergistic, however multilateral agreements will be required to ensure an equitable distribution of healthcare between sending and receiving countries. The International Labour

EXHIBIT 27: LABOUR MIGRATION MOVEMENT



Source: APRC analysis of ILO dataset

Organization has developed a framework and guidelines to assist migration policy makers⁶¹. They cover subjects such as the management of labour migration, and the protection and social integration of migrant workers. Similarly, ASEAN has issued a Declaration on the Protection and Promotion of the Rights of Migrant Workers (DPPMW), although there is still a need to improve and standardise migration governance policies across the region in order further to facilitate the cross-border flow of labour⁶². In addition, as more than half of global population growth is expected to occur in Africa through to 2050⁶³, APAC countries will need to be open to migration from growing, young countries within, as well as beyond the APAC region.

The healthcare ecosystem is complex with multiple stakeholders. In developing potential solutions high quality and comprehensive healthcare data is needed to provide better understanding and insights.

COUNTRY IN FOCUS

NURSE MIGRATION FROM THE PHILIPPINES

The Philippines is a major source of migrant nurses worldwide and one of the main contributors to labour migration globally⁶⁴. Over 10,000 professional nurses leave annually⁶⁵. This movement benefits Group 1 and 2 markets, such as Taiwan and Singapore, which depend heavily on foreign healthcare workers to support their shrinking domestic workforce.

For example, more than one-fifth of the nurses in Singapore's public health sector come from the Philippines, India, and China⁶⁶. In Taiwan, approximately 40 per cent of their healthcare and house services sectors comprise migrant workers from Indonesia (79 per cent), the Philippines (12 per cent), and Vietnam (8.7 per cent)⁶⁷.

Nevertheless, these significant outflows of professional health workers result in much lower nurse-to-population ratios in their home countries, especially in rural areas⁶⁸. This might not be a pressing concern now, since the Philippines will remain a young nation into the near future (its elderly population will still be below 7 per cent in 2030). But this kind of model will need to change sooner rather than later in order to prepare for the eventual ageing of the population.

However, many stakeholders across the region have to contend with data quality issues (in terms of availability, accuracy, and completeness) and under-developed information infrastructure (e.g., systems and policies for data collection and analysis, linkage between data sources), which contributes to:

- **Inefficiency of care delivery.** Data quality and availability issues contribute to the difficulty for healthcare providers to coordinate care, and monitor and evaluate the safety and effectiveness of healthcare provided to patients.
- **Uncertainty in healthcare financing.** For governments, the lack of information makes it difficult to forecast healthcare expenditure trends to inform allocation of government resources, as well as assessing efficiency and value of healthcare expenditure. For insurers, the lack of data makes it difficult to model and price risk to develop financially viable products.

Accordingly, there is a need for improved systems for the accurate and comprehensive collection and analysis of healthcare data to allow better informed decision making.

3 THE ROAD AHEAD: INNOVATIONS IN ELDERLY HEALTHCARE

The projected escalation in elderly healthcare expenditure due to societal ageing represents a significant fiscal risk and burden to countries across APAC.

Taking into consideration the inter-connections of cost drivers and stakeholders discussed, we have identified four aspects of the healthcare ecosystem that urgently require improvements. These critical issues will form the basis of future research publications:

- Funding sources for elderly healthcare
- Efficiency in the healthcare delivery model
- Infrastructure development to support increased healthcare demands
- Human capital initiatives

Instead of discussing “traditional” strategies to combat societal ageing and healthcare costs, the following section presents “green shoots”, innovative solutions and concepts that could be cultivated to improve the sustainability of healthcare provision for the elderly in APAC.

3.1. FUNDING SOURCES FOR ELDERLY HEALTHCARE

3.1.1. ACCURATE HEALTHCARE RISK MANAGEMENT TO IMPROVE AFFORDABILITY

While medical insurance products for the elderly exist, premiums are often prohibitively expensive and they increase steeply with age, with no certainty over future premium rates. In part, the high prices are due to the correlation of healthcare expenditure with age, the high inflation in healthcare costs, and increasing life expectancies. All these factors contribute to uncertainty and risk for insurers when pricing such products.

However, while healthcare expenditure typically increases with age, studies have shown that there is a concentration of healthcare expenditure in the final years of life^{69,70}. With life expectancies continuing to increase, the period of low healthcare expenditure between retirement and death will also increase. The “Internet of things” and Big Data analysis (e.g., using telematics, wearable technologies, and online behaviour tracking) hold promise for improving the measurement of risk⁷¹. That could allow insurance pricing to more accurately reflect the distribution of healthcare during people’s later years. The downside of improved accuracy in risk pricing is that it will make premiums even less affordable for high-risk segments of the elderly population.

One option is government mandated cross-subsidies where low-risk, younger individuals are forced into insurance pools to subsidise high-risk policy holders. For example, in Australia, the government imposes an additional income tax of up to

1.5 percent on individuals without private healthcare insurance. However, mandated large scale cross-subsidisation has social and political ramifications, and may commoditise the insurance market, impacting insurers’ innovation and economic efficiency. Instead, targeted subsidies funded from general taxation may be a fairer way of keeping high-risk individuals insured, as insurers could still be allowed the flexibility to offer more affordable premiums to lower-risk individuals.

Overcoming the current barriers to the uptake of medical insurance by the elderly needs better risk pooling and greater accuracy in risk measurement. It will also require innovative structuring of products (e.g., pre-funding later years premiums during working years) to provide certainty over future premiums rates and coverage.

3.1.2. INNOVATIVE REVERSE MORTGAGE SCHEMES

Equity release mortgages are challenging for insurers due to longevity risk, interest rate risk and asset risk that they have to assume. Furthermore, financial institutions also need to consider the potential of negative publicity associated with foreclosures and the resulting homelessness of other occupiers of the property. As a consequence, products may not be financially attractive or simple to understand for consumers, in addition to the cultural and social barriers to selling of family assets particularly in Asia.

Accordingly, the development of innovative hybrid products that bundle risks may offer greater consumer value. Hybrid products

can allow risks to offset each other⁷¹, such as longevity risk (e.g., life insurance) and morbidity risk (e.g., critical illness insurance) can be offset as longevity is typically shortened by a morbidity event, though the reverse is not necessarily true. Similarly, for reverse mortgages, a hybrid product could combine reverse mortgages with life- and

non-life insurance products that minimise the inherent risks and provides the option for the asset to be retained by the borrower's spouse (or heirs) at the termination of the loan period. Development of such a product enhances the value of reverse mortgages to consumers and has the potential to improve the take-up rate.

CASE STUDY

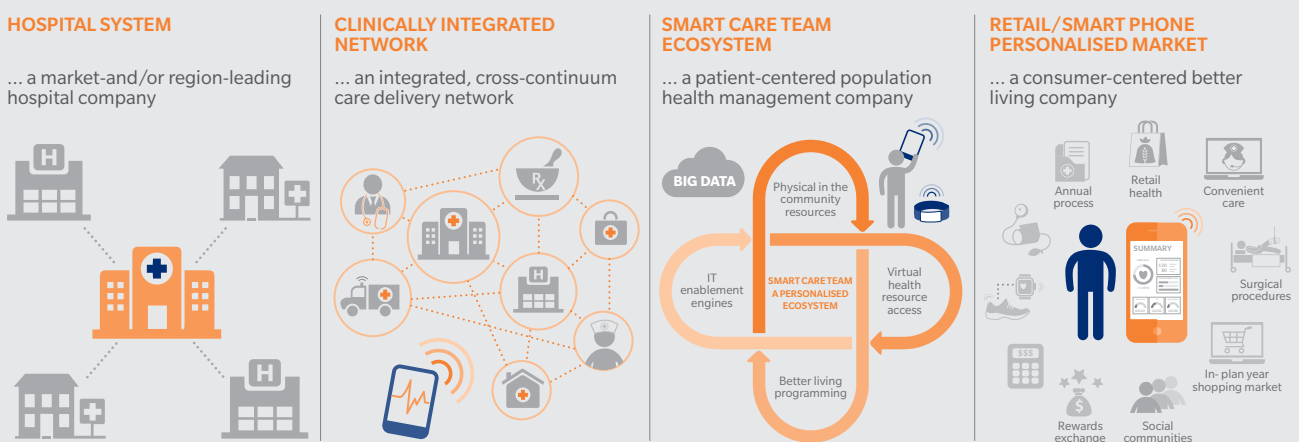
HEALTH MARKET 2.0

Health Market 2.0 is Oliver Wyman's term for the consumer-driven, big data, value-based marketplace that is rising in healthcare. Unlike today's frustrating, fragmented healthcare landscape, the future landscape will be seamless, affordable, highly social/mobile-tech enabled, and prevention focused.

Similar transformations have been seen before – consider the rise of the consumer travel and consumer financial services industries. And there are already lots of great health innovations percolating up. The challenge is knitting them together into a genuine new market faster.

Demand creation reshapes industries, which is why Oliver Wyman looked to the healthcare tech attack as the driving force behind the creation of Health Market 2.0. Healthcare has long been a supply-oriented industry, in which consumers are driven to scarce resources by disease and injury – conditions they feel they could not control. To the extent that they make choices, they are subjected to provider networks defined for them by health plans, with little or no information about cost and quality. In contrast, Health Market 2.0 is a consumer-centric, data-driven, integrated and coordinated network of care providers that delivers significant new value to consumers.

EXHIBIT 28: HEALTHCARE SYSTEMS: WHAT IS THE CENTRE OF YOUR NEW BUSINESS MODEL?



Source Oliver Wyman analysis

3.2. EFFICIENCY IMPROVEMENTS IN HEALTHCARE DELIVERY MODEL

3.2.1. INTEGRATED HEALTHCARE DELIVERY

Current healthcare models are typically fragmented, with poor coordination between different medical specialists or healthcare facilities. This is especially relevant to elderly patients, who often have several disorders that are managed by multiple providers who operate independently in the care system. For example, an elderly patient may need to visit their endocrinologist for their diabetes, cardiologist for high blood pressure, ophthalmologists to monitor diabetes-related eye disease. Lack of coordination between these specialities mean multiple visits on different days, and duplication of services (e.g., multiple visits to lab for blood test ordered by different doctors) increasing the cost and time to patients and their carers. In contrast, integrated healthcare can improve patient outcomes and efficiency, and bring the potential for financial savings through improvements in the coordination of the care process. This is delivered by a multidisciplinary team,

enabled by technology and infrastructure (e.g., electronic health records, patient monitoring).

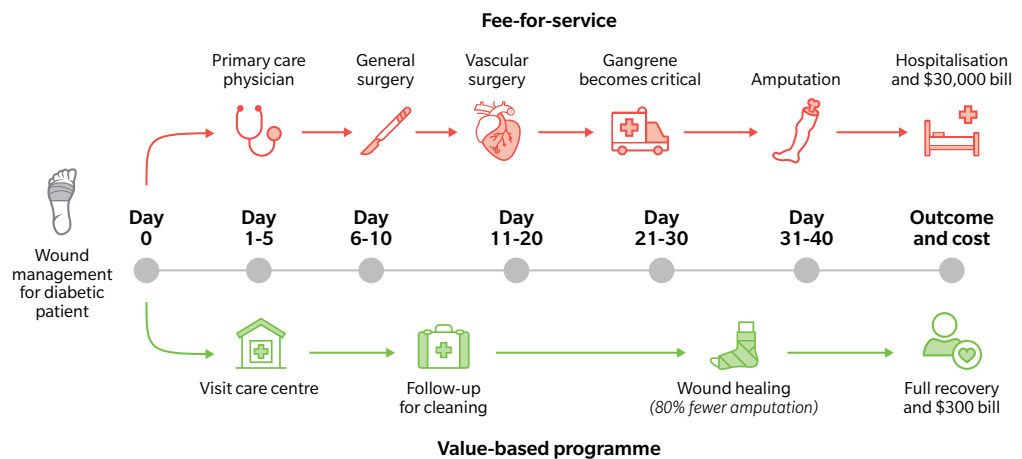
In a systematic review⁷² of 25 studies of integrated healthcare delivery systems, the integration of care was associated with increased quality of care, lower utilisation of services, and lower healthcare cost for patients.

A case in point is CareMore, an integrated multi-specialty physician association in the US, which focuses on elderly healthcare. By focusing on prevention and comprehensively treating the sickest patients in a coordinated manner, CareMore has generated better patient outcomes and financial savings (Exhibit 29).

3.2.2. HEALTHCARE SYSTEM DISRUPTORS

Healthcare is changing fast, in particular with respect to who delivers care and how. The development of innovative digital healthcare technologies, such as wearable

EXHIBIT 29: COMPARISON OF CARE PROCESS BETWEEN FEE-FOR-SERVICE AND VALUE-BASED PROGRAMME



Source APRC analysis on CareMore Communications

EXHIBIT 30: INNOVATIONS AND INTEGRATION ACROSS HEALTHCARE ECOSYSTEM



Source Oliver Wyman analysis

or at-home monitoring and diagnostic systems, has the potential to further improve patient outcomes. Such systems can encourage greater adherence to medical treatment or lifestyle programs, and can help provide timely and coordinated access to care.

Technology is advancing at such a rate that it is not hard to imagine any number of futuristic healthcare scenarios. IBM predicts that the volume of available medical data will double every 73 days until 2020. This presents an opportunity for firms to collect, analyse and translate this data into

actionable insights. New technology such as wearable health trackers, smart watches, and smart contact lenses could easily redefine mobile, personalised diagnostics.

For example, two innovative in-home monitoring devices have been invented in Singapore to improve safety for the elderly. The Smart Elderly Monitoring and Alert System (Semas), co-developed by Housing Development Board (HDB) and four local enterprises, monitors the living patterns of elderly residents through motion sensors installed in their apartments. The system's algorithm is able to detect behavioural

anomalies, such as when the elderly is in the bathroom for an unusually long period of time.

BreathOptics™ is an optical fibre-based breath-sensing technology developed and patented in Singapore, which is able to monitor the breathing patterns of elderly during sleep. When irregularities are detected, both devices are able to alert the caregivers or relatives via a smart device (e.g., mobile smart phone).

It is clear that there is an ever-larger set of disruptors that can play a role in the transformation and expansion of elderly healthcare as it combines medical care, wellness, and technology. There is every chance that the innovative organisations that will eventually have the largest impact on healthcare provision for the elderly have yet to understand the future influence of their products or services.

3.3. INFRASTRUCTURE DEVELOPMENT TO SUPPORT ELDERLY HEALTHCARE DEMANDS

3.3.1. CLOSING THE INFRASTRUCTURE FINANCING GAP

The infrastructure financing gap is a common problem for developing countries due to uncertainty over the “bankability” of healthcare infrastructure projects. However the current long period of low interest rates means there are opportunities for developing APAC countries to tap into international funds⁷³. Governments in these countries need to facilitate the process by addressing the legal and financial uncertainties so as to mitigate the risks for foreign private investors. Measures can include sovereignty waivers, the establishment of a transparent process for recourse in cases of non-fulfilment of terms, and regulatory changes⁷⁴. Such moves could lead to the upgrading and commoditising of healthcare infrastructure investments to a viable alternative asset class.

Strategies for closing the financing gap may be as straightforward as the removal of protectionist measures. For example, protectionist measures in Indonesia require all general hospitals to be 100 percent funded by domestic capital, while nursing homes need to be at least 67 percent

domestically funded. This limits investment in an industry that already faces capacity constraints and is in need of foreign funds and expertise⁷⁵. In contrast, China’s lifting of stringent controls on foreign investment in healthcare has resulted in a flurry of foreign investments, leading to an increase in the country’s number of hospital beds⁷⁶.

3.3.2. CROWDFUNDING

The use of crowdfunding is growing rapidly. Platforms such as kickstarter.com, Citizinvestor.com and Spacehive.com have successfully raised funds for public projects, from park renovations to the construction of a multi-purpose community centre. One model of crowdfunding⁷⁷ is termed impact crowdfunding, as it involves impact enterprises – companies that generate social or environmental returns in addition to financial returns. Consequently, crowdfunding presents a potential source of funds for healthcare infrastructure projects. However, it comes with risks, such as fraud and investor scams. Also, the ability to scale up this approach to fund billion-dollar infrastructure projects will require further developments in regulation and technology, as well as more financing options.

3.4. HUMAN CAPITAL INITIATIVES

3.4.1. THE ROBOTS ARE COMING: BRIDGING THE GAP IN HEALTHCARE WORKFORCE

Japan is the most aged nation in the world. Faced with a growing crisis from its ageing population and a reluctance to import foreign workers, the Japanese have been designing robots since the early 2000s to fill the growing gaps in their workforce. The Japanese government has provided significant subsidies to incentivise the development of eldercare robotics to assist the elderly and their carers⁷⁸.

Recent developments include wearable robotics such as *Hybrid Assistive Limbs*[®] (Cyberdyne Inc⁷⁹), which stabilise and magnify the strength of the wearer. These exoskeletons could enable workers to remain longer in physically demanding jobs, and reduce the physical strain on caregivers, up to 70 percent of whom suffer back injuries from carrying their patients⁸⁰. The improvement in mobility and independence of the elderly may also reduce the burden and demand for long-term care.

Nursing care robots have been developed to monitor the safety of elderly patients with dementia and other disabilities. Robots like *Robear* (pictured, RIKEN Japan⁸¹) have been developed to reduce caregiver burden, by lifting a patient from a bed into a wheelchair. Similarly, the *RoboCoach* (Ngee Ann Polytechnic⁸²) robot invented in Singapore is designed to lead fitness classes and offer personalised workout routines, and is slated to be introduced at senior activity centres across Singapore.



While technological disruptions and automation contribute to global unemployment⁴⁸, robots may be a viable solution to fill the growing needs in the elderly healthcare sector.

3.4.2. POKÉMON GO: THE FUTURE OF HEALTH AND WELLNESS PROMOTION?

The incidence of NCDs, which compound the effects of societal ageing on elderly healthcare expenditure, can be reduced or delayed through healthier lifestyles – practices like regular exercise and better diet. Traditional public health strategies, such as smoking cessation programmes, have in the past had some success at encouraging healthy behaviour. Now, continued advances in mobile phone technology and the expanding number of applications have the potential to transform health promotion strategies in a way that might prevent NCDs.

As with many disruptors, the potential impact of new products is uncertain and so might be underestimated. The global success and popularity of mobile gaming app Pokémon Go has increased physical activity among its users. It has also proven to be an effective advertising medium, driving users to specific businesses through the use of augmented reality (AR), which overlays live images from the phone's camera with media information. This provides opportunities for health and wellness initiatives by, for example, directing players to healthier food stores or to the gym. Through AR information on healthy food options or exercise instructions can be provided to the user.

3.4.3. ANALYTICS AND COLLABORATIVE CONSUMPTION: STRATEGIES FOR LTC WORKFORCE DEVELOPMENT

The shortage of healthcare workforce, especially LTC providers, is of particular relevance to an ageing population. The deficit in LTC workers is attributed to high turnover rates, and the perception of LTC as a less sophisticated and lower status profession compared to other allied health roles (eg, radiotherapist)^{83,84}. In addition to traditional approaches to improve recruitment and retention, such as educational grants, innovative human capital

strategies have the potential to improve LTC workforce development and reduce costs.

Human capital analytics, such as Mercer's Strategic Retention Analysis, provides data-driven analysis of external market conditions, employee attributes and organisational practices. The analyses identify and quantify key drivers of employee retention, enabling the development of effective strategies that have been shown to reduce turnover rates and provide significant cost savings⁸⁵.

On-demand carer and nursing services.

The recent advent of the collaborative consumption business model such as ride-sharing (e.g., Uber) and apartment sharing (e.g., Airbnb) has potential applications for carer and nursing services. For example, two start-ups (Homage.sg, Jaga-Me.com) in Singapore have started to offer on-demand, part-time professional nursing and caregiving services that include nursing procedures (e.g., wound management, injections), medical appointment escort, and assistance with daily activities (e.g., bathing). The availability and convenience of on-demand care services may be of particular value to elderly individuals who only need occasional care support. Cost-savings arise from the potential of avoiding institutionalisation, and enabling family carers an alternative means of providing care instead of having to incur the opportunity cost of taking time off work.

4 CONCLUSION

Societal ageing presents a daunting challenge to APAC. Here, we have considered only one of the risks, which is that of healthcare financing for the elderly population. Based on our modelling projections, the overall financial burden (estimated at US\$20 trillion for 2015-30) is significant and the APAC region is not likely to be able to afford this. Furthermore, increasing dependency ratios together with national pension schemes that fare poorly in terms of sustainability, adequacy, and integrity, threaten the ability of governments to meet their obligations to support their citizens in retirement. Given the long latency between investment and impact at the national level, it is imperative that identification and mitigation of ageing risks should be an immediate priority for all stakeholders.

While there are commonalities in APAC, deeper analysis shows that APAC countries are at different levels of risk, face different types of risks, have different levels of preparedness and hence, need different and customised solutions. In developing potential solutions to manage elderly healthcare expenditure, high quality and comprehensive healthcare data is needed to provide better understanding and insights. However, many stakeholders across the region today have to contend with data quality issues (in terms of availability, accuracy, and completeness) and under-developed information infrastructure. Accordingly, there is a need for improved systems for the accurate and comprehensive collection and analysis of healthcare data to allow better informed decision making.

Innovative solutions and technologies are emerging which could potentially help offset some of the future cost impact by shifting the cost curve. New models of care and technology present an opportunity to ageing and young developing countries to leap-frog to more efficient and sustainable healthcare models to mitigate the impact of societal ageing. Lastly, this presents a great business opportunity for existing companies and new “disruptors” alike.

This publication shows the link between the increase in demand for healthcare services, the need for long term care, inflation of medical costs and underlying healthcare policies and regulations, and the increase in elderly healthcare costs. The multi-faceted nature of elderly healthcare reflects the complexity of the greater societal ageing phenomenon. This highlights the need for an **Ageing Preparedness Index** to provide a consistent means by which to assess the drivers, policies and infrastructure that influence a country’s ability to cope with the challenges associated with societal ageing.

REFERENCES

1. Duggar, E. and Van Praagh, A., 2014. Ageing will reduce economic growth worldwide in the next two decades. New York: Moody's Global Credit Research
2. World Health Organisation, 2014. Global status report on non-communicable disease 2014. Geneva: World Health Organisation
3. Callander, E., Corscadden, L. and Levesque, J.F., 2016. Out-of-pocket healthcare expenditure and chronic disease – do Australians forgo care due to the cost. *Australian Journal of Primary Health*
4. Bloom, D.E., Canning, D. and Fink, G., 2010. Implications of population ageing for economic growth. *Oxford Review of Economic Policy*, 26(4), pp.583-612
5. United Nations, Department of Economic and Social Affairs, Population Division, 2013. *World Population Prospects: The 2012 Revision, Highlights and Advance Tables*. New York: United Nations
6. Espenshade, T.J., Guzman, J.C. and Westoff, C.F., 2003. The surprising global variation in replacement fertility. *Population Research and Policy Review*, 22(5-6), pp.575-583
7. Westley, S.B., Choe, M.K. and Retherford, R.D., 2010. Very low fertility in Asia: Is there a problem? Can it be solved?
8. McDonald, P., 2008. Very Low Fertility Consequences, Causes and Policy Approaches. *The Japanese Journal of Population*, 6(1), pp.19-23
9. World Health Organisation, 2015. *World report on ageing and health*. Luxembourg: World Health Organisation
10. Bloom, D.E., Fried, L.P., Hogan, P., Kalache, A., Beard, J.R., Biggs, S. and Jay Olshansky, S., 2011. *Global Population Ageing: Peril or Promise?* Geneva: World Economic Forum
11. Hofilena, E., 2013. More Japanese men seen quitting jobs to take care of elderly parents. *Japan Daily Press*, 14 May 2013
12. 노지현, 2015. Japan's unmarried rate much higher than Korea's. *The Dong-A Ilbo*, 18 July 2015
13. The Japan Times, 2015. Japan grapples with ¥14.5 trillion dementia costs. *The Japan Times*, 29 May 2015
14. Appleby, J., 2013. *Spending on health and social care over the next 50 years. Why think long term?* London: The King's Fund
15. Mercer Marsh Benefits, 2016. *Medical Trends around the World 2016*. Global: Mercer Marsh Benefits
16. World Health Organisation, 2016. *Burden of Disease data*. Available through: World Health Organisation database [Accessed 15 July 2016]
17. National Institute of Aging, US Department of Health and Human Resources, 2007. *Why population ageing matters: A Global Perspective*. United States: Department of State
18. Sun, Q., Liu, X., Meng, Q., Tang, S., Yu, B. and Tolhurst, R., 2009. Evaluating the financial protection of patients with chronic disease by health insurance in rural China. *International Journal for Equity in Health*, 8(1), pp. 1
19. Xu, K., Evans, D.B., Kawabata, K., Zeramdini, R., Klavus, J. and Murray, C.J., 2003. Household catastrophic health expenditure: A multicountry analysis. *The Lancet*, 362(9378), pp. 111-117
20. Tung, Y.C., Chang, G.M. and Cheng, S.H., 2015. Long-Term Effect of Fee-For-Service-Based Reimbursement Cuts on Processes and Outcomes of Care for Stroke Interrupted Time-Series Study From Taiwan. *Circulation: Cardiovascular Quality and Outcomes*, 8(1), pp.30-37
21. Infocomm Development Authority of Singapore, 2015. *Integrating healthcare, empowering patients*. Singapore: Infocomm Development Authority of Singapore
22. Organisation for Economic Co-operation and Development, 2015. *Fiscal Sustainability of Health Systems: Bridging Health and Finance Perspectives*. Paris: Organisation for Economic Co-operation and Development
23. Sorenson, C., Drummond, M. and Khan, B.B., 2013. Medical technology as a key driver of rising health expenditure: disentangling the relationship. *ClinicoEconomics and outcomes research: CEOR*, 5, pp.223
24. Global Burden of Disease Study 2013 Collaborators, 2015. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*, 386(9995), pp.743-800

25. Xiao, N., Long, Q., Tang, X. and Tang, S., 2014. A community-based approach to non-communicable chronic disease management within a context of advancing universal health coverage in China: progress and challenges. *BMC public health*, 14(2), pp.1
26. Xu, Y., Wang, L., He, J., Bi, Y., Li, M., Wang, T., Wang, L., Jiang, Y., Dai, M., Lu, J. and Xu, M., 2013. Prevalence and control of diabetes in Chinese adults. *Jama*, 310(9), pp.948-959
27. Astolfi, R., Lorenzoni, L. and Oderkirk, J., 2012. Informing policy makers about future health spending: A comparative analysis of forecasting methods in OECD countries. *Health Policy*, 107(1), pp.1-10
28. Matsuyama, Y., 2014. *Aging and the governance of the healthcare system in Japan*. Brussels: Bruegel
29. Goyen, M. and Debatin, J., 2009. Healthcare costs for new technologies. *European Journal of Nuclear Medicine & Molecular Imaging*. 36(S1), pp. 139-143
30. Australian Government Budget, 2015. *Budget Strategy and Outlook*. [online] Available at: http://www.budget.gov.au/2015-16/content/bp1/html/bp1_bs5-01.htm [Accessed 20 July 2016]
31. Main, T. and Slywotzky, A., 2014. *The Patient-to-Consumer Revolution: How high tech, transparent marketplaces, and consumer power are transforming US healthcare*. United States: Oliver Wyman
32. Wong, C. and Haberman, S., 2004. Projecting mortality trends: Recent developments in the United Kingdom and the United States. *North American Actuarial Journal*, 8(2), pp.56-83
33. Chomik, R. and Piggott, J., 2015. Population ageing and social security in Asia. *Asian Economic Policy Review*, 10(2), pp.199-222
34. O'Meara, Taleitha, and Aaron Bruhn. "Compulsory Annuitisation: A Policy Option for Australia?" *Australasian Accounting Business & Finance Journal* 7.3 (2013): 5-30
35. Barnato, A.E., McClellan, M.B., Kagay, C.R. and Garber, A.M., 2004. Trends in inpatient treatment intensity among Medicare beneficiaries at the end of life. *Health Services Research*. 39(2). pp.363-375
36. Organisation for Economic Co-operation and Development, 2015. *OECD Business and Finance Outlook 2015*. Paris: Organisation for Economic Co-operation and Development
37. Mercer, 2015. *Melbourne Mercer Global Pension Index 2015*. Melbourne: Australian Centre for Financial Studies
38. Tandon, A., Murray, C.J., Lauer, J.A. and Evans, D., 2000. *Measuring overall health system performance for 191 countries*. Geneva: World Health Organisation
39. Truth, A.U., 2013. *No Health Without a Workforce*. ISBN, 978(92), pp.4
40. Hazarika, I., 2013. *Health workforce in India: Assessment of availability, production and distribution*. World Health Organisation South-East Asia Journal for Public Health, 2(2), pp. 106-112
41. Lakshminarayanan, S., 2011. Role of government in public health: Current scenario in India and future scope. *Journal of Family and Community Medicine*, 18(1), pp.26-30
42. World Health Organisation, 2014. *WHO Country Cooperation Strategy 2007-2011: Indonesia*. New Delhi: World Health Organisation Regional Office for South-East Asia
43. Wong, A. and Rodrigues de Almeida, P., 2013. *Strategic Infrastructure: Steps to Prepare and Accelerate Public-Private Partnerships*. Geneva: World Economic Forum
44. World Health Organisation, 2010. *Strategy of health care financing for countries of the Western Pacific and South-East Asia regions*. New Delhi: World Health Organisation Regional Office for South-East Asia
45. Ehlers, T., 2014. *Understanding the challenges for infrastructure finance*. Bank for International Settlements Working Papers, 454, pp.10
46. Scheil-Adlung, X., 2015. *Long-term care protection for older persons: A review of coverage deficits in 46 countries*. Geneva: International Labour Office Extension of Social Security
47. Asia Pacific Risk Centre analysis. Refer to Appendix
48. World Economic Forum, 2016. *The Global Risks Report 2016, 11th Edition*. Geneva: World Economic Forum
49. Engen, E. and Hubbard, R., 2004. *Federal Government Debt and Interest Rates*. National Bureau of Economic Research Macroeconomics Annual 2004, 19, pp.83-160

50. Baldacci, M.E., Ding, D., Coady, D., Callegari, G., Tommasino, P., Woo, J. and Kumar, M.M.S., 2010. Public Expenditures on Social Programs and Household Consumption in China. (No. 10-69). International Monetary Fund
51. Australian Institute of Health and Welfare, 2016. Aged care spending. [online] Available at: <http://www.aihw.gov.au/aged-care/residential-and-home-care-2013-14/aged-care-spending/> [Accessed 15 July 2016]
52. Jadhav, A., Sathyanarayana, K.M., Kuma, S. and James, K.S., 2013. Living Arrangements of the Elderly in India: Who lives alone and what are the patterns of familial support. Busan, Korea: IUSSP
53. Law of the People's Republic of China on Protection of the Rights and Interests of the Elderly, 1996. China: Standing Committee of the Eight National People's Congress
54. Lyengar, R., 2016. Shanghai Citizens May Soon Have Their Credit Scores Lowered for Not Visiting Their Parents. TIME, 12 April 2016
55. Forbes, 2014. Medical tourism gets a facelift and perhaps a pace-maker. Forbes, 19 August 2014
56. Indonesia Investments, 2016. New regulation: Foreigners can own landed houses in Indonesia. [online] Available at: <http://www.indonesia-investments.com/news/todays-headlines/new-regulation-foreigners-can-own-landed-houses-in-indonesia/item6370> [Accessed 15 July 2016]
57. Based on 2016 exchange rate retrieved from XE.com
58. Indonesia Investments, 2016. Foreigners can buy property in Indonesia, but will they? [online] Available at: <http://www.indonesia-investments.com/news/news-columns/foreigners-can-buy-property-in-indonesia-but-will-they/item6913> [Accessed 15 July 2016]
59. ASEAN Mutual Recognition Arrangement on Nursing Services, 2006. Cebu: Association of South East Asian Nations
60. ASEAN Mutual Recognition Arrangement on Medical Practitioners, 2009. Cha-am: Association of South East Asian Nations
61. International Labour Organization, 2006. Multilateral Framework on Labour Migration; Non-binding principles and guidelines for a rights-based approach to labour migration. Geneva: International Labour Organization
62. International Labour Organization, 2015. Progress of the implementation of Recommendations adopted at the 3rd – 6th ASEAN Forum on Migrant Labour meetings: Background paper to the 7th AFML. Geneva: International Labour Organization
63. United Nations, Department of Economic and Social Affairs, Population Division, 2015. World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP.241
64. Matsuno, A., 2009. Nurse migration: the Asian perspective. Geneva: ILO/EU Asian Programme on the Governance of Labour Migration
65. Packer, C., Labonté, R. and Runnels, V., 2009. Globalisation and the cross-border flow of health workers. Globalisation and health: pathways, evidence and policy. New York, Routledge, pp.213-234
66. Ministry of Health, Singapore, 2012. Demographics of Nursing Professionals in Singapore [online] Available at: https://www.moh.gov.sg/content/moh_web/home/pressRoom/Parliamentary_QA/2012/demographics_of_nursingprofessionalsinsingapore.html [Accessed 16 July 2016]
67. Tsay, C., 2016. Migration between Southeast Asia and Taiwan: Trends, Characteristics and Implications. Journal of ASEAN Studies, 3(2), pp.68-92
68. Lorenzo, F.M.E., Galvez-Tan, J., Icamina, K. and Javier, L., 2007. Nurse migration from a source country perspective: Philippines country case study. Health services research, 42(3p2), pp.1406-1418
69. Hoover, D.R., Crystal, S., Kumar, R., Sambamoorthi, U. and Cantor, J.C., 2002. Medical expenditures during the last year of life: Findings from the 1992-1996 Medicare current beneficiary survey. Health Services Research. 37(6), pp.1625-1642
70. Chang, S., He, Y. and Hsieh, C.R., 2014. The determinants of health care expenditure toward the end of Life: Evidence from Taiwan. Health economics, 23(8), pp.951-961
71. White, A., 2015. Ten ideas from Oliver Wyman Volume 2: It's time to think digital. New York: Oliver Wyman
72. Hwang, W., Chang, J., LaClair, M. and Paz, H., 2013. Effects of integrated delivery system on cost and quality. American Journal of Managed Care, 19(5), pp.175-184

73. The World Bank Group, 2016. Inter-agency task force on financing for development issue brief series: Closing the infrastructure gap. New York: United Nations Department of Economic and Social Affairs
74. Narayanaswamy, M., 2016. Infrastructure finance – Colombia and FDN: Lessons on infrastructure lending from Colombia. Washington DC: International Finance Corporation
75. Government of Indonesia, 2016. Presidential Decree no. 44: List of business fields closed and business fields open with conditions to investment. Jakarta: Government of Indonesia
76. Clearstate, an Economist Intelligence Unit business, 2016. Understanding China’s emerging private healthcare market. Singapore: Clearstate
77. Gurdeniz, E. and Ames, M., 2016. Meeting consumer demand for a better world: Financial innovation for a triple win for consumers, banks and the planet. United States: Oliver Wyman
78. Maverick, T., 2015. Japan’s Tech Solution for Its Ageing Population. Wall Street Daily, 11 July 2015
79. Simms, J., 2015. Yoshiyuki Sankai’s Cyborgs Serve Japan’s Elderly. Forbes, 1 April 2015
80. Hay, M., 2015. Why Robots Are the Future of Elder Care. The Daily Good, 24 June 2015
81. RIKEN, 2015. The strong robot with the gentle touch. Press release, 23 February 2015
82. Griffiths, J., 2016. Singapore turns to robots to get seniors moving. CNN, 29 February 2016
83. Howe, A.L., King, D.S., Ellis, J.M., Wells, Y.D., Wei, Z. and Teshuva, K.A., 2012. Stabilising the aged care workforce: An analysis of worker retention and intention. Australian Health Review, 36(1), pp.83-91
84. Goel, K. and Penman, J., 2015. Employment experiences of immigrant workers in aged care in regional South Australia. Rural and remote health, 15(2693)
85. Mercer, 2016. Improving retention – The power of disciplined measurement. New York: Mercer

GLOSSARY

Ageing profile – Young (<7% of population aged 65+); ageing (7-14% of population aged 65+); aged (14-21% of population aged 65+); super-aged (21-28% of population aged 65+); ultra-aged (>28% of population aged 65+)

APAC – Asia Pacific region covering East Asia, South Asia, South-East Asia and Oceania, excluding Central Asia, Russia and countries of the Eastern Pacific (North and South America)

APRC – Marsh & McLennan Companies' Asia Pacific Risk Center

ASEAN – The Association of South-East Asian Nations comprising Indonesia, Thailand, Malaysia, Philippines, Singapore, Vietnam, Brunei, Cambodia, Laos, Myanmar

Bankable/Bankability – The state or ability of an investment to return predictable, sustainable profit, such that lenders or investors are willing to finance it

BMI – Business Monitor International. It is a research firm that provides macroeconomic, industry and financial market analysis

CAGR – Compound annual growth rate

Demographic dividend – Increase in economic productivity or economic growth potential that results from shifts in a population's age structure, where the share of working-age population (aged 15-64) increases while the non-working-age share of the population (aged 14 and younger, 65 and older) decreases

Demographic tax – Drop in economic productivity or economic growth potential resulting from shifts in a population's age structure, where the share of working-age population (aged 15-64) decreases while the non-working-age share of the population (aged 14 and younger, 65 and older) increases

Dependency ratio – Age-population ratio of those typically not in the labour force (aged 14 and younger, 65 and older) to those typically in the labour force (aged 15-64)

EIU – Economist Intelligence Unit. It is a business within The Economist Group providing forecasting and advisory services through research and analysis

Elderly – In the present publication, we have used the term elderly to refer to persons aged 65 and above, although it is often used interchangeably with the terms "elder" or "senior"

Fee-for-service healthcare – Healthcare delivery or system where services are unbundled and paid for separately; payment is dependent on quantity of care instead of quality or patient outcomes

Healthcare tourism – Healthcare consumers travel to another country for the purpose of obtaining healthcare services in that country. Typically, the main reasons are availability and quality of treatment, and cost considerations

Infrastructure financing gap – Lack of investment in infrastructure (summing to US\$1 trillion per year globally) to meet severe infrastructure needs owing to growing populations, economic growth, increasing urbanisation and ageing legacy assets

Integrated healthcare system – A healthcare system where inputs, delivery, management and organisation of healthcare services relating to diagnosis, treatment, care, rehabilitation and health promotion are brought together as a means of improving access, quality, user satisfaction and efficiency

ILO – International Labour Organization. It is a United Nations agency managing labour issues, particularly international labour standards, social protection, and work opportunities for all

Longevity risk – Potential risk caused by the increasing life expectancies due to societal ageing

LTC – Long-term care covers all care for the elderly in residential facilities or at home

Medical inflation – Change in medical costs, taking into consideration general price inflation, utilisation patterns and change in incidence of NCDs

MMB – Marsh Mercer Benefits

MRA – Mutual Recognition Arrangements are framework arrangements established in support of liberalising and facilitating trade in services, aiming to facilitate the mobility of professionals or skilled labour in ASEAN

NCD – Non-communicable diseases refer to chronic diseases that are non-infectious or non-transmissible e.g. cardiovascular diseases, cancers, diabetes

OOP – Out of pocket expenditure that is not covered by a personal insurance plan or corporate benefits plan

Old-age dependency ratio – Age-population ratio of those above typical working age (aged 65 and older) to those of typical working age (aged 15-64)

OECD – Organisation for Economic Co-operation and Development

Primary care – The level of a health services system that provides entry into the system for all new needs and problems, provides person-focused care over time provides care for all but very uncommon or unusual conditions and coordinates or integrates care with other sections of the health system such as specialists

Reverse mortgage – A loan product available to elderly homeowners that allows them to convert part of the equity in their homes into cash

Soda tax – A tax or surcharge on soft drinks specific to the promotion of reduced overall sugar consumption

Universal healthcare coverage – A health system where all people receive health services needed without suffering financial hardship when paying for them

Value-based healthcare/marketplace – Healthcare delivery or system that prioritises the value of healthcare delivered, where value is defined to be patient health outcomes per dollar spent

WHO – World Health Organisation

RECENT PUBLICATIONS

FROM MARSH AND MCLENNAN COMPANIES

MARSH



ASIA INSURANCE MARKET REPORT 2016

A snapshot of current insurance market conditions, with risk trends across major lines of coverage in 12 different countries and markets across the region, as well as various specialty sectors

Download at www.asia.marsh.com



EMERGING RISKS: ANTICIPATING THREATS AND OPPORTUNITIES AROUND THE CORNER

Who are organisations turning to? What tools are risk professionals using? Why do some organisations continue to see barriers to understanding the impacts of emerging risks?

MERCER



FUTURE-PROOFING HR

Mercer's 2016 Global Talent Trends study highlights current issues in the world of work and identifies priorities that demand immediate attention



MELBOURNE MERCER GLOBAL PENSION INDEX

Pension systems around the world are under more pressure than ever before. Significant pension reform is being considered or implemented



MEETING THE CHALLENGES OF RETIREMENT

With the global workforce living longer and healthier lives, this report looks at how employers can help employees overcome the central challenge of retirement income adequacy



AGE-FRIENDLY EMPLOYER RESEARCH

Are policies and behaviours within companies facilitating the change towards providing a welcoming and inclusive working environment for older workers?

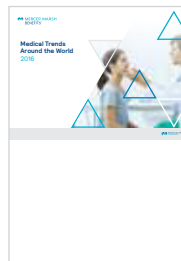
Download at www.asean.mercer.com

MERCER MARSH BENEFITS



A QUICK FIX TO EMPLOYEE BENEFITS COSTS

How a more proactive approach to employees' healthcare costs will enable employers to maintain their benefits program's competitiveness and sustainability, in the face of healthcare costs outpacing inflation



MEDICAL TRENDS AROUND THE WORLD 2016

Marsh and Mercer's annual survey provides information on external medical trends that influence competitiveness and sustainability of health programs

GUY CARPENTER



A CLEARER VIEW OF EMERGING RISKS

Advancements in sophisticated medical technologies, including specialty drugs and innovative cures, compounded with an ageing population are creating a “chicken and egg” scenario that will contribute to the risk of healthcare costs expanding at a more geometric rate

Download at www.guycarp.com

OLIVER WYMAN



MORE THAN FIFTY SHADES OF GREY

China's ageing population a challenge and an opportunity for the region's consumer corporates



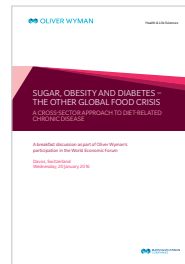
THE PATIENT-TO-CONSUMER REVOLUTION

How high tech, transparent marketplaces, and consumer power are transforming US healthcare



THE MARKETPLACE REVOLUTION

Culmination of a multi-year series of white papers examining healthcare market transformation, focused on game-changing innovation and the rise of new business designs



SUGAR, OBESITY AND DIABETES - THE OTHER GLOBAL FOOD CRISIS

Oliver Wyman's participation in the World Economic Forum 2016 presents a cross-sector approach to diet-related chronic disease

Download at www.oliverwyman.com

ACKNOWLEDGEMENTS

AUTHORS

WOLFRAM HEDRICH

Executive Director, APRC
wolfram.hedrich@mmc.com

JONATHAN TAN

Director, APRC
jonathan_tan@mmc.com

BLAIR CHALMERS

Director, APRC
blair.chalmers@mmc.com

JACLYN YEO

Senior Research Analyst, APRC
jaclyn.yeo@mmc.com

We would like to give special thanks to Manav Saxena and Alvin Loh for contributing to sections of the report.

ACKNOWLEDGEMENTS

DAVID JACOB

CEO for Asia, Marsh

ROSE KWAN

Partner, Employee Health & Benefits, Mercer

MICHAEL OWEN

Senior Actuary, Guy Carpenter

CHRISTIAN PEDERSEN

Partner, Head Finance & Risk Practice Asia,
Market Leader South East Asia, Oliver Wyman

REPORT ADVISORY GROUP

JEREMY LIM

Partner, Head Health & Life Sciences Practice
Asia, Oliver Wyman

MARSHALL LEE

Head of Strategy and Business Planning
Asia-Pacific, Marsh

JOAN COLLAR

Asia Regional Leader, Employee Health &
Benefits, Marsh

PENG TIEN CHUA

Partner, Employee Health & Benefits, Mercer

SAM BERRY

Principal, Employee Health & Benefits, Mercer

DION GROENEWEG

Principal, HR Transformation and Workforce Planning &
Analytics, Mercer

SIDDHARTH MEHTA

Principal, Workforce Planning & Analytics, Mercer

YUKARI KOBAYASHI

Principal, Business Operations for Far East, Mercer

TATSUYA KAMOI

Market Leader Japan, Mercer

HIROFUMI SHIMOYAMA

Japan Country Manager, Marsh

This report would not have been possible without the help from Yanan Liu, Joseph Mocanu, Zhe Wei Chong, Liyin Ke, Caroline Tan, Richard Green, Neil Narale, Emily Thornton, Francine Minadeo, Carl Haughton, David Rains, Lucy Dalimonte, Shaun Scade, Agatha Foo and the Knowledge Services team, Charles Alessi (Senior Advisor to Public Health England), and Manu Bhaskaran (Chief Executive, Centennial Asia Advisors).

We would like to give special thanks for the support by the MMC Global Risk Center team in launching APRC: Alex Wittenberg, John Craig, Richard Smith-Bingham, and Lucy Nottingham.

The design work for this report was led by Doreen Tan and Erika Colwill.

To read the digital version of Advancing into the Golden Years publication and complete methodology documentation, visit www.mmc.com/asia-pacific-risk-center.html

About Marsh & McLennan Companies

MARSH & McLENNAN COMPANIES (NYSE: MMC) is a global professional services firm offering clients advice and solutions in the areas of risk, strategy and people. Marsh is a leader in insurance broking and risk management; Guy Carpenter is a leader in providing risk and reinsurance intermediary services; Mercer is a leader in talent, health, retirement and investment consulting; and Oliver Wyman is a leader in management consulting. With annual revenue of \$13 billion and approximately 60,000 colleagues worldwide, Marsh & McLennan Companies provides analysis, advice and transactional capabilities to clients in more than 130 countries. The Company is committed to being a responsible corporate citizen and making a positive impact in the communities in which it operates. Visit www.mmc.com for more information and follow us on LinkedIn and Twitter @MMC_Global.

About Asia Pacific Risk Center

Asia Pacific Risk Center (APRC) is Marsh & McLennan Companies' research institute dedicated to analysing the key risks facing industries, governments, and societies in Asia, and identifying practical ways to build resilience and realise opportunity in light of them. APRC will assist decision makers to address these risks through research and insight that combine MMC's rigorous analytical approach to risk management with leading thinking from renowned research partners.

For more information, please email the team at contactaprc@mmc.com.

www.mmc.com

Copyright © 2016 Marsh & McLennan Companies, Inc. All rights reserved.

This report may not be sold, reproduced or redistributed, in whole or in part, without the prior written permission of Marsh & McLennan Companies, Inc., which accepts no liability whatsoever for the actions of third parties in this respect. This report is not investment or legal advice and should not be relied on for such advice or as a substitute for consultation with professional accountants or with professional tax, legal or financial advisors. The opinions expressed herein are valid only for the purpose stated herein and as of the date hereof. Information furnished by others, as well as public information and industry and statistical data, upon which all or portions of this report are based, are believed to be reliable but have not been verified. We have made every effort to use reliable, up-to-date and comprehensive information and analysis, but all information is provided without warranty of any kind, express or implied, and we disclaim any responsibility to update the information or conclusions in this report. We accept no liability for any loss arising from any action taken or refrained from, or any decision made, as a result of information or advice contained in this report or any reports or sources of information referred to herein, or for any consequential, special or similar damages even if advised of the possibility of such damages. This report is not an offer to buy or sell securities or a solicitation of an offer to buy or sell securities. No responsibility is taken for changes in market conditions or laws or regulations which occur subsequent to the date hereof.