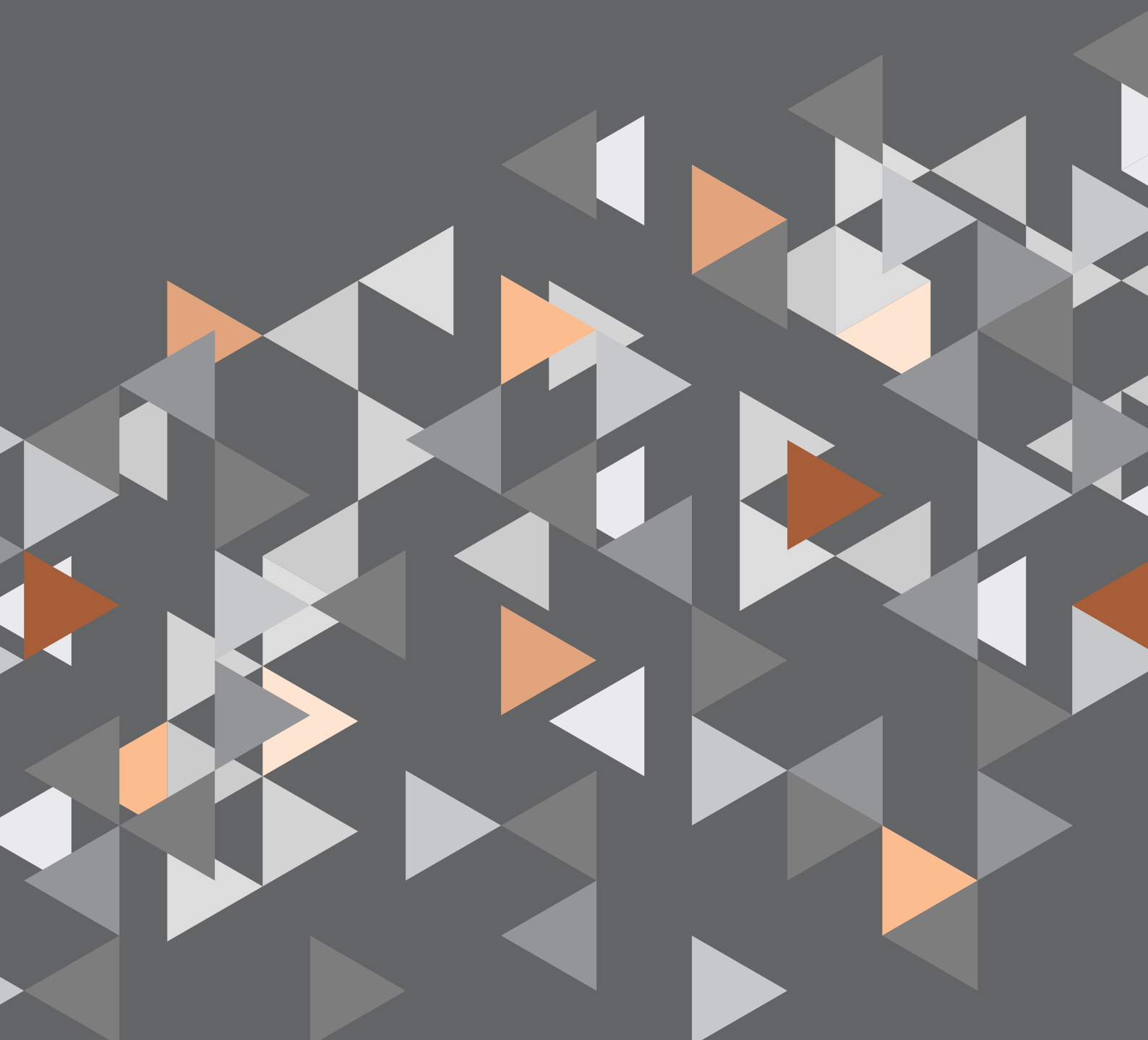


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"The Golden Years – Cost of healthcare for Asia Pacific's elderly" is the first publication from Marsh & McLennan Companies' Asia Pacific Risk Center (APRC). It is the first in a series of publications by APRC assessing the risks that societal ageing poses to communities, industries, and governments in the Asia Pacific region (APAC).

The Asia Pacific region is the fastest growing region in the world and already has some of the oldest populations. However, it also has some relatively young populations, and there are significant differences in the readiness for ageing of the region as a whole.

As the region's population ages, the challenges they and their citizens are to finance their retirement needs will influence government policies and individual financial planning. Individuals need to carefully consider how they can meet their retirement needs, especially given the limited availability of traditional pension plans. Companies seeking to provide retirement solutions for their employees need to consider post-retirement risks and the products that are available to meet these needs.

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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

Many APAC countries are moving from a

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

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.

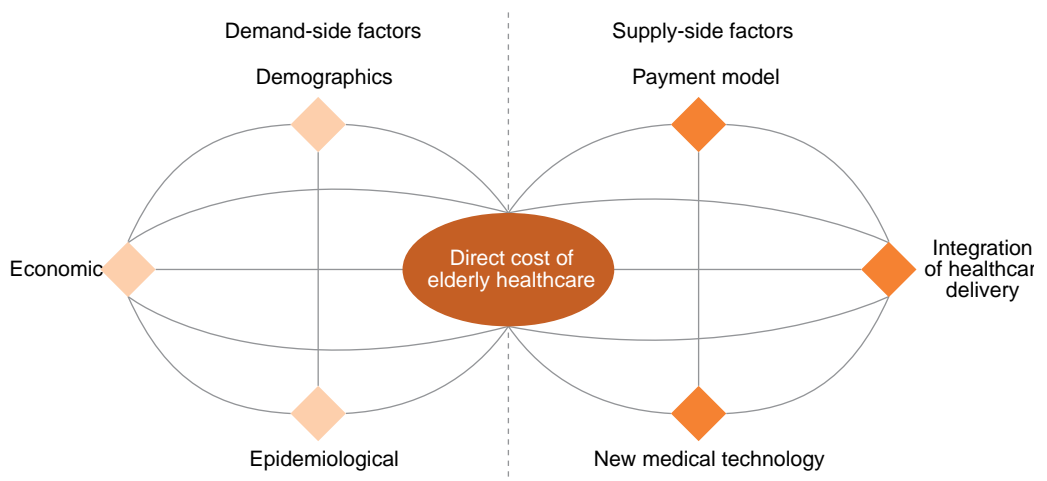
COMPLEXITY SOLUTIONS

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:

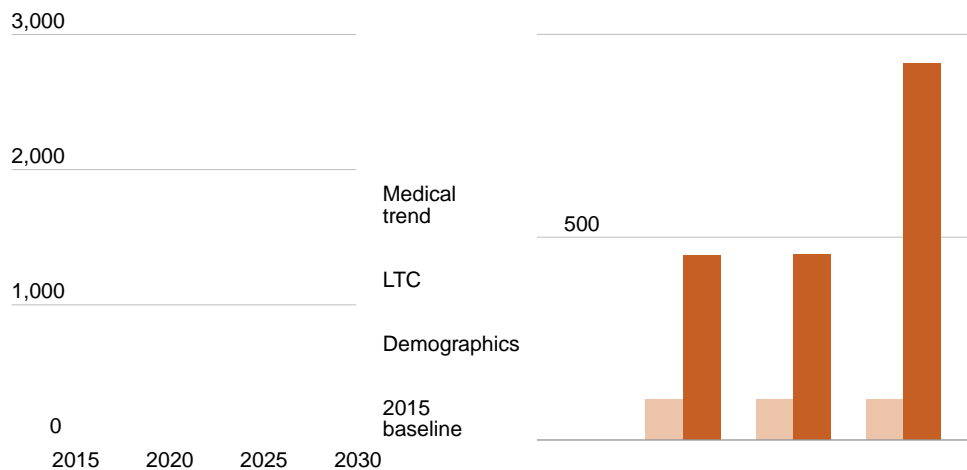
- Growth of elderly population (65 years)
- GDP growth rates
- Medical cost trends, which include demand- and supply-side drivers such as price inflation and utilisation patterns (such as changes in the incidence of non-communicable diseases (NCDs), and of regulations)
- Cost and growth in the utilisation 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 MARKET FROM 2015 TO 2030

ELDERLY HEALTHCARE EXPENDITURE
BREAKDOWN BY COST COMPONENTS
US\$ BILLION



PROBLEMS IN NEED OF URGE 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 FUNDS 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.

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 MODEL DELIVERY

- 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

KEYTAKEAWAYS

- 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.

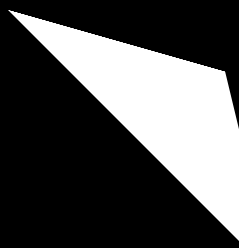
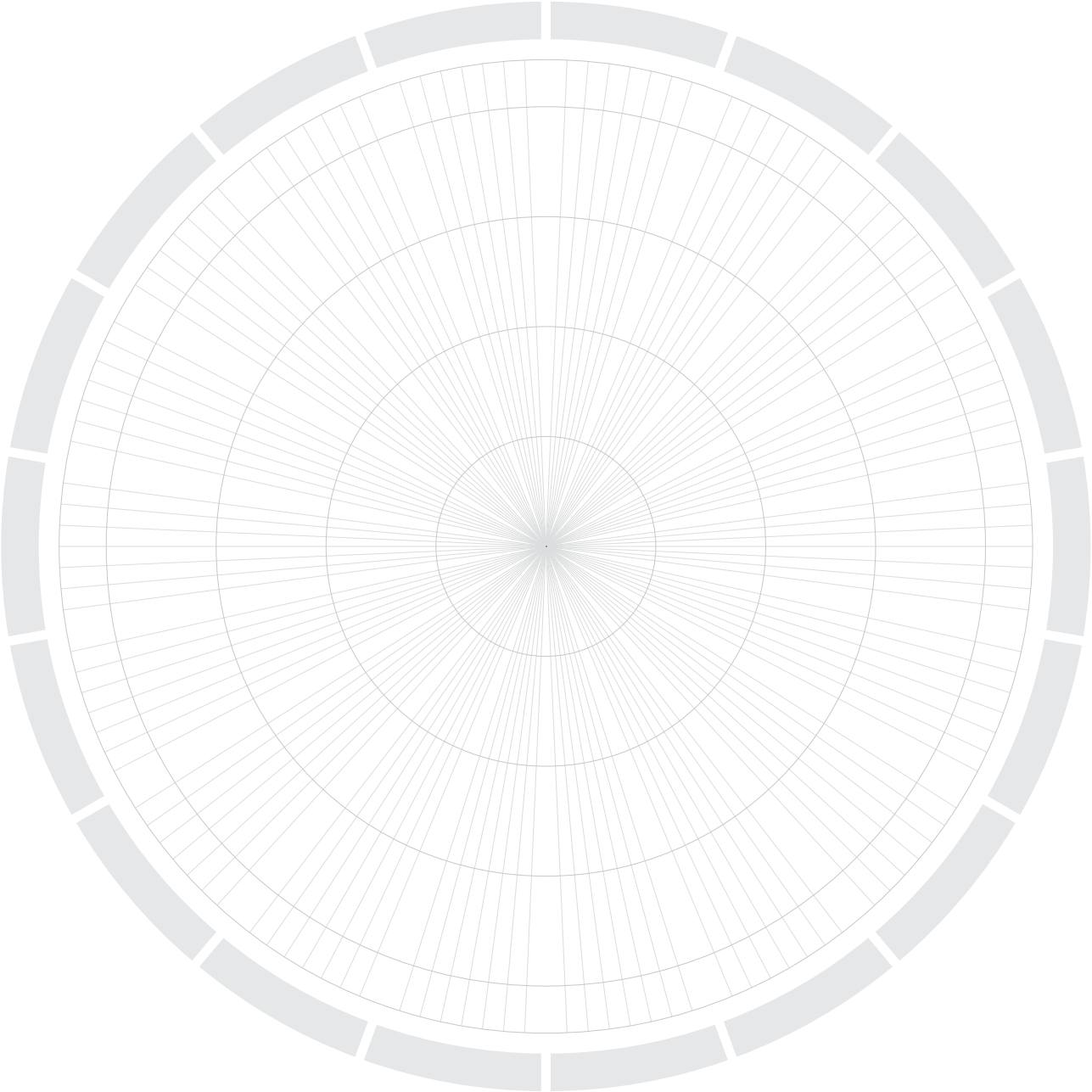


EXHIBIT 2: SPEED OF AGEING ACROSS APAC AND REFERENCE COUNTRIES BY PERCENTAGE OF ELDERLY POPULATION FROM 1960-2030



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 2020-25. However, if governments and industries can

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

In a perfect world, elderly healthcare – in fact, most inflation, and the degree of adequacy 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 supply to match increased levels of demand.

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

CASE STUDY

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.

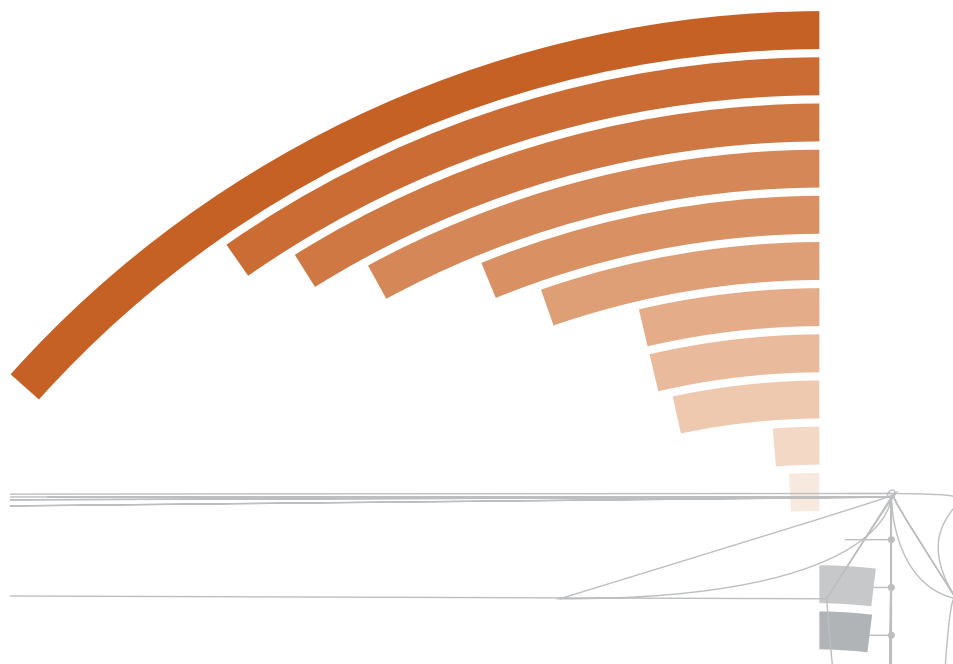
1.3.1. CHANGE IN WORKFORCE SIZE

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,

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.

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 BE OVERNEXT 15 YEARS



However, significant variations exist between health costs – an assumption that does not hold in most 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

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

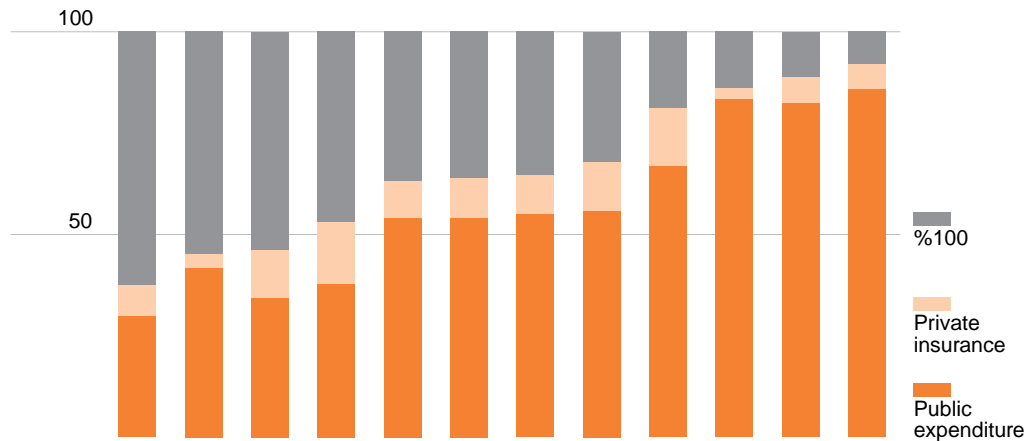
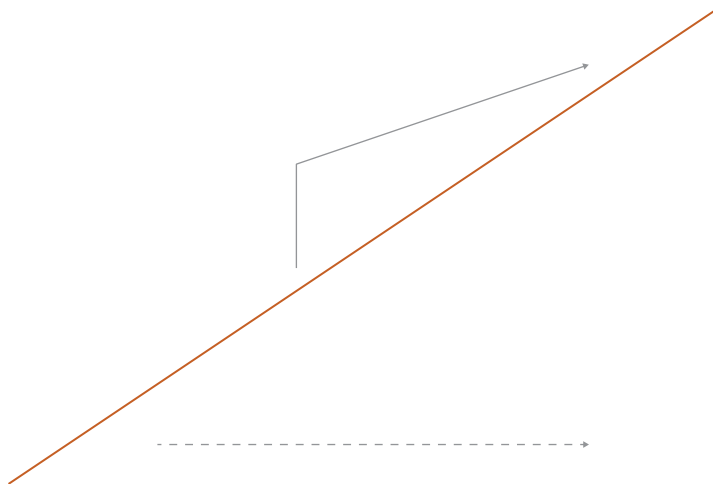


EXHIBIT 8: SIX GENERAL STAGES THE ELDERLY TAKE THROUGH THE CARE SYSTEM BASED ON THEIR CONDITION

PROGRESSION BETWEEN LEVELS OF CARE



1.3.3. ACCESS TO LONG TERM CARE

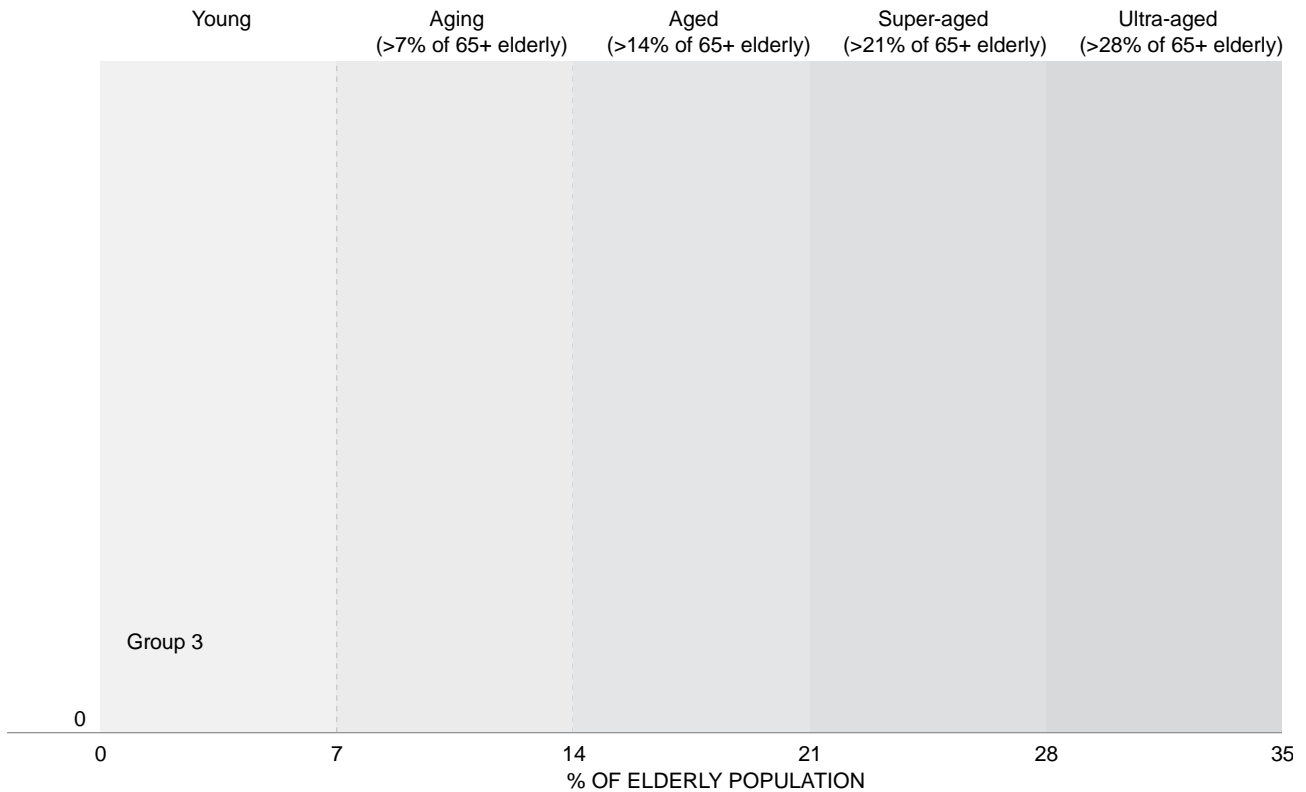
The third difference among APAC countries is the access to long-term care (LTC). Health status is one of the key drivers for the level of care required, as frailty and prevalence of NCDs are a direct function of age (Exhibit 8). While there are substantial proportions of self-sufficient seniors who are 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 0: AGEING GROUPS OF IN APAC REGION ACCORDING TO ELDERLY PROPORTION AND GDP PER CAPITA IN 2015

US\$, 2015



1.4. THE SITUATION: AGEING ACROSS

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 development. 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.

in 2030, with only limited transition between each group (Exhibit 1). 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 2). It should be noted that the rate of cancer incidence is reflective of both the actual cancer rate and its level of diagnosis.

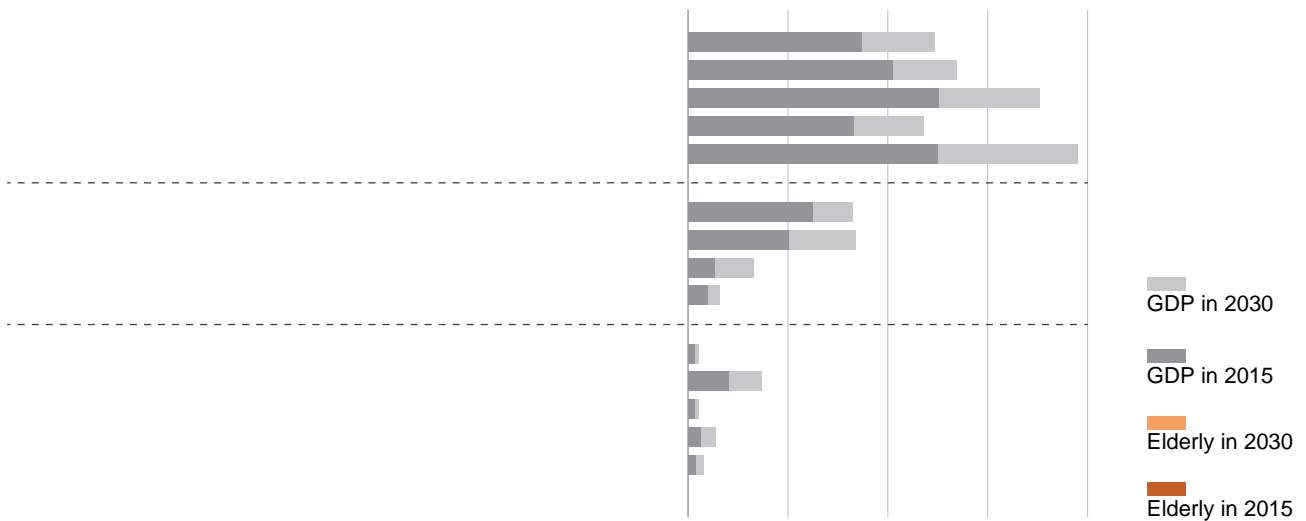
Exhibit 0 shows that there are three key groups in terms of percentage of elderly people in the population and GDP per capita. The groupings still apply broadly

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



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.

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

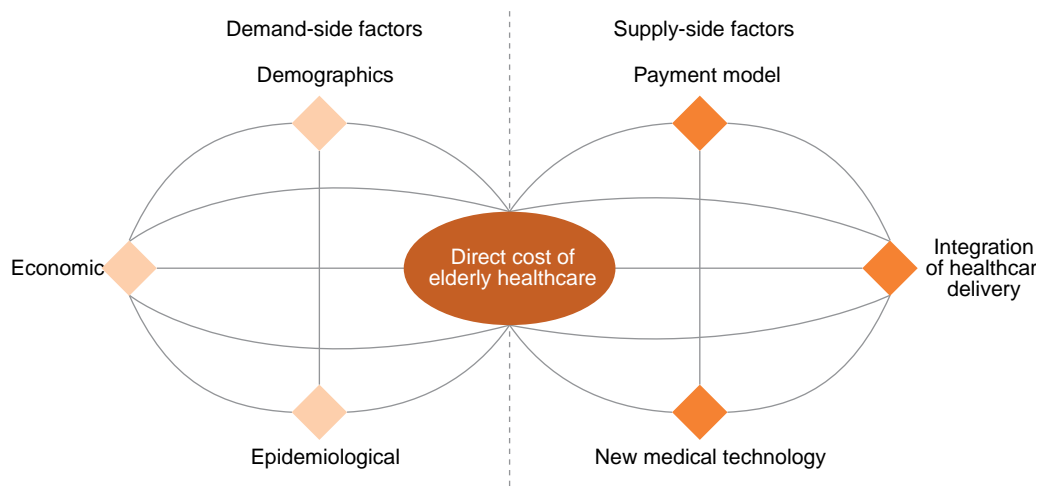
Demographic, economic and epidemiological changes associated with societal ageing are key drivers of healthcare demand.

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 2013).

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 countries. 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 HEALTHCARE



Source: APRC analysis

CASE STUDY

TRADITIONAL TIDES OF CHANGE: JAPANESE MEN AND ELDERCARE

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 survey 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 women. On average, the value of care offered by family members is estimated at an opportunity cost of approximately US\$38,000 per elderly person.

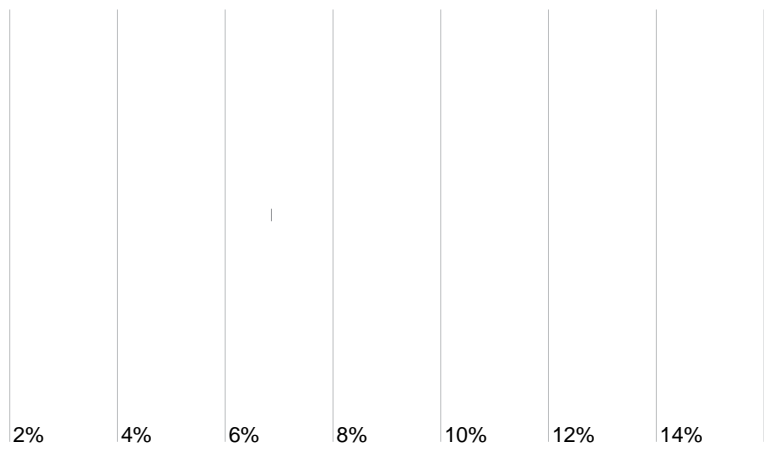
In the absence of urgent reforms, working Japanese will be further squeezed by higher taxation to address the declining fiscal health of the ageing country.

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.

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). 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 savings. The latter is of particular significance in countries where public social support is low and out-of-pocket (OOP) payments are high.

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



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 patients, 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 care.

NEW MEDICAL TECHNOLOGY

Pricing of new medical technology has been shown to be a key driver of rising healthcare costs^{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 absurd

CASE STUDY

NON COMMUNICABLE DISEASES IN ASIA

In a 2016 survey of 180 insurers across 49 countries undertaken by MMC's Mercer Marsh Benefits (MMB), 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.

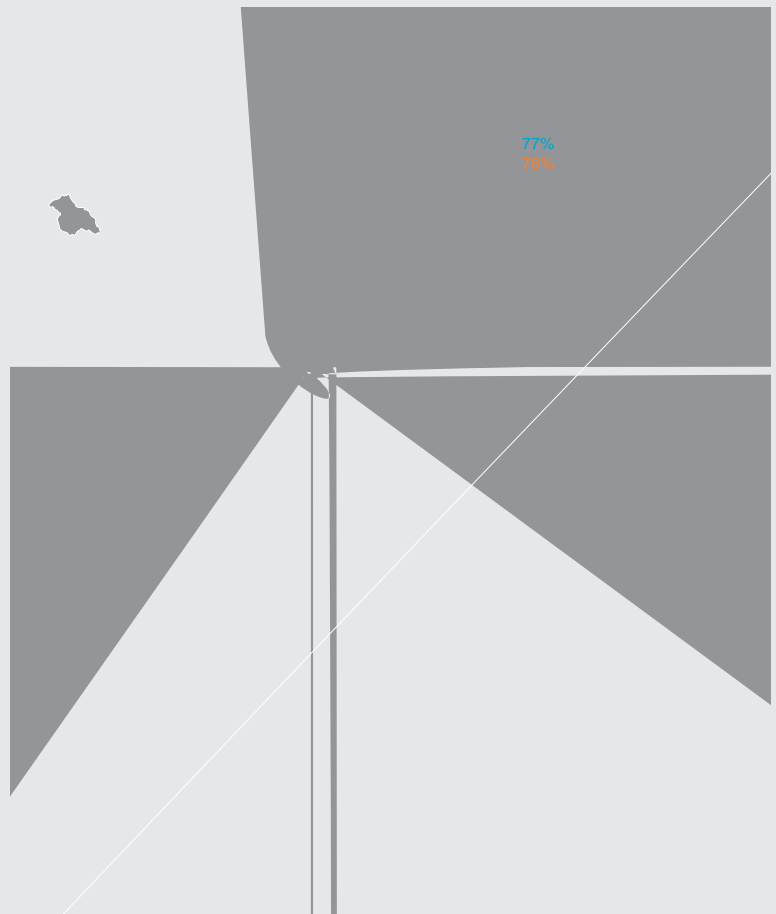
Economic development is associated with improved access to healthcare and lifestyle changes (e.g., calorie-rich diets and decreased physical activity), which result in an epidemiological transition, as infectious diseases are replaced by NCDs.

Exhibit 5 shows the change in the proportion of the disease burden attributable to NCDs between 2000 and 2012⁶. 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 2010⁷. Along with other NCDs, the incidence of diabetes increases with age. Among the elderly in China, the prevalence of diabetes is 28 percent. Accordingly, 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 5: INCREASED PREVALENCE OF NON COMMUNICABLE DISEASES FROM 2000 TO 2012

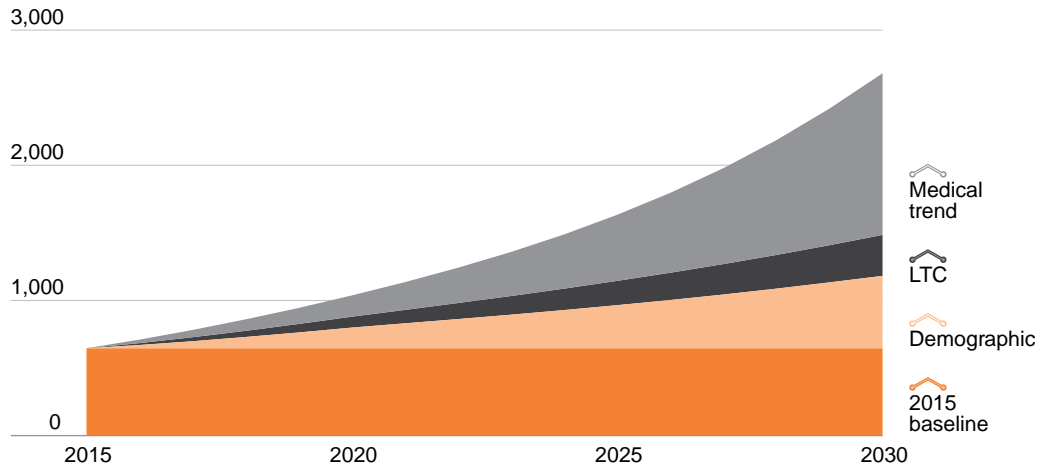
DISEASE BURDEN DUE TO NCDs
%



2.2.

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

**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



Exhibit 9 shows the elderly healthcare expenditure per capita modelled into

2.3. PROBLEMS IN NEED FOR URGENCY

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 delivery¹ 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 expectancy²

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 coverage³, 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 UK⁴ 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.

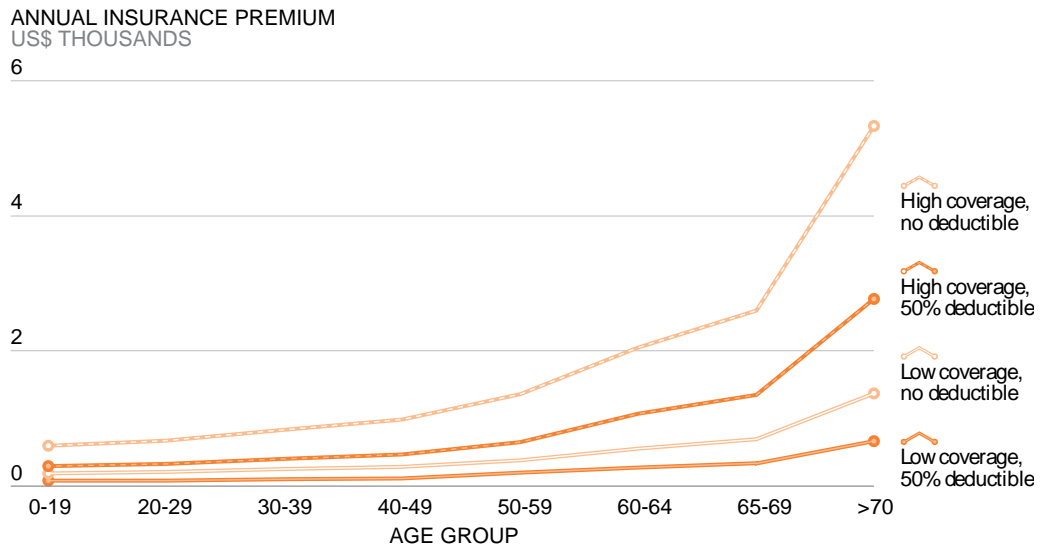
In addition, societal ageing may further impact government revenue due to an increase in the dependency ratio, which means that relatively fewer active workers pay tax. These financial constraints will pressure governments to reduce non-healthcare expenditure, increase taxation, increase borrowing and 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 US 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 OECD 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 HOUSTON



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

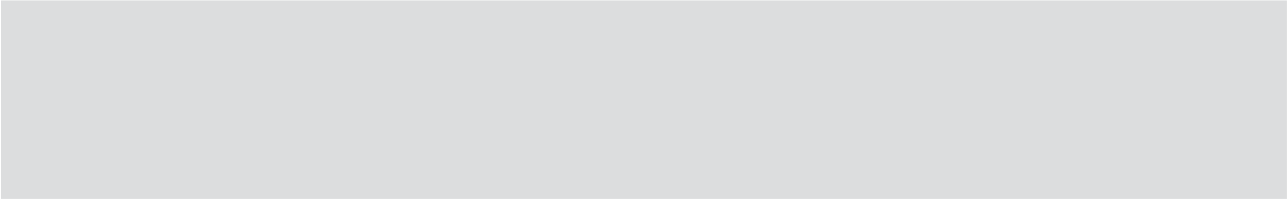
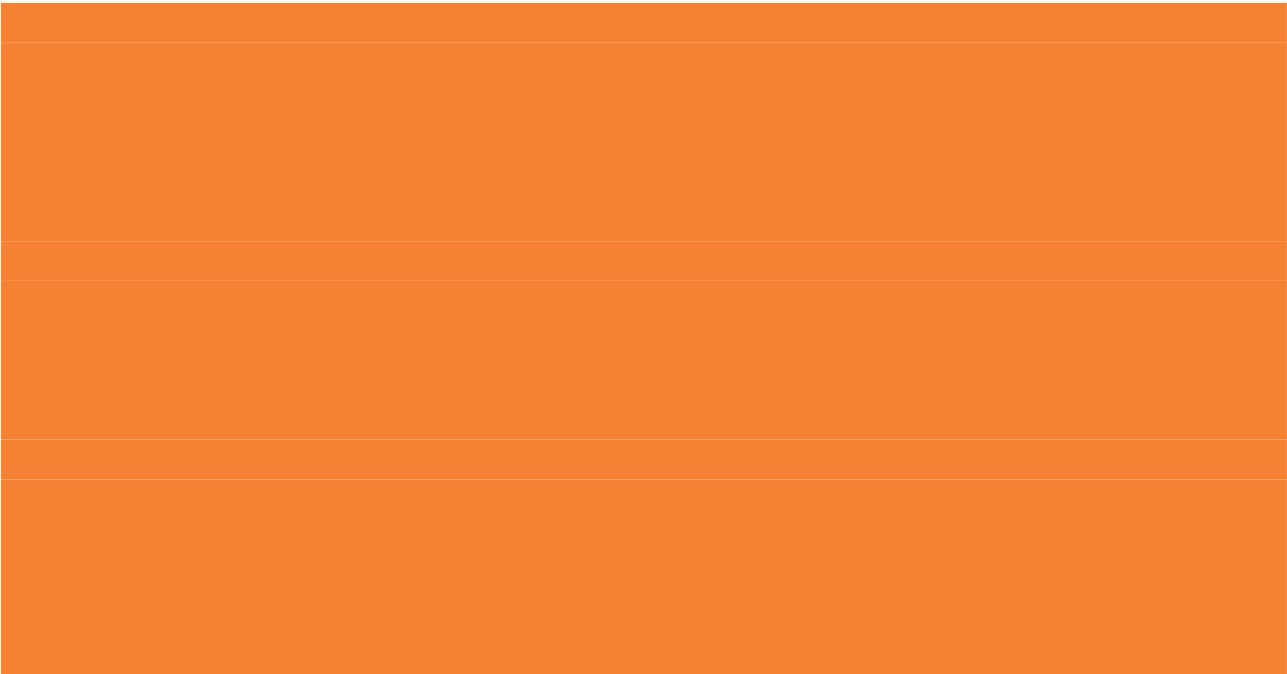
pensions, and personal savings. As evident from the Melbourne Mercer Global Pension Index, the pension systems in most APAC countries have fared poorly in terms of adequacy, sustainability and integrity (Exhibit 21). This implies a greater reliance on personal savings for the funding of healthcare, which represents a significant cost, as a large proportion of healthcare (particularly non-medical services such as LTC) is paid OOP in³³Asia

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



EXHIBIT 22: MEASUREMENTS OF HEALTHCARE INFRASTRUCTURE AND WORKFORCE



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 16th in WHO's global ranking of health systems⁴³. 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 workers, 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 gap 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)⁶ 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 caregivers⁷. 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.

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 Report⁸

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^{4,49} which would place further downward pressure on economic growth.

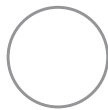
It is estimated that a percent increase in the old-age dependency ratio (a proxy for a relatively lower labour supply) could reduce average savings rate by up to 1.2 percent, which could negatively impact investment

In APAC where a significant proportion of the population is aged 65 and over

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

2.4.



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.

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 2014 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 percent), while others are taken care of at home by caregivers hired. Care by family members is the norm due to strong traditional kinship ties 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

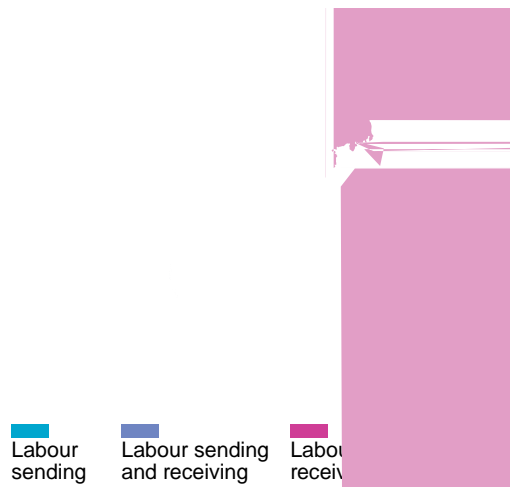
COUNTRIES IN FOCUS

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 rules. 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) and a lease of less than 80 years. 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.

EXHIBIT 27: LABOUR MIGRATION MOVEMENT



COUNTRY 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)

Nevertheless, these significant outflows of professional health workers result in much lower nurse-to-population ratios in their home countries, especially in rural areas. 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

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 ELDER 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 risk. 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

CASE STUDY

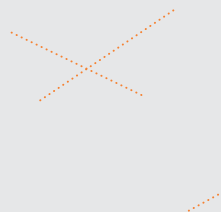
HEALTH MARKET 2.0

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



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

BreathOpticsTM 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

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.

CONCLUSION

Societal ageing presents a daunting challenge to APAC. Here, we have considered only

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