



THE MCKELL INSTITUTE

Positive Disruption: Healthcare, Ageing & Participation in the Age of Technology

SEPTEMBER 2015

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William McKell made a powerful contribution to both New South Wales and Australian society through significant social, economic and environmental reforms

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Scope

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Adapting to an ageing population and rapidly advancing 'Age of Technology' are central challenges for Australian policymakers today. Innovative approaches to both these phenomena, however, enable great long-term opportunities for Australia's society and economy.

While the Australian population is getting older, it is also getting healthier. Technological change is causing strain on some industries, but is enabling the emergence of entirely new industries and fostering new entrepreneurial opportunities for Australians of all ages.

Australia's healthcare system can benefit greatly from the emergence of new technologies, in particular big data analytics, and the integration of healthcare services. Harnessing such technologies will enable the potential cost impacts of an ageing population to be offset with a more streamlined, efficient and cost effective health system.

As Australians live longer, the concept of retirement is changing in a positive way. Evidence demonstrates that adopting a more productive and active lifestyle through community engagement, volunteering, or longer and more flexible working lives in older age is beneficial to the health of older Australians. Recognising this potential is similarly vital for the long-term health of the economy.

This report aims to reframe the debate around Australia's ageing population in the Age of Technology, demonstrating the benefits that necessary steps by policymakers today can have on future Australian generations.

Johnson & Johnson Family of Companies supports this necessary contribution to the public discussion.



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Foreword

The ageing population and the exponential advancement of technology are two of the central challenges facing policymakers in Australia today. Adapting these two phenomena to Australia's society and economy through innovative solutions enables an optimistic outlook.

The scale of Australia's ageing population is well documented. The ratio of workers to non-workers will fall from 5-to-1 today to 2.7-to-1 by 2050. Structural adjustments to the economy necessitated by the decline of certain industries make catering for an increasingly ageing population a vexing issue for governments.

Technological capabilities are growing exponentially, creating great opportunities for individuals, the private sector and, importantly, healthcare. Harnessing and integrating rapidly evolving technologies is a vital step needed to remove inefficiencies from the healthcare system. It can lower its fiscal strain on the budget, deliver better services to the Australian public and improve productive working lives of citizens.

A key requirement in successfully adapting to an ageing population is an optimistic and innovative outlook from policymakers and the wider population. Central to this is embracing the notion that retirement can be a productive and healthy part of life. Although the population is getting older, it is also getting healthier, enabling older Australians to enjoy a more active lifestyle engaged in their communities through volunteering or longer, more flexible working lives.

The benefits of a more engaged and healthier older population are significant – not only for the health of the individual, but for the Australian economy too. This report notes, in one example, that with only a marginal increase in the rates of volunteering by older Australians, \$3.1 billion of value could be added to the economy.

This report aims to demonstrate the benefits and opportunities created by an ageing population in an age of rapid technological advancement, and to show how a healthier and engaged population benefits individuals as well as the economy.

We thank Johnson & Johnson Australia for their support in making this necessary contribution to the public discussion possible.



The Hon John Watkins
CHAIR,
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Executive Summary

Australia is on the cusp of two of the greatest disruptive transformations in history: the ageing of the population and a technological revolution. How the nation manages with both of these prospects will determine its fortune.

These two phenomena will cause a ripple effect across the Australian economy and society, but Australia is now at the point where it can choose how it will react and rectify the exposed problems and inefficiencies caused.

It is expected that productivity growth will slow in coming years, in part due to Australia's working age dependency ratio dropping from 7.3 in 1974-75 to just 2.7 by mid-century.¹ But the advent of health innovations and lifestyle changes for many Australians has resulted in longer life expectancies, and a greater level of health for a greater proportion of life. This translates into a longer period of time spent in retirement in an active and healthy state for many Australians.

With even a small growth in productivity, enormous benefits could be seen over the long term. For example, this report notes that an increase in labour productivity of 0.3 percentage points per year from 2013-4 to 2059-2060 could increase the cumulative sum of GDP by \$13 trillion over that period.

The transition into the information age has also brought about changes in work styles. Rather than working largely laborious jobs, many Australians are now employed in white collar, knowledge industry jobs that are less taxing on the body as we age. So too, the traditional distinction between full and part-time work is becoming increasingly blurred through technology-enabled workplace flexibility, with a continuum of work options becoming available throughout life.

However, the cost of health becomes exponentially higher as we age. The federal government currently

spends 4.1% of GDP on health, but that figure could rise to 7% by 2060. The ageing of the population is anticipated to account for about 10% of growth in health expenditure: pharmaceutical and public hospital spending on those over the age of 85 is more than four times the spending on an average person across all other age categories.²

In spite of this, targeted investment in healthcare technologies and treatments we know to be effective, such as joint replacements and medicines for diabetes and mental health, is essential to maintaining a productive workforce throughout life.

All these require a concerted and coordinated effort to ensure Australia remains a prosperous nation well into the future.

This report proposes a series of recommendations to address the various inefficiencies within our current systems, and the emerging conditions caused by an ageing nation and our greater dependency on technology.

Correcting inefficiencies in the health system, for example, will go a long way to resolving ballooning healthcare costs into the future. Coordinating national healthcare data collection systems is one place to start. Examples of inefficiencies were discovered while researching this report. One was the case of an elderly woman who was being treated by doctors who were not aware that she had already been diagnosed with an aggressive form of cancer – this information would have helped the doctors avoid unnecessary medications and administer a more streamlined treatment regime. In another case, nurses in emergency wards were forced to



waste valuable time manually copying data from the ambulance medic's laptop to the hospital's computer, as the two organisations did not operate on the same system.

By looking to other health systems such as in the United Kingdom, Australian policymakers can learn valuable lessons. Health data is available for every British citizen on a centralised service, ensuring the best, up-to-date information is available for patients as they are admitted to hospital. IBM in the US has also created a system called Watson Health, which uses big data analytics to provide the latest in diagnostic and treatment recommendations to doctors as they treat each patient. This solves the issue of wastage through unnecessary or ineffective treatment: a huge cost to the hospital system.

Encouraging innovation will also go a long way to ensuring Australia's prosperity and productivity in the future. This report recommends an 'open-door' approach to innovation led by government, which both encourages new innovations in industry and connects innovators and thinkers to capital and developers. Innovation in the healthcare sector, as well as in the jobs sector will allow more Australians to remain in meaningful work for longer, but to also choose the means and regularity of work that they wish to be involved in as they age.

Emerging organisations situated in the so-called 'sharing economy' will play a large part in this. Organisations such as Uber and Airbnb already

boast a large cohort of older 'associates' that can choose to work as often or as little as they wish. Government can play its role by better regulating the sharing economy and by implementing programs that remove the barriers to participation for many older Australians.

Additionally, encouraging people to stay in work for longer is in the best interests of all Australians: both for economic and health reasons. Programs to support people to find meaningful work - whether full time, part time, paid or voluntary - should be implemented by government. This report recommends some specific industries and programs that should be investigated further: programs such as Lifeline that provide telehealth services could be expanded to provide more proactive interventions to at-risk individuals; and industries such as childcare could benefit greatly from an increase in mature workers.

Finally, ageing should be re-branded as a largely positive process: in the end, it is an event that we all experience; and given developments in health and technology, it is an event that Australians will increasingly experience in a more positive way than any previous generations. Australia is now at the point where we can choose how we will address the issues that will arise from the new technological revolution and an ageing population, but that window will not be open forever. Now is the time to act decisively.

Key Recommendations

RECOMMENDATION: **Introduction of information systems protocols to mandate user-orientation and interoperability across government**

Governments should prioritise ways of using information systems (including big data technology) to provide better outcomes by partnering with leading innovators, universities and analytics firms to develop more efficient systems. To facilitate this, government should explore means of enhancing existing information and procurement protocols to ensure:

- ▶ User-orientation, so an individual's interface with government services (particularly health, education and employment-related) as they age can be accessed via a single personalised portal which is intuitive and easy to master.
- ▶ Interoperability in information systems to facilitate better integration of government services, particularly in healthcare, and set standards for innovators to ensure their inventions integrate across our institutions.
- ▶ Technologies which have the most potential to **reduce costs** and deliver best outcomes should be prioritised.

RECOMMENDATION: **Open-Door Innovation Policy**

Government should look to leverage the benefits of innovation by adopting an "Open Door Innovation Policy" that opens the door of government to innovators. Measures could include:

- ▶ Working with universities and the Digital Transformation Office to enhance the public service's use of big data information systems to solve complex problems in public administration.
- ▶ Reviewing ways to make it easier for innovators to test their inventions and products for effectiveness in health delivery (subject to appropriate safeguards).
- ▶ Internships encouraged in the start-up innovation sector, universities and the public service.

RECOMMENDATION: **Adopt Best-Practice Integrated Care Models**

Government should build on its National eHealth framework and look to improve Australia's Integrated Care models by reference to successful international programs, such as the United Kingdom, rather than reinventing the wheel. Ideas for reform include:

- ▶ Investigating better use of big data driven informatics to coordinate healthcare nationally.
- ▶ Promoting a bipartisan approach to promote the take-up of the National eHealth system.
- ▶ Running a nationwide campaign of community engagement around ageing, led by respected members of local communities and well-known Australians.

RECOMMENDATION: Personalised Career Portals

Government should work with the private sector and innovators to create personalised career-management portals (akin to personally controlled electronic health records in healthcare) for older Australians to make it easier for them to participate in the labour market.

- ▶ The portals should be designed to be user-friendly by incorporating feedback of older Australians from the beginning.
- ▶ The portals should contain access to mentoring and career-coaching, ways of cataloguing their skills and work experience, work-history and training needs.
- ▶ They should be integrated with current government information systems (such as MyGov) with a view to integrating them further into big data informatics systems over time.

RECOMMENDATION: Big data driven ALMPs for older Australians

The government should undertake a comprehensive review into how Active Labour Market Policies (ALMPs) can stimulate higher participation rates among older Australians:

- ▶ ALMPs should be highly personalised and based on principles of adult-learning. The programs should concentrate on teaching adaptive skills, the ability to use and apply new technologies.
- ▶ The policy environment should not be based on the assumption older Australians are less interested in, or unable to use digital technologies, but concentrate on design features suitably adaptable for use by an older cohort.

- ▶ To ensure the systems will be effective and used *en masse*, the design of such programs should involve input and feedback from older Australians at all stages.
- ▶ Programs that encourage involving older individuals in volunteering, childcare and other industries where there is a need should be explored.

RECOMMENDATION: Entrepreneurial Ageing

Government should work with research institutions, care providers and the innovation sector to foster entrepreneurship in older Australians.

- ▶ Australia should develop an Ageing Australia Innovation Hub, a startup ecosystem tailored to the needs and preferences of older Australians, allowing them to gain advice and input from the startup industry. This recognises the traditional concept of 'retirement' is becoming less meaningful, as many older Australian embrace new careers and ways of working later in life.
- ▶ Make it easier for older Australians to participate in the sharing economy, through platforms such as Uber, Airbnb and Airtasker.
- ▶ Policymakers should look at ways of supporting internships and placement programs for older Australians in existing startups.
- ▶ The models should look at ways of providing the support for older entrepreneurs, including via financial incentives and garnering 'demand-side' relevant ideas about consumption patterns of older individuals and mentoring programs.

Introduction

Australia is undergoing two tectonic shifts in its social and economic landscape. On the one hand, the ageing of the population is causing profound demographic change: Australia is facing an ageing population and all the consequences that will accompany it. On the other, rapid technological advancements are building new futures as fast as they disrupt old certainties, reshaping our economy in the process.

These twin disruptions present positive opportunities and challenges for the nation.

Living longer and healthier lives offers us unparalleled opportunities for personal growth, yet if current conditions continue, will cause healthcare costs to rise, placing pressure on Australia's fiscal sustainability. Automation and computerisation will likely replace entire industries and jobs. But it will also generate new industries, new opportunities through the sharing economy and provide us with innovations to live well into old age.

It is vital that Australia prioritise a positive national conversation about ageing, health, and productivity.

Our longer life-spans are a testament to Australia's success as a modern democracy, a positive demonstration of our capacity to transform as a nation. Access to high quality innovative healthcare and productivity growth has ensured Australians have gained decades of high quality life over the last century.

Even small increases in the productivity of older Australians can create very large economic benefits.

Innovation in healthcare can boost productivity, but for our universal healthcare system to be sustainable it must be appropriately targeted to avoid futile care and waste.

Technology is the key: but to harness its potential, it must be properly integrated into our social and political institutions in a way that promote equity and efficiency. Innovative public policy can transform Australia through measures such as:

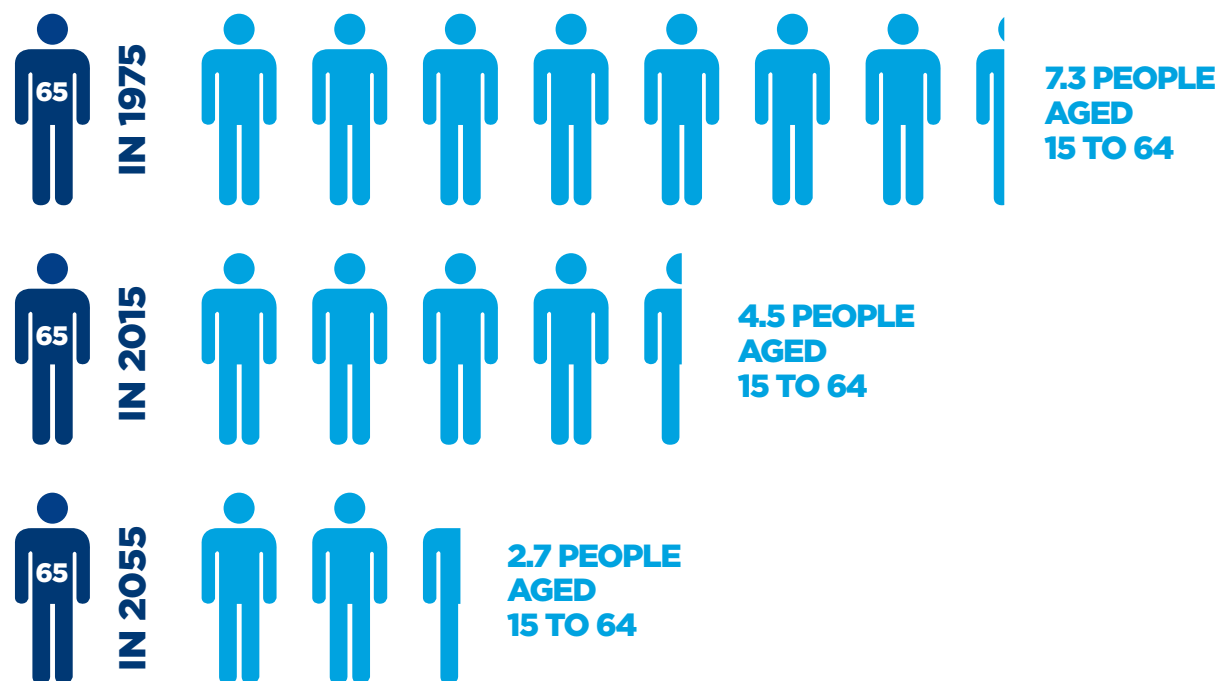
- ▶ Data transparency, integration, analytics and linkages within the health system improving quality and eliminating waste;
- ▶ Labour-saving work options for older workers and support for senior entrepreneurs; and
- ▶ Better healthcare technology to improve productivity; raise health literacy and enable prevention, early diagnosis and treatment.

This report will look to reframe the debate about 'retirement' by concentrating on positive policy responses that enhance older Australians' capacity to be active and productive, and thereby healthier throughout their later years. It will examine how emerging and exciting technological advances in health administration and practice (such as the use of big data analytics to improve management, diagnosis and treatment) can positively motivate and empower people to participate in the labour force and live high-quality lives. Harnessing the potential productivity of older Australians through high quality and efficient healthcare, could have an enormous positive impact on our economic future.

Snapshot of an Ageing Australia

Australia's standards of living and economic prosperity depend on three key underlying factors: population, productivity and participation, each of which is being impacted by technological change.

FIGURE 1: THE NUMBER OF PEOPLE (AGED 15 TO 64) PER PERSON AGED 65+ IS DECREASING



Source: Intergenerational Report 2015

Population

Over the next forty years, Australia's population will increase to nearly 40 million but grow more slowly.

- ▶ We will become older on average, a demographic shift that is part of a global trend in developed nations.
- ▶ Australians will continue to live longer and healthier lives, with life expectancy increases driven by a decline in the mortality rate. Australia's health status will be heavily influenced by chronic conditions of older-age.

Productivity

Productivity remains the main driver of economic growth and increases in Australia's living standards: it will continue to grow but at a slower rate as labour productivity and multifactor productivity growth declines. The economic consequences of Australia's demographic shift are significant.

- ▶ Economic growth will slow and government expenditure will increase, driven by demographic and non-demographic changes.
- ▶ Changes to Aged Pension eligibility will have some impact on participation, but the effects will be insufficient to address the underlying decline in productivity growth.



Participation

Increasing older Australians' participation in the economy is a national economic and social priority. It must be achieved by positively framing ageing as an opportunity and getting the policy settings right in order to make it easier for participation. Assuming the current trajectory continues:

- ▶ An ageing population will mean less people will participate in the labour market, though participation in older cohorts will increase.
- ▶ The labour force will shrink as a proportion of the total population and Australians will spend more of their lives outside of work.
- ▶ Decreasing returns to labour will pose further challenges in terms of inequality.
- ▶ Average-hours-worked is declining, but older workers work longer hours than other groups, with older part-time workers working more hours than younger part-time workers.

The Age of Technology

In addition to an ageing population, Australia is also facing, along with other nations, the onset of the 'Age of Technology', the greatest era of technological advancement in history marked by rapid advances in automation, information technologies and machine learning. The consequences for Australian society will be profound.

- ▶ Nearly 40 per cent of Australian jobs have a high likelihood of being automated or computerised in the next 15 years. Older Australians will be particularly affected.
- ▶ Routine manual and cognitive jobs are those most susceptible to automation, including in the services sector (where most Australians work).
- ▶ Adaptive skill-sets enabling the rapid learning of new technologies that enable creative problem solving will need to become widespread.



- ▶ Automation is expected to occur in waves, separated by plateaus due to engineering bottlenecks.
- ▶ Due to the complexity in automation, jobs involving high degrees of non-routine perception and manipulation, creative intelligence and social intelligence are less susceptible to automation.
- ▶ The rise of the sharing economy is providing unprecedented opportunities for older Australians, through platforms such as Airbnb, Uber and Airtasker.

Barriers to participation

Older individuals face barriers to participation including health conditions and discrimination, but also new opportunities through the sharing economy and entrepreneurship.

- ▶ Active Labour Market Policies (ALMPs) that integrate skill-retraining and job-placement with healthcare needs should be considered a priority and must be designed in a way that takes into account their mixed record of success internationally.
- ▶ Increasing participation also requires a demand-side response so there are jobs for older Australians that are flexible enough to cater for changing life-goals and preferences as people age.

Healthcare is central to participation

While financial incentives, socio-economic factors and training levels are important, it is the health status of older Australians, particularly mental health, which research indicates is a primary supply-side factor affecting labour market participation.

Australia's healthcare system needs better integration

Improving participation rates among older Australians requires improving our health system, which is burdened by insufficient integration, standardisation and interoperability. But Australia's healthcare system is facing challenges in achieving better integration.

- ▶ Technology is no longer the limiting step: today it is coordination and governance. Strong coordinated leadership at the different levels of Australia's health system is needed.
- ▶ Experts report the biggest challenge facing Australia's healthcare system is the chronic lack of integration in information and management systems.
- ▶ Senior health professionals indicate Australia's healthcare system lags almost two decades behind other countries, both in terms of its use of informatics and integrated care.

EXAMPLES OF INEFFICIENCIES ABOUND:

- ▶ In one reported example, nurses in emergency wards were required to manually type patient data into their own computer by reading it from an ambulance medic's laptop (rather than accessing the information directly) because the two systems weren't linked.
- ▶ In another case, mobile phone reception was so bad in one hospital that health professionals relying on SMS to keep them informed had to hold their phones out the window or walk on one particular side of a corridor where reception was available just to update their data.
- ▶ In many hospitals, fax and cumbersome paperwork remains the basis for patient management, slowing down treatment and increasing the risk of error.
- ▶ The lack of integrated information systems can have life or death consequences. In one reported case, an elderly woman was being treated by doctors who had no idea that she had been diagnosed with aggressive cancer – vital information that would have changed the treatment she received.

A Case for Optimism

The capacity to rapidly adapt to new technology is among the most important skills in the future economy and a vital skill for all Australians, especially older individuals. Adaptability is also a critical success factor for Australia's infrastructure.

We have reason to be optimistic. We have managed demographic change before and can do so again.

Technology, if integrated into our lives and workplaces properly, provides immense opportunities to improve participation and positively empower older Australians.

To address these challenges, what Australia needs above all is leadership to drive coordinated action across all levels of government, the research sector and industry and bring the public along by placing individuals at the centre of policy design and implementation.



Section 1: How Ageing & Technology are transforming Australia



Innovation
Branding
Solution
Marketing
Analysis
Ideas
Success
Management



Population, Productivity and Participation

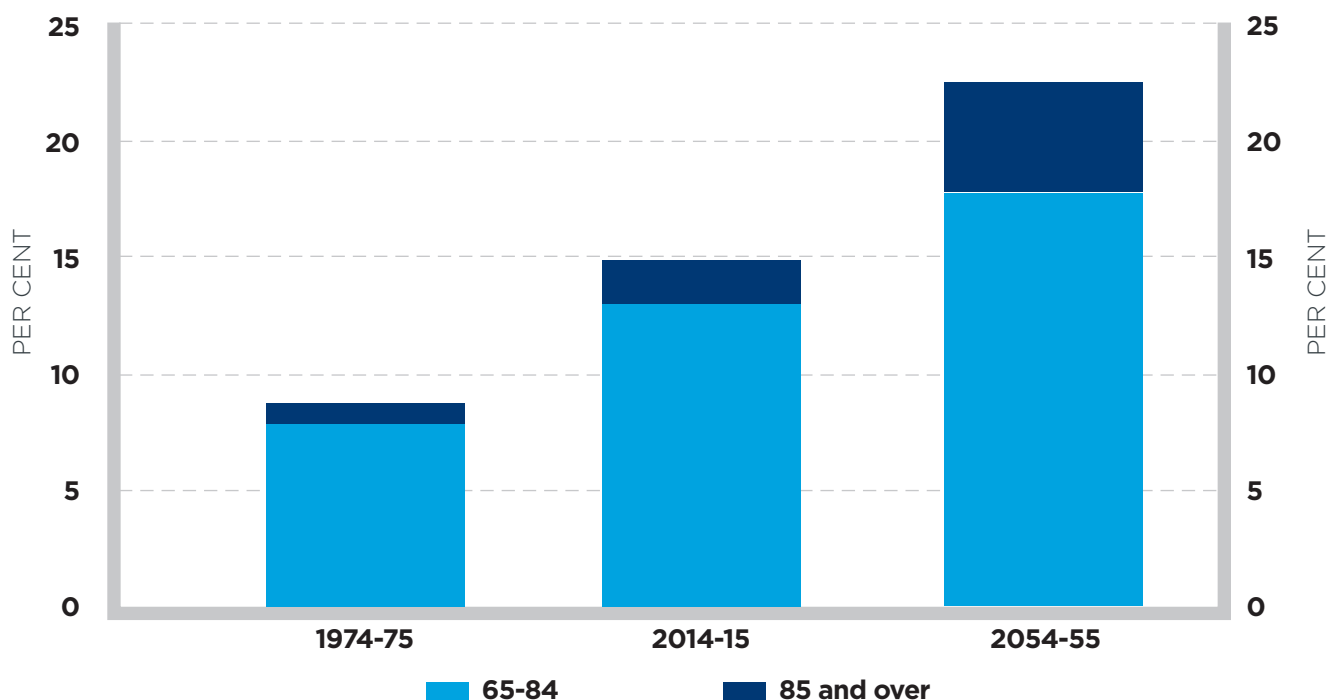
The recent *Intergenerational Report* (IGR)³ is the latest in a long-line of literature analysing the impact of population ageing in Australia. It is the story of a nation confronted by demographic shifts and challenges of economic sustainability and technological relevance. The distribution of ages in Australia will be weighted more heavily towards older cohorts: there will be more of us and we will be collectively older.

Population

Australia's population will increase to nearly 40 million and become older on average

Australia's population is projected to change in composition and growth rates over the next 40 years. Combined with steady fertility rates and estimated net overseas migration figures, it is expected that Australia's population will increase from 23.9 million (today) to 39.7 million in 2054-55. We can expect significant projected increases in life expectancy for men (95.1 years) and women (96.6 years) for those born by 2054-56, compared with 91.5 and 93.6 years for those born today.⁴ The proportion of Australians aged 65 and over will increase, expected to double by 2054-55 to around 7 million people (17.7% of the total population). The proportion of people aged 85 and over is projected to increase to 4.9 per cent (2 million Australians). By mid-century, Australia can expect to be home to over 40,000 centenarians, compared with only 122 in 1974-1975. The proportion of traditional working-age (15-64) Australians will decrease from 66.2% to 60% of the total population, with 2.7 people of traditional working age for every person aged 65 and over (compared with 7.3 in 1974-1975).⁵

FIGURE 2: PROPORTION OF POPULATION AGED 65 AND OVER



Source: ABS cat no. 3105.0.65.001, 3101 and Treasury projections

Australia's population will increase in absolute terms but grow more slowly

Over the next 40 years, the average annual growth rate of the population is projected to be 1.3 per cent, a decline from 1.4 per cent over the preceding 40 years.⁶ Our cities will get bigger, our communities denser and demands on resources greater.

Life expectancy increases are driven by declines in mortality rates

The decline in mortality rates, due to advances in technology and lifestyle changes, will lead to life expectancy at birth increasing from 91.5 years in 2015 to 95.1 years in 2055 for males, and from 93.6 years in 2015 to 96.6 years for females.⁷ The number of people in a given older age group who will die in any given year has fallen dramatically⁸ due to improved diet and housing, immunisation and medications, a lower incidence of accidents and smoking, and other positive lifestyle changes.⁹

Australians are living a greater proportion of their lives in better health

The future of ageing is positive as indicated by the increases in healthy life expectancy – Australians can expect to live better for longer,¹⁰ males are projected to live 62.4 years out of 79.9 years healthily, for women it is 64.5 years out of 84.3 years – the fourth-highest in the world.¹¹ While other population factors, such as increases in migration, can reduce the average age of the population and increase economic growth, it is not expected to significantly mitigate the trend towards an ageing population.

Australia's health status will be heavily influenced by chronic conditions of older-age

An ageing population will see conditions such as obesity, diabetes and heart conditions become more prevalent.¹² Mobility-restricting muscular and skeletal conditions will be even more ubiquitous. Physical impairment and disability will become a major issue for large segments of the population, impacting not just the individual but family members who act as unpaid carers. Psychological and mental health conditions of older age, particularly dementia, will have impacts on labour market participation and our society's ability to manage transitions between work and retirement.

Australia's demographic shift is part of a global trend in developed nations

Australia's experience of population ageing is by no means unique or extreme. The impact of ageing globally brings with it new opportunities for the economy as well as challenges: Australia is well-placed to benefit from developing age-specific sectors and catering for older tourists in areas such as health services, medical-friendly tourism and even as a place to retire.¹³

Productivity

Productivity is the driver of economic growth and increases in Australia's living standards

Productivity improvements – which have been the key determinant of Australia's economic growth and the primary driver of income growth in Australia – will have greater impact than reduction in labour supply per capita.¹⁴ 'Increased productivity growth rates allow workers to more readily fund the needs of older people who are not in paid employment in future years, while those workers can still enjoy a higher standard of living by comparison with earlier generations.'¹⁵

Productivity will continue to grow but at a slower rate

Productivity growth is projected to slow by comparison with the recent past, to around 1.5% over the next 40 years (in line with the current 30-year average).¹⁶ Productivity is usually partitioned into labour productivity and multi-factor productivity (MFP). Labour productivity is 'a measure of how much is produced, on average, for every hour that is worked',¹⁷ while MFP measures the efficiency with which the key inputs of labour and capital are used to produce goods and services.¹⁸

Both labour productivity and MFP growth rates will decline

Average labour productivity growth will be 1.5% to 2060 (0.8% of labour productivity growth due to capital accumulation), with MFP growth estimated at 0.7% over the same period – below previous levels.¹⁹ Part of the expected decline in MFP is due to the rise in labour intensive employment (such as in healthcare and other services).

Small changes can have big effects

An overarching aspect of the Productivity Commission's analysis is the capacity for improvement due to economies of scale: even small efficiency gains or participation-rate increases can have significant impacts on the economy. For example, an increase in labour productivity of 0.3 percentage points per year from 2013-4 to 2059-2060 could increase the cumulative sum of GDP by \$13 trillion over that period.²⁰

We need to ensure a broad view of productivity suiting activities of older individuals is incorporated into public policy

Given how the ageing population is affecting Australia, it is important to be mindful of including other measures of activity in productivity suited to older Australians, such as volunteer assistance, child-minding, mentoring and other voluntary activities that might not be captured in conventional measures of productivity.

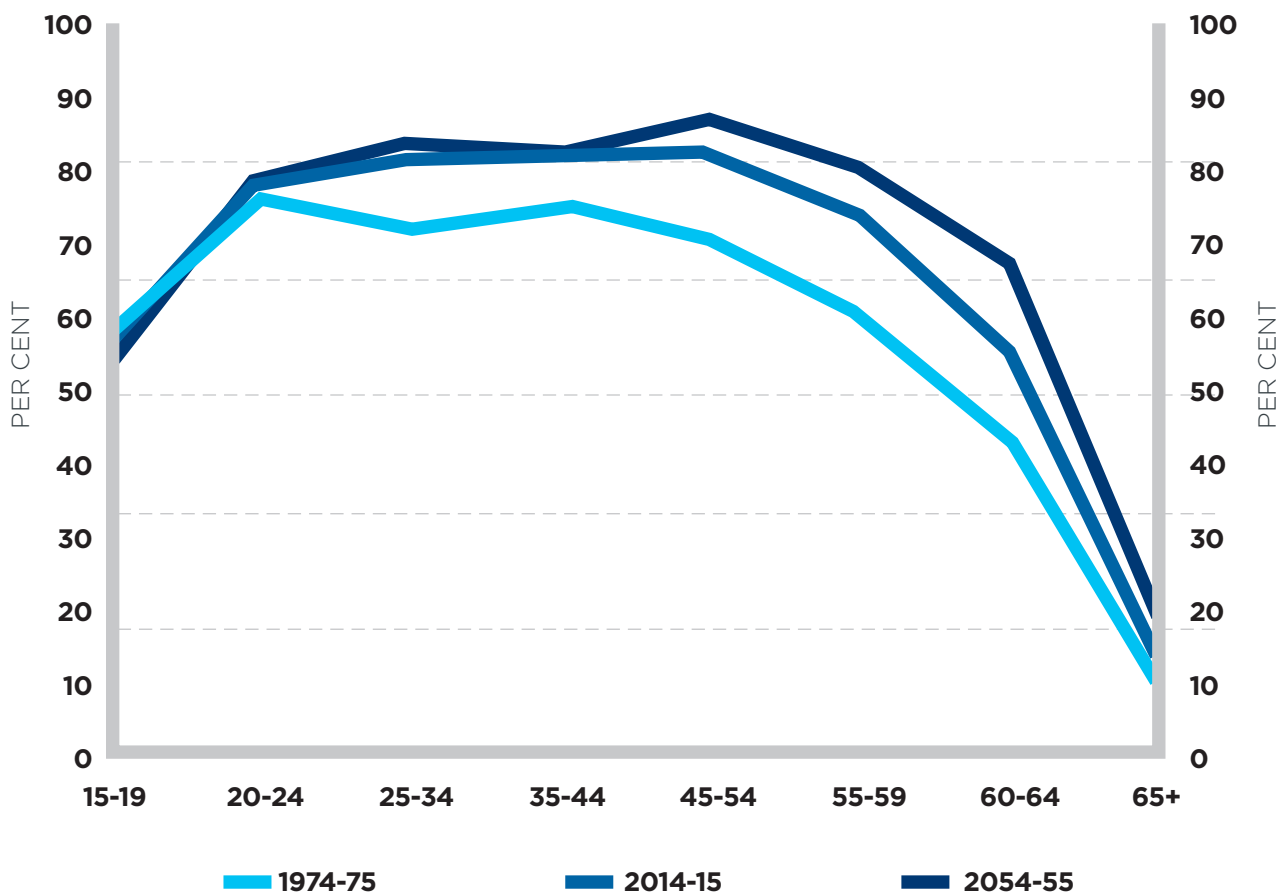


Participation and the Labour Market

Less people overall will participate in the labour market, though more older people will participate

Participation – how it is framed and recast – is the key focus of a positive ageing agenda. The proportion of the population of people aged 15 years and over who are actively engaged in the workforce in Australia is expected to decrease due to population ageing. This decline is driven by a shift in the demographic distribution of Australians into older cohorts. By mid-century, a greater proportion of the population will be aged 65 and over and a significantly smaller proportion of the population will be of traditional working age, falling to 62.4 per cent in 2054-55 and 60% by 2060, compared with 64.6 per cent in 2014-15.²¹ This will have significant impacts on Australia's long term economic outlook.

FIGURE 3: PARTICIPATION RATES IN 1975, 2015 AND 2055 BY AGE GROUP



Source: ABS cat no. 6291.0.55.001 and Treasury projections

The labour force will shrink as a proportion of total population

Economic consequences arise from a decline in the labour force relative to the population as a whole. There is a need to enable people, particularly older Australians, disabled Australians and women, to stay in the workforce longer. Though overall participation is expected to decrease, the participation rate for older Australians (aged 65 and above) is projected to increase from its current level of 12.9 per cent in 2014-15 to 17.3 per cent in 2054-55.²² The ratio of working age people to those over 65 years is projected to fall to 2.7 people (currently at 4.5, 7.3 in 1975)²³.

A greater proportion of Australians' lives will be spent out of work

Ageing Australians will undertake less traditional work throughout life. According to NATSEM²⁴ modelling, the majority of Australians have less than a 50% chance they will still be working in 2035 when they are aged between 60 and 74 years, with lower probabilities for women than men. The proportion of time that will be spent 'outside' the labour force is remarkable. Research demonstrates that 'GenWhats' (2006-2060) will live an additional 78 years once they reach 15 years old, of which 33 years will be spent outside the labour force.²⁵

Aged Pension eligibility will have some effect but is insufficient to address the underlying challenge

Australians are retiring earlier than expected, with average ages of retirement at 63.3 years for men and 59.6 years for women, below the Aged Pension eligibility age of 65 years (from which age, 'most men (83%) and women (92%) older than 65 no longer work').²⁶ Australians should be encouraged to work until the current age of retirement, harnessing their experience and maintaining their physical and mental health through increased productivity.

The natural rate of unemployment is estimated to remain on trend

On the supply-side, the natural-unemployment rate (NAIRU) is estimated²⁷ to remain at trend levels of around 5% with older cohorts (65 and over) unemployment trending slightly upwards. The impact of age-related disability on participation is, however, hard to predict. Unemployment rates for older workers are very low because they exit the labour force if they cannot find jobs and once outside the labour force, they do not attempt to re-enter. This is a crucial problem Australia must address by framing active ageing as positive rather than as a reticent return to the workforce is an important pull factor.²⁸

Older participation is expected to increase – but insufficiently

'Older people have been able to extend their labour force participation as a result of the improvements that have led to longer life expectancy, the rise of less physically demanding work and new technologies. Between 1978-79 and 2013-14, the participation of people aged 55 to 64 increased from 45.6 per cent to 63.8 per cent'.²⁹ A major reason – not necessarily age-specific – is increasing female participation rates (which NATSEM estimates³⁰ could rise by 3% by 2035) which, if structured correctly, could permanently add \$25 billion to Australia's bottom-line.³¹

Average hours worked is declining but older workers work longer hours than other groups

Later retirement, better education and improved job opportunities in the service sector are expected to enable more flexible or part-time work. Preferences of older workers for flexible employment arrangements is expected to see part-time work rise (as a proportion of total hours worked) to 31.9% by 2060 from 29.9% in 2012³² – consistent with a general shift from 'full-time to part-time employment' due to population ageing.³³ Older employees (over 60 years) are more likely to work and have a preference for part-time work that should be incorporated into positive ageing strategies.

Older part-time workers work more hours than younger part-time workers

Average-hours-worked for part-time workers are lower for younger workers but are higher for older workers. NATSEM notes³⁴ that workers in their 'sixties in paid employment spend a higher number of hours working per week', with males in the 65-69 year cohort working 47 hours on average (higher than younger cohort) – and 'similarly for women'.

Characteristics of work: employment sectors of older Australians

The most common occupation for both sexes of older workers in the 60-69 year cohort is 'professional', with significant numbers for women in clerical and administrative roles and for men, in technician or trade roles. Men in this cohort are mostly employed in manufacturing, electricity and construction while for women, employment in health and education sectors dominates. The over 60s cohort has a higher proportion of self-employment compared with the general labour force of self-employed or employers consistent with OECD trends.³⁵

Economic Projections

An ageing population is predicted to impact negatively on economic growth which is predicted to decline due to 'slower population growth and declining participation rates', reducing average economic growth by 0.1 percentage points over the next 40 years (in the previous 40 years it contributed positively by 0.2 percentage points).³⁶

Economic growth will slow

The IGR estimates³⁷ 'average annual growth of real GDP is projected to be 2.8 per cent over the next 40 years compared with 3.1 per cent over the past 40 years, with a decline in GDP growth per person'. Real gross national income per person – an important measure of well-being – is anticipated to grow at 1.4% over the next 40 years, down from 1.5% over the previous 40 years. On such forecasts, the 'annual average Australian income will increase from \$66,400 today to \$117,300 in 2045-55 in today's dollars'.³⁸ However, the Productivity Commission notes that disposable income will grow at a slower rate and is expected to be less than half that of the 'boom years'.³⁹ The key message is that 'ongoing improvements in Australian living standards will remain primarily contingent upon continually improving our productivity and improved participation'.⁴⁰

Expenditure will increase

The ageing of Australia has a positive potential, but also places strain on our fiscal health, with 55% of federal government spending distributed to health, NDIS, aged care, pensions and education,⁴¹ and with government expenditure strongly weighted towards older Australians. Population-ageing related budget pressures will amount to almost 6% of GDP, mainly due to health care, aged care and retirement.⁴²

Expenditure increases will be driven by demographic and non-demographic factors

Expenditure is driven by demographic and non-demographic change (the latter including higher incomes, health sector wages, and technological change in the health expenditure context).⁴³ Aged care expenditure – community care – has ‘nearly quadrupled since 1975’ – and is ‘projected to nearly double again as a share of the economy by 2055’. Looking at ways of achieving efficiencies by keeping older Australians at home longer are needed.

Participation and the Healthcare Challenge

Health status is a major determinant of participation

The demographic shift due to ageing is influencing the predominant forms of healthcare required by the population, which in turn affects participation in the labour market. Health is central to workforce participation in older workers, as is their ability to accumulate superannuation and savings to fund retirement.⁴⁴ Around 26 % of men and 21 % of women leave the workforce because of injury, sickness and disability.⁴⁵ Australia has seen the share of working age population ‘permanently unable to work’, whose ‘main activity’ is disability or sickness and number of women on disability support, increase significantly.⁴⁶

Australia’s self-reported health status is changing as a result of living longer lives

The healthiness of different age-cohorts as self-reported indicates a ‘gradual deterioration in health status between 60 and 65 years of age’ with a small percentage of individuals in surveys reporting improvement. From 65 to 70 years, as expected,

the population transitions into lower levels of health. Overall, NATSEM reports a positive result: that ‘good health is increasingly becoming the dominant self-assessed health status with people reporting excellent or very good health becoming less prevalent’.⁴⁷

Healthcare is a significant item of expenditure

Maintaining good health becomes more expensive as we age. As more of the population moves into these high-cost groups, healthcare costs will rise. Federal healthcare expenditure is projected to rise from 4.1% of GDP in 2012 to 7% in 2060.⁴⁸ In 2012-13, the federal government provided 41% of total health spending, state and local government provided 27% and private contributed the remaining 32%. Ageing has also led to an increased prevalence of chronic conditions (also partly due to higher diagnosis levels).⁴⁹ Older individuals consume more healthcare and increasing demand by all ages can be a significant driver of costs.⁵⁰ Higher incidents of disease similarly raises expenditure.⁵¹

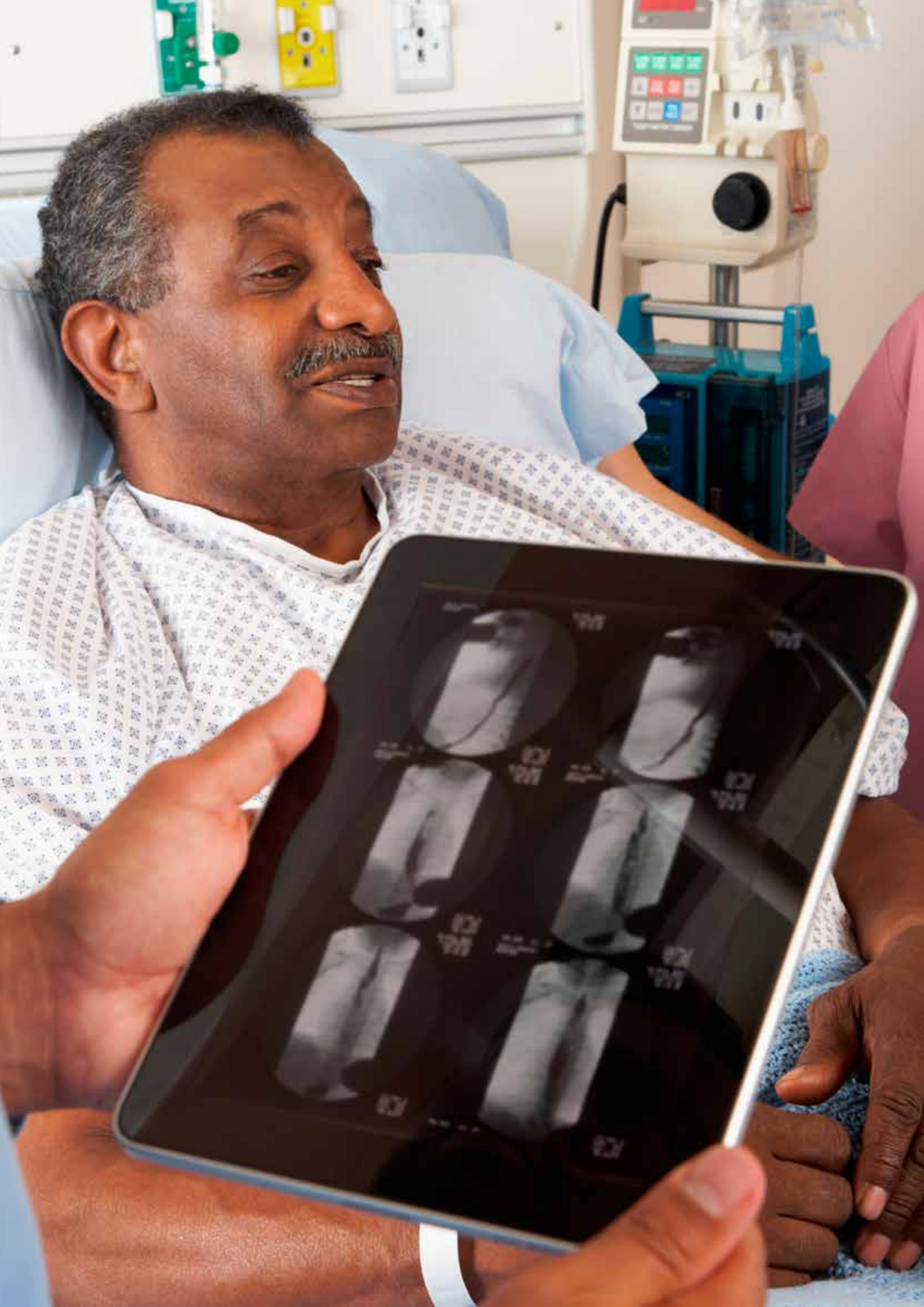
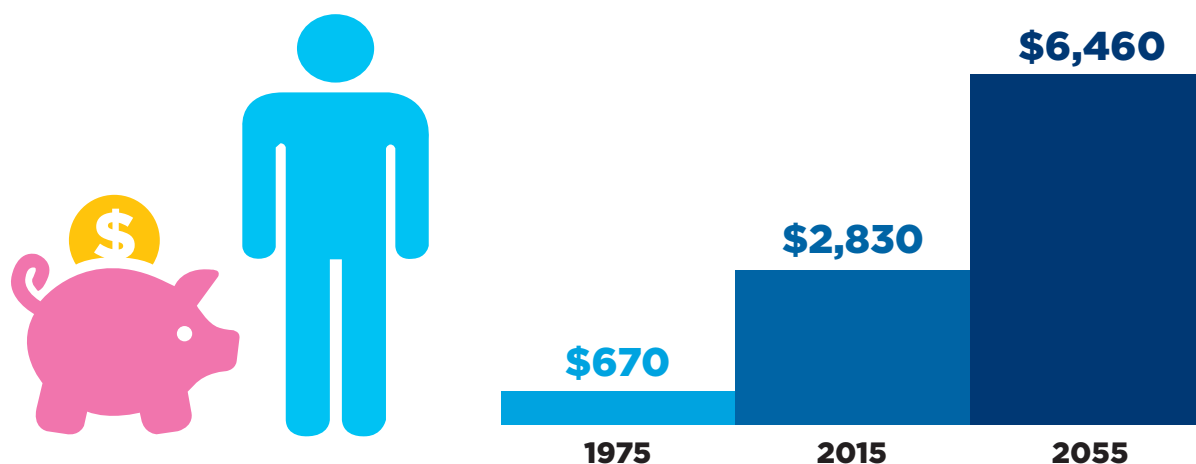


FIGURE 3: HEALTH CARE SPENDING PER PERSON (IN TODAY'S DOLLARS)



Source: Intergeneration Report 2015

Ageing will drive up expenditure growth, particularly on health

The ageing of the population is anticipated to be responsible for around 10% of growth in expenses: expenditure on older cohorts is substantially more than average (pharmaceutical and public hospital expenses of those over 85 years is over four times the spending on an average person across all ages). Spending in medical services, aged care pharmaceutical spending, public and private hospital spending per person are all projected to increase.⁵² That's why we need systems that tailor care in a way that is efficient: the best targeted care can also be a route to the most economically efficient outcomes if managed correctly.

Technology can drive efficiencies, but also stimulate demand for greater expenditure

Though demographic changes will increase expenditure, non-demographic factors, such as changes in consumption and infrastructure costs, are considered⁵³ to be the dominant factor driving cost growth. Technology has led to better quality outcomes and enabled interventions where none would have been available before. However, despite

efficiencies, technology can increase healthcare by stimulating greater demand for new and emerging services or pharmaceuticals.⁵⁴ To lower costs, productivity improvements via lean care models and the type, manner and effectiveness of early intervention and prevention programs must be considered.⁵⁵ Healthcare costs are also highly concentrated towards the end of life (due to the compression of morbidity accompanying healthy expectancy gains): Australia should be prepared for an open discussion about the economic sustainability and personal value of prolonging the very late stages of life.⁵⁶

RECOMMENDATION

A bipartisan committee should be established to lead community discussion around the appropriate levels of treatment of end-of-life periods. The committee should have an open, honest and frank conversation about the most beneficial way to use health resources at the end-of-life stage.



Australia's Age of Technology

Technology and digital transformation is disrupting Australia's economy

Australia is facing the onset of the greatest era of technological advancement in history.

The rise of computerised and automated technologies able to perform complex non-routine tasks will change the nature of how people work and earn a living. Innovative technology is opening up new opportunities, while the automation of jobs and digital disruption of traditional industries presents challenges.

Routine manual and service jobs are at high risk of automation

Nearly 40 per cent of Australian jobs have a high likelihood of being automated in the next 15 years.

“40 per cent of current Australian jobs have a high probability (greater than 0.7) of being computerised or automated in the next 10 to 15 years.”⁵⁷

US research estimates that up to 140 million full-time knowledge workers could be substituted by algorithms.⁵⁸ Such statistics are representative of the challenge Australia faces. Older Australians will be impacted by technological advancement if they are unable to sufficiently adapt to inevitable changes. However, technology will also be highly complementary, improving productivity and



allowing learning of new skills sets. An area of huge potential is using machine learning and artificial intelligence to assist older individuals with cognitive functioning.⁵⁹

It is necessary for policy makers to foster conditions that enable older individuals (whose attitude to technology may impede their willingness to learn)⁶⁰ to increase their adaptability to new technologies. Adaptability is of vital importance in the pursuit of a harmonious transition into a more technologically driven economy and a necessary skill to have given how fast technology evolves.

Research⁶¹ predicts automation will be slowed by engineering bottlenecks caused by the difficulty in computerising jobs based on particular skills, such as (i) perception and manipulation skills – areas

where automation cannot yet match human skill, (ii) creative intelligence skills – human ingenuity that automation cannot match and (iii) social intelligence skills – human interaction and engagement. Jobs more aligned with these types of tasks, particularly those requiring social intelligence and interaction (which are suitable for older individuals who may be slowing down as they age) are less likely to be subject to direct substitution.

Technology will disrupt Australia's service-based economy in positive and negative ways which will likely affect older workers who tend to participate in service industries as they age. But it also offers unparalleled opportunities for positive experiences of ageing (as flagged in our discussion of new healthcare technologies below) that can increase participation rates.

A photograph of two healthcare professionals, a man and a woman, both wearing white lab coats. The man, on the left, is pointing at a tablet held by the woman on the right. They are both looking down at the screen. The woman has a stethoscope around her neck and a clipboard with an orange card attached to her lab coat. The background is a bright, out-of-focus window.

Section 2: Integrated Care & Big Data

Integrating Health and Ageing

The fragmentation of healthcare services in Australia is recognised⁶² as a cause of significant inefficiencies and cost burdens. Australia's integrated healthcare system has been described by senior health professionals lagging behind comparative international countries. Innovations are often incorporated in a piecemeal way and not interoperable with existing systems, making it difficult to achieve equality of access and cost reductions. Although there have been numerous trials and pilots, with some improvements in local geographies a truly national and coordinated approach to integrated care is lacking.⁶³

The solution to this fragmentation is better 'Integrated Care' consisting of (i) vertical integration of primary, secondary and tertiary care infrastructure and (ii) horizontal integration of disciplines and expertise.

Two primary principles which experts report are needed to achieve integration are (i) standardisation, to ensure different technologies are inter-operable and (ii) user-orientation, to ensure systems are designed with patient input around usability from the beginning. The focus on user-orientation is particularly important. As Eric Topol writes in *The Patient Will See You Now*, the revolution in data-science will likely see a commensurate revolution in self-managed care thanks to big data and genomics⁶⁴: as access to data analytics expands, patients will be increasingly able to be involved in clinical analysis of their own health. This addresses one of the most persistent market failures in healthcare – information asymmetry as a result of poor health literacy in the community.

As the AIHW notes,⁶⁵ “[i]n a health system dispersed across the states and territories by the Australian Government, strong governance arrangements are needed to ensure health information, collected under different health administrations, is consistent and therefore accurate and useful for policy, planning and

program management.” Without integration, new innovations designed to assist ageing Australians will have patchy impacts and costs will be difficult to contain in healthcare and participation programs.

Australia's healthcare system needs an improved focus on data management

Australia's current National Health Information Standards infrastructure (which goes some-way to addressing standardisation and interoperability protocols)⁶⁶, including the National Health Information Standards and Statistics Committee⁶⁷ provides a basis for developing better ways of designing information systems to integrate care nationally. Despite such frameworks being in place, fragmentation of healthcare is continuing to impede proper collection, sharing and effective use of information.⁶⁸

Big data analytics can help and should be a focus of policy. Australia's Public Service (APS) organisations can play an important role in developing data integration and analytic programs to improve participation rates and healthcare outcomes. The APS recently released its *Better Practice Guide for Big Data* guidelines in January 2015 which are a step in the right direction, providing background information to the public service on the role that big data can play in delivering public services.⁶⁹

RECOMMENDATION

Governments should prioritise practical ways of using information systems (including big data technology) to achieve better integration of the healthcare system by partnering with leading innovators, universities and analytics firms to develop more efficient systems. Protocols to ensure interoperability and user-orientation of product design should be developed with innovators to enable uptake of new technologies.

Case Study:

Using big data to save costs in Australian healthcare

A recent Australian example of using big data technology to achieve gains in the health system has been the Patients Admission Prediction Tool (PAPT) collaboration between the Australian e-Health Research Centre, Queensland Health, Griffith University and Queensland University of Technology. This innovative software “predicts how many patients will arrive at emergency, their medical needs and how many will be admitted or discharged and allows on-the-ground staff to see what their patient load will be like in the next hour, the rest of the day, into next week, or even on holidays with varying dates, such as Easter and locally specific events.”⁷⁰ The software has been used to develop new pre-emptive responses to large events with the potential to impact on admissions, such as during ‘schoolies week’. If implemented nationally, it is predicted to save \$23 million a year.

Case Study:

UK's Integrated Care Model

Putting personalised care at the centre

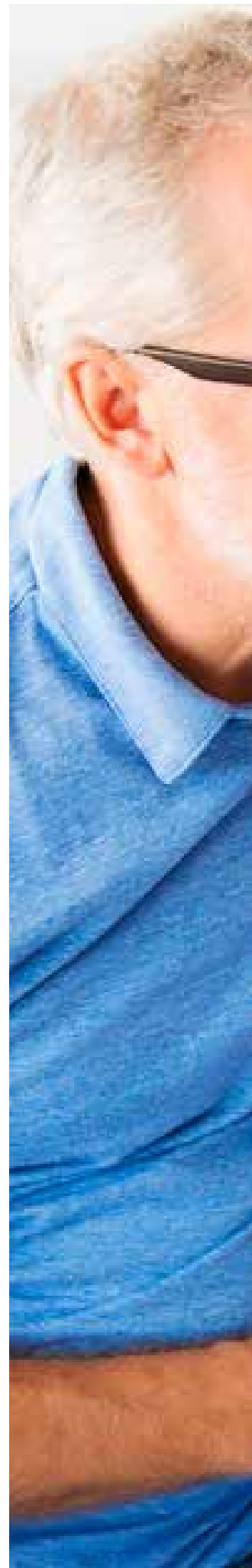
In 2012, the UK Government released its ten-year strategy⁷¹ into integrated e-Health information systems and health reform entitled “The Power of Information”, aimed at giving patients ‘easy and continuous access to their own health records’. The UK’s approach was to combine integrated care models with patient-centred treatment avenues with up-to-date and best-practice information to give patients better control over their own health. The NHS is moving towards full digital integration of health services by 2020. In a six ‘domain’ strategy, the NHS is implementing digitized services across its entire system, with the primary objectives being cost effectiveness, and more comprehensive, streamlined patient care.⁷² The NHS plan will focus around the ‘nhs.uk’ online hub. This hub will be the central base for all UK health services, ranging from accessing personal health records, to booking health services and ordering prescriptions and medications.

Case Study:

Big data in the United States

The big data Revolution in Health – Harnessing Digitised Medicine through big data analytics

Moves towards digitized health services in the US have gained speed in recent years. Over the past decade, the US federal government has invested up to \$25 billion in initiatives aimed at digitising medical records, which has resulted in up to 400,000 health providers incorporating digital services. The quantity of data that is already being received through digitised record keeping is enormous, with national initiatives such as ‘Big Data to Knowledge’ (BD2K) created to find the best way to incorporate this data into better health services.





Case Study: IBM's Watson Health

Digital Disruption in Healthcare

A major example of US innovation in combining big data analytics with personalised and integrated care is IBM's Watson Health platform. The overwhelming complexity presented by the daily influx of data poses challenges for experts who may be unable to keep pace with developments in their field. Often data is unstructured and difficult to convert into productive form. The solution to this problem is provided by incorporating big data analytics into healthcare services. IBM's Watson Health is an excellent case study in how technology can be used to solve this problem. IBM's supercomputer is being used to survey vast amounts of journal articles and diagnostic information to improve personalised health outcomes (improving what the American Medical Association estimates is an around a 20% rate of medical misdiagnosis in the US) in ways no human could.⁷³ The basis of IBM's Watson Health is 'content analytics'⁷⁴ which uses computational methods to resolve unstructured data – from sources as diverse as patient records, to trend forecasts, to handwritten notes – into recommendations. Watson can also offer diagnostic services, analysing information from over 600,000 medical evidence reports and over a million patient records.⁷⁵



Open Door Innovation Policies for Government

Open Door Innovation Policy

Australia has a mixed record at integrating innovation in its procurement lifecycle and has been criticised for not fostering a sufficiently open dialogue and connectivity between potential innovators and government during the pre-tender stage.⁷⁶ This has had implications for telehealth, eHealth records and remote monitoring solutions in the Australian health system which have been slow to evolve. One solution is to adopt an 'Open Door innovation Policy' approach to problem solving and procurement. The objectives are to leverage the wealth of innovative ideas across public and private sectors to design and implement the solutions that are user-friendly; to efficiently convert data to information and to be cost effective.

The idea is to for government to open its doors to innovation by allowing innovators to access and collaborate with front-line staff and administrators in order to facilitate design led and user oriented products. Procurement policy would be used to stimulate bespoke innovations early in the life-cycle that are tailored to sectoral or specific needs of the integrated care system.

RECOMMENDATION

Government should establish a cross-sectional steering committee comprising senior public service officials, Ministers, peak-bodies from universities and industry and members of the startup community to develop a practical set of Open Door Innovation Policies to facilitate better use of innovative technologies in solving healthcare and participation challenges.

A Minister for Ageing & Ageing Australia Steering Committee

The Challenge of Political Coordination

Calls for more coordinated integration are growing.⁷⁷ Implementing better models of Integrated Care and Open Door Innovation Policies will need bipartisan political support and leadership from the most senior levels of government. Ageing needs its own seat at the Cabinet table. We need to overcome bureaucratic inertia to change by appointing a Minister for Ageing and a senior governmental committee to coordinate responses to the challenges of ageing across portfolios.

RECOMMENDATION: AN AGEING AUSTRALIA STEERING COMMITTEE

The federal government should consider the appointment of a governmental Ageing Australia Steering Committee comprising of senior Cabinet members. Their role should be to coordinate the development and implementation of evidence-based Open Door Innovation Policies with an emphasis on big data analytics across government in ways that are practical (not jargon-heavy), facilitate interoperability and are cost-effective.

Specific Health Issues to Address on Participation

Musculo-skeletal issues, arthritis, hearing loss and heart-disease are the most common health conditions of the aged

For older cohorts of Australians, musculo-skeletal issues and heart conditions are among the most predominant medical conditions experienced. According to the 2011–12 Australian Health Survey (AHS) of older individuals,⁷⁸ the most prevalent long-term health conditions facing older Australians (excluding short- and long-sightedness) are: arthritis (affecting 49% of those aged 65 and over), hypertensive disease (38%), and hearing loss (complete or partial -35%). Around 22% of those surveyed reported incidences of heart, stroke and vascular diseases; 15% suffered diabetes; and 7% had cancer. Age-related vision problems that are likely to be disabling include cataracts (affecting 10% of those aged 65 and over); glaucoma (3%); macular degeneration (5%); and blindness (2%). User-oriented technology designed to overcome such health conditions is a major focus of innovation and an enabling tool for translating concepts of positive-ageing into practical outcomes.

RECOMMENDATION

Policymakers should follow Open Door Innovation Policy principles to involve innovators to develop ways of cost-effectively allowing access to mobility-enhancing technologies and wearable sensory technologies, with a particular emphasis on those relevant to major chronic health conditions facing older Australians such as heart disease. The impact of proven interventions in healthcare such as joint replacement, medical treatment for macular degeneration and diabetes, and angioplasty for coronary artery disease should be understood, and treatments effective and getting people active again should be proactively invested in.

Obesity

Obesity is highly prevalent in older Australians and adversely impacts participation rates

Improving labour force participation and enacting positive strategies for ageing requires that rising obesity in the Australian population be addressed. The prevalence of obesity in Australia has more than doubled between 1990 and 2010.⁷⁹ According to the ABS's 2011-2012 *Australian Health Survey*, the prevalence of "overweight and obesity in adults aged 18 years and over has continued to rise to 63.4% in 2011-12 from 61.2% in 2007-08 and 56.3% in 1995".⁸⁰ Obesity rates increase with age, peaking for males between the ages of 45 and 65 at a staggering 80% and for females between 55 and 74 at 70%.⁸¹ Obese Australians are 8% more likely to be out of the labour force and obese older Australians 20% more likely – obesity is associated with absenteeism from work, partly due to co-morbidities.⁸²

According to the AIHW's report into *Obesity and workplace absenteeism among older Australians*, "[o]bese employees responding to the 2001 National Health Survey were 17% more likely than non-obese employees to have been absent from work on at least one day during the previous two weeks because of personal illness or injury",⁸³ with longer absenteeism for obese workers, millions of work-days lost, and strong associations with other co-morbidities. It's important to recognise the difficulty in 'mass programs' to tackle obesity. Tailored solutions are important: '[i]t is possible to increase physical activity for older people (at least in motivated volunteers) with multi-element programs tailored to the needs and circumstances of participants and involving long term intensive contact with trained practitioners'.⁸⁴

RECOMMENDATION

Policymakers should explore ways to use informatics and big data systems implemented in the context of integrated care reforms to facilitate personalised obesity prevention programs for older Australians. These should include self-monitoring, peer-support, stimulus control measures and access to physical exercise infrastructure. Once health interventions are required, an integrated, community-based approach covering all facets of diet, medication, exercise and surgical care should be adopted. State and local governments should consider adopting aspects of the United Kingdom's approach of using community-health champions to build peer support networks that normalise healthy living among at-risk communities, including the aged.⁸⁵



Diabetes

Diabetes is a prevalent health condition affecting participation rates which can be targeted with new technology

The incidence of diabetes, particularly type II or 'lifestyle' diabetes, is increasing and impacts the participation of older individuals in the workforce. Approximately 1 million (or 4% of) Australians have been diagnosed with diabetes with a forecast of up to 3 million sufferers by 2025.⁸⁶ Obese Australians are more at risk from diabetes.⁸⁷ The disease is a top-10 cause of death in Australia, costing up to \$6 billion in health treatment annually. The key point about lifestyle diabetes (and pre-diabetic conditions) is that it is preventable and manageable through appropriate changes to how we live.

Technology can help us manage this issue.⁸⁸ Google and pharmaceutical subsidiary Alcon are creating contact lenses that measure glucose levels in tears (addressing inconveniences in usual testing); IGI Stat, a Stanford University-affiliated startup is improving diagnosis for type I or II diabetes via autoantibody measurement. Real-time glucose monitoring, technology to help manage and remember insulin doses, inhaler-devices for insulin

(instead of injections) from Afrezza and even 'smart insulin' which 'goes into action when glucose is too high and switches off when at safe levels' – and even fully-automated insulin management (by Australian firm Medtronic)⁸⁹ are exciting examples of technology that will impact diabetics' abilities to positively age and stay at work.

RECOMMENDATION

State and federal governments should adopt Open Door Innovation Policy approaches to work with innovators and industry to develop cost-effective ways to deliver diabetic technology throughout the community.

Government should work with sectors in which diabetes is highly prevalent in the workforce to look at strategies to combat lifestyle causes of diabetes. Such approaches should engage individuals in the planning and design at all stages to ensure the programs are personalised and more likely to be adopted.



Mental Health at Work and Home: Make it a Priority

Mental health status is the most significant factor in participation of certain age groups

A striking result from NATSEM's recent report⁹⁰ is that mental illness appears to be the most significant health factor determining workforce participation in certain age cohorts. Mental health impacts participation in a big way. For men aged 60-69 years, mental health issues are twice as prevalent in men outside the labour force and three-times as prevalent for men working part-time by comparison with the rate in 'men working full-time'. Mental illness also has a major impact on female participation though to a lesser degree than for men. The Australian Human Rights Commission's *Workers with Mental Illness: a Practical Guide for Managers*⁹¹ drives home these points: 45% of Australians between 16 and 80 years of age are expected to experience mental health issues during their lives. Job-stress that precipitates or exacerbates mental health status of individuals has a big impact on their decisions to participate. Mental health issues covers a spectrum of ailments, from dementia to more gradual declines in capacity, such as workers experiencing difficulty with memorising or following instructions, forming clear thoughts or concentrating; dealing with anxieties

or difficulties in social interactions at work are all issues relevant to an ageing workforce.

Program interventions to build psychological resilience, avoid loneliness and increase happiness and wellbeing are recommended by empirical research into active ageing.⁹² Ensuring a 'mentally healthy workplace' is of primary importance to participation generally and, given the significance of psychological state to participation decisions of older Australians, vital to getting older Australians to work longer. It should also be noted that Australians who continue to be actively engaged in work and community activities later in life tend to have better mental health than those who are socially isolated.

Dementia: Approaches and Treatments

Dementia is a significant health problem among older Australians – an estimated 332,000 Australians had dementia in 2014, of whom 93% were aged 65 and over. Based on projections of population growth and ageing, the number of people with dementia is estimated to reach around 900,000 by 2050.⁹³ It is important to recognise that dementia treatment is multi-faceted, may not lead to improved participation and requires integrated care frameworks.⁹⁴

The most common type of dementia is Alzheimer's disease. It accounts for between 50% and 70% of all types of dementia.⁹⁵ To date, medical treatment



options for dementia have at best shown limited short-term results, and the best strategy remains to prevent the condition for as long as possible through maintenance of a healthy lifestyle. This includes smoking cessation, avoiding excess alcohol consumption, maintaining physical and mental activity, preventing 'diabesity' and high blood pressure.

There is the need for a systemic way to personalise prevention of this major factor in participation rates, through mitigating risk factors throughout life.

Emerging Technologies in Healthcare Internationally

Having examined many of the systemic issues that Australia must address to improve its healthcare outcomes, it is worthwhile taking a look at some of the amazing technological opportunities that are emerging worldwide:

1. *Virtual clinics*: videoconferencing supplemented by biometrics 'and remote monitoring allows participants to feel as if they are in the same room and to allow accurate diagnostics of simulation patients'.⁹⁶
2. *Wearables integration*: using consumer wearable technology to complement healthcare, such as sensor technology from gaming consoles to help monitor elderly health,⁹⁷ and wireless sensors that track heart status;⁹⁸
3. *Social inclusion*: connecting people more efficiently and relevantly to social services, even

robots to deal with loneliness,⁹⁹ including social networking platforms tailored to older individuals such as Tapestry¹⁰⁰ and Stitch;¹⁰¹

4. *Supported discharge*: hospital discharge support and improvements in 'hospital at home' such as 24 hour access to nursing remotely;¹⁰²
5. *Supporting mobility*: mobile health and healthcare solutions, such as the bed that converts into a wheelchair¹⁰³ or robot that helps wash older individuals¹⁰⁴ – or a robot that can be easily controlled to undertake tasks for less mobile individuals;¹⁰⁵
6. *Informatics*: information processing and scheduling for professionals such as clinicians, such as a smartphone that keeps updating health information for clinicians to access to check on patients.¹⁰⁶

Other fascinating examples include wearable devices such as Lively, a sensory-based device that tracks the movement of individuals and alerts them if they're at risk of a fall. This is particularly significant given that 'falls are common among older people and often result in fractures or other serious injuries'.¹⁰⁷

Innovations which have the potential to introduce significant improvements to both the quality of patient outcomes and system efficiencies will increase exponentially as a result of digital technology. It is critical our health system policy settings and reimbursement systems continue to be 'fit-for-purpose' in this environment to capture the value of the technology and minimise wasteful care.

A photograph of two elderly people sitting at a desk in a computer lab. In the foreground, an elderly man with glasses and a yellow shirt is smiling and looking towards the camera. His hands are on a computer mouse. In the background, an elderly woman with short blonde hair, wearing a dark purple jacket, is also smiling and looking towards the camera. Her hands are on a computer keyboard. The background is slightly blurred, showing other computer monitors and a bright indoor setting.

Section 3: Positive Ideas for Participation by Older Australians



Incentives to Participate: Push and Pull Factors

Older individuals face barriers to participation but also opportunities

The OECD notes that older individuals experience both ‘push’ (driving away from) and ‘pull’ (drawing towards) factors in relation to labour market participation. Furthermore, underemployment in aged population categories is significant. Surveys of older workers indicate that 20% cited ‘being considered too old by employers’ as the main problem while 51% found that the lack of vacancies or too many applications was the reason they couldn’t participate.¹⁰⁸

Pull factors into participation include financial incentives and the desire for self-employment. According to the OECD, many “mature individuals with the experience, know-how and financial means for entrepreneurship prefer self-employment as a late-career option. It is a flexible alternative to organisational employment offering an attractive work-life balance, it also generates additional income in or for retirement that allows the individual to maintain their preferred lifestyle”.¹⁰⁹ Australia should capitalise on this preference by making it easier for older individuals to become self-employed, particularly as the global knowledge economy evolves.

Push factors include events pushing individuals out of the labour market and barriers preventing them entering the market such as:

- ▶ Health status (illness, chronic diseases, disability) - a deterioration in physical and mental health (the latter is of particular significance, both in terms of chronic conditions and how people cope with ageing and the loss of control it can entail);

- ▶ Discrimination in employment and recruitment (such as by private job network agencies who may have less incentive to find employment for older workers) on the basis of age. Age-discrimination has been experienced by one-third of workers in the 55-59 cohort and one-fifth in the above 65 year cohort,¹¹⁰ indicating that measures to redress discriminatory attitudes and practices are paramount if older participation is to be encouraged;
- ▶ Social and built environment factors such as significant care-giving responsibilities (such as looking after a partner or parent);
- ▶ Lack of available flexible work arrangements or poor quality workplaces unsuitable to older workers;¹¹¹
- ▶ Supply-side issues such as insufficient job search skills, lack of appropriate skills due to rapid technological innovation;
- ▶ Superannuation and tax treatment – financial incentives are a major determinant of participation.

These findings are backed up by recent NATSEM research, which listed, the ‘job attributes most important to older workers’ as including: flexible working times (lower working hours), how physically laborious a task is, eyesight or concentration intensity, the intensity of commuter use, the speed required, the level of difficulty and notably the level of job autonomy (along with other aspects non age-specific such as job satisfaction generally and work-relationships with co-workers).¹¹²

Financial incentives and opportunity costs are major determinants of participation

Financial incentives matter: 44% of people are retiring due to eligibility for some kind of pension. It is important to ensure that the prospect of forgoing access to financial support or being subject to higher tax rates

does not discourage older participation. For some older people, working can limit their access to the Aged Pension. This needs to be addressed, as older people are more likely to work if doing so won't trigger the Aged Pension income test.¹¹³ An important point raised by NATSEM in its 2015 report is that the socio-economic status of where people live influences participation: generally those living in higher socio-economic rankings geographically are more likely to be employed by comparison with more disadvantaged areas.¹¹⁴

FIGURE 2:

UNTAPPED POTENTIAL OF INACTIVE, UNEMPLOYED AND UNDER-EMPLOYED OLDER WORKERS

	55-64s	65+	ALL 55+
Inactive & want a job	\$17.8b	\$12.2b	\$30.0b
Unemployed	\$1.6b	\$0.1b	\$1.7b
Under-employed	\$1.0b	\$0.1b	\$1.1b
Totally untapped value	\$20.4b	\$12.4b	\$32.8b

Note: Based on multiplying GDP per hour worked by hours sought. Source: Authors' calculations. GDP per hour worked is \$69.5 based on chain vol GDP of \$1,349,097m for year to March qtr 2012 (ABS 2012, Cat 1350.0 Table 1) and total hours worked of 19,413m in 12 months to June 2012 (ABS 2012, Cat 6202.0 Table 21). Volume of hours sought for unemployed and under-employed as provided by ABS (2012, Cat 6105.0 Table 4). Volume of hours for inactive who want work based on 318,100 people, who want on average 26.7 hours per week (ABS 2011, Cat 6239.0 Table 9). This table was sourced from: Chomik, R & Piggott, J. 2012, *Mature Age Labour Force Participation: Trends, barriers, incentives, and future participation*, Centre of Excellence in Population Ageing Research and http://www.cepar.edu.au/media/97250/participation_briefing_paper_final_with_logo.pdf

Positive Framing and Changing Preferences

Flexible work practices are needed to cater for changing life-goals and preferences as people age. For most of us, as we age and our remaining time on earth diminishes, our preferences are to spend more time with families, loved-ones and enjoying the experiences the world has to offer.

Positive agendas for engagement matter because preferences change as we age

For example, changes to wealth affect participation rates: greater wealth is associated with more withdrawal from the formal labour market.¹¹⁵ We need to keep this in mind because Australians who regard their wealth and income as satisfactory are not driven by the same needs and incentives to participate as others.

Increasing participation requires not only a supply of labour. Without demand for older individuals

to participate, it will be difficult to lift employment levels.¹¹⁶ Older workers may be targeted for involuntary redundancies¹¹⁷ during restructures with potentially negative effects on both physical and mental health.¹¹⁸ NATSEM's report¹¹⁹ indicates that older retirement ages are often observed in countries where 'there is a high demand for labour, a skills shortage' or where an 'increased' share of work is knowledge or cognitively based – where demand is sufficient for older workers to continue to participate, participation rates are higher. Australian policy makers need to consider the dynamics of how demand for older cohort labour can be stimulated.

Integrated Careers

Integrated Careers provide a model for improving participation rates

One option that should be examined is an "Integrated Careers" model of increasing participation: an information-systems approach that

looks to apply personalised services management principles from the Integrated Care model (such as via designing personalised career portals that connect easily with ALMPs, social security, education and job-networks) to achieve better participation outcomes and save money. Global online consulting services which match older knowledge workers to customers around the world who could use their skills, are an example of this.

As NATSEM's *Going the distance: working longer, living healthier* report emphasises, 'reaching a certain age shouldn't mean leaving the workforce entirely. Retirement should be a transition phase with reduced levels of work' to allow greater focus on health and well-being.¹²⁰ It is important to be realistic about labour market policies that encourage participation as ALMPs have had mixed success in the past and internationally.¹²¹ It is also vital for ALMPs to be designed according to empirical principles so their effectiveness can be tracked and measured (the impact of ageing on skills-evolution can be challenging to measure).¹²²

Research shows ALMP design should engage local communities and employers; be focused on small-scale individual projects; recognise achievement of participants via certificates and milestones; cater for skills employers seek; and focus on early intervention.¹²³ Innovative use of mobile technology can also assist with upskilling workers.

RECOMMENDATION

The government should undertake a comprehensive review regarding development of ALMP programs, integrating with existing government services and private sector providers and utilising the latest in big data analytics and informational systems. They should be intensive, personalised (with detailed coaching) in design, but utilise latest technologies such as telementoring.

Suggested Examples for Improving Participation

The value of volunteering

The value of a volunteering hour in Australia can be estimated at approximately \$31 per hour in 2015.¹²⁴ Presently, there are about 5.1 million baby boomers in Australia, who have recently begun to enter retirement age.¹²⁵ In 2010, ACMA¹²⁶ found Australians 65 years and older spend an average of 330 minutes per day watching television: if only 10 per cent of those television-watching minutes were spent volunteering, the added value to the Australian economy would be over \$3.1 billion annually. This would also have measurable benefits to the health of the individual participant through reduction in a sedentary activity.

Australia must find ways to make volunteering more accessible for older Australians.

Volunteering ACT has reported that the greatest barriers to participation for all people are time pressures arising from work, family or study commitments.¹²⁷ Yet time commitments are less pressing for older Australian's. Volunteering ACT advises volunteer organisations to explore how they can be more flexible and creative in their volunteering arrangements, in order to attract older Australians.

RECOMMENDATION

The expansion of VolunteerMatch, (matches volunteers with working opportunities in charities and not-for-profits) to include a greater range of volunteer organisations

Combining mental health best practice with volunteering initiatives

An issue that affects many older Australians is that of social exclusion and depression. The implementation of a 'phone buddies' program, that matches older Australians with other older Australians, either by the phone or through an online videoconferencing facility such as Skype, could help to connect people and give them much-needed social contact, even within the confines of their own homes.

RECOMMENDATION: VOLUNTEER MENTAL HEALTH PROFESSIONALS

Retired social workers, psychologist and psychiatrists volunteer their time to provide this service to 'at-risk' Australians.

This service will be built on the service Lifeline already provides, including additional funding that would provide a daily or weekly 'check-up'

Childcare

One industry in particular that would benefit from increased participation by older Australians in the workforce is childcare which is currently extremely expensive. The lack of quality facilities combined with a higher workforce participation rate for women has created a huge demand for childcare, pushing up the cost of the service Australia-wide, but particularly in our capital cities.

Matching senior Australians to the childcare industry provides three different benefits: benefits for seniors in terms of health and wellness; benefits for children in terms of social development and educational outcomes; and benefits to the industry as a whole in terms of filling a gap in demand.

Research from the United States into intergenerational care facilities (that combine day care facilities for both the elderly and children) has found that retirees displayed better mental, emotional and physical health, as well as greater opportunities for socialisation and a greater sense of engagement with their community than retirees enrolled in other day care facilities.¹²⁸

The same study found that children, too, benefit from increased positive interaction with older adults. Children involved in intergenerational programming displayed improved academic performance, a more positive attitude to ageing, the elderly and disability, and were more socially and personally mature than their counterparts in child-only day care facilities.¹²⁹

The third benefit to involving senior Australians in the childcare workforce is to fill the gap in industry demand for the quality care of children.

Entrepreneurial Ageing and Senior Startups

Airtasker to Agetasker

AirBnB is the one of the largest facilitators of accommodation in the world, yet owns no hotels; Uber among the largest connector of retail taxi services, yet owns no fleets of vehicles. This is all down to the power of digital disruption. Digital disruption can be used to help address the ageing participation decline as well as healthcare.

The application of information-driven big data technology to careers is not new: online career profiles and networks such as LinkedIn, Seek and others fulfil a vast networking function in the economy, though they do not cover the entire economy.

Greater integration of individuals with the 'share-economy' labour market is an important feature of stimulating workforce participation as Australia ages. A recent example is Uber's collaboration with the *Life Reimagined* initiative of AARP (formerly the American Association of Retirees and Pensioners) to encourage drivers over 40 years of age to sign-up as Uber drivers¹³⁰ – reported in one headline as "Uber Wants Your Parents to Be Drivers If They Can Use a Smartphone."¹³¹

RECOMMENDATION

Open door policies to build integrated online start-up and entrepreneurial systems for older Australians that allow individuals to more easily access the sharing economy

What's in it for older Australians?

Financial incentives are clearly a driver of entrepreneurship and any new business ultimately needs to be financially sound. But equally it is the potential of entrepreneurialism as a satisfying and rewarding vehicle for creativity and exploring new life experiences that is most exciting. The concept of 'startups for seniors'¹³² and by seniors is gaining traction internationally, particularly within the United States and forms part of a growing trend in 'third-age entrepreneurialism' throughout the world and should be prioritised in Australia.

RECOMMENDATION OLDER AUSTRALIANS SHARING ECONOMY POLICY REVIEW

Government should also review how changes to the taxation and transfer system can specifically be made to assist older individuals to participate in the sharing economy.

Startups by Seniors

While the 'startup scene' is globally characterised as a youth movement, older individuals participating in start-ups is not an anomaly. As Camila Souza notes, youth is not an essential ingredient for successful start-ups and business propositions, where the 'median age of start-ups with turnover of at least US\$1 million was 39 years'.¹³³ Age UK (a charity focused on ageing) claimed (cited in a Future Laboratory report) that "older entrepreneurs have a better success rate, with 70% of start-ups lasting five years, compared with 28% for younger entrepreneurs".¹³⁴

Older entrepreneurs possess advantages such as more developed networks, more work and industry experience, higher technical and managerial skills, and a stronger financial position that assist in successful start-ups. There are also push factors away from senior entrepreneurialism that need to be addressed, such as a rise in opportunity costs (time is more valuable for older people, similarly there is less interest in waiting for equity upsides to materialise). Other barriers include lack of financial support, administrative complexity, and lack information on how to actually ‘start-up’ a business. Softer barriers include negative perceptions of doing so from peers or family members as well as other push factors related to general labour market participation.¹³⁵

New technologies and training can help too. For example, Dream Reader is an app developed to assist reading in a variety of ways, including reducing the amount of text that appears on a screen, which minimises clutter with fast and intuitive navigation.¹³⁶ Assistive technologies are also used to educate older individuals, such as Massive Open Online Courses (MOOCs) and virtual mentors. Telstra’s ‘Tech Savvy Seniors’ partnerships¹³⁷ in New South Wales and Victoria is one example of a public-private initiative aimed at improving older Australians’ engagement with technology and heightening their connectivity. The program includes training sessions held at libraries and guides¹³⁸ on how to use technologies such as mobiles, tablets, apps, home networking, social networking, internet security and online commerce.

Older individuals should similarly be encouraged to engage in entrepreneurialism on smaller scales, harnessing their knowledge developed over long careers to offer consultative services and advice to younger generations. By engaging in consultative engagement with the workforce, older Australians will be utilizing their skills and entrepreneurial energy into older age, whilst limiting any financial risks associated with developing larger businesses.

Innovation Hubs and Startup Ecosystems for Older Australians

There needs to be a focus by Australia’s various innovation policy arms on connecting the start-up community with older cohorts. Policymakers should work with the startup community to establish seed-capital and mentoring institutions, such as Kickstarter¹³⁹ globally and Fishburners¹⁴⁰ that are more inviting to older Australians. These concepts fit well within the positive ageing agenda. Retirees with time on their hands can combine pursuing their passions with the entrepreneurial know-how of startup hubs.

RECOMMENDATION: THE DEVELOPMENT OF OLDER AUSTRALIAN AUSTRALIA INNOVATION HUBS

Policymakers should consider establishing a startup ecosystem via older Australian Innovation Hubs comprising mentoring, business coaching and access to capital to encourage senior entrepreneurship.





Conclusion

By establishing the right frameworks that allow for interoperability and connectivity, we can look to leverage the efficiencies afforded by smart application and design of technology to achieve the broader objectives of a positive ageing agenda while addressing socio-economic challenges above.



The disruptions of ageing and technological change are, like all forms of historical change, at once challenges and opportunities.

By concentrating on how healthcare is at the core of increasing participation in our community, we can build better and more efficient systems.

Policy responses to demographic shift and technological change should be driven by a number of foundational principles designed to enhance the sustainability, equity, functionality, coordination and interoperability of programs.

Ageing can't be an afterthought or regarded as a separate 'policy challenge' – effective solutions which are sustainable and actually work as we age require that management of ageing become a feature across the policy landscape.

Healthcare must be placed at the centre of labour market participation policies to deal with the ageing of the population.

For this to occur, whole-of-government approaches that actually allow innovative and cost-saving technologies to disseminate must be developed.

The practical approaches outlined in this report go some way to setting out the vital steps needed to ensure Australia's continuing prosperity as it heads into a world of ageing in the age of technology.

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