Economist Intelligence Unit

Healthcare strategies for an ageing society

Commissioned by Philips



The fourth report in a series of four from the Economist Intelligence Unit



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Preface

Healthcare strategies for an ageing society is an Economist Intelligence Unit report, commissioned by Philips, the final in a series of four published in 2009. The Economist Intelligence Unit bears sole responsibility for the content of this report. The findings and views expressed within do not necessarily reflect the views of Philips.

This paper provides insights into the implications for healthcare systems of a rapidly ageing population globally, and outlines some of the strategies that might be adopted. It is based on a number of interviews with leading experts and senior executives as well as extensive desk research. The report was written by Dr Paul Kielstra and edited by Iain Scott.

We would like to thank everyone who participated in the survey, and all the interviewees, for their time and insight. The following individuals were interviewed for the study:

- Professor Thomas Kirkwood, director of the Institute for Ageing and Health, Newcastle University, UK
- Professor Dr James Vaupel, founding director of the Max Planck Institute for Demographic Research, Rostock, Germany
- Dr Julio Frenk, dean of the Harvard School of Public Health (US) and former minister of health for Mexico
- Dr Narottam Puri, president of medical strategy and quality, Fortis Healthcare Limited, India
- Richard Humphries, senior fellow for social care at the King's Fund, UK
- Klaus Böttcher, director of benefits, KKH-Allianz, Germany
- Susan Eng, vice-president, advocacy, CARP, Canada
- Dr Robert Butler, president of the International Longevity Center, US
- Dr John Beard, director, Department of Ageing and Life Course, World Health Organisation, Switzerland
- Dr Manuel Dayrit, director, global health resources programme, World Health Organisation, Switzerland, and former minister of health of the Philippines
- Mary Wakefield, administrator, Health Resources and Services Administration, Department of Health and Human Services, US
- Dr Zaldy Tan, a gerontologist, and associate director of the Harvard Multicampus Geriatric Medicine Fellowship Program, US
- Michael Gelder, senior adviser on health policy, Illinois, US
- Dr Catherine Eng, medical director for the On Lok programme in San Francisco, US
- Eric Dishman, director of Health Policy and Innovation, Intel Corporation, US
- Professor Vinesh Raja, head, Information Technology Group, Warwick University, UK



Executive summary

That the world's population is ageing rapidly is old news. Driven by falling fertility rates and a sustained increase in longevity, many countries—especially in the developed world—are now bracing themselves for the fact that their fastest-growing demographic is the over-80s. Moreover, the linear trend that life expectancies have followed for over a century is set to continue.

Of course, any demographic shift brings with it social and economic challenges, not least for healthcare systems. The notion of a greying population is usually framed in terms of the added demands and pressures they will bring. But although there will be challenges in adjusting, the overall picture is far from bleak if policymakers enact sensible change. On the individual level, an increased lifespan is welcome news to most. Although many of those living longer do have long-term conditions, they are also showing a heartening ability to manage them—and data suggest that the onset of the most severe disabilities may be coming later in life. In other words, old age is not itself a disease. While the baby boomers will live longer than any generation before them, they are not necessarily happy to retire at 65 and count the days until they have to enter a nursing home.

For this report, the Economist Intelligence Unit analyses the latest thinking relating to provision of healthcare for ageing societies. Below are some of the issues that need to be addressed if healthcare is to adapt to an ageing world

Change assumptions about the financial impact of ageing on healthcare

Demographic change has had less of an impact on health spending than is widely believed. In reality, birth and death account for the majority of an individual's lifetime healthcare costs. The final two years before death consume about one-quarter of this total cost, no matter whether this comes at 8 years or 88. Although there is a link between healthcare costs and age, those costs rise more in the over-65s mainly because more people die in this age bracket.

There are other factors at play. Although the proportion of the elderly that faces severe disability is falling sharply, there is generally a stronger susceptibility to various chronic conditions and mild disability. Once again, however, the impact of this in the elderly segment of the population is not as great as is often assumed. According to a study in *Health Affairs*, a policy journal, the average growth in healthcare costs related to ageing within OECD countries between 1970 and 2002 was 0.5% per year, and just 0.3% in the US. In contrast, real growth in GDP per head accounted for 2%.

The real financial issue related to ageing is a decrease in the proportion of people in the workforce. The impact of this goes far beyond healthcare. But it is worth noting that even if ageing populations are not significantly driving up health costs, medical provision will take place in a context of fiscal constraint. This may limit what societies will be able to do for older citizens.

Make geriatric care a bigger part of medical training

The shift in the specific healthcare needs of an older population will require major adjustments. One key challenge for policymakers and health providers will be a shake-up of medical training. Quite



simply, not enough talent will gravitate towards geriatric care until the field is given the attention it warrants. Harvard Medical School did not require basic training in geriatrics for all medical school students until just two years ago. In many other countries, geriatric training is barely provided.

Financial incentives play a part, too. While a radiographer earns an average of US\$400,000 per year in the US, geriatricians make about US\$150,000. To make the field more attractive, some thought will need to be given as to how prospects might be improved for future graduates. This is especially true as the existing population of healthcare professionals starts to retire. Canada, for example, has just one-fifth of the 1,000 geriatricians it currently needs—and 20% of them are near retirement. The US has about half the geriatrics specialists it needs, but their absolute number has actually fallen over the past decade.

Reconsider care options

Given the rising demand for social care services from an ageing population, governments are increasingly keen to share their responsibility for meeting this need. Even in the UK, where healthcare is overwhelmingly state-funded, the private sector is now the main provider of nursing home beds. In the US, where the cost of one care-home bed is US\$70,000 a year, the government is proposing a new insurance scheme to help people to stay out of nursing homes for longer. Once out of fashion, home-based care is coming back into vogue as governments grapple with the costs and management challenges of aged care and because older individuals, ever more likely to exercise their consumer power, prefer to live at home. Medical professionals agree. In a survey conducted in early 2009 by the Economist Intelligence Unit, care in the home was selected by medical professionals as the second most important area for healthcare investment, after hospitals and clinics.

Depending on how it is set up, community or home-based care can offer strong economic benefits. In the US state of Illinois, for example, the Department on Aging spends about US\$117 per day for people in nursing homes, versus a monthly total of US\$650 for home care. Existing plans, such as San Francisco's On Lok, provide a possible model for a middle path by aiming to bridge the gap between medical and non-medical services. But getting such schemes right will require a better understanding of the needs of the elderly.

Make treatments more appropriate to older populations

Just one of the problems facing policymakers and healthcare professionals is widespread ignorance about responsiveness to and tolerance for drug treatments in a population of over-65s—let alone one of over-80s. Clinical trials for new drugs rarely address populations of over-75s as a sizeable cohort. More importantly, there has been little attempt to encourage post-market studies of existing drugs in elderly populations. Rising pressures will compel policymakers to insist on more research. As the elderly become the biggest demographic, new opportunities will emerge for pharmaceutical and related companies.

Beyond this, a greater understanding of the needs of the elderly is also required. Older bodies are different—they have different conditions and they metabolise differently to younger people. And they simply get frailer as they age. Some of this is well known, but even in the medical community there is a lack of awareness about the seriousness of falls, or the high suicide rate, among the elderly.



Use technology to deliver key skills remotely and enable home-based care

Technology will play an increasingly active role in providing care to ageing populations. At a basic level, it can be applied to support medical professionals by relieving them of routine, mundane tasks. In Japan, "robot nurses" already provide assistance in the form of cleaning, assisting patients from wheelchairs and onto beds, for example.

More broadly, the wider adoption of telemedicine and remote monitoring systems will likely assist in making home-based care more feasible and safe. This enables medical professionals to provide advice remotely, and by monitoring patients' vital signs it gives nurses time to focus on more important tasks. There are also knock-on benefits for developing countries—in 2005, almost one-quarter of a million people were employed in telemedicine in India, up from barely 30,000 five years previously. The European Commission has suggested that member states should go as far as establishing a legal framework in place by 2011 to promote telemedicine.

But technology alone is not the whole answer. Pilot trials have been relatively small, partly because the infrastructure required to support larger trials does not exist in many places. Nor is there yet appropriate support for full-scale telemedicine. There are also ethical concerns to consider. Some people find certain technologies rather inhumane and frightening, and more needs to be done to address the fear that they could replace the more human aspects of care for the elderly.

Reset public mindsets about the elderly

The key challenge when dealing with an ageing population is the need to change assumptions about what it is to be "old". In particular, ageism needs to be urgently addressed in medical treatment. In the UK, for example, 80-year-olds have been shown to be about half as likely as 50-year-olds to receive appropriate secondary prevention drugs. A study of 12,000 patients in Scotland showed that the elderly were less likely than other age groups to receive appropriate care, including admission to intensive care. Much of this relates to mindsets that society has about the elderly. Society needs to come to terms with the fact that people are not going to die off simply because of age. A recent survey found that 72% of British doctors believe older people are less likely to be referred for essential treatment. Such studies are mirrored elsewhere too, notably the US. New legislation to make age discrimination illegal within the UK's National Health Service (NHS) has been specifically aimed at resetting attitudes regarding what is normal as a population ages.

More broadly, the idea that people should feel obliged to stop working and retire in their mid-60s, when many are healthy, alert and at the peak of their experience, is often perverse. Aside from helping address skills shortages and financial pressures by paying taxes for longer, there can be health benefits too: one recent study highlights clear mental health benefits to part-time working after retirement.

All this emphasises another key point about the nature of ageing populations. People will continue to vote, irrespective of their age—and in fact older people are often among the most likely to vote. This will make the older population the most important voting bloc in years to come. In any future healthcare reforms, it will be essential for governments to address the needs of this generation if they are to remain in power.



Introduction: Coming to terms with an ageing society

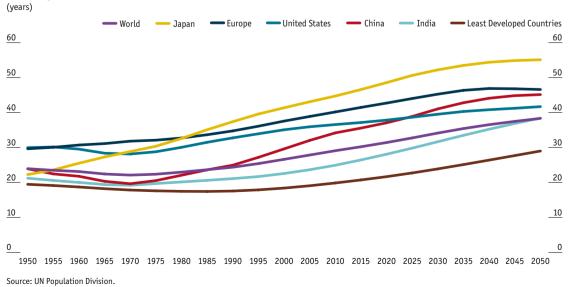
The world's population is ageing more rapidly than at any time in history. According to United Nations Population Division (UNPD) data, humanity's median age, after decades of very little change, has climbed by five years in the last 20, to an expected 29.1 years in 2010. The next two decades are likely to see a similar increase. In the oldest society, Japan, the median age is already nearly 45. To put this into perspective, until about 1840 even the best-off demographic groups in the world had lower life expectancies than Japan's current average.

An ageing, post-second world war baby boom in many countries is one reason for the change, but the two more important, underlying drivers are a reduction in the fertility rate and an increase in life expectancy. Between 1950 and 2005, global fertility per woman nearly halved, reaching 2.6 children a decline that is expected to continue, albeit more slowly. In fact, around 2018 those aged over 65 will outnumber those under 5 for the first time.

The other driver of ageing within societies is the higher number of people reaching old age. For most of this decade, humanity as a whole has fit the United Nations definition of an ageing society—one in which more than 7% of the population is over the age of 65. In absolute numbers, as the UNPD demographers put it starkly at the beginning of this decade, "the number of older persons has tripled over the last 50 years; it will more than triple again over the next 50 years."

The issue is most immediate in the developed world, although it is also relevant to developing countries. Nearly one in six Europeans is already aged over 65, a figure higher than the proportion under 15. By 2025, the number of over-65s will exceed 20%. In Germany and Italy it has already done so. The United States is younger, but not that far behind Europe as a whole, expecting to break 20%

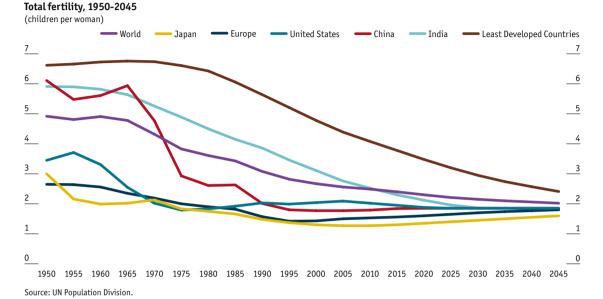
¹ UNPD, World Population Ageing: 1950-2050, 2002, p. 11.



Median ages, 1950-2050

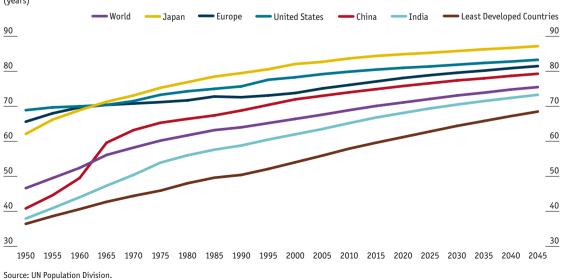
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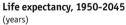




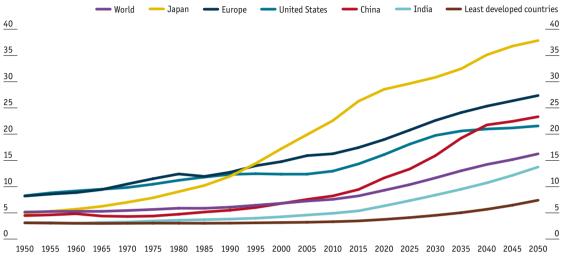
before 2030. Professor Thomas Kirkwood, director of the Institute for Ageing and Health at the UK's Newcastle University, explains that rich countries as a whole are seeing fairly uniform growth in life expectancy of around five or six hours per day. In most developing countries he believes it is faster. China and India already have the largest and second-largest elderly populations in the world. As the long-term demographic impact of China's one-child policy kicks in, the proportion of Chinese over 65 will grow from around 8% in 2009 to nearly 16% by 2030.

On the one hand, this is old news. Life expectancy—as measured by the highest national figure for females (consistently the longer-lived gender)—has been going up in almost a straight line of three months per year since 1840. Global average life expectancy has also been climbing rapidly.









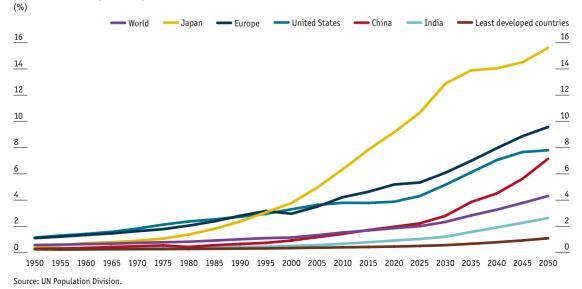
Population over 65 years of age

(%)

Source: UN Population Division.

Fertility rates have also been falling for many years: indeed, analysts speak of a "demographic transition" where as developing countries grow wealthier the average number of children predictably decreases.

Today's ageing, however, has something very new and unpredictable about it. Life expectancy was supposed to have stopped rising. Previous gains, largely on the back of public health improvements in the 19th century and medical advances in the 20th, had come about because fewer people were dying young, thereby driving up the average age at death. Statistically, the possibilities for progress seemed constrained by a presumed, pre-determined upper age limit for the human frame. Professor Dr James Vaupel, founding director of the Max Planck Institute for Demographic Research in Rostock, Germany,



Population over 80 years of age

estimates that as late as 2001, about half of demographers, and most gerontologists and actuaries, still assumed life expectancy would level out.

Professor Kirkwood says that in the last few years, "a simple demographic fact has taken most of society by surprise": older people are living on through the assumed boundaries. In many countries, the fastest-growing demographic group is the over-80s or -85s, often termed "the oldest old". In fact, UN models, which have included assumptions of a notional upper age range, have needed marked revision in some areas. In looking at the UNPD's forecast figures for 2050, for example, even while the prediction of global population made in 2006 was down by 6.5% from that made in 1994, the expected number of those over 80 was 21.7% greater.

² Kaare Christensen, Gabriele Doblhammer, Roland Rau and James W Vaupel, "Ageing populations: the challenges ahead", *The Lancet*, 2009; 374: 1196–208.

The greater longevity of older people suggests that ageing is a biological process, rather than a chronological one. Without a pre-programmed shutdown point for the body, many demographers see no reason why life expectancy cannot just keep expanding. For example, a recent review article in *The Lancet* points out that smoking—which is in decline in developed countries—was a major factor in holding back life expectancy among the elderly.²

CASE STUDY: Russia's demographic challenge



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Over the last decades, Russia and the countries of the former Soviet Union have experienced major political and economic transitions. However, several are also experiencing a third, overlapping transition, described in one World Bank report as a movement "from red to grey".³ Not only are their populations ageing, as in other places, but they are actually declining. Russia's population fell from 149m to 143m between 1990 and 2005, and is projected to fall to 111m by 2050, caused by a combination of an ageing population and declining fertility.

On average, according to the World Bank, life expectancies increased significantly in most of the countries in Eastern Europe

over the last half of the 20th century, by 10 years for men and 12 for women. The exception was Russia, where life expectancy for men actually decreased by a month or so. It is now on the rise, but by 2007 the average life expectancy for Russian men was still only 59, lower than in Pakistan or Bangladesh. (For women it is higher, at around 73 years.)

In part, this is because of alcoholism—Russians drink an average of 18 litres of pure alcohol per person each year, more than double the figure for the US, for example. Earlier this year *The Lancet* published a study which had found that more than half of the deaths of males aged 15-55 in three Siberian cities were from alcohol-related causes. Meanwhile, the number of Russian smokers is among the highest in the world, with 42% of early deaths among men aged 35-69 caused by smoking. Incidence of tuberculosis, hepatitis and HIV/AIDS has also been increasing.

The government raised its expenditure on healthcare—most of which is free at point of care—to 5.3% of GDP in 2006, but that is still well below the level of most developed economies. Meanwhile, Russia's public finances deteriorated sharply as it entered recession, forcing the deferment of several programmes—including the construction of medical centres and restrictions on healthcare spending. Meanwhile, the proportion of pensioners in Russia increased from 12.6% of the population in 2000 to 14.6% in 2007. They face an uncertain future.

³ Mukesh Chawla, Gordon Betcherman and Arup Banerji, *From Red to Gray: The 'Third Transition' of Aging Populations in Eastern Europe and the Former Soviet Union*, World Bank, 2007.



The implications are wide-ranging. "The changed understanding [of life expectancy] is arguably the most important discovery ever made about the biology of ageing," Professor Vaupel says. "It used to be gerontological dogma through the 1990s that nothing can be done about old age. It has now become widely recognised that a lot can be done about ageing, mortality and postponed senescence even at higher ages."

Although that may be good news for individuals, provided that their quality of life is good too, the unexpected growth in the number of older citizens—in particular of the oldest old—leaves societies with a host of questions. Some people may well spend nearly as much time in retirement as they did in their working lives. How will they occupy themselves to stay mentally and physically well? Professor Vaupel likens the situation to climate change: "Both are slow, inexorable processes that will change people's lives. Ageing will have a major effect within decades."

Among the greatest effects of this change will be to the way in which healthcare is delivered.

Key points

- Fears about the impact of ageing populations on healthcare funding are too simplistic
- Cost is one factor, but ability to pay for care is another
- Some countries' economic growth could be cut because of age-related labour force changes

Money and mortality: the implications of ageing on healthcare costs

O n the surface, an ageing society raises concerns about the economic viability of health systems. In the UK, for example, people over-65 visit their doctor seven times a year, on average, while those aged 16-44 do so only four times a year. More strikingly, the over-65s account for two-thirds of general and acute hospital bed use, even though they make up only about 16% of the population. In the US, the over-65s made up 13% of the population in 2002, but required 36% of healthcare expenditure.⁴ Average spending on this group was more than three times the figure for those of working age. In most west European states, meanwhile, spending per head on health increases slowly until around the age of 55 when it escalates rapidly, frequently tripling by the age of 80.

For organisations that fund healthcare for older populations, such as Medicare in the US, more people in this group obviously means greater costs. But for universal healthcare providers, or healthcare systems as a whole, the situation is not so simple. Extensive research over the last decade indicates that looking at age alone as a driver of costs is something of a red herring. What is becoming more apparent is that healthcare spending on the average individual rises rapidly in the year or two before death, whether the person is 8 years old or 88. Moreover, this near-death spending constitutes the dominant proportion of lifetime health expenditure. It only looks as though the elderly spend dramatically more on health because statistically more people die after the age of 65.

Even looking retrospectively at health expenditure throughout a person's life, it is surprisingly difficult to tease out exactly how much it correlates with age. Societies with a larger proportion of the elderly, for example, also tend to be wealthier ones. Wealth is already a strong predictor of healthcare spending, making it hard to differentiate causation. One recent study even suggested that income elasticity increases with population ageing, making it harder still to decide what is influencing what.⁵ A frequently cited 2007 article looking at the growth in healthcare spending across OECD countries between 1970 and 2002 found that population ageing was responsible for only a very small part of the total annual increase in healthcare costs, accounting for 0.5% of a total increase of 3.7%. In the US, it was 0.3% out of a total of 4.6% (see chart).⁶ In other words, ageing is bringing about a small increase in spending, but not enough on its own to break the system—a message which could summarise the emerging consensus. However, the situation differs in poorer states. Dr Julio Frenk, dean of the Harvard School of Public

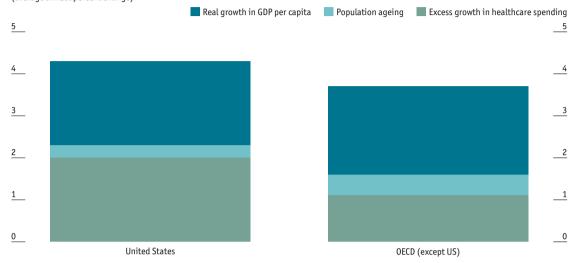
Health, and formerly Mexico's health minister, explains that his country's health programmes had

⁴ Figure from the US Department of Health and Human Services' Agency for Healthcare Research and Quality.

⁵ Helmut Herwartz and Bernd Theilen, "The determinants of healthcare expenditure: new results from semiparametric estimation", *Health Economics*, August 2009.

⁶ Chapin White, "Health Care Spending Growth: How Different Is the United States From the Rest of the OECD?", *Health Affairs* 2007, 154–61.





Components of real growth in healthcare spending per capita, United States and other OECD countries, 1970-2002 (average annual percent change)

Source: White, "Health Care Spending Growth: How Different Is the United States From the Rest of the OECD?", Health Affairs, 2007

for many years focused on diseases that had been pervasive yet relatively inexpensive to address. The measure of success was that people were surviving longer, but with the demographic transition came an epidemiological one that drove up costs. "You cannot deal with chronic diseases like cardiovascular disease and diabetes, thinking that you can continue to spend the same level of resources as for acute diarrhoea or other easily preventable childhood conditions," Dr Frenk says. Mexico is in the OECD, which accounts for 80% of the world's health spending, according to the World Health Organisation (WHO). But in even poorer states, the problem will be even starker. "Reforming the healthcare financing system is an essential part of dealing with an ageing population," Dr Frenk says.

Ageing has different meanings

Cost is one thing; ability to pay is another. As Dr Frenk points out, it is important to make a distinction between two meanings of ageing. At the population level, ageing is simply a shift within different age groups in a society towards the older ones. At the individual level, it is about people living longer. The two do not always overlap completely. In many developing countries, for example, reduced fertility has driven population ageing more than longevity. This shift means that for many ageing societies, there are bigger economic issues than funding healthcare for older citizens. Not only will costs such as pensions rise, but more importantly some states will have to pay for them, even though an increasing proportion of the population will be retired. This will pose challenges for funding age-related healthcare cost increases, even if countries are able to tame the other drivers of rapidly rising health budgets.

For developing countries such as India, the situation is both worse and better. On the one hand, "a huge population in India cannot afford decent healthcare" even at current cost levels, says Dr Narottam Puri, president of medical strategy and quality for Fortis Healthcare Limited, based in India. This is a problem common to many less-developed countries. On the other hand, demographically these states are potentially in a slightly better situation. In most, the proportion of people of working



age—who generate the income to pay for medical care—will increase, even as the number of elderly grows because of the drop in the number of children. This is a phenomenon known as the demographic bonus. This means that the dependency ratio (the number of non-working age to working age people in a society) will decline or stay stable in less-developed regions—with the exception of China—until at least 2050, according to UN figures. Of course, this is only a temporary solution. Eventually, lower fertility means the balance will tip in favour of an ageing population. What's more, Dr Frenk says, many developing countries are exporting their demographic bonus to the rich world through a huge level of out-migration.

In developed countries, an ageing population problem is already a reality. The OECD, comparing the previous and next three decades, says that economic growth could be cut by one-third because of agerelated labour force changes. At the same time, more people over 65 means more voters over 65, who will be anxious to protect state provisions for their retirement and care. There are no easy solutions to the macroeconomic issues brought on by ageing, which are likely to involve policies designed to encourage saving and increase workforce participation—possibly by people who are past what is now the conventional retirement age. Examining this area in detail is beyond the scope of this study, as is looking at the broader issue of controlling spiralling healthcare costs in general. But it is worth noting that even if ageing populations are not driving significantly greater health expense, medical provision will take place in a context of fiscal constraint, which may reduce what societies will be able to do for older citizens.



Key points

- Ageing increases the risk of chronic and degenerative diseases
- Increases in mental health issues, as well as increased frailty, are less understood
- Healthcare systems will need to be adjusted to account for these factors

Understanding ageing: new needs, risks and concerns

A geing populations may not have as great an effect on overall healthcare costs as once predicted, but their impact will nevertheless be profound. As bodies age, their needs and vulnerabilities change, as do their medical requirements. What healthcare systems will need to provide in the coming decades will shift accordingly.

Human bodies undergo significant wear and tear over the years, whether intentional—through lifestyle choices—or environmental. The attendant accumulated risks make certain conditions more prevalent over time. A particular case in point is chronic diseases, such as cancer. Although becoming more common among all age groups worldwide, these conditions are a particular issue for older people. According to the United States' Centers for Disease Control (CDC), 86% of Americans over 65 have at least one of cardiovascular disease (the leading cause of death among the elderly), arthritis, asthma, cancer, chronic obstructive pulmonary disease, or diabetes. Moreover, 53% have two or more and nearly one-quarter have at least three. The Survey of Health Ageing and Retirement in Europe (SHARE) found that in the EU more than two-thirds of people over 50 reported having one chronic disease and 40% had two. Moreover, one-half of all respondents said that they had pain as a result of a chronic condition. These figures probably underestimate the problem, as SHARE surveys only the non-institutionalised population.

Degenerative diseases are even more closely associated with age than chronic ones, again because they take their toll over time. Osteoporosis, for example, strikes about one in three women and one in five men, but is rarely apparent before the age of 50. Dementia is also a particular concern in many countries. According to Richard Humphries, senior fellow for social care at the King's Fund, a British health think-tank, numbers of dementia sufferers are projected to soar over the next 30 years. Only 2% of European sufferers are under 65, but after that age the risk doubles every five years, so that among the over 90s, 22% of men and 30% of women have dementia. Similar figures apply in the US. Klaus Böttcher, director of benefits at KKH-Allianz, a German insurer, believes that a growth in degenerative conditions is likely to be one of the leading health impacts of an ageing population in Germany, and one that the government is only just beginning to think about.

Psychological health in general is also a major concern for older populations. "We know depression and dementia will become key issues in the next ten years," Mr Böttcher says. Studies in various



developed countries back up this assessment. Typically, the proportion of those suffering clinical depression—a condition sufficient to impede a person's everyday life for an extended time—among the over-65s is around one in six. In most countries, suicide rates rise with age, and are usually at their highest among males over 75. This may have as much to do with social isolation and sense of worth as physical difficulties. A recent study in the *Journal of Occupational Health Psychology* found that men who took up part-time work in their career fields after retirement enjoyed much better mental health.

Fear of falling

Finally, as the body ages, the significance of certain threats changes. One key issue is what happens to older people if they fall. Falling down is a normal part of childhood, and usually nothing more than an embarrassment for young adults, but it is a serious issue for the elderly. A 2006 Norwegian survey of people aged 67-97 found that nearly one-quarter had experienced a fall in the preceding six months. Of those, more than one-half reported that their most recent fall had led to an injury and roughly 15% said it had resulted in a fracture—data consistent with other European research. In the US, according to the CDC, falls are the leading cause of injury-associated deaths among the over-65s, and are the leading cause of non-fatal injuries and hospital admissions for trauma in that group. The CDC adds that the fear of falling can in itself place great restrictions on mobility and increase social isolation, leading to further negative outcomes.

The data cited in this section come from developed countries. Developing countries with ageing populations are likely to face the same problems, as well as additional problems that wealthier health systems are currently able to address. Dr Puri of Fortis Healthcare lists the three biggest challenges for his country arising from ageing as vision, hearing and mobility.

However, these conditions and risks do not all inevitably mean a low quality of life. For people to live with them successfully, however, requires appropriate healthcare and disease management.



Key points

- Issues that affect ageing populations should be seen as integral to society as a whole
- There is a lack of insight about the health and wellbeing of the elderly, especially the over-85s
- When it comes to medical treatment, there is strong evidence of widespread ageism

How prepared are our health systems?

The changes necessary to address an ageing population are broadly of two types. One consists of the adjustments which health systems need to make anyway, but which ageing may make more pressing. This link is too often missed. "People tend to put older people in a ghetto and talk about them as an added burden for everyone else," says Susan Eng, vice-president, advocacy, for CARP, the largest advocacy association for older Canadians. "We have to 'mainstream' ageing, and not keep it a segregated issue." As noted above, older populations will not in themselves put an undue stress on health budgets—allocation of health spending will need careful attention for numerous other reasons. Similarly, healthcare systems will need to shift their emphasis away from acute care to managing chronic diseases and to disease prevention, irrespective of the ageing population.

Ageing, of course, may necessitate variations in the content of these reforms. Prevention programmes, for example, will need to look at issues specific to older people, such as falls, and address the problem of getting risk-loving 20-year-olds to change their lifestyles in order to reduce the likelihood of certain medical problems 50 years down the road. Nevertheless, the general difficulties and benefits of greater attention to prevention remain much the same.

Ignorance and its fruits

On a fundamental level, many healthcare systems do need to address certain issues specific to caring for an older population. The first problem is that there is a shortage of basic information on what to expect. Although current disease loads among the elderly point to some obvious likely developments, one important area of uncertainty is the likely general overall health of an older population. Will people's extra years be spent ill or well? Initial studies in this field suggested that older people were seeing a "compression of morbidity"—that years of disability and disease were definitely not increasing, and might even be declining. In other words, chronic conditions were manifesting themselves later in life, so that the greater life expectancy led to more healthy—and less costly— years. In the US, for example, surveys found that the average age at which males were suffering their first heart attacks was actually rising faster than average life expectancy. Put another way, heart attacks were happening later in both absolute terms and proportionally within overall lifespan. This made sense: if more healthy people were reaching old age, more would probably be healthy for some years further.



But more recent studies have muddied the picture. An influential study of 12 OECD countries found a decrease in the rate of severe disability in only five, including the US. Three, however, reported an increase in the incidence of severe disability, two reported a stable rate, and two had conflicting results from multiple studies. Moreover, even in those states with declining morbidity, the study still projected that the increasing size of the older population would yield an increase in the absolute number affected by severe disability. "It would not be prudent for policymakers to count on future reductions in the prevalence of severe disability among elderly people to offset completely the rising demand for long-term care that will result from population ageing," the report says.⁷

Relying on an even broader survey of available evidence, Professor Vaupel sees a more positive picture. He notes that it is much more difficult to measure health than mortality. "There are questions of definition, response error, the surveys are typically small—but if you put all the studies together, the general thrust is that disability is being postponed," he says. Most European data on mild disability, meanwhile, unambiguously show an increase in prevalence of disability, although they also indicate a greater ability of these disabled to take care of their conditions. The issue is also partly one of perspective. Numbers of people with mild, or even severe, disability may be increasing because advances in medicine mean that their conditions are no longer fatal, while some with no conditions might previously have had a mild one. For the vast majority of individuals, this represents an improvement. At the very least, especially if chronic diseases are properly managed, ageing populations do not need to look forward with dread to years of suffering.

Information gap

As for certain specific conditions more common among older people, researchers are only beginning to determine the extent of the challenge. Huntington's disease, for example, was first identified only 150 years ago, when life expectancy grew beyond the age of 40, the age at which the disease begins to develop. In other words, it was no longer lumped in with the conditions described collectively as "dying of old age". Today, researchers must unpack the current conditions which affect an age group where death is no longer assumed to be perfectly normal. The dementia figures for the United States cited previously, for example, were from the first comprehensive, country-wide study, which was only held in 2007. The CDC's website reports that critical knowledge gaps exist for responding to the health needs of older adults. "For chronic diseases and conditions such as Alzheimer's disease, arthritis, depression, psychiatric disorders, osteoporosis, Parkinson's disease and urinary incontinence, much remains to be learned about their distribution in the population, associated risk factors, and effective measures to prevent or delay their onset," it says.⁸ It is hard to say for sure what an older population might look like, says Professor Kirkwood. "There is a remarkable dearth of information about what people at older ages are really like," he says—especially among the fastest-growing part of the population, the over-85s. Although epidemiological data exist, the historical novelty of these populations means that uncertainty remains over the likely true spectrum of health and what factors have the greatest impact. The lack of knowledge makes planning much more difficult. "We know that women who are 60 years old now will die at an average age of 88," Mr Böttcher says. "Ten years ago it was 80. We know that some of these people will need new kinds of treatment, especially in care." But, he adds, insurers will not

⁷ Gaétan Lafortune, Gaëlle Balestat and the Disability Study Expert Group Members, "Trends in Severe Disability Among Elderly People: Assessing the Evidence in 12 OECD Countries and the Future Implications", *OECD Health Working Paper 26*, 2007.

⁸ www.cdc.gov/aging/



able to do a prognosis for the next 10 or 15 years—not just because of demographic change, but also because of the technological healthcare innovations which might also take place.

Professor Kirkwood believes that not enough is being done in scientific and medical research into ageing. In particular, lack of data is a major issue to be addressed, to boost understanding of the big issues. In 2006, his institute launched one of the first broad investigations of the issue—the Newcastle 85+ study. This will follow some 800 residents of the city—amounting to most of the city's population in that age group—for five years, starting with an initial visit and continuing with regular follow-ups. The aim of the study is to go beyond looking at the health measures of the individuals involved, and examine in unprecedented detail the various health trajectories and outcomes of older people, and their associations with underlying biological, medical and social factors.⁹ "We want to know what people are actually like, what the true spectrum of health is," Professor Kirkwood says. Although the group recognises that this is far from a complete survey of the country, it hopes to begin to answer some fundamental questions about the ageing process and health among the oldest old. The initial findings, soon to be published, are remarkably hopeful. "Although most people have something medically wrong with them, they actually manage daily lives quite successfully," acknowledges Professor Kirkwood.

The lack of knowledge has had a negative impact on healthcare for older people. In Charles Dickens' novel, *A Christmas Carol*, Ebenezer Scrooge opines that if the poor would rather die than go to workhouses, "they had better do it, and decrease the surplus population". Although Dickens meant to shock polite readers, for many years society, including medical professionals, held a parallel view: the old are going to die soon anyway, so providing them with anything but palliative care would be a waste of resources. The underlying assumption has now changed, but a firmly rooted ageism that once seemed like common sense has now become a serious, long-term issue in healthcare provision. It ranges from patronising attitudes by professionals, through widespread incorrect assumptions about the physical changes brought about by normal ageing, to pharmaceuticals which are almost always tested on young males and which older patients may well metabolise differently.

A costly issue

This ignorance costs lives. A study of 12,000 patients in 20 Scottish hospital accident and emergency rooms in 2000 found a higher death rate than could be expected merely from age and supposed fragility. Older patients were less likely than younger ones to receive appropriate care, including admission to intensive care, and medical staff did not always understand the potential seriousness of certain injuries to older patients. Pharmaceutical provision is another issue. A *British Medical Journal* article from 2009 reported that in the UK 80-year-olds were about half as likely as 50-year-olds to receive appropriate secondary prevention drugs. More broadly, a 2006 government review of the NHS found that despite some improvement, there was evidence of ageism among staff across all services. A recent survey commissioned by the British Geriatrics Society of 201 British doctors found that 67% believe older people are less likely to have symptoms fully investigated, and 72% that they were less likely to be referred for essential treatment. Perhaps most telling, over one-half were worried about how they would be treated when they were old. This is not to pick on the UK. These studies are mirrored in research elsewhere, notably the United States.

⁹ BMC Geriatrics 2007, 7:14.



The data are good in the UK because the government has made efforts to address the issue. In 2001, the NHS launched a ten-year National Service Framework for Older People which dealt with issues from preventing ageism to reducing falls. Progress has been made, but it has been slow. In October 2009, the health secretary, Andy Burnham, announced that as of 2012 age discrimination within the NHS would be made illegal—not so much to remove overt discrimination, as to change attitudes about what is normal and expected as a population ages. However, the UK's efforts are rare—in most other countries, there is a lack of political will to address health and ageing issues, says Ms Eng of CARP.

Politicians and health systems, however, may face such heat sooner rather than later. "Few things are so central to people as health security," says Dr Frenk. "It is a fundamental aspect of providing people with piece of mind, even when not sick." What that means, in a democracy, is that the issue will inevitably become important. "The coming wave of baby-boomer retirees is not about to take age discrimination lying down," Ms Eng says. "But in order to get real change, you have to hold politicians' feet to fire." Mr Humphries of the King's Fund adds: "Instead of being grateful for what crumbs are thrown to them, the next generation of older people will be much more articulate and demanding. They will know their rights, and will be much more active consumers than older people have traditionally been. People won't stand for age discrimination."



Key points

- There is a major shortage of skills in the healthcare sector with regard to geriatric care
- A shake-up of medical training should be an immediate priority for policymakers
- Relying on imported talent will not be a sustainable solution

Addressing the lack of expertise

E ven if attitudes shift, there is another question concerning the ability of healthcare systems to provide the right kind of care for older people. Geriatrics, the medical specialty dealing with the elderly, is horribly undermanned across much of Europe and North America. Canada, for example, has one-fifth of the roughly 1,000 geriatricians it currently needs. Moreover, 20% of them are near retirement themselves, and very few are joining the profession. The US has roughly one-half of the geriatrics specialists it needs, and their absolute number has actually declined over the last decade. By 2030, the country will probably have only one-quarter of the estimated 36,000 geriatricians it will need. In Europe, the problem varies. British academic articles wonder aloud whether undergraduate geriatric training can survive. In Austria, it is barely taught at all—just a few lectures in other courses—and in Slovakia, internal medicine specialists who qualify in geriatrics actually lose their right to prescribe certain drugs.

Of course, not all medical care for older patients requires a geriatrician. Dr Frenk suggests, for example, that countries such as Mexico need a new generation of community healthcare workers, whose expertise in ageing issues is similar to that of the healthcare workers who made inroads into addressing diseases prevalent in that country in the 1970s. Indeed, ultimately, given the current small base of geriatricians, any solution will require what Ms Eng of CARP calls the "mainstreaming" of these issues, so that most healthcare professionals have adequate knowledge of the healthcare needs of older people.

But in that regard, the current state of knowledge about the specific needs of the elderly is not promising. Dr Robert Butler, president of the International Longevity Center and a pioneer in geriatrics training, says it is striking that doctors are not well trained to deal with old people, even though they tend to show different symptoms and reactions to treatment than younger people with similar ailments. It is more than just an impression. In 2008, America's Institute of Medicine, the health arm of the National Academy of Sciences, reported that the education and training of the entire healthcare workforce with respect to the range of needs of older adults remained "woefully inadequate". Nor is the problem confined to the US. Dr John Beard, who directs the WHO's Department of Ageing and Life Course, notes that most healthcare providers are not trained to deal with older people, which leads to many errors with far-reaching costs for individuals and society.



Care for older people, whether provided by a geriatrician or not, must be more than a series of discrete services. Older patients more than any others need someone who can co-ordinate the various types of care that they may find essential. As already noted, this part of the population is much more likely to have multiple conditions, and is more likely to be taking medication that was tested on physiologically very different people. According to the Swedish National Institute of Public Health, the percentage of hospital admissions due to adverse drug reactions rises from 4% in younger patients to 16% or more among older ones. It adds that a review of various data suggests that between one-quarter and one-half of such adverse reactions among the elderly are preventable. Even when the drugs themselves do not lead to hospitalisation, dizziness from drug interactions, causing falls, can have a profound impact on quality of life. Integrated, patient-centred care is often advanced as a laudable goal for the entire healthcare system. For older patients, maintaining silos can be disastrous—which is why general geriatric expertise is likely to be so necessary.

What's stopping better care?

There are two common characteristics of healthcare provision that will get in the way of more effective geriatric care. First, the current prevalence of fee-for-service payment models is a disadvantage to those who provide management of the whole breadth of an individual's health issues, rather than discrete health interventions. This system is common in many countries, but the effects are particularly clear in the US. There, radiographers—a specialty with easily definable services—earn on average US\$400,000 per year. Geriatricians, by contrast, pull in about US\$150,000. Moreover, the federal Medicare system, which covers senior care, generally pays doctors less than private insurance payments for the same procedures. Quite simply, younger patients are generally less complicated and costly to treat.

Moreover, the shortage of geriatricians is taking place in a context of too few healthcare providers in general, a problem that will increase as those in employment make up a smaller part of the population. Even though the US is not ageing as fast as Europe, the shortages are expected to intensify. The situation will only get worse unless there is intervention, says Mary Wakefield, who administers the federal Health Resources and Services Administration (HRSA), a division of the US Department of Health and Human Services.

Faced with the prospect of drastic shortages to come, governments and the private health sector might pursue various strategies to find the necessary number of health workers.

One solution that will almost certainly not work for geriatric care, however, is relying on the immigration of foreign professionals. A number of wealthier countries, notably the English-speaking OECD states, have relied extensively on such additions to the workforce, unlike continental European health services. A 2007 report by Médecins Sans Frontières (MSF), the medical relief agency, noted that almost one in five of all nurses and midwives trained in Sub-Saharan Africa were working in the developed world, mainly in the UK, America and Canada. This is an issue replete with ethical issues, including both the morality of encouraging immigration of health workers from countries that lack them, as well as the rights of individual workers against their responsibility to their societies of origin. Moreover, resistance to immigration in certain developed countries complicates matters further.



In the context of care for an ageing population, however, it is not the ethical complications but the practical difficulties that make the issue much less important. According to the British Geriatric Society, the strategy of attracting trained immigrants is "largely a non-starter in geriatric medicine, since geriatric medicine is very under-developed as a specialty in countries", from which the NHS seeks to attract talent. Indeed, according to the OECD, the largest contingent of foreign-trained doctors within member states comes from India. In that country, however, specialist geriatric training simply does not exist, says Dr Puri of Fortis. This is unlikely to change soon.

Modest attempts

A second approach is to provide more money for training. The US government has earmarked US\$500m, some from the 2009 Recovery Act, for training people for health professions. Ms Wakefield of HRSA notes that about US\$11m of President Barack Obama's fiscal year 2010 budget proposal specifically targets geriatrics training programmes. In the private sector, meanwhile, funders such as the Hartford Foundation and Donald Reynolds Foundation have focused on the geriatrics skills gap. The latter, for instance, has given money to several dozen medical schools across the country to increase their geriatrics training. Ms Wakefield's department also funds a series of geriatric education centres across the US.

But this money is unlikely to be enough to fill the need. Dr Butler notes that today only 11 of the 145 medical schools in the US—"small potatoes"—have fully fledged geriatrics departments. Moreover, those teaching geriatrics must compete for students' time and resources within medical schools. Dr Zaldy Tan, a gerontologist, is helping Harvard Medical School bolster its geriatrics training. The school started a geriatrics fellowship programme back in the 1970s, but did not require basic training in geriatrics for all medical school students until two years ago. Now, all second-year students participate in a day-long series of lectures and demonstrations on how to interview and examine older patients, and visit a nursing home to interview frail older patients. Dr Tan is now trying to add further practical training in geriatrics for third- and fourth-year students. But one day is a just a fraction of a medical student's career. "It's sort of the battle that we geriatricians have to make at any medical school," he says. "We certainly recognise we have a long way to go."

Practising physicians' continuing education is another important approach. In the US, Mount Sinai School of Medicine has welcomed a variety of specialists into its continuing education programmes in geriatrics. One course, called "the hazards of hospitalisation", teaches doctors about the risks of admitting some elderly patients to hospital. Dr Tan is encouraged by interest in a new online geriatrics programme that he devised for Harvard that uses "virtual patients". Just a few months after launch, 150 physicians in 28 countries were following the eight modules.

A smarter application of existing funds can also help. In the UK, physicians have a greater incentive than their American peers to focus on geriatrics. Reimbursement formulae increase their payments for treating older patients, meaning they are compensated for taking the extra time and attention that may be needed. Although the shortages there are not so acute, however, the British Geriatrics Society still reports that the number of geriatricians, while growing, is not keeping up with the country's needs.



Key points

- Rising numbers of elderly will increase pressure for alternative approaches to social care
- Integrated care is hard to provide in countries with fragmented healthcare systems, such as the US
- One successful model in the US integrates both care and funding to provide a quality service at affordable cost

Long-term care: a return to the home?

A sthey age, many people are no longer able to live alone and unaided, for reasons ranging from simple frailty to specific conditions such as dementia. Accordingly, the need for integrated care comes through particularly strongly in the issue of long-term or social care, most of which is geared towards older people. Although theoretically differentiated from medical care, both are closely intertwined: long-term care is largely only necessary because of health deterioration and its standard is directly relevant to maintaining, or sometimes even restoring, health. In Western Europe, according to the OECD, usually between 10% and 20% of the population over 65 requires such care, at a cost of 1% and 2% of total GDP. The OECD also expects need and spending to increase, as both correlate statistically with age. The British government, according to Mr Humphries of the King's Fund, is expecting to need to find £6bn more for social care by 2026 without even increasing current levels of service.

One pressing issue in the near future will be finding enough carers. Typically, the vast majority of long-term care is provided informally, usually by family members who are unpaid. In the UK, for example, public care is dwarfed by informal care, Mr Humphries says: "There are probably around 5m unpaid informal carers, compared to a social care workforce of around 1.5m." The UK's Office of National Statistics reported that by 2001 more than 20% of women and 15% of men aged between 45 and 65 provided some unpaid home care. In developing countries, such care is even more family-based. According to the UNPD, by 2005 more than 60% of people aged over 60 in Africa, Asia and Latin America lived with children or grandchildren, compared with roughly 20% in Europe or North America. As populations age, however, there will be fewer people able to provide such care. Moreover, the social change that comes with economic development may exacerbate the problem. "As we become more like the West, there will be more nuclear families and support for the elderly will dwindle," says Dr Puri of Fortis, in India.

No place like home

Most countries addressing this issue are understandably focusing on ways to improve the provision of home care, rather than invest in more institutional care. From the standpoint of cash-strapped governments, says Michael Gelder, senior adviser on health policy to the governor of Illinois, home care is economically much more attractive. In Illinois, for instance, the Department on Ageing spends about US\$117 per day for people in nursing homes, against a monthly cost of just US\$650 for home

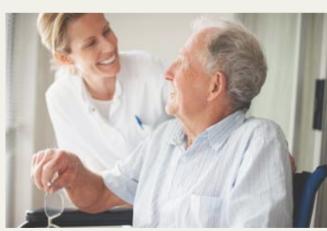


care. It is also usually much more in line with the wishes of the care receiver and family members providing care.

Providing such care effectively, however, requires a comprehensive strategy, says Ms Eng of CARP, rather than a few disconnected policies—including income replacement and job protection for home-carers if they have to take time off work. "To leverage a tremendous amount of already unpaid labour, you need to have some kind of support from the larger system," she says. "For example, the formal healthcare system needs to provide some kind of training. Most people don't know how to help someone with a broken hip."

The other common option is, of course, institutional care. But overall, there is already considerable unmet need, especially for older people, says Mr Humphries of the King's Fund. "We are getting to the point in many parts of England where most social care is sorted out through private arrangements, excessive reliance on unpaid carers, or by going without," he says. In any case, institutional care is not always effective, from a medical viewpoint. A recent British study found that seven in ten nursinghome residents had received either the wrong dosage or the wrong medication.

Meanwhile, community day-care programmes are also taking off in more traditional societies—such as Japan and Taiwan—where two-career couples or adult children living far from their parents are seeking care arrangements that allow both oversight and a degree of independents for the elderly. Yet many such programmes are more social than medical in nature. In America, with its highly fragmented system of health providers and payors, it has traditionally been difficult to achieve fully integrated



CASE STUDY: How On Lok connects the dots

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The On Lok programme was created in the early 1970s, when an influx of older immigrants arrived in San Francisco's bustling Chinatown. Although it originally borrowed from the concept of adult day-health centres that existed elsewhere, On Lok added a number of unique twists to become a prototype for integrated-care programmes (known as the National PACE network) across the US.

There are now 50 PACE programmes in the US—the largest, in the Bronx, serves more than 2,300 frail people, while in San Francisco On Lok serves more than 1,000.

On Lok—Cantonese for "happy, peaceful abode"—offers two key elements. It is firstly an integrated, community-based programme that includes all the medical and social services that a frail, elderly person needs. The idea is to bridge what Dr Catherine Eng (no relation to Ms Susan Eng, of CARP) calls "the disconnect between the medical services and the non-medical services", such as social workers, involved in patient care. Since many doctors typically spend 30 minutes or less with a patient, the idea is to identify and treat areas of concern that doctors might miss, such as loss of function or mobility, that have important implications for the patient's overall health.

The second innovation of On Lok is its financing model. Of the US\$6,000 per month that it costs for each participant, one-third is covered by Medicare payments and the remaining two-thirds comes from Medicaid (federal aid to the poor) or private payments. Dr Eng calls it a "capitated, risk-based, integrated payment system". In other words, pots of money are combined to follow individual patients, rather than being spread around. Without that integration, the model does not work.



healthcare for seniors, especially for older people on limited incomes. However, the growing numbers of frail elderly, spurred by some shocking stories of abuse in nursing homes, are providing political incentive and will—not to mention economic pressure—to find alternative solutions. Some initiatives are now providing evidence for the viability of a middle way, which combines good, financially-integrated community health and social care, even within a system such as the US (see box on previous page). There, the Program of All-inclusive Care for the Elderly (PACE) is gaining momentum.

The challenge in starting up new PACE programmes is that although the Medicare portion of payments has been approved since 1997, Medicaid funding needs approval at the state level. Some states have not approved the programme, and among those that have, different states pay different amounts. "We have successfully shifted the locus of care from the in-patient to the out-patient," says Dr Catherine Eng, of the On Lok PACE programme. "If you can shift those dollars out into the community, you can stretch those dollars a lot further."

But what about quality? Each PACE programme has its own quality initiatives, benchmarking against Medicare outcomes and other national standards in areas such as immunisation rates and treatment of depression. Dr Eng is quick to point out that quality discussions are a side debate. In her view, "without money, there's no quality either".

In fact, it is hard to separate one from the other. One key measure of quality is in hospital readmissions. The Commonwealth Fund, a research centre focused on health issues, reports a great variation in hospital readmission rates within 30 days for Medicare patients across America. One of five people discharged from hospital ends up being readmitted within 30 days, according to Dr Eng, at a cost of about US\$10,000 each. She argues that the high readmission rate stems in large part from a lack of continuity in care. On Lok, in contrast, has readmission rates of 10% to 12% within the same period, about half of the average.

About 1.8m Americans still live in nursing homes, but Dr Eng is convinced that integrated community care is a better alternative for most. "It is really imperative to find a different way to care for people than institutions," she says. "It's expensive and it's not what people want."



Key points

- There are many opportunities for investment in innovative technology to address the challenges of ageing
- Key advancements in robotics and telemedicine are easing the pressure on medical professionals and carers
- Technology alone will not meet all the challenges, unless it is accompanied by investment in infrastructure and support services

The role of technology: the robot nurse will see you now

T t is undeniable that more healthcare professionals who have at least familiarity with geriatric medicine will be necessary. But other strategies will also be enlisted to support the needs of an ageing population, including the application of technology.

Intel Corporation, better known as a microprocessor manufacturer, has a division devoted to serving the needs of older people with health challenges. Why? "Huge societal need and a huge business opportunity," says Eric Dishman, Intel's director of health policy and innovation. "One of the most common misperceptions is that seniors can't learn new technologies to take care of their own health."

Intel is not alone in recognising new opportunities for technology to serve the health needs of seniors. Some of the biggest technology names in the US, Europe and Asia have jumped into the market. In a natural extension of the cutting-edge products already developed for use in hospitals, an increasing amount of research and development funding is spent on innovations to assist older people in hospital and at home.

Some of these innovations are truly novel. In robot-crazy Japan, for instance, "nurse robots" are being built to help care for elderly patients, along with service robots that assist them at home. With the oldest population in the world, the Japanese government is openly encouraging such innovations. Video demonstrations show robots performing functions such as lifting patients out of wheelchairs and placing them on beds. Toshiba's latest model can open doors and handle trays, and is equipped with a camera for remote monitoring.

Professor Vinesh Raja, who heads an informatics and virtual reality group at Warwick University in the UK, is working in conjunction with the university's Institute of Digital Healthcare to develop teams of robots for use in health settings. Rather than replacing nurses, as the Japanese are trying to do in some settings, the project is developing robots that are meant to perform a few clearly defined functions—such as cleaning or monitoring hospital hallways—so that human nurses have more time to care for patients. The NHS is one of several European healthcare systems investing in the project.

The concept of robot nurses may be exciting to some and controversial to others, but is only one aspect of the technology-based research aimed at enabling older people to live better lives. A wide range of innovations is being developed, often grouped under the umbrella of telemedicine, to allow healthcare professionals to monitor and assess the health of individuals from information



transmitted by phone or the Internet or some other means. Products include Massachusetts Institute of Technology's "smart personal advisers", which use radio-frequency identification and wireless technology to make an individual's personal diet information available on a screen-based device that offers them in-store guidance while shopping for food, and intelligent cardiopulmonary decision systems, which apply telemedicine to provide early detection of and warning about patients at risk of congestive heart failure.

Professor Raja says voice-based systems are a growing area of interest, given the challenges that some seniors have in seeing and using technology screens and keyboards. His team is working on a device aimed at reducing or eliminating the need for stroke patients to make repeat visits to physical therapists once they go home from hospital. The device uses technology that can be programmed to read a specific patient's disabilities and generate different games based upon that person's prestroke activities, such as tennis or golf. This allows them to do their physical therapy at home, at an ability level that suits their stage of rehabilitation, in a manner intended to keep them interested, all monitored remotely by a therapist via videoconferencing.

The Warwick programme is part of a broader European effort to create digital technologies that will improve the lives of older people at home, in the workplace and society. Ageing Well in the Information Society is a €1bn project with funding from the EU.

The project recognises that if it is applied properly, technology that supplements human skills can free up the overstretched cohorts of geriatric experts to work where they can add the most value. But it also recognises that technology alone will not solve the issue. Obstacles to its adoption include technical and regulatory barriers, ethical concerns, lack of awareness, and research and development funding. For example, pilot trials in telemedicine can produce promising results, but they are often conducted on too small a scale to show significant clinical or economic benefits. But in most places in the world, conducting a larger trial or rolling out the technology on a scale large enough to make it count would require some big shifts—not just in infrastructure, but also culturally. In many cases, older people will need to be trained to use new technologies. A new services structure will need to be developed to support new technologies in healthcare.

Nonetheless, this presents opportunities almost as exciting as the technologies themselves. Intel's research into the dynamics of ageing involves fieldwork at some 200 hospitals and clinics, as well as over 1,000 households. The research is led by ethnographers, and engineers join them to study people's everyday environments. The aim of this approach is to open new levels of understanding, balancing technological know-how with a degree of humanity. "Most tech people are young, white and male," explains Mr Dishman. "They've never done care-giving in their lives, and they think they're immortal because they've never faced chronic disease."

This kind of field research has led to product development in several clusters that cut across geography: chronic-disease management, memory assistance, social connectivity, and the desire for a sense of purpose. Maintaining the latter two can be as vital to the overall health of older people as more direct medical interventions.



This report has argued that the steady increase in life expectancy being witnessed around the globe is not a catastrophe, but rather a laudable success brought about by advances across the entire front of medical knowledge and practice—from basic nutritional information and public health measures to advanced, technology-enabled treatments for specific conditions.

However, only in recent years has the likely scope of this success become apparent, pushing back a seemingly fixed border of longevity into unexplored territory. Faced with an unexpected victory here, societies must avoid the trap of population pessimism. Rather than viewing the elderly as a burden, they should be viewed as a resource. Healthy years—defined not as years without any illness, but as years in which people can take care of themselves—seem to be increasing along with longevity, and the overall healthcare costs of ageing are far from overwhelming. Nevertheless, healthcare systems need to adjust to the new realities. Older people will have different medical concerns than the rest of the population. At the very least, mainstream medical providers need a better understanding of the specific issues and concerns of geriatric medicine, and most countries will require more expert geriatricians who can provide the integrated care needed by individuals frequently suffering from multiple conditions and—for all their continuing ability to cope—increased frailty.

Looking ahead, societies will need to consider how older citizens can obtain long-term care that provides the requisite medical attention, while also keeping costs under control and catering to the widespread desire for independence over institutionalisation. Most importantly, healthcare systems, like society in general, need to address ageism. Elderly individuals are not suffering from some unknowable, terminal disease called old age which will inevitably take their lives very soon. They are patients for whom proper treatment may well increase length and quality of life for several decades; consumers with specific desires and often the assets to match; and citizens with rights.

While every effort has been taken to verify the accuracy of this information, neither The Economist Intelligence Unit Ltd. nor the sponsor of this report can accept any responsibility or liability for reliance by any person on this white paper or any of the information, opinions or conclusions set out in this white paper.

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