THE IMPLICATIONS OF POPULATION AGEING FOR HEALTH FINANCING IN THE WESTERN PACIFIC REGION

EXPLORING FUTURE SCENARIOS AND POLICY OPTIONS FOR SELECTED COUNTRIES USING THE PASH SIMULATOR

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Acronyms

GDP  gross domestic product
PASH  Population Ageing financial Sustainability gap for Health systems
VAT  value added tax
WHO  World Health Organization

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Key messages

1. **Changing age-demographics prompt fears about the financial sustainability of health systems.**
   - People are living longer across the Western Pacific Region, in part because of the successes of health systems.
   - Having greater numbers of people at older ages raises questions (and concerns) about health system financing and what happens if the demand for health care outstrips economic growth over the long-term.

2. **Modelling revenues and expenditures using the PASH Simulator can help countries anticipate the impacts of population ageing on health financing and develop policy responses.**
   - Understanding the implications of ageing for economic growth and for health systems, particularly those that depend on payroll-based taxes or social insurance contributions, is key to getting policy responses right.
   - The Population Ageing financial Sustainability gap for Health systems (PASH) Simulator allows policy makers to explore the relationships between ageing, health expenditures and health revenues.
   - It projects health revenues and expenditures based on current health financing arrangements so that countries can see the magnitude of the challenge and begin to test possible policy responses to address financing gaps.

3. **Patterns of ageing and current approaches to publicly financing health care suggest both differences and shared challenges across the Western Pacific Region.**
   - The proportion of the population aged 65+ varies greatly across the Region but the countries that are currently ‘younger’ will experience the most rapid increases in the size of their older populations in the coming years.
   - Countries that spend more on health overall typically spend disproportionately more per person on older people compared to younger people, while those that spend less overall on health spend similar amounts per person across all age groups.
   - The mix of revenue sources for publicly financed health care varies widely and plays a key role in determining how vulnerable health financing is to population ageing.
4. PASH Simulator projections of health expenditure and revenues suggest that by 2040 six of the 14 countries modelled will have a health financing surplus and eight will face a deficit – assuming expenditure and revenue patterns by age remain constant – but these projections are not ‘fixed’.

- Policy can alter (or take advantage of) projected gaps.
- Potential policy options explored using the PASH Simulator show that in some contexts deficits can be reduced.
- It is also clear that surpluses may be used to expand health coverage.

5. The PASH Simulator is an effective tool that can support policy makers as they test policy options to improve financial sustainability of health systems.

- Countries can devise effective policy responses to the health financing challenges and exploit the opportunities that come with population ageing.
Executive summary

The share of older people in the Western Pacific Region is increasing, which raises policy concerns

All countries in the Western Pacific Region will experience profound changes in their age demographics due to rising life expectancy and falling birth rates. While longer lives are a major achievement, they also raise several policy concerns related to health financing:

- Needs for health care may rise as populations age, which can accelerate growth in health care expenditures. High health expenditure levels at older ages are in fact mainly driven by the number of people near the end of life, not by the size of the older population.

- Economic growth may slow due to fewer working-age people and possibly lower productivity of older workers. Nevertheless, many older people continue to work beyond normal retirement ages and there is conflicting evidence on whether older people are less productive in practice.

- Revenues for health may be adversely affected. This is of particular concern in countries that depend heavily on payroll-based taxes or social insurance contributions as these are more susceptible to changes in population age structure (compared to property and consumption taxes), due to the shrinking workforce.

The PASH Simulator can support policy-makers by showing how population ageing affects health expenditures and revenues

The Population Ageing financial Sustainability gap for Health systems (PASH) Simulator tool has been developed by the European Observatory on Health Systems and Policies and the World Health Organization (WHO) Kobe Centre to understand the implications of population ageing for health financing and to support countries in developing effective policy responses in light of the policy concerns outlined above.

The Simulator uses population projections and information on current public health care expenditures and revenues to estimate the per person financing gap (deficit or surplus) that will arise from the effects of population ageing under no policy changes. The Simulator can then be used to explore different policy scenarios and their effects on the financing gap in each country.

This policy brief looks at the likely patterns of ageing and approaches to financing health care in the Western Pacific Region

We study 14 Western Pacific countries, at different stages of economic development and population ageing: Australia, China, Fiji, Japan, Malaysia, Mongolia, New Zealand, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands and Vanuatu.

The proportion of the population currently over 65 years varies, from less than 5% in Vanuatu and Papua New Guinea to around 30% in Japan. The numbers of people over the age of 65 are likely to increase in all countries between 2020 and 2100, with the ‘younger’ countries experiencing the most rapid increases in the size of their older populations in the coming years.
Per person publicly financed health expenditure levels are correlated with per person GDP levels. Countries with higher GDP per person also tend to spend a higher share of their national income on health – up to 9% of GDP is spent on publicly financed health care in Japan. Countries that spend more on health care also often (although not always) have large older populations. These countries tend to spend disproportionately more per person on older people compared to younger people. Countries with relatively low spending levels generally have few older people and instead usually prioritize maternal and child health care; as a result, per person health spending does not vary substantially by age.

All countries rely on more than one revenue base to finance health care, but the mix of revenue sources varies and, with this, the vulnerability to the effects of population ageing. For example, China, Japan and the Republic of Korea raise more than half of their publicly financed health revenues from social contributions, making them more susceptible to population ageing.

If current approaches to health financing remain constant in the future and only the population age mix changes, eight of the 14 countries will face a financing deficit in 2040 due to population ageing

Based on population projections, current patterns of health spending by age, and current approaches to funding health care, the PASH Simulator predicts that six out of the 14 countries could have a financing surplus in 2040 (Fiji, Malaysia, Papua New Guinea, Samoa, Solomon Islands, Vanuatu), and five a surplus in 2100 (the aforementioned countries except Malaysia) resulting from population ageing. Eight countries are projected to face a deficit by 2040, with the Republic of Korea facing the largest projected ageing-related financing gap. In these countries, age-related health financing deficits are only expected to grow further in the later part of the century.

Policy changes can address (or take advantage of) health financing gaps attributable to population ageing

Example policy options explored using the PASH Simulator and discussed in this brief include:

1. Replacing part of social insurance contributions with taxation in the Republic of Korea. We find this has the potential to reduce the size of the ageing-related financing deficit, delaying its emergence by around 3 years.
2. Using part of the projected financing surplus in Papua New Guinea to expand services and population coverage. The PASH Simulator suggests this would be feasible without creating a deficit due to revenue gains associated with population ageing.
3. Implementing policies promoting health and wellbeing across the life-course in New Zealand. Evidence suggests this could reduce per person health care expenditures at older ages, thus lowering projected growth in health spending.
4. Expanding coverage for people over age 60 in Fiji. We project that revenue gains associated with population ageing would make this possible without running into a funding deficit.

There are many other ways in which countries can respond to the challenges of population ageing and the PASH Simulator is an entry point to explore these.

Population ageing is often seen to be detrimental to health financing, however the PASH Simulator can shed light on the scope of the challenge and the effectiveness of possible solutions

The situation in the Western Pacific Region is not unique and most countries around the world will see health spending grow as their populations age. Some countries will be able to accommodate this more easily since they also have a growing population at working age, but others will face the dual challenges of rising needs and potentially falling revenues. Examples explored in this brief show that it is possible to design policies to reduce future deficits. Forecasted surpluses attributable to population ageing can also be used to improve health across all ages by extending coverage. All countries can benefit from using the PASH Simulator to explore policy scenarios. Population ageing is a major achievement of public health systems and, while it poses financing challenges, these are not necessarily insurmountable.
1. Introduction

**Population ageing is a major policy success but also a challenge for health system financing**

Population ageing has been a major achievement of public health policies and health services. In all countries in the Western Pacific Region, the share of the population over the age of 65 has been rising and in some cases is rising very rapidly. To prepare for the challenges this success brings, countries need to consider:

- how health care service provision may need to evolve in the context of lower birth rates, fewer children, and more people at older ages
- the level of public financial resources that are required to support these changing health care needs
- how to raise public financial resources on a sustainable basis.

**The PASH Simulator can help countries explore how population ageing will affect their health revenues and expenditures in the future**

The Population Ageing financial Sustainability gap for Health systems (PASH) Simulator (European Observatory on Health Systems and Policies, 2022) is a tool that has been developed to help countries to plan for changing health care needs as populations age, and to consider options that will help ensure that health financing is sustainable. It projects likely changes in expenditures and revenues as the population ages (assuming no other changes, such as in policy or productivity) and then allows a range of different policy options to be explored (for more information about the methodology, see Cylus et al., 2022).

The PASH Simulator relies on publicly available data to maximize its utility across a large number of countries. The extent to which health care expenditures will rise with population ageing depends on the numbers of people in each age group and the pattern of spending by age. Some countries (such as Fiji) are assumed to have limited variability in their public health spending per person across different ages, given a focus on improving maternal and child health (Roberts et al., 2011). In others (such as the Republic of Korea), however, per capita spending on older people is currently on average more than three times that spent on younger people (Williams et al., 2019). The extent to which health expenditures will rise as populations age depends on how much more a country spends per person on care for older people compared to younger people, combined with how many people live to older ages (Williams et al., 2019; Normand et al., 2022).

As economies develop and societies age it is typical for countries to spend a higher proportion of public resources on health care for older people. It is important to consider not only the affordability of public health spending levels (which reflects expenditures relative to the national income of a country) but also the sustainability of public health spending based on current revenue-raising tools. Revenues from taxes generated through labour markets (including quasi taxes such as compulsory social health insurance premiums) vary more across the life-course than taxes on consumption spending (e.g. value added tax (VAT)) or taxes on property. For stable future public health spending, revenues need to come from a diverse mix of revenue sources.

**This policy brief considers the effects of population ageing on health financing in the Western Pacific Region through the end of the 21st century**

This policy brief looks at the likely patterns of ageing in 14 countries in the Western Pacific Region and the current patterns of publicly financed health care. The brief does not consider long-term care because this is often financed through mechanisms that are distinct from those used to finance health care. Countries were chosen based on the objective of including countries at different stages of economic development and at different stages of population ageing. They include:

Australia, China, Fiji, Japan, Malaysia, Mongolia, New Zealand, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands and Vanuatu.
The analyses show that, based solely on projected changes in population age mix and current sources of finance, a financing gap will occur for health systems in most countries in the Region. In a few countries there would be a financing surplus if current policies were to remain in place. Using the PASH Simulator some possible policy actions are explored for selected countries, focusing on:

- diversifying revenues
- making use of available resources to expand access to care
- reducing health care needs by adopting life-course policies to improve health in older ages
- making use of available resources to increase per capita spending on older people.

There may be other ways in which a country can potentially respond to the challenges of increased demands and potentially lower revenues – and the Simulator can be used as an entry point to explore these.

The rest of the brief is structured as follows. We start by discussing the pattern of ageing in the Western Pacific Region and the associated policy concerns in different contexts. We then explain how the PASH Simulator works and show how it can be applied in practice. First, the current levels of public health expenditure for countries in the Region are presented with simulations of how these, along with revenues, would change with ageing by 2040 and 2100 given no change in policies. Second, the PASH Simulator is used to illustrate how policy changes might be used to address any deficits or surpluses that may arise in the future. Financing gap deficits will arise if expenditures rise more rapidly than revenues. The policy options presented address cases where the financing gap would widen mainly as a result of higher expenditures, as well as where the main problem is on the revenue side. In addition, where there is a projected financing surplus, health care coverage expansion is explored.

2. What is the pattern of population ageing in the Western Pacific Region?

All countries in the Western Pacific Region will see increasing shares of older people, with the ‘younger’ countries experiencing the most rapid increases in the coming years

The share of older people in the Western Pacific Region is increasing because of rising life expectancy and falling birth rates. While this trend is seen in all countries in the Region, Box 1 shows how the pattern of population ageing differs between countries. The proportion currently over 65 years varies from less than 5% in Vanuatu and Papua New Guinea to over 30% in Japan. The proportion over 65 is rising everywhere in the Region but most rapidly in those countries that currently have the youngest populations.

Perhaps more importantly, it is these ‘younger’ countries that will experience much more rapid change than was the case in the countries that aged in the past. It took 60 years for the share of people over 65 years to double from 7% to 14% in Australia and New Zealand, and 24 years in Japan, but the same transition will occur in less than 20 years in Mongolia and Papua New Guinea (United Nations, 2021; European Observatory on Health Systems and Policies, 2021). At the same time, in some countries that are currently quite young, for example Samoa and the Solomon Islands, an effect of population ageing is that there will be substantial increases in the population of working age in the coming years.
Box 1: How does population ageing differ across the Western Pacific Region?

Figure 1 shows how the number of people over the age of 65 is expected to increase in each country between 2020 and 2100. While the share of older people is bound to increase in every country, there are important differences in the current and forecast shares among the countries:

- Japan has the oldest population globally, with 29% of the population over 65 in 2020.
- The next oldest populations in the Western Pacific Region are in New Zealand (17% over 65), Australia and the Republic of Korea (each with 16% over 65); the Republic of Korea is projected to have the oldest population by 2100.
- By contrast: 5% or less of the population was over 65 years in 2020 in the Philippines (5%), Samoa (5%), Mongolia (4%), Papua New Guinea (3%), Solomon Islands (3%) and Vanuatu (3%).
- The proportion of the population over age 65 will increase by 1.3 times in Japan between 2020 and 2100, but Mongolia, the Philippines, Solomon Islands and Vanuatu will all see a rise of over five-fold.

**Figure 1**: All countries in the Region will see increases in the share of the population aged 65 years and over in the next decades

Notes: AUS = Australia, CHN = China, FJI = Fiji, JPN = Japan, KOR = Republic of Korea, MNG = Mongolia, MYS = Malaysia, NZL = New Zealand, PHL = Philippines, PNG = Papua New Guinea, SGP = Singapore, SLB = Solomon Islands, VUT = Vanuatu, WSM = Samoa.
3. What are the key policy concerns related to ageing populations?

There are three related concerns about the effects of population ageing which we focus on in this policy brief:

**Needs for health care may rise; this is mainly driven by the number of people near the end of life rather than the number of older people overall**

While care needs will rise overall as there are more older people with more chronic illnesses, as has been shown elsewhere, this growth occurs quite slowly (Cylus, Figueras & Normand, 2019). Although it is possible to further slow the growth in needs with appropriate public health policies, in fact, the best evidence shows that the main driver of high health care spending among older people is the number of people near the end of life (Normand et al., 2021). Many of these people near the end of life have multiple chronic diseases and complex needs. In the early stages of population ageing more people survive into later life, so the annual number of deaths in a country falls, dampening the observed effects of ageing on health expenditure growth. However, in the later stages of population ageing these longer survivors die, along with those who would in any case have survived into old age, so the total number who die each year increases.

**Economic growth may slow due to ageing, but many older people continue to work beyond retirement and policies to improve health at all ages can help to maintain their labour productivity**

Concerns about the effects of ageing on economic growth and prosperity focus primarily on the changing numbers in (what are currently considered to be) people of working age. There is great variation between countries and within countries in the ages at which workers retire. Many people reduce or stop work before the ‘normal’ retirement or pension age, and many continue to work (full time or part time) into later life. There is also a concern (but only weak evidence) that older workers are less productive and less adaptable and, in fact, much evidence suggests that older people have considerable underutilized capacity to work (Avendano & Cylus, 2019). Still, older workers are widely involved in both paid and unpaid work, and improving health at all ages will offset some effects of ageing on productivity. If there is no improvement in productivity (through, for example, better education or the use of better technology) the effect of a decline in the workforce will contribute to a slowdown in growth or decline in national income. The simulations in this policy brief do not assume any productivity changes over time. Increasing the value of output per person working (and, in turn, the tax revenues collected per person) may offset some effects on per capita national income of the decline in the number of workers. This is discussed in more detail in the case study of possible options for the Republic of Korea (see Annex B).

**Revenues for health may decline, particularly if they depend heavily on payroll-based taxes or social insurance contributions**

Some countries have a tradition of using payroll-based taxes and compulsory social insurance to fund public health care. Such taxes are subject to variation both due to short-term fluctuations in employment and wages, and through falling levels of formal employment that can occur as populations age. Broadening the mix of tax instruments (especially increasing the proportion raised as taxes on property and on consumption) can make health revenues more stable and sustainable.

**Projections based on current per person health revenues and expenditures by age can support discussions on how to adapt policies going forward**

Taking these concerns together, reduced public sector revenues and increased care needs and expenditures could make health financing systems unsustainable as populations age. In order to ensure that countries can plan to meet changing health care needs and ensure stable financing, it is useful to project forward the revenues from current sources and how spending will change with the changing population age mix (assuming no policy change). This then allows different choices to be explored on the scope and scale of care provision, spending and revenue raising.
4. The PASH Simulator as a tool to help project health expenditures and revenues

The PASH Simulator can support policy-makers by showing how population ageing affects health expenditures and revenues and by exploring potential policy options.

To help to understand the implications of population ageing for health financing and to identify policy options to address these issues, the European Observatory on Health Systems and Policies, together with the WHO Kobe Centre, has developed the Population Ageing financial Sustainability gap for Health systems (PASH) Simulator tool. The PASH Simulator tool allows users to see how both health expenditures and health revenues would be expected to change through the end of the century due to changes in population age structure across a wide range of countries if there were no changes to the current approach to health financing (see Box 2). The Simulator can allow policy-makers to look both at how needs and health expenditures are likely to grow, but also to track the likely effects of using different sources of revenues for health. Where there is an expected financing gap between revenues and expenditures in the future, users can explore potential policy options to reduce it. The overall message is that how population ageing affects health financing is a policy choice rather than an inevitable consequence of ageing societies.

Box 2: How does the PASH Simulator work?


Simulations are underpinned by projected population distribution

The Simulator uses UN population projections to the year 2100, broken down into four age groups (0–19, 20–64, 65–84, 85+). Screenshot S1 below shows current and projected population distribution for Fiji.

Current health spending by age patterns are used to estimate future public health expenditures

The Simulator estimates future health expenditures based on the current pattern of spending for each age group. As the share of the population in older age groups changes in future years, the estimated average per person expenditure level changes. The Simulator uses the current breakdown of spending by age in a country to extrapolate future spending as the population ages. A country like Fiji, which is assumed to have fairly similar per person spending levels across the life-course, will likely see expenditure rise only slowly with population ageing, which is shown in screenshot S2, while Australia, which has much higher per person spending on older people compared to younger people, would experience a rapid increase in spending as the population ages. The different health spending per person by age scenarios included in the PASH Simulator are shown in Figure A1 in Annex A.

Details of health expenditure by age are available for only some countries in the Region and, where available, these inform the estimates in the Simulator. For other countries, health spending per capita at different ages has been estimated based on a number of assumptions. Baseline health expenditure profiles for the 14 countries covered in this policy brief are presented in Figure 1 and further outlined in Table A1 in the annex.

Future revenues are also estimated on the basis of current tax and contribution by age patterns

The Simulator estimates future revenues based on the current contribution of different revenue sources (e.g. income taxes, social contributions, and taxes on goods and services), each of which varies per person by age. As the population ages, with no change in policy there are assumed to be fewer formal workers (thereby reducing social contributions and income taxes, although income taxes are reduced less since they come both from labour- and non-labour-related sources). Alternatively, revenue from taxes on goods and services is more stable because it is collected from the whole population, including those who are no longer in formal work, and because consumption levels do not change substantively over the life-course. Property taxes are only collected from adults and are assumed not to vary much among adults. The baseline health revenue profile for Fiji (How is domestic general government health expenditure paid for?) is based on public revenue statistics and shown in screenshot S2 above.
The Simulator shows the per person financing gap that would arise as the population ages if there were no policy change

Putting the two sides together, the Simulator estimates the per person financing gap (deficit or surplus) that will arise from the effects of population ageing with no policy change and no increases in the productivity of workers. For ease of interpretation, the projections are indexed to a base year (where we assume that revenues perfectly finance expenditures in that base year). The Simulator then allows different policy options to be explored that can reduce the deficit or make use of the projected surplus to expand health care coverage. Screenshot S3 shows that in the case of Fiji no health financing policy gap is expected by 2100 if current policies remain unchanged. Since Fiji has a projected surplus, this could be used to expand health coverage, and this is explored in Example 4 later in the brief.

Screenshot S3: PASH simulator showing projected gap between health revenues and expenditures in Fiji, 2020–2100

What is not included?
The PASH Simulator tool does not include long-term care (social care). Patterns of long-term care revenues and expenditures by age follow very different patterns from health expenditures and vary greatly across countries. The evidence suggests that there is a direct effect of population ageing on long-term care expenditures (McGrail et al., 2000), but this increase is from a much lower expenditure baseline. As populations age, the balance between health and long-term care expenditures may change, and it is sensible to consider this in the context of the PASH Simulator’s findings.
5. What are the key health financing and revenue-raising patterns in the Western Pacific Region?

Public health expenditure is correlated with per capita GDP, current age structure of the population, and the extent to which countries spend on older people

Publicly financed health expenditure in countries in the Western Pacific Region is largely correlated with per capita GDP. Higher income countries in the Western Pacific Region spend more on health care than those with lower GDP per capita (Figure 2). Countries with higher GDP per capita also tend to have a higher share of income spend on health – Korea spends 5% of GDP on health, and Australia and New Zealand 7%. Japan spends the highest share of GDP on health at 9%. Vanuatu and Papua New Guinea spend less than 2% of GDP per capita on publicly financed health care.

Spending is also related to the current age structure of the population and the extent to which countries spend more per capita on older people (Williams et al., 2019). The higher proportionate spending in China (3%) as compared to Malaysia (2%) may partially reflect its higher proportion of older people. The countries with relatively low spending tend to currently have few older people and thus spend similar levels per person for all ages. They also tend to prioritize maternal and child health services. While this has often been the best use of very scarce public health care resources, with growing revenues and population ageing it is likely that priorities will need to shift gradually towards higher spending on care for older people.

Figure 2: There can be large variations in public health spending among countries with similar levels of per capita GDP

Notes: AUS = Australia, CHN = China, FJI = Fiji, JPN = Japan, KOR = Republic of Korea, MNG = Mongolia, MYS = Malaysia, NZL = New Zealand, PHL = Philippines, PNG = Papua New Guinea, SGP = Singapore, SLB = Solomon Islands, VUT = Vanuatu, WSM = Samoa; data is for 2020 (or nearest available year).
Singapore appears to be an outlier in terms of spending as a proportion of GDP, but it has higher absolute per capita health spending than all countries in the Region except Japan and Australia. Its relatively younger population compared to countries such as Japan and the Republic of Korea and very high GDP per capita, may explain in part its current expenditure levels.

Revenue raising relies on a range of funding sources; this mix determines how vulnerable revenue is to population ageing

Figure 3 shows how different countries in the Region currently raise revenues for public or compulsory government-mandated health care.

**Figure 3: There is a large variation in the mix of revenue sources for domestic general government health expenditure**

All countries use more than one source for public health care revenues, but the balance varies and with this the vulnerability to the effects of population ageing on revenues. China, Japan and the Republic of Korea all have more than half of their government health revenues raised from social contributions. These countries have a high proportion of the working population in formal employment, where taxing labour is relatively easy. Most Pacific Island countries rely heavily on taxes on goods and services, reflecting the smaller proportion of the population in formal employment and, in some cases, less developed tax collection. Taxes on incomes, profits and capital gains form the main source of public funding in Australia, New Zealand, Malaysia, Papua New Guinea and Singapore.
6. How will ageing affect health care spending and revenues in the countries of the Region?

The PASH Simulator can show whether countries are likely to experience health financing surpluses or deficits attributable to population ageing until 2100

In this section we use the PASH Simulator to explore how changes in the population age mix will alter health expenditures and revenues until 2100 if current spending patterns, financing mechanisms and labour productivity are assumed to be unchanged in the future.

As discussed above, there are several factors that drive the projections:

- How rapidly is the population of older people increasing?
- How much more is spent per person on older people compared to younger people in each country?
- To what extent will future revenues change with population ageing?

Figure 4 provides an overall picture on how the financing gap in each country would look given current projections on ageing, current patterns of spending by age, and current policies on public funding of care.

The financing gap is measured in ‘base points’. One base point in each country is 1% of that country’s health spending in a base year. The projections in Figure 4 do not reflect absolute deficits or surpluses, but rather gaps relative to base year spending. Later in the brief, where we refer to financing gaps in dollars per person, we do so based on 2018 spending levels.

Figure 4: With no change in policy, six countries are expected to have a health financing surplus in 2040 and eight would face a deficit

![Graph showing the estimated financing gap between health revenues and expenditures as a result of population ageing by 2040 and 2100 (base points).]


Notes: The figure shows the estimated financing gap between health revenues and expenditures as a result of population ageing by 2040 and 2100 (base points).

AUS = Australia, CHN = China, FJI = Fiji, JPN = Japan, KOR = Republic of Korea, MNG = Mongolia, MYS = Malaysia, NZL = New Zealand, PHL = Philippines, PNG = Papua New Guinea, SGP = Singapore, SLB = Solomon Islands, VUT = Vanuatu, WSM = Samoa; data is for 2020.
Countries with projected surpluses are typically ones with a diverse revenue base where revenues grow with the growing size of the workforce, and where current spending does not currently vary substantially by age

Given current policies and practices, six countries would have a financing surplus in 2040 (Fiji, Malaysia, Papua New Guinea, Samoa, Vanuatu), and five a surplus in 2100 (the aforementioned countries except Malaysia). The Republic of Korea would face the largest projected financing deficits. Large deficits are also projected for China, Japan, New Zealand and Singapore.

The Pacific Island countries and Papua New Guinea are projected to have only modest increases in spending as their populations age – partly because of low current expenditure levels and the assumption that they do not currently spend much larger amounts on older people compared to younger people. In these countries it would be possible to expand coverage of publicly financed care without any change in revenue sources. They currently rely on revenue collection tools (largely taxes on goods and services) that are relatively unaffected by ageing, and this, combined with expected economic growth from a growing labour force, is assumed to produce a financing surplus.

Eight countries would have a financing deficit in 2040 that increases by 2100. From the perspective of changes in expenditure, the countries facing the most dramatic age-demographic changes that will also dramatically affect spending growth include the Republic of Korea, China and the Philippines – they all have very rapid increases in older people and higher spending on older people relative to younger people. China and Japan face a decline in revenues due to their high reliance on social contributions and, in the case of China, this is combined with rapid population ageing. The Republic of Korea has the largest emerging financing deficit – its rapidly growing older population, high spending on older people and reliance on payroll-based revenues combine to make the deficit increase rapidly. Singapore has rapid population ageing but is to some extent protected by the diversity of its revenue sources. Although Japan has relatively slow ageing in future years, its reliance on social contributions partly explains the rising deficit. Australia and New Zealand have a combination of substantial ageing and large differences in spending on different age groups, leading to projected deficits.

7. Exploring the effects of policy changes using the PASH Simulator

The PASH Simulator allows a user to test policy changes that affect health expenditures or revenues

Figure 4 provides some estimates of how the financing deficit (or surplus) is likely to emerge given current approaches for spending and revenue raising. In this section some examples are provided on how changes to policy might affect the extent or timing of any financing deficits or surpluses. We test out the effects of possible policy changes that might affect expenditures (through reducing care needs, increasing efficiency or improving access to care) or revenues (by changing the mix of revenue sources and labour productivity). Box 3 provides an overview of some of the policy options that countries might consider; some of these are explored in detail below.

Simulation examples below show likely effects of a single policy change, although in reality countries will use a mix of policies to address their specific challenges

Below we consider some examples of how projected revenues and expenditures would be affected by policy changes using countries that are either most at risk of high deficits or those where current policy and practice would lead to surpluses. Only one policy change is explored in each case to allow a clearer understanding of how each might perform. In reality it is likely that countries will use a number of different policy changes to meet their particular challenges, but the aim in this brief is to allow a focus on the likely effects of policy options. As discussed above, the Simulator does not make assumptions about possible improvements in labour productivity or possible associated increases in the tax base. However, some simple discussion of possible effects of increased productivity is included in the discussion about the Republic of Korea as well as in Annex B.
Example 1: Changing revenue sources can help to close the financing deficit in the Republic of Korea

Replacing part of social health insurance contributions with taxation can reduce the financing deficit

It has been shown above that the Republic of Korea faces the twin challenges of expected increases in population ageing-related health care expenditures and projected decreases in revenues, due in part to the high dependence on social contributions. A simple policy change is to broaden the base of revenue by replacing part of the payroll-based social health insurance contributions with a wider tax on incomes and on goods and services.

Changing the mix of revenue sources has been common in systems that have historically relied on social contributions; for example, in France, where social contributions used to provide most of the public health care funds, an earmarked income tax now accounts for around a third of public finance, and taxes on alcohol, tobacco and pharmaceuticals for 12%, leaving social contributions at around one half.
There is an opportunity in the Republic of Korea to do this carefully and deliberately, and to adapt the financing system to avoid a revenue deficit. In this example, the share of revenues from social insurance contributions would fall from 72% to 15%, with wider income tax revenues increasing to 35% and tax on goods and services to 46% (see Figure 5).

**Figure 5:** *The simulated new revenue mix for the Republic of Korea assumes a higher share of revenues from taxation*

There is an opportunity in the Republic of Korea to do this carefully and deliberately, and to adapt the financing system to avoid a revenue deficit. In this example, the share of revenues from social insurance contributions would fall from 72% to 15%, with wider income tax revenues increasing to 35% and tax on goods and services to 46% (see Figure 5).

**This simulated change postpones the emergence of the financing deficit by around 3 years and reduces the deficit overall**

Figure 6 shows the likely effect of this change on the financing gap (right panel). Compared to the no-change scenario (left panel) the financing deficit by 2100 would be reduced by the equivalent of nearly $400 per capita (based on 2018 expenditure levels) or around one quarter of the deficit. The challenge facing the Republic of Korea comes mainly from the rapid ageing and growing care needs, and a rapid decline in the population of working age. To some extent this can be accommodated by diversification in the sources of revenues.

**Figure 6:** *Broadening the sources of revenues can postpone the revenue deficit in the Republic of Korea*

The implications of population ageing for health financing in the Western Pacific Region

The projected demographic changes in Republic of Korea potentially present some of the largest challenges for health care finance and development. The rapid development of the economy has been based both on substantial capital investment and increases in labour productivity. The extent to which increased productivity could offset some of the other changes is explored in Annex B.

**Example 2: Exploring the scope to use the projected surplus to expand services and population coverage in Papua New Guinea**

*A financing surplus can be used to increase health coverage without creating a deficit*

Papua New Guinea has a projected surplus in 2040 and 2100, due mostly to the stable projections of public revenues and the effects of a growing labour force. It also has quite low coverage of public health services at all ages and low utilization of public health facilities, particularly in rural and remote areas where the majority of the population lives (Grundy, 2019). This allows for the possibility of some widening of access to care. The scenario here uses some of this projected surplus to expand coverage – in this example, spending would increase, gradually rising to $19 per capita (in 2018 USD) by 2100.

Figure 7 shows how this change would still leave a projected surplus. Larger increases in coverage would likely be possible without creating a financing deficit.

![Figure 7: Health care coverage can be expanded for all age groups to use some of the projected revenue surplus](image)


Given the relatively low levels of public health care spending, the relatively low levels of spending on older people and the projected surplus, it is feasible for Papua New Guinea to plan for a gradual increase in public health coverage and expenditure without generating a financing deficit.

**Example 3: Exploring the effects of successful public health policies that reduce per person health care costs by promoting health and wellbeing across the life-course in New Zealand**

*Policies to improve health at all ages can help to slow projected growth in health spending*

There is good evidence that policies that aim to improve health at all ages can be effective as well as cost-effective (European Observatory on Health Systems and Policies 2021; McDaid and Park, 2022; WHO, 2020). Better health through the life-course can contribute to maintaining and improving functional ability, thereby lowering the need for health care and reducing growth in per capita health spending as people age. The scenario explored in this example demonstrates the consequences of successful improvement of health at all ages in New Zealand. As shown in Figure 8, policies to improve health can help to lower projected growth in health spending, reducing expenditures by around $770 per person (in 2018 USD) in 2100. While there is still a financing deficit in 2100, the deficit only emerges after 2050.
Numerous policy actions are available to promote health across the life-course so that people can age in good health. As outlined in the WHO Regional Action Plan on Healthy Ageing in the Western Pacific, these strategies range from those that target individuals or groups to improve health behaviours to wider actions that seek to address the social determinants of health or create age-friendly physical environments (WHO, 2020). Some of the most cost-effective strategies for improving health across the life-course – identified as ‘best buy’ strategies by the WHO (WHO, 2011) – are those implemented outside of the health sector at the population level, such as regulations and taxes on tobacco, alcohol and unhealthy foods. Nevertheless, strong health systems remain central to promoting good health at older ages; it is therefore important that accessible, high-quality and coordinated primary care, prevention activities, long-term care and social services are available in all countries.

As can be seen in this simulated policy, New Zealand has a relatively small projected deficit in 2040, and the modelled policy change would postpone the deficit until after 2040. This comes in part as a result of the relatively stable revenue from the mix of sources of funds. As a contrast to the very challenging changes facing the Republic of Korea, the effects of increased labour productivity in New Zealand are modelled in Annex B.

Example 4: Expanding coverage for people over 60 in Fiji

**Health coverage for older people can be expanded using revenue surpluses as the population ages**

In this scenario, the policy change focuses only on expanded coverage for older people. Fiji has a projected surplus, and some of this could be used to provide for the existing and growing needs for care for people over 60. The scenario that is modelled would increase spending by the equivalent of $9 per person (in 2018 USD) by the year 2100, but this is focused on increasing coverage for older people. The effects of this improved coverage are shown in Figure 9 (right panel).
It can be seen from Figure 9 that there is scope for this increase in spending without running into a funding deficit, and indeed a larger increase in spending is feasible.

8. Conclusion: Financing health care is a universal challenge

**Most countries will see their health spending grow as their populations age**

Although the effect of population ageing on health care expenditures is often exaggerated (Cylus, Figueras & Normand, 2019), most countries will see some growth in health spending as their age mix evolves. In some countries the growing expenditures are also in the context of an ageing and declining workforce. Unless workers become more productive there is a risk that national income and tax revenues will fall.

**Patterns of ageing differ among countries; revenue and spending policies affect their vulnerability to future age-demographic changes**

Countries in the Western Pacific Region face different patterns of ageing, but in all cases the proportion of people over 65 is rising rapidly. Some countries can accommodate this more easily since they also have a growing population of working age, but others face the dual challenges of rising needs and potentially falling revenues. While affordability of public health care mainly reflects the national income of a country, the simulations show that the way in which revenues are raised affects the stability of revenues and whether revenues will be adequate to meet expenditure needs. Some changes in the mix of revenue sources can contribute to reducing the financing deficit, as was shown in the example above for the Republic of Korea.

**Demographic changes often bring a change in health care priorities and the examples of PASH simulations show that countries can indeed effectively respond to these changes**

The burden of disease is shifting from maternal and child health and infectious disease to chronic, non-communicable disease in many countries. This is widely recognized in the Region and is particularly important in countries with a relatively young but rapidly ageing population. The simulations in this policy brief suggest that, to some extent, such countries can increase resources for health in response to these changes.

All countries aspire to improving health across the life-course. In the context of a population with relatively slow ageing, the simulation for New Zealand shows that successful improvements in health, especially the health of older people, may offset much of the effect of ageing.

**The PASH Simulator serves as a ‘thought-experiment’ rather than a prediction tool**

The aim of the PASH Simulator is to support countries in looking at future patterns of ageing and related health care needs if care patterns and approaches to financing remain constant in the future, and to understand options to address the associated issues in terms of service provision and funding. While this analysis has explored a range of possible scenarios, there are many other policy challenges policy-makers may want to consider, including the level of informality, reliance on external sources of financing, and the quality and availability of service delivery, among others. Some of these challenges may be possible to consider using the PASH Simulator on a country-by-country basis.

Some countries face problems mainly on the expenditure side, where the number of older people is rising rapidly, and some mainly on the revenue side, where sources are unstable; others face challenges on both sides of the equation. Policy developments are likely to focus both on how services can meet future needs, but also on how the growth in costs can be controlled and managed. On the revenue side, it is important to ensure that health care revenues are mobilized in a reliable and sustainable way.
References


Annex A

Figure A1: Health expenditure profiles in PASH Simulator

How does domestic general government health expenditure vary by age

- Profile A (EU average)
- Profile B
- Profile C
- Profile D
- Profile E
- Profile F

Per person expenditure level

Age Group
Table A1: Choice of baseline health expenditure profile for each case study country

<table>
<thead>
<tr>
<th>Country</th>
<th>Baseline health profile used for estimations</th>
<th>Rationale for choosing baseline expenditure profile</th>
</tr>
</thead>
</table>
| China                | Profile D                                   | • Good coverage for older people  
• Similar to estimated spending by age data shown here: [https://www.dovepress.com/the-effect-of-population-aging-on-healthcare-expenditure-from-a-health-peer-reviewed-fulltext-article-RMHP](https://www.dovepress.com/the-effect-of-population-aging-on-healthcare-expenditure-from-a-health-peer-reviewed-fulltext-article-RMHP) |
| Fiji                 | Profile F                                   | • Low health spending overall  
• Low per capita health spending  
• Limited formal coverage for older people |
| Japan                | Profile B                                   | • Similar to actual health spending by age data available here: [https://www.mhlw.go.jp/toukei/saikin/hw/iryohi/17/dl/data.pdf](https://www.mhlw.go.jp/toukei/saikin/hw/iryohi/17/dl/data.pdf) |
| Malaysia             | Profile E                                   | • Relatively low per capita health spending  
• Expanding but still developing services for older people |
| Mongolia             | Profile E                                   | • Similar to actual health spending by age data available here: [https://tinyurl.com/2p834upp](https://tinyurl.com/2p834upp) |
| Papua New Guinea     | Profile F                                   | • Low health spending overall  
• Low per capita health spending  
• Limited formal coverage for older people |
| Republic of Korea    | Profile B                                   | • Similar to actual health spending by age data available here: [https://stats.oecd.org](https://stats.oecd.org) |
| Samoa                | Profile F                                   | • Low health spending overall  
• Low per capita health spending  
• Limited formal coverage for older people |
| Singapore            | Profile A                                   | • High per capita health spending  
• Good coverage for older people |
| Solomon Islands      | Profile F                                   | • Low health spending overall  
• Low per capita health spending  
• Limited formal coverage for older people |
| Vanuatu              | Profile F                                   | • Low health spending overall  
• Low per capita health spending  
• Limited formal coverage for older people |
Annex B

Can improved labour productivity help to reduce financing deficits? Some estimates for the Republic of Korea and New Zealand

If increased productivity were to increase the tax base by the equivalent proportion to the increase in productivity, it is possible to explore the effects of this on the future patterns of revenues and deficits. The estimates below are for 2040. Given the contrasting population projections for the Republic of Korea and New Zealand (the current proportions of older people are very similar but will be very different by 2040), we can see that the productivity growth required to avoid financing deficits is much greater for the Republic of Korea.

Republic of Korea

The rapid development of the economy in the Republic of Korea has been driven by innovation, investment in capital equipment and upskilling the workforce. One effect has been a large increase in labour productivity over recent decades. For the reasons given above, the PASH Simulator does not assume increased labour productivity, but in the context of the projected demographic changes in the Republic of Korea, there are strong incentives to support increased output per worker. Over the last 10 years, the Republic of Korea has experienced an average of around 1.8% annual gain in labour productivity, down from an average of nearly 5.7% between 1992 and 2001, and 7.3% between 1982 and 1991 (OECD. Stat, 2022). In the table below it is assumed that the gains in labour productivity translate into equivalent increases in the tax base overall (which has only been the case in some countries).

Financing deficit (surplus), Republic of Korea 2040

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Financing deficit (surplus) in base points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline scenario deficit in 2040</td>
<td>49.6</td>
</tr>
<tr>
<td>Baseline scenario deficit with 1% productivity growth</td>
<td>29.6</td>
</tr>
<tr>
<td>Baseline deficit with 2% productivity growth</td>
<td>5.6</td>
</tr>
<tr>
<td>Policy option</td>
<td>31.3</td>
</tr>
<tr>
<td>Policy option with 1% productivity growth</td>
<td>7.3</td>
</tr>
<tr>
<td>Policy option with 2% productivity growth</td>
<td>-(21.6)</td>
</tr>
</tbody>
</table>

The productivity growth required to avoid a financing deficit in 2040 is 2.3% with the baseline policy. This is below historical rates but above the recent experience. The necessary increase is 1.4% for the modelled policy option. This is below the recent rates of productivity gains, but the overall trend has been falling.

New Zealand

Over the last 10 years, New Zealand has experienced an average of around 1.5% annual gain in labour productivity, down from an average of nearly 2.5% between 1992 and 2001, and 2.8% between 1982 and 1991 (OECD. Stat, 2022).

Financing deficit (surplus), New Zealand 2040

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Financing deficit (surplus) in base points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline scenario deficit in 2040</td>
<td>15.9</td>
</tr>
<tr>
<td>Baseline scenario deficit with 1% productivity growth</td>
<td>-(6.6)</td>
</tr>
<tr>
<td>Baseline deficit with 2% productivity growth</td>
<td>-(33.8)</td>
</tr>
<tr>
<td>Policy option</td>
<td>-(3.5)</td>
</tr>
<tr>
<td>Policy option with 1% productivity growth</td>
<td>-(53.2)</td>
</tr>
<tr>
<td>Policy option with 2% productivity growth</td>
<td>-(106.3)</td>
</tr>
</tbody>
</table>

In the baseline scenario, the necessary productivity growth to avoid a deficit in 2040 would be 0.8% and for the policy option there is no deficit in 2040 even with no productivity gains.
The European Observatory on Health Systems and Policies is a partnership that supports and promotes evidence-based health policy-making through comprehensive and rigorous analysis of health systems. It brings together a wide range of policy-makers, academics and practitioners to analyse trends in health reform, drawing on global experience to illuminate policy issues. The Observatory’s products are available on its web site (www.healthobservatory.eu).

The World Health Organization (WHO) Centre for Health Development (the “WHO Kobe Centre”), was established in Kobe, Japan, in 1995 as an outposted office to WHO Headquarters and a global research centre. The Centre supports research on Universal Health Coverage, capacity building and information exchange.