

# The economics of healthy and active ageing series

## SUSTAINABLE HEALTH FINANCING WITH AN AGEING POPULATION

Will population ageing lead to uncontrolled health expenditure growth?

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Sustainable health financing with an ageing population:  
will population ageing lead to uncontrolled health expenditure growth?

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<b>Contents</b>	page
Key messages	5
Executive summary	6
Introduction	7
How will population ageing affect health expenditure growth?	8
How would population ageing affect health expenditure growth <i>if</i> older people were more costly to care for than they are now?	10
Policy options to control growth in health expenditures, particularly as populations age	13
Discussion	14
References	17
Annex	18

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## About the series

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Population ageing is often perceived negatively from an economic standpoint. Yet, taking a more balanced view, it becomes evident that a growing older population is not necessarily very costly to care for, and that older people provide significant economic and societal benefits – particularly if they are healthy and active. This is the broad perspective of the Economics of Healthy and Active Ageing series: to inspire a “rethink” of the economic consequences of population ageing.

In this series we investigate key policy questions associated with population ageing, bringing together findings from research and country experiences. We review what is known about the health and long-term care costs of older people and consider many of the economic and societal benefits of healthy ageing. We also explore policy options within the health and long-term care sectors, as well as other areas beyond the care sector, which either minimize avoidable health and long-term care costs, support older people so that they can continue to contribute meaningfully to society, or otherwise contribute to the sustainability of care systems in the context of changing age demographics.

The outputs of this study series take a variety of brief formats that are accessible, policy-relevant and can be rapidly disseminated.

## About this brief

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This brief considers how population ageing is likely to affect health expenditure growth in countries at different stages of the age-demographic transition over the next 40 years. We develop projections of health spending due to population ageing and explore how future health spending patterns could vary if health care costs for older people were markedly higher than they are currently. The results confirm that population ageing is not and will not become the primary driver of health expenditure growth. In relatively younger countries that still need to scale-up their health systems to deliver adequate care to future older populations, now is a good time to begin investing in the health system to spread costs over a long period of time. We conclude by considering some of the policy options that can effectively moderate growth in health spending as populations age.

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## Acronyms

<b>AWG</b>	Working Group on Ageing Populations and Sustainability
<b>DALY</b>	Disability-adjusted life years
<b>EU</b>	European Union
<b>GDP</b>	Gross domestic product
<b>HTA</b>	Health technology assessment
<b>LMIC</b>	Low- and middle-income countries
<b>LTC</b>	Long-term care
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UNICEF</b>	United Nations Children's Fund
<b>WHO</b>	World Health Organization

## Boxes and figures

### Boxes

<b>Box 1:</b> Data and methods for population ageing projections	7
<b>Box 2:</b> Description of hypothetical scenarios 1-5	10

### Figures

<b>Figure 1:</b> Per person health expenditure by age group, 2007–2016, EU average	8
<b>Figure 2:</b> Additional growth in per person health expenditure attributable to population ageing, EU and Japan, 2015–2060	9
<b>Figure 3:</b> Additional growth in per person health expenditure attributable to an ageing population, Indonesia, 2015–2060, assuming health spending is scaled-up over 5, 10 and 15 years to be comparable with EU average health spending by age patterns	9
<b>Figure 4:</b> Per person health expenditure by age group, baseline and hypothetical scenarios	11
<b>Figure 5:</b> Average annual increase in health expenditures as a share of GDP between 2020 and 2060 as a result of population ageing under current health expenditure by age patterns (Scenario 0) and the hypothetical scenarios (Scenarios 1–5)	12

## Key messages

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- Per person health expenditures are generally higher among older people than younger people – particularly in developed health systems. As such, policy-makers often assume that population ageing will result in unconstrained growth in health spending.
- However, by applying data on public health expenditure patterns by age from European Union (EU) countries to population projections for both the EU and Japan, we find that health spending growth attributable to population ageing will be marginal through 2060, adding less than 1 percentage point per year to per person annual growth.
- Applying the same public health expenditure by age data to population projections for Indonesia, we estimate the costs of “scaling-up” a health system to meet the care needs of an ageing population. We find that this too can be modest, especially if investments are made before a large share of the population is at older ages, and if scaling-up is spread out over time.
- In recognition that future expenditure patterns may vary due to a number of other factors that relate to changes in the age-mix, we develop a series of hypothetical scenarios where per person health expenditures are even higher for older people compared with their younger counterparts than the most recent EU health expenditure data suggest.
- However, even in the most “extreme” hypothetical scenario presented here, designed to be consistent with an increase in the volume, price, intensity and coverage of services for older people under the public health budget, population ageing only increases the overall EU health spending share of GDP in 2060 by 0.85 more percentage points than it would according to projections based on current expenditure by age patterns; 1.00 more percentage point for Japan; and 1.67 percentage points more for Indonesia, assuming that health spending is scaled-up to reach the EU average over 15 years.
- Taken together, these findings suggest that population ageing is not, and will not become, a major driver of growth in health expenditures.
- Policy choices still play an important role in determining the ways in which health spending trends will materialize. Such choices determine how health services are delivered, the prices paid for goods and services, and how coverage decisions are made. While ageing will not become the main driver of health expenditure growth, effective policy options can be implemented to moderate the growth in health expenditures as populations age.

## Executive summary

Countries around the world are experiencing changes in the age-mix of their populations. In Japan, for example, one third of the population is already 60 years old or older. In countries such as Indonesia, life expectancy is increasing rapidly due to more recent successes in communicable disease control and reductions in premature mortality. Regardless of a country's stage of the age-demographic transition, many policy-makers are concerned that as populations age, this will lead to inexorable growth in health care expenditures.

Expenditure data from developed health systems in the EU would, at first glance, seem to validate this concern. People in older age groups do, on average, have substantially higher health care expenditures than those in younger age groups. However, this does not mean that population ageing will lead to large increases in health expenditure growth. Indeed, our projections to 2060 for the total EU population suggest that population ageing plays only a minor role in driving health expenditure growth, with the contribution of population ageing to health expenditure growth expected to decline over time.

Using population projections for both the EU and Japan, assuming per person health spending patterns by age that are consistent with current EU averages, population ageing is expected to contribute less than 1 percentage point to per person average annual growth over the next 40 years. This implies an increase in health spending as a share of gross domestic product (GDP) of 1.3 percentage points in the EU, and 1.8 percentage points in Japan between 2020 and 2060.

Using population projections for Indonesia, we estimate the costs of "scaling-up" a health system over five, 10 and 15 years to meet the future care needs of an older population. This simulation suggests that, for countries where age demographics are changing but the size of the older population is not yet large, the costs of improving coverage and access to services for older people is manageable, adding at most 1.6 percentage points to per person average annual growth if investments are spread out over 15 years. The simulation suggests that now is a good time to begin investing in the health system while the population is relatively young.

While population ageing by itself will cause an arguably small increase in the total share of the economy spent on health over the next 40 years, a key factor determining the extent to which population ageing affects health expenditure growth is the magnitude of the difference in average per person spending levels between older and younger age groups. If older age groups become disproportionately more expensive to care for in the future as compared with younger people, the effects for health expenditure growth patterns of having a larger share of the population at older ages could be greater.

In recognition that a number of factors could nevertheless alter the way population ageing influences future expenditure patterns, we develop a series of hypothetical scenarios in which per person expenditure levels are higher for older people compared with their younger counterparts than those suggested by current EU data. These scenarios are intended to approximate an increase in demand and a concomitant increase in the volume of health services provided to older people; an increase in the intensity of services for older people; the introduction of a new high-cost medicine aimed primarily at older people; and a structural change in which spending on long-term care (including health and social care) is covered by public health budgets.

Under the most "extreme" hypothetical scenario studied here which combines elements of all four scenarios – an increase in volume, prices, intensity and coverage for older people – population ageing only increases the overall EU health spending share of GDP in 2060 by 0.85 more percentage points than it would according to projections based on current expenditure by age patterns; 1.0 more percentage point for Japan; and 1.67 percentage points more for Indonesia, assuming that health spending is scaled-up to reach the EU average over 15 years.

These findings suggest that while ageing will not become a main driver of health expenditure growth, there is still scope for policy intervention to control health expenditure growth, particularly as populations age. Effective policy options can be implemented to limit growth in health expenditures, including changes in how health services are delivered, prices paid (or negotiated) for services, coverage of medicines and new technologies, and volumes of care.



## Introduction

Most countries are experiencing population ageing in some form [1,2]. Increases in life expectancy result from declines in infant mortality, fertility, and premature death that are, in part, driven by effective public health policies and improvements in health care services. However, policy-makers are concerned about the associations between older ages and higher health care expenditures. Given that, on average, older people have higher health expenditures than younger people, the assumption is that health expenditures overall will rise as older people make up an increasing share of the population, thus challenging the sustainability of health systems [3–5]. Providing appropriate health and social care to an increasing number of persons as they age does place pressure on the health system. However, the extent to which ageing drives growth in health care spending has been long debated. Some authors have referred to this relationship between age and health spending as a “red herring” [6–8], arguing that biological age is not a good predictor of health status or health spending levels, and that proximity to death rather than calendar age itself is the primary reason for high health care expenditures among older people.

In this brief, we consider the role of population ageing as a determinant of health expenditure growth through a set of projections and hypothetical scenarios. We first review data on per person health spending by age groups in the EU between 2007 and 2016 to understand how spending patterns by age have evolved over time. Making use of these baseline expenditure data, we then forecast the contribution of population ageing to future expenditure growth from 2020 until 2060. Data and methods for these projections are outlined in Box 1. We explore effects of population ageing on health spending trends based on changes in the age structures of the EU, Japan and Indonesia: three settings at different stages of the age-demographic transition. In Europe, 23.8% of people were aged 60 years or older in 2015; 35% will be 60 years or older in 2060 [1]. In Japan, almost one third of the population was 60 years or older in 2015 and this is projected to increase to 44.3% by 2060 [1]. Similar to many other emerging middle-income countries, Indonesia’s population is relatively young, with 8.5% of people over the 60 years and older. Nevertheless, this share is expected to increase to 23.6% by 2060 [1].

To understand how variations in health spending by age patterns might alter how shifts in the population age structure affect future health spending growth, we next develop hypothetical scenarios that assume higher levels of per person health spending among older adults than those suggested by current data (Box 2). These scenarios are designed to reflect plausible, hypothetical increases in the volume of health services provided to older people; increases in the intensity of services for older people; the introduction of a new high-cost medicine aimed primarily at older people; and a structural change in which spending on long-term care (LTC) (including health and social care) is covered by

public health budgets. To conclude, we consider some of the policy options available that may be effective at moderating increases in age-related health care expenditures should these alternative scenarios come to be, while still delivering the most appropriate, high-quality care to meet the health and social care needs of an ageing population.

### Box 1: Data and methods for population ageing projections

Data on health spending by 5-year age groups are available every three years from 2007 to 2016 from the European Commission’s Ageing working group (EC AWG) for most EU countries. The data capture all public expenditures on health care less long-term care<sup>1</sup> and public expenditures on gross capital formation in health.<sup>2</sup> Each country’s per person health expenditures by age are divided by per person GDP and then averaged to calculate EU-wide health expenditures by age group in a given year.<sup>3</sup>

Population projections by age are available from Eurostat, the OECD and the United Nations Population Division for the EU, Japan and Indonesia [1,9,10]. To isolate the contribution of population ageing to future health expenditure growth for a particular country, we multiply the most recent average EU per person health expenditures for each age group by the respective age group’s population size and sum the resulting expenditure across all age groups; we then divide by the total population size. This leaves us with a per person health expenditure level which varies from year to year only due to changes in the age-mix of the population.

This type of model assumes that relative per person spending patterns by age remain constant. That is, any changes in other drivers of health care expenditures, such as prices, technology, quality and volume of care, affect all age groups equally in the future. Doing this allows us to isolate the effects of population ageing on expenditure trends. As a result, if people aged 65 years and over currently spend four times as much on health care as younger age groups, it is assumed this continues in the future, even if the actual level of spending has increased.

Less developed health systems may not have the same per person health expenditure patterns by age as those found in EU countries. In these settings there may be no notable differences in per person spending levels as people age. To estimate the potential costs of scaling up a health system to meet the health needs of an older population, we use the same modelling approach but instead of holding spending patterns by age constant in all projection years, we incrementally raise the per person spending by age to the EU spending levels over five, 10 and 15 years, respectively, for people 55 years and over to proxy the costs of investing in the health system over time (Annex 1). We apply this model to the Indonesian population projections in this brief.

#### Notes:

1. Expenditure categories HC1 to HC9, excluding HC3 (long-term care).
2. Classification of the Functions of Government (COFOG) 07 Health function excluding research and development.
3. Croatia, Denmark, France, Greece, Ireland, Latvia, Romania, and Spain are not included due to incomplete data.

## How will population ageing affect health expenditure growth?

### Health expenditures generally increase with age but appear to decline slightly among the oldest old

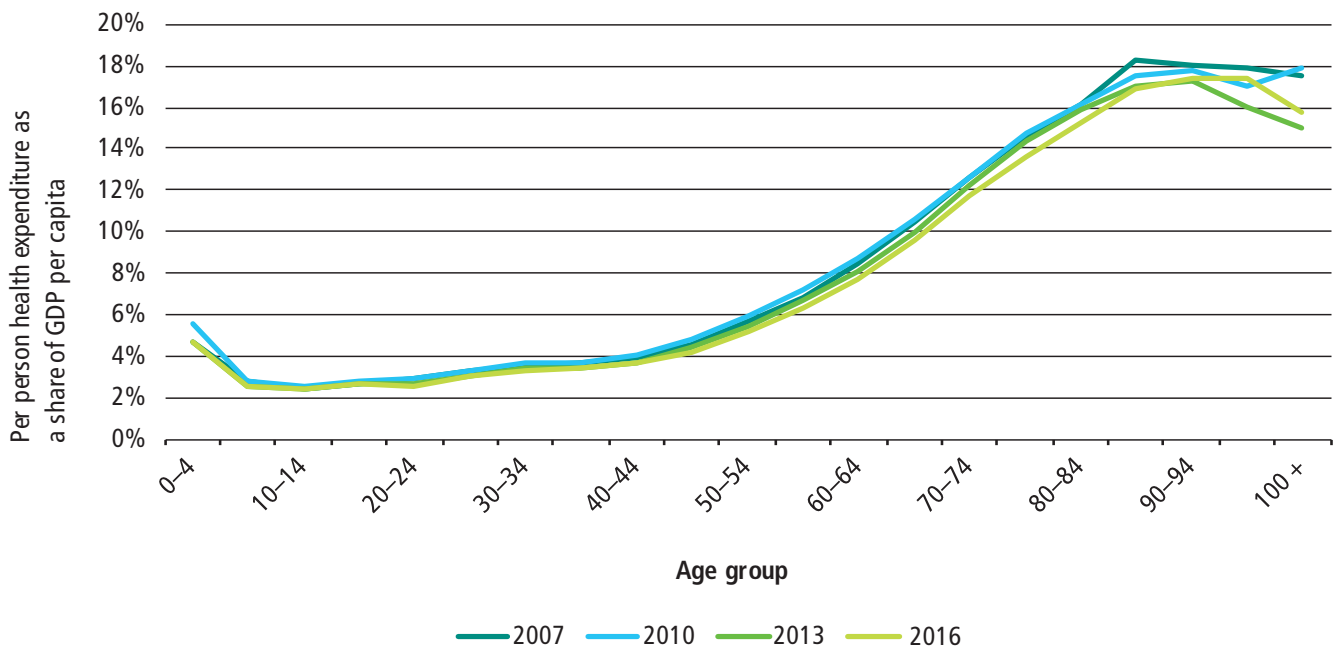
We first analyse the historical relationships between calendar age and per person health spending. Per capita health spending presented as a share of GDP is shown by age groups for the average EU country in three year intervals from 2007 to 2016 (Figure 1). As expected, health expenditures are relatively high at birth until 1 year of age. At about 50 years of age, health expenditures steadily increase until about 90 years of age, at which time they decline slightly. The per person health expenditure trends by age are remarkably similar in the four years with available data between 2007 and 2016. This suggests that spending patterns by age do not change very much over time; it also would seem to validate the analytical approach used in this brief, since we hold the relative spending between older and younger age groups in Figure 1 constant over time to model the contribution of population ageing to health expenditure growth.

### Growth in health expenditures due to population ageing is expected to be comparatively low, but may be higher in countries with relatively younger populations who are scaling-up their health systems

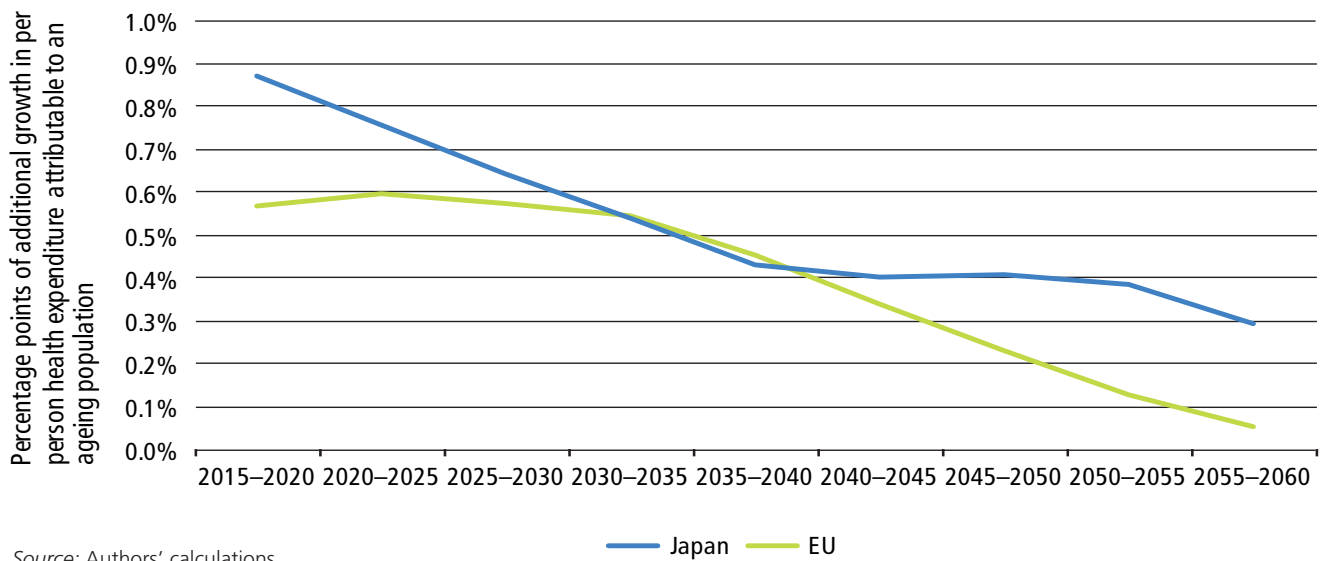
Using 2016 EU per person spending levels by age (Figure 1, the light green line), we project the contribution of population ageing to health care expenditure growth through 2060 for the EU and Japanese populations (Figure 2).

For the EU population, the additional growth in average annual per person spending attributable to population ageing is expected to peak at 0.6 percentage points per year between 2020 and 2025, before steadily declining to 0.07 percentage points per year in 2060. For the Japanese population, the data suggest that health expenditure growth attributable to population ageing has already peaked at 0.9 percentage points of additional growth per year between 2015 and 2020 and will continue an overall downward trend to reach 0.3 percentage points per year of additional growth between 2055 and 2060. To place this in context, the average nominal per person annual growth rate in health expenditure due to all causes including population ageing was approximately 4% in the United States and Japan and 5.8% in the United Kingdom between 2010–2018 [11]. One could infer then that in Japan, population ageing accounts for less than one quarter of per person health spending growth, with the remaining growth driven by prices, volume and technology.

Figure 1: Per person health expenditure by age group, 2007–2016, EU average



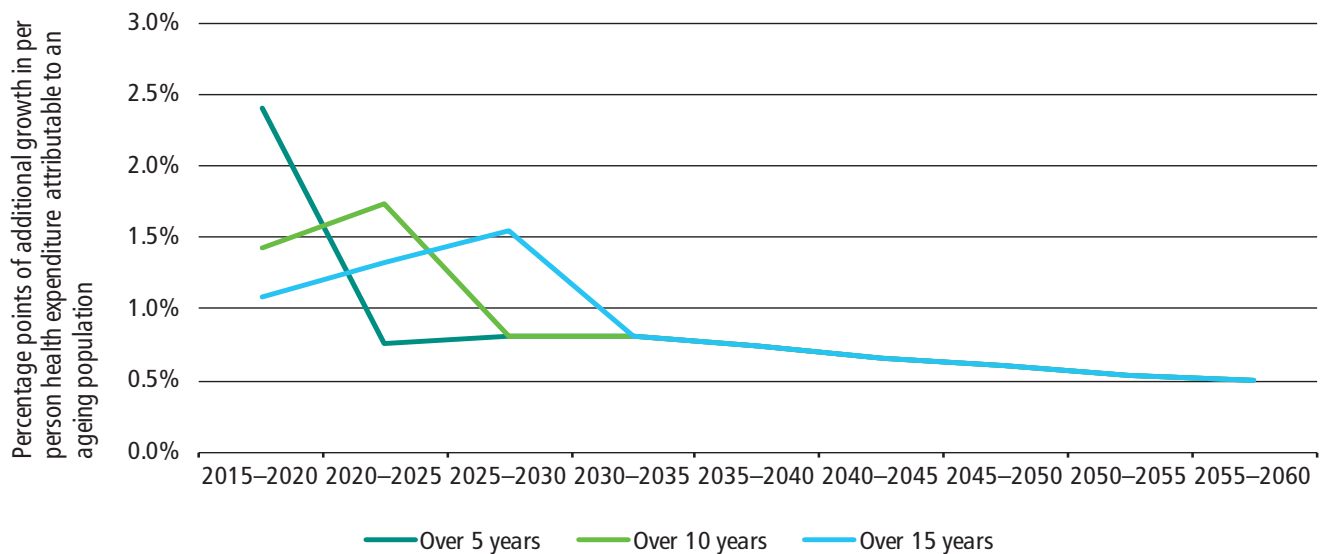
Source: Data from the European Commission Ageing Working Group (not published)

**Figure 2: Additional growth in per person health expenditure attributable to population ageing, EU and Japan, 2015–2060**

Source: Authors' calculations

In many countries with less developed health systems, spending by age patterns are likely to differ from those in the EU because of fewer entitlements and reduced access to care. We illustrate how population ageing may affect health spending growth under scenarios where health spending for older people is “scaled-up” to be comparable with the EU average over five, 10 and 15 years. This is undertaken using Indonesian population projections as an example to illustrate how the scale of health spending growth may be affected in a country with a relatively younger population experiencing rapid ageing, while simultaneously expanding health financing in an effort to move towards universal health coverage.

These projections suggest that if health spending were rapidly scaled-up over five years to be in line with average EU spending by age patterns, population ageing would contribute an additional 2.4 percentage points per year to growth in per person health expenditures between 2015–2020 (Figure 3). Extending the scaling-up period to 10 years or 15 years leads to a smaller increase in per person annual growth attributable to population ageing of 1.4% or 1.1% from 2015 to 2020 respectively. For all three scaling-up scenarios, additional health spending growth attributable to population ageing would be 0.8 percentage points or less after 2035, once the health system reached average EU expenditure by age patterns.

**Figure 3: Additional growth in per person health expenditure attributable to an ageing population, Indonesia, 2015–2060, assuming health spending is scaled-up over 5, 10 and 15 years to be comparable with EU average health spending by age patterns**

Source: Authors' calculations

### Population ageing on its own is expected to slowly (and only modestly) increase health spending as a share of the economy between now and 2060

The projections imply that population ageing will result in increases in health expenditures as a share of GDP by 1.8 percentage points in Japan and 1.3 percentage points in the EU between 2020 and 2060. This is not an insignificant additional share of the economy; however, it is important to note that this increase will occur slowly. In Japan, over this 40 year period, the average increase in the share of the economy spent on health as a result of population ageing would be around 0.05 percentage points per year and in the EU it would be 0.03 percentage points per year. Assuming that Indonesia scaled-up health spending for older people to be comparable with the EU average over a period of 15 years, health expenditure as a share of GDP would increase by a total of 3.0 percentage points over the same time period, corresponding to an increase of 0.08 percentage points per year.

Overall, the estimates coming out of this exercise suggest that using population data for the EU, Japan and Indonesia, population ageing is likely to contribute only modestly to health spending growth, irrespective of the current and future age structure of a country.

### How would population ageing affect health expenditure growth if older people were more costly to care for than they are now?

The projections shown above suggest that population ageing is not a major driver of growth in health spending. However, per person health spending by age patterns could differ markedly from those presented for the EU and used for these analyses. For example, spending by age patterns could differ due to variations by age in demand for care, in the intensity of treatment, in the price of new technologies and services, and in entitlements to care. Since these factors are likely to already vary from country-to-country and may change over time, we generate projections based on a series of hypothetical scenarios as a sort of sensitivity analysis (see Box 2) to explore how differences in the volume, price and intensity of care provided to older people, as well as the structure of the health care financing and delivery system for older people may influence health spending by age patterns and ultimately lead to differences in how population ageing shapes future health expenditure growth rates. Given that the baseline projections already suggest that age-related health expenditure growth is likely to be fairly modest, we only consider scenarios that portend greater challenges to explore whether population ageing could in fact become problematic.

It should be emphasized that the scenarios explored in this section are purely hypothetical and should *not* be viewed as forecasts of future health expenditures in any particular country or region. We are simply using population data from the EU, Japan and Indonesia to illustrate the implications of changes in determinants of health spending that could lead to increased health care expenditure levels for older people.

#### Box 2: Description of hypothetical scenarios 1–5

We present a series of hypothetical scenarios to consider how population ageing could have differential effects on future health spending growth due to changes in key factors that alter health spending at older ages. To do this, we adjust the EU per person health expenditure by age data (Figure 1) to reflect changes in the aforementioned factors and use an analogous modelling approach as described in Box 1.

Scenario 1, *greater volume* of services for older people, envisages an increase in demand and a concomitant increase in the volume of health services used by older people. We assume that such an increase might occur because of an expansion of morbidity leading to the early onset of care for chronic conditions. We modify actual EU per person health expenditures by assuming that health spending for each age group from 50–54 years and until 80 years is equivalent to baseline 2016 health expenditures for the respective age group 5 years older. For example, health spending for 60–64 year olds in this scenario would equal the actual spending of 65–69 year olds from the EU data. Spending for the 85 years and above age group relative to the 80 to 84 years age group in the hypothetical scenario is assumed to remain the same as in the actual EU spending data.

Scenario 2, *intensity*, envisions increased intensity of services for end-of-life care for older people. This may arise due to many policy choices, for instance if payment mechanisms for end-of-life care in hospitals were changed from case-based payments to fee for service, or alternatively if people under certain insurance schemes were no longer eligible to receive reimbursement for palliative care in hospices. In our hypothetical scenario, it is assumed that increased intensity results in higher health expenditures for individuals over 65 years of age, with the largest increase for those 85 years and older given that proximity to death is higher in this age group [6–8]. EU health spending data are modified to assume that health spending is increased by 2% for the 65–69 age group; 10% for 70–74 year olds; 25% for 75 to 79 year olds; 35% for 80 to 84 year olds and 45% for individuals over 85 years.

Scenario 3, *prices*, explores the impact of a new high-cost medicine for a chronic health condition which we assume is equally prevalent across people 60 years of age and older, but is not used by younger people. We base the cost of this hypothetical new medicine on the estimated annual cost of levodopa–carbidopa intestinal gel, an innovative treatment for advanced Parkinson disease, which costs around \$ 44 000 per person per year; the choice of this particular treatment is arbitrary and is used to give a rough sense of how much a new, high-cost medicine might cost [12]. In our analysis, we assume that this new medicine's relative cost remains the same across the projection period, although we acknowledge that in reality a new medicine would likely face generic competition at some stage, resulting in a price reduction.

Scenario 4, *structure*, we postulate that all spending on LTC (including health and social care) is absorbed into health budgets, and a vastly more comprehensive level of public LTC coverage is offered than that currently covered by the EU spending data. We assume that public expenditure on LTC is equal to 3.7% of GDP at baseline in 2015, which is equal to actual spending in the Netherlands, the highest spending on LTC in the EU [13]. The majority of this spending increase (50%) is allocated to individuals aged over 85 years given that they comprise the majority of LTC users in most countries, with 30% allocated to the 80–84 age group, 15% to the 75–79 age group, and 2.5% each to the 65–69 and 70–74 age groups, reflecting the lower probability of needing LTC at younger ages. It is important to re-emphasize that, while we are using Japanese population data to illustrate how future spending trends may be affected by different policy choices for countries at different stages of the age-demographic transition, we are not producing spending forecasts for Japan per se. Japan has already

established a comprehensive LTC insurance programme that offers extensive benefits and in reality would not need to increase LTC funding by 4.1% to offer comprehensive coverage [14].

Scenario 5, *combination*, assumes that the four scenarios occur simultaneously. Under these circumstances there would be many interactions between the scenarios making it difficult to accurately predict how health care expenditures for older people may be affected. For instance, while the introduction of a new medicine for treating a chronic condition may increase health care costs for older people, it may ultimately decrease the volume of treatment. Similarly, the introduction of a comprehensive LTC system may reduce spending in high intensity hospital settings. Given these interactions and the complexity of determining how they might influence health care costs at older ages, we arbitrarily assume that expenditure profiles by age equal to those in scenario four, with an increase in price, volume and intensity adding an additional 15% to health care expenditures for people 60 years and over.

Figure 4 illustrates how the five hypothetical scenarios might look in terms of per person expenditure patterns by age. Under all scenarios, health expenditures are greater for older people than shown in the actual 2016 EU data (Figure 1). In other words, a “steepening” of the health expenditure by age curve can be seen [15].

**Under the most “extreme” expenditure by age scenario, by 2060, health spending in the EU would consume a further 0.85 percentage points of GDP in excess of the increase expected based on current expenditure by age patterns**

Using EU population data, simulations that assume greater volume, prices, and intensity of services for older people

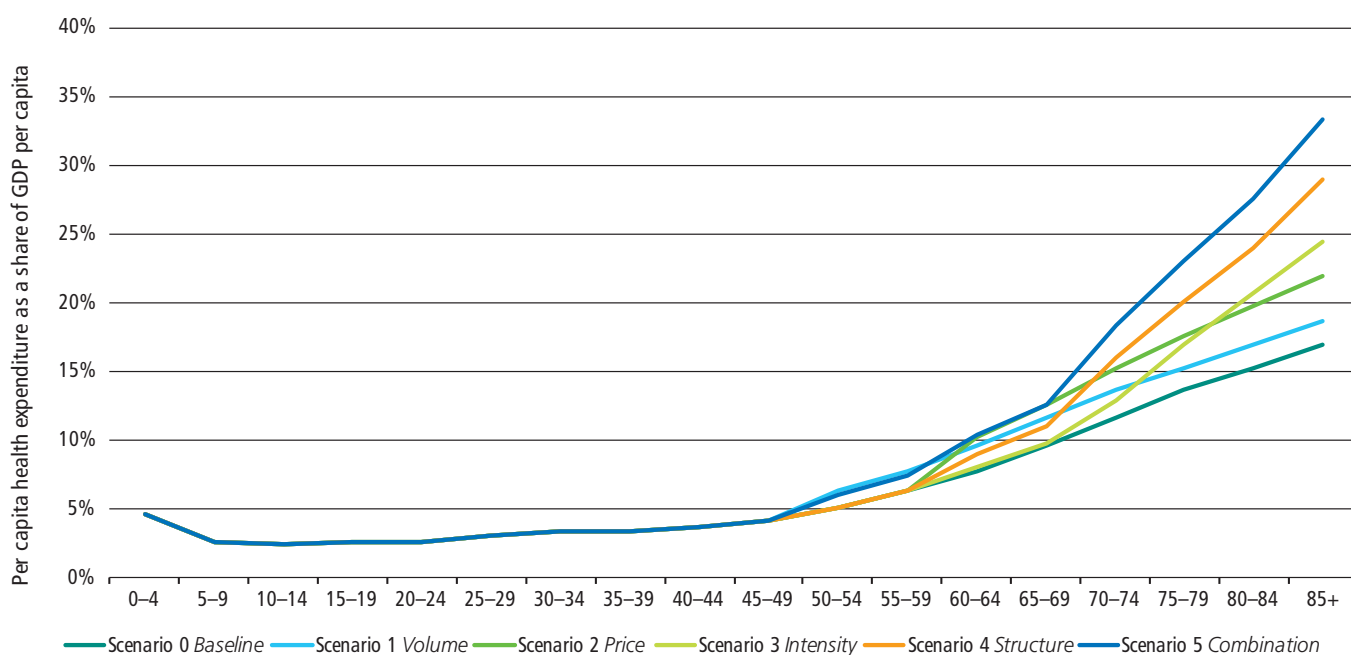
show a modest upwards impact on the growth in health expenditures from 2020 to 2060 due to population ageing.

Assuming baseline health expenditure as a share of GDP is equal to 8.1% – the average health share of GDP in EU countries in 2016 according to EC AWG data used for projections – population ageing under individual scenarios would cause health expenditures as a share of GDP to increase by between 1.3 percentage points (for scenario 1, *volume*) and 2.1 percentage points (for scenario 4, *structure*) in the EU from 2020 to 2060. Over the 40 year period, the average increase in the share of the economy spent on health as a result of population ageing under the hypothetical scenarios would be between 0.03 to 0.05 percentage points per year (Figure 5).

Under the most “extreme” scenario (*combination*), where all four scenarios occur simultaneously alongside an ageing population, health spending would increase by 2.2 percentage points of GDP from 2020 to 2060, or 0.06 percentage points per year, to reach 10.3%. As a comparison, health expenditure as a share of GDP in 2060 would be expected to reach 9.4% according to current expenditure by age patterns. This suggests that health spending in the EU under the extreme scenario would consume a further 0.85 percentage points of GDP in excess of the increase expected based on current expenditure by age patterns.

The additional growth in average annual per person spending attributable to population ageing under this extreme scenario would be expected to remain modest and to peak at 0.86 percentage points per year between 2020 and 2035, before steadily declining to 0.14 percentage points per year in 2060 (Annex; Figure A.1).

**Figure 4: Per person health expenditure by age group, baseline and hypothetical scenarios**



Source: Authors' calculations

**Under the most “extreme” expenditure by age scenario, by 2060, health spending in Japan would consume a further 1.0 percentage points of GDP in excess of the increase expected based on current expenditure by age patterns**

The effects of the hypothetical scenarios on future health expenditure growth are projected to be marginally higher when using Japanese rather than EU population data. Using Japanese population data, and once more assuming health expenditure as a share of GDP is equal to 8.1% at baseline, population ageing under individual scenarios would cause health expenditures as a share of GDP to increase by between 1.8 percentage points (scenario 1, *volume*) and 2.7 percentage points (scenario 4, *structure*) from 2020 to 2060. Over the 40 year period, the average increase in the share of the economy spent on health as a result of population ageing under the hypothetical scenarios would be between 0.05 to 0.07 percentage points per year (Figure 5).

Under the most “extreme” scenario (scenario 5, *combination*), health spending would increase by 2.8 percentage points of GDP from 2020 to 2060, or 0.07 percentage points per year, to reach 10.9% by 2060 as a result of population ageing. In comparison, health expenditure as a share of GDP in 2060 is projected to rise to 9.9% based on current expenditure by age patterns. As such, even this “extreme” scenario of all four policy changes occurring simultaneously would result in a difference in health spending of 1.0 percentage points of GDP in 2060, as

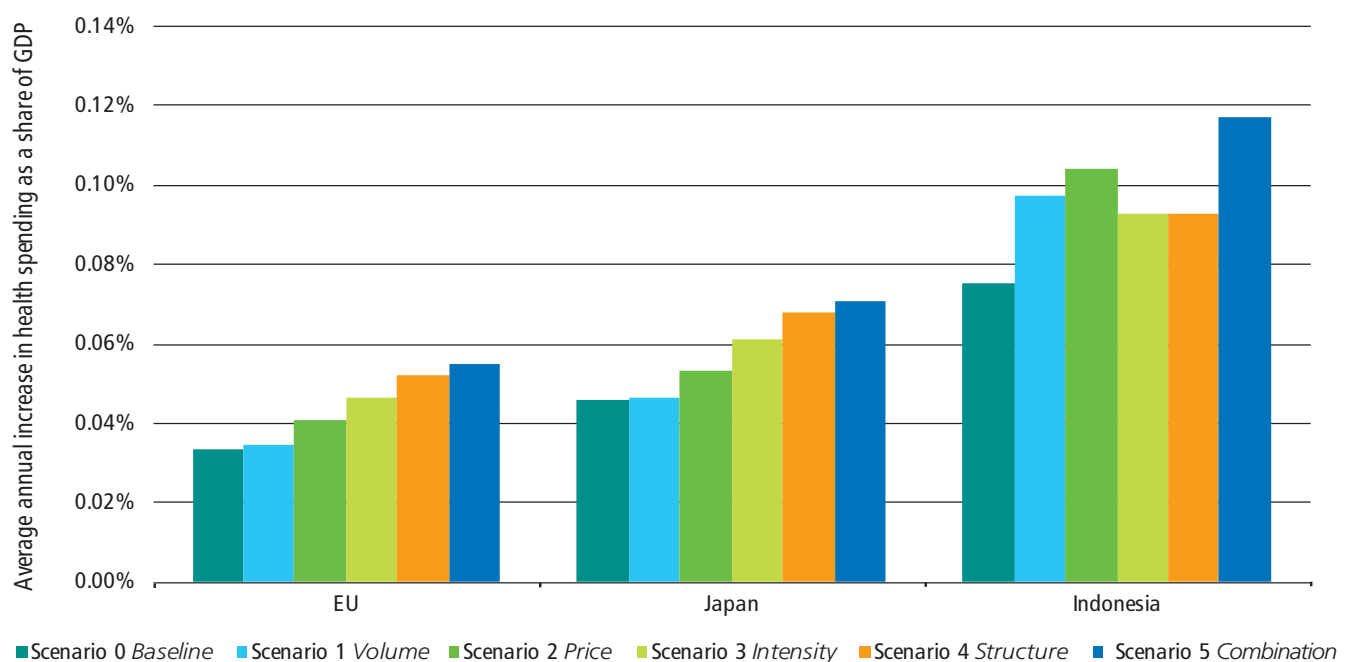
compared with the increase resulting from population ageing using the current expenditure by age patterns.

The additional growth in average annual per person spending attributable to population ageing under the most extreme scenario is expected to peak at 1.3 percentage points per year between 2020 and 2025, before steadily declining to 0.5 percentage points per year in 2060 (Annex, Figure A.2).

**Under the most “extreme” expenditure by age scenario, by 2060, health spending in Indonesia would consume a further 1.67 percentage points of GDP in excess of the increase expected based on current expenditure by age patterns**

Under an assumption that health spending in a country with Indonesia’s population structure is scaled-up over a period of 15 years to reach the EU average in 2030, expenditure by age patterns under the hypothetical scenarios as compared with the baseline expenditure by age patterns would see health expenditures increase by 3.9 (for scenario 1, *volume*), 4.2 (for scenario 2 *price*), 3.7 (for scenario 3, *intensity*) and 3.7 (for scenario 4, *structure*) percentage points of GDP from 2020 to 2060 due to population ageing. It is interesting to note that in contrast to projections using EU and Japanese population data, an increase in volume of care and prices are expected to lead to a greater increase in health spending as a share of GDP than a change in intensity or structure of care (Figure 5). This reflects where

**Figure 5: Average annual increase in health expenditures as a share of GDP between 2020 and 2060 as a result of population ageing under current health expenditure by age patterns (Scenario 0) and the hypothetical scenarios (Scenarios 1–5)**



Source: Authors' calculations

Indonesia has reached in the ageing transition, with a higher share of the population at younger ages compared with the EU and Japan.

If all four scenarios occurred concurrently alongside population ageing, while also assuming health spending is simultaneously scaled-up to reach the EU average under each scenario by 2030, population ageing would result in health spending consuming an additional 4.7 percentage points of GDP in 2060 than in 2020. This would translate to an average of about 0.12 additional percentage points of GDP spent on health annually (Figure 5), though much of the growth would occur during the early scaling-up period, which could present funding challenges.

Health expenditure as a share of GDP in 2060 would be expected to reach 12.8% under this “extreme” scenario, compared with 11.1% under the baseline scenario using current age spending profiles. As such, the scenario of all four policy changes would result in a difference in health spending of 1.67 percentage points of GDP in 2060 in Indonesia as compared with the increase resulting from population ageing alone in the baseline projection (where we also assume health spending is scaled-up over a period of 15 years to reach the EU average).

The additional growth in average annual per person spending due to population ageing under the most extreme scenario is expected to peak during the scaling-up period at 2.4 percentage points per year between 2025 and 2030, before declining to 0.7 percentage points per year between 2055 and 2060 (Annex, Figure A.3).

### Policy options to control growth in health expenditures, particularly as populations age

Our analysis suggests that population ageing on its own is not, and will not become, a major driver of growth in health expenditure. Rather, other determinants of the growth in spending such as prices, technologies, and the ways in which health services are organized, provided and paid for are more important. If these factors change substantially, then it is possible that health expenditure growth as populations age could be different than expected. Indeed, our projections based on hypothetical scenarios do indicate that if per person spending was considerably greater for older people than it is currently, there would be increases in health expenditure growth as the share of the population at older ages increases.

All countries – including those at a relatively early stage of the age-demographic transition but with growing numbers of older persons – do take policy actions to control health expenditure growth and ensure they obtain value for spending irrespective of their concerns over population ageing. Such policies include promoting healthy and active ageing to reduce demand for health care, reducing the prices for essential medicines, reducing the price of health services purchased, introducing technology into the system in a systematic way, and organizing health services to attain better value for health spending among others.

### Promoting healthy and active ageing to reduce demand for health care

Healthy and active ageing can help reduce the burden of disease and disability in older people and delay care dependency, contributing to reduced demand for health care. Policy actions to support healthy ageing can include more forceful and proven cost-effective approaches that target the wider population such as legislation and regulations restricting the advertising or sale of alcohol, tobacco products and unhealthy foods or taxes and other financial (dis)incentives that affect the price of (un)healthy foods and drinks. Behaviour change can also be encouraged through less coercive measures such as health education, nutrition labelling of food, prescribing exercise or placing health warnings on alcohol content and tobacco products. Policy actions may also target the prevention of falls, the leading cause of injury related DALYs (disability-adjusted life years) in people aged over 50 years [15], and the prevention of cognitive decline through, for example, the use of assistive home technologies, cognitive brain-training programmes and the promotion of exercise specifically tailored towards older people.

### Reducing prices for essential medicines

Spending on medicines accounts for a large share of total health spending globally [16]. To control medicines prices, countries have used external reference pricing as a benchmark when negotiating prices for procurement. They have also regulated mark-ups in the supply and distribution chains and exempted medicines and other pharmaceutical products from taxation. Many countries promote the use of generic essential medicines through multiple means, such as enabling early market entry of generics, legislating generic substitution policies, legislating the use of international nonproprietary names, and conducting consumer and professional education campaigns to increase acceptance of generics [17]. Reducing prices of essential medicines is particularly important as populations age due to the increased prevalence of people living with chronic conditions and complex multimorbidity.

### Enabling strategic (or active) purchasing

With countries increasing their public spending on health, the determining factors in driving health care costs include policy decisions about the services covered, payments to providers, and the conditions for these payments [18]. Many countries are introducing new ways to finance, organize and deliver health care. This is being done by modifying the basis for payment for health care providers from line-item budgets to alternatives such as per diems and diagnosis related groups in an effort to incentivize providers to increase their efficiency. This enables countries to take an active strategic approach in defining what services are purchased and paid for, and how to link payments with quality and performance.

### Controlling health service prices

Pricing health services is a key component in purchasing the benefits package. Where health care providers are rewarded based on the outcomes they achieve, these payments also must be priced correctly to provide the right incentives. If the price is too high or too low, it can easily overshadow the incentives in payment mechanisms. In comparing the main methods for setting prices, unilateral price setting by a regulator has generally performed better in controlling price levels, avoiding price discrimination, and providing incentives for quality in comparison with individual negotiations between the seller and buyers [19].

### Introducing technology in a systematic way

New technologies are a major driver of health care costs. Conducting health technology assessment (HTA) involves evaluating the costs and benefits of a new medical innovation to determine its value relative to what is currently in use [20]. Such an assessment can help ensure that new technologies are adopted only where they are better than the alternatives and under conditions that are financially sustainable. Most high-income countries have already implemented HTA, and it is increasingly being tested in a number of low- and middle-income countries (LMICs), such as Ghana, Kenya, Nigeria, Philippines and Thailand [21]. Introducing new technologies in a systematic way is a particular concern within the context of population ageing as many new technologies and procedures may disproportionately benefit older people.

### Promoting efficient service delivery configurations

Health care is more expensive when delivered in a hospital-centric health system – in comparison with alternatives such as a primary care or network system. Countries have, therefore, made major efforts to shift services to outpatient or primary care clinics to reduce costs and deliver care closer to the community. Evidence shows that hospital-based patients are more likely to receive unnecessary medical treatment that does not enhance quality of care or patient and family satisfaction [22]. Moving end-of-life care away from hospitals to settings that are less resource intensive and generally less costly such as the home or special palliative settings is also of central importance in helping to mitigate the impact of population ageing on health spending. Not only will this help contain health spending growth, but a growing body of research indicates that many people would prefer to die at home and outside of institutional settings [23].

Many countries have focused on how to best manage the health needs of people with long-term, complex health and social care needs. This may involve, as an example, individual care plans delivered by multidisciplinary teams involving health professionals from across different specialities, and health and social care settings with a variety of skills to meet patient needs. A successful example of coordinated health and social care can be found in the “care in the neighbourhood” programme in the Netherlands, which has now been adopted in other countries [24,25].

Developing defined pathways of care is another approach to improve the quality and efficiency of care delivery. Discharge planning is one example of a defined care planning that aims to promote the safe and timely transfer of patients from one care setting to another [26]. Systematic reviews have found that discharge planning can reduce length of hospital stay and may increase satisfaction among both patients and health care professionals [27]; comprehensive discharge planning with individualized follow-up is more effective at reducing readmissions [26]. However, neither review was able to draw conclusions on cost-effectiveness and more research is still needed.

### Limitations

This study has several limitations. First, the role of population ageing in driving health expenditure growth is projected assuming health spending by age group remains the same over time; while EU data over the past decade shows this to be a plausible assumption, actual health spending growth rates will likely show very different patterns than our projections due to changes in prices, the volume of care delivered, and the types of care delivered. Secondly, our projections for the EU, Japan and Indonesia are estimated using health spending by age data from the EU. In Japan and Indonesia, health spending by age patterns are inevitably different and therefore our projections do not attempt to estimate by how much population ageing will drive spending growth in these countries. Our projections instead serve to illustrate how future spending trends may be affected by different policy choices for countries at different stages of the age-demographic transition. Finally, the analysis is undertaken based on age groups, rather than at the individual level, which may result in some information loss and does not take account of micro-level differences in future developments in health and health spending.

### Discussion

The belief that population ageing will contribute substantially to growth in health spending is based on two primary observations. First, the number of older persons is increasing as a share of the total population. Second is the supposition that health expenditures, especially in developed health systems, are on average higher for older people compared with younger people. The logic follows that, with an increasing number of older persons, health expenditures will inevitably increase.

Populations are indeed ageing in nearly every country [1]. However, contrary to expectations, an ageing population is unlikely to translate into significantly higher growth in health spending. Using current expenditure data for the EU, this study confirms that health care expenditures are often greater on average for people in older age groups. However, for population ageing to drive growth in health spending, a key factor is the magnitude of the difference in average spending levels between older and younger age groups. We projected health care spending through 2060 under the assumption that the relative difference in per capita health



spending between older and younger age groups would remain the same over time (i.e., the age-expenditure curve remains unchanged). In doing so, we isolate the impact of ageing on health expenditure growth from other factors such as prices of technologies and services. Our projections through 2060 find that per person health expenditure growth attributable to ageing is expected to be modest in all three settings studied (the EU, Japan and Indonesia).

These projections rely on current health expenditure patterns that reflect what has been achieved with the existing levels of health systems capacity and utilization rates. In recognition that health spending patterns by age depend on factors which can vary across countries and time, we develop a series of hypothetical scenarios that consider situations where per person expenditures are even greater for older people compared with their younger counterparts. In the most "extreme" scenario presented, which envisioned an increase in volume, prices, intensity and entitlements for older people, the difference in health spending due to population ageing is 0.85 GDP percentages points in 2060 above the increase expected for population ageing alone for EU countries, 1.0 percentage point greater for Japan, and 1.67 percentage points greater for Indonesia (where we also assume health spending is scaled-up over a period of 15 years to reach the EU average). This suggests that even with disproportionately higher spending levels for older people than we see currently, the shift in the population age-mix towards an older population will still not cause ageing to become the main driver of health expenditure trends.

Nevertheless, the scenarios do show that variations in spending by age patterns matter. It is important to acknowledge that even small increases in age-related health expenditure may push spending levels above budgetary ceilings in some countries and will inevitably require an

increasing share of economic resources to be allocated to health care. Although the overall impact of ageing on health expenditure is small, it can be non-trivial for countries (such as Indonesia) that will experience a rapid change in ageing alongside increased investment in health system development. Creating the necessary "fiscal space" [28], in other words finding the necessary financial resources to fund any increase in age-related health spending, will require key decisions to be made on what services can and should be funded by the public sector as well as how sustainable revenues for health can be generated as populations age [29].

Fortunately, as our scenarios show, age-related health spending increases are linked to factors that are largely modifiable through policy intervention. This suggests that policy choices can play a key role in determining health spending by age patterns, and ultimately contain growth in health expenditures as populations age. For countries at a relatively early stage of the age-demographic transition, it also suggests that now is a good time to begin investing in health systems while the population is relatively young. It is important to note that many countries are already moving towards greater efficiencies within the health system, which is helping to slow the growth in per person health care costs.

In conclusion, these analyses find that population ageing is not the major driver of growth in health expenditures. Importantly, however, policy choices related to how health services are delivered, the prices paid (or negotiated) for services, medicines and technologies, and volumes of care will determine health spending by age trends. Effective policy options can be implemented to target these factors, helping to limit future growth in health expenditures within a context of population ageing.



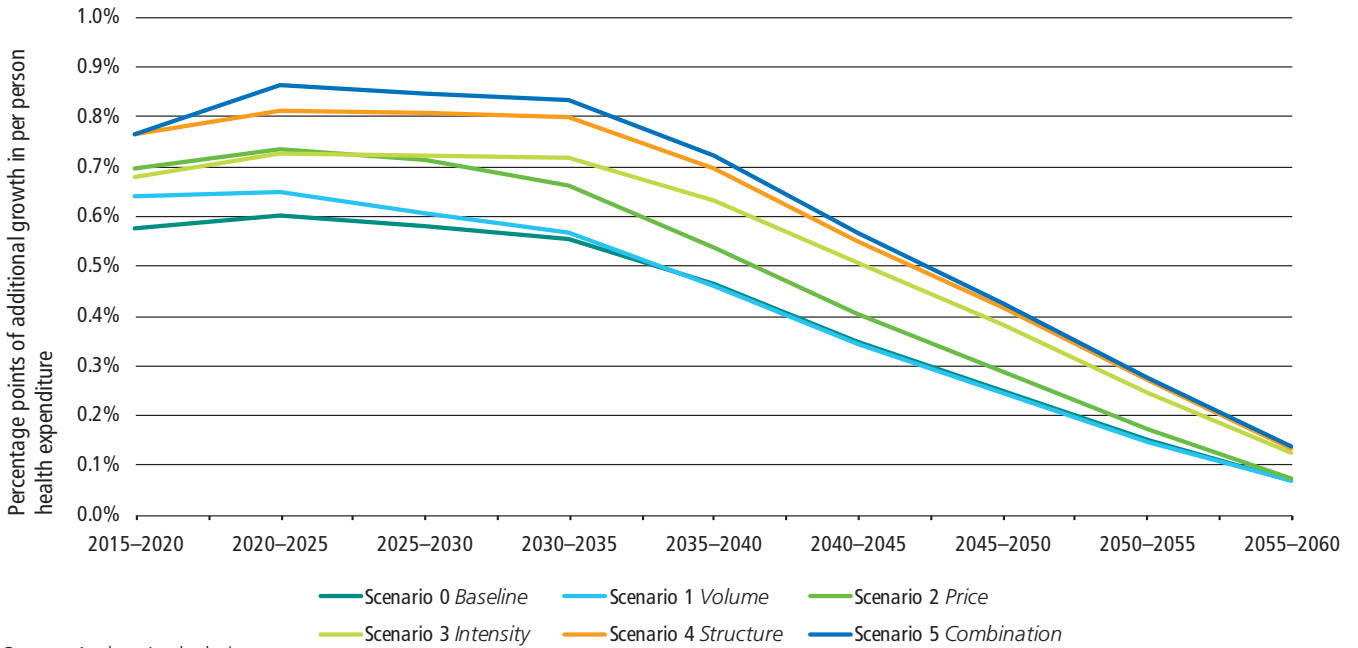
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Annex

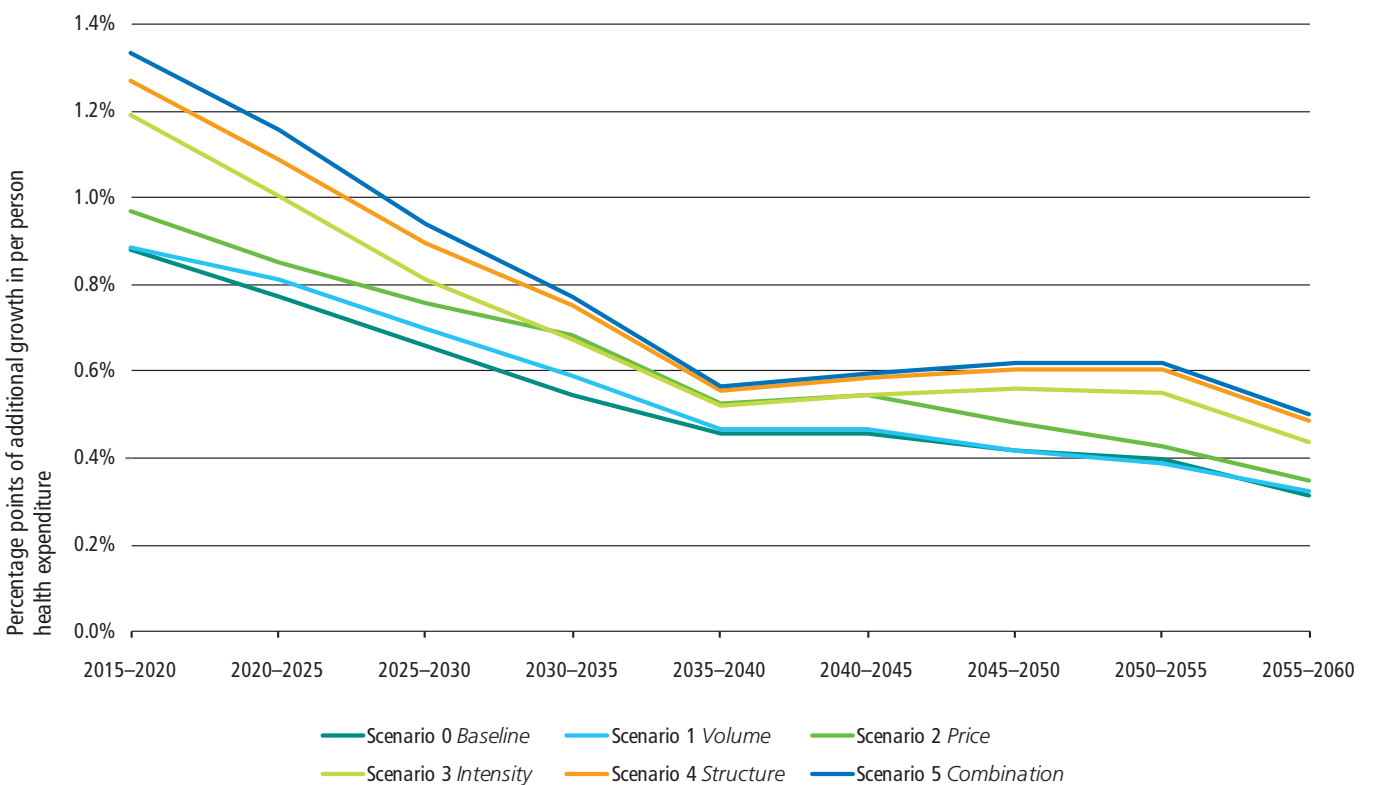
**Additional per person health spending growth as a result of population ageing under current health expenditure by age patterns (Scenario 0) and the hypothetical scenarios (Scenarios 1–5)**

**Figure A.1: Projected additional percentage points of growth in per person health expenditure under hypothetical scenarios, 2020–2060 using EU population projections**



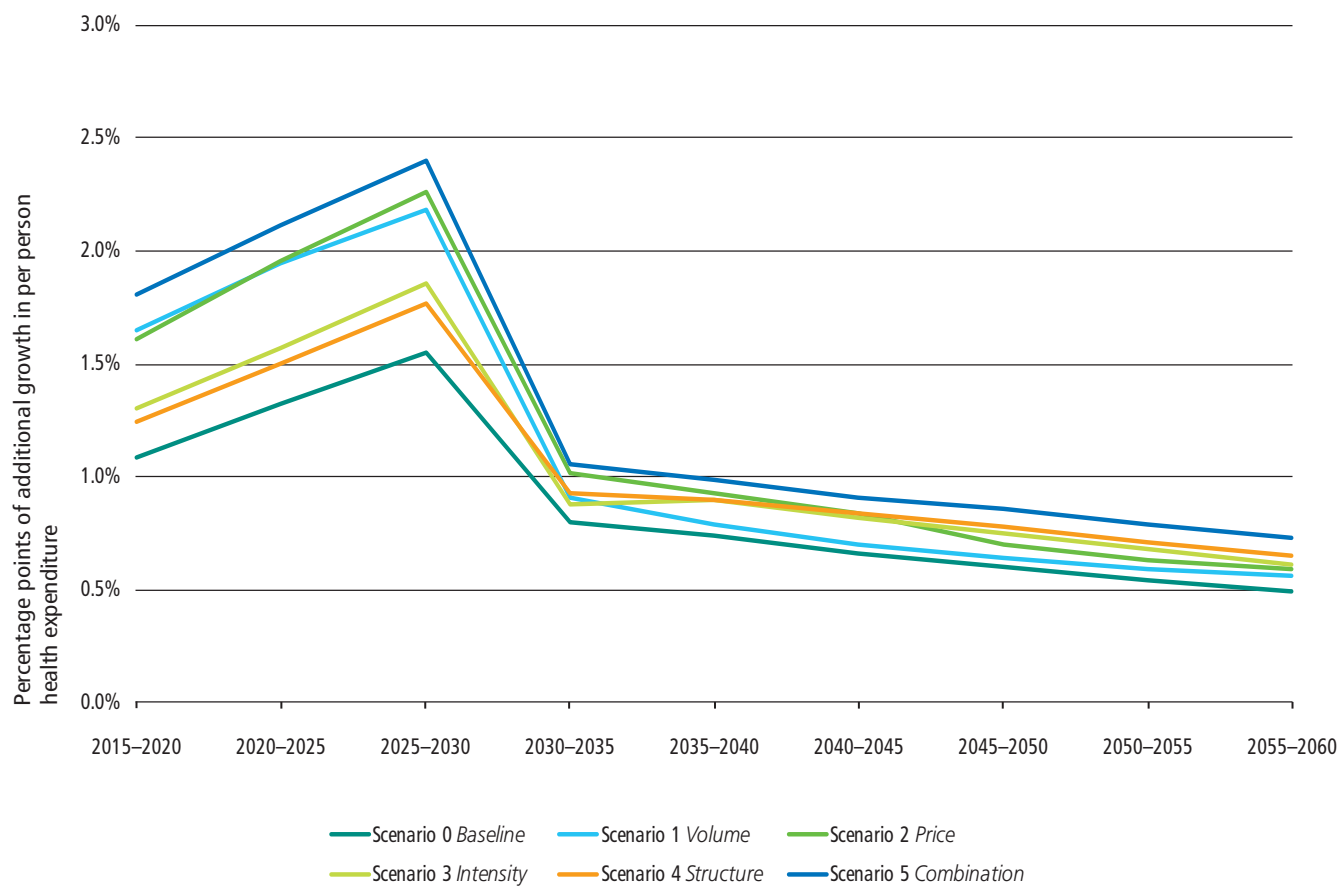
Source: Authors' calculations

**Figure A.2: Projected additional percentage points of growth in per person health expenditure under hypothetical scenarios, 2020–2060 using Japan population projections**



Source: Authors' calculations

**Figure A.3: Projected additional percentage points of growth in per person health expenditure under hypothetical scenarios, 2020–2060 using Indonesian population projections and assuming health spending is scaled-up over a 15-year period to be comparable with EU average health spending by age pattern**



Source: Authors' calculations

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