

## Expenditure by disease, age and gender

Key Facts	
 <p><b>Circulatory diseases</b> (such as strokes and heart attacks) account for <b>more than 10% of current health expenditure</b> as well as the largest share of in-patient and pharmaceutical spending.</p>	 <p><b>Dental care</b> accounts for 5% of all health spending – and for a fifth of all outpatient spending.</p>
 <p>Circulatory, digestive and muscular conditions together with cancer and mental health account for almost <b>60% of current health spending</b>.</p>	 <p><b>Women</b> account for <b>56% of health spending</b>, with higher expenditure on mental health (e.g. depression and dementia) and musculoskeletal conditions (e.g. arthritis and back pain).</p>
 <p><b>Mental health</b> accounts for up to <b>14% of health spending</b> and the share is growing.</p>	 <p>Per capita health spending is <b>highest among the very old</b> with as much as a six-fold difference between those aged over 85 and those aged 55 and 59 years.</p>

OECD has released data on health spending by disease, age and gender – the first time that such consistent international estimates have been made available. These data are important because they can support policy makers in decisions about resource allocation. This policy brief presents the main findings using data from a group of 12 OECD countries over the period from 2003 to 2011.

### Most health spending goes on major non-communicable disease (NCD) groups – such as heart disease and mental health

Circulatory diseases (including stroke and heart attack) account for the largest share of current health expenditure (CHE), ranging from 11% to 15% of health spending in countries where data are available. The major non-communicable diseases (NCDs) groups covering circulatory, digestive, muscular, cancer, endocrine and mental health together account for nearly 60% of health spending in these countries.

Infectious diseases now represent only a very small share of spending in OECD countries, ranging from 1% to 6% of total health expenditure. The rest of the spending is split across a variety of different disease

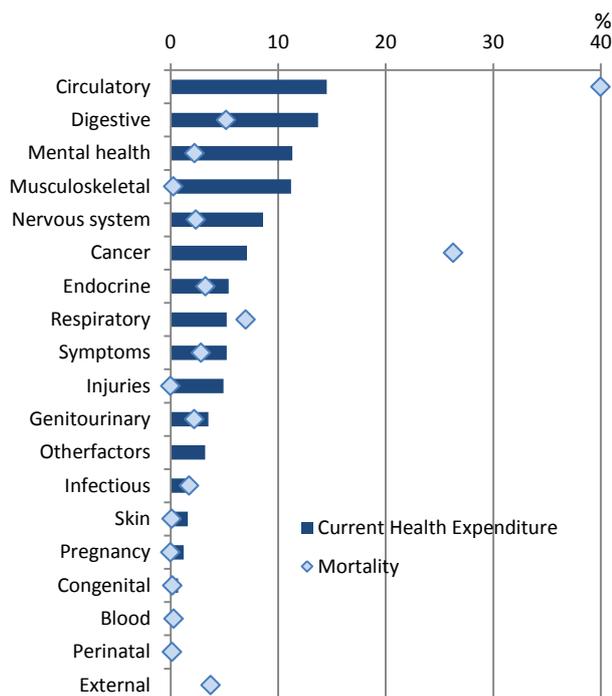
groups and conditions – notably injuries, as well as all unspecified symptoms and diagnoses, and other reasons for contact with the health system (e.g. regular check-ups).

In Germany, for example, 15% of health spending is allocated to the treatment of circulatory disease, followed by digestive diseases (14%), mental health (11%), and musculoskeletal problems (11%), which combined account for more than half of health spending (Figure 1).

The overall spending on any particular disease is a combination of both price and volume effects; this means that the high spending on circulatory disease can be driven by the number of patient admissions and length of stay in hospital, or the relative cost of treating each condition.

In Germany, the number of hospital discharges for circulatory disease is the highest in the OECD (at 37 per 1 000 population) while the average length of stay for acute myocardial infarction (AMI) is second only to Korea, at more than 10 days. At the same time, spending per discharge on circulatory disease is relatively low compared to other high-income OECD countries (Figure 8) suggesting that high volumes contribute to the high share of spending.

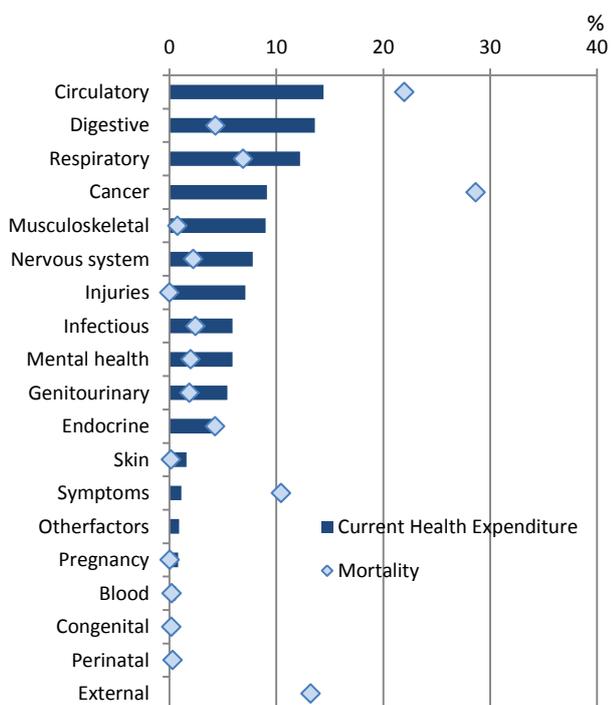
**Figure 1. Health spending and cause of death, by disease, Germany**



Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

Circulatory and digestive diseases were also the top two disease spending categories in Korea - together accounting for almost 30% of health spending (Figure 2). Unlike Germany and the Netherlands,

**Figure 2. Health spending and cause of death, by disease, Korea**



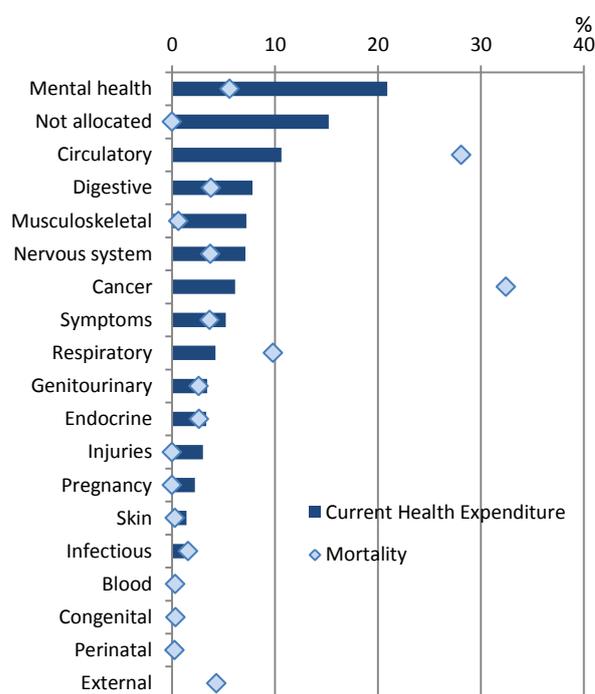
Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

spending on mental health accounted for a relatively small share (6%) of total spending, despite Korea having the highest suicide rate in the OECD, with nearly 30 deaths per 100 000 population in 2013 (OECD, 2015).

By contrast, mental health spending in the Netherlands far exceeds that of the other two countries, accounting for more than 20% of health expenditure (Figure 3). Many of those who are diagnosed with mental illness live in institutions.

One growing component of spending on mental health is for dementia care. Box 1 provides a discussion of trends in dementia spending in the Netherlands and across OECD countries.

**Figure 3. Health spending and cause of death, by disease, the Netherlands**



Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

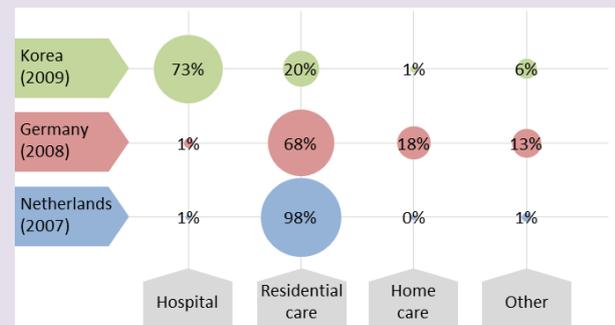
Various factors can lead individuals to use health care services. Along with spending by disease, the figures above also show the share of overall mortality, which is one measure of disease burden. A comparison of spending with mortality shows that, in 2013, circulatory diseases accounted for up to 40% of all deaths in Germany, while accounting for 15% of health expenditure. While spending on circulatory diseases accounted for similar shares in Korea and the Netherlands, mortality rates were lower than Germany's at 22% and 28% respectively.

Spending on cancer (both prevention and treatment) was only around 7% of overall health spending on average across the three countries while deaths due to cancer accounted for around 25% of all deaths, and up to one in three deaths in the Netherlands.

### Box 1. High spending on dementia

Dementia is one category of mental health under the International Classification of Diseases (ICD-10). However, because dementia is associated with age, the direct costs of dementia have become a significant and growing share of health spending in OECD countries. Of the countries where data is available, the Netherlands spends the highest proportion of its health budget on dementia (5.5%, compared to 3.7% in Germany and 3% in Korea). This is between a quarter to half of total spending on mental health. The Netherlands also has one of the highest levels of long-term care expenditure among OECD countries, growing from 3.5% of GDP in 2008 to 4.3% of GDP in 2013. Residential care accounts for the most of the cost for people with dementia while dementia cost in Germany are spread between residential and community long-term care (Figure 4). In Korea, a large proportion of dementia care is provided in long-term care hospitals.

**Figure 4. Proportion of dementia costs accrued in different settings for Korea, Germany and the Netherlands**



Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

Note that the latest data split by care setting for the Netherlands refers to 2007.

### Expenditure by setting:

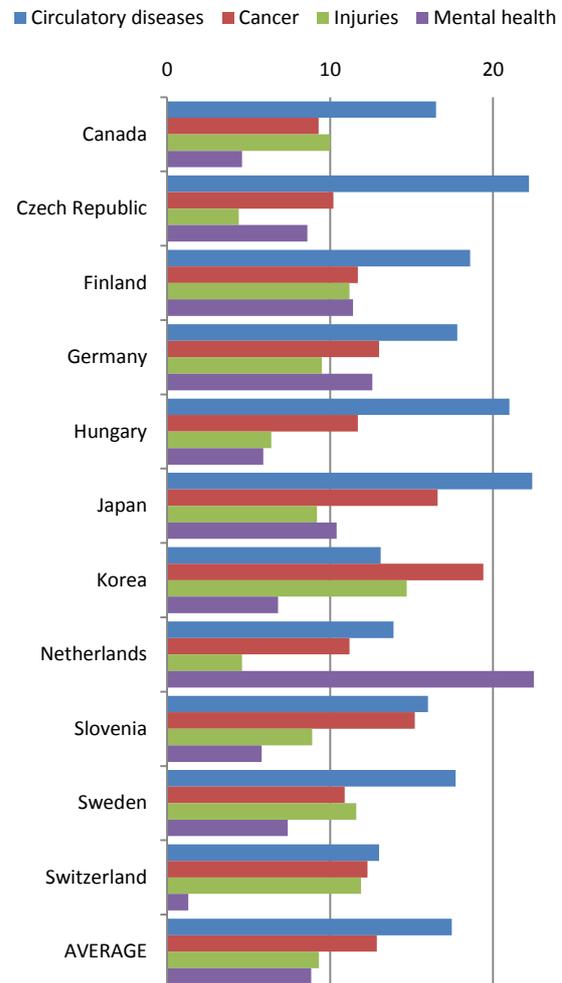
#### Circulatory disease tops hospital spending in most OECD countries

The hospital sector accounts for nearly 40% of current health expenditure, on average across the OECD. Diseases of the circulatory system consistently account for the highest share of hospital spending (on average around 17.5% for the countries in this study) – ranging from 13-14% in Switzerland, Korea and the Netherlands to over 22% in Japan and the Czech Republic (Figure 5).

Only in Korea and the Netherlands other types of diseases or conditions account for higher shares of hospital spending. Notably, mental illness accounts for 23% of hospital spending in the Netherlands (mostly in mental health hospitals) while over 19% of hospital spending in Korea is allocated to cancer care.

Cancer is the second most important disease group accounting for around 13% of hospital spending, followed by expenditure related to injuries, musculoskeletal and the digestive system.

**Figure 5. Top spending categories in hospital care by diagnostic category**

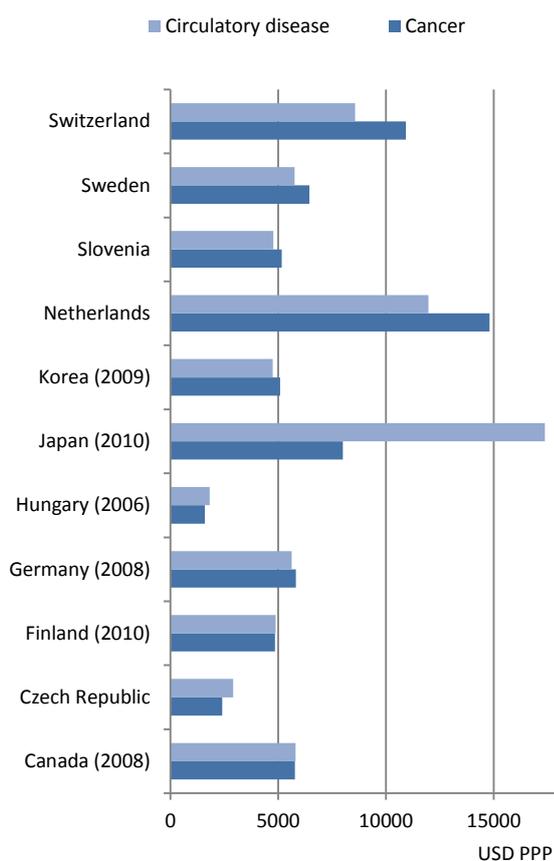


Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

Figure 6 shows a comparison of spending *per hospital discharge* for circulatory disease and cancers. Although the overall level of spending varies between countries – resulting in a more than nine-fold difference between the lowest and highest costing countries – the cost per discharge for circulatory disease tends to be similar to that for cancer for all countries. The exception is Japan, where spending on circulatory disease per hospital discharge is more than twice the amount spent on each admission for cancer care. This could be due to the very long length of stay for circulatory disease (45.3 days on average in 2013) in Japanese hospitals compared to 19.5 days for cancer in 2011.<sup>1</sup>

1. <http://www.mhlw.go.jp/toukei/saikin/hw/kanja/11/dl/03.pdf> (for 2011).

**Figure 6. Expenditure per hospital discharge for two diagnostic categories, 2011 (or nearest year)**



Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

### Expenditure by setting:

#### Dental care accounts for a significant share of outpatient care spending in OECD countries

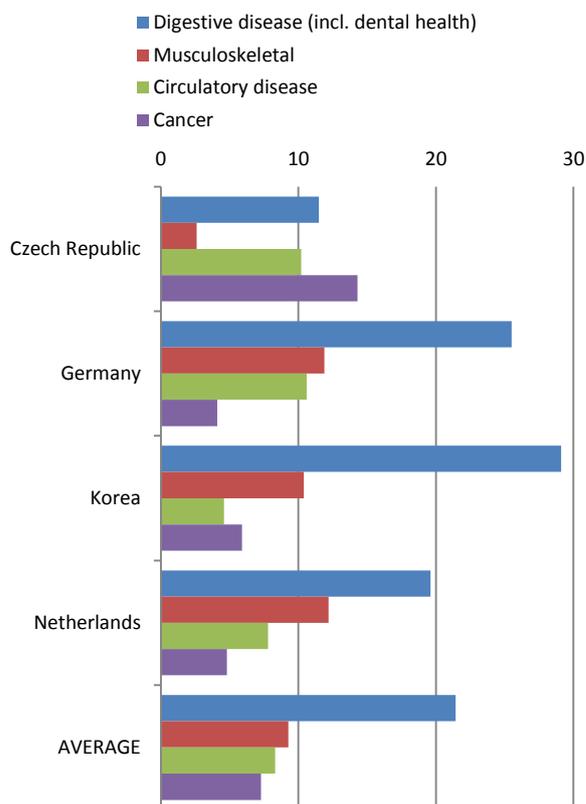
On average, over a fifth of all spending in the outpatient sector can be linked to the digestive system – of which oral or dental care is the major component (Figure 7). Overall, conditions of the digestive system accounted for as much as 30% of all outpatient care spending in Korea.

Health accounts data confirm that outpatient dental care is an important category in its own right in the vast majority of OECD countries, accounting for 5% of all health spending – and 21% of all outpatient spending. Implications on financial protection can be important, as spending on dental services are more often a direct burden for households.

After the digestive system, conditions relating to the musculoskeletal system, such as arthritis and back pain account for a further 10% of all outpatient care spending. Circulatory disease and cancer are the next most important categories – in the Czech Republic, cancer care accounts for over 14% of all outpatient spending.

Around 10% of all outpatient care spending cannot be linked to any specific diagnostic group. In the Netherlands this rises to 15% of outpatient expenditure. This highlights some of the remaining challenges in allocating spending across disease categories because, for example, many doctor visits can be a result of a whole range of different reasons or non-specific conditions (see Box 2).

**Figure 7. Top spending categories in ambulatory/outpatient care by diagnostic category**



Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

#### A fifth of spending on pharmaceutical and other medical goods is linked to the treatment of circulatory disease

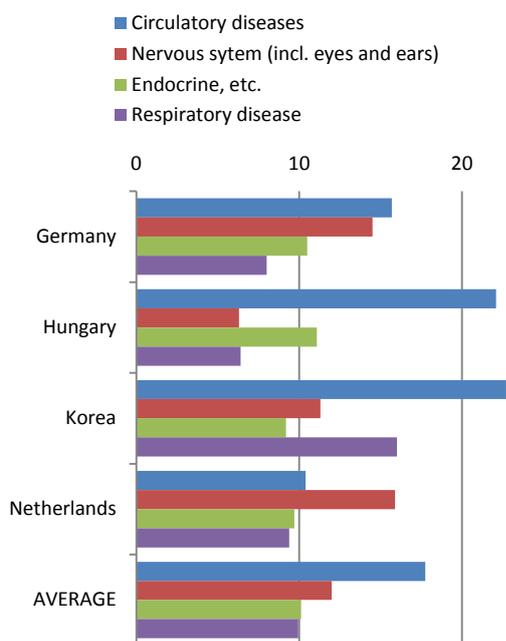
After inpatient and outpatient care, retail spending on medical goods represents the third largest expenditure item of health care spending, accounting for around one in every five health dollars on average across OECD countries in 2013.

Analysing the breakdown by diagnostic category for a group of four countries shows that spending on drugs and medical devices in the treatment of circulatory disease accounts for 18% of all medical goods spending, on average – rising to more than 22% in Hungary and Korea (Figure 8). The prescribing of cholesterol-lowering drugs to prevent and treat heart conditions has increased significantly in recent years in many OECD countries (Figure 9).

While retail medical goods expenditure is dominated by spending on pharmaceuticals (more than 82% on average), medical goods also cover other durable and therapeutic items such as lenses, glasses and hearing aids. This helps explain why spending related to the nervous system (which includes eyes and ears) is often the second highest category.

The third and fourth disease categories - both accounting for 10% of drug spending - cover endocrine and nutritional diseases, most notably to treat diabetes, and respiratory diseases, including chest infections and asthma.

**Figure 8. Top spending categories on medical goods by diagnostic category**



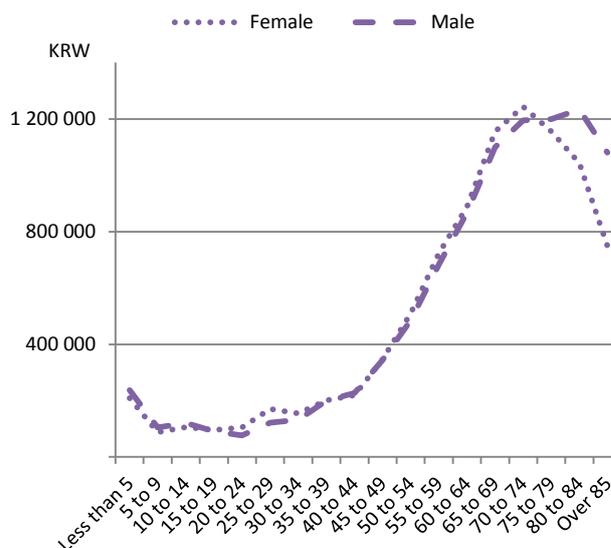
Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

The dispensing channels for certain drugs can have an impact on the way spending on retail medical goods and inpatient spending is allocated to disease categories<sup>2</sup>. For example, countries may limit the prescribing of some high-cost cancer drugs to the hospital setting. Additional data on pharmaceutical sales show that when both retail and hospital sectors are considered, cancer drugs and immunomodulating agents can account for more than a quarter of total drug sales. Similarly, anti-infectives (which includes antibiotics and antivirals) and drugs to treat blood disorders (including drugs to reduce bleeding and aid clotting) also account for a much higher share of spending when both sectors are considered (Belloni et al., 2016).

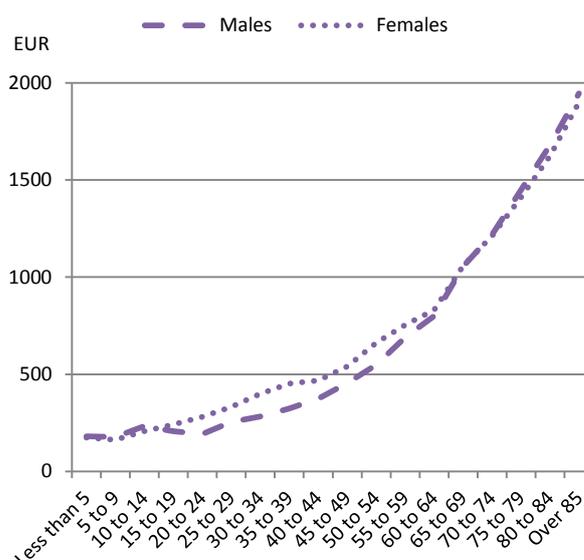
2. Pharmaceuticals consumed during an episode of hospital care are included under inpatient spending.

Figures 9 and 10 show the relationship between per capita spending on retail pharmaceuticals and age and gender in Korea and the Netherlands. While per capita spending on retail pharmaceuticals continues to rise with age in the Netherlands, in Korea it reaches a peak at age 70-74. This may be due to the fact that levels of financial protection for prescription drugs are very high in the Netherlands; out-of-pocket spending on retail pharmaceuticals is 44% in Korea, higher than the OECD average (37%) while the share is low in Germany (18%) and the Netherlands (19%).

**Figure 9. Per capita spending on retail pharmaceuticals by age, Korea**



**Figure 10. Per capita spending on retail pharmaceuticals by age, the Netherlands**



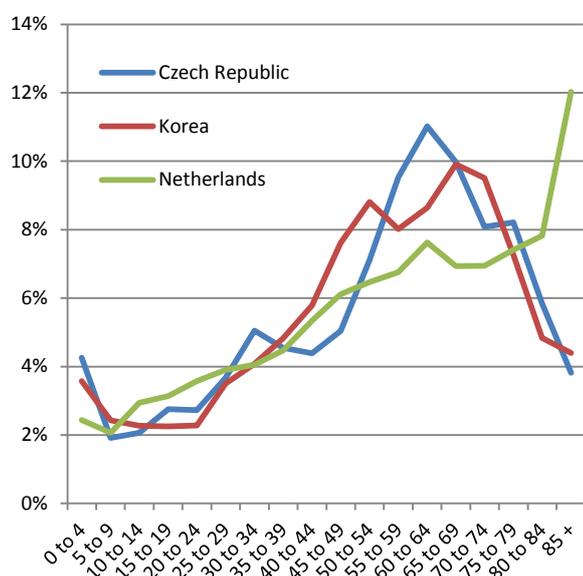
Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

## Age is a major determinant of health spending

Changes in demographic and epidemiological characteristics, service utilisation and the diffusion of technology all have an influence on the pattern of health care spending. At the same time, illness and chronic conditions tend to become more common with age and, as a consequence, health care spending increases through the age groups.

Figure 11 shows the share of health spending broken down into 5-year age groups for the Czech Republic, Korea and the Netherlands. After relatively high spending associated with birth and infant illnesses among the youngest age group, there is a sharp drop with lower health spending throughout childhood and early adulthood. The share of health spending then steadily increases to reach a peak of almost 10% of health spending on average around the 60-64 year age group. While the share of spending then tends to drop off among the elderly age-groups in the Czech Republic and Korea, greater financial protection and high spending associated with the provision of formal long-term care in the Netherlands means that the share continues to rise with age such that 20% of health spending is accounted for by those over 80 years old.

**Figure 11. Share of current health spending by age group, 2011 (or nearest year)**

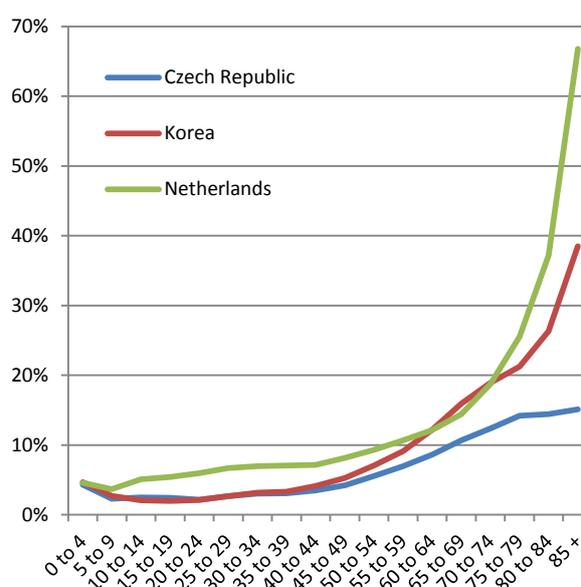


Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

Figure 11 does not take into account differences in the population structure between countries. For example, in the Netherlands, those aged 65 and above comprise 16% of the population (and consumed 40% of health spending). Korea, on the other hand, is a relatively young country with 12% of the population over 65 (and less than 30% of health spending).

To account for these differences, it is better to look at *per capita* health spending (relative to GDP per capita i.e. average national income<sup>3</sup>) for each age group. Figure 12 clearly shows that per capita spending on health increases with age, albeit at differing rates. The slope remains relatively flat until around 50 to 54 years old. Those between 65 and 69 years old spend the equivalent of between 11 and 16% of average national income on health. This continues to rise, albeit at different rates, such that the oldest, aged 85 years and over, show the highest per capita spending on health, ranging from 15% to 67% of average income. Per capita spending in the Czech Republic is relatively flat across the highest age groups (although the data exclude pharmaceutical spending). In Korea, the share of per capita spending more than doubles between 70 and 85 years old, while, in the Netherlands, those aged 85 years and over spend six times more than those between 55 and 59 years old.

**Figure 12. Per capita health spending by age group as a share of GDP per capita, 2011 (or nearest year)**



Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

However, according to the literature, it is not ageing *per se* that pushes up average health expenditures at higher age groups, but the fact that proximity to death is a key driver of health spending. That said, higher per capita costs are not entirely attributable to end-of-life care. There is an increased probability of care need and thus more frequent utilisation and higher intensity of health services as age increases, as shown in this report.

3. Per capita spending is shown relative to the average GDP per capita for each country to remove the actual differences in the level of spending between countries.

## Women account for more health care spending than men, except in the hospital sector

On average, women account for a higher proportion of health spending than men. According to data from Czech Republic, Korea and the Netherlands, 56% of overall health spending was consumed by the female population.

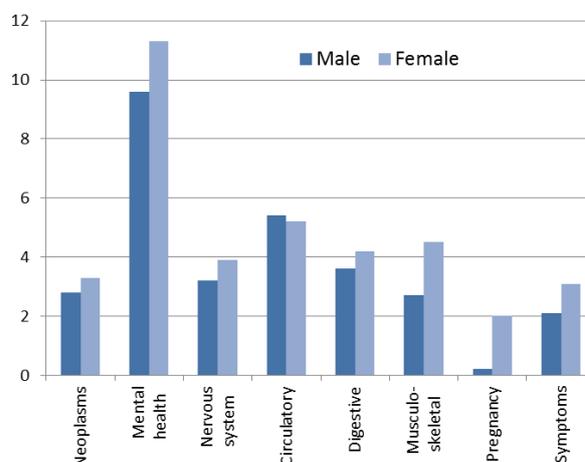
As well as the additional spending related to pregnancy and childbirth, much of the gap would appear to be concentrated in just a few of the disease groups (Figure 13). For example, higher spending on mental health can be explained by women more likely to seek help for mental health issues (e.g. depression) at younger ages, and longer life expectancy among women giving rise to more dementia care among the elderly female population.

Conditions related to the musculoskeletal system also show a significant difference, with higher spending amongst women in areas such as osteoporosis, arthritis and back pain.

While overall health spending is skewed towards the female population, interestingly men tend to account for a higher proportion of spending in

hospitals. Men show higher spending on circulatory disease, injuries and mental conditions requiring hospital care (e.g. schizophrenia or substance abuse).

Figure 13. Share of health spending by gender, the Netherlands



Source: "Health expenditure and financing: Health expenditure indicators", *OECD Health Statistics* (database).

### Box 2. Towards comparable measurement of expenditure by disease

This is the first time a comprehensive picture of health spending by different categories of disease and age groups has become available in an internationally comparable manner under the System of Health Accounts 2011 (SHA) framework. The availability of data can lead to a better understanding of the drivers of health spending, leading to an assessment of the impact of recent reforms, future ageing populations, as well as changes in disease patterns and medical practice. Around 16 countries have so far produced or are in a position to produce some expenditure data broken down by disease, age and gender: namely, Australia, Canada, the Czech Republic, England, Finland, France, Germany, Hungary, Israel, Japan, Korea, the Netherlands, Slovenia, Sweden, Switzerland, and the United States. The extent of available data varies according to the country and sector. The most accessible data tends to be in the inpatient and hospital where the systematic recording of diagnostic information is used for reimbursement and administrative purposes. On the contrary, breaking down all areas of current health expenditure is more challenging as it requires the complete picture of different functions and providers (i.e. the outpatient and pharmaceutical sectors) categorised by disease group.

**Disease classification according to ICD 10.** Expenditure by disease, age and gender uses a top-down attribution of direct costs in a mutually exclusive manner by using a disease classification tool (OECD, 2011). The standard classification is the International Classification of Diseases (ICD), currently version 10, which consists of 21 broad disease categories including circulatory (e.g. hypertension and stroke), cancer, digestive (e.g. dental health), muscular (e.g. arthrosis), mental health (e.g. dementia, mood disorders, schizophrenia) and injuries.

**Limitations continue to affect the availability of data by disease, age and gender.** While the hospital sector provides the most available and comparable data, there remain some limitations. Some countries include mental health hospitals in their data and others don't; some provide inpatient care data (HC1.1) while others provide hospital data (HP1). This will obviously limit the level of compatibility and distort the relative shares and affect the comparisons where hospitals perform a significant amount of non-inpatient services (i.e. day-care and outpatient care) with different disease profiles. All these factors should be taken into account when interpreting the results. The issues around the availability and limitations of many data sources continue to hamper the development of fully comparable international results. The coverage has been more difficult in areas such as pharmaceutical spending and outpatient spending as each patient or purchase of drugs may not be necessarily linked to disease groups. This results in unallocated spending and affects the availability of current health spending by disease, age and gender. The timeliness of data availability hampers the usability of data for policy analyses as the production of disease account data tend to be 'additional' to regular work.



## Did you know?

Key Facts about spending by disease in OECD countries

- Almost half of OECD countries, (Australia, Canada, the Czech Republic, England, Finland, France, Germany, Hungary, Israel, Japan, Korea, the Netherlands, Slovenia, Sweden, Switzerland and the United States) have produced or are in a position to produce some health expenditure data according to disease groups. Currently, twelve of these countries are incorporated in the database (available at <http://stats.oecd.org/> under Health>Health expenditure and financing>Additional indicators).
- Circulatory diseases including hypertension and stroke top hospital spending - ranging from below 14% in Korea, Switzerland and the Netherlands to over 22% in Japan and the Czech Republic. The OECD average of 11 countries is 17.5%.
- Age is a good predictor of spending as the per capita spending rises as age increases. Per capita spending on health shows that the oldest of the oldest, age 85 years and over, spend the highest, ranging from 15% of average national income (i.e. per capita) in the Czech Republic to as much as 67% in the Netherlands.
- While women account for more of health spending overall, men tend to take a greater proportion of hospital spending, due to higher male spending on circulatory disease, injuries and mental conditions.
- Dementia accounts for an increasing share of health expenditure in OECD countries. The Netherlands spent 5.5% of current health expenditure on dementia; about a quarter of total spending on mental illnesses.

### Futher reading

Belloni, A., D. Morgan and V. Paris (forthcoming), "Pharmaceutical Expenditure and Policies: Past Trends and Future Challenges", *OECD Health Working Papers*, OECD Publishing, Paris.

OECD (2015), *Health at a Glance 2015: OECD Indicators*, OECD Publishing, Paris, [http://dx.doi.org/10.1787/health\\_glance-2015-en](http://dx.doi.org/10.1787/health_glance-2015-en).

Extension of work on expenditure by disease, age and gender - Final project report (2013).

<http://www.oecd.org/els/health-systems/Extension-of-work-on-expenditure-by-disease-age-and-gender-Final-Report.pdf>

Guidelines on the voluntary reporting of disease-specific expenditures (2013),

<http://www.oecd.org/els/health-systems/Guidelines-Reporting-Disease-Age-Gender-Dec2013.pdf>

### Contact:

Yuki Murakami – Health Economist/Policy Analyst  
OECD Health Division

✉ [yuki.murakami@oecd.org](mailto:yuki.murakami@oecd.org)

☎ +33 1 45 24 78 23

David Morgan - Head of Health Accounts  
OECD Health Division

✉ [david.morgan@oecd.org](mailto:david.morgan@oecd.org)

☎ +33 1 45 24 76 09

### Useful links

**OECD Expenditure by disease, age and gender database**

<http://stats.oecd.org/>

Health > Health expenditure and financing > Additional indicators

**OECD Estimating Expenditure by Disease, Age and Gender website**

<http://www.oecd.org/els/health-systems/estimating-expenditure-by-disease-age-and-gender.htm>

**OECD Health Expenditure website**

<http://www.oecd.org/els/health-systems/health-expenditure.htm>

**Data for each country refer to the following year:**

Canada: 2008; Czech Republic: 2011; Finland: 2010; Germany: 2008; Hungary: 2006; Japan: 2010; Korea: 2009; Netherlands: 2011; Slovenia: 2011; Sweden: 2011; Switzerland: 2011.