Healthcare outcomes and expenditure in Central and Eastern Europe – a review

June 2021
Introduction

Assessing public healthcare spending in Central and Eastern Europe and its implications

- PricewaterhouseCoopers UK (PwC) was engaged by the European Federation of Pharmaceutical Industry Associations (EFPIA) to examine the case for increasing healthcare spending in Central and Eastern Europe (CEE).
- Health outcomes play an important role in driving economic growth whilst the level of healthcare spending shapes countries’ health outcomes. Historically, the countries of CEE have spent less on public healthcare than other parts of the European Union (EU).
- This report examines the pattern of public spending on healthcare in the CEE countries and its consequences for health outcomes, as well as fiscal sustainability and economic prosperity.
- The focus is on nine CEE countries: Bulgaria, Croatia, Czech Republic, Hungary, Lithuania, Poland, Romania, Slovakia and Slovenia. These are compared to France, Germany, Italy, Spain and the UK, the largest five EU countries in 2019. These countries have some of the most developed healthcare systems in Europe.
- This document is structured in four further sections each of which deals with one issue:
  - Why CEE governments’ lower spending on healthcare than the EU5 is linked to their poorer health outcomes, when compared to the EU5.
  - How increased healthcare spending will improve health outcomes, boost economic performance and improve fiscal sustainability.
  - Why CEE health systems require further investment to meet future challenges and be financially sustainable over the longer term.
  - Why the efficiency and effectiveness of spending is as crucial to improving health as the level of spending.
- The analysis in this report is based on data published before the COVID-19 pandemic, and therefore doesn’t consider the short-term impacts of COVID-19 on health outcomes and healthcare spending. This was due to a lack of accurate and comparable data for all countries in scope of our analysis at the point of evidence gathering.
- The pandemic has further demonstrated the crucial link between health outcomes and economic performance. The impact of COVID-19 on global health and healthcare investment has been profound and will shape healthcare policy for decades to come, as discussed on the following slide.
The COVID-19 pandemic has highlighted the need for a resilient healthcare system to cope with unexpected surges of demand

**European countries varied dramatically in their preparedness for the pandemic**

- The COVID-19 pandemic has had a profound impact on the health of the global population and healthcare systems across the world. From March to December 2020, 580,000 excess deaths were recorded across the European Union compared with the average period 2016-2019, both from the virus itself and from the pandemic overwhelming national healthcare systems.
- The economic impacts have also been severe, with the World Bank reporting that the COVID-19 recession has seen the fastest and steepest downgrade in global growth projections since 1990.
- The pandemic has led to a short-term increase in healthcare spending to deal with treatment and containment of the virus (although this was partially offset by foregone care during lockdowns and the postponement of other healthcare treatments such as elective surgeries). However it has also highlighted the importance of stable and resilient healthcare systems to manage future, unexpected surges of demand.
- Health outcomes after the pandemic are also likely to worsen in the longer term due to the disruption to screening programmes and delays to treatment. Healthcare systems will need to be appropriately resourced to face this ongoing challenge.
- Historic spending on healthcare was a key determinant of countries’ preparedness to deal with the impacts of the pandemic, with countries varying greatly across Europe (see chart).
- During the post-COVID recovery, policymakers must prioritise long-term investment in healthcare and recognise the clear link between health and the economy. Upcoming analysis from PwC and EFPIA recommends:
  - An increased focus on prevention and early care.
  - A move from short-term approaches to longer-term planning around health outcomes and addressing patient needs.
  - Investing in digital infrastructure and data governance.
  - Focusing on people and outcomes, equipping healthcare professionals with new skills to best respond to patients needs and empowering patients to understand their own health status better.

**Healthcare preparedness index**
Dimensions: COVID-19 testing capacity, Population structure, Healthcare resources & Historic healthcare expenditure (most recent data)

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<tr>
<th>Country</th>
<th>Index Score</th>
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<td>Hungary</td>
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**Further resources:**
OECD, ‘Beyond Containment: Health systems responses to COVID-19 in the OCED’ (2020)
OECD, ‘Strengthening the frontline: How primary health care helps health systems adapt during the COVID-19 pandemic’ (2021)
Better transparency over health spending and outcomes is essential for improving efficiency and making fair comparisons

However, increasing the overall level of healthcare spending is still vital for improving outcomes.

- Increasing spending does not always improve health outcomes - what also matters is how this money is spent and the efficiency of spending.
  - Improving efficiency is not the same as cutting costs – it’s about freeing up additional resources to be used in higher value areas.
  - This will require health stakeholders from across the industry to work together to share best practices, improve patient outcomes and increase quality of care.
  - The Covid-19 pandemic has provided some opportunities to increase efficiency across the healthcare system and has accelerating trends such as digitalisation and e-health.

- However there currently lacks enough robust data over how healthcare budgets are invested and the resulting health outcomes:
  - Much of the current variation in health outcomes between countries is due to differences in the definition and measurement of data, making it very difficult to compare healthcare systems internationally.
  - Standardising health spending and health outcomes data across the EU would allow policymakers to better understand and compare the efficiency of current spending.
  - Publishing this data more transparently would also give patients more confidence in their healthcare system and empower them to make better decisions for themselves, as well as allowing service providers to shape future service provision more effectively.

- This report focuses on understanding the need for increased healthcare spending in CEE countries and exploring ways to increase efficiency as a potential source to cover existing financing gaps. However, we recognise that the level of spending and the efficiency of spending should be explored in parallel as the current gaps in healthcare financing cannot be covered by increasing efficiency alone.

Key statistics on healthcare inefficiency:

- 10% of patients in OECD countries are unnecessarily harmed at the point of care. (OECD 2017)
- OECD life expectancy could be raised by >2 years at current spending levels if all countries became as efficient as the top performers. (OECD 2008)
- More than 10% of hospital expenditure is spent on correcting preventable medical mistakes or treating infections caught in hospitals. (OECD 2017)
- Up to 20% of healthcare spending in the OECD is consumed in ways that do little to improve health. OECD (2017)

Further resources:
EFPIA (2020) – ‘Strengthening health systems through smart spending’
**Summary of the case for change:** More spending on healthcare and better healthcare policies lead to superior health, economic, and fiscal outcomes

A healthier population is more productive and has fewer social and healthcare costs

- Healthcare policies and spending affect health outcomes within a country, whether positively or negatively. The health of the population in turn affects future economic and fiscal outcomes, through the channels shown below.
- When assessing the economic and fiscal impacts of healthcare spending or policy changes, the effects through all of these channels should be taken into account; not only the direct cost of the new policy or additional spend.
- However, the full economic and fiscal impact is often underestimated, but when the potential impact is observed across all channels it is clear there is significant opportunity.

<table>
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<tr>
<th>Health spending</th>
<th>Health outcomes</th>
<th>Economic outcomes</th>
<th>Fiscal outcomes</th>
<th>Long-term impact</th>
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<tbody>
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<td>Increased healthcare spending and efficiency</td>
<td>Reduced length/frequency of illness and rates of disability</td>
<td>Increased human capital e.g. reduced sick leave, absenteeism, early retirement etc.</td>
<td>Increased labour supply and productivity</td>
<td>Higher tax receipts</td>
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<tr>
<td>Reduced need for medical treatment/social care</td>
<td>Lower health and social care costs</td>
<td>Lower health and social care spending</td>
<td>Better long-term fiscal sustainability</td>
<td>Higher GDP per capita and GDP growth</td>
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<td>Direct cost of healthcare spending</td>
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CEE governments spend less on their healthcare than the EU5 and have poorer health outcomes
Message 1 overview:
CEE governments spend less on their healthcare systems than the EU5 and have poorer health outcomes

1a) Historical public health spending in CEE countries

• Public healthcare spending in CEE countries has grown over time, but current spending as a proportion of GDP is still less than in the EU5 by around 3 percentage points
• The gap in public healthcare spending accumulates over time creating an ever-growing wedge
• If CEE countries spent the same proportion of GDP as the EU5, per capita public healthcare spend could increase by 65%
• Health spending allocation between human resources and infrastructure varies across the region

1b) Current health outcomes in CEE countries

1c) Access to innovative therapies
In CEE countries, public spending on healthcare as a % of GDP is around 3 percentage points lower than the EU5 average.

Income differences are not enough to explain the total gap in public healthcare spending.

EU5 GDP per capita is on average 50% higher than in CEE countries, but public healthcare spending per capita is on average 2.5x higher than in CEE countries.

Source: PwC analysis of WHO data ‘Health expenditure financed by government schemes & compulsory contributory health insurance schemes’ for public spend per capita (PPP) and World Bank Data for GDP per capita (PPP).
Since 2010, GDP in CEE countries has grown faster than in the EU5 but growth in public healthcare spending has not kept pace.

On average CEE GDP per capita has grown by 1.4% p.a. compared to just 0.5% for per capita healthcare spending.

### Annual GDP per capita growth and annual public healthcare per capita spending growth

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**Methodology**

**Compound annual growth rate** = \(\left(\frac{\text{value in 2017}}{\text{value in 2010}}\right)^\frac{1}{\text{period in years}}\)

Source: PwC analysis of WHO data ‘Health expenditure financed by government schemes & compulsory contributory health insurance schemes’ for public spend per capita (PPP, constant 2017 prices) and World Bank Data for GDP per capita (PPP, constant 2017 prices).

Note: Converted to from US$ to €EUR using PPP conversion rates (EA19/USD) before taking CAGR.
This has caused the gap in healthcare spending between CEE and the EU5 to widen by 0.5% of GDP between 2010 and 2017.
The effect of the gap in public healthcare spending accumulates over time creating an ever-growing wedge

On average, people in CEE countries will have benefitted from €26,000 less in public healthcare spending between 2000 - 2017 compared to someone in the EU5

Cumulative per capita public healthcare expenditure
€000s, PPP-adjusted, 2000-2017

Source: PwC analysis of WHO data ‘Health expenditure financed by government schemes & compulsory contributory health insurance schemes’ for public spend per capita (PPP)

Note: Estimated by summing average PPP per capita spend (constant 2017 prices) between 2000-2017. Converted to from US$ to €EUR using PPP conversion rates (EA19/USD) for each year before summation.

The example of the child is meant in a figurative way, to represent the average expenditure over a period of 17 years across all age classes. In reality, healthcare expenditure tends to be higher as individuals get older (see slide 52)

PwC
Strategy&
If CEE countries spent the same proportion of GDP on healthcare as the EU5, average per capita public spending would rise by 65%.

This amounts to an extra €644 per person in 2017 across CEE countries on average.

Additional spending required to increase public healthcare spending to 8% of GDP

€, PPP adjusted, 2017

<table>
<thead>
<tr>
<th>Country</th>
<th>Current healthcare spending</th>
<th>Additional spending required to reach 8% of GDP</th>
<th>Gap explained by income differences</th>
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</table>

Source: PwC analysis of WHO data ‘Health expenditure financed by government schemes & compulsory contributory health insurance schemes’ for public spend per capita (PPP).
Note: Converted to from US$ to €EUR using PPP conversion rates (EA19/USD).

June 2021
In most CEE countries, general government expenditure on health is less than 7% of GDP.

Health spending currently represents less than 15% of total general government expenditure and there is potential for it to grow.

**General government expenditure by function**

% of GDP, 2017

Note: These figures are from the Classifications of Functions of Government (COFOG), whereas previous analysis has used the System of Health Accounts (SHA) dataset and therefore figures may differ, as these classifications differ in purpose and scope of services.
Health spending allocation between human resources and infrastructure varies across the region

**CEE countries have invested in more hospital beds but fewer healthcare professionals which may lead to inefficiency due to a mismatch of resources**

**Number of practising nurses and physicians per 1000 inhabitants**
2018 (or latest year)

- **Hospital beds per 1000 inhabitants**
2018

---

Source: PwC analysis of OECD and Eurostat data

1. Poland data is 2017, Slovakia data refers to professionally active doctors and nurses

June 2021
Message 1 overview:
CEE governments spend less on their healthcare systems than the EU5 and have poorer health outcomes

1a) Historical public health spending in CEE countries

1b) Current health outcomes in CEE countries
• Health outcomes in CEE countries have improved significantly over time, but still lag behind the EU5
• This includes life expectancy, amenable mortality rates, mortality from cardiovascular disease and cancer survival rates
• At current rates of improvement in these health outcome indicators, it would still take many years for CEE countries to catch up to current EU5 averages

1c) Access to innovative therapies
Although life expectancy in CEE has improved greatly over the past 60 years, it is still 5 years less than in the EU5.

EU5 life expectancy has increased by 12 years since 1960, compared to 9 years in CEE countries.

Life expectancy at birth
Years, 1960, 2004, 2017

Source: PwC analysis of World Bank data
At historic growth rates, it will take an average of 22 years for life expectancy to catch up to the current EU5 average (82 years)

Some countries would bridge the gap more quickly (e.g. 4 years in Slovenia) but others will take longer (e.g. 46 years in Lithuania)

**Life expectancy**
Actual (2000-2017) and projected (2017-2055)*

- **Slovenia**: 4 years
- **Czech R.**: 10 years
- **Croatia**: 15 years
- **Poland**: 18 years
- **Slovakia**: 20 years
- **Hungary**: 21 years
- **Romania**: 27 years
- **Bulgaria**: 38 years
- **Lithuania**: 46 years

**Current EUS average**

**Methodology**
Estimated by assuming that life expectancy increases are sustained at their current growth rate, Estimated as constant average growth rate, 2000-2017.

- If EU5 life expectancy **continues to grow at its current rate, the catchup period will be even longer**, with the Czech Republic, for example, taking 22 years to catch up, instead of 10.

Source: PwC analysis of World Bank data
Amenable mortality rates across CEE are twice those of the EU5 despite having fallen since 2011

Amenable mortality has fallen 10% since 2011 across CEE countries

The amenable mortality rate measures the percentage of deaths from a collection of diseases such as diabetes and appendicitis that could be avoided with optimal quality healthcare.

Methodology

Age standardisation: Deaths are age-standardised to account for differing population structures between countries. The rate is estimated as a weighted average of age-specific mortality rates per 100,000 persons.

Source: PwC analysis of Eurostat data
Mortality rates for cardiovascular diseases across CEE have declined but are still about three times that of the EU5

Cardiovascular diseases are responsible for nearly one third of all deaths across CEE

Source: PwC analysis of Eurostat data

1. Cardiovascular diseases are a group of disorders of the heart and blood vessels. Two major diseases within this group are coronary heart disease (ischaemic) and cerebrovascular disease

2. For definition of age-standardised mortality rates, see slide 18.
At the current rate of improvement it would take some CEE countries >50 years to reach EU5 levels on these health outcomes. There is, however, significant variation between countries, for example Slovenia has already caught up on some indicators.

Estimated time to reach current EU5 rates of amenable, cerebrovascular and coronary heart disease mortality

Years, 2020-2070

**Methodology**
Estimated by assuming that mortality rate decreases are sustained at their current growth rate, Estimated as constant average growth rate (2002-2016 for cerebrovascular and coronary heart disease, 2011-2016 for amenable mortality).

Source: PwC analysis of Eurostat data
Lung and colon cancer survival rates have improved by 22% and 13% respectively in CEE but still lag behind those in the EU5

A patient diagnosed in CEE between 2010-2014 was almost one third less likely to survive lung cancer than a patient in the EU5

Five year net survival rates\(^1\) for lung cancer patients
\%, age-standardised\(^2\), patients diagnosed during 2000-2004 and during 2010-2014

<table>
<thead>
<tr>
<th>Country</th>
<th>2000-2004</th>
<th>2010-2014</th>
<th>EU5 average</th>
<th>CEE 11%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU5 average</td>
<td>15.7</td>
<td>11.1</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>12.4</td>
<td>11.2</td>
<td>12.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Slovenia</td>
<td>14.4</td>
<td>11.2</td>
<td>14.8</td>
<td>10.0</td>
</tr>
<tr>
<td>Croatia</td>
<td>14.8</td>
<td>10.6</td>
<td>11.2</td>
<td>10.0</td>
</tr>
<tr>
<td>Slovakia</td>
<td>10.0</td>
<td>9.5</td>
<td>9.9</td>
<td>8.6</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>11.2</td>
<td>8.8</td>
<td>11.1</td>
<td>8.8</td>
</tr>
<tr>
<td>Romania(^3)</td>
<td>8.9</td>
<td>7.9</td>
<td>9.9</td>
<td>7.7</td>
</tr>
<tr>
<td>Lithuania</td>
<td>5.8</td>
<td>5.8</td>
<td>5.8</td>
<td>5.8</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Five year net survival rates\(^1\) for colon cancer patients
\%, age-standardised\(^2\), patients diagnosed during 2000-2004 and during 2010-2014

<table>
<thead>
<tr>
<th>Country</th>
<th>2000-2004</th>
<th>2010-2014</th>
<th>EU5 average</th>
<th>CEE 54%</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU5 average</td>
<td>63.2</td>
<td>56.1</td>
<td>63%</td>
<td>58.5</td>
</tr>
<tr>
<td>Slovenia</td>
<td>53.6</td>
<td>50.4</td>
<td>53.5</td>
<td>53.6</td>
</tr>
<tr>
<td>Romania(^3)</td>
<td>52.2</td>
<td>51.8</td>
<td>52.2</td>
<td>52.2</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>48.0</td>
<td>47.3</td>
<td>48.0</td>
<td>48.0</td>
</tr>
<tr>
<td>Slovakia</td>
<td>56.1</td>
<td>44.5</td>
<td>56.1</td>
<td>56.1</td>
</tr>
<tr>
<td>Lithuania</td>
<td>56.9</td>
<td>51.1</td>
<td>56.9</td>
<td>56.9</td>
</tr>
<tr>
<td>Croatia</td>
<td>51.8</td>
<td>45.3</td>
<td>51.8</td>
<td>51.8</td>
</tr>
<tr>
<td>Poland</td>
<td>52.9</td>
<td>43.9</td>
<td>52.9</td>
<td>52.9</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>52.4</td>
<td>43.9</td>
<td>52.4</td>
<td>52.4</td>
</tr>
</tbody>
</table>

Source: PwC analysis of CONCORD London School of Hygiene and Tropical Medicine data
1. Five survival rates use short-term predictions of 5-year survival for patients who were diagnosed with cancer during 2000-2004 (and 2010-2014).
2. Survival rates are expressed in net terms (to account for international differences in background risk of death)
Prostate and breast cancer survival rates in CEE have also improved but still lag behind the EU5

CEE countries lag behind considerably, with Lithuania a notable exception for prostate cancer

Five year net survival rates\(^1\) for breast cancer
\(\%\), age-standardised\(^2\), patients diagnosed during 2000-2004 and during 2010-2014

Five year net survival rates\(^1\) for prostate cancer
\(\%\), age-standardised\(^2\), patients diagnosed during 2000-2004 and during 2010-2014

Source: PwC analysis of CONCORD London School of Hygiene and Tropical Medicine data

1. Five survival rates use short-term predictions of 5-year survival for patients who were diagnosed with cancer during 2000-2004 (and 2010-2014).
2. For definition of age-standardised mortality rates, see slide 18.
Message 1 overview:
CEE governments spend less on their healthcare systems than the EU5 and have poorer health outcomes

1a) Historical public health spending in CEE countries

1b) Current health outcomes in CEE countries

1c) Access to innovative therapies

- CEE governments spend less on pharmaceuticals per capita than the EU5
- Across several CEE countries, out-of-pocket expenditure makes up a significant proportion of pharmaceutical expenditure
- Patient access to innovative medicines in CEE countries, both in terms of the availability of new drugs and the time taken for these drugs to become available, is significantly lower than in the EU5
Official data do not provide an accurate picture of pharmaceutical spending largely due to the exclusion of hospital spend.

Components of a hypothetical gross pharmaceutical market

- EFPIA has commissioned estimates of net pharmaceutical expenditure as no official statistics exist which provide consistent, reliable estimates across the EU.
- OECD statistics include spending on medical non-durables such as syringes but exclude spending within hospitals. OECD statistics are also reported on a gross basis including VAT, where applicable, and distribution costs but before rebated/discounts provided by manufacturers.
- The chart illustrates the complexity of the composition of pharmaceutical expenditure, which contains over ten elements, and demonstrates the need to obtain a net figure for comparison purposes.

Methodology

- Working with national associations, EFPIA used a standard template to collect data on each component of spend for each country from official and other sources. Where gaps existed, the missing data were estimated.
- The Public Net Pharmaceutical Expenditure reported in the following slides is the publicly quoted number (provided by National Associations) minus any discounts or rebates. There is some variability in the inclusion/exclusion of pharmacy fees, wholesale fees and VAT between the countries as it depends on how their Sick Fund or National Statistics Organisation report the data.

Note: Illustrative pie-chart to show general components in pharmaceutical spending – does not represent real data from CEE countries.
Although CEE countries have lower levels of income than the EU5, pharmaceutical spending is still significantly lower...
...and lower levels of government spending on pharmaceuticals is associated with worse health outcomes

This relationship holds for DALYs, amenable mortality and mortality rates from circulatory diseases

Public Net Pharmaceutical spending per capita (2017) and key health indicators (2016) across the EU

Methodology

Disability-adjusted life years - The sum of DALYs across the population measures the gap between current health status and an ideal health situation. It is the sum of Years of Life Lost (YLL) due to premature mortality and Years Lost due to Disability (YLD) for people living with the health condition or its consequence.
Across several CEE countries, out-of-pocket expenditure makes up a significant proportion of pharmaceutical expenditure

High co-payments worsen health outcomes by incentivising underconsumption of medicines\(^1\)

**Breakdown of Total Net Pharmaceutical Expenditure per capita**

2017

<table>
<thead>
<tr>
<th>Country</th>
<th>Net public retail spend (per capita)</th>
<th>Net public hospital spend (per capita)</th>
<th>Out-of-pocket spend (per capita)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romania</td>
<td>93 (59%)</td>
<td>14% (27%)</td>
<td>4% (14%)</td>
</tr>
<tr>
<td>Poland</td>
<td>118 (62%)</td>
<td>20% (20%)</td>
<td>17% (17%)</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>150 (32%)</td>
<td>31% (37%)</td>
<td>4% (4%)</td>
</tr>
<tr>
<td>Croatia</td>
<td>172 (60%)</td>
<td>54% (35%)</td>
<td>28% (18%)</td>
</tr>
<tr>
<td>Hungary</td>
<td>224 (28%)</td>
<td>18% (33%)</td>
<td>50% (17%)</td>
</tr>
<tr>
<td>Czechia</td>
<td>237 (33%)</td>
<td>17% (23%)</td>
<td>61% (15%)</td>
</tr>
<tr>
<td>Slovakia</td>
<td>267 (23%)</td>
<td>15% (64%)</td>
<td>61% (10%)</td>
</tr>
<tr>
<td>Lithuania</td>
<td>286 (26%)</td>
<td>64% (73%)</td>
<td>323 (69%)</td>
</tr>
<tr>
<td>Slovenia</td>
<td>323 (69%)</td>
<td>323 (69%)</td>
<td>375 (69%)</td>
</tr>
<tr>
<td>EU5 Average</td>
<td>224 (37%)</td>
<td>224 (37%)</td>
<td>375 (37%)</td>
</tr>
</tbody>
</table>

\(^1\) Out-of-pocket (OOP) pharmaceutical expenditure is high in many CEE countries, driving up total figures.

\(^2\) In Czechia and Slovenia there are no mandatory OOP charges. If there is a tariff on an off-patent molecule and a patient decides to buy a more expensive brand then they do co-pay, but this is a consumer choice.

Source: PwC analysis of EFPIA estimates of net pharmaceutical expenditure
1. Gemmill 2008
2. Additional measures have been implemented in Lithuania since 2017 that have sought to reduce levels of Out-of-pocket spending within the country
Patients in the EU5 had access to over twice as many innovative therapies as those in CEE between 2016 and 2019

On average, only 34% of new drugs authorised by the European Medicines Agency (EMA) were available in CEE countries

---

**W.A.I.T. Indicator: Availability of new¹ drugs 2016-2019**

<table>
<thead>
<tr>
<th>Country</th>
<th>Actual available drugs</th>
<th>Missing drugs</th>
<th>EMA approved drugs (total 152)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU5 average²</td>
<td>107</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>87</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>78</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>57</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>55</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>42</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Slovakia</td>
<td>41</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>39</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td>38</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>26</td>
<td>126</td>
<td></td>
</tr>
</tbody>
</table>

---

• The W.A.I.T. Indicator measures differences in time to reimbursement across Europe. A medicine is available on the market if patients can receive the medicine under a reimbursement scheme. The chart shows number of new EMA-authorised medicines available to patients across Europe.

• Some available medicines are only for a limited sub-population, rather than all patients.³ For instance, 22% of available medicines in Slovakia and in Poland had limited availability.

---

**Methodology**

**Availability date** — The first date when doctors can prescribe/hospitals can administer the medicine to patients in the country, who will be able to benefit from reimbursement conditions applicable in the country.

---

¹ By new medicines, we refer to medicines, including a substance that has not been previously available in Europe.

² EU5 average for the W.A.I.T Indicator consists of Italy, Spain, France, Germany and England (rather than the UK).

³ Czech - 9%, Slovenia - 7%, Croatia - 4%, Hungary - 11%, Poland - 22%, Romania - 7%, Lithuania - 8%.
Poorer access to innovative therapies is often linked to poorer health outcomes, for example in oncology

Patients in the EU5 had access to almost twice as many new oncology drugs as those in CEE and had a much lower risk of dying from cancer

W.A.I.T Indicator: Availability of new oncology drugs
2016-2019

<table>
<thead>
<tr>
<th>Country</th>
<th>Available drugs</th>
<th>Unavailable EMA approved drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU5 average</td>
<td>33</td>
<td>8</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td>Slovenia</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>Hungary</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Poland</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Croatia³</td>
<td>15</td>
<td>26</td>
</tr>
<tr>
<td>Slovakia</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td>Romania</td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td>Lithuania</td>
<td>10</td>
<td>31</td>
</tr>
</tbody>
</table>

W.A.I.T Indicator: Rate of availability of new oncology drugs (2016-19) compared to risk of dying from cancer (2018)

Risk of dying from cancer – The cumulative probability of dying from cancer, expressed as the % of newborn children who would be expected to die from cancer before the age of 75, assuming a constant rate of cancer incidence as observed in the period of observation and in absence of competing causes of death. It is estimated using age-specific rates and therefore not influenced by differences in age structures.

Methodology
1. EU5 average for the W.A.I.T indicator consists of Italy, Spain, France, Germany and England (rather than the UK). This contrasts to the ‘Risk of dying’ indicator, where data is available for the UK (rather than England).
2. European Medicines Agency.
3. Croatia did not complete a full dataset and therefore availability may be unrepresentative.

Source: (Left) PwC analysis of EFPIA W.A.I.T survey, (Right) WHO Global Cancer Observatory and EFPIA W.A.I.T survey

June 2021
Patients in CEE countries also waited longer to get access to new drugs that were available between 2016 and 2019

It took an extra 304 days on average for a drug to be made available in CEE than in the EU5

There is a large variation in the speed of access to different products within a country. For example, in Poland some drugs become available after 170 days, whereas for other drugs this can take almost five years.

**Methodology**

**Time to availability** (previously known as length of delay) - The number of days between EMA market authorisation of a medicine and the date it becomes available to patients which, for most countries, is the point at which it gains access to the reimbursement list.

<table>
<thead>
<tr>
<th>Country</th>
<th>Time to Availability for EMA(^1) Approved Drugs (Days, 2016-2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romania</td>
<td>883</td>
</tr>
<tr>
<td>Poland</td>
<td>815</td>
</tr>
<tr>
<td>Lithuania</td>
<td>780</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>692</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>622</td>
</tr>
<tr>
<td>Slovakia</td>
<td>613</td>
</tr>
<tr>
<td>Slovenia</td>
<td>581</td>
</tr>
<tr>
<td>Hungary</td>
<td>566</td>
</tr>
<tr>
<td>Croatia(^2)</td>
<td>522</td>
</tr>
<tr>
<td>EU5 Average</td>
<td>370</td>
</tr>
</tbody>
</table>

\(^1\) European Medicines Agency
\(^2\) Croatia did not complete a full dataset and therefore availability may be unrepresentative.

Source: PwC analysis of EFPIA data

June 2021
Increased healthcare spending will improve health outcomes, boost economic performance and improve fiscal sustainability
Message 2 overview:
Increased healthcare spending will improve health outcomes, boost economic performance and improve fiscal sustainability

2a) The economic benefits of better health outcomes
   • Healthcare spending is associated with better health outcomes, including lower disability adjusted life years, amenable mortality and mortality from circulatory diseases
   • Improved health outcomes enhance the economic performance of a country, measured through GDP and productivity

2b) The potential impact of improving health outcomes in CEE countries

2c) The positive impact of innovative therapies for CEE countries
Higher levels of healthcare spending are associated with better health outcomes

This relationship holds across the EU for health outcomes such as DALYs, amenable mortality and mortality rates from circulatory diseases

Public health spending per capita (2006) and key health indicators (2016) across the EU

Methodology

Disability-adjusted life years - The sum of DALYs across the population measures the gap between current health status and an ideal health situation. It is the sum of Years of Life Lost (YLL) due to premature mortality and Years Lost due to Disability (YLD) for people living with the health condition or its consequence.

Note: We have analysed a 10 year lag between health spending and outcomes, to allow for impacts of spending changes to fully materialise.

Source: PwC analysis of WHO data ‘Health expenditure financed by government schemes & compulsory contributory health insurance schemes’ (PPP) data, WHO data for DALY and Eurostat data for Amenable mortality and Circulatory disease.  
1. For definition of amenable mortality see slide 18.
Better health outcomes are associated with higher per capita incomes across the world and over time

This positive relationship was identified in 1970 by Preston

The Preston Curve: Life expectancy and GDP per capita across 194 countries

$000s, PPP-adjusted, 2017

Better health outcomes drive higher per capita incomes and higher incomes drive better health outcomes (e.g. by allowing more investment in healthcare).

The countries in the EU with the most lost years of ‘healthy life’ are also the least productive

CEE countries have higher rates of disability and lower productivity than the EU5 average

Disability adjusted life years (DALYs)\(^1\) lost compared to GDP per hour worked

\(\text{€, PPP-adjusted, EU countries, 2016}\)

Source: PwC analysis of WHO data for DALY and OECD data for Productivity

1 For definition of DALY see slide 33.
Message 2 overview:
Increased healthcare spending will improve health outcomes, boost economic performance and improve fiscal sustainability

2a) The economic benefits of better health outcomes

2b) The potential impact of improving health outcomes in CEE countries
- Improved health outcomes have the potential to boost economic and fiscal performance of CEE countries
- This can occur through a number of channels, including reductions in time taken away from work (absenteeism), or reducing inactivity in the labour force due to ill health and informal caring responsibilities

2c) The positive impact of innovative therapies for CEE countries
Improved health outcomes boost economic and fiscal performance in several ways

Including through increased labour supply, tax contributions and enhanced productivity

Better health outcomes can be achieved by:
1. Reducing incidence of illness through prevention.
2. Reducing level of impairment or degradation of health through treatment.
3. Reducing length or severity of illness through treatment.

Better health increases the well-being of the population, a fundamental aim of government health policy.

Improved health outcomes improve economic outcomes through many different channels, with impacts varying depending on age group:
- **Children** invest more in their education.
- The **working age population** increases labour supply and productivity.
- The **old age population** relies less on informal caring, allowing carers to join the workforce or return to education.

Better health outcomes and economic outcomes improve fiscal outcomes by increasing taxes and reducing welfare spending and long term healthcare costs. This further improves long-term economic outcomes.
### Economic benefits of health

CEE countries experience significant economic and fiscal losses due to the impact of illness and disability on the workforce

**Lost working days gave rise to an estimated economic loss of €264bn across CEE in 2018**

#### 1. Absence from work due to illness

- 12 working days lost due to illness per employee in 2018 across CEE.¹
- The direct estimated economic loss of this is ~ €55 billion.
- N/A

#### 2. Inactivity due to disability or illness

- 4% of the working-age population or 3m people in 2018 in CEE.²
- The direct estimated economic loss of these people not entering work is ~ €82 billion.
- Leads to an estimated additional benefit requirement of ~ €2.2 billion and lost tax revenue of ~ €2.1 billion.⁴

#### 3. Inactivity due to informal caring

- 5% of the population or 4m people in 2018 in CEE.³
- The direct estimated economic loss of these carers not entering work is ~ €115 billion.
- Leads to an estimated lost income tax revenue of ~ €3.1 billion⁴.

---

¹. WHO data, ². Eurostat data, ³. Eurostat data – GDP per worker calculated by dividing GDP in current prices with data on the number of employees, ⁴. Eurostat data

*N/A*  

National breakdowns of all figures and detailed methodologies are available on slides 39 - 42
Poorer health outcomes in CEE have led to more of the working age population being inactive or absent from work

With 9% of the working age population inactive in CEE and 5% of working days lost for workers

Average number of working days lost per employee per year due to sickness or injury
2018 or most recent available year

Inactivity due to illness or disability and due to informal caring responsibilities
% of the working age population 2017/2018 (current prices)

This represents 6% of working days in 2018 for the Czech Republic. This figure also does not account for the self-employed or for ‘presenteeism’ where workers attend work when sick and are therefore less productive.
Even modest reductions in time away from work due to ill health would have large potential benefits

In 2013 the cost of paid sick leave constituted 0.8% of GDP across the EU\(^1\)

Reducing absenteeism by 10% by improving health outcomes represents an average fall from 12.6 to 11.8 days per employee per year.

**Methodology:**

Estimated by multiplying working days lost per employee, the total no. of employees and GDP per worker per working day, assuming 250 working days p.a.. Assumed GDP per worker remains constant, i.e. increases in the labour supply do not decrease wages. This figure was then multiplied by 0.1 (additional working days gained) to find 10% improvement.

**Estimated annual increase in GDP from reducing absence\(^2\) from work due to illness by 10%**

€ million, 2018 or most recent available year (current prices)

<table>
<thead>
<tr>
<th>Country</th>
<th>Economic Benefit (€ millions)</th>
<th>% GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland(^4)</td>
<td>€2,430m</td>
<td>0.6%</td>
</tr>
<tr>
<td>Czech Republic(^1)</td>
<td>€1,086m</td>
<td>0.4%</td>
</tr>
<tr>
<td>Romania(^8)</td>
<td>€545m</td>
<td>0.3%</td>
</tr>
<tr>
<td>Slovakia(^5)</td>
<td>€461m</td>
<td>0.5%</td>
</tr>
<tr>
<td>Hungary(^3)</td>
<td>€389m</td>
<td>0.5%</td>
</tr>
<tr>
<td>Slovenia(^5)</td>
<td>€218m</td>
<td>0.4%</td>
</tr>
<tr>
<td>Croatia(^2)</td>
<td>€201m</td>
<td>0.4%</td>
</tr>
<tr>
<td>Lithuania(^7)</td>
<td>€159m</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

Source: PwC analysis of WHO data for absenteeism. Eurostat data for employment statistics and €GDP. Most recent years for absenteeism data 2012(8), 2015(4), 2016(1,3,7) . 2017(2), 2018(5,6) .

1. Eurostat data (Labour Force Survey) – includes 24 European countries.
2. WHO definition of absenteeism: Average number of working days lost per employee per year due to sickness or injury (excluding maternity leave).
Improved health outcomes for the long-term sick and disabled would offer even larger economic and fiscal benefits

Reducing inactivity due to disability/illness by 10% has a potential economic and fiscal gain of €8.6bn across CEE countries

**Estimated annual increase in GDP if inactivity¹ due to illness or disability fell 10%**
€ million, 2017 (current prices)

<table>
<thead>
<tr>
<th>Country</th>
<th>Economic Benefit</th>
<th>% GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>€329</td>
<td>0.2%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>€202</td>
<td>0.5%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>€268</td>
<td>0.7%</td>
</tr>
<tr>
<td>Poland</td>
<td>€940</td>
<td>0.5%</td>
</tr>
<tr>
<td>Romania</td>
<td>€920</td>
<td>0.7%</td>
</tr>
<tr>
<td>Hungary</td>
<td>€673</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

**Estimated decrease in benefit payments and increase in income tax revenue if inactivity due to illness/disability fell 10%**
€ million, 2017 (current prices)

<table>
<thead>
<tr>
<th>Country</th>
<th>Reduction in benefit payments</th>
<th>Income tax gain</th>
<th>Difference largely explained by Poland’s significantly larger population size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>€240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>€42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovakia</td>
<td>€35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td>€26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>€21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td>€18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>€16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>€16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>€14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Methodology:**
Estimated by multiplying 10% of no. of working age people made inactive due to a) disability and illness and b) caring responsibilities by annual GDP per worker. Assumed GDP per worker remains constant, i.e. increases in the labour supply do not decrease wages.

**Methodology:**
Average annual income tax payments per working age person Estimated (using income tax data and population data) then multiplied by 10% of the no. of working age people made inactive due to disability and illness. Assumed tax revenue remains constant for each additional worker.

Source: PwC analysis of Eurostat data for inactivity statistics, disability payments, tax revenue statistics and GDP

1. Defined by Eurostat: The inactivity rate here is the proportion of people outside of the labour force in the total population of the same age group (% of working-age people) due to own illness or disability.
Improved health outcomes can also boost labour supply by reducing the need for informal care

With a total estimated increase in GDP of €11.5bn across CEE countries

**Estimated increase in GDP from getting 10% of currently inactive¹ informal carers into work**

<table>
<thead>
<tr>
<th>Country</th>
<th>Economic benefit (€ millions), 2018 (current prices)</th>
<th>% GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>€5,456</td>
<td>1.1%</td>
</tr>
<tr>
<td>Romania</td>
<td>€1,835</td>
<td>0.9%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>€1,242</td>
<td>0.6%</td>
</tr>
<tr>
<td>Hungary</td>
<td>€932</td>
<td>0.7%</td>
</tr>
<tr>
<td>Slovakia</td>
<td>€791</td>
<td>0.9%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>€472</td>
<td>0.8%</td>
</tr>
<tr>
<td>Croatia</td>
<td>€450</td>
<td>0.9%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>€175</td>
<td>0.4%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>€146</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

**Estimated increase in income tax revenue if inactivity due to caring reduced by 10%**

<table>
<thead>
<tr>
<th>Country</th>
<th>Reduction in benefit payments (€ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>€185</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>€42</td>
</tr>
<tr>
<td>Romania</td>
<td>€29</td>
</tr>
<tr>
<td>Slovakia</td>
<td>€18</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>€11</td>
</tr>
<tr>
<td>Croatia</td>
<td>€10</td>
</tr>
<tr>
<td>Slovenia</td>
<td>€6</td>
</tr>
<tr>
<td>Lithuania</td>
<td>€5</td>
</tr>
</tbody>
</table>

¹ Defined by Eurostat: The inactivity rate here is the proportion of people outside of the labour force in the total population of the same age group (% of working-age people) due to informal family/caring responsibilities.

**Methodology:**

Estimated by multiplying 10% of the inactive population by annual GDP per worker. Assumed GDP per worker remains constant, i.e. increases in the labour supply do not decrease wages.

Source: PwC analysis of Eurostat data for inactivity statistics, tax revenue statistics and €GDP

June 2021
Message 2 overview: Increased healthcare spending will improve health outcomes, boost economic performance and improve fiscal sustainability

2a) The economic benefits of better health outcomes

2b) The potential impact of improving health outcomes in CEE countries

2c) The positive impact of innovative therapies for CEE countries

- Innovative therapies have improved health outcomes, reduced costs to the healthcare system and delivered economic benefits
- Therapies currently being developed have the potential to deliver even further benefits in the future
Innovative therapies have created direct savings by lowering healthcare costs, for example in oncology.

Innovative cancer therapies have fewer side effects and are more effective than previous options.

Pharmaceutical innovation in Slovenia 2003 – 2009:

- **7%** fall in hospital discharges in 2010
- **85%** of the increase in drug expenditure has been offset by reduction in hospital expenditure
- **12%** more cancer deaths (age-standardised) could have occurred if innovation had not taken place

Lichtenberg (2015) - Pharmaceutical innovation in **Slovenia** between 2003-2009 is estimated to have contributed to two-thirds of the decline in premature mortality. It has resulted in a cost-per-life year saved of **€3 953**. This is considered significantly cost effective, when comparing to the country’s GDP per capita.

Lichtenberg (2018) - New cancer drugs in the US between 1993-2014 reduced the amount of days spent in hospital and thus the cost of treatment by **$5bn**

The number of life years lost from cancer also fell, by an average rate of **0.93% per year**

Cost of cancer treatment per patient
United States, $, 1997-2013

- **$29,000** in 1997
- **$24,000** in 2013


1. The most common cost-effectiveness threshold is that interventions costing less than 3x GDP per capita for each DALY averted should be supported (WHO [https://www.who.int/heli/economics/costeffanalysis/en/])
Innovative therapies for cardiovascular diseases have delivered significant benefits by reducing patient adverse events\(^1\)

*This reduces the cost of treatment and increases patient well-being*

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**Net value per patient of innovative cardiovascular medicines**

20 OECD countries, $, 1995-2003

- Hospitalisation savings: $89
- Cost of medicine: -$24
- Net value per patient: +$65

---

**Lichtenberg (2009)** – Study of innovative cardiovascular medicines across 20 OECD countries (1995-2003) found that:

- Usage of innovative medicines led to a reduction of hospitalisation costs that was 4x greater than an increase in the direct cost of medicines
- Reduced the age-adjusted cardiovascular disease mortality rate

---

**Grabwoski (2012)** - The development of statins between 1987-2008 to treat high cholesterol was estimated to reduce 28,000 deaths, 41,000 heart attacks, 15,000 strokes in 2008 across Europe

---

**+$433bn**

Net gain (overall social value from extra years of life minus the cost of treatment)

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1. Adverse event = injury resulting in prolonged hospitalisation, disability or death, caused by healthcare management
Innovative therapies currently being developed have the potential to create further benefits in the future (1/3)

A recent pipeline review identified a number of key disease areas where new innovations are likely to address significant unmet need

Disease modifying therapy for Alzheimer’s disease

Around 1.4m patients in CEE countries suffered from dementia in 2018, with an average cost of €13,000 per person or €19bn p/year across all CEE countries (€2bn p/year in the average CEE country).

- Current treatments of Alzheimer’s disease only treat worsening symptoms of the disease. However, a disease modifying therapy (β-Amyloid Pathway), that can be administered at early stages of the disease, could offer the potential to delay disease progression.
- It is estimated that the development of innovative therapies to delay the onset of dementia by 5 years, could lower hospitalisation costs in US by 40% by 2050

CGRP inhibitors for Migraines

Migraines contribute to ~14 lost work days per patient each year, equivalent to ~530m days lost in the EU and €45bn lost in GDP³

- CGRP inhibitors are currently in development, with three drugs approved between 2018/19, and three expected to launch by 2020/21.
- Phase 3 trial evidence indicates that patients could achieve >50% reduction in headache days, translating to ~155m fewer work days lost and GDP gains of €13bn p/year across the EU³.
- CGRP inhibitors could also prevent hospitalisation due to medicine overuse and, as a result, decrease total healthcare spend across the EU by 15.3% (~€1bn per year).

1. The number of patients with Dementia obtained from (‘Dementia in Europe Yearbook 2019’).
2. Cost is obtained from World Alzheimer Report by taking average cost per person in Central and Eastern Europe – assume that it stays constant (2015).
3. GDP and healthcare impacts based on EFPIA/IQVIA impact analysis, summarised in the EFPIA pipeline review full evidence deck.
Innovative therapies currently being developed have the potential to create further benefits in the future (2/3)

A recent pipeline review identified a number of key disease areas where new innovations are likely to address significant unmet need.

**CAR-T therapies for Blood Cancer**

<table>
<thead>
<tr>
<th>Haematological cancers resulted in 600,000 global deaths in 2013, up 37% from 1990, and cause 3.6m DALYs in Europe each year</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CAR-T therapies have the potential to reduce blood cancer mortality and improve quality of life compared to the current standard of care, which have high relapse rates.</td>
</tr>
<tr>
<td>• They could reduce current healthcare expenditure on targeted therapy by ~55-100% and the associated side effects. The curative potential could allow patients to contribute to the economy, resulting in an additional ~€5.1bn to nominal GDP(^1) p/year across the EU for patients diagnosed in 2020</td>
</tr>
</tbody>
</table>

**Combination therapies for Lung Cancer (NSCLC)**

<table>
<thead>
<tr>
<th>Lung cancer is the 3(^{rd}) most common cancer in Europe. Non-small-cell lung cancer (NSCLC) represent 85-90% of all lung cancers(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Combination therapies use multiple drugs to boost the chance of patient survival and improve patient quality of life vs chemotherapy alone. Between 2018-19, three product combinations received market authorisation and four more combinations are to launch by 2023.</td>
</tr>
<tr>
<td>• Increasing long-term survival rates could mean fewer patients requiring palliative care/overnight stays; reducing the pressure on healthcare utilisation. It could also increase patient contribution to the economy. For NSCLC patients diagnosed in 2020, an estimated €662m could be generated in GDP each year(^1).</td>
</tr>
</tbody>
</table>

Sources: EFPIA pipeline review full evidence deck (2019). See for [https://www.efpia.eu/we-wont-rest/innovation-1-old/](https://www.efpia.eu/we-wont-rest/innovation-1-old/) more detail on the various therapy areas

1. GDP and healthcare impacts based on EFPIA/IQVIA impact analysis, summarised in the EFPIA pipeline review full evidence deck
2. European Society for Medical Oncology (2018)
Innovative therapies currently being developed have the potential to create further benefits in the future (3/3)

A recent pipeline review identified a number of key disease areas where new innovations are likely to address significant unmet need

Cell Therapies for Type 1 Diabetes

In the EU, approximately 5 million people suffer from Type 1 diabetes (T1D), with incidence growing at 3-5% p/year. The cost of managing T1D and associated co-morbidities is estimated to cost EU healthcare systems a total of €12bn p/year¹.

**Cell therapies** involve injecting living cells into a patient to treat the T1D, without the need for daily injections and without relying on patient adherence to therapy. Five cell therapies are anticipated to receive marketing authorisation by 2021.

Cell therapies offer significant clinical and quality of life benefits for T1D patients. They reduce the incidence of life-threatening co-morbidities due to long-term control of blood-glucose levels and have the potential to **reduce the risk of cardiovascular disease by ~30%** in patients that do not receive intensive treatment.

Current therapy is unable to fully control blood-glucose levels and results in many days taken off work as a result. The reduction in co-morbidities could **reduce sick days due to hospitalisation by ~650,000 per year**, which could lead to an **increase in nominal GDP of ~€16bn¹**.

mAb’s for Bacterial infections

**Bacterial, lower respiratory infections are the 4th leading cause of death in the world².**

Innovation in antibacterials has falling since the 1980s, despite a growing problem of multiple drug resistant bacteria. **Antibacterial monoclonal antibodies (mAbs)** offer more targeted treatment to slow the development of antibiotic resistance - saving lives of patients that would otherwise not respond to treatment and improving quality of life by reducing side effects of high antibiotic doses.

**mAbs** could reduce infections due to these selected MDR bacteria, reducing healthcare costs and productivity losses, which **currently cost the EU economy at least €1.5 billion each year³**.
CEE health systems require further investment to meet future healthcare challenges and be financially sustainable over the longer term.
Message 3 overview:
CEE health systems require further investment to meet future healthcare challenges, and be financially sustainable in over the longer term

3a) Future healthcare challenges for CEE
• An ageing population in CEE countries will put pressure on healthcare spending in the future, as elderly people require more costly care
• Increasing dependency rates associated with an ageing population will also increase demand for social care services in CEE, requiring increases in long-term care spending
• Ensuring that health outcomes improve as the population ages can significantly reduce future spending pressures

3b) Ensuring long-term fiscal sustainability in CEE
Populations in CEE countries are ageing

The share of the population aged over 65 in CEE is expected to increase from 19% in 2018 to 31% in 2050

Proportion (%) of the population aged 65+ in 2018, 2030 and 2050 (projections)

CEE countries are expected to see between 110,000 (Lithuania) - 4.5 million (Poland) additional elderly people in the next 30 years
Per capita healthcare spending increases with age, largely driven by higher rates of disease as people get older

Elderly people require more costly care so an ageing population will tend to put pressure on the cost of future healthcare systems

Analysis by the European Commission shows that, in CEE countries public spending per capita increases with age, notably 55+.

This is largely because older people often develop multiple diseases, which require costly medical care.

For instance, the prevalence of multimorbidity increased from 23% for those aged 55-59 to 53% for those aged 70 and over across 16 EU countries.1

Improving health outcomes in CEE countries will reduce future spending pressures linked to ageing.

This could reduce public healthcare spending by an estimated €310bn across CEE by 2050.

The European Commission projects future healthcare spending based on two scenarios which assume different levels of per capita spending according to age:

1. The ‘Status quo/Fixed health outcomes’ scenario assumes no change in current rates of disease and morbidity. Every additional year of life is spent ‘bad health’. The age-expenditure profiles remain constant and a greater number of older people results in increasing healthcare costs.

2. The ‘Healthy Ageing/Better health outcomes’ scenario assumes longevity increases in line with an increasing number of healthy life years. Age-expenditure profiles are shifted outwards from the base year, in proportion to life expectancy increases.

Total estimated savings calculated by combining public healthcare spending projections as % of GDP\(^3\) (in 5 year intervals) with projected GDP (PPP terms) to calculate cumulative spending under both scenarios and then finding the difference. For missing data in the intervals, we assume the compound annual growth rate.

Source: PwC analysis of data provided by European Commission 2018 Ageing report
1. Croatia, Bulgaria and Romania are excluded from this figure as there were no GDP projections (OECD data). Figures have been converted from USD to EUR using 2018 exchange rate.
2. This is considered the ‘demographic scenario’ in the report. For example, the life expectancy of a 50 year old man is expected to increase from 30 years in year t to 34 years in t+20 (by 4 years). This scenario assumes that this old man will have per capita public expenditure profile of a (50-4) = 46 year old man in year 5
3. Public healthcare spending as % of GDP is not directly comparable to earlier analysis, as these projections combine SHA and COFOG datasets and exclude long-term care spending.
Ageing populations will also mean growing demand for social care services

4% of 16-64s had severe health problems limiting their ability to perform daily activities compared to 40% of those over 85

Methodology:
Dependency relates to the severe inability to perform activities of daily living and instrumental activities of daily living. People with dependency issues therefore require some degree of external assistance. Dependency rates are higher in older age groups, and directly drive long term care expenditure.
An ageing population is projected to increase public spending on long-term care from 0.8% of GDP to 1.3% by 2050 in CEE.

If populations age healthily, this could save a total of €80bn across CEE countries.

Source: PwC analysis of data provided by European Commission 2018 Ageing report
1. Defined as the ‘base case’ scenario in the report
2. Defined as ‘constant disability scenario’ and/or ‘healthy ageing scenario’ in the report.
3. Croatia, Bulgaria and Romania are excluded from this figure as there were no GDP projections (OECD data). Figures have been converted from USD to EUR using 2018 exchange rate.
Chronic diseases are becoming more prevalent which increases demand for healthcare services and the need for spending. Patients with chronic diseases use health services more frequently and are most costly to treat.

Across 16 EU countries, the presence of multiple diseases or conditions (multimorbidity) was found to double the number of annual doctor visits compared to those with no chronic disease and increase annual hospitalisations by over one third.¹

### Cancer

18% estimated increase in new cases in CEE by 2040²

- Health expenditure on cancer care was around €32bn across Europe in 2018.
- The estimated annual loss in productivity from the disease was €70bn.³

### Hypertension

Global prevalence predicted to rise by 15-20% by 2025⁷

- CEE has the highest rates of hypertension in Europe
- The estimated cost of strokes in the EU was around €45bn in 2015 (including productivity impacts)
- The total number of stroke events in the EU is also expected to increase by 34% by 2035 (to around 820,000).

### Diabetes

Prevalence in Europe predicted to increase by 20% by 2040⁴

- This will cause an estimated increase in total healthcare expenditure in Europe of $18bn per year (12% increase) by 2040.⁶

### Dementia

Prevalence in CEE countries predicted to rise by over 25% by 2050⁸

- This could increase health and social care costs in an average CEE country by around $1.7bn by 2050.⁹
- According to the OECD, dementia is the second largest cause of disability for the over-70s, costing societies more than half a trillion US dollars every year globally.

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Message 3 overview:
CEE health systems require further investment to meet future healthcare challenges, and be financially sustainable in over the longer term

3a) Future healthcare challenges for CEE

3b) Ensuring long-term fiscal sustainability in CEE

• Relieving future pressure on the health system is particularly necessary in CEE countries as the working age population decreases and income tax receipts decline
The working age population is projected to fall by 16m in CEE so reducing labour supply and tax revenue

This would reduce annual income tax revenue by an estimated €11bn by 2050 across CEE

Source: PwC analysis of Eurostat data for income tax and population projections

1. This is the difference between annual tax revenue in 2018 and annual tax revenue in 2050. We assume tax paid per working age person remains constant between 2018 and 2050. Income tax is from salaries/wages ‘individual or household income.

2. Hungary has missing tax revenue data

---

Population projections take into account the effect natural population change as well as net migration, although these flows represent a small proportion of the population projections (< 0.4%). In fact, net migration is expected to be a positive contributor to population growth in most CEE countries up to 2050.

---

*Estimated tax revenue impact (2050 compared to 2018)*

Source: PwC analysis of Eurostat data for income tax and population projections

1. This is the difference between annual tax revenue in 2018 and annual tax revenue in 2050. We assume tax paid per working age person remains constant between 2018 and 2050. Income tax is from salaries/wages ‘individual or household income.

2. Hungary has missing tax revenue data

---

June 2021

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This also means that fewer workers will pay into compulsory health insurance schemes reducing funding for public healthcare.

These schemes make up 88% of public healthcare financing in CEE countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Compulsory contributory health insurance schemes</th>
<th>Government schemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>17.7%</td>
<td>82.3%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>15.9%</td>
<td>84.1%</td>
</tr>
<tr>
<td>Croatia</td>
<td>7.7%</td>
<td>92.3%</td>
</tr>
<tr>
<td>Hungary</td>
<td>11.7%</td>
<td>88.3%</td>
</tr>
<tr>
<td>Poland</td>
<td>14.9%</td>
<td>85.1%</td>
</tr>
<tr>
<td>Romania</td>
<td>19.7%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>4.7%</td>
<td>95.3%</td>
</tr>
<tr>
<td>Slovakia</td>
<td>3.0%</td>
<td>97.0%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>13.5%</td>
<td>86.5%</td>
</tr>
</tbody>
</table>

Salary contributions (from employer and employee) range from 8% of income in Bulgaria to 14% in Slovakia and 16.5% in Croatia.
Increasing demand for healthcare coupled with a shrinking workforce pose a threat to future fiscal sustainability.

Investing in healthcare will reduce future cost pressures as well as create economic benefit.

**Estimated change in health, long-term care spending and annual tax revenue across all CEE countries**

Based on scenarios developed by the European Commission, 2018-2050

### Methodology:

The net fiscal loss is an estimate of increases in absolute health spending under both scenarios (higher under S1), combined with estimated reductions in tax revenues (equivalent under both scenarios) between 2018 and 2050. To calculate the absolute spending difference, we have combined two data sources – European Commission projections for healthcare spend as % GDP for each country and OECD projections for GDP in PPP terms (with missing data for non-OECD countries Romania, Bulgaria and Croatia).

Note: Health and long-term care spending projections exclude Bulgaria, Croatia and Romania due to missing GDP projections. Tax revenue impact excludes Hungary due to missing tax revenue data. Figures have been calculated by taking the difference between 2050 and 2018 values of projected spending and tax revenue. These have been converted from USD to EUR using 2018 exchange rate.
Policy reform can improve health outcomes by increasing the efficiency and effectiveness of healthcare spending
Message 4 overview:
Policy reform can also improve health outcomes by increasing the efficiency and effectiveness of healthcare spending

- Moving toward a digitised healthcare system, with strong community based care can improve efficiency i.e. reducing costs without compromising care quality.
- Policies which promote appropriate competition from biosimilars and generics can create headroom in budgets for new and more effective medicines.
- Improving adherence to medication, through initiatives such as medicine reviews and patient support, has the potential to reduce resource waste and improve treatment effectiveness.
- Reforming the way healthcare systems are financed, through the introduction of integrated budgets and novel payment schemes, can improve resource allocation and support the sustainability of funding for new medicines.
- Ensuring the flow of better information across the healthcare system, through outcome measurement and horizon scanning, can help to identify effective treatments and support sustainable budget planning.
There is considerable scope to improve efficiency across healthcare systems in CEE

**CEE countries currently sit below the EU5 average when it comes to healthcare efficiency scores**

- **Key sources of inefficiencies**:  
  - **Wasteful clinical care** - patients receive ineffective / inappropriate care (e.g. medical errors, provision of ‘low-value’ care).  
  - **Operational waste** – poor management of resources and spending on medicines.  
  - **Governance-related waste** – use of resources that do not directly contribute to patient care (e.g. administrative burden, fraud).

**Bloomberg healthcare efficiency index**

(based on 2016 data)

Scores are based on three characteristics: health status (life expectancy), healthcare cost as a % of GDP per capita and health care costs per capita.

- **Hong Kong** (highest score)
- **EU5 average**
- **Poland**
- **Czech Republic**
- **Romania**
- **Hungary**
- **Slovakia**
- **Bulgaria**

The following slides outline a number of **policy reforms** to increase efficiency across the entire healthcare sector.
Healthcare systems can improve efficiency and increase patient access by investing in digitisation

The COVID-19 pandemic has demonstrated the need for rapid digitisation across the sector

**Challenge:**

- Limited adoption of e-Health (e.g. inability to book doctors appointments online or limited patient data analytics) presents a challenge for managing rising healthcare costs and changing patient preferences.
- There is currently uneven development of digitisation and eHealth solutions across the EU and CEE countries.

**Digitisation can generate substantial cost-savings by reducing the cost of services - Polityka estimates that eHealth solutions could decrease health expenditure in most European countries by ~5%.

Examples of digitisation:

- **Telemedicine** (remote medical consultations) which reduces the need for travel and the likelihood of missed appointments, saving doctor and patient time.
- **Electronic health systems & records** which improves accuracy and availability of medical records, enabling better and more efficient patient management.
- **Remote monitoring devices + biosensors** to improve disease surveillance and, consequently, health outcomes.
- **Data analytics + artificial intelligence** to identify high-risk patients and provide targeted treatments.

**Opportunity:**

The impact of COVID-19 has heightened awareness of the limitations of healthcare systems and the need for new digital approaches to healthcare delivery.

**Further resources:**

OECD (2019) - Health in the 21st Century *Putting Data to Work for Stronger Health Systems*
Stronger community-based care can reduce the burden on hospitals and generate cost savings for the healthcare system

This requires moving care into community-based settings and investing in primary care

**Challenge:**

Lack of investment in primary care systems (including availability of community based physicians) and reliance on secondary care results in unnecessary admissions (as shown in the chart below, with hospital discharges used as a proxy for admissions).

- Over a quarter of patients in the EU visit emergency departments due to inadequate primary care; this is a particular issue in rural areas.

**Opportunity:**

The development of high quality, accessible community based care can strengthen the overall health system by:

- **Reducing avoidable hospital admissions**, which can reduce overall costs for the healthcare system and improve resource utilisation.
- **Improving patient health outcomes.** Primary care is proven to be an effective and efficient way to address causes of poor health and the associated risks.
- **Meeting the increasingly complex healthcare needs of the future**, which will require people-centered, community based care.
- **Improved patient experience**, through better coordination of care and patients receiving the most appropriate services in the right settings.

**Further resources:**

OECD (2019) - Realising the full potential of primary healthcare

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**Note:**

1. European Commission (2017) *State of the health in the EU*

   Outpatient care includes both outpatient curative and rehabilitative care and home-based care.
Biosimilar and generic competition can create headroom in budgets for new and more effective medicines

Adoption of generics and biosimilars is inconsistent across CEE countries

**Challenge:**

- Generics and biosimilars are usually cheaper than branded products and low uptake represents a lost opportunity to reduce costs e.g. the adoption of biosimilars reduced average prices across CEE by 15-25%.

**Opportunity:**

- Competition in off-patent pharmaceutical/biologics markets is key to generate savings, contribute to the sustainability of health systems and foster innovation.
- Effective mechanisms should ensure that potential cost savings from increased competition are not retained in the distribution channel but are passed on to payers and patients.
- Incentives need to guarantee security of supply and continuation of treatment by providing a sufficiently broad choice of products and avoiding a “winner takes all” scenario.

**Share of biosimilars in the accessible market, %, 2018**

2. A biosimilar product contains a version of the active substance of an already authorized original biological medicinal product.
3. The accessible market includes the original referenced and original non-referenced products as well as the biosimilar product. The biosimilar market share is measured as the number of biosimilar treatment days as a share of accessible market volume.
4. GCSF (Granulocyte-colony stimulating factor) is used with cancer patients to accelerate recovery from neutropenia after chemotherapy. EPO initiates production of hemoglobin to treat patients with anemia after chemotherapy. Rituximab = blood cancer and inflammatory conditions drug. Anti-TNF = inflammatory condition treatment e.g. arthritis/Chron’s disease. F-Alta = fertility medication, HGH = treats growth disorders in children and hormone deficiency in adults. Insulins = treatment of diabetics allergic to beef/pork insulin.

Further resources:

EFPIA (2015) - Policy principles for off-patent biologic markets in Europe
The effectiveness of treatment can be improved through increasing adherence to medication

Poor adherence is estimated to contribute to 200,000 deaths in Europe per year, costing €125b

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**Challenge:**

Poor adherence to treatment leads to **poorer health and economic outcomes** in several ways:

- It wastes medication and increases the cost of treatment.
- It reduces the effectiveness of treatment and **increases the risk of further adverse events** (e.g. stroke, heart attack) which result in additional costs.

Poor adherence is caused by a number of factors such as a lack of information for patients, side effects from treatment or polypharmacy (where a patient is taking 5+ medications):

- Inappropriate polypharmacy (e.g. drug-drug interaction) contributes to 45% of the avoidable costs due to suboptimal medicine use - a total of **0.3% of global total health expenditure** ($18 bn worldwide).

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**Opportunity:**

Increasing adherence to medication can be achieved through:

- Introduce **guidelines which encourage more frequent medicine reviews** to identify opportunities for reducing polypharmacy and ensuring medicines are working optimally in combination.
- **Support for patients** by providing self-management education by nurses to adopt sustainable self-management skills and behaviour.
- **Investment in medical technologies** that have fewer side effects and reduce the need for polypharmacy e.g. through the combination of active ingredients into one treatment.

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**Further resources:**

- Pfizer (2018) *The value of drug adherence*
- PwC (2019) *Touching lives, improving health*
Integrated budgeting across primary, secondary and social care can incentivise collaboration and the provision of continuous care

**Siloed budgeting can disincentivise funding treatments with wider social or longer-term benefits**

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**Challenge:**

Budgets across CEE countries are siloed - they are rigidly assigned to specific healthcare settings (e.g. primary, secondary, social care), cost categories or disease areas. This results in silo ways of working and, as a result:

- **Disincentives exist to fund treatments that could create system-wide benefits:** When investing in treatments, only the value to a specific setting is taken into account, even though wider benefits exist.¹

- **Disincentives to provide coordinated care:** ~5.6% of EU hospital admissions could have been avoided, had there been better care coordination and management.³ The need for care continuity to alleviate pressure on healthcare systems is growing, with increasingly ‘complex’ patients facing multiple chronic conditions.⁴,⁵

- **The business case for preventative primary care measures is weakened** without considering downstream impacts on reduced hospitalisation and secondary care spending.

**Further resources:** see references in footnote

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**Opportunity:**

Integrated budgeting is considered a pre-requisite to successful delivery of integrated care.⁴ It can align incentives across the healthcare system, improving resource allocation and efficiency.⁶,⁷ Benefits include:

- **Accountability & flexibility:** A fixed bundled payment to cover multiple settings incentivises collaboration and coordination of care⁸ to achieve system-wide, rather than individual, cost savings. Without the constraints of siloed budgeting, there is flexibility to deliver the most effective service mix. For instance, investing in treatments that bring the best long-term value for the healthcare system and provision of preventative care, community-based care.⁹

- **New treatments:** Breaking away from siloed funding can incentivise development of innovative treatments for multiple indications and with wide-ranging benefits.¹⁰

- **Predictability:** Identification of the value of the budget upfront increases the stability of the healthcare system to plan and implement changes.⁸
Novel payment models can support sustainability of funding for innovative medicines

By allowing for uncertainty over benefits and spreading out costs over longer periods

Challenge:

Scientific advances and novel treatments offer significant benefits to patients but pose new challenges to current payment models, which may restrict affordability:

- **High one-off cost** of curative treatments. Payers face affordability constraints as single upfront payment is required, while benefits to patients and the healthcare system occur over many years.
- **Uncertainty regarding the extent of the benefits** of treatments and their real-world value at the time of assessment.
- **Medicines may deliver significantly different value** across a range of contexts and indications/sub-populations, whereas current pricing and reimbursement processes are often rigid in assigning a single composite price.

Opportunity:

Given these challenges, traditional pricing and reimbursement models can become a barrier to patient access. Novel pricing and payment models may be required:

- **Outcomes-based payments (OBPM)** are conditioned on real world performance and are related to observable outcomes, providing incentives to deliver the most effective treatments.
- **Over-time payments** mean that manufacturers are paid over fixed periods for each patient receiving a therapy to mitigate up-front costs.
- **Subscription payments** involve decoupling payments for a treatment from the number of patients that receive the medicine. This can help payers anticipate the budget impact of treating patients in a given disease area, as payment is not linked to the number of patients treated.
- **Indication & combination based pricing** allows the price of a medicine to differ to reflect its observed value across indications.

Further resources:

EFPIA (2019) – Addressing Healthcare Challenges Novel Pricing and Payment Methods
Information sharing and healthcare analytics can improve resource allocation and allow for effective budget planning

This includes the use of performance indicators for healthcare delivery and horizon scanning

**Challenge:**

A lack of appropriate information or data can limit the effectiveness of the healthcare system and allocation of resources, for example:

- Practitioners in healthcare systems may have limited information on their **performance across different disease areas** or the most appropriate treatment. This can result in **wasteful clinical care**, driven by inaccurate beliefs about treatment effectiveness and the inability to identify which interventions deliver better patient outcomes.

- Governments that have **limited insight on the pipeline of innovation** are not able to effectively plan budgets to fund these innovations when they come to market.

**Opportunity:**

Information sharing and health analytics (e.g. through a quality and outcomes framework) has the potential to:

- **Improve effectiveness of patient care** by assessing performance and receiving continuous feedback.

- **Reduce unnecessary care and costs** by having a greater understanding what matters to patients in terms of health and prioritising interventions that deliver better outcomes.

- **Reduce waste through prescriptive analytics** - estimating patient costs allows for appropriate allocation of personnel and resources.

- **Reducing costs of treating chronic diseases through predictive analytics** - identifying high-risk patients, making early intervention possible.

Governments can prepare for the future of innovative medicines through effective ‘Horizon Scanning’ and identification of off-patent medicines. **Collaboration with pharmaceutical firms** enables governments to identify, assess and prioritise innovations early and plan their budgets better.

**Further resources:**


OECD (2019) - *Improving Forecasting of Pharmaceutical Spending p17-20*
Thank you