IPOKE

Research Institute

FINAL REPORT

The impact of Underinvestment on Medicines and Health Services:

The case of Poland, Romania & Greece

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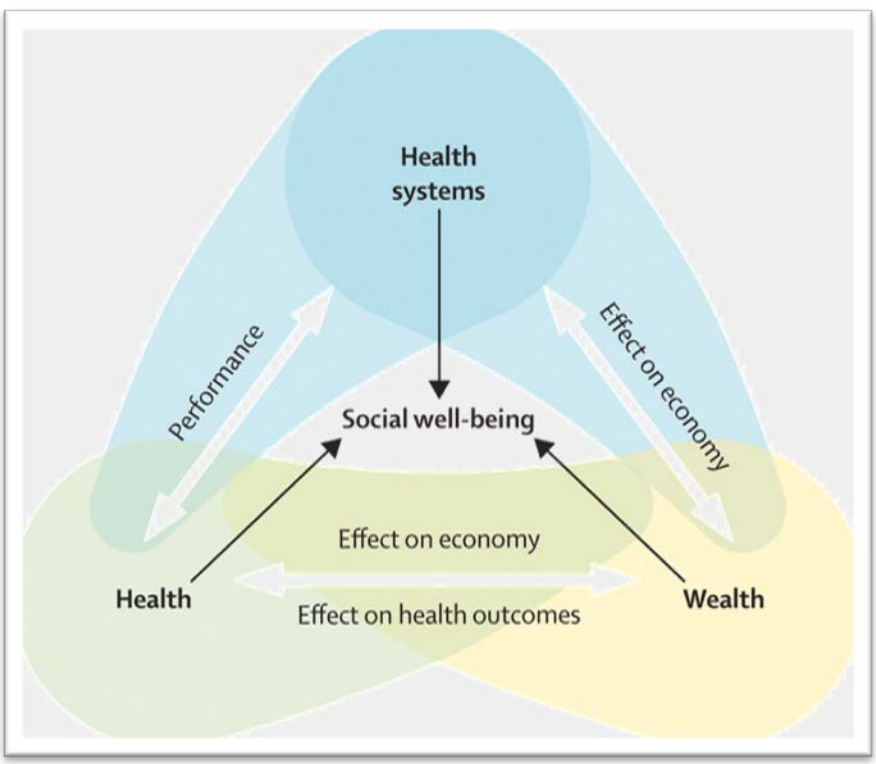
Extended Executive Summary

1. Introduction

❖ **Better health improves human capital and is a driver of economic growth. Hence, allocating resources to the health system should be considered as an investment and not an expense.**

It is generally accepted that higher health is associated with better health outcomes owing to the greater availability of resources. However, the relationship is bi-directional. There are at least four pathways by which improved health could induce economic growth (McKee et al. 2009). First, people with good health status are associated with a lower risk of unemployment and, if employed, sickness absence and early retirement. Second, healthy people can be more productive in their work. Third, there is a correlation between investing in health and investing in education, and stronger human capital in a society is a driver of economic growth. Finally, because healthy people expect to live longer, they may also save more for their retirement period, which creates more opportunities for capital investments.

Figure 1 Health systems, health and wealth



Source: McKee et al. (2009)

Health has an investment value in itself. It is also a precondition for increase in productivity labour supply, economic welfare and wellbeing. Investing in people's health as human capital improves the Quality of life of the population and reinforces happiness, active employment, economic and social policies contributing to growth and social inclusion. Evidence across the EU and the CEE Member States reveals the significant underinvestment in health and the need for policy intervention to improve access and health outcomes.

2. Objectives

The **primary objective** of this project was to investigate the impact of underinvestment the impact of underinvestment in health systems on health outcomes and pharmaceutical care, in particular, in Greece, Poland and Romania using macro and micro 'big data' sources.

To achieve the overall purpose of the project, the **specific objectives** for this study are defined as follows:

- Investigation of the evolution of investment in health systems and in pharmaceutical care, in particular, in Greece, Poland and Romania in comparison with the rest of the European countries using macroeconomic data.
- Exploration of the trends and changes in morbidity and health profiles over time, and more specifically with respect to:
    - Multimorbidity
    - Different categories of chronic diseases
    - Ill-health using other health indicators
    - Quality of life
- Examination of the changes in the use of healthcare services over time, regarding:
    - Inpatient and outpatient care
    - Pharmaceutical care
    - Long-term care
- Investigation of the changes in unmet healthcare needs over time:
    - Healthcare services
    - Pharmaceutical care
    - Long-term care
- Assessment of the satisfaction of the population with their health system in general
- Analysis of out-of-pocket payments (OOPP), and more specifically:

  - Total OOPP and its components (including pharmaceutical OOPP)
  - Total OOPP and chronic diseases
  - Pharmaceutical OOPP and chronic diseases
  - Total and pharmaceutical OOPP burden
  - Catastrophic total and pharmaceutical OOPP
- Inspection of income and education-related health outcomes inequalities
- Assessment the impact of investment in health on various health outcomes using advanced econometric analysis, and more specifically on:
  - Total and pharmaceutical OOPP burden
  - Catastrophic total and pharmaceutical OOPP
  - Total and pharmaceutical unmet needs
  - Self-reported health and quality of life
  - Satisfaction with the health system
- The predictors of total and pharmaceutical OOPP are also explored to determine the impact of chronic diseases.

3. Methodology

Two main databases were used for the purpose of this report:

- Eurostat's database, from which macro data, mainly health expenditure, at a country level were extracted.
- Micro data from the SHARE survey (Survey of Health, Aging and Retirement in Europe). The SHARE survey is an interdisciplinary and cross-national panel study that has been conducted biennially since 2004. It collects data on health, socioeconomic status, and social and family networks for people aged 50 and over and their households, namely, the main consumers of healthcare resources in society.

Table 1 SHARE survey total sample per country and wave

Countries	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Total sample
Greece	2666	3192	2967			4777	33	2986	**16621**
Poland		2412	1914	1718		1798	4624	265	**12731**
Romania							237	1265	**1502**

Total sample for all countries	26951	27247	23571	49887	41031	59902	58736	35399	322724

Interested readers can find a detailed presentation of the methodology in the main report.

4. Results

4.1. Health expenditure and public funding over time

- **The Economic Adjustment Programmes led to a diverging trend in total health expenditure between Greece and the rest of Europe; the overall adjustment between 2009 and 2019 was equal to -22.8%, while, on average, total health spending per inhabitant increased by 16.7% in Europe.**
- **Despite the convergence with Europe during the last decade in terms of total investment in the health system, total health expenditure per capita is well below the European average for both Poland and Romania, the latter in particular.**
- **A similar pattern is observed with respect to pharmaceutical health expenditure per capita. Despite the convergence with Europe, investment in pharmaceutical care is below the European average in Poland and Romania.**
- **Following a decade of adjustment, pharmaceutical expenditure per inhabitant in Greece is somewhat higher compared with the rest of Europe.**
- **Overall, public investment in health is falling short of the European average for all three countries.**

At first, the evolution of investment in the health systems and in pharmaceutical care in particular was investigated. Investment in health and in pharmaceutical care was defined with respect to health and pharmaceutical spending, respectively.

4.1.1. Total health expenditure

Greece

Although the average total health spending per capita (pps) in Europe increased from 2359 € to 2752 € over the period of 2009-2019, in Greece, health expenditure decreased significantly from 2148 € to 1657

€ due to the economic crisis and the implementation of the economic adjustment programs. Greece is associated with the largest reduction in total health spending (-22.8%) among all European countries during the overall period of analysis, while, on average, total health spending per inhabitant increased by 16.7% between 2009 and 2019 in Europe. European countries decreased their total health expenditure as a share of GDP from 9.3% to 8.4%. The same applies to Greece, which registered a significant downward adjustment from 9.4% to 7.8%.

Public health spending per capita (pps) increased from 1805 € to 2081 € in Europe between 2009 and 2019, registering a relative growth of 15.3%. Greece is the only European country in which a decrease (-32.5%) in public health expenditure (from 1467 € to 990 €) was observed. Greece showed a small decrease of -2.3% in private health spending per capita (pps), i.e. from 680 € to 669 €, although an increasing trend is evident following 2011. At the same time, the relative growth in private health spending was 20.7% in Europe, namely from 554 € to 669 €. The above changes resulted in shifts in the composition of total health expenditure. The share of public funding in total health expenditure decreased in Europe from 75.4% to 73.9% and in Greece from 68.3% to 59.8%. This confirms that the Greek health system remains among the most privatised health systems in the European Union, as it relies heavily on OOPP as a funding mechanism for health care (Yfantopoulos and Chantzaras 2018).

Poland

In Poland, although total health expenditure per capita (pps) increased from 1262 € to 1636 € (+29.7%) between 2013 and 2019, total investment in health remains far below the European average (2752 € in 2019). The share of total health spending in GDP remained broadly stable in Poland between 2013 and 2019 (6.41% and 6.45%, respectively), while the European average continues to be substantially higher (8.4% in 2019).

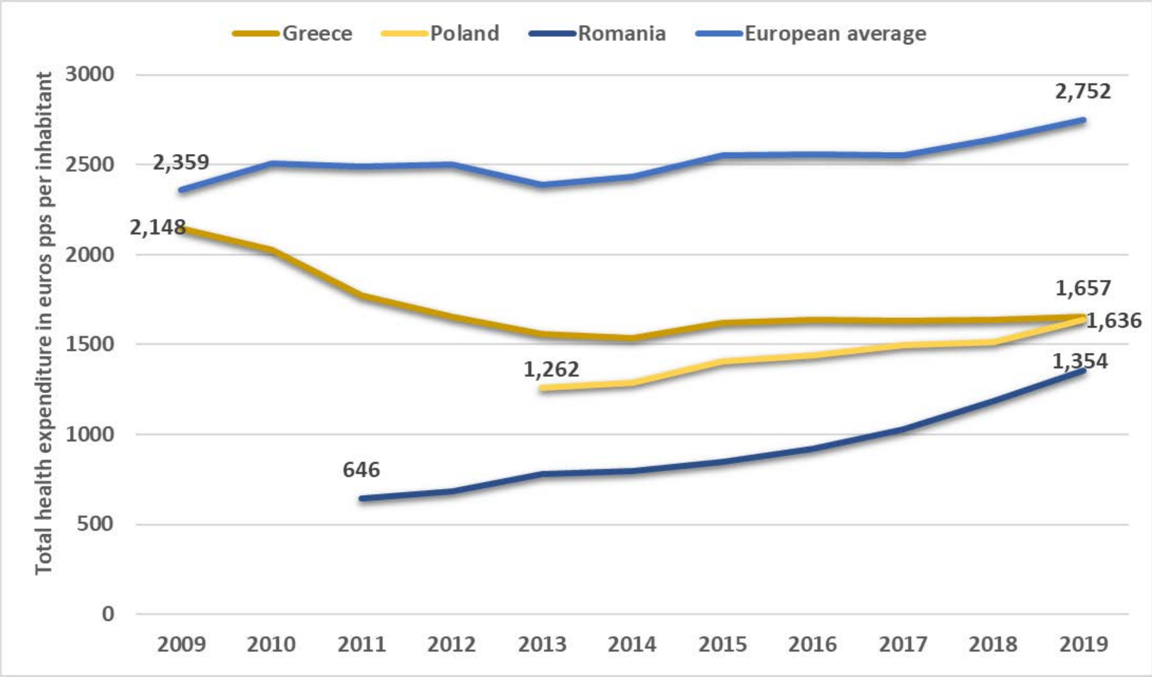
In the same period, public health spending increased by 31.7%, i.e. from 892 € to 1174 €. Nevertheless, public investment in health is also falling short of the European average (2081 € in 2019). The growth in private health spending per capita (pps) in Poland (24.7%), i.e. from 370 € to 462 €, was above the European average (20.7%), but private investment in health remains lower compared with Europe (669 € in 2019). These changes led to a small increase from 70.7% to 71.8% in the share of public funding in total health expenditure, while the European average is still higher (73.9% in 2019).

Romania

In Romania, total health spending per capita (pps) increased from 646 € to 1354 € (+109.8%) between 2011 and 2019. However, total investment in health still remains far below the European average (2,752 € in 2019). The share of total health expenditure in GDP increased from 4.7% to 5.7% in Romania, while the European average continues to be substantially higher (8.4% in 2019).

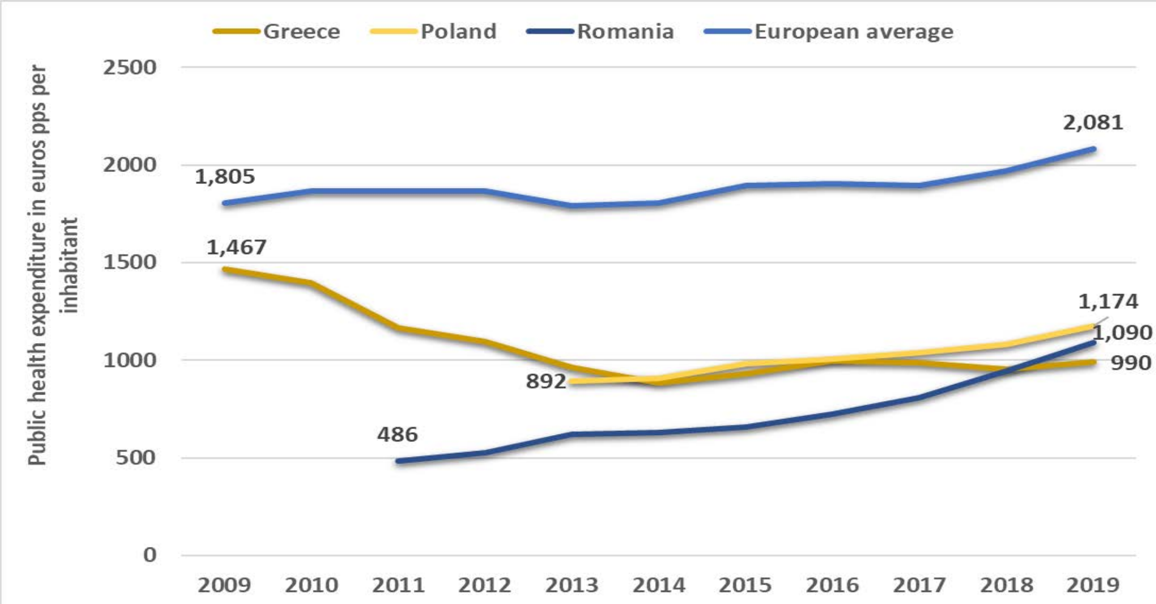
In the same period, the growth in public health spending was large in Romania (124.3%), i.e. from 486 € to 1090 €, however, it remains far behind the European average (2081 € in 2019). Romania ranks third in the list of European countries in terms of size of increase (65.8%) in private health expenditure per capita (pps), i.e. from 160 € to 265 €. Nevertheless, private investment in health in Romania remains far below the European average (669 € in 2019). As a result of these changes, a rise from 75.3% to 80.5% in the share of public funding in total health expenditure was registered Romania, while the European average is somewhat lower (73.9% in 2019).

Figure 2 Total health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



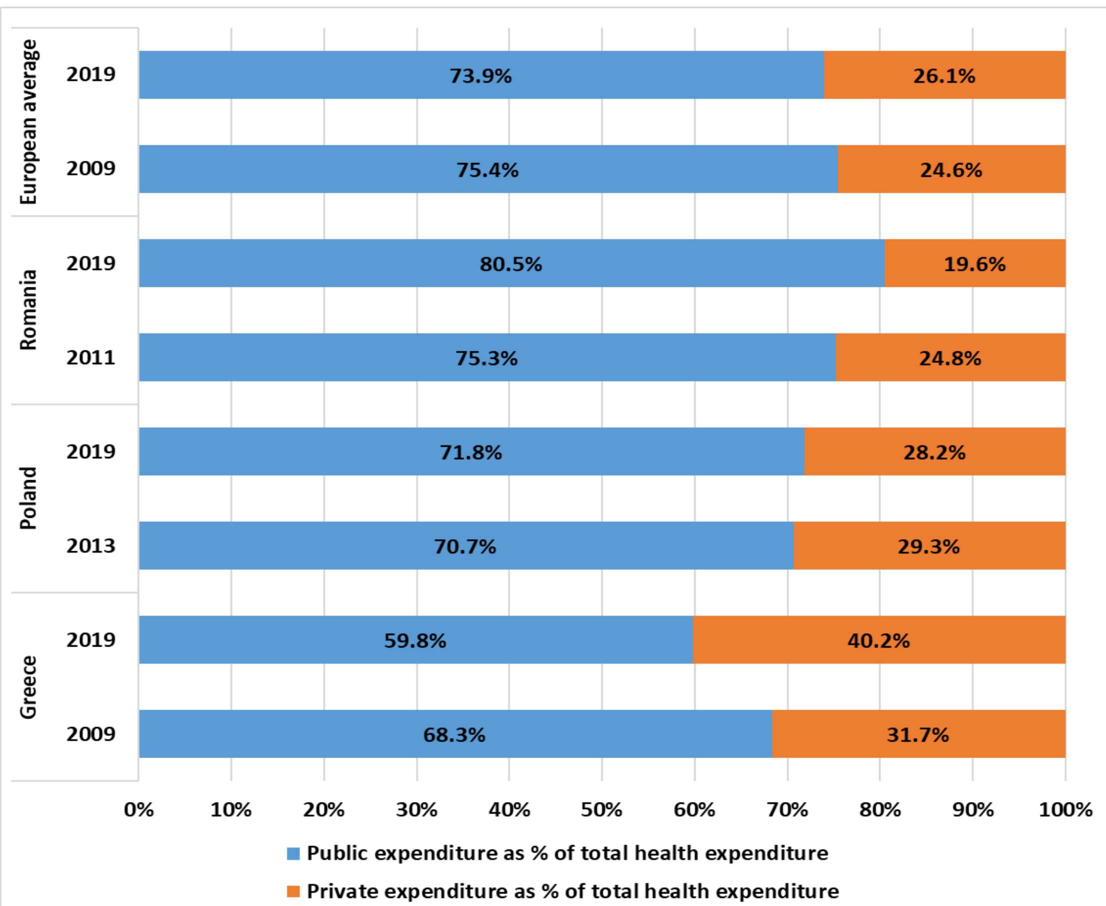
Note: pps: purchasing power standard.

Figure 3 Public health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

Figure 4 Public and private health expenditure as a % of total health expenditure (2009 or nearest year & 2019)



4.1.2. Pharmaceutical expenditure

Greece

Now, we turn our focus to spending on medicines. The average pharmaceutical expenditure per capita (pps) increased from 389 € to 403 € (+3.6%), on average, in Europe between 2009 and 2019, whereas it decreased from 587 € to 434 € in Greece. Greece is associated with the largest decrease in pharmaceutical expenditure among the European countries (-26.2%). Regarding the share of total pharmaceutical expenditure in GDP, it has decreased from 2.6% to 1.1% in Greece and from 1.7.% to 1.3% in Europe. The share of pharmaceutical expenditure in total health expenditure decreased in almost all European countries (-7.7%, on average) between 2009 and 2019, in Greece including (-4.4%). It was estimated at 26.2% in 2019, which is comparable with the European average (25.8%).

Public pharmaceutical expenditure per capita (PPS) showed a slight decreasing tendency in Europe at the beginning of the previous decade, which was followed by an opposite trend. Overall, public pharmaceutical spending decreased from 256 € to 239 €, on average, in the European countries between 2009 and 2019, which translates to a decline of 6.7%. Greece is associated with the largest reduction in public pharmaceutical spending, i.e. from 459 € to 221 € (-51.8%). In the same period, private pharmaceutical expenditure per inhabitant (pps) increased from 133 € to 164 € (+23.6%), on average in Europe. Greece was associated with the second highest rise (65.3%), i.e. from 128 € to 212 €. This means that private spending in Greece is much higher than the European average. As a consequence of the above analyzed trends, the share of public pharmaceutical expenditure in total pharmaceutical spending decreased substantially in Greece from 78.1% to just 51% between 2009 and 2019, whereas the corresponding decrease in Europe was from 65.9% to 59.3%, on average. This shows that, while the gravity of public funding in pharmaceutical care was higher in Greece compared with the European average in 2009, the order was reversed following the economic crisis.

Poland

The average pharmaceutical expenditure per capita (pps) increased from 274 € to 322 € in Poland between 2013-2019. This translates to an increase of 17.7%, while the average growth in Europe was 3.6%. Nevertheless, investment in pharmaceutical care remains lower in Poland compared with the European average (403 € in 2019). At the same time, the share of total pharmaceutical expenditure in GDP has decreased from 1.4% to 1.3% in Poland (1.3% in Europe, on average, in 2019). The share of pharmaceutical expenditure in total health expenditure decreased by 9.2% in Poland. It was estimated at 19.7% in 2019, which is much lower than the European average (25.8%)

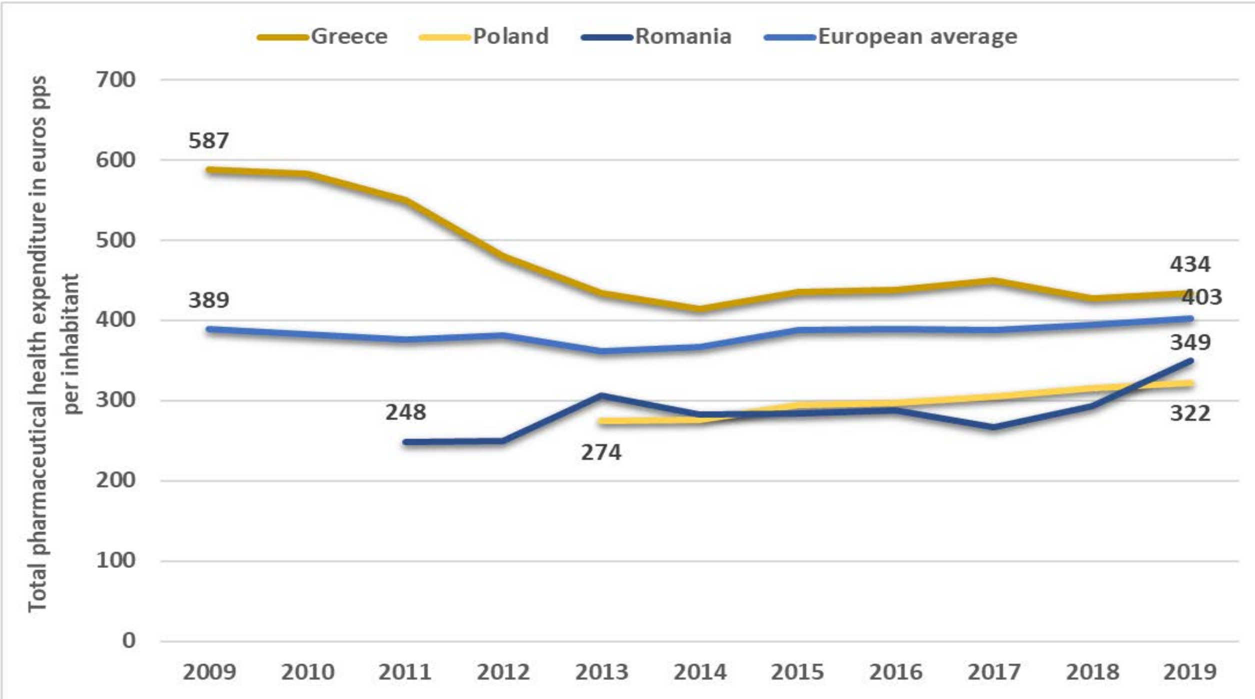
A significant increase in public pharmaceutical expenditure per capita (pps) was observed in Poland (31.7%) between 2013 and 2019, i.e. from 88 € to 116 €. However, public investment in pharmaceutical care in Poland remains far below the European average (239 € in 2019). Private pharmaceutical spending per inhabitant (pps) has increased from 186 € to 207 € (+11.1%) in Poland during the same period. This means that, while public investment in pharmaceutical care in Poland is falling short of the European average, private pharmaceutical spending is far higher than the respective average for Europe (164 € in 2019). The share of public pharmaceutical expenditure in total pharmaceutical spending has increased from 32% to 35.9% in Poland between 2013 and 2019. However, it remains considerably below the European average (59.3% in 2019).

Romania

The average pharmaceutical spending per capita (pps) increased from 248 € 349 € in Romania between 2011 and 2019. This is a growth of 40.6%, while the increase in Europe was 3.6%, on average. Nevertheless, investment in pharmaceutical care in Romania is falling short of the European average (403 € in 2019). The share of total pharmaceutical expenditure in GDP has decreased from 1.8% to 1.5% in Romania (1.3% in Europe, on average, in 2019). Romania is associated with the largest decline in the share of pharmaceutical spending in total health expenditure (-33%) among all European countries (-7.7%, on average). It was estimated at 16.9% in 2019, which is far below the European average (25.8%).

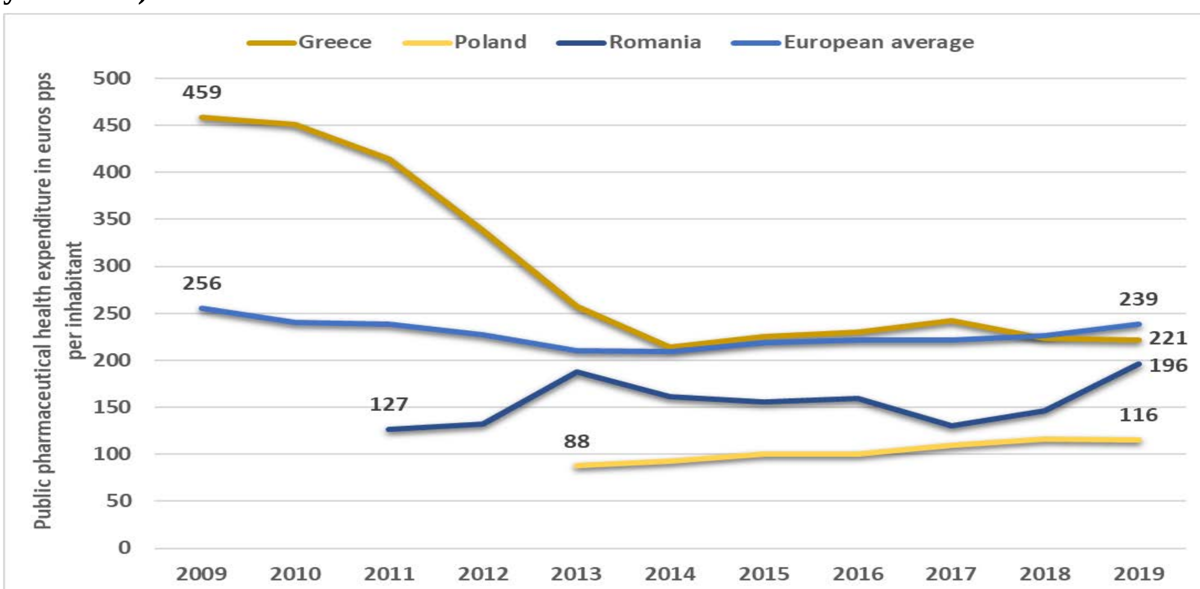
Public pharmaceutical expenditure per capita (pps) has significantly increased in Romania (54.7%) between 2011 and 2019, i.e. from 127 € to 196 €. Public investment in pharmaceutical care in Romania remains somewhat below the European average (239 € in 2019). Private pharmaceutical spending per inhabitant (pps) has increased from 121 € to 153 € (+25.9%) in Romania during the same period. The share of public pharmaceutical expenditure in total pharmaceutical spending has increased from 51.1% to 56.3% in Romania between 2011 and 2019. Nevertheless, it is still below the European average (59.3% in 2019).

Figure 5 Total pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



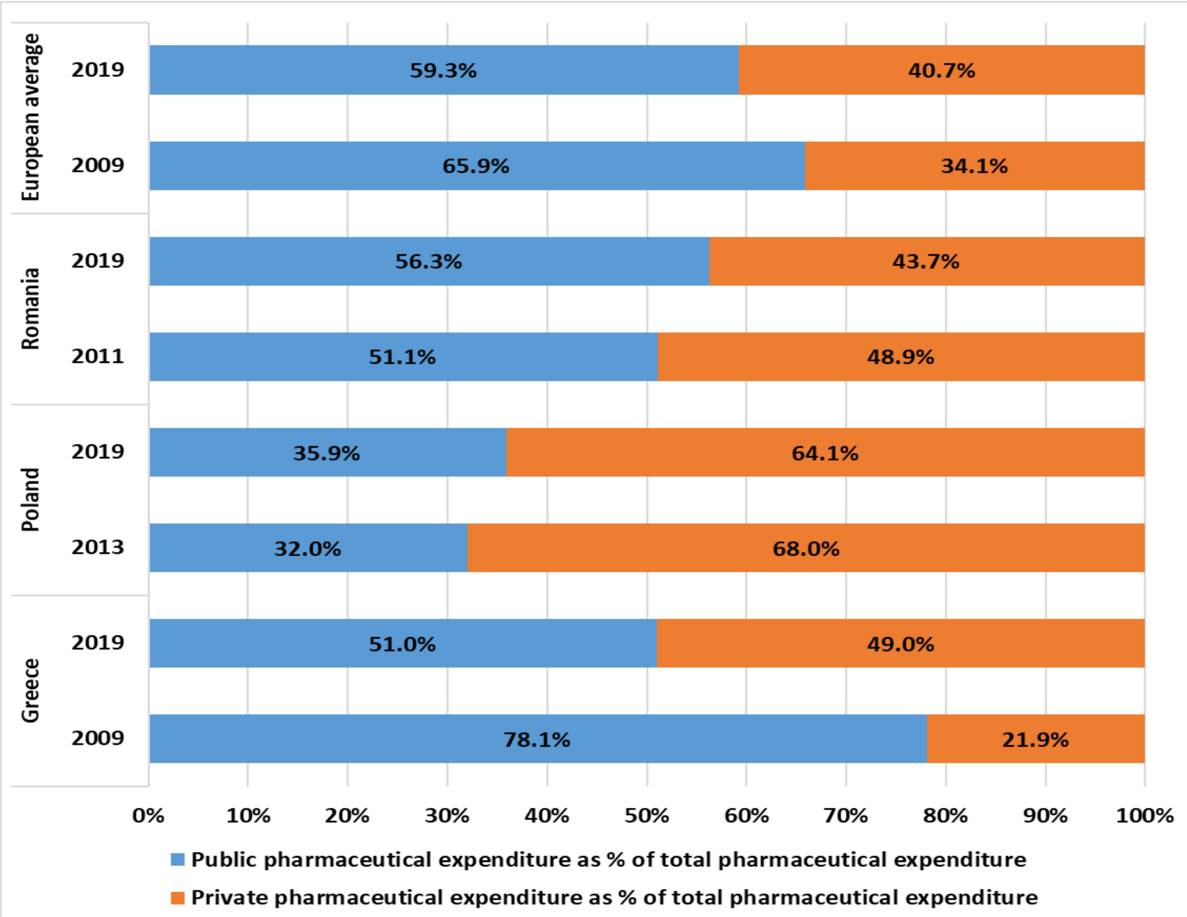
Note: pps: purchasing power standard.

Figure 6 Public pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

Figure 7 Public and private pharmaceutical health expenditure as a % of total pharmaceutical expenditure (2009 or nearest year & 2019)



4.2. Trends and changes in the prevalence of morbidity and in health profiles over time

- **Complex health needs have aggravated in Poland, Greece and Romania, as it is shown by the increased prevalence of multimorbidity; Poland has the second highest prevalence in 2020 among all countries considered.**
- **Compared with the other countries, the prevalence of hypertension and hyperlipidemia were found to be rather high in Greece, while, in Poland, the prevalence of cardiovascular diseases, musculoskeletal diseases, cancer and diabetes were relatively high.**
- **Relatively to the time period considered for each country, significant increases are observed over time in the prevalence of hypertension, hyperlipidemia and diabetes**

in Greece and Poland and of cardiovascular diseases, hypertension and diabetes in Romania.

- **Overall, the largest part of the additional morbidity burden related to chronic diseases is carried by men.**
- **Regarding other ill-health indices that were also explored, their prevalence shows improvements over time. Interestingly, Romania was associated with the highest frequency of depression.**
- **The risk of ill-health was generally higher in women compared with men; however, it appears that men are catching up.**
- **Greece is associated with the worst quality of life among all countries considered. Furthermore, it is the only country where an adverse change was recorded. Poland is fourth in the ordered list, although it is associated with an improvement over time. Women tend to report lower quality of life than men and the gap is quite pronounced in the case of Greece.**

The time trends and changes in morbidity and in health profiles over time were explored with reference to the prevalence of multimorbidity, various chronic diseases and ill-health indices and, finally, with respect to quality of life. Time trends were evaluated with the estimation of the Average Annual Percent Changes (AAPC), which were derived from the application of multiple segmented regression models using the standardized by age and gender distributions. In essence, the standardized time trends reflect any changes in the health profile of the population regardless of any demographic changes (or differences between countries) over time, whereas the unstandardized distributions provide an insight on the actual situation in each country. Hence, it is a useful way to explore the effect of other important factors of morbidity, such as lifestyle, socioeconomic influences and environmental risk factors.

4.2.1. Multimorbidity

Greece

Using the unstandardized distributions, it was estimated that the unstandardized prevalence of multimorbidity, i.e. the concurrent presence of two or more chronic diseases, among individuals 50 years and older has increased from 41.5% to 50.5% in Greece between 2004 and 2020. Greece ranks somewhere in the middle of the ordered list of European countries. Furthermore, women are more likely to be afflicted with multimorbidity than men, which is also the case in almost all 21 European countries included in the analysis. Regarding the standardized distributions, a statistically significant increasing trend (AAPC: 0.9) was established during the time span 2014-2020. Hence, both the standardized and unstandardized distributions yield similar results concerning the direction of changes over time. It is also interesting that the upward trend is higher in older individuals and in men. This means that men are narrowing the gap on women when it comes to multimorbidity.

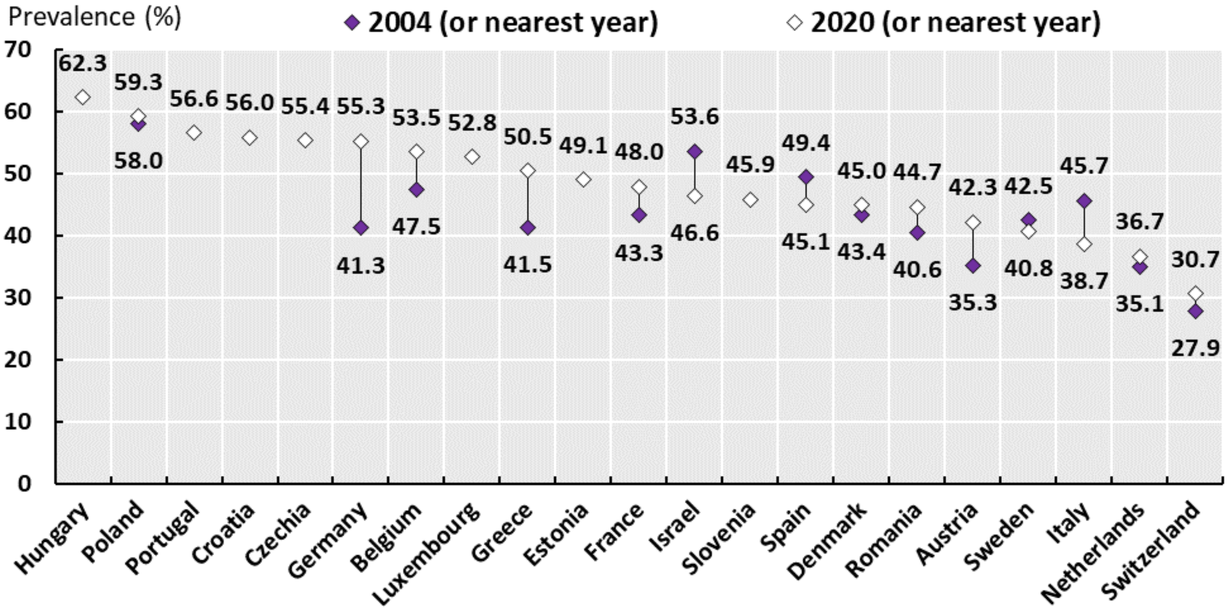
Poland

A small increase from 58% to 59.3% was recorded in the prevalence of multimorbidity in Poland during the period 2007-2020; Poland has the second highest prevalence in 2020 among all countries considered. Furthermore, the risk of multimorbidity is higher among women compared with men. The time trends in the standardized distributions showed a small but significant reduction (AAPC: 0.2%) over the period of 2007-2020. Nevertheless, a closer inspection of the prevalence of multimorbidity through time reveals the existence of a U-shaped trend, which indicated that an upward tendency is to be expected over the next years in Poland as well. Finally, as in Greece, older people and men were associated with a higher AAPC.

Romania

Romania showed an increase in the prevalence of multimorbidity from 40.6% in 2017 to 44.7% in 2020; Romania lies sixth from the bottom in the ranking of countries in 2020. There is also a large discrepancy in the prevalence of multimorbidity between men and women, with the latter being associated with a much higher risk. Despite the somewhat low prevalence in 2020, Romania has the second highest AAPC (5.2%) among all countries when the standardized distributions are considered, although the time period is small (2017-2020) due to data unavailability. Notably, although the AAPC is higher in men than women, as in Greece and Poland, the increasing trend is higher in the younger age groups of men, while the opposite is true among women.

Figure 8 Changes in the prevalence (%) of multimorbidity per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

4.2.2. Chronic diseases

The chronic diseases that were investigated were: cardiovascular diseases, musculoskeletal diseases, chronic lung disease, cancer, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia.

<u>Greece</u>

Relatively to the unstandardized estimates of the other countries included in the analyses, the prevalence of hypertension (48.3%) and hyperlipidemia (33.5%) were found to be rather high in Greece in 2020, while Greece ranked low when the prevalence of chronic lung disease (4.2%) and cancer (2.1%) were considered. Men were found to have higher risk of cardiovascular diseases, cancer and hypertension, while women were associated with a higher risk of musculoskeletal diseases, neurodegenerative diseases and diabetes. Between 2004 and 2020, the unstandardized prevalence of musculoskeletal diseases, chronic lung disease, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia increased, while that of cardiovascular diseases decreased. It should be mentioned that the rise was particularly large in hypertension, hyperlipidemia and diabetes. During the period of 2004-2020, a downward trend in the standardized prevalence of cardiovascular diseases, musculoskeletal diseases, chronic lung disease (not significant) and cancer was observed in Greece, while there was a significant increasing trend for neurodegenerative diseases, hypertension, diabetes and hyperlipidemia. Except for musculoskeletal disorders and chronic lung disease, the trends in the prevalence of chronic diseases were worse among men than among women.

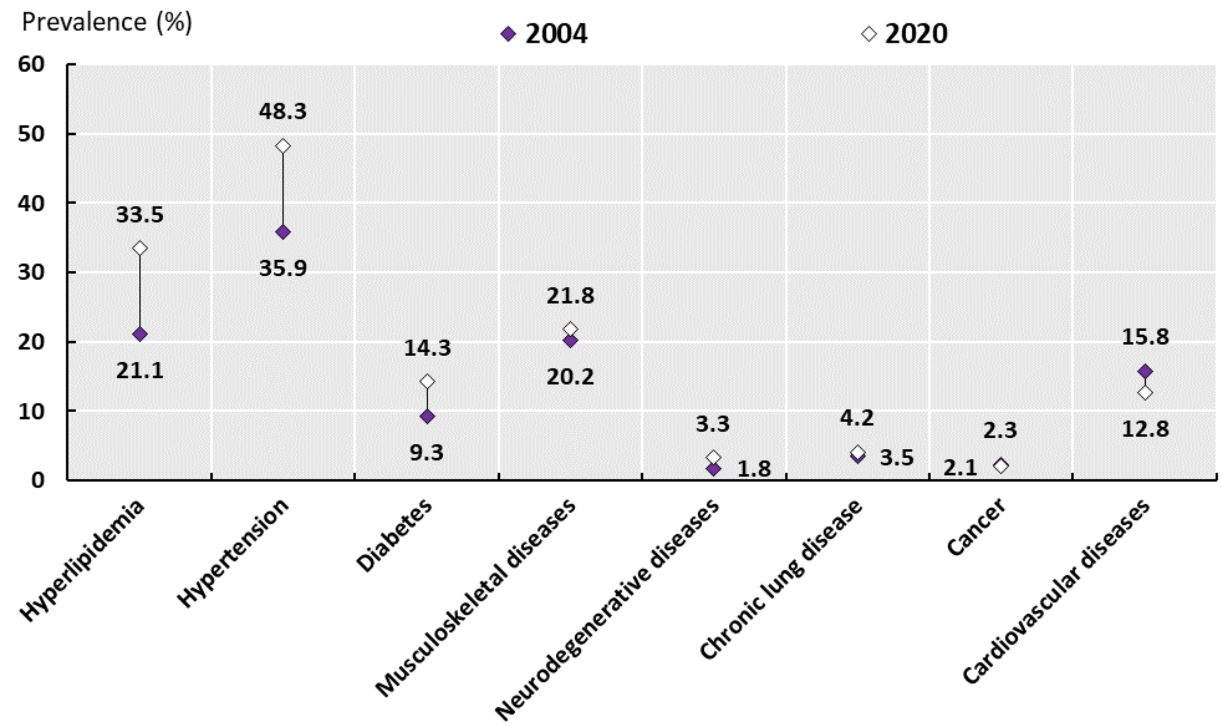
Poland

Compared with the corresponding unstandardized estimates of the other countries, the prevalence of cardiovascular diseases (19.8%), musculoskeletal diseases (35%), cancer (5.8%) and diabetes (18.7%) were found to be relatively high in Poland in 2020. Men were associated with a higher risk of cardiovascular diseases and chronic lung disease, while women had higher risk of musculoskeletal diseases, neurodegenerative diseases, hypertension and hyperlipidemia. Between 2007 and 2020, the unstandardized prevalence of chronic lung disease, cancer, hypertension, diabetes and hyperlipidemia increased, while the frequency of cardiovascular diseases decreased. The increase was particularly strong with respect to diabetes, hyperlipidemia and hypertension. A decreasing trend in the standardized prevalence of cardiovascular diseases, musculoskeletal diseases and chronic lung disease (not significant) was observed in Poland during the period of analysis, while an upward trend was established for cancer, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia. Moreover, the trends over time were worse in women compared with men only in musculoskeletal diseases, chronic lung disease and cancer.

Romania

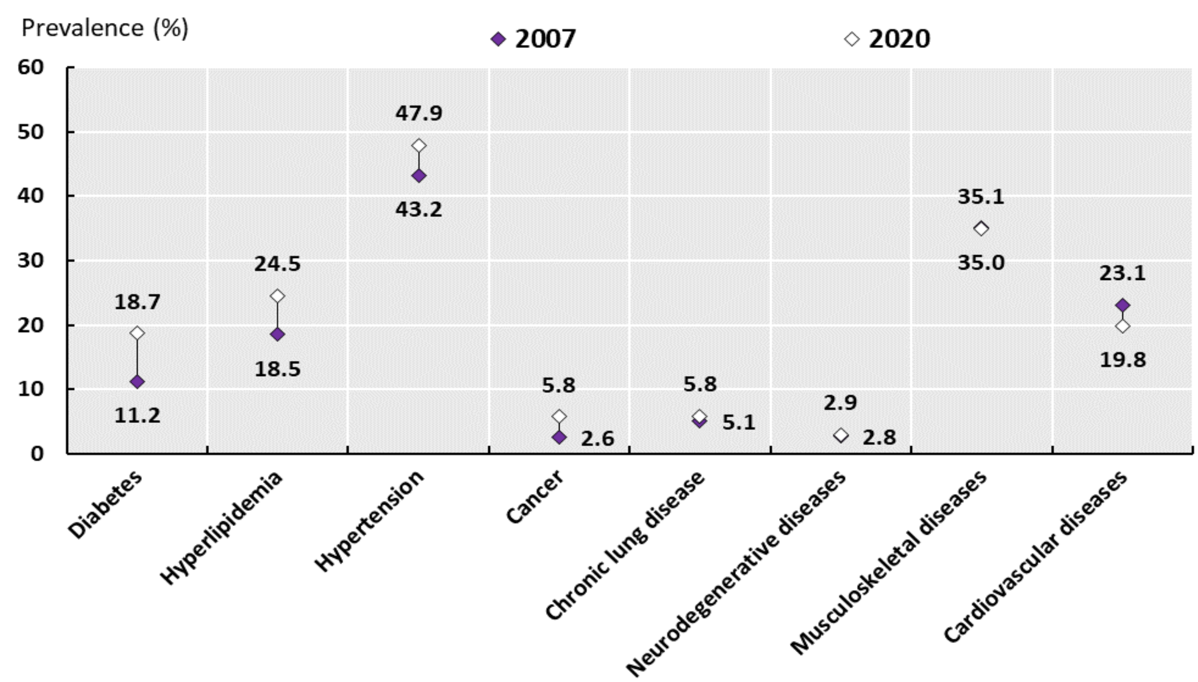
Romania ranked rather low in the ordered list of countries in 2020 with respect to musculoskeletal diseases (20%), chronic lung disease (3.5%), cancer (2.4%) and hyperlipidemia (14%), whereas there were no chronic diseases for which it ranked high. The risk of cardiovascular diseases and cancer was higher among men, while the risk of musculoskeletal diseases, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia was higher among women. Between 2017 and 2020, the unstandardized prevalence of cardiovascular diseases, cancer, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia increased. The increase in the frequency of cardiovascular diseases, diabetes and hypertension was particularly high for such a short time span. Moreover, during the period of analysis, the standardized prevalence of musculoskeletal diseases and chronic lung disease was associated with a decreasing trend in Romania, while cardiovascular diseases, cancer, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia showed a significant upward tendency. The changes in outcomes over time were worse in women compared with men only in musculoskeletal diseases, neurodegenerative diseases and diabetes.

Figure 9 Changes in the prevalence (%) of chronic diseases in Greece



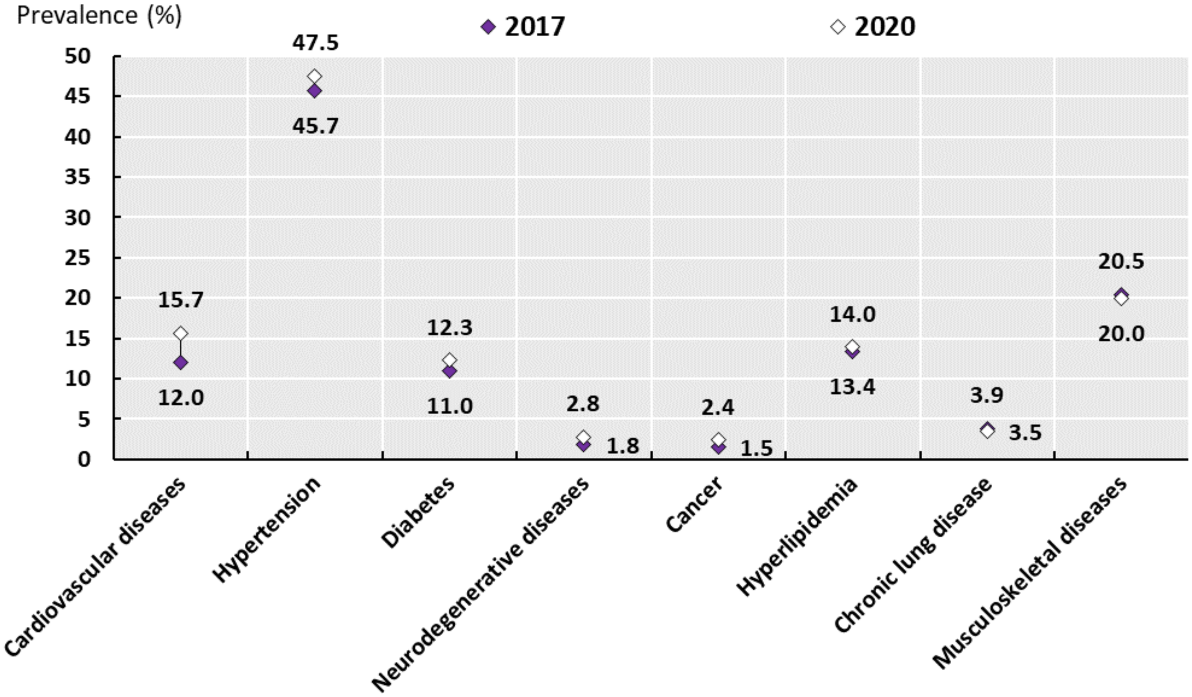
Note: Estimates are based on the unstandardized distributions.

Figure 10 Changes in the prevalence (%) of chronic diseases in Poland



Note: Estimates are based on the unstandardized distributions.

Figure 11 Changes in the prevalence (%) of chronic diseases in Romania



Note: Estimates are based on the unstandardized distributions.

4.2.3. Other health indices

The ill-health indices that were explored were: fair/poor self-reported health, mobility limitations, global activity limitations (GALI), limitations in activities of daily living (ADL), limitations in instrumental activities of daily living (IADL) and depression.

Greece

Relatively to the other countries, Greece lies low in the rankings with respect to the unstandardized prevalence of fair/poor self-reported health (28.8%), GALI (28.8 %) and ADL (6.3%) in 2020. The risk of ill-health was higher in women regardless of the index considered. Between 2004 and 2020, the unstandardized prevalence of fair/poor self-reported health, GALI, ADL, IADL and depression decreased, whereas that of mobility limitations did not change much. Furthermore, a downward trend in the standardized prevalence of all ill-health indices was found during this period. Also, the time trends in the frequency of ill-health indices were more favourable for women compared with men, with the exception of limitations in instrumental activities of daily living.

Poland

Compared with the other countries, the unstandardized prevalence of fair/poor self-reported health (47.7%), mobility limitations (35.2%), GALI (47.7%), ADL (14.2%) and depression (36.2%) was rather high in Poland in 2020. The risk of ill-health was higher in women with respect to all ill-health indices, with the exception of ADL. Between 2007 and 2020, the unstandardized prevalence of fair/poor self-reported health, mobility limitations, GALI, ADL, IADL and depression decreased. Furthermore, during this period, a decreasing trend in the standardized prevalence of ill-health indices is also observed in Poland. Again, the time trends are more favourable for women compared with men, as women are associated with steeper downward trends.

Romania

The unstandardized prevalence of fair/poor self-reported health (48.1%), mobility limitations (36%), GALI (48.1%), ADL (14.4%) and depression (39.3%) were found to be relatively high in Romania in 2020. In particular, Romania was associated with the highest frequency of depression among all countries considered. The risk of ill-health was higher in women compared with men regarding all ill-health indices. Between 2017 and 2020, the unstandardized prevalence of fair/poor self-reported health, mobility limitations, GALI, ADL and IADL declined. Moreover, during this period, there is a decreasing trend in the standardized prevalence of all ill-health indices in Romania, except for long-term limitations in usual activities (GALI). The adverse changes in the frequency of long-term limitations are due to the increasing trend observed among men, while the changes in women are always favourable.

4.2.4. Quality of life

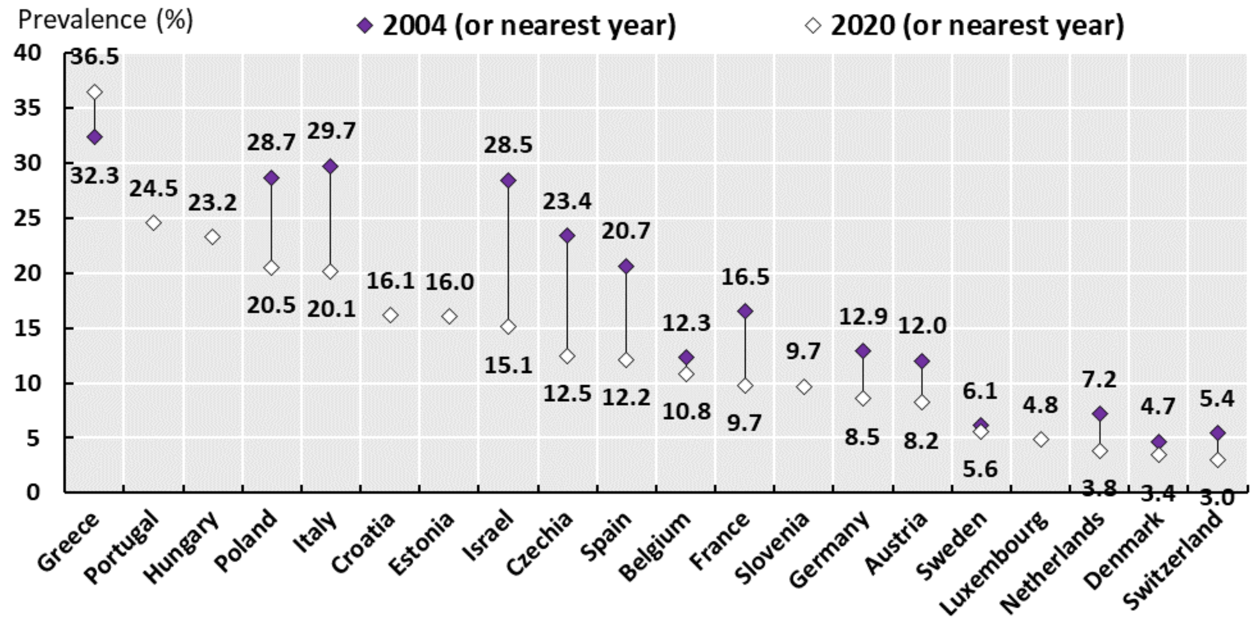
Greece

Greece had the highest unstandardized prevalence of low quality of life among all countries included in the analysis for the year 2020. Furthermore, women were associated with a much higher risk of low quality of life compared with men. Between 2004 and 2020, the prevalence increased from 32.3% to 36.5%, being the only country with an adverse overall change during this period. The trend analysis also showed that a deterioration of quality of life was observed only in Greece among all European countries. It is also interesting that this development was mainly driven by the respective changes in the group of men, although women generally report more frequently low quality of life.

Poland

Poland is fourth in the ordered list of countries with respect to the prevalence of low quality of life, although it is associated with an improvement over time (from 28.7% to 20.5%).

Figure 12 Changes in the prevalence (%) of low quality of life (CASP-12) per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004 and Portugal 2018 instead of 2020.

4.3. Changes in the use of healthcare services over time

- **Outpatient care use is lower in Greece, Poland and Romania compared with most European countries, considering dental care in particular.**
- **Romania and Poland are associated with a high use of inpatient care, while the opposite is true for Greece.**
- **Pharmaceutical care use has increased in Greece and Poland and in most European countries, but it has decreased in Romania.**
- **Polypharmacy is frequent in Poland and Romania, which also show increases over time. In contrast, a reduction is observed in Greece, which is associated with one of the lowest estimates among all countries.**
- **Medicine use in ons the rise especially for hypertension, hyperlipidemia, diabetes and heart diseases.**

This section investigates the changes in the use of healthcare services over time and, more specifically, with respect to inpatient, outpatient and pharmaceutical care.

4.3.1. Inpatient and outpatient care

Greece

Greece is seventh from the bottom in the ordered list of countries with respect to the share of individuals with a doctor visit in the previous year. The share increased from 79.3% to 86.1% between 2004 and 2020. Nevertheless, the mean number of visits has decreased from 7.2 to 5.7 during the same period, placing Greece at the bottom of the rankings. Regarding hospitalizations, a decrease is observed in the share of individuals reporting at least one admission to a hospital from 9% to 7% as well as in the mean number of hospitalizations from 10.8 to 10.4 per year. Moreover, Greece is fifth from the bottom in the rankings based on the share of people with a dentist visit in the previous year, although it marginally increased from 37.1% to 37.4%. Notably, outpatient healthcare use is higher among women compared with men, while the opposite is true regarding hospital healthcare.

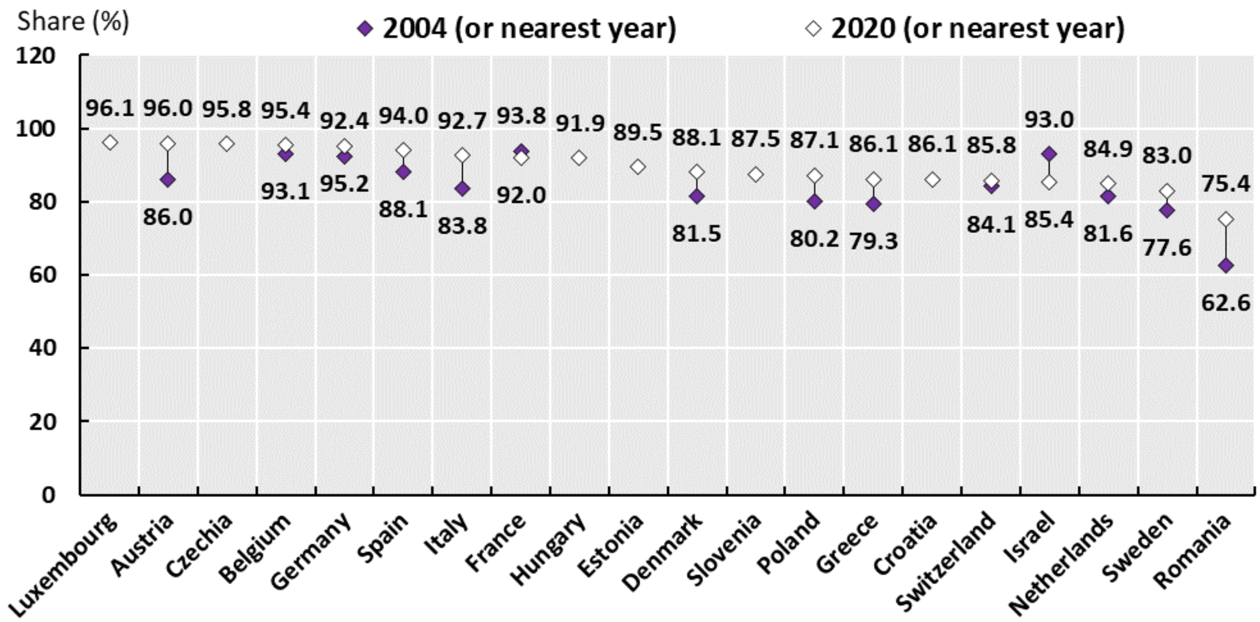
Poland

The share of individuals with a doctor visit has increased from 80.2% to 87.1% in Poland between 2007 and 2020; however, the country is located in the lower middle of the distribution of the estimates for all countries. At the same time, the mean number of visits has decreased from 8.8 to 7.9. Poland is ranked high, in the sixth place, with respect to the share of individuals hospitalized during the previous year, despite the decrease from 17.3% to 17.1% that was observed during the period of analysis. Furthermore, the mean number of admissions has decreased from 16.6 to 11.4. Finally, Poland is ranked third from the bottom regarding the share of people reporting receiving dental care in the previous year, although the share has risen from 23% to 31.5%. Once more we found that women are more likely to use outpatient care than men, while it is the other way around considering hospital care.

Romania

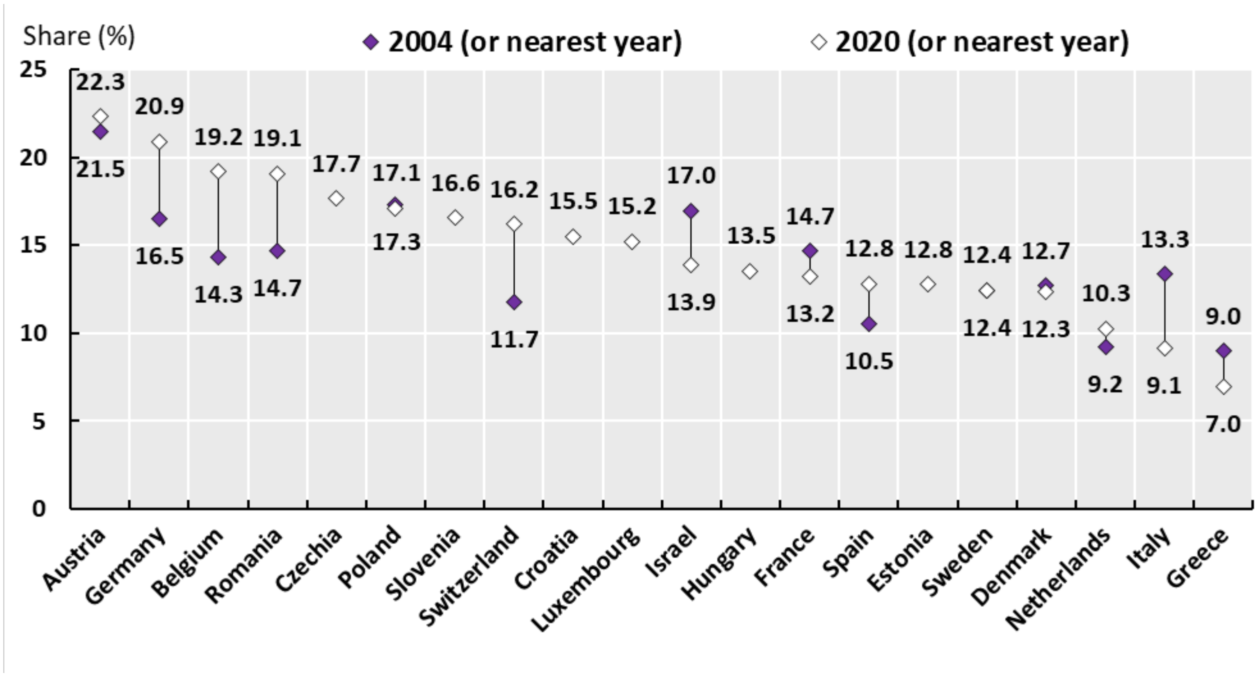
Romania is at the bottom of the ordered list of countries considering doctor visits, despite the rise in the share of individuals reporting outpatient care use in the previous year from 62.6% to 75.4% between 2017 and 2020. Nevertheless, the country is located in the middle of the rankings with respect to the mean number of visits, which has increased from 5.7 to 7.5 over a short time span. Furthermore, Romania is associated with a high use of hospital care. The share of individuals with a hospital admission has increased from 14.7 to 19.1, while the mean number of hospitalizations has decreased from 16.6 to 11.4. Finally, Romania has the lowest share of individuals that have used dental care in the previous year, despite a small increase from 13% to 13.2% over time. A similar pattern between genders is observed in Romania regarding outpatient care. However, the share of women with a hospitalization was higher in women than in men in 2020, due to a significant increase observed during a very short period of time.

Figure 13 Changes in the share (%) of individuals with a doctor visit in the previous year per country



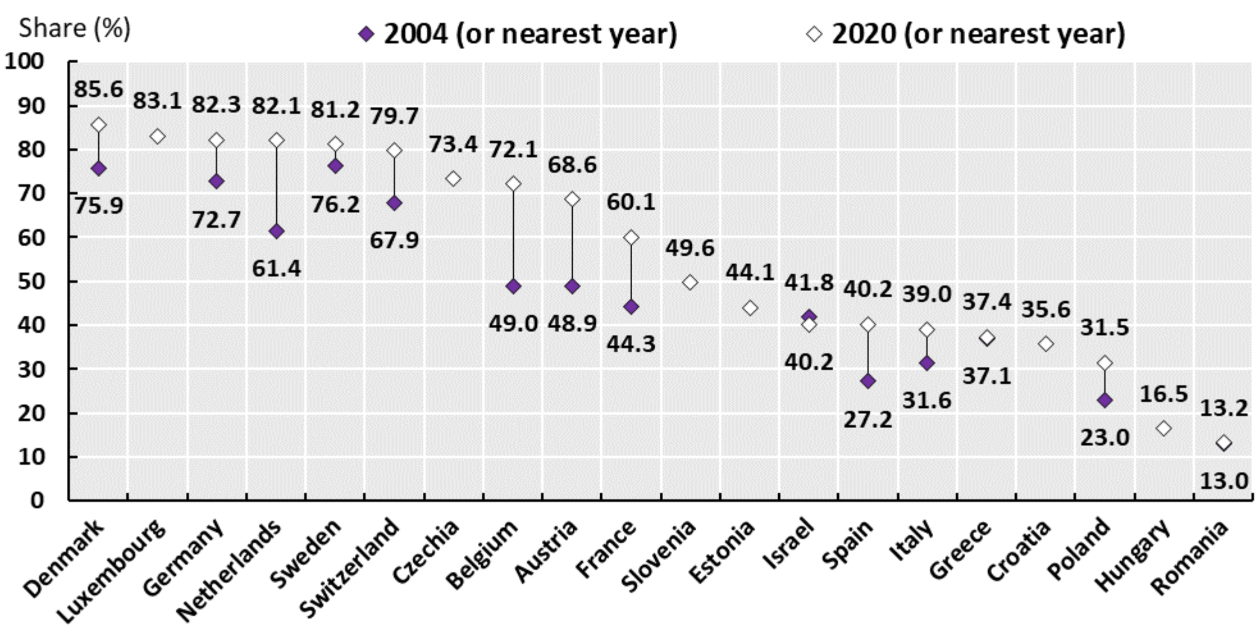
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 14 Changes in the share (%) of individuals with a hospitalization in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 15 Changes in the share (%) of individuals with a dentist visit in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

4.3.2. Pharmaceutical care

Greece

Greece is ranked fifth considering the share of individuals taking a drug for any disease at least weekly, which has increased from 71.5% to 80.3% between 2004 and 2020. Regarding polypharmacy, the share of individuals taking at least five different drugs on a typical day has shown a reduction from 23.3% to 21.6% in Greece in the period of 2015-2020, which ranks third from the bottom in the ordered list of countries. Furthermore, Greece is high in the ranking of countries based on the use of medicines for hyperlipidemia, hypertension, diabetes, joint pain, other pain and osteoporosis, in particular. Moreover, the highest increases in the use of medicines are observed in hyperlipidemia, hypertension and heart diseases. Finally, pharmaceutical consumption is usually higher among women in most chronic diseases and countries and increases over time are observed for both sexes.

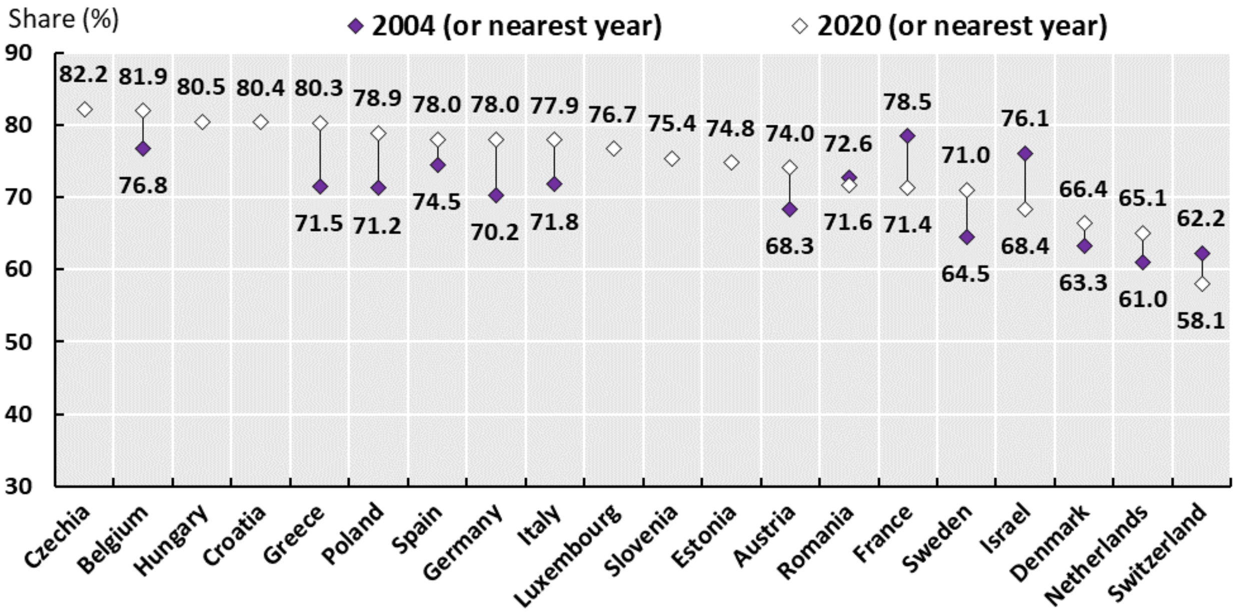
Poland

The share of individuals reporting pharmaceutical consumption in the previous year has increased from 71.2% to 78.9% in Poland between 2007 and 2020; Poland holds the sixth place, just below Greece. The share of individuals taking at least five different medicines daily has increased from 36.9% to 41.6% between 2015 and 2020; Poland is associated with the third highest frequency of polypharmacy among all countries considered. Relative to the other countries, pharmaceutical consumption is very high in hypertension, diabetes, heart diseases, joint pain and other pain in Poland. Moreover, the highest increases in medicine use are found in hyperlipidemia, hypertension and diabetes.

Romania

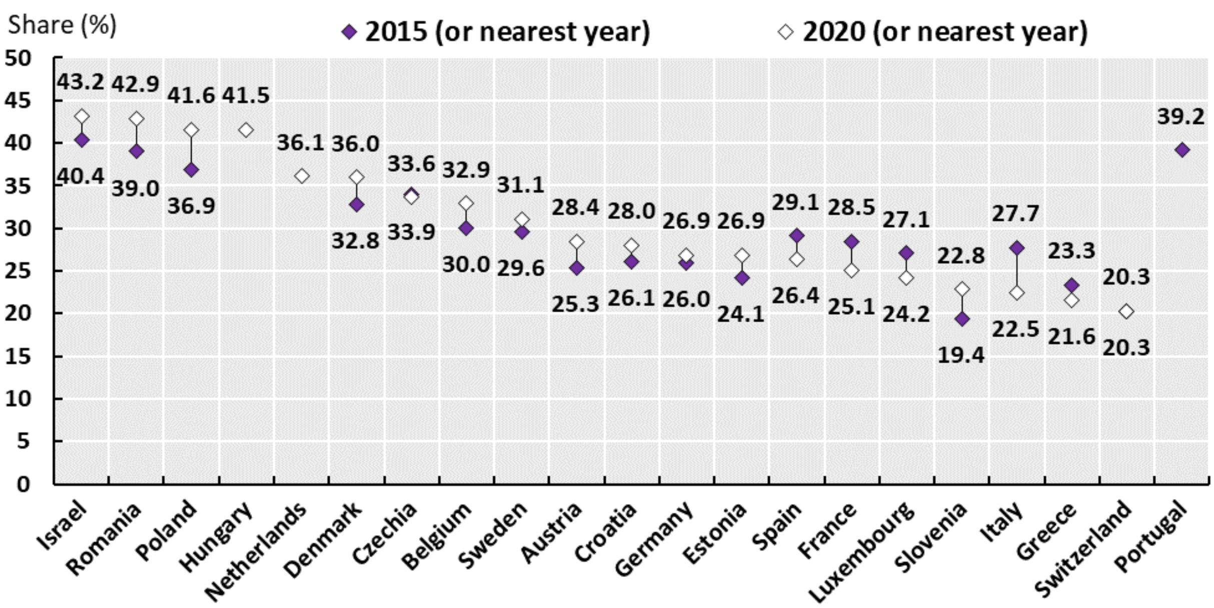
The share of individuals taking a drug for any disease at least weekly has decreased from 72.6% to 71.6% in Romania between 2017 and 2020. However, polypharmacy is a frequent phenomenon in Poland. The share of individuals reporting polypharmacy has increased from 39% to 42.9% in the period of 2017-2020, and the country ranks second in the ordered list of countries. Furthermore, joint pain, heart diseases and diabetes are the chronic diseases associated with the largest increases in medicine use in Romania.

Figure 16 Changes in the share (%) of individuals taking a drug (for any disease) at least weekly per country



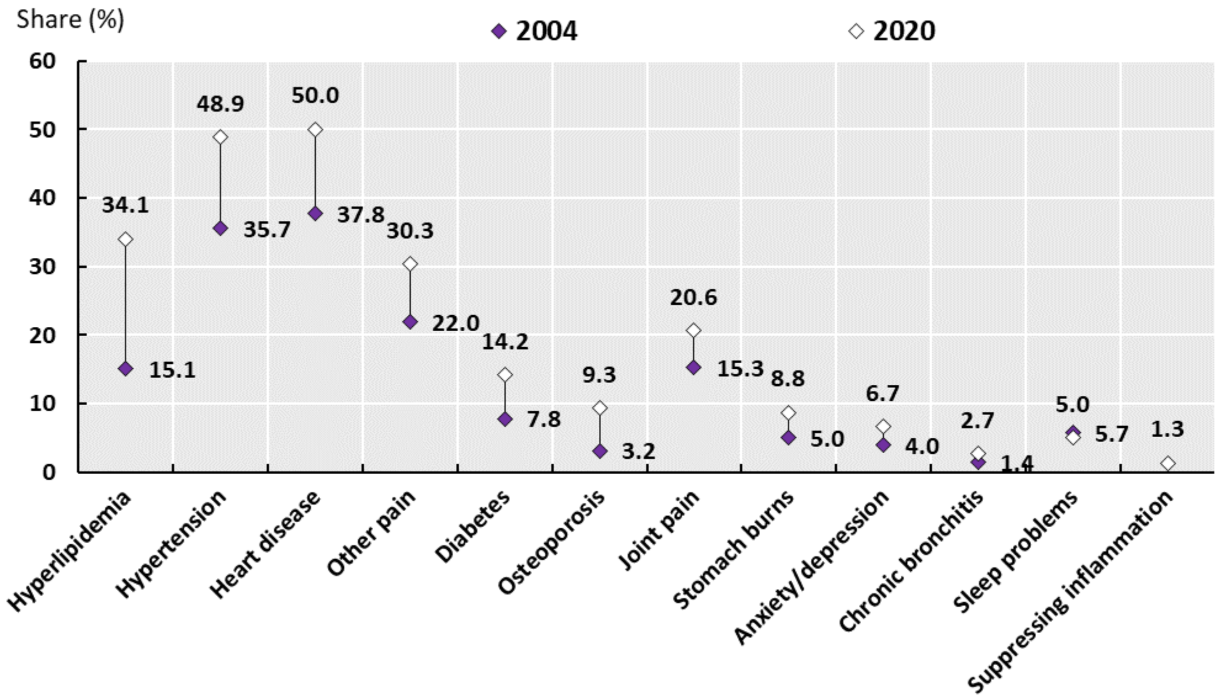
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 17 Changes in the share (%) of individuals taking at least five different drugs on a typical day (polypharmacy) per country



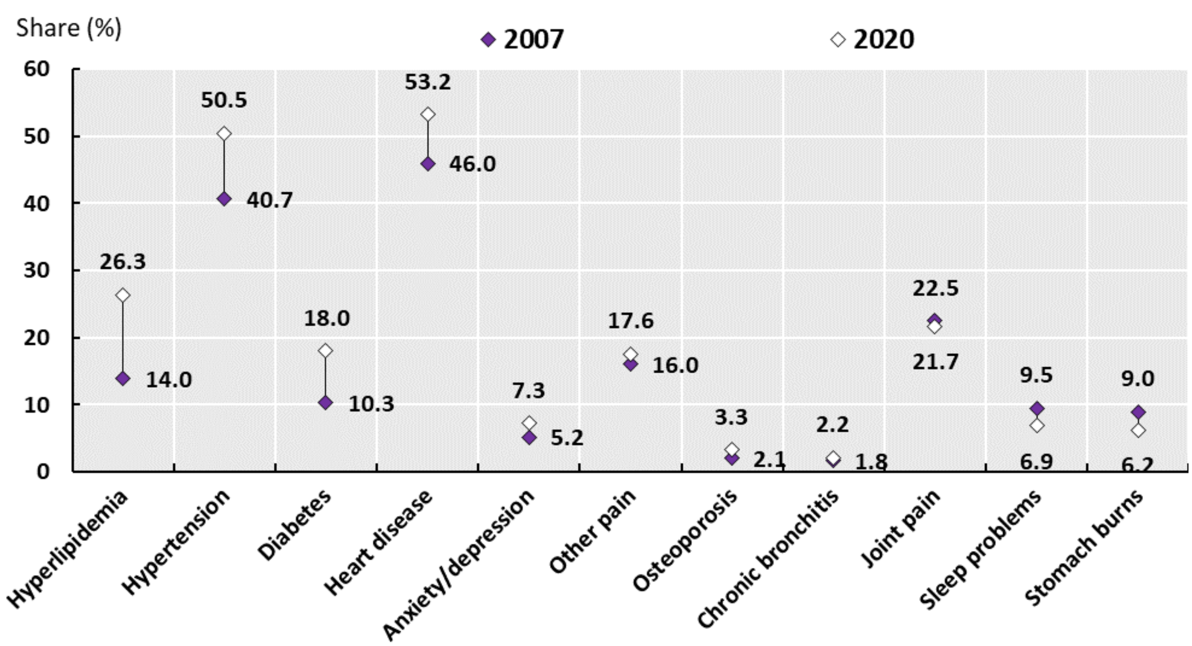
Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020 and Romania 2017 instead of 2015.

Figure 18 Changes in the share (%) of individuals taking a drug for a chronic disease at least weekly per chronic disease in Greece



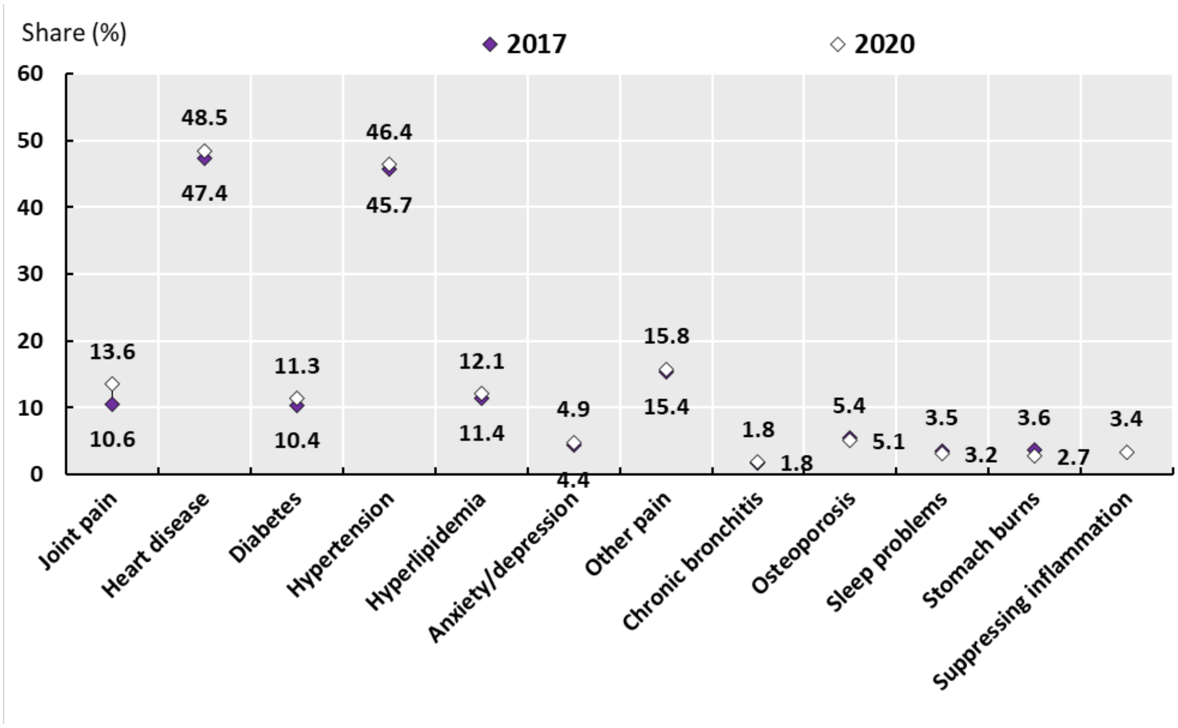
Note: Estimates are based on the unstandardized distributions.

Figure 19 Changes in the share (%) of individuals taking a drug for a chronic disease at least weekly per chronic disease in Poland



Note: Estimates are based on the unstandardized distributions.

Figure 20 Changes in the share (%) of individuals taking a drug for a chronic disease at least weekly per chronic disease in Romania



Note: Estimates are based on the unstandardized distributions.

4.4. Changes in unmet healthcare needs over time

- **Unmet healthcare needs are particularly high in Greece, Poland and Romania. Greece is ranked first in the ordered list of countries and Romania second in 2020, while Poland also has a high share of individuals reporting unmet needs.**
- **Notably, it appears that unmet needs are increasing over time in almost all countries.**
- **Regarding pharmaceutical care in particular, Romania, Greece and Poland were associated with the highest prevalence of unmet needs for medicines.**

Unmet healthcare needs refer to the cases where a healthcare need was not met due to cost or lack of availability. In particular, the following types of unmet healthcare needs are examined: a) overall, and those related to b) general practitioner services, c) specialist services, d) the use of medicines, e) dental services and f) home care (including paid help) services. The measurement of unmet health needs was based on respondents' subjective self-assessment of whether their healthcare needs have been met or not. An unmet long-term care need (or gap) is defined as the case where a person with at least one (or at least two, respectively) limitations in its daily activities reported not receiving any professional or informal care for the same period.

4.4.1. Healthcare services

Greece

Greece is ranked first in terms of unmet healthcare needs in 2020. Almost all countries show an increase over time, but Greece is associated with the high rise, i.e. from 9.8% to 27.8% between 2004 and 2020. In particular, it is first in the rankings in terms of unmet needs for specialist physician (16.8%) and dental care (17.4%), second with respect to home care (3.8%) and third based on the prevalence of unmet needs for general practitioner (3.4%),. Unmet needs are more frequently observed among women than among men in almost all countries and measures, including Greece.

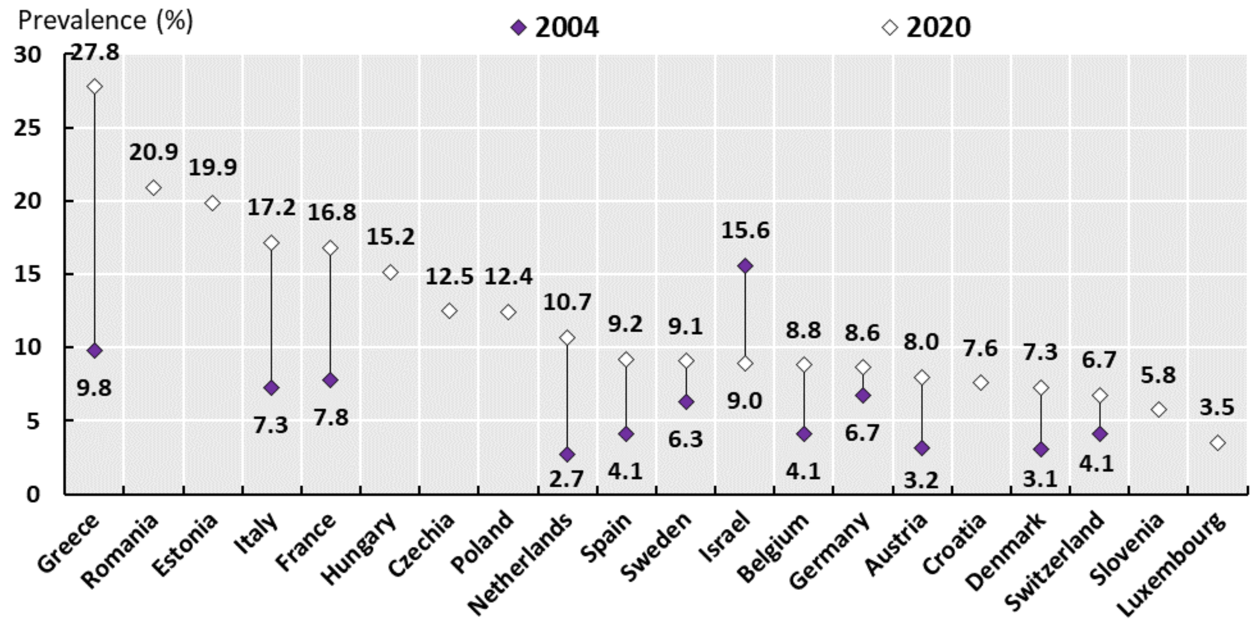
Poland

Poland is associated with the eighth highest prevalence of unmet healthcare needs in 2020 (12.4%). More specifically, Poland is ranked fifth with respect to unmet needs for specialist physician (9.1%), while the prevalence is relatively low in terms of unmet needs for dental care (2.4%), home care (1%) and general practitioner (0.9%).

Romania

Romania has the second highest prevalence of unmet healthcare needs in 2020 (20.9%). In particular, Romania is ranked first in terms of unmet needs for general practitioner (10%) and home care (8%) and second with respect to specialist physician (16.7%) and dental care (11.8%).

Figure 21 Changes in the prevalence (%) of total unmet needs per country



Note: Estimates are based on the unstandardized distributions.

4.4.2. Pharmaceutical care

<u>Greece</u>

Regarding unmet needs for medicines, Greece is ranked second in 2020 with 2.9%.

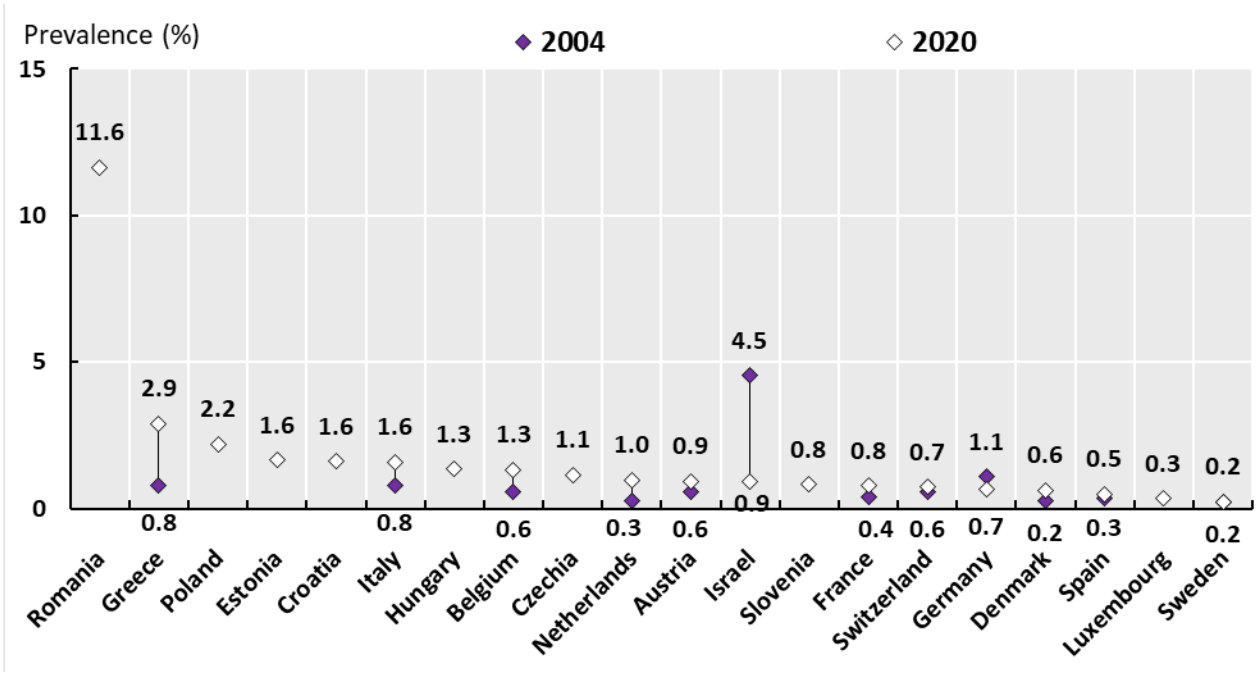
<u>Poland</u>

Poland has the third highest prevalence of unmet needs for pharmaceutical care in 2020 with 2.2%.

<u>Romania</u>

Romania is associated with the highest prevalence of unmet needs for medicines in 2020 with 11.6%

Figure 22 Changes in the prevalence (%) of unmet needs for medicines per country



Note: Estimates are based on the unstandardized distributions.

4.4.3. Long-term care gap in the elderly

Greece

As far as the long-term care gap in the elderly (60+) is concerned, Greece is ranked eighth in the rankings for one or more (36.9%) and two or more (25.5%) ADL/IADL limitations, respectively; the prevalence for both measures has decreased over time. Furthermore, the long-term care gap is estimated to be larger among women compared with men in almost all countries, including Greece.

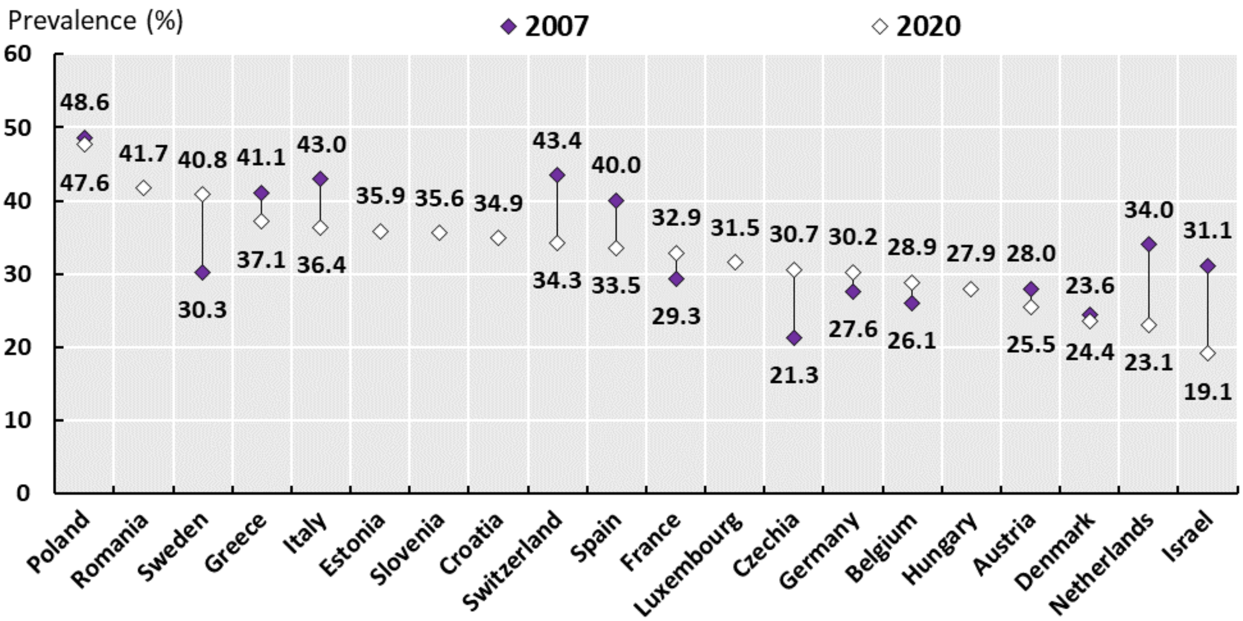
Poland

Poland tops all other countries in terms of long-term care gap in the elderly for one or more (49.4 %) and two or more (37.7 %) ADL/IADL limitations, respectively, despite the improvements observed over time.

Romania

Romania is ranked fourth and third with respect to the long-term gap for one or more (38.6%) and two or more (31 %) ADL/IADL limitations, respectively.

Figure 23 Changes in the prevalence (%) of long-term care gap (2+ ADL/IADL limitations) per country



Note: Estimates are based on the unstandardized distributions.

4.5. Out-of-pocket payments

- **The vast majority of the population in Poland and Greece incurs OOPP.**
- **In Greece, cancer, neurodegenerative diseases and chronic lung disease were associated with the highest impact on total OOPP and suppressing inflammation, coronary diseases and anxiety/depression on pharmaceutical OOPP.**
- **In Poland, cardiovascular diseases, diabetes and cancer had the largest impact on total OOPP and diabetes, heart diseases and sleep problems on pharmaceutical OOPP.**
- **Reliance on OOPP to provide health care is putting significant financial pressures on households.**
- **In the case that these health payments are high enough, they can worsen households' living conditions, impoverish them or even force them to forgo necessary treatment.**
- **The burden of OOPP on households' budget, i.e. the share of OOPP in equivalised household net income, is quite large in both Poland and Greece.**
- **The average pharmaceutical OOPP burden is even larger in Poland and Greece. Poland has the second highest pharmaceutical OOPP burden among all countries, while Greece is ranked fifth.**

- **If OOPP exceed a predetermined share of the household budget, it is considered as a significant financial risk or, to put it differently, a catastrophe.**
- **The incidence of catastrophic OOPP was found to be large in both Poland and Greece, in Poland in particular. Relative to the other countries, the risk of catastrophe was even larger when pharmaceutical OOPP were considered.**

4.5.1. Total and pharmaceutical out-of-pocket payments

Greece

About 90.2% and 79.3% of respondents incurred OOPP and pharmaceutical OOPP, respectively, in Greece during the previous year. The average spending per person was estimated at 408.6 € and 191.2 € for total and pharmaceutical OOPP, respectively. Furthermore, the mean OOPP for those with positive OOPP was 452.9 € and 241.3 € for total and pharmaceutical OOPP respectively. Overall, Greece is ranked around the middle of the distribution of countries in terms of OOPP.

Poland

In Poland, around 89.7% and 86.3% of participants had OOPP and pharmaceutical OOPP, respectively. The average spending per person was estimated at 502.8 € and 390.4€ for total and pharmaceutical OOPP, respectively. Furthermore, the mean OOPP for those with non-zero OOPP was 560.8 € and 452.2 € for total and pharmaceutical OOPP respectively. Overall, Poland is ranked in the fifth and sixth place, respectively, in terms of total and pharmaceutical OOPP.

Table 2 Total OOPP in the previous year per country (wave 6)

Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Portugal	98.3	612.1	622.6
Denmark	98.1	330.6	337.1
Sweden	98.0	318.7	325.1
Belgium	97.3	479.5	492.8
Czechia	97.1	197.9	203.9
Estonia	95.0	414.6	436.4
Switzerland	93.5	784.5	839.5
Luxembourg	91.8	482.5	525.5
Germany	90.3	322.8	357.6
Greece	90.2	408.6	452.9

Poland	89.7	502.8	560.8
Austria	88.8	541.8	609.9
Italy	81.2	523.1	644.7
Spain	80.2	267.8	334.1
France	79.0	201.6	255.1
Slovenia	74.4	167.6	225.4
Croatia	67.3	139.4	207.2
Israel	66.5	463.8	697.3

Note: OOPP: Out-of-pocket payments

Table 3 Pharmaceutical OOPP in the previous year per country (wave 6)

Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Portugal	94.2	367.4	390.2
Czechia	92.9	122.0	131.3
Estonia	91.4	264.6	289.7
Belgium	90.6	234.3	258.7
Denmark	87.9	125.7	143.0
Sweden	87.3	85.5	97.9
Poland	86.3	390.4	452.2
Germany	82.1	92.7	112.8
Greece	79.3	191.2	241.3
Luxembourg	78.7	165.9	210.7
Austria	76.3	146.5	192.0
Spain	72.4	66.2	91.4
Italy	67.8	129.9	191.6
Slovenia	63.4	51.2	80.8
France	62.6	46.4	74.2
Croatia	61.7	75.8	123.0
Switzerland	60.0	95.3	158.9
Israel	56.7	175.4	309.5

Note: OOPP: Out-of-pocket payments

4.5.2. Total out-of-pocket payments and chronic diseases

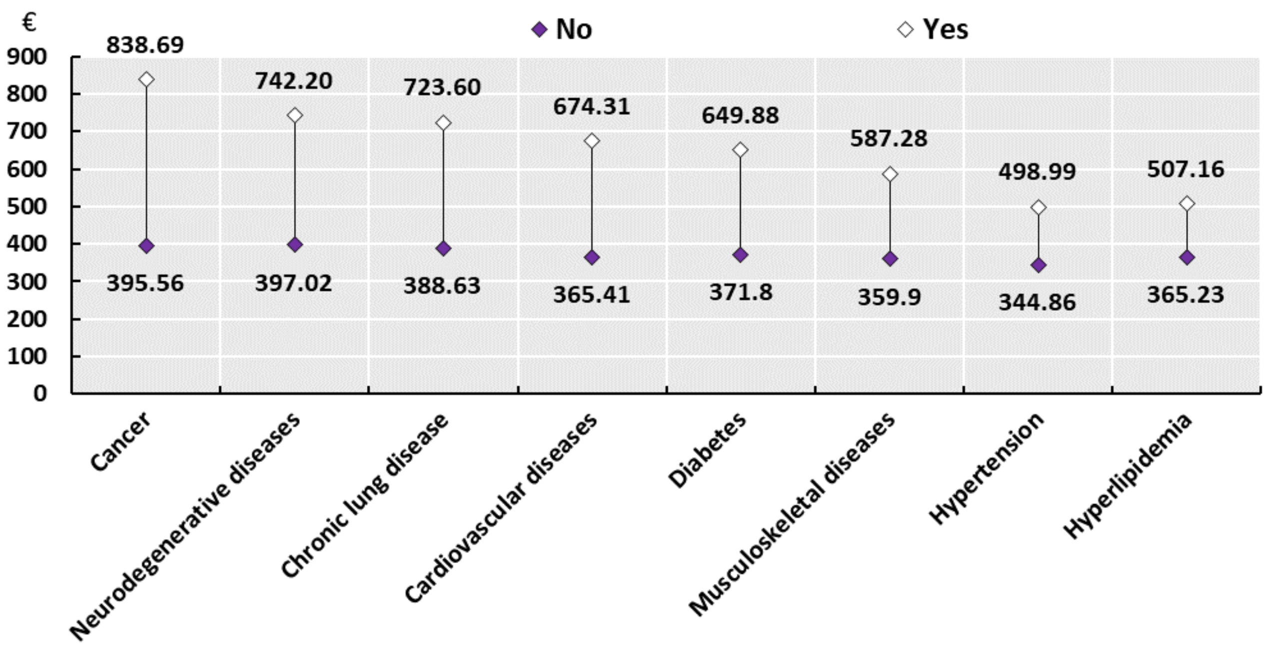
Greece

Cancer has the highest average impact among chronic diseases on total OOPP in Greece (443.13 € average difference in OOPP between those with and without the disease), followed by neurodegenerative diseases (345.18 € average difference) and chronic lung disease (334.97 € average difference).

Poland

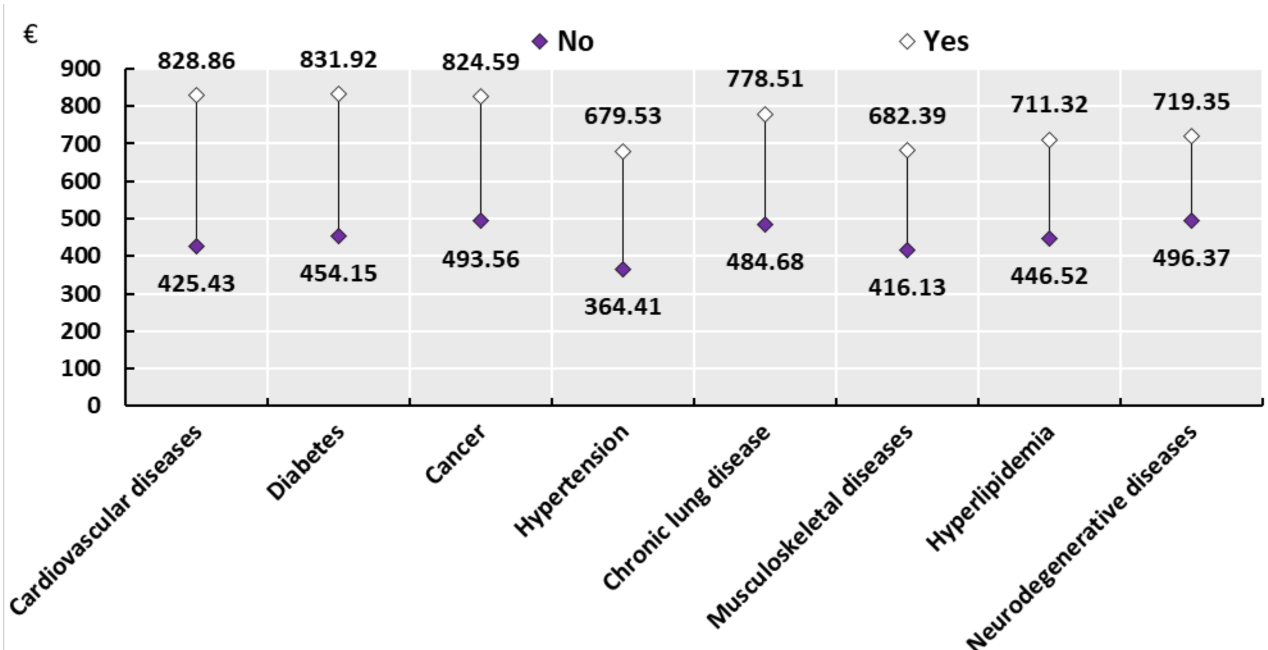
In Poland, the highest average impact is found in cardiovascular diseases (403.43 € average difference), followed by diabetes (377.77 € average difference) and cancer (331.03 € average difference).

Figure 24 Average total OOPP (€) for individuals with chronic diseases in Greece (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 25 Average total OOPP (€) for individuals with chronic diseases in Poland (wave 6)



Note: OOPP: Out-of-pocket payments

4.5.3. Pharmaceutical out-of-pocket payments and chronic diseases

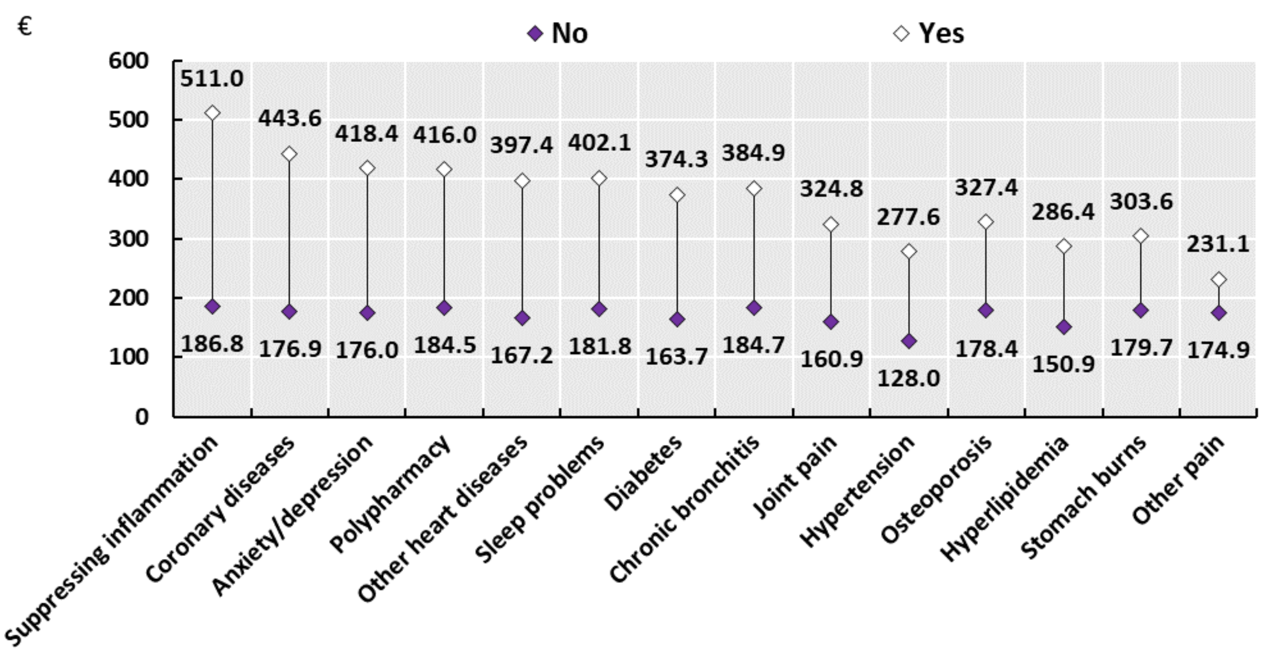
Greece

In Greece, the highest average impact on pharmaceutical OOPP was associated with suppressing inflammation (324.17 € average difference in pharmaceutical OOPP between those with and without taking medicines), followed by coronary diseases (266.71 € average difference) and anxiety/depression (242.39 € average difference).

Poland

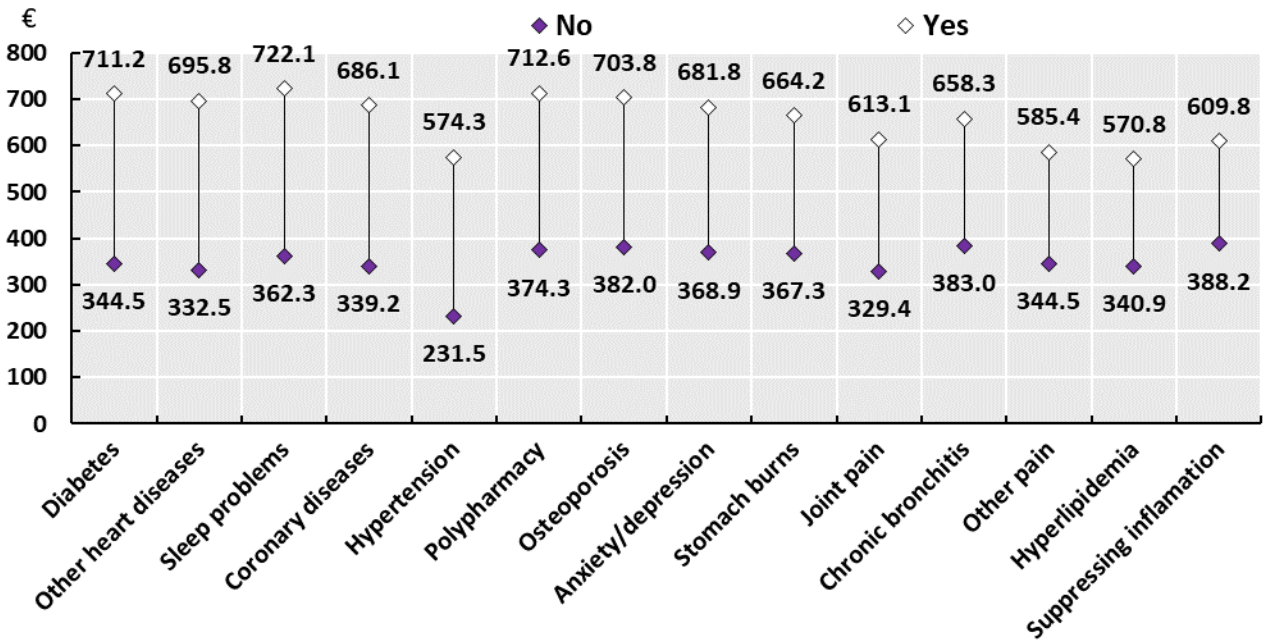
Diabetes was found to have the largest average impact on pharmaceutical OOPP in Poland (366.64 € average difference), followed by other heart diseases (363.28 € average difference) and sleep problems (359.76 € average difference).

Figure 26 Average pharmaceutical OOPP (€) for individuals with chronic diseases in Greece (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 27 Average pharmaceutical OOPP (€) for individuals with chronic diseases in Poland (wave 6)



Note: OOPP: Out-of-pocket payments

4.5.4. Total and pharmaceutical out-of-pocket payments burden and catastrophe

OOPP burden is the share of (total or pharmaceutical) OOPP in equivalised household net income. A catastrophic OOPP occurs if OOPP exceed a predetermined share (threshold of 5% and 10%) of the household standard of living (budget) in a given period. This threshold defines a level of OOPP above which the living conditions of the household are compromised owing to the purchase of necessary healthcare services.

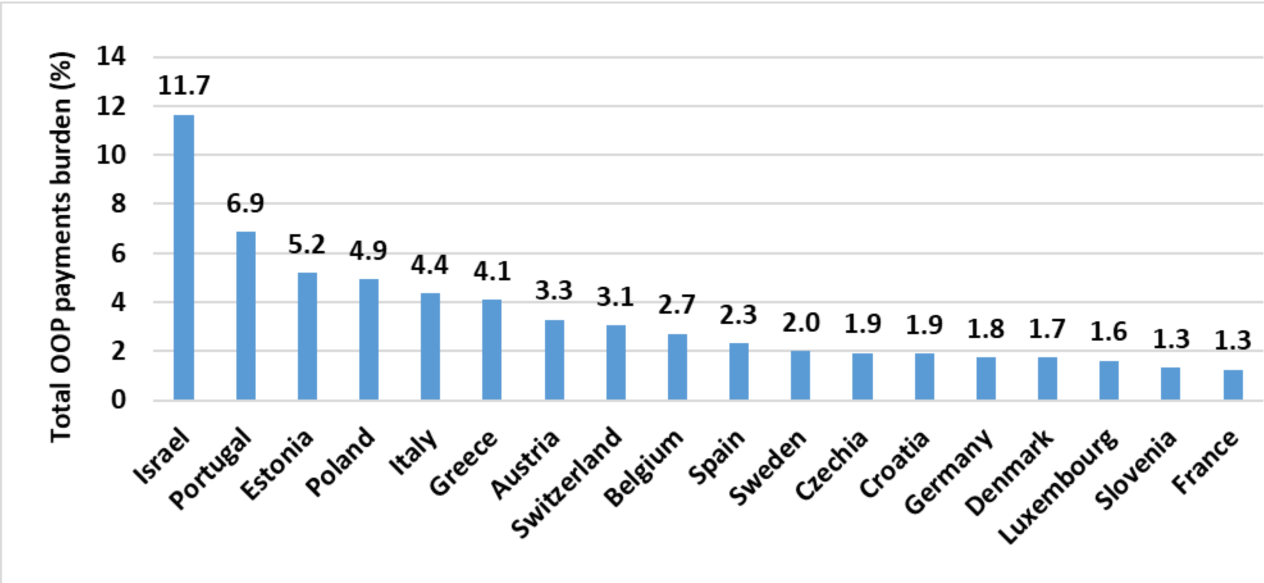
Greece

Greece is ranked sixth and fifth in terms of total and pharmaceutical OOPP burden (4.1% and 2%, respectively). Moreover, it has the sixth highest incidence of catastrophic total OOPP (25.3% and 11% for the 5% and 10% thresholds, respectively) and it is ranked fifth with respect to catastrophic pharmaceutical OOPP (11.5% and 3.5% for the 5% and 10% thresholds, respectively).

Poland

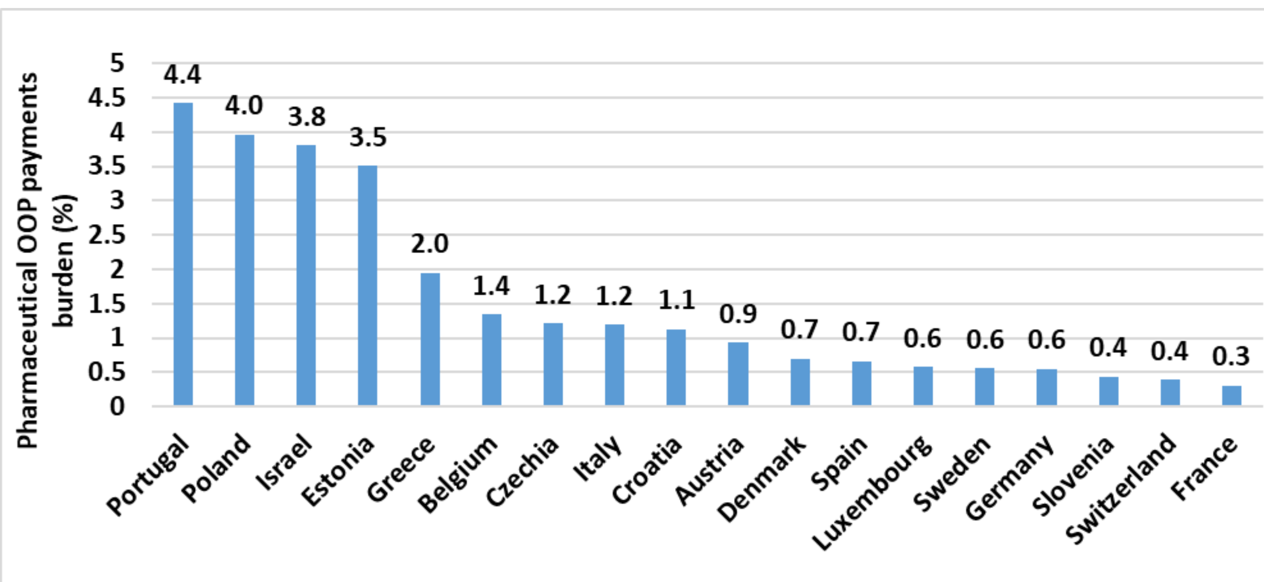
Poland is associated with the fourth highest total OOPP burden (4.9%), while it is ranked second in terms of pharmaceutical OOPP burden (4%). As far as the incidence of catastrophic total OOPP is concerned, Poland is ranked third using both the 5% (35.9%) and 10% (14.6%) thresholds, while it is second in the rankings based on the incidence of catastrophic pharmaceutical OOPP (28.1% and 10.2% for the 5% and 10% thresholds, respectively).

Figure 28 Total OOPP burden (%) per country (wave 6)



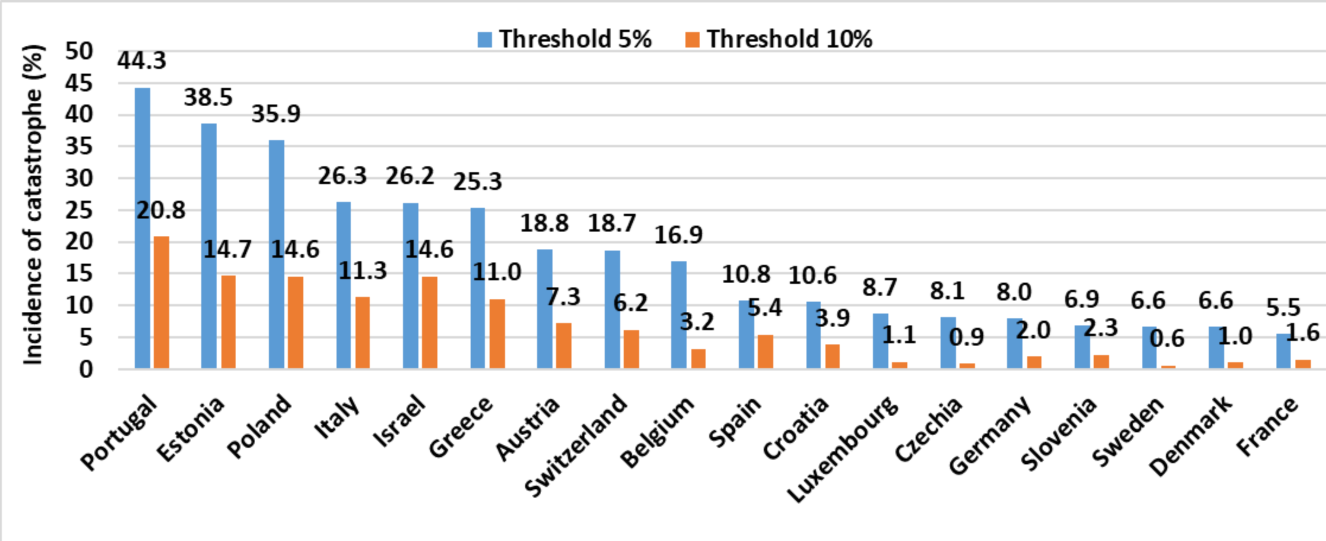
Note: Total OOPP burden is defined as the share (%) net equivalized income spent on OOPP. OOPP: Out-of-pocket payments.

Figure 29 Pharmaceutical OOPP burden (%) per country (wave 6)



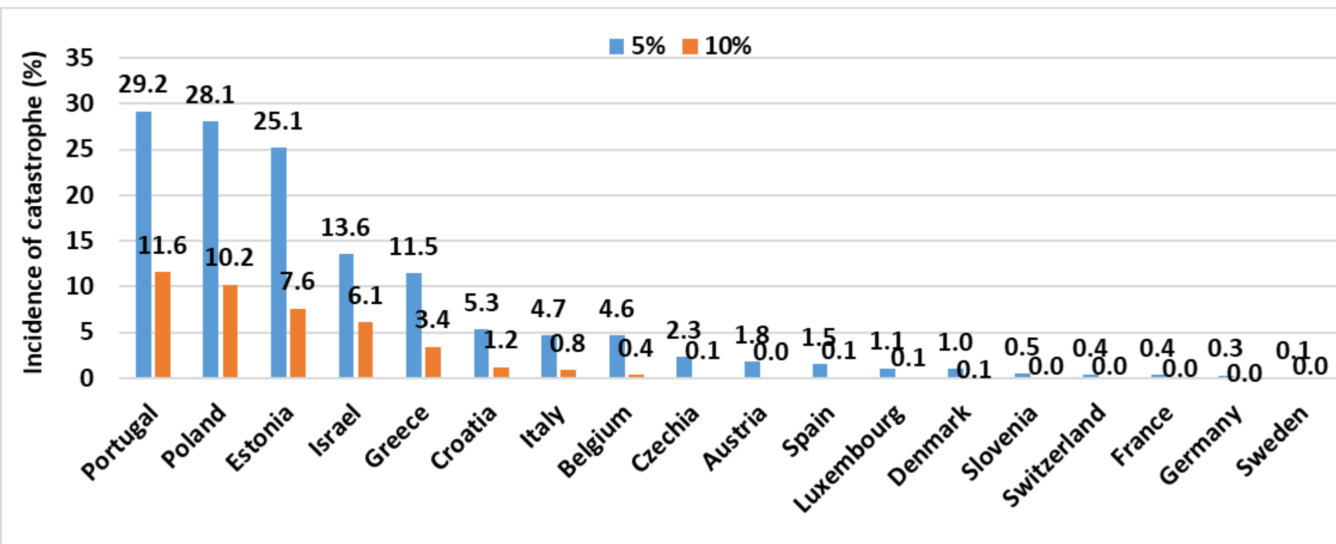
Note: Pharmaceutical OOPP burden is defined as the share (%) net equivalized income spent on pharmaceutical OOPP. OOPP: Out-of-pocket payments.

Figure 30 Incidence of catastrophic total OOPP per country (wave 6)



Note: OOPP: Out-of-pocket payments.

Figure 31 Incidence of catastrophic pharmaceutical OOPP per country (wave 6)



Note: OOPP: Out-of-pocket payments.

4.6. Satisfaction with the health system

❖ **Satisfaction with the health system is rather low in Greece, Poland and Romania.**

Greece

Greece has the lowest share of respondents (just 45.4%) reporting as being satisfied with their basic health coverage / health system in 2020.

Poland

Poland is associated with the second lowest satisfaction with the health system rate (64.3%) among all countries considered.

Romania

Romania is ranked fourth from the bottom in terms of the share of individuals being satisfied with the health system (73.6%).

Table 4 Share (%) of individuals that are satisfied with their health coverage / health system per country and gender (2020)

Countries	Total	Males	Females
Switzerland	96.5	97.0	96.1
Czechia	95.5	94.5	96.4
Denmark	93.9	94.5	93.4
Austria	92.1	92.4	91.8
Luxembourg	91.6	93.6	89.7
Belgium	91.4	92.1	90.8
Spain	91.3	90.7	91.8
Germany	90.9	90.6	91.1
Slovenia	89.1	89.7	88.7
Netherlands	88.7	90.0	87.4
Sweden	88.3	90.3	86.4
France	87.7	89.2	86.3
Israel	86.6	82.3	90.9
Croatia	85.1	83.4	86.5
Estonia	78.7	78.6	78.8
Italy	73.9	75.2	72.8
Romania	73.6	76.8	71.0
Hungary	67.4	58.8	73.9
Poland	64.3	65.1	63.7
Greece	45.4	45.7	45.2

Note: Estimates are based on the unstandardized distributions.

4.7. Income- and education-related inequalities in health outcomes

- **Substantial income- and education-related inequalities were found in Greece, Poland and Romania in terms of various health outcomes.**
- **In Greece, large socioeconomic health inequalities were found in total and pharmaceutical OOPP burden, catastrophic total and pharmaceutical OOPP (third and fifth highest gap, respectively, overall and pharmaceutical unmet needs, quality of life, multimorbidity and satisfaction with the health system.**
- **In Poland, substantial health inequalities were observed in total and pharmaceutical OOPP burden, catastrophic total and pharmaceutical OOPP, unmet needs for medicines, quality of life, multimorbidity, fair/poor self-rated health and satisfaction with the health system.**
- **In Romania, sizeable socioeconomic inequalities were ascertained in overall and pharmaceutical unmet needs, fair/poor self-rated health, quality of life and satisfaction with the health system.**

4.7.1. Health outcomes inequalities among income groups

Greece

The absolute inequalities (percentage point differences) between the poorest and the richest quartile were found to be substantial in Greece in terms of total and pharmaceutical OOPP burden (fourth and fifth highest gap, respectively, among all countries), catastrophic total and pharmaceutical OOPP (third and fifth highest gap, respectively), overall unmet needs (fourth highest gap), quality of life (tenth highest gap) and satisfaction with the health system (sixth highest gap), but were low with respect to pharmaceutical unmet needs (bottom of the distribution), multimorbidity (sixth lowest gap) and fair/poor self-reported health (lowest gap).

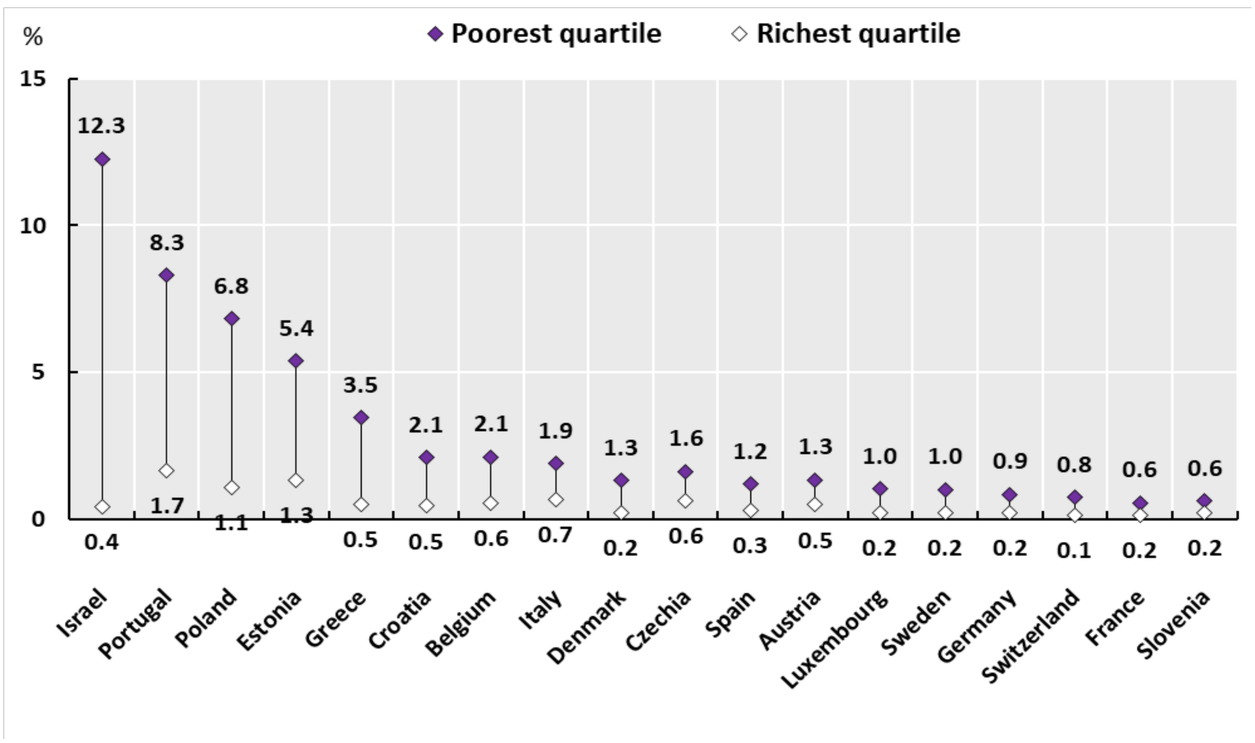
Poland

In Poland, the income-related inequalities were found to be large in total and pharmaceutical OOPP burden (third highest gaps), catastrophic total and pharmaceutical OOPP (second highest gaps), unmet needs for medicines (eighth highest gap) and quality of life (fifth highest gap), while they were relatively narrow when considering overall unmet needs (third lowest gap), multimorbidity (second lowest gap), fair/poor self-reported health (tenth lowest gap) and satisfaction with the health system (second lowest gap).

Romania

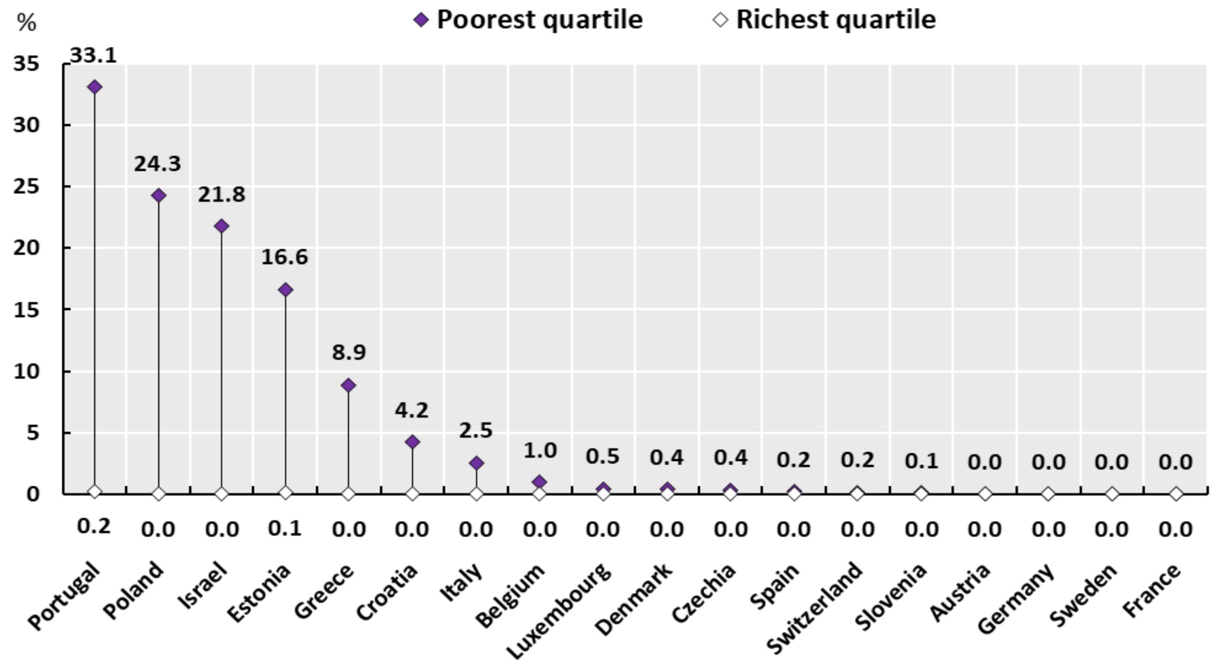
In Romania, the income-related inequalities were sizable in overall and pharmaceutical unmet needs (second highest and highest gaps, respectively), fair/poor self-rated health (ninth highest gap) and quality of life (third highest gap), but not in multimorbidity (seventh lowest gap).

Figure 32 Inequalities in pharmaceutical OOPP burden (%) by country and income group (wave 6)



Note: OOPP: Out-of-pocket payments.

Figure 33 Inequalities in the incidence (%) of catastrophic (10% threshold) pharmaceutical OOPP by country and income group (wave 6)



Note: OOPP: Out-of-pocket payments.

Figure 34 Inequalities in the prevalence (%) of unmet needs for medicines by country and income group (2020)

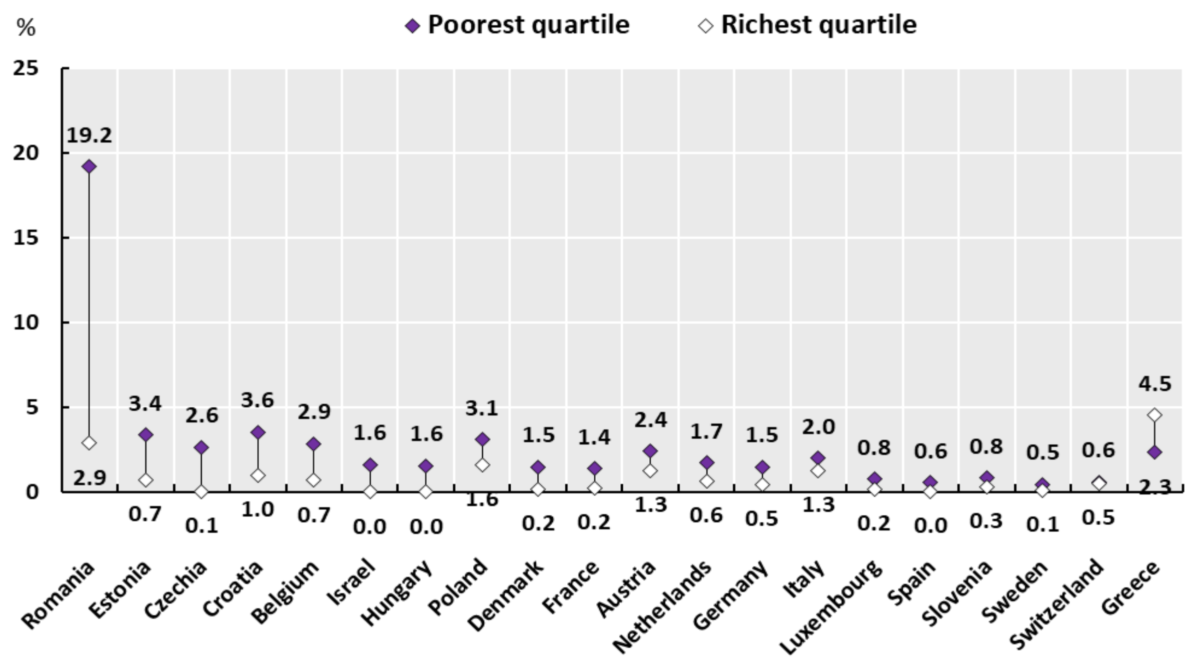
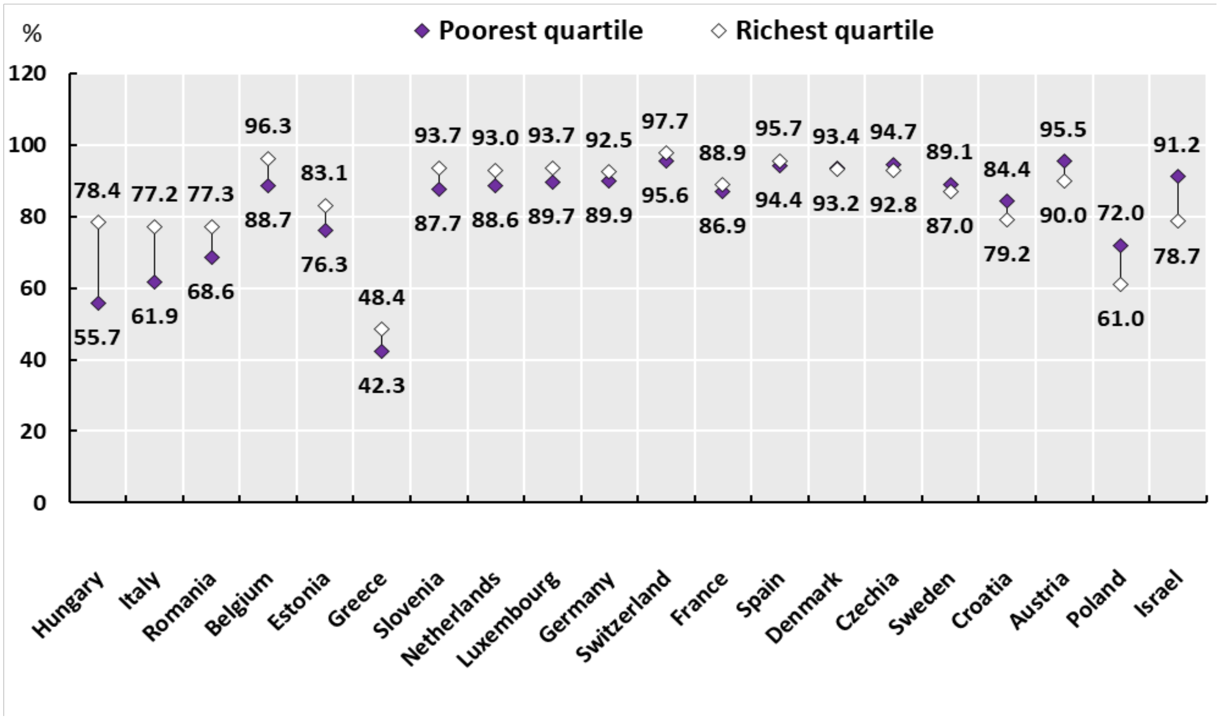


Figure 35 Inequalities in the share (%) of individuals satisfied with health system by country and income group (2020)



4.7.2. Health outcomes inequalities among education attainment groups

Greece

The absolute inequalities (percentage point differences) between non/primary and tertiary education attainment group were found to be large in total and pharmaceutical OOPP burden (second and fourth highest gaps, respectively), catastrophic total and pharmaceutical OOPP (third and fourth highest gaps, respectively), overall and pharmaceutical unmet needs (fourth and seventh highest gaps, respectively), multimorbidity (third highest gap) and quality of life (sixth highest gap), but they were relatively low in fair/poor self-rated health (ninth lowest gap) and satisfaction with the health system (ninth lowest gap).

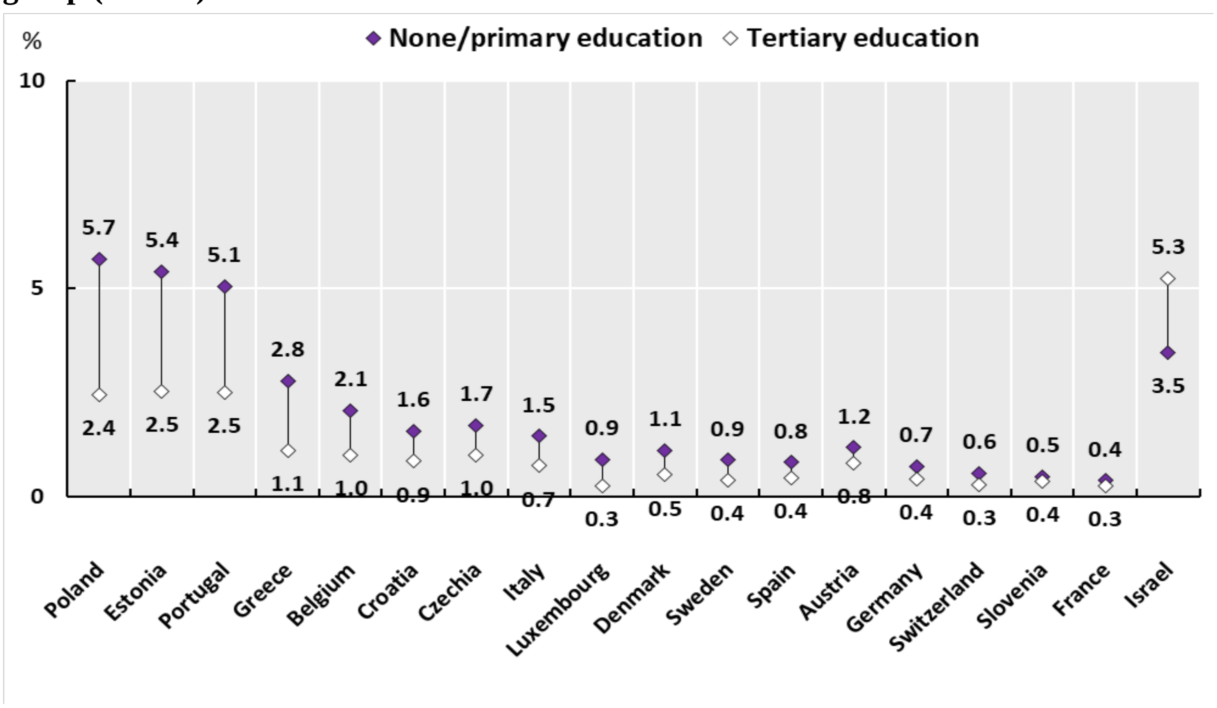
Poland

In Poland, the education-related inequalities were large in total and pharmaceutical OOPP burden (third highest and highest gaps, respectively), catastrophic total and pharmaceutical OOPP (second highest gaps), multimorbidity (fourth highest gap), fair/poor self-rated health (third highest gap), quality of life (fifth highest gap) and satisfaction with the health system (highest gap), but not in overall unmet needs (second and fourth lowest gaps, respectively).

Romania

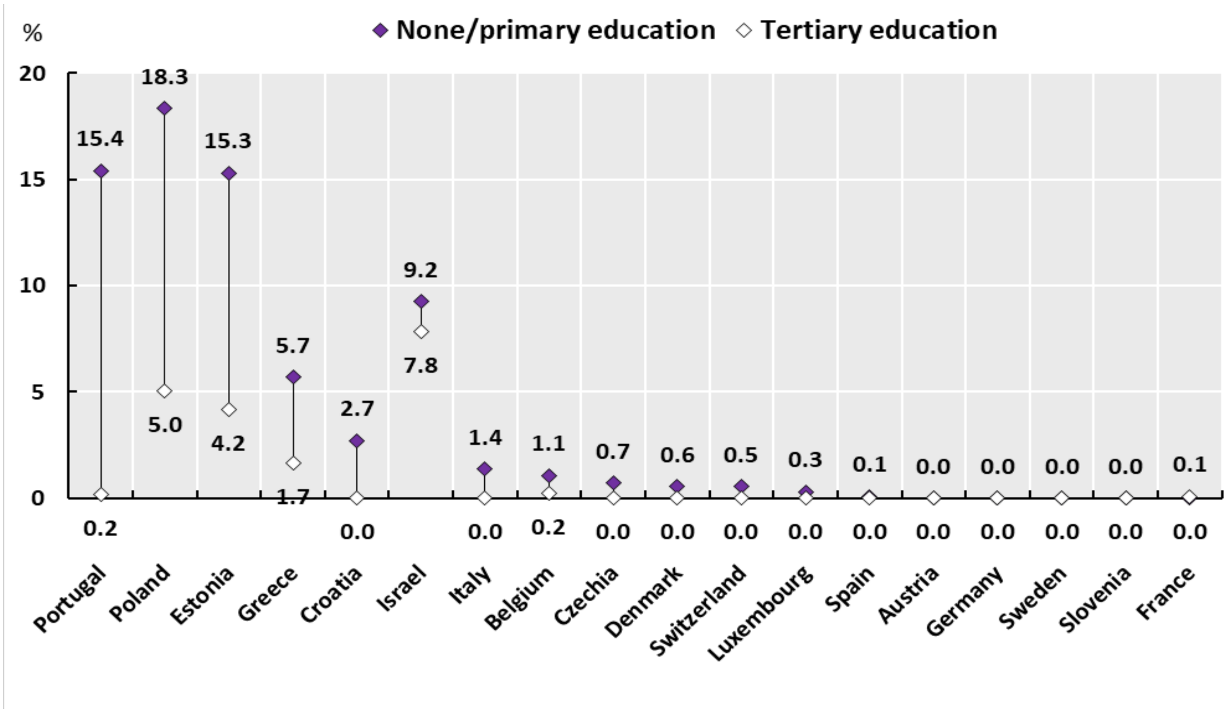
In Romania, substantial education-related inequalities were found in overall and pharmaceutical unmet needs (fifth highest and highest gaps, respectively), fair/poor self-reported health (highest gap) and satisfaction with the health system (third highest gap), but not in multimorbidity (fourth lowest gap).

Figure 36 Inequalities in pharmaceutical OOPP burden (%) by country and education attainment group (wave 6)



Note: OOPP: Out-of-pocket payments.

Figure 37 Inequalities in the incidence (%) of catastrophic (10% threshold) pharmaceutical OOPP by country and education attainment group (wave 6)



Note: OOPP: Out-of-pocket payments.

Figure 38 Inequalities in the prevalence (%) of unmet needs for medicines by country and education attainment group (2020)

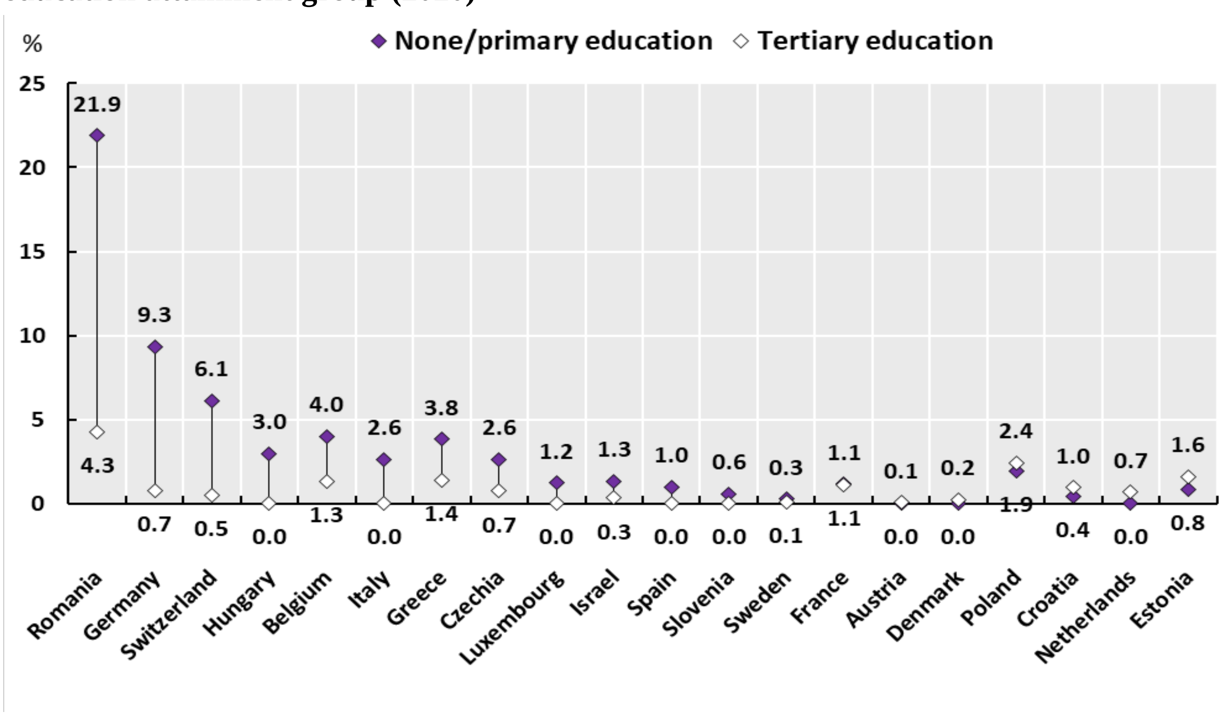


Figure 39 Inequalities in the prevalence (%) of fair/poor self-reported health by country and education attainment group (2020)

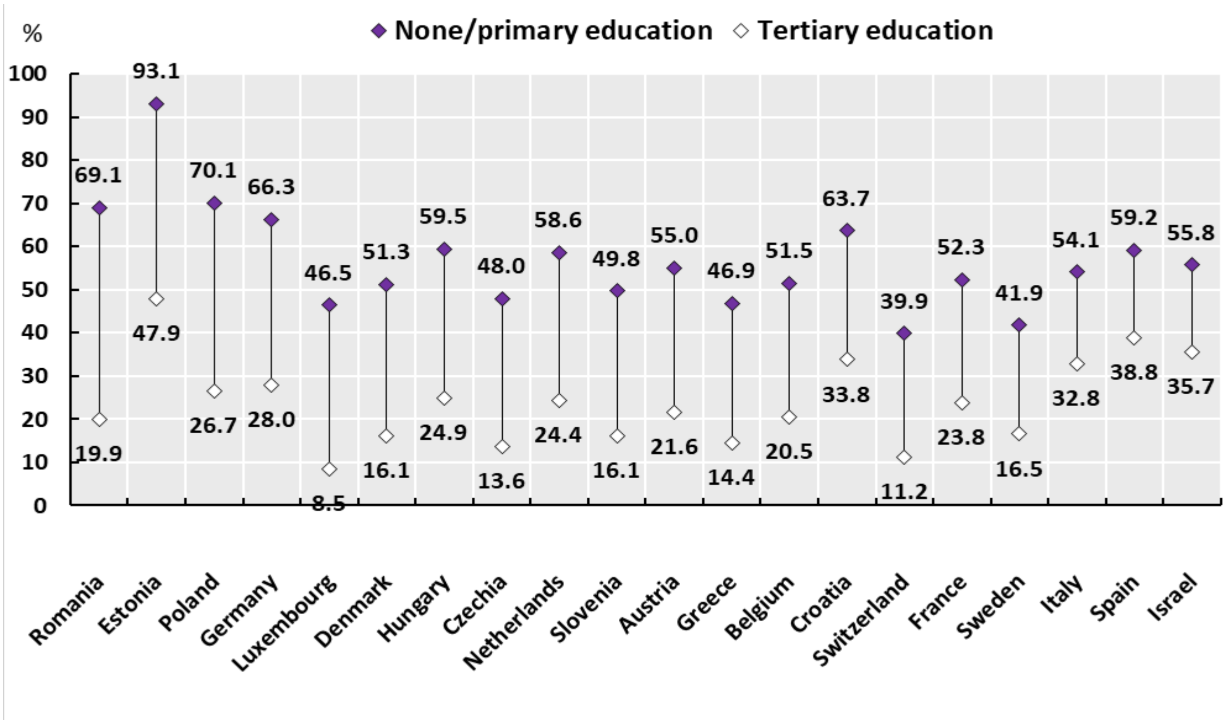
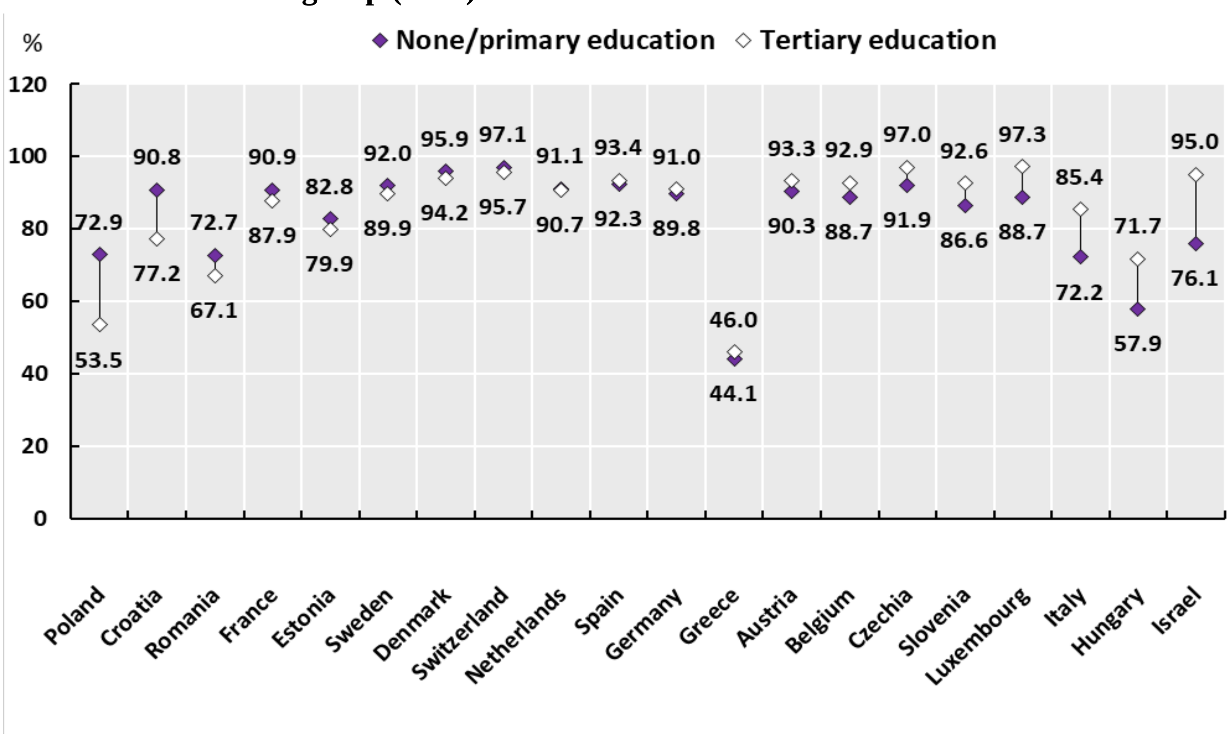


Figure 40 Inequalities in the share (%) of individuals satisfied with health system by country and education attainment group (2020)



4.8. Public investment in health and health outcomes

- **Investment in health outcomes in the form of public health expenditure was found to significantly decrease total OOPP burden and the risk of catastrophic total OOPP, overall unmet needs and low quality of life, whereas it also significantly increased the probability of being satisfied with the health system.**
- **Investment in health outcomes in the form of public pharmaceutical expenditure was found to significantly decrease pharmaceutical OOPP burden and the risk of catastrophic pharmaceutical OOPP and unmet pharmaceutical needs.**
- **Further analyses revealed that these effects were consistent in the subpopulations of Greece, Poland and Romania.**

The objective of econometric modelling was to assess the impact of investment on health outcomes after adjusting for several other independent factors. Investment in health outcomes was defined as public (total and pharmaceutical) health expenditure. As dependent variables were used several health outcomes, and more specifically:

- Total and pharmaceutical OOPP
- Total and pharmaceutical OOPP burden
- Catastrophic total and pharmaceutical OOPP
- Total and pharmaceutical unmet needs
- (fair/poor) Self-reported health and (low) quality of life
- Satisfaction with the health system

The following table summarizes the main results of the econometric modelling analyses. Regarding the demographic factors, higher age was significantly and independently associated with higher expected total OOPP and OOPP burden, higher risk of OOPP catastrophe and higher probability of being satisfied with the health system. The female gender was found to be associated with higher total and pharma OOPP (both risk and expected value), total and pharmaceutical OOPP burden (both risk and expected value) and higher risk of catastrophic OOPP. Being married was significantly increasing total and pharmaceutical OOPP, total and pharmaceutical OOPP burden and the risk of catastrophic both total and pharmaceutical OOPP, while it was decreasing the probability of low quality of life and being satisfied with the health system. Urban area was associated with higher pharmaceutical OOPP, total and pharmaceutical OOPP burden and higher risk of unmet needs. Individuals who worked were associated with higher total and pharmaceutical OOPP, total and pharmaceutical OOPP burden and lower risk of unmet pharmaceutical needs and fair/poor self-rated health.

Regarding the socioeconomic factors, higher education was increasing total and pharmaceutical OOPP, total and pharmaceutical OOPP burden and decreasing the risk of fair/poor self-reported health and low quality of life. Higher income was significantly associated with higher total and pharmaceutical OOPP, lower total and pharmaceutical OOPP burden, lower risk of catastrophic total and pharmaceutical OOPP, overall and pharmaceutical unmet needs, fair/poor self-reported health and low quality of life and higher probability of being satisfied with the health system. Finally, supplementary health insurance was decreasing total and pharmaceutical OOPP, total and pharmaceutical OOPP burden, the risk of catastrophic total OOPP, fair/poor self-reported health and low quality of life.

As far as the health need factors were concerned, multimorbidity was increasing total and pharmaceutical OOPP, total and pharmaceutical OOPP burden, the risk of catastrophic total OOPP and fair/poor self -reported health, whereas it was decreasing the probability of being satisfied with the health system. The presence of ADL/IADL limitations was associated with higher total and pharmaceutical OOPP, pharmaceutical OOPP burden, higher risk of overall and pharmaceutical unmet needs, fair/poor self-reported health and low quality of life and lower probability of being satisfied with the health system. Polypharmacy was found to be increasing total and pharmaceutical OOPP, total and pharmaceutical OOPP burden, the risk of catastrophic total and pharmaceutical OOPP, fair/poor self-reported health and low quality of life. Regarding the independent impact of chronic diseases, it varied with respect to the chronic disease and the health outcome. Notably, emotional disorders were found to be associated with the most consistent negative impact among all chronic diseases.

Regarding life-style factors, obesity and sedentary life were increasing the risk of fair/poor self-reported health and drinking and sedentary life the risk of low quality of life.

Moreover, non-Social Democratic welfare regimes (Mediterranean and Eastern, in particular) were generally associated with higher total and pharmaceutical OOPP, total and pharmaceutical OOPP burden, catastrophic total and pharmaceutical OOPP, unmet pharmaceutical needs, but also with higher probability of being satisfied with the health system.

Finally, we explored the independent impact of public total and pharmaceutical health expenditure on the health outcomes. Higher total health expenditure was found to significantly decrease total OOPP burden, the risk of catastrophic total OOPP, overall unmet needs and low quality of life, whereas it significantly increased the probability of being satisfied with the health system. Finally, higher pharmaceutical expenditure was decreasing the pharmaceutical OOPP burden, the risk of catastrophic pharmaceutical OOPP and unmet pharmaceutical needs. Further analyses revealed that these effects were consistent in the subpopulations of Greece, Poland and Romania.

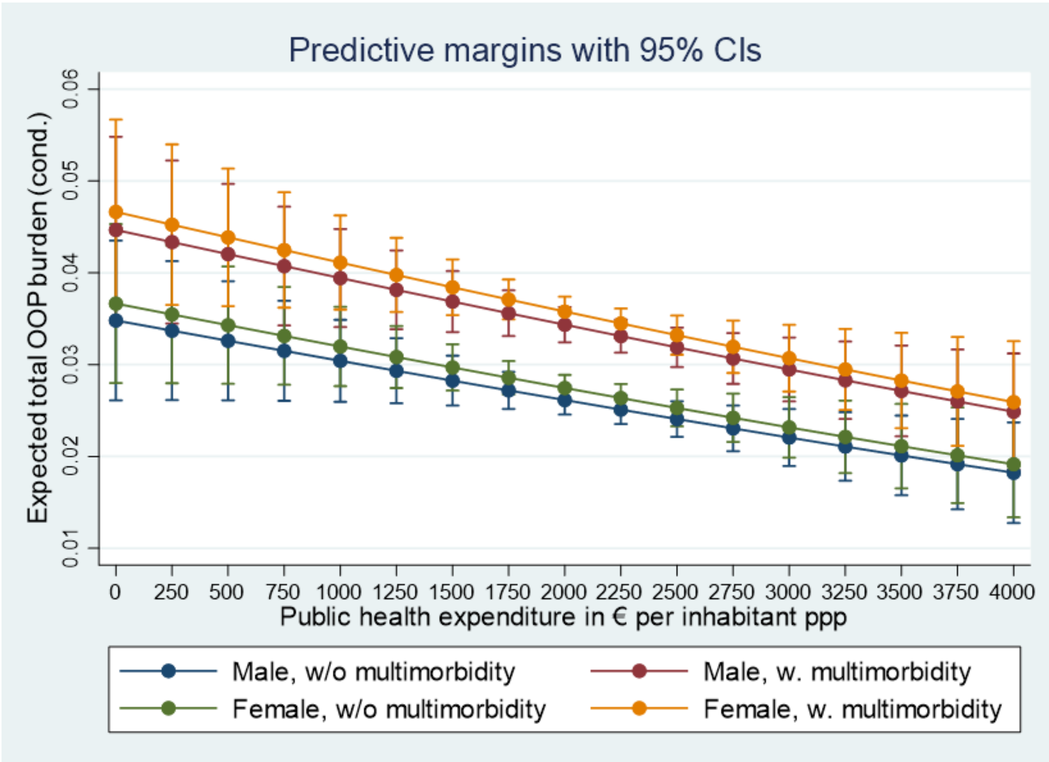
Table 15 Synopsis of the results of the econometric modelling analyses

	Total OOPP		Pharma OOPP		Total OOPP burden		Pharma OOPP burden		Catastr. total OOPP	Catastr. pharma OOPP	Unmet needs	Unmet pharma needs	Fair/poor SRH	Low QoL	Satisfied with HS
	Prob. of incurring	Exp. value (OOPP>0)	Prob. of incurring	Exp. value (OOPP>0)	Prob. of incurring	Exp. value (OOPP>0)	Prob. of incurring	Exp. value (OOPP>0)	Prob.	Prob.	Prob.	Prob.	Prob.	Prob.	Prob.
Higher age		+				+		+	+	+	-	-			+
Female	+	+	+	+	+	+	+	+	+						
Marriage		+		+		+		+	+	+				-	-
Urban area				+		+		+			+				
Working	+	+	+		+	+	+	+				-	-		
Higher education	+	+	+	+	+	+	+	+					-	-	
Higher income	+	+	+	+	+	-	+	-	-	-	-	-	-	-	+
Suppl. health insurance	-	-		-	-	-	-	-	-				-	-	
Multimorbidity	+	+		+	+	+	+	+	+				+		-
Cardiovascular diseases		+		+		+		+		+			+	+	
Arthritis	+	+	+	+	+	+	+	+			+		+		
Neurodegenerative diseases													+	+	
Chronic lung disease		+		+		+		+	+	+			+		
Cancer		+		+									+		
Hypertension	+		+		+		+						-		
Diabetes	-	-	-	+	-	-			-	+			+		
Hyperlipidemia							+				-		-		
Emotional disorders	+	+	+	+	+	+	+	+		+	+		+	+	
Cataracts	+		+	+			+								
Polypharmacy	+	+	+	+	+	+	+	+	+	+			+	+	
ADL/IADL limitations	+	+	+	+	+			+			+	+	+	+	-
Obesity													+		
Drinking														+	

Smoking															
Sedentary life													+	+	
Social Democratic welfare regime	+	-	+	-	+	-	+	-	-	-	+	-	-	-	-
Bismarckian welfare regime	-		-	-	-	-	-	+	+	+	+	+	+	+	
Mediterranean welfare regime	-	+	-	+	-	+	-	+	+	+		+	+		+
Eastern welfare regime	-	+	-	+	-	+	-	+	+	+	-	+	+		+
Higher public total HE					+	-			-		-			-	+
Higher public pharma HE							+	-		-		-			

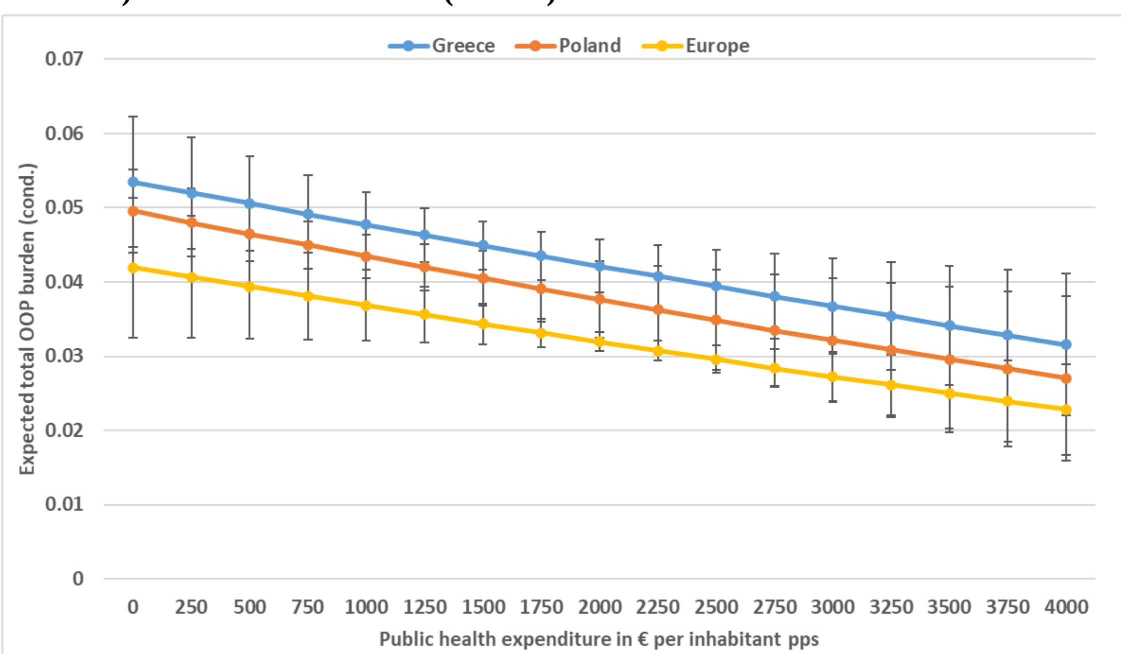
Note: A + sign indicates a significantly increasing effect and a – sign denotes a significantly decreasing effect. ADL/IADL: limitations in Activities of Daily Living or in Instrumental Activities in Daily Living, Catastr.: catastrophic, Exp.: expected, HE: health expenditure, HS: health system, OOPP: out-of-pocket payments, pharma: pharmaceutical, prob.: probability, QoL: quality of life, SRH: self-reported health, suppl.: supplementary.

Figure 41 Impact of public health expenditure on total OOPP burden (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



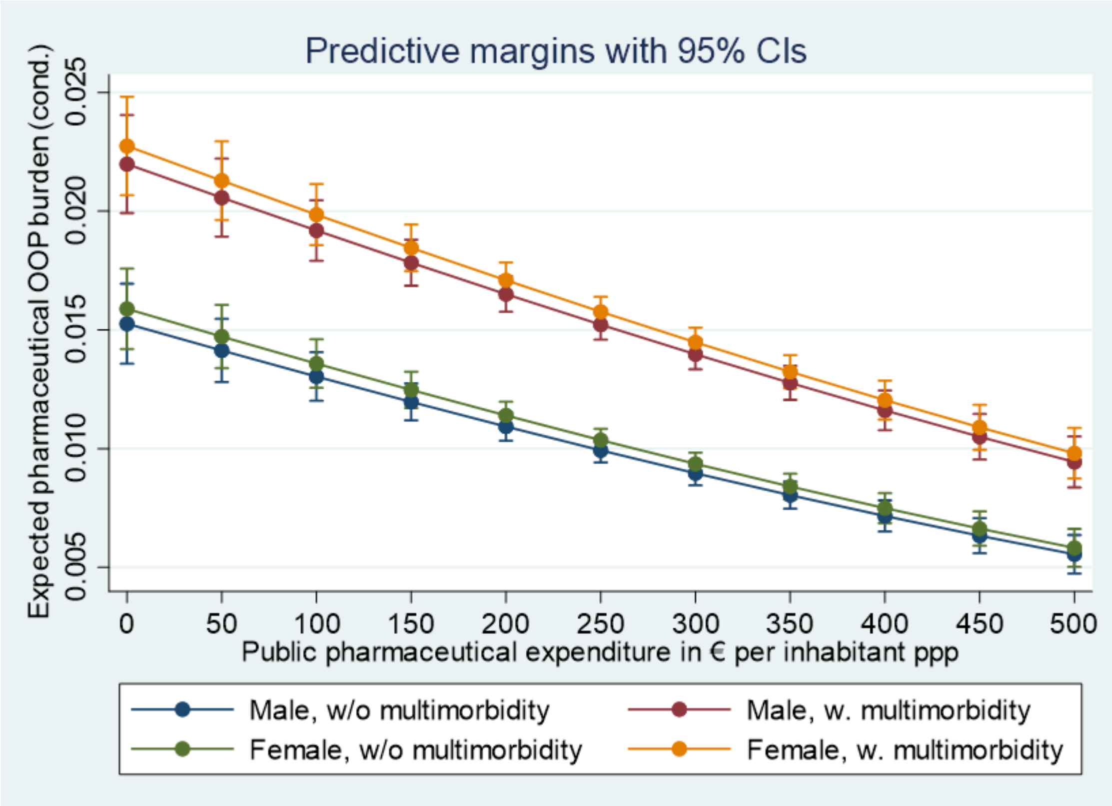
Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 42 Impact of public health expenditure on total OOPP burden (predictive margins with 95% CIs) in Greece and Poland (wave 6)



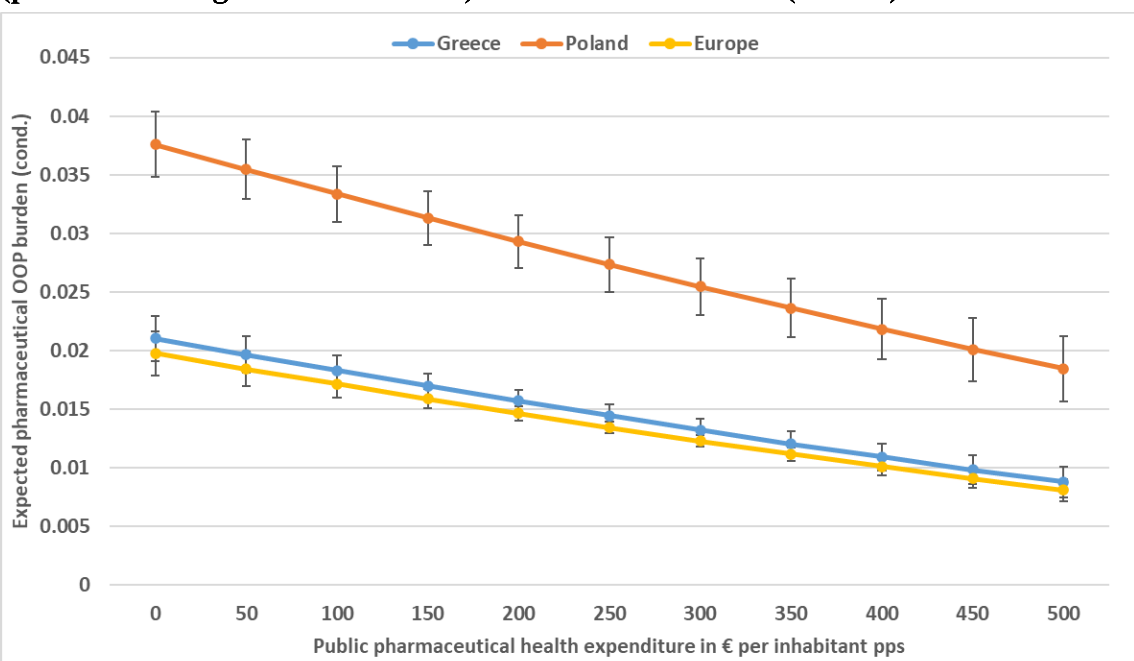
Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

Figure 43 Impact of pharmaceutical health expenditure on pharmaceutical OOPP burden (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



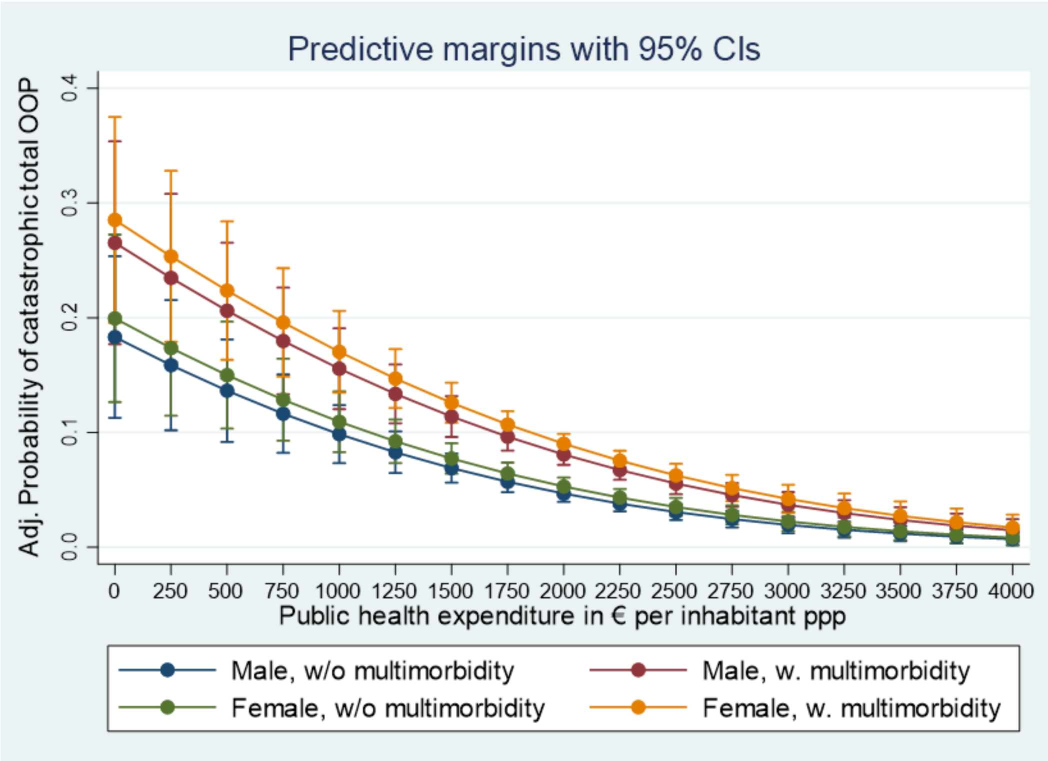
Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 44 Impact of pharmaceutical health expenditure on pharmaceutical OOPP burden (predictive margins with 95% CIs) in Greece and Poland (wave 6)



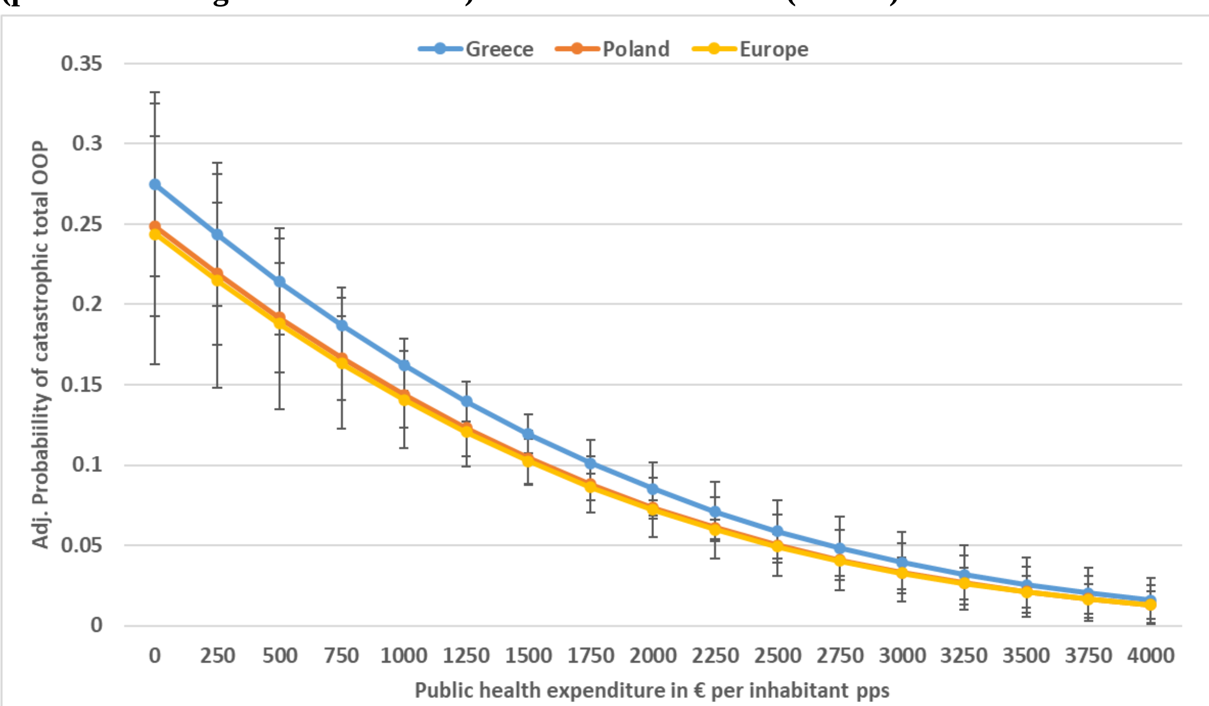
Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

Figure 45 Impact of public health expenditure on the incidence of catastrophic total OOPP (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



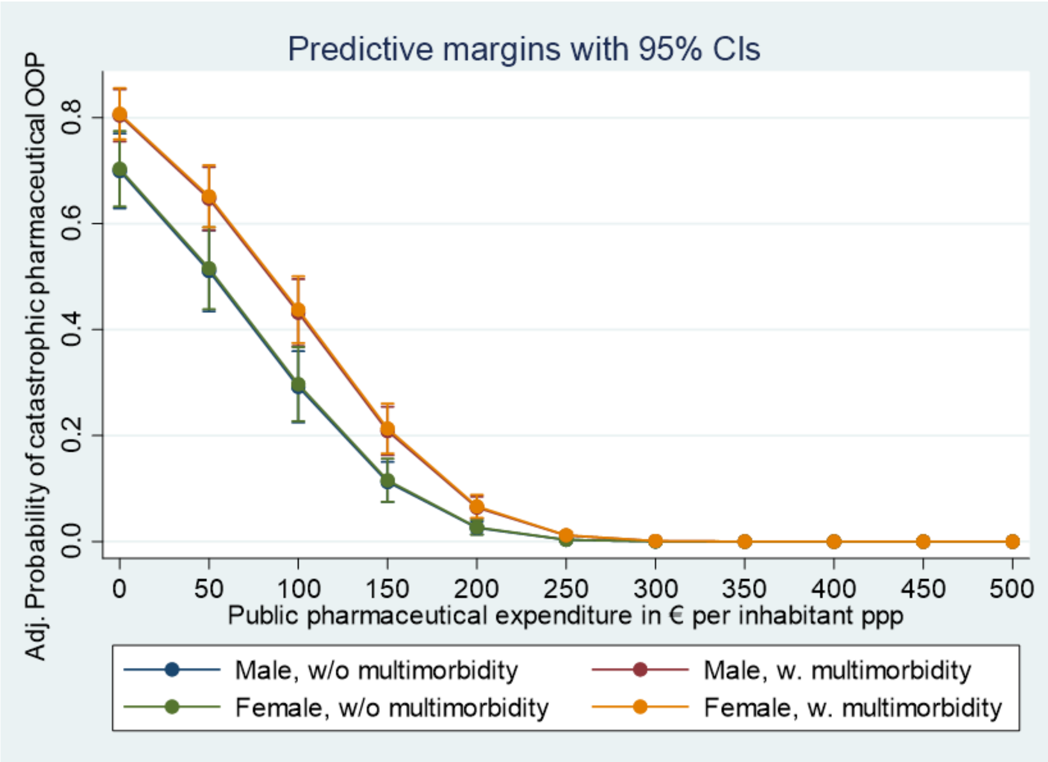
Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 46 Impact of public health expenditure on the probability of catastrophic total OOPP (predictive margins with 95% CIs) in Greece and Poland (wave 6)



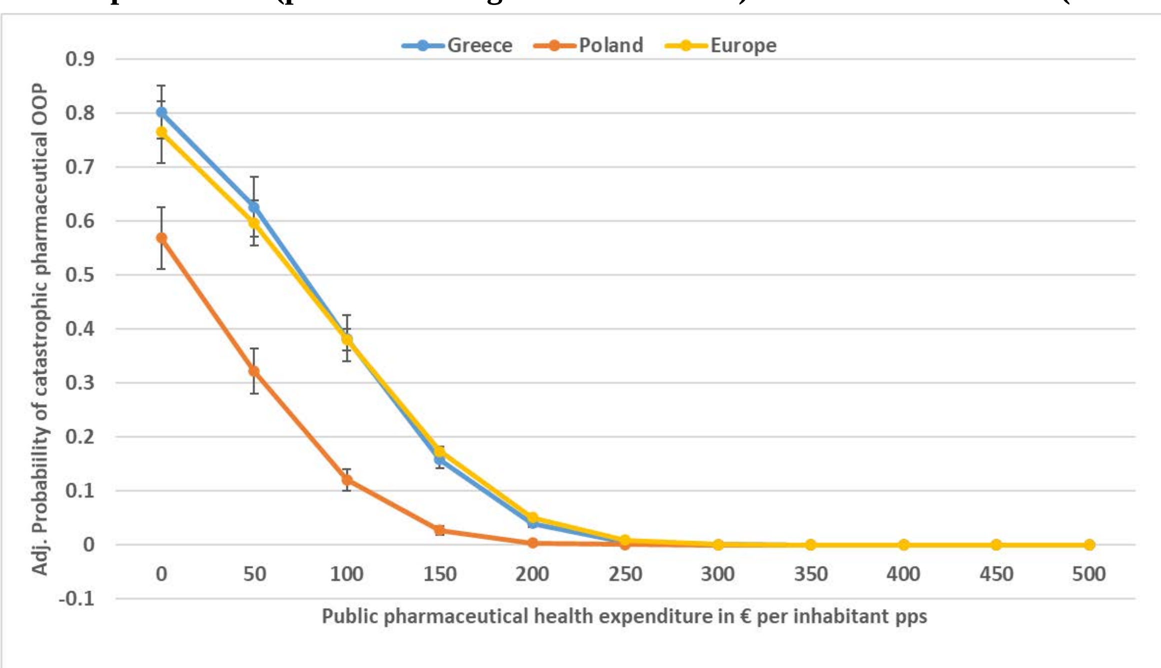
Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

Figure 47 Impact of pharmaceutical health expenditure on the probability of catastrophic pharmaceutical OOPP (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



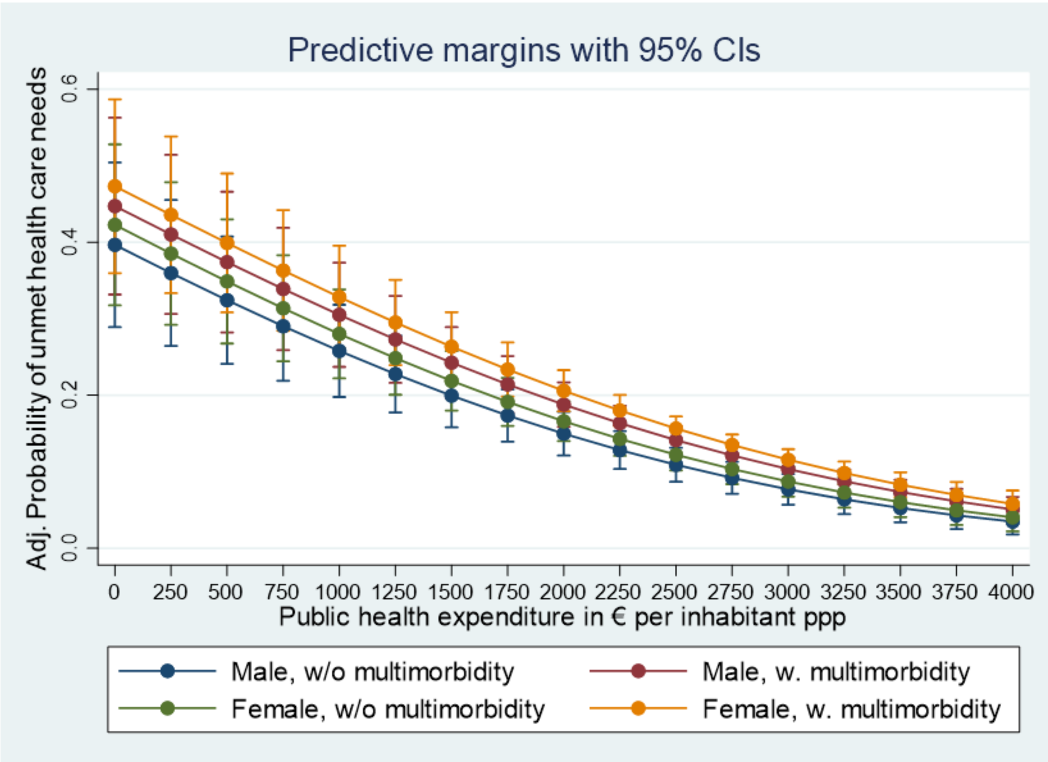
Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 48 Impact of pharmaceutical health expenditure on the probability of pharmaceutical catastrophic OOPP (predictive margins with 95% CIs) in Greece and Poland (wave 6)



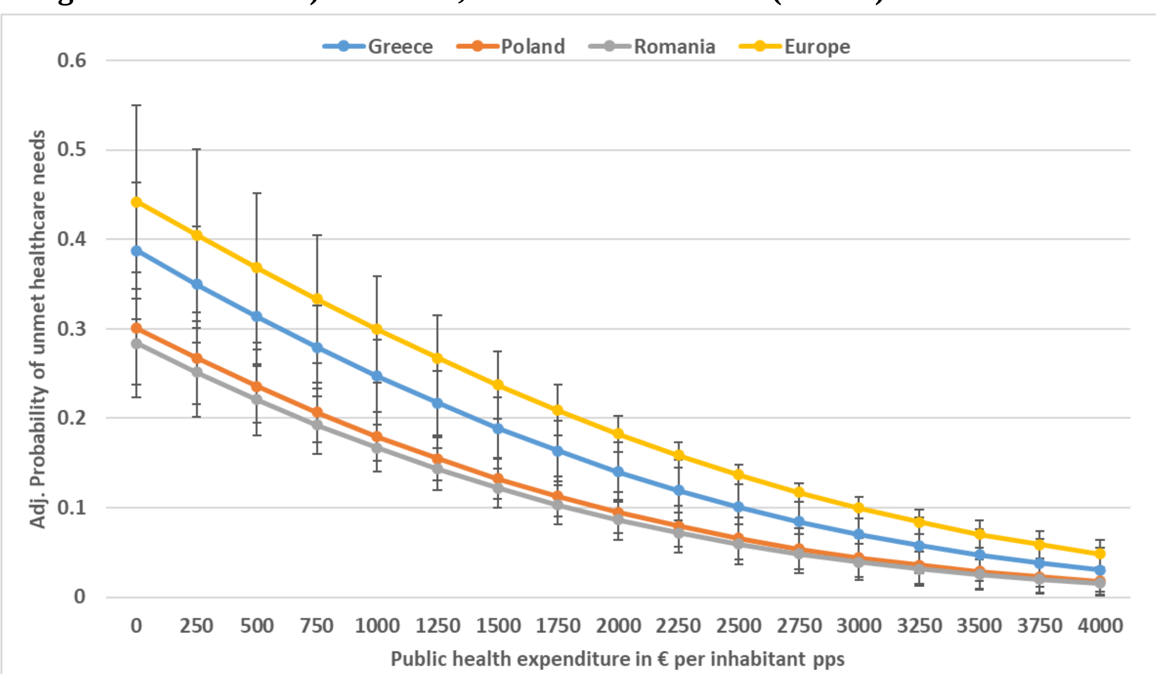
Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

Figure 49 Impact of public health expenditure on the probability of unmet needs (predictive margins with 95% CIs) by gender and multimorbidity status (wave 8)



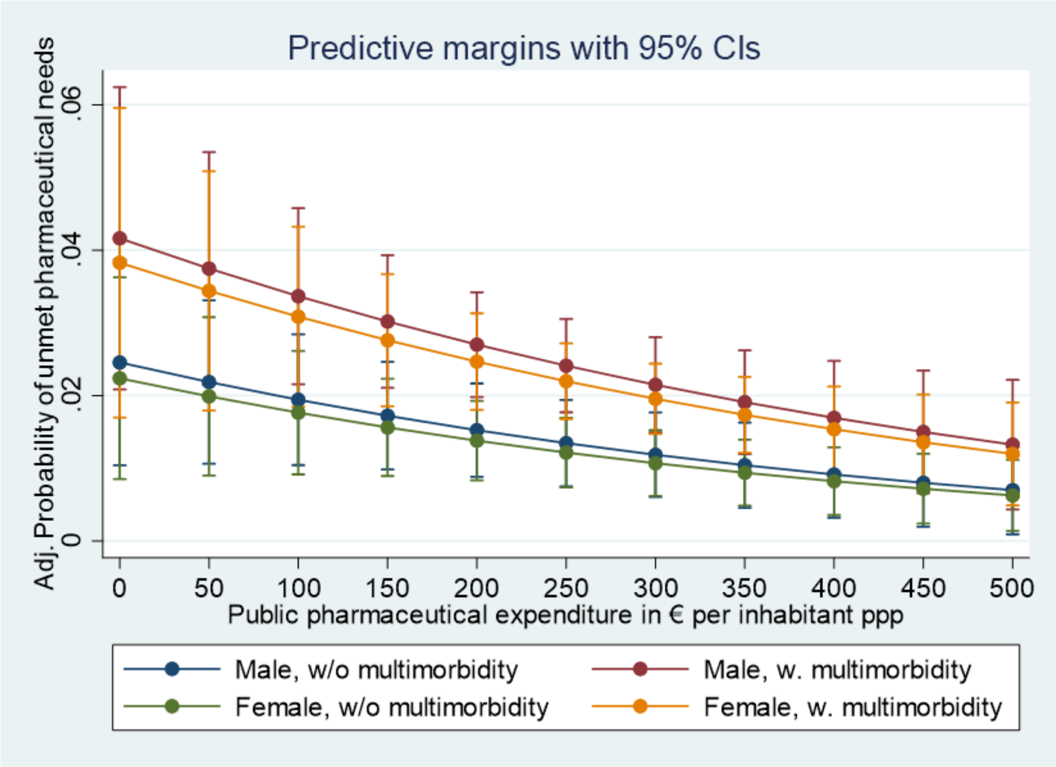
Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 50 Impact of public health expenditure on the probability of unmet needs (predictive margins with 95% CIs) in Greece, Poland and Romania (wave 8)



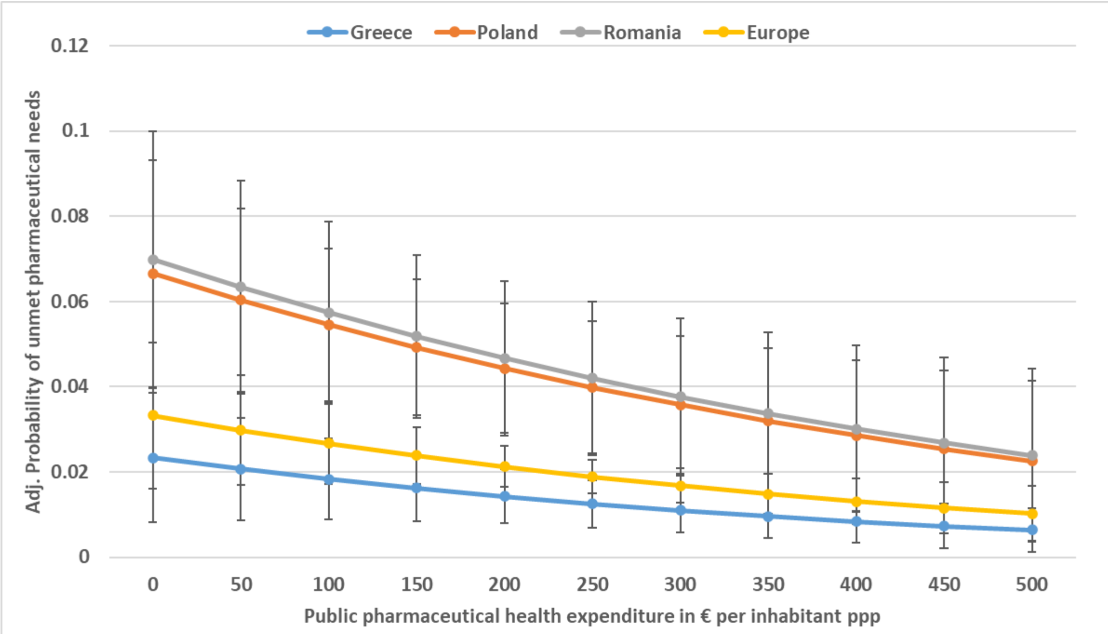
Note: CIs: confidence intervals, pps: purchasing power standard.

Figure 51 Impact of pharmaceutical health expenditure on the probability of unmet needs for medicines (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



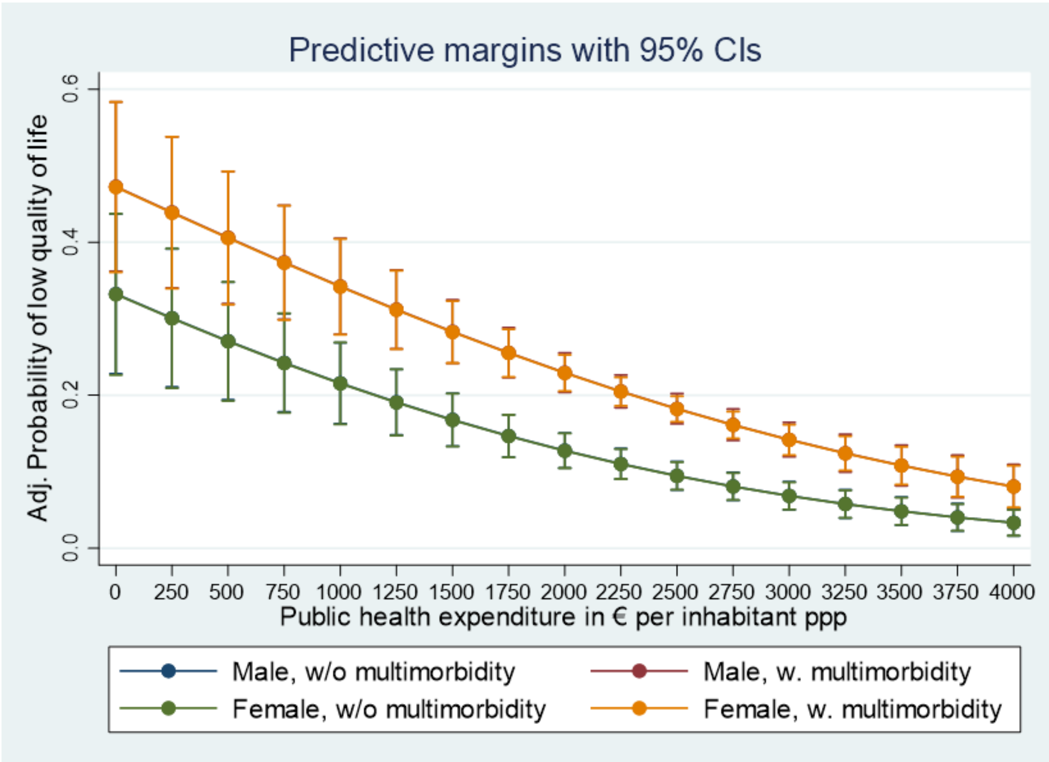
Note: CIs: confidence intervals.

Figure 52 Impact of pharmaceutical health expenditure on the probability of unmet needs for medicines (predictive margins with 95% CIs) in Greece, Poland and Romania (wave 6)



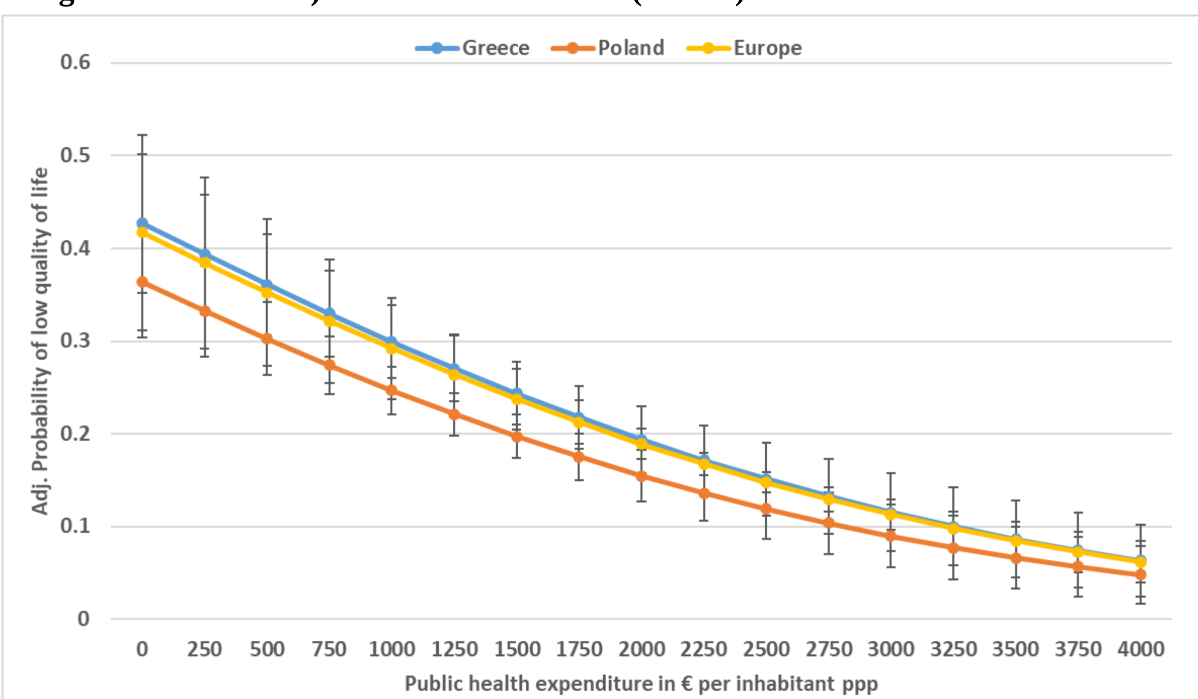
Note: CIs: confidence intervals, pps: purchasing power standard.

Figure 53 Impact of public health expenditure on the probability of low quality of life (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



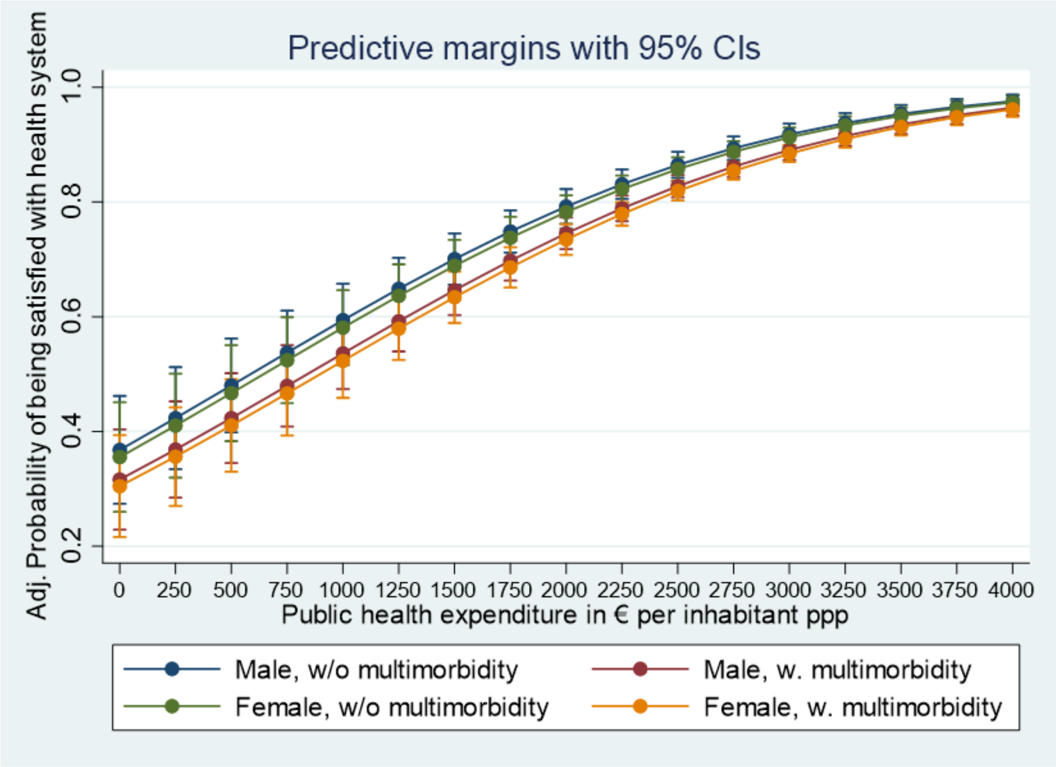
Note: CIs: confidence intervals.

Figure 54 Impact of public health expenditure on the probability of low quality of life (predictive margins with 95% CIs) in Greece and Poland (wave 6)



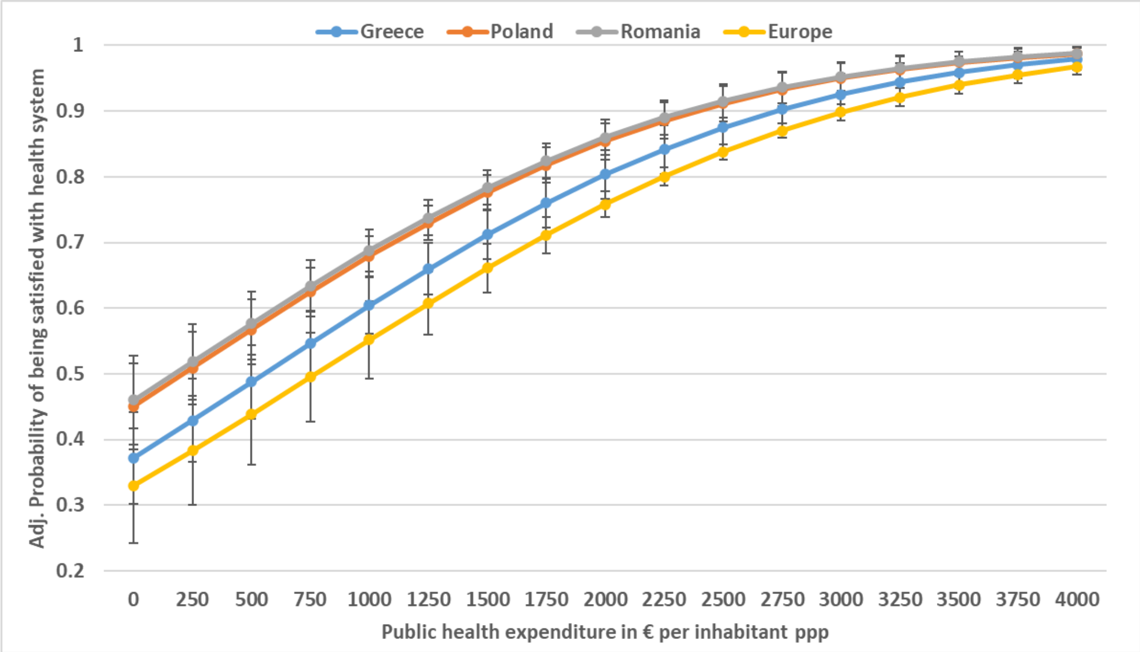
Note: CIs: confidence intervals, pps: purchasing power standard.

Figure 55 Impact of public health expenditure on the probability of being satisfied with health system (predictive margins with 95% CIs) by gender and multimorbidity status (wave 8)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 56 Impact of public health expenditure on the probability of being satisfied with health system (predictive margins with 95% CIs) in Greece, Poland and Romania (wave 8)



Note: CIs: confidence intervals, pps: purchasing power standard.

5. Conclusions

In view of growing cost pressures, concerns about the sustainability of health systems have led to the dominance of the cost-containment policy perspective in the public debate. Policy-makers worldwide usually opt for a combination of measures on both the supply and the demand sides of health systems to curtail costs, often to the detriment of health outcomes for individuals, families and society as a whole. However, health systems should not be regarded as a drag on resources, but rather as an investment on population health and a means to achieve better economic growth (Figueras et al. 2012). The interdependency between health systems, health and wealth is complex, but there appears to be a scientific consensus.

This report sought to shed light specifically on the impact of underinvestment in health systems on health outcomes and pharmaceutical care, in particular, in Greece, Poland and Romania using macro and micro 'big data' sources. Following the literature, health expenditure constitutes an indicator of investment in health systems. This premise is in accordance with the work of Grossman (Grossman 1972), according to which an increase in investment in medical treatment, time, and human resources improves health outcomes.

At first, investment in the health systems of Greece, Poland and Romania was investigated. On the one hand, the Economic Adjustment Programmes led to a divergence between Greece and the rest of Europe in terms of total health expenditure; the overall adjustment between 2009 and 2019 was equal to -22.8%, while, on average, total health spending per inhabitant increased by 16.7% in Europe. On the other hand, despite the convergence with Europe during the last decade in terms of investment in the health system, total health expenditure per capita is well below the European average for both Poland and Romania, the latter in particular. A similar pattern is observed with respect to pharmaceutical health expenditure per capita. Despite the convergence with Europe, investment in pharmaceutical care is below the European average in Poland and Romania, whereas pharmaceutical expenditure per inhabitant in Greece is somewhat higher compared with the rest of Europe.

Moreover, it is important to investigate the mix of financing arrangements of health systems. Public investment in health is falling short of the European average for all three countries. Overall, there appears to be a tendency to privatize health care, pharmaceutical care in particular, in Europe, as it is used as a policy instrument to decrease the rising financial burden of the public sector. This is particularly evident in Poland, where the share of public funding in total pharmaceutical spending was just 35.9% in 2019, whereas the European average was 59.3%. Public investment in pharmaceutical care remains well below the European average in Greece and Romania as well.

Reliance on private spending and in OOPP, in particular to provide health care is putting significant financial pressures on households, leading to significant economic welfare losses or even preventing them from seeking appropriate healthcare treatment. Unmet healthcare needs are particularly high in Greece, Poland and Romania. Greece is ranked first (27,8%) and Romania (20.9%) second in terms of the prevalence of unmet healthcare needs in 2020, while Poland also has a high share of individuals reporting unmet needs (12.4%). It is also noteworthy that unmet needs are increasing in almost all European countries over time. Regarding pharmaceutical care in particular, Romania (11.6%), Greece (2.9%) and Poland (2.2%) were associated with the highest prevalence of unmet needs for medicines among all countries.

The vast majority of the population in Poland and Greece incurs OOPP. As a result, the burden of OOPP on households' budget, i.e. the share of OOPP in equivalised household net income, is quite large in both Poland and Greece. Compared with the other countries, the average pharmaceutical OOPP burden is even larger in Poland and Greece, since. Poland has the second highest pharmaceutical OOPP burden among all countries, while Greece is ranked fifth. If OOPP exceed a predetermined share of the household budget, it is considered as a significant financial risk or, to put it differently, a catastrophe. A high incidence of catastrophic OOPP reveals the inefficiencies and the inadequacy of a health system to financially protect households from wellbeing disruptions caused by ill-health (Chantzaras and Yfantopoulos 2018a). The incidence of catastrophic OOPP was found to be large in both Poland and Greece, in Poland in particular. Furthermore, relative to the estimates in the other countries, the risk of catastrophe was even larger when pharmaceutical OOPP were considered.

An important proxy of the overall performance of the health system as well as a critical policy objective concerns satisfaction with the health system. It was found that the rate of satisfaction with the health system is rather low in Greece (lowest rate among all countries), Poland (second lowest rate) and Romania (fourth lowest). Just 45.4% of individuals in Greece stated that they are satisfied with their health system, while the corresponding estimates for Poland and Romania were 64.3% and 73.6%. M

Besides the average estimates of health outcomes, which were established to be suboptimal in the three countries of interest, substantial socioeconomic inequalities were also found in Greece, Poland and Romania in terms of various health outcomes. Socioeconomic inequalities in health outcomes can be tackled by acting across a range of public policy areas, namely, investing in the health of the more disadvantaged groups (Chantzaras and Yfantopoulos 2018b).

Econometric modelling was subsequently used to assess the impact of investment on health outcomes after adjusting for several other independent factors. Investment in health outcomes was defined as public (total and pharmaceutical) health expenditure. Investment in health outcomes in the form of public health expenditure was found to significantly decrease total OOPP burden and the risk of catastrophic total OOPP, overall unmet needs and low quality of life, whereas it also significantly increased the probability of being satisfied with the health system. Investment in health outcomes in the form of public pharmaceutical expenditure was found to significantly decrease pharmaceutical OOPP burden and the risk of catastrophic pharmaceutical OOPP and unmet pharmaceutical needs. Moreover, further analyses revealed that these effects were consistent in the subpopulations of Greece, Poland and Romania.

Overall, investment in health systems is not only a prerequisite for the improvement of health outcomes, but also a driver for economic growth. This report found that investment in health, public total and pharmaceutical health expenditure, is not adequate in Greece, Poland and Romania. Moreover, it established that private spending is a regressive way to fund health care, and it leads to increased unmet needs for health services and medicines and significant risk of economic catastrophe for households. Since it was demonstrated that public total and pharmaceutical expenditure can significantly improve health outcomes, policy-makers should consider public funding of their health systems not as waste of public resources, but as an opportunity to invest in the health of the population, namely, the human capital of their economy.

Main Report

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1. Introduction

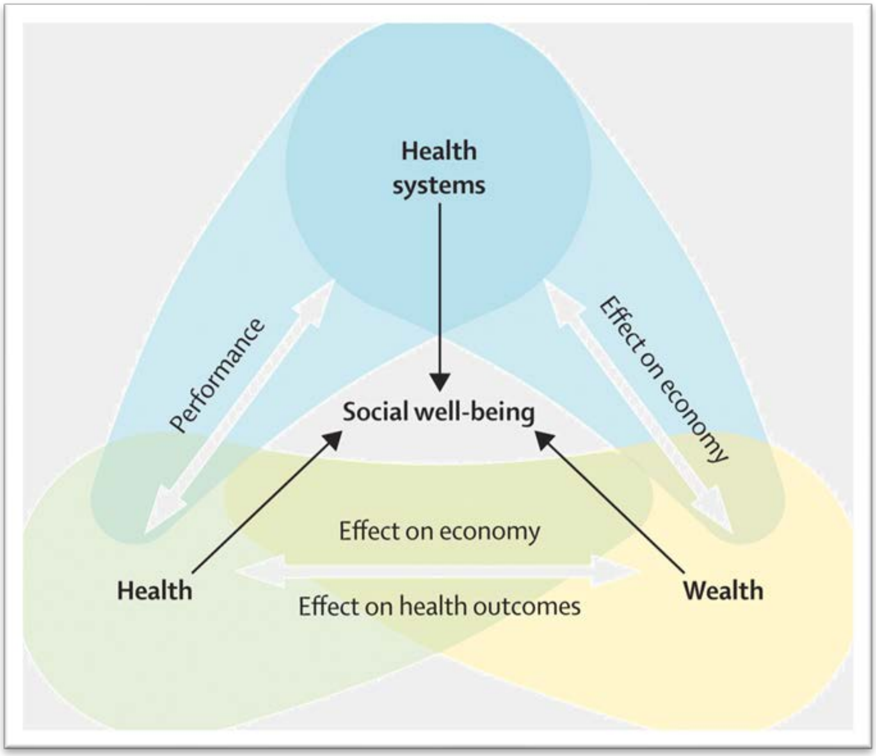
Over the last two decades, all European Member States have faced increasing demands for more and better-quality health services. Given the commitment of the European Health Model to the principles of Long-Term Sustainability, Effectiveness, Quality, and Access to health services, several reforms have been introduced aiming at improving Health Outcomes and Quality of Life. Despite the noble statements of the above objectives there have been rising concerns about the long-term sustainability of the health and pharmaceutical systems due to the ageing of the population, rise in the prevalence of chronic diseases and multimorbidity leading to greater demand for effective therapies, new pharmaceutical technologies, higher expectations of the population for better quality of services, persistent levels of long-term unemployment, aggravation of poverty, inequality and social exclusion, increasing debts and macroeconomics imbalances.

The recent economic crisis introduced a new impetus in balancing the economic and social objectives in the pharmaceutical systems. The decline in GDP and the corresponding reduction in pharmaceutical expenditure jeopardize the ability of the European governments to satisfy the Lisbon's Strategy Objectives of Equity, Efficiency and Effectiveness.

It is generally accepted that higher health is associated with better health outcomes owing to the greater availability of resources. However, the relationship is bi-directional. There are at least four pathways by which improved health could induce economic growth (McKee et al. 2009). First, people with good health status are associated with a lower risk of unemployment and, if employed, sickness absence and early retirement. Second, healthy people can be more productive in their work. Third, there is a correlation between investing in health and investing in education, and stronger human capital in a society is a driver of economic growth. Finally, because healthy people expect to live longer, they may also save more for their retirement period, which creates more opportunities for capital investments.

Health has an investment value in itself. It is also a precondition for increase in productivity labour supply, economic welfare and wellbeing. **Investing in people's health as human capital** improves the Quality of life of the population and reinforces happiness, active employment, economic and social policies contributing to growth and social inclusion. **Investing in health** helps the EU and the CEE countries rise to the challenges identified in its Health Strategy Europe 2025. **Evidence** across the EU and the CEE Member States reveals the significant underinvestment in health and the need for policy intervention to improve access and Health Outcomes.

Figure 1 Health systems, health and wealth



Source: McKee et al. (2009)

2. Objectives of the Project

2.1. Primary Objective

- ✓ **The primary objective** of this project is to investigate the impact of underinvestment in health systems on health outcomes and pharmaceutical care, in particular, in Greece, Poland and Romania using macro and micro 'big data' sources.

It should be highlighted that the primary focus is on Greece, Poland and Romania; however, when possible, comparisons are made with the rest of the European countries.

2.2. Specific objectives

To achieve the overall purpose of the project, the **specific objectives** for this study are defined as follows:

- Investigation of the evolution of investment in health systems and in pharmaceutical care, in particular, in Greece, Poland and Romania in comparison with the rest of the European countries using macroeconomic data.
- Exploration of the trends and changes in morbidity and health profiles over time, and more specifically with respect to:
    - Multimorbidity
    - Different categories of chronic diseases
    - Ill-health using other health indicators
    - Quality of life
- Examination of the changes in the use of healthcare services over time, regarding:
    - Inpatient and outpatient care
    - Pharmaceutical care
    - Long-term care
- Investigation of the changes in unmet healthcare needs over time:
    - Healthcare services
    - Pharmaceutical care
    - Long-term care
- Assessment of the satisfaction of the population with their health system in general
- Analysis of out-of-pocket payments (OOPP), and more specifically:
    - Total OOPP and its components (including pharmaceutical OOPP)

  - Total OOPP and chronic diseases
  - Pharmaceutical OOPP and chronic diseases
  - Total and pharmaceutical OOPP burden
  - Catastrophic total and pharmaceutical OOPP
- Inspection of income and education-related health outcomes inequalities
- Assessment the impact of investment in health on various health outcomes using advanced econometric analysis, and more specifically on:
  - Total and pharmaceutical OOPP burden
  - Catastrophic total and pharmaceutical OOPP
  - Total and pharmaceutical unmet needs
  - Self-reported health and quality of life
  - Satisfaction with the health system
- The predictors of total and pharmaceutical OOPP are also explored to determine the impact of chronic diseases.

3. Methods

To achieve the aforementioned objectives of the project several methods were employed using both macro and micro data sources and based on the disciplines of Epidemiology, Biostatistics, Public Health, and Health Economics.

3.1. Data sources

Two main databases are used for the purpose of this report:

- Eurostat's database, from which macro data, mainly health expenditure, at a country level were extracted.
- Micro data from the SHARE survey (Survey of Health, Aging and Retirement in Europe)

The SHARE survey is an interdisciplinary and cross-national panel study that has been conducted biennially since 2004. It collects data on health, socioeconomic status, and social and family networks for people aged 50 and over and their households. The research is of the panel type, as the same people are followed over a number of years. In addition, refreshment samples are taken regularly to i) maintain the representativeness of the younger age cohorts of the target population that were ineligible due to age in previous waves and ii) to compensate for the reduction in panel sample size due to sample attrition over time.

In particular:

- Greece has participated in waves 1 (2004), 2 (2007), 3 (2008/2009), 6 (2015), 7 (2017) and 8 (2019/2020).
- Poland has participated in waves 2 (2006/2007), 3 (2008/2009), 4 (2011/2012), 6 (2015), 7 (2017) and 8 (2019/2020).
- Romania has participated in waves 7 (2017) and 8 (2019/2020).

It should be noted that in wave 3 only retrospective information was collected and there was no sample renewal. Table 1 presents the sample size for each wave and per country. It should be noted that people under 50 and those for whom no weighting scale is provided have been excluded from the final sample.

Table 2 SHARE survey total sample per country and wave

Countries	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Total
Austria	1518	1173	978	4936	4173	3267	3141	1563	**20749**
Germany	2925	257	1891	168	5566	4334	3784	287	**19212**
Sweden	2996	2756	1947	1961	45	3875	3179	2351	**19110**
Netherlands	2872	2628	2229	2742	419			1936	**12826**
Spain	2276	2364	2229	3643	6545	5543	4663	2127	**29390**
Italy	254	295	2491	3494	4632	5192	457	2159	**18974**
France	2964	2874	2444	561	441	3866	3286	2473	**18909**
Denmark	1614	2525	291	2214	44	3648	322	2162	**12820**
Greece	2666	3192	2967			4777	33	2986	**16621**
Switzerland	952	1451	1291	3648	2985	2768	2382	1896	**17373**
Belgium	3618	318	284	5136	553	5675	4833	1993	**22410**
Israel	2296	2354			2557	21	2114	933	**10275**
Czechia		2635	1782	5336	5512	4779	4178	276	**24498**
Poland		2412	1914	1718		1798	4624	265	**12731**
Ireland		13	833						**846**
Luxembourg					1582	1541	1235	95	**4453**
Hungary				2983			1528	777	**5288**
Portugal				1937		1658	1276		**4871**
Slovenia				2691	298	4177	3674	2494	**13334**
Estonia				6719	5679	554	557	314	**13823**
Croatia						2429	2372	1186	**5987**
Lithuania							1976	1421	**3397**
Bulgaria							1934	897	**2831**
Cyprus							1194	538	**1732**
Finland							1971	1159	**3130**
Latvia							1681	778	**2459**
Malta							124	84	**208**
Romania							237	1265	**1502**
Slovakia							1981	984	**2965**
Total	**26951**	**27247**	**23571**	**49887**	**41031**	**59902**	**58736**	**35399**	**322724**

3.2. Trends in morbidity and health profiles

To investigate the trends in morbidity and health profiles over time (2004-2020), the methodology of Souza et al. (2021) was followed. SHARE survey data from waves 1, 2, 4, 5, 6, 7, 8 for the following countries are used: Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Israel, Czech Republic, Poland, Luxembourg, Hungary, Portugal, Slovenia, Estonia, Croatia and Romania. From the statistical analysis, countries for which data are not available for more than 2 waves were excluded (except for Romania), as well as Ireland, since it did not participate in waves 4–7.

Multimorbidity is defined as the concurrent presence of two or more chronic diseases. In addition, the following disease categories were created from 11 non-communicable diseases: 1) cardiovascular diseases (infarction including heart attack, coronary thrombosis or other heart disease, such as chronic heart failure, or stroke or other disease of the blood vessels brain), musculoskeletal disease (rheumatoid arthritis, osteoarthritis, or other rheumatic or hip fracture), chronic lung disease (such as chronic bronchitis, or emphysema), cancer or neoplasm (including leukemia and lymphoma, but excluding small skin neoplasms), neurodegenerative diseases (Alzheimer's, dementia, organic brain syndrome, senile dementia or other severe memory impairment, or Parkinson's disease), hypertension (or high blood pressure), diabetes mellitus and hyperlipidemia (or high blood cholesterol). The above data were collected through self-report questions from the participants themselves, regarding whether they have ever been diagnosed with any of these diseases.

Statistical analyses of trends were evaluated with the estimation of the Average Annual Percent Change (AAPC) and the corresponding 95% confidence intervals (CI), following the application of multiple segmented regression models. Unlike Average Percent Change (APC), AAPC does not assume a constant rate of change and it takes into account changes in trends over time (Clegg et al. 2009).

AAPC results from the estimations the underlying segmented regression model that best fits the data (based on permutation tests). Suppose that $\log(\gamma i)$ is non-linear throughout the time interval [a,b] and that it follows the segmented linear regression model (Clegg et al., 2009):

$$\log(\gamma_i)\begin{cases}\beta_{1,0}+\beta_1 t_i \ if \ a\le t_i\le \tau_1\\ \beta_{2,0}+\beta_2 t_i \ if \ \tau_1\le t_i\le \tau_2\\ \cdot\\ \cdot\\ \cdot\\ \beta_{k+1,0}+\beta_{k+1} t_i \ if \ \tau_k< t_i\le b\end{cases}$$

In this model, the time interval [a,b] is partitioned into k+1 segments by the k transition points τ_j , j = 1, . . . , k, with a = $t_1 <\cdot\cdot\cdot< t_{n1}$ 1 ≤ $t_{n1+1} <\cdot\cdot\cdot< t_{Nj} \le$ tNj+1 $<\cdot\cdot\cdot< t_{Nk+1} = t_n = b$, where $N_j = \sum_{I=1}^{j} n_I$ and n_j represents the number of observed data points between the transition points τ_{j-1} and τ_j, that is in the time interval (τ_{j-1}, τ_j], with $\sum_{j=1}^{k+1} n_j = N_{k+1} = n$.

AAPC at any fixed interval is calculated using the weighted average of the slope coefficients of the underlying segmented regression line, with weights equal to the length of each segment in the total interval. The final step of the calculation transforms the weighted average of the slope coefficients into an annual percentage change. If we denote by bis the slope coefficients for each segment in the desired range of years and by wis the length of each segment in the range of years, then:

$$APC_i = \{Exp(b_i) - 1\} \times 100, \text{ and}$$

$$AAPC = \left\{Exp\left(\frac{\sum w_i b_i}{\sum w_i}\right) - 1\right\} \times 100$$

In the context of the above analysis, standardized (by gender and age groups) distributions were estimated with the statistical package STATA v.17. The relevant estimates were entered into the statistical program Jointpoint v.4.9.1.0, which was developed by the National Cancer Institute of the USA (Statistical Methodology and Applications Branch - Surveillance Research Program 2022) and it is used by many registries worldwide to calculate segmented regression models and AAPC estimates. The prevalence of health outcomes of interest for the waves in which some countries did not participate but also in the in-between years were estimated by applying linear interpolation.

The same methodology was also applied to assess the time trends in other health outcomes included in the SHARE survey database. In particular, the following health indicators were examined: self-assessed health, mobility difficulties, the EURO-D index (presence of depressive symptoms), the GALI index (long-term limitations in activities), the ADL index (limitations in Activities of Daily Living), the IADL index (limitations in Instrumental Activities of Daily Living) and the CASP-12 index (quality of life).

In addition, the changes between 2004 and 2020 in the unstandardized distributions of the health outcomes are presented using descriptive statistics, charts and tables, by country and gender. In essence, the standardized time trends reflect any changes in the health profile of the population regardless of any demographic changes (or differences between countries), whereas the unstandardized distributions provide an insight on the actual situation in each country.

The following table shows the descriptions of the variables that will be used in this section.

Table 3 Variables used to describe changes in the health profiles of countries

Health variable	Description	Values
Multimorbidity	The concurrent presence of two or more chronic diseases	0 = 0-1 chronic diseases 1 = 2+ chronic diseases
Cardiovascular diseases	Heart attack including myocardial infarction or coronary thrombosis or any other heart problem including congestive heart failure	0 = Not diagnosed 1 = Diagnosed
Musculoskeletal diseases	Rheumatoid arthritis, osteoarthritis, or other rheumatic or hip fracture	0 = Not diagnosed 1 = Diagnosed
Chronic lung disease	Such as chronic bronchitis or emphysema	0 = Not diagnosed 1 = Diagnosed
Cancer	Including leukaemia or lymphoma, but excluding minor skin cancers	0 = Not diagnosed 1 = Diagnosed
Neurodegenerative diseases	Alzheimer's disease, dementia, organic brain syndrome, senility or any other serious memory impairment or Parkinson disease	0 = Not diagnosed 1 = Diagnosed
Hypertension	Hypertension or high blood pressure	0 = Not diagnosed 1 = Diagnosed
Diabetes	Diabetes or high blood sugar	0 = Not diagnosed 1 = Diagnosed
Hyperlipidemia	Hyperlipidemia or high blood cholesterol	0 = Not diagnosed 1 = Diagnosed
Bad self-reported health	Fair or poor self-reported health	0 = Excellent/very good/good 1 = Fair/poor
Mobility limitations	Mobility limitations from a list of then items	0 = 0-2 limitations 1 = 3+ limitations
Long-term limitations in usual activities due to a health problem (GALI)	Extent of limitations due to a health problem in activities that people usually do during the past six months	0 = No limitations 1 = Limitations
ADL limitations	Limitations in people's daily self-care activities (ADL score), such as dressing, walking, grooming, eating, and toileting, that are fundamental to maintaining independence (15-item list)	0 = No limitations 1 = 1+ limitations
IADL limitations	Limitations in people's instrumental daily self-care activities (IADL index), such as preparing a hot meal, shopping at a grocery store, being able to make phone calls, and taking medication, which are fundamental to maintaining independence (list of 7-9 items)	0 = No limitations 1 = 1+ Limitations
Depression	Presence of depressive symptoms based on the EURO-D index	0 = No depression (EURO-D: 0-3)

		1 = Case of depression (EURO-D: 4+)
Low quality of life	Presence of low quality of life based on the CASP-12 index	0 = High quality of life (CASP-12: 31-48) 1 = Low quality of life (CASP-12: 0-30)

3.3. Healthcare use and unmet healthcare needs

To explore the changes in healthcare utilization and unmet healthcare needs over time (2004-2020), a range of variables are examined using descriptive statistics, charts and tables by country and gender, of their unstandardized distributions.

For the use of health services, the following dimensions are investigated: a) visits to a doctor during the last 12 months, b) hospitalizations during the last 12 months and c) visits to a dentist during the last 12 months. Then, regular intake of drugs for the following categories of diseases is examined: a) high blood cholesterol, b) arterial hypertension, c) diabetes mellitus, d) heart disease (coronary artery disease or disease of the vessels of the brain or other heart disease), e) pain in joints or arthritis, f) other pain, g) sleep problems, h) anxiety or depression, i) osteoporosis, j) stomach burns, k) chronic bronchitis, l) suppressing inflammation (glucocorticoids or steroids only) and m) other diseases. Polypharmacy is also examined, which is defined as taking at least five different medications on a typical day.

Unmet healthcare needs refer to the cases where a healthcare need was not met due to cost or lack of availability. In particular, the following types of unmet healthcare needs are examined: a) overall, and those related to b) general practitioner services, c) specialist services, d) the use of medicines, e) dental services and f) home care (including paid help) services. The measurement of unmet health needs was based on respondents' subjective self-assessment of whether their healthcare needs have been met or not.

Regarding the long-term care gap, a methodology similar to the one used by Lyberaki et al. (2019) and Gannon and Davin (2010) is applied. In particular, people requiring long-term care are defined as those who reported one or more limitations or difficulties in their basic or instrumental daily activities (ADL or IADL) for at least three months in the last year due to a physical, mental, emotional or memory problem. In addition, the case of the presence of at least two such limitations (ADL and/or IADL) is also examined separately. Then, formal long-term care is defined as the instance where a respondent received a professional or paid service at home related to, for example, personal care or housework, or spent the night in a nursing home or residential care facility in the last 12 months. Informal care is defined as receiving help, for example, with personal care or housework from people who either live with the person or live outside the person's household (family member, friend or neighbor). An unmet long-term care need (or gap) is defined as the case where a person with at least one (or at least two, respectively) limitations in its daily activities reported not receiving any professional or informal care for the same period. Finally, changes in the types of care over time for people with long-term care needs are also examined. Data for long-term care were available for the period 2007-2020.

Satisfaction with basic health insurance / health system was measured on a 4-point scale (very satisfied, relatively satisfied, relatively dissatisfied, very dissatisfied). This scale was transformed into a binary variable, where individuals reporting being relatively or very satisfied were considered as satisfied with their country's health system.

The following table describes the variables that are used for the objectives of this section.

Table 4 Variables used to describe changes in healthcare use and unmet needs

Variable	Description	Values
Doctor visit	Visit or contact with a doctor in the last 12 months	0 = No 1 = Yes
Number of doctor visits	Number of visits or contacts with a doctor in the last 12 months	
Hospitalization	Hospitalization in the last 12 months	0 = No 1 = Yes
Number of hospital stays	Hospital stays in the last 12 months	
Dentist visits	Visit or contact with a dentist in the last 12 months	0 = No 1 = Yes
Unmet healthcare need	Forgo necessary health care due to cost or unavailability in the last 12 months	0 = No 1 = Yes
Unmet need for a general practitioner	Forgo necessary health care from a general practitioner due to cost or unavailability in the last 12 months	0 = No 1 = Yes
Unmet need for a specialist physician	Forgo necessary health care from a specialist physician due to cost or unavailability in the last 12 months	0 = No 1 = Yes
Unmet need for a general practitioner	Forgo necessary pharmaceutical care due to cost or unavailability in the last 12 months	0 = No 1 = Yes
Unmet need for a dentist	Forgo necessary health care from a dentist due to cost or unavailability in the last 12 months	0 = No 1 = Yes
Unmet need for home care (including paid help)	Forgo necessary home care (including paid help) due to cost or unavailability in the last 12 months	0 = No 1 = Yes
Long-term care need (1+ ADL/IADL limitations)	Reporting one or more limitations or difficulties in their basic or instrumental activities of daily living (ADL or IADL) for at least three months in the last year due to a physical, mental, emotional or memory problem.	0 = 0 ADL/IADL limitations 1 = 1+ ADL/IADL limitations
Long-term care need (2+ ADL/IADL limitations)	Reporting two or more limitations or difficulties in their basic or instrumental activities of daily living (ADL or IADL) for at least three months in the last year due to a physical, mental, emotional or memory problem.	0 = 0-1 ADL/IADL limitations 1 = 2+ ADL/IADL limitations

Formal care	Provision at home of any professional or paid service related to, for example, personal care or housework, or spent the night in a nursing home or residential care facility in the last 12 months	0 = No 1 = Yes
Informal care	Getting help, for example, with personal care or housework from people who either live with the person or live outside the person's household (family member, friend or neighbor) in the last 12 months	0 = No 1 = Yes
Medicines use	Taking drugs at least once a week for: a) high blood cholesterol, b) arterial hypertension, c) diabetes mellitus, d) heart disease (coronary artery disease or disease of the vessels of the brain or other heart disease), e) pain in joints or arthritis, f) other pain, g) sleep problems, h) anxiety or depression, i) osteoporosis, j) stomach burns, k) chronic bronchitis, l) suppressing inflammation (glucocorticoids or steroids only) and m) other diseases.	0 = No 1 = Yes
Polypharmacy	Taking at least five different drugs on a typical day	0 = No 1 = Yes
Long-term care gap (1+ ADL/IADL limitations)	When a person, while reporting the existence of at least one limitation in their daily activities, stated that they did not receive any professional or informal care	0 = No 1 = Yes
Long-term care gap (2+ ADL/IADL limitations)	When a person, while reporting the existence of at least two limitations in their daily activities, stated that they did not receive any professional or informal care	0 = No 1 = Yes
Satisfaction with health system	Overall satisfaction with own coverage in basic health insurance/national health system (wave 8)	0 = relatively or very dissatisfied 1 = relatively or very satisfied

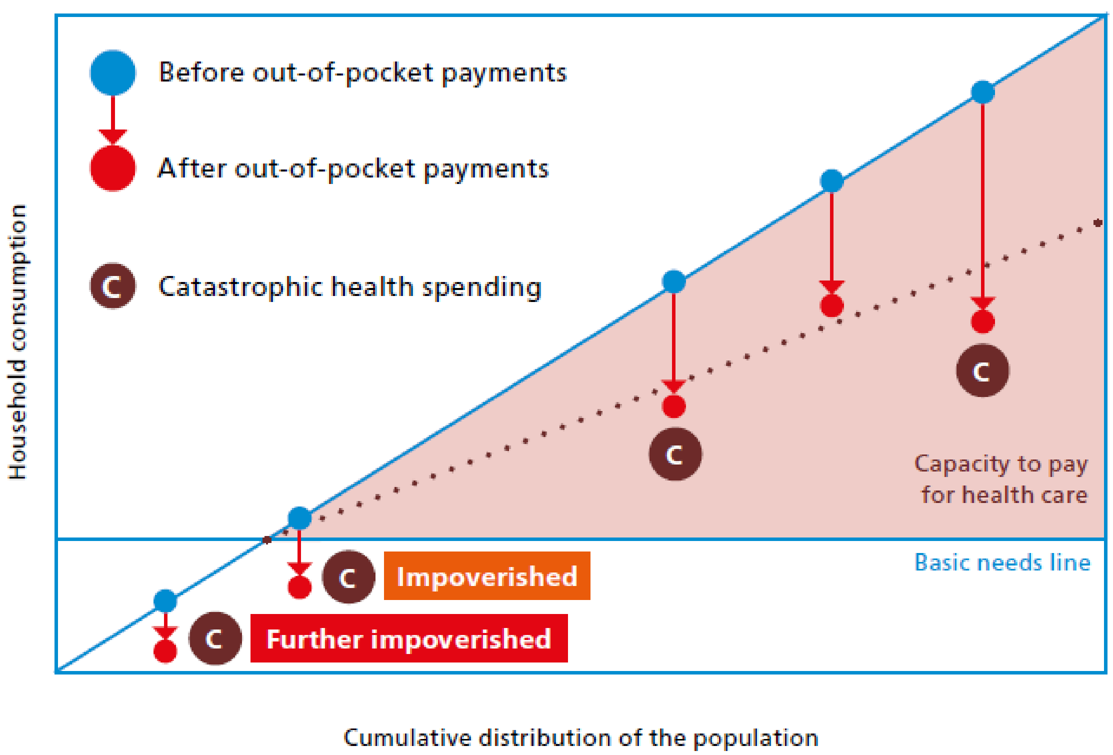
3.4. Out-of-pocket payments burden and catastrophe

In wave 6, SHARE collected data on respondents' annual OOPP. OOPP were defined as payments made directly to healthcare providers in the last 12 months without getting reimbursed by a health insurance/national health system/a third party payer for the following types of care: a) outpatient care (doctor and dentist visits), b) inpatient care, c) prescription and over-the-counter medicines, d) nursing home care and e) aids, appliances and physical therapy. We converted all financial amounts into euros and transformed them into real terms by using purchasing power parity (PPP)-adjusted exchange rates from Eurostat (Germany 2015 = 100).

Total OOPP burden is defined as the share of total OOPP in equivalised household net income. Equivalization was done by applying the modified OECD equivalence scale. Pharmaceutical OOPP burden is defined accordingly.

The financial protection of households with respect to health expenditures has long been recognized as a major policy objective, as it is linked to the general issues of access to adequate and qualitative health care and health equity as well as to the well-being of the population (Commission on the Social Determinants of Health 2008). The abrupt character of disease (health shock) can lead to the redirection of a large part of the financial resources of households to the purchase of health goods and services (budget shock), thus disrupting their living conditions or, in extreme cases, even impoverishing them, pushing them into poverty or exacerbating the poverty they already experience (Wagstaff 2007). In the case that these health payments are high enough, they can worsen the living conditions of households, withholding resources that would otherwise be used for other goods and services, including meeting their basic needs, thus reducing their wellbeing in the short run (O'Donnell et al. 2008; Wagstaff 2008). In the long run, this situation can lead to depletion of savings or liquidation of assets as well as to a spiral of debt for the household that will try to preserve its consumption level (Kim and Hong 2015; Van Doorslaer et al. 2007). Reliance on OOPP to provide health care is putting significant financial pressures on households. In 2010, approximately 150 million people faced economic catastrophe and 100 million fell below the poverty line due to unavoidable health payments (WHO 2013). In fact, some households can also be associated with a significant financial inability to meet the necessary medical expenses, and, therefore, are forced to forfeit necessary treatment (thus creating an unmet medical need), in order to meet other necessities of their lives, such as feeding and clothing (O'Donnell et al., 2008).

Figure 2 Measurement of catastrophic health spending



Source: WHO (2019)

Our analysis of the impact of OOPP on population welfare follows the methodology of catastrophic OOPP of previous studies (Jürges and Stella 2019; Jürges 2015). A catastrophic OOPP occurs if OOPP exceed a predetermined share (threshold) of the household standard of living (budget) in a given period (Xu et al. 2003; Wagstaff 2007; Wagstaff and Doorslaer 2003; O'Donnell et al. 2008). A significant (or a comparatively larger) incidence of catastrophic OOPP reveals the inefficiencies and inadequacy of a healthcare and social security system to financially protect households from wellbeing disruptions caused by diseases and ill-health. As there is no consensus on the share of the budget above which health expenditures become catastrophic, previous research uses different thresholds. We refer to a household's net equivalized income as its capacity to pay, which is a common approach used by studies focusing on the OOPP burden (Kočiš Krůtilová, Bahnsen, and De Graeve 2021; Jürges and Stella 2019; Jürges 2015). The 5% and 10% of net equivalized household income are specified as the thresholds defining catastrophic OOPP. It should be noted that a larger threshold is a more conservative approach in measuring the incidence of catastrophe due to OOPP.

3.5. Inequalities in health outcomes

Inequalities in health are examined with respect to income groups (1st quartile vs. 4th quartile) and education attainment (none/primary education vs. tertiary education).

3.6. Econometric modelling

The objective of econometric modelling is to assess the impact of investment on health outcomes after adjusting for several other independent factors. Investment in health outcomes is defined as public (total and pharmaceutical) health expenditure expressed in 100 € per inhabitant in purchasing power standard (pps). Furthermore, the predictors of total and pharmaceutical OOPP are also explored to determine the impact of chronic diseases.

<u>Dependent variables</u>

As dependent variables are used several health outcomes, and more specifically:

- Total and pharmaceutical OOPP (wave 6)
- Total and pharmaceutical OOPP burden (wave 6)

- Catastrophic total and pharmaceutical OOPP (wave 6)
- Total and pharmaceutical unmet needs (wave 8)
- (fair/poor) Self-reported health and (low) quality of life (wave 8)
- Satisfaction with the health system (wave 8)

Independent variables

OOPP follow health care consumption and it appear at the point of use of health services. Hence, the set of independent variables used in our analysis is based on the well-known "Andersen model" (Andersen and Newman), which classifies determinants of healthcare utilization in three categories, namely predisposing, need and enabling factors. The final set of the selected independent variables rests on the results of multicollinearity and goodness-of-fit tests as well as on the availability of data. A similar group of independent variables is used for the other health outcomes as well in order to allow drawing meaningful comparisons between models.

The following table presents the independent variables used in our analyses.

Table 5 Independent variables used in econometric modelling of health outcomes

Independent variables	Description	Values
Age	Age of the respondent at the time of the interview	
Age squared	Age of the respondent at the time of the interview squared	
Gender	Gender of the respondent	0 = Male 1 = Female
Married	Marital status of the respondent	0 = Not married 1 = Married
Urban area	Living in urban area	0 = Not urban 1 = Urban
Employment status	Employment status of the respondent	0 = Not working 1 = Working
Education	Education attainment of the respondent	1 = None/primary education 2 = Secondary education 3 = Tertiary education
Income	Equivalized household net income quartiles	1 = 1^{st} quartile 2 = 2^{nd} quartile 3 = 3^{rd} quartile 4 = 4^{th} quartile
Supp. health insurance	Supplemental health insurance status of the respondent	0 = No 1 = Yes
Multimorbidity	The concurrent presence of two or more chronic diseases	0 = 0-1 chronic diseases 1 = 2+ chronic diseases
Cardiovascular diseases	Heart attack including myocardial infarction or coronary thrombosis or any other heart problem including congestive heart failure	0 = Not diagnosed 1 = Diagnosed
Arthritis	Rheumatoid arthritis or osteoarthritis	0 = Not diagnosed 1 = Diagnosed

Neurodegenerative diseases	Alzheimer's disease, dementia, organic brain syndrome, senility or any other serious memory impairment or Parkinson disease	0 = Not diagnosed 1 = Diagnosed
Chronic lung disease	Such as chronic bronchitis or emphysema	0 = Not diagnosed 1 = Diagnosed
Cancer	Including leukaemia or lymphoma, but excluding minor skin cancers	0 = Not diagnosed 1 = Diagnosed
Hypertension	Hypertension or high blood pressure	0 = Not diagnosed 1 = Diagnosed
Diabetes	Diabetes or high blood sugar	0 = Not diagnosed 1 = Diagnosed
Hyperlipidemia	Hyperlipidemia or high blood cholesterol	0 = Not diagnosed 1 = Diagnosed
Emotional disorders	Other affective or emotional disorders, including anxiety, nervous or psychiatric problems	0 = Not diagnosed 1 = Diagnosed
Cataracts	Cataract in one or both eyes	0 = Not diagnosed 1 = Diagnosed
Polypharmacy	Taking at least five different drugs on a typical day	0 = No 1 = Yes
ADL/IADL	Reporting one or more limitations or difficulties in their basic or instrumental activities of daily living (ADL or IADL) for at least three months in the last year due to a physical, mental, emotional or memory problem.	0 = 0 ADL/IADL limitations 1 = 1+ ADL/IADL limitations
Obesity	Whether the respondent is obese (Body Mass Index ≥ 30)	0 = No 1 = Yes
Drinking	Frequency of heavy drinking (6 or more drinks at least once a month)	0 = No 1 = Yes
Smoking	Whether there was a period in the life of the respondent in which he/she smoked daily	0 = No 1 = Yes
Sedentary life	Extent of typical physical activity of respondent	0 = Not sedentary 1 = Sedentary (one to three times a month activities requiring a moderate level of energy at most)
Welfare regime	Type of welfare regime of country where the respondent lives	1 = Social Democratic 2 = Bismarckian 3 = Mediterranean 4 = Eastern
Public total HE	Public total health expenditure in 100 € per inhabitant ppp	
Public pharma HE	Public pharmaceutical health expenditure in 100 € per inhabitant ppp	

Type of modelling

All dependent variables belong to the class of limited dependent variables. In particular, OOPP (and burden) variables have features such as zero, mass, non-negativity, right skewness and heavy tails (Kočiš Krůtilová, Bahnsen, and De Graeve 2021), which imposes several challenges in practice. The two-part model assumes a sequential decision. A binary choice (probit or logit) model is fit for the probability of observing any OOPP (positive outcome) (Belotti et al. 2015):

$$\varphi(\mathrm{y} > 0) = \Pr(y > 0|\mathrm{x}) = F(\mathrm{x}\delta)$$

Where x is a vector of explanatory variables, δ is the corresponding vector of parameters to be estimated, and F is the cumulative distribution function of an independent and identically distributed error term, typically chosen to be from extreme value (logit) or normal (probit) distributions. Then, conditional on having any OOPP (positive outcome), an appropriate regression model is fit for the positive outcome (Belotti et al. 2015):

$$\varphi(y|y > 0, \mathrm{x}) = g(\mathrm{x}\gamma)$$

where x is a vector of explanatory variables, γ is the corresponding vector of parameters to be estimated, and g is an appropriate density function for $y|y > 0$.

Regarding the first part, there is not a substantial difference between logit and probit (Deb and Norton 2018), and we chose to run a probit model. As far as the second part is concerned, generalized linear models (GLM) offer a variety of alternative functional forms to describe the relationship between the expected value of the dependent variable and the linear index of covariates. For the prediction of OOPP, we opted for a log link and assumed a gamma distribution, as expenditure data often fit best with this functional form (Deb and Norton 2018; Kočiš Krůtilová 2021), while, for the OOPP burden, we chose gamma distribution with a power link of 0.5 (Kočiš Krůtilová, Bahnsen, and De Graeve 2021).

The catastrophic OOPP, unmet needs, fair/poor self-reported health, low quality of life and satisfaction with the health system variables all are binary outcomes. Hence, the multivariable probit regression method is employed. The general form of the probit model is given by the following equation (Başar, Dikmen, and Öztürk 2021):

$$y* = \mathrm{x}'\beta + \mathrm{e}$$

Where, $y*$ represents the unobserved dependent variable, β is the set of parameters and x the vector of independent variables. The error term, e is assumed to be normally distributed: $e \sim N(0,1)$. The β coefficient shows the effect of a unit change in the independent variables on the dependent variable, which is the probability of occurrence of catastrophe or unmet healthcare needs. The assumption of cumulative standard normal distribution F(.) limits the probability between the values of 0 and 1.

Model diagnostics, including checking for influential outliers and multicollinearity, link testing and goodness of fit testing demonstrated that the models were properly fitted.

Regression results are displayed as average marginal effects as they allow comparisons between the models and of the influence of each of the independent variables on the dependent variable and are generally more easily interpreted. Calculating the marginal effects for the probit models yield information regarding the effect of a change in any specific variable on the probability of the occurrence of the event, whereas, for the GLM part, they show the effect of a change in any specific variable on the expected value of OOPP (and burden) conditional upon a positive outcome.

Statistical significance was set at α = 5%. All analyses were conducted with STATA v.17.

4. Results

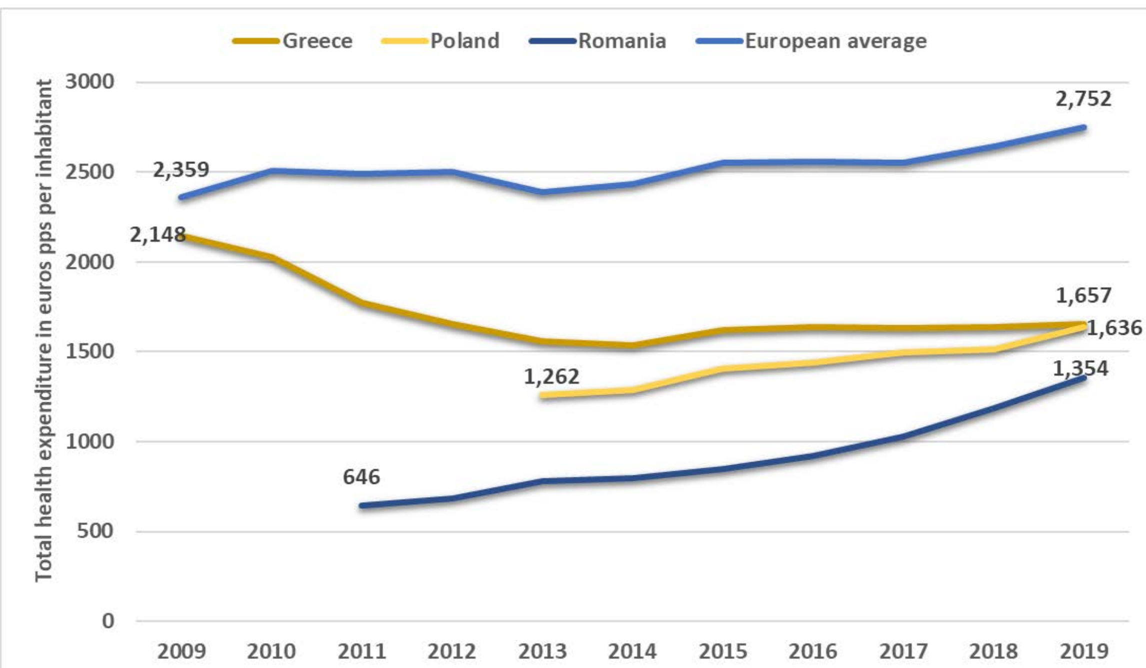
4.1. Health expenditure and public investment in health over time

This section presents the descriptive results of the macroeconomic data regarding total health expenditure and pharmaceutical spending.

4.1.1. Total health expenditure

Figure 2 displays the changes in total health expenditure per inhabitant over time in Greece, Poland, Romania and the average of the European countries. Although the average total health spending per capita in Europe increased from 2359 € to 2752 € over the period of 2009-2019, in Greece, health expenditure decreased significantly from 2148 € to 1657 € due to the economic crisis and the implementation of the economic adjustment programs. At the same time, there appears to be an increasing trend in both Poland (from 1262 € to 1636 €) and Romania (from 646 € to 1354 €). However, all three countries of interest are well below the European average in 2019, Romania in particular.

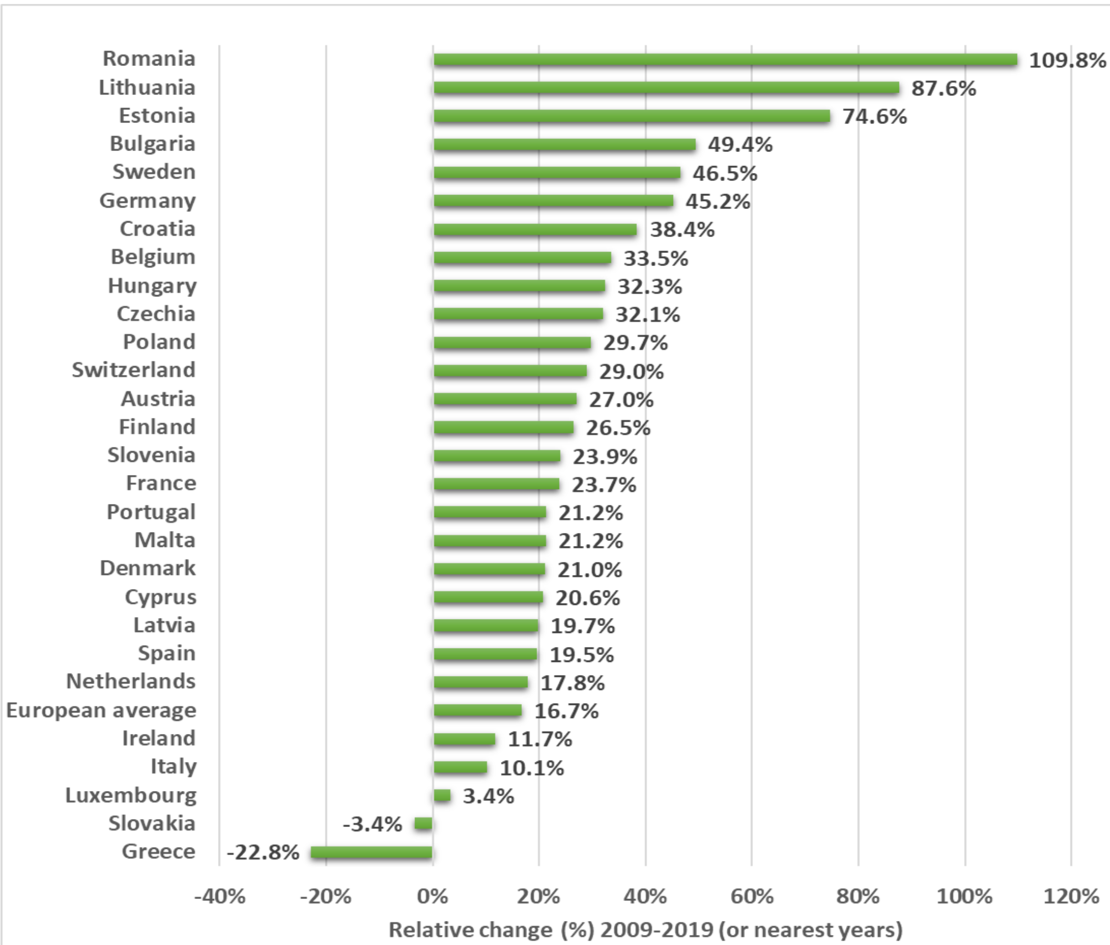
Figure 3 Total health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

The largest relative increase in total health spending is observed in Romania (109.8%), while Greece (-22.8%) and Slovakia (-3.4%) are the only countries that show a decline in the period of analysis (Figure 3); on average, total health spending per inhabitant increased by 16.7% between 2009 and 2019 in Europe.

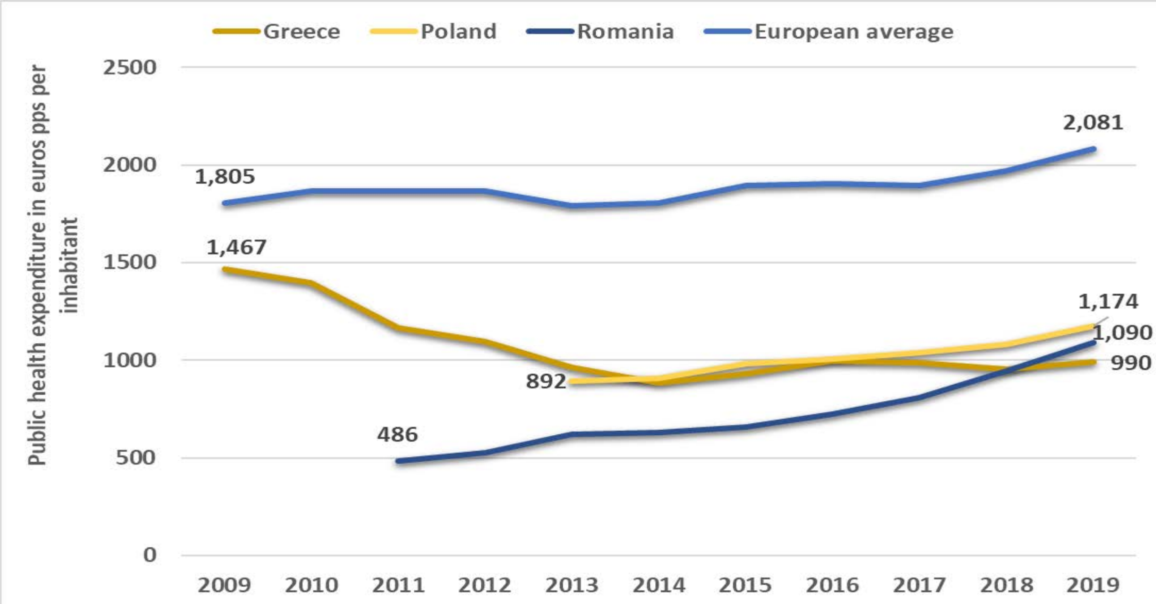
Figure 4 Relative changes (%) in total health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

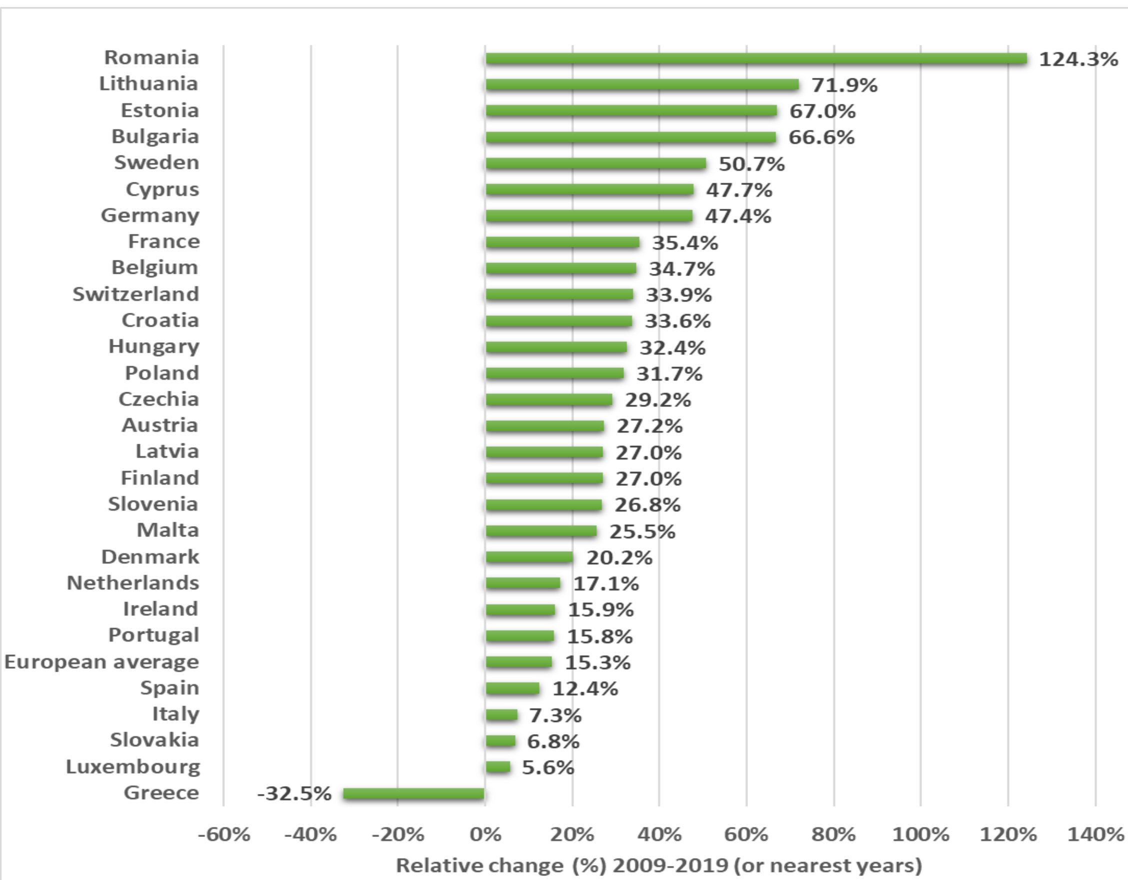
Public health spending per capita increased from 1805 € to 2081 € in Europe between 2009 and 2019 (Figure 4), registering a relative growth of 15.3% (Figure 5). Greece is the only country that registered a decrease in public health expenditure (from 1467 € to 990 €), which was also substantial (-32.5%). The growth in public health spending was largest in Romania (124.3%), while for Poland it was more moderate (31.7%).

Figure 5 Public health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

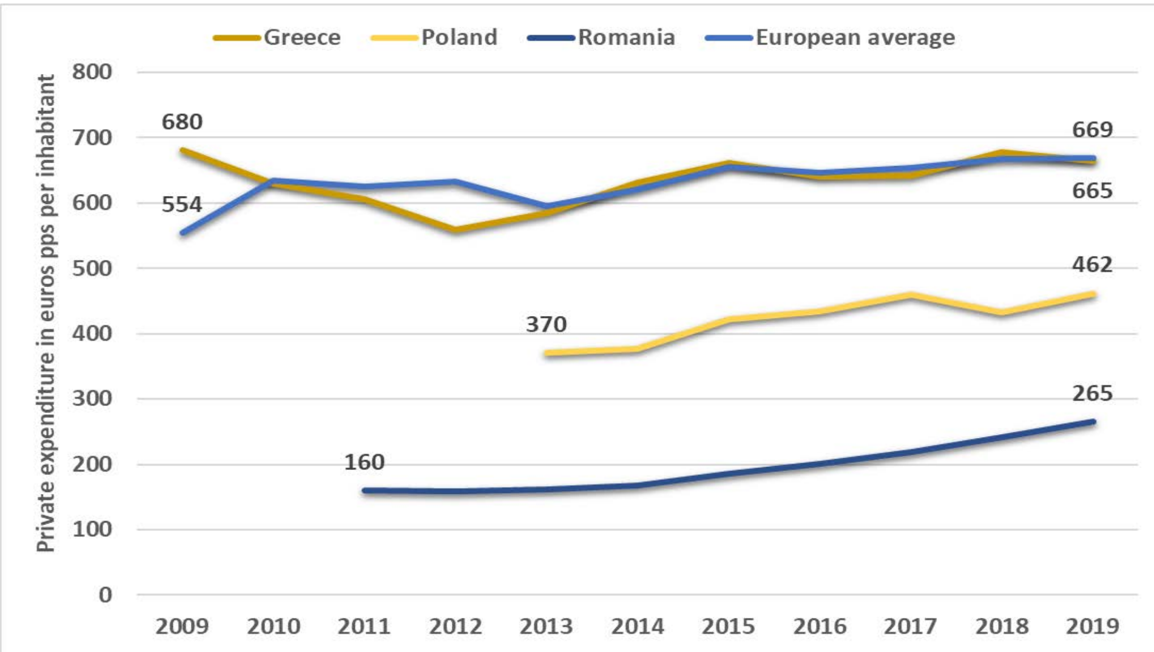
Figure 6 Relative changes (%) in public health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

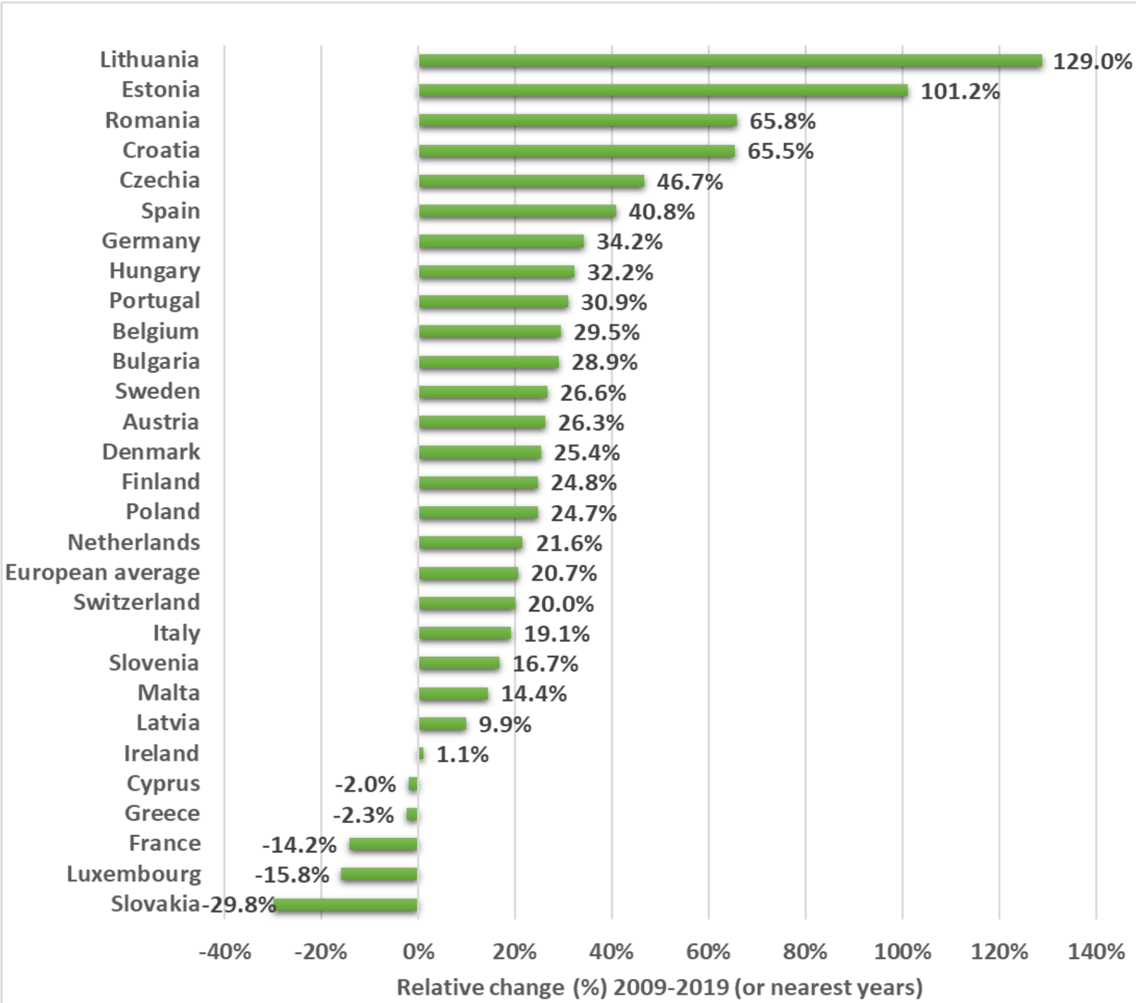
On average, in Europe, the relative growth in private health spending was larger (20.7%) compared with public health expenditure (Figure 6 and Figure 7). Romania ranks third in terms of size of increase (65.8%) in private health expenditure, whereas Poland is above the European average growth with 24.7% and Greece exhibits a small decrease of -2.3%.

Figure 7 Private health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

Figure 8 Relative changes (%) in private health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

The above changes resulted in shifts in the composition of total health expenditure (Figure 8 and Figure 9). The share of public funding in total health expenditure decreased in Europe from 75.4% to 73.9% and in Greece from 68.3% to 59.8%. In contrast, Romania registers a rise from 75.3% to 80.5% and Poland a smaller increase from 70.7% to 71.8%.

Figure 9 Public health expenditure as a % of total health expenditure (2009 or nearest year-2019)

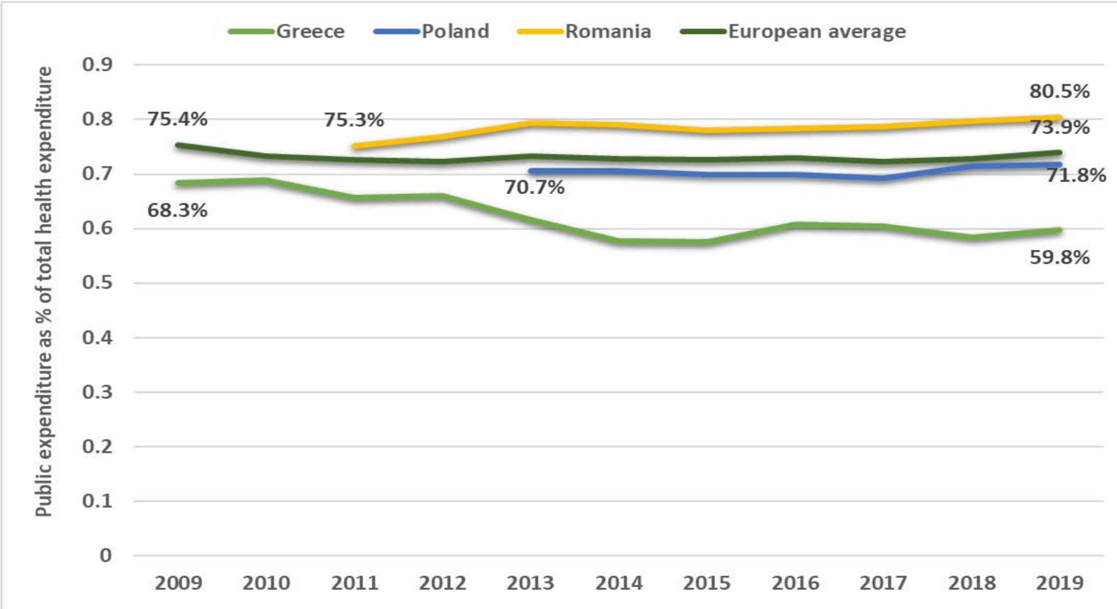
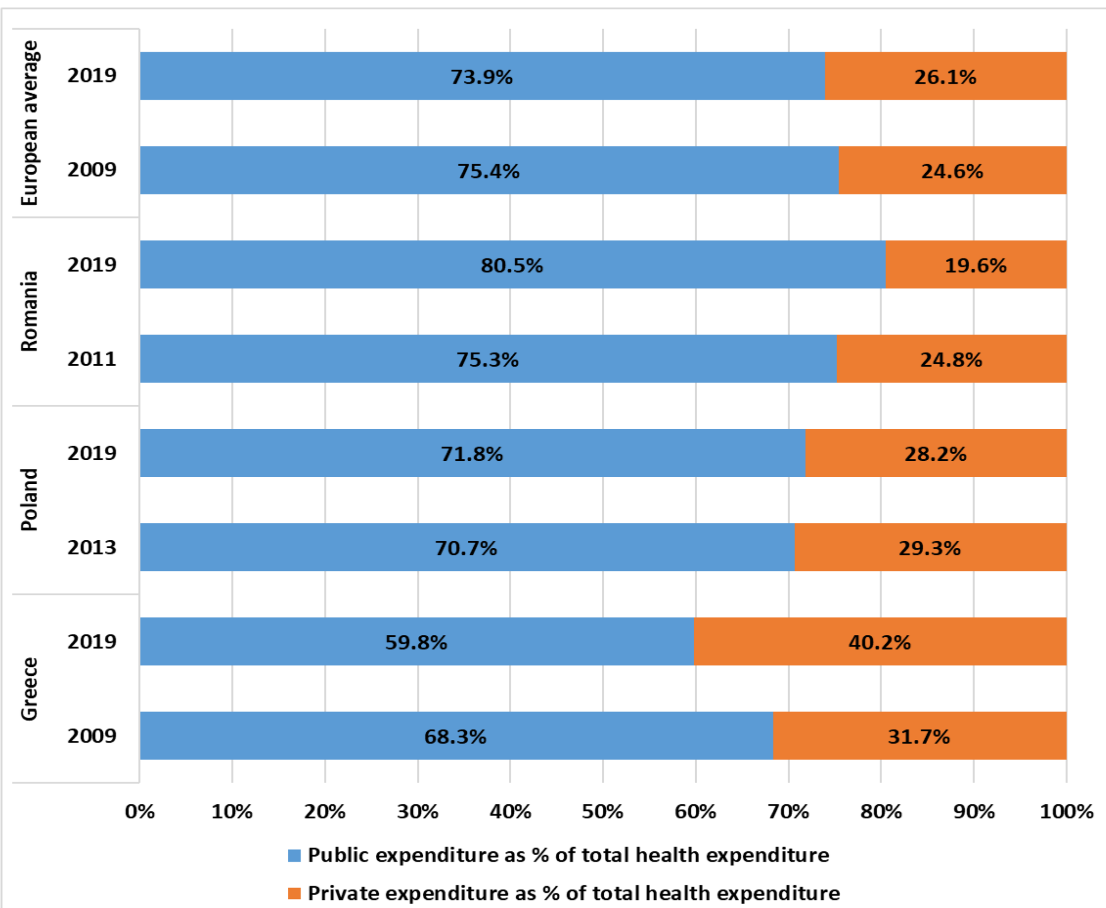


Figure 10 Public and private health expenditure as a % of total health expenditure (2009 or nearest year & 2019)



European countries decreased their total health expenditure as a share of GDP from 9.3% to 8.4% (Figure 10, Figure 11 and Figure 12). The same applies to Greece, which registered a significant downward adjustment from 9.4% to 7.8%. The share of total health spending remained broadly stable in Poland between 2013 and 2019 (6.41% and 6.45%, respectively), while it increased from 4.7% to 5.7% in Romania. Nevertheless, all countries of interest fall below the European average, Romania in particular, despite the converging trend over time.

Figure 11 Total health expenditure as a % of GDP (2009 or nearest year-2019)

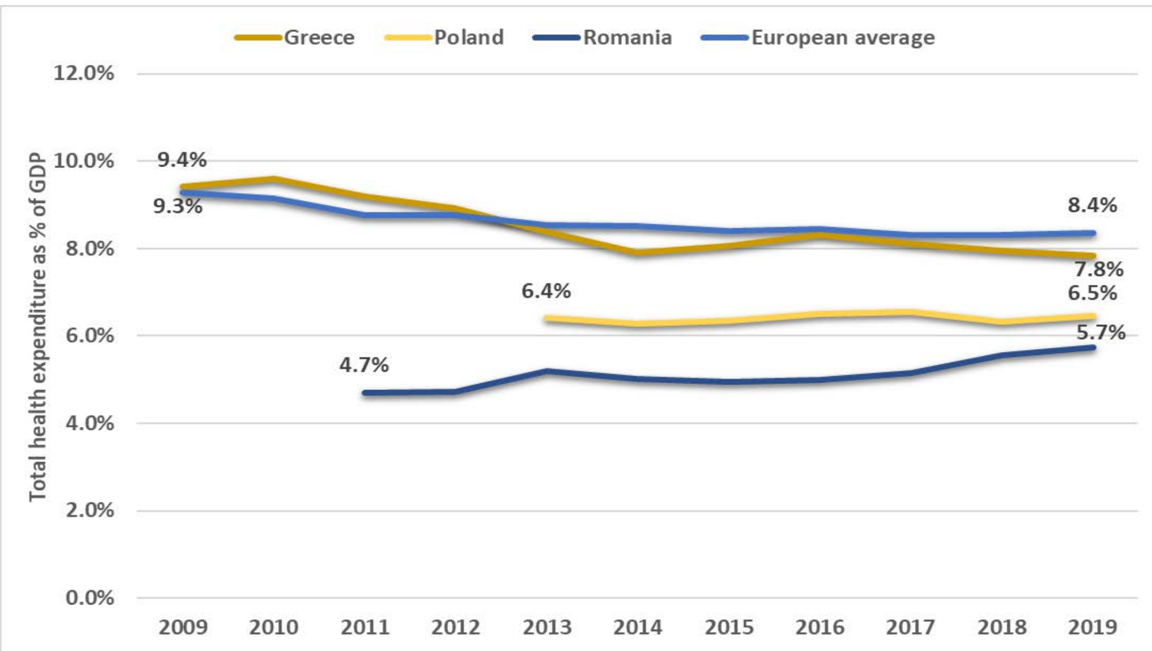


Figure 12 Public health expenditure as a % of GDP (2009 or nearest year-2019)

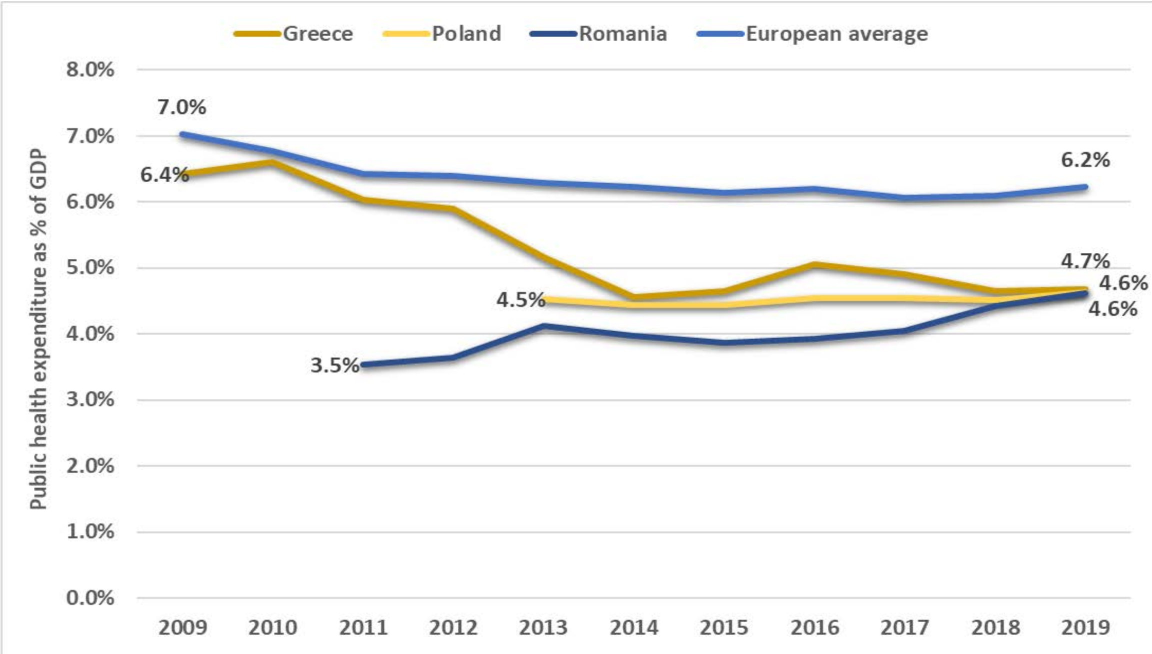
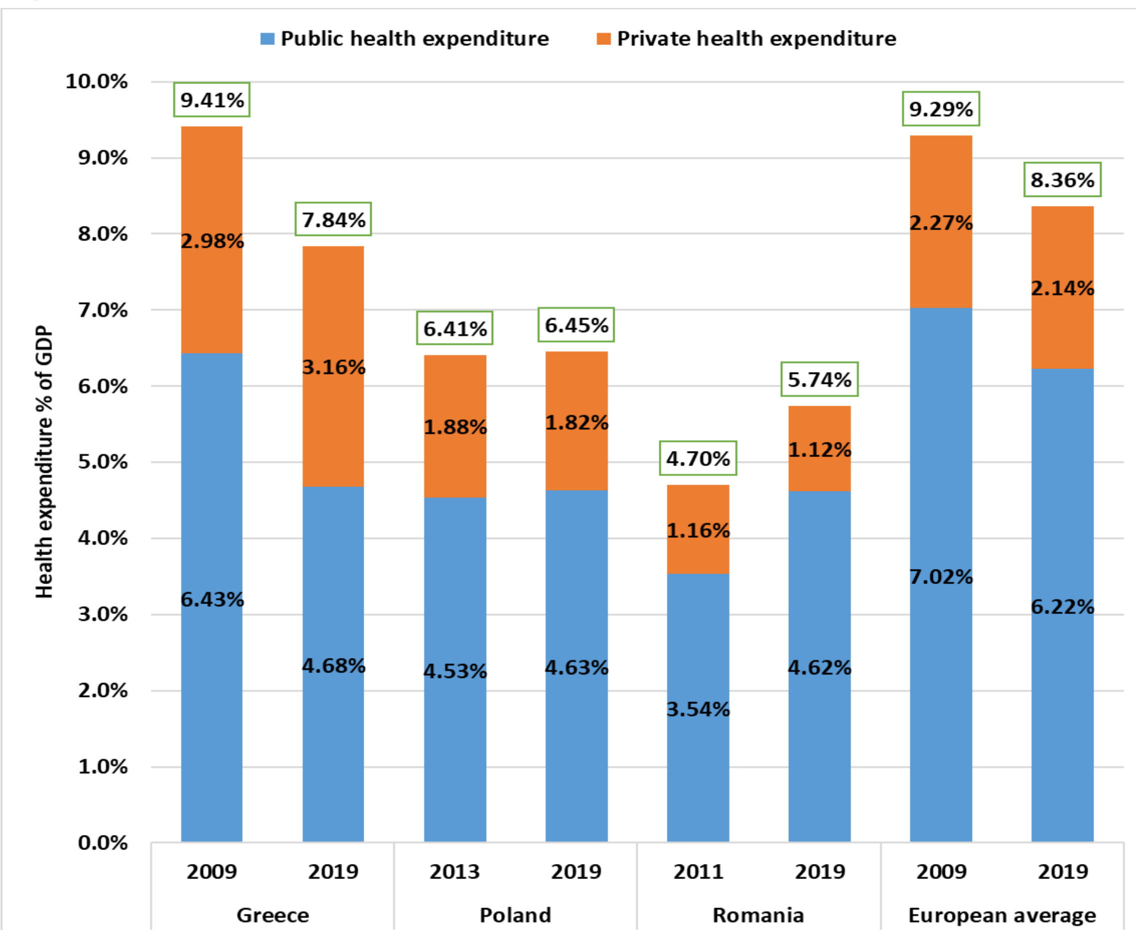


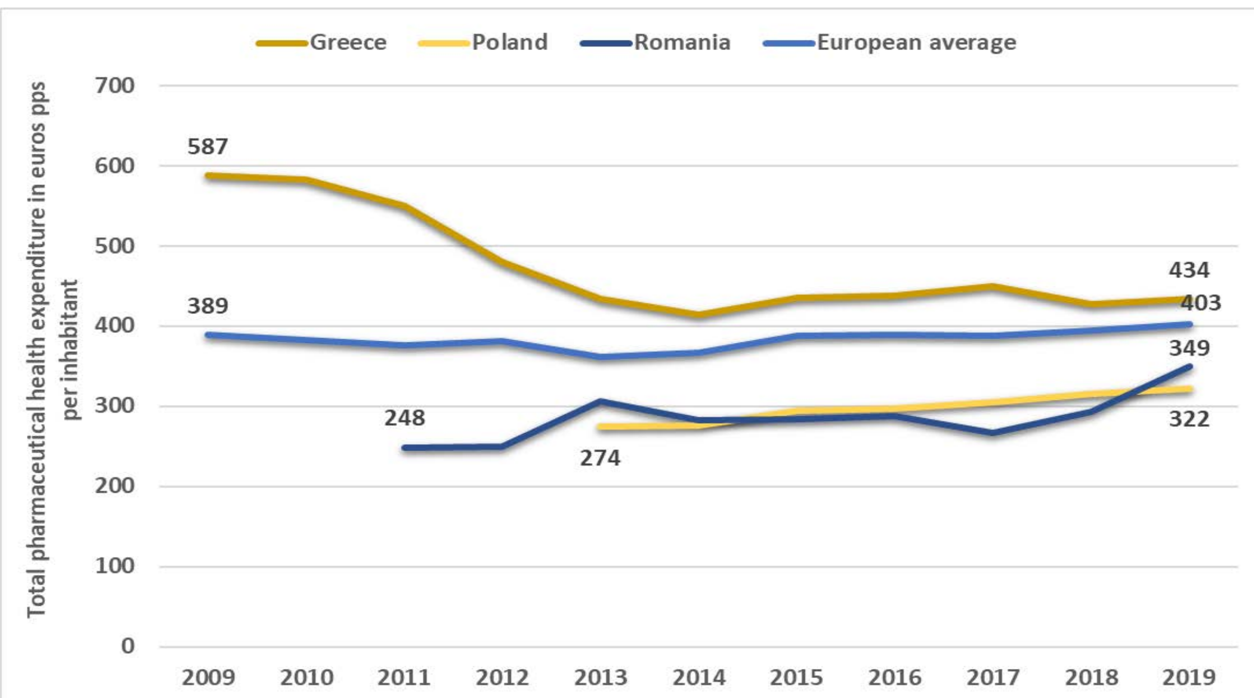
Figure 13 Public/private health expenditure as a % of GDP (2009 or nearest year & 2019)



4.1.2. Pharmaceutical expenditure

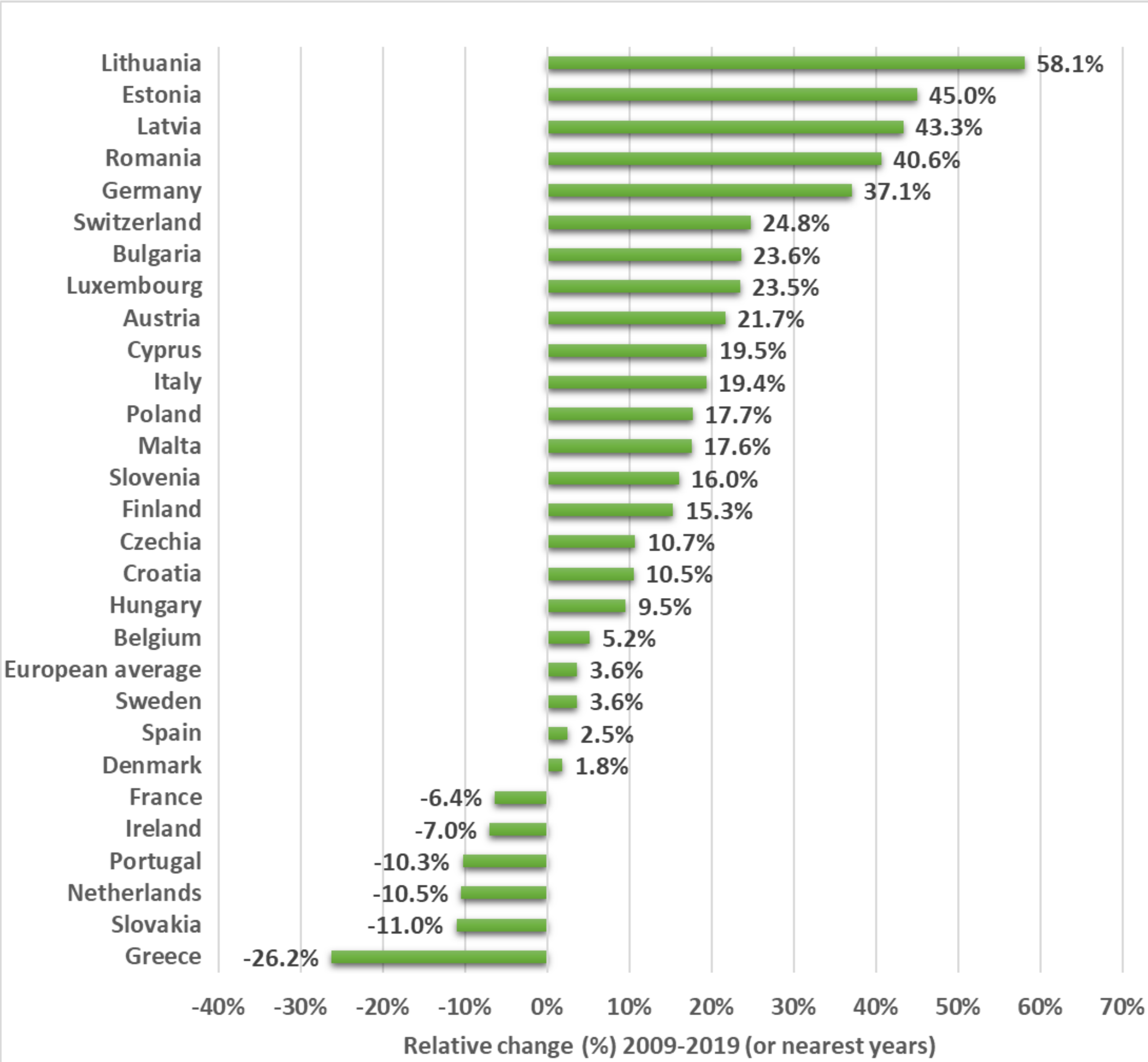
Now, we turn our focus to spending on medicines. The average pharmaceutical expenditure per capita increased from 389 € to 403 € in Europe, on average (Figure 13). An upward trend in pharmaceutical spending is observed in both Poland (from 274 € to 322 €) and Romania (from 248 € 349 €), whereas it decreased from 587 € to 434 € in Greece. The largest decrease in pharmaceutical expenditure among the European countries is observed in Greece (-26.2%), while Poland (17.7%) and Romania (40.6%) showed an upward trend (Figure 14). Nevertheless, both Central Eastern European countries stand below the European average in 2019, Poland in particular.

Figure 14 Total pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

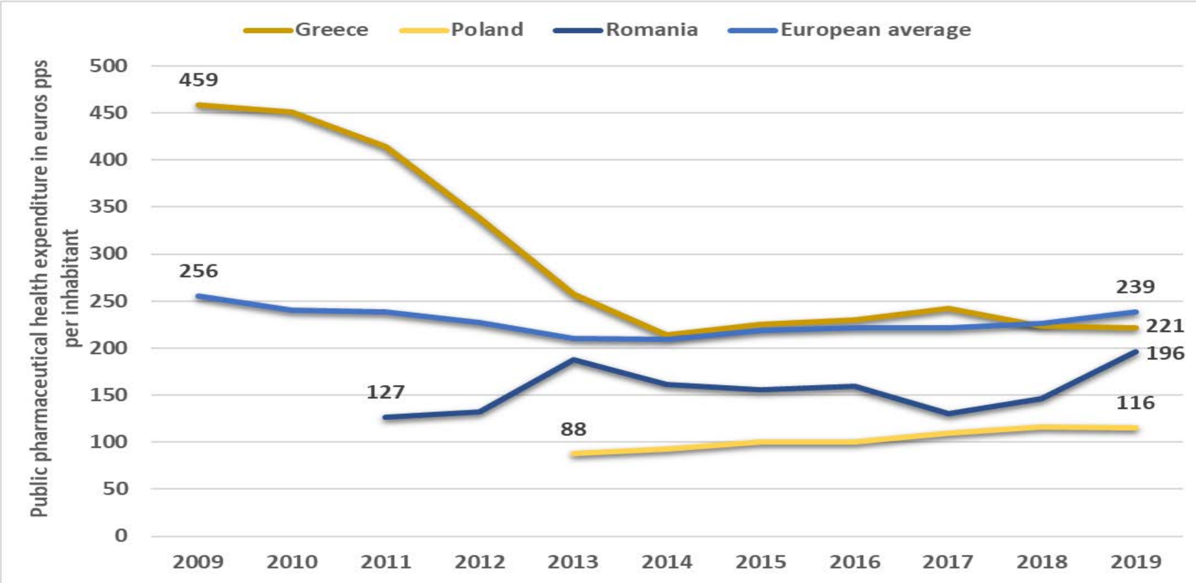
Figure 15 Relative changes (%) in total pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

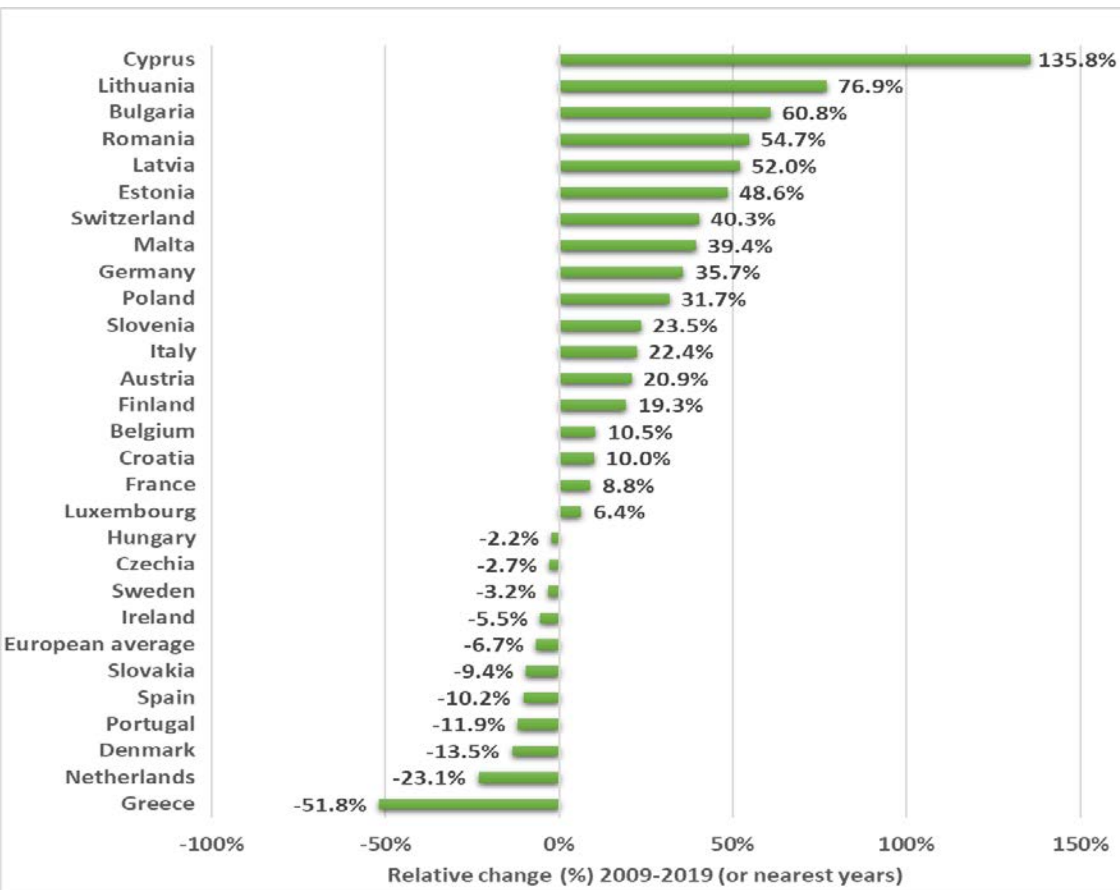
Public pharmaceutical expenditure per capita showed a slight decreasing tendency in Europe at the beginning of the previous decade, which was followed by an opposite trend (Figure 15). Overall, public pharmaceutical spending decreased from 256 € to 239 €, on average, in the European countries between 2009 and 2019, which translates to a decline of 6.7% (Figure 18). Greece is associated with the largest reduction in public pharmaceutical spending, i.e. from 459 € to 221 € (-51.8%). In contrast, a significant increase is observed both in Poland (31.7%) and Romania (54.7%). It is interesting that, whereas Greece and Romania are near the European average, Poland falls far below it.

Figure 16 Public pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

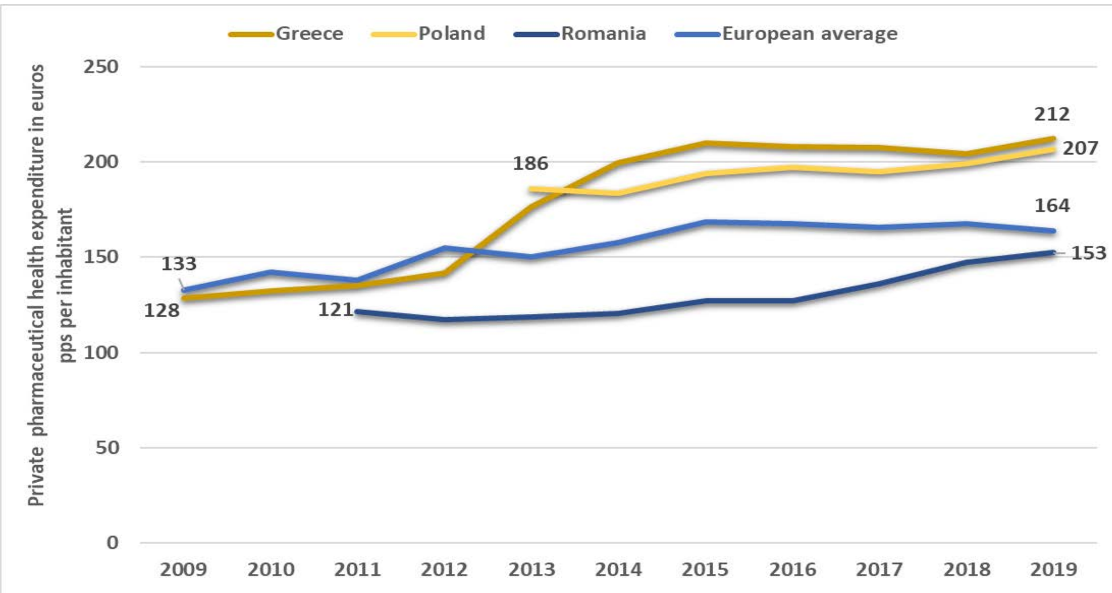
Figure 17 Relative changes (%) in public pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

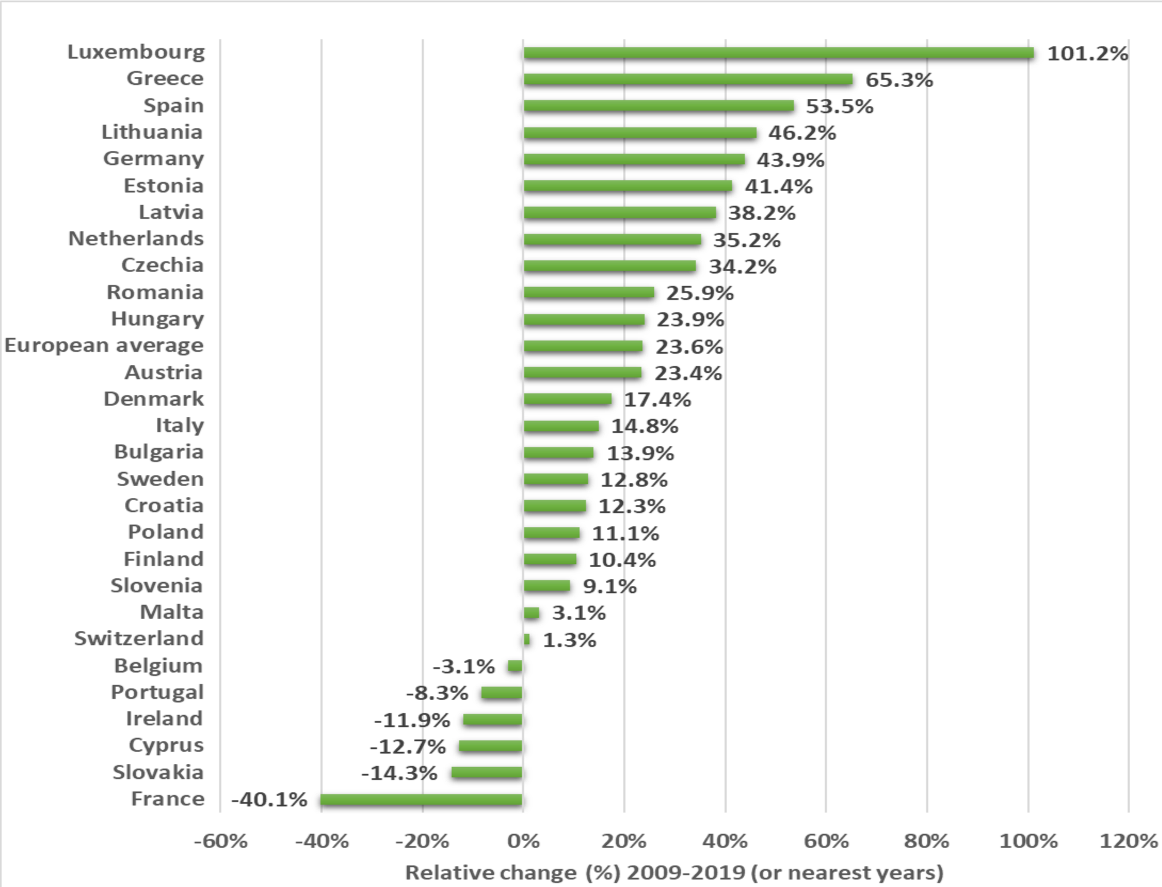
In most European countries, private pharmaceutical expenditure per inhabitant increased during the period 2009-2019 (Figure 17 and Figure 18); on average, the relative growth was estimated at 23.6%. Greece was associated with the second highest increase (65.3%), while a significant rise is also observed in Romania (25.9%) and a more moderate one in Poland (11.1%). Only Romania falls below the European average, and estimates appear to be converging.

Figure 18 Private pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

Figure 19 Relative changes (%) in private pharmaceutical health expenditure in euros pps per inhabitant (2009 or nearest year-2019)



Note: pps: purchasing power standard.

The share of total pharmaceutical expenditure in total health expenditure decreased in all European countries between 2009 and 2019, except for Luxemburg and Italy (Figure 19 and Figure 20). The largest decline is observed in Romania (-33%), while the reduction is much smaller in Poland and Greece (-9.2% and -4.4%, respectively). The share of pharmaceutical spending is above the European average (16.9%) for all countries of interest in 2019, Greece and Romania in particular (around 26%).

Figure 20 Total pharmaceutical health expenditure as a % of total health expenditure (2009 or nearest year-2019)

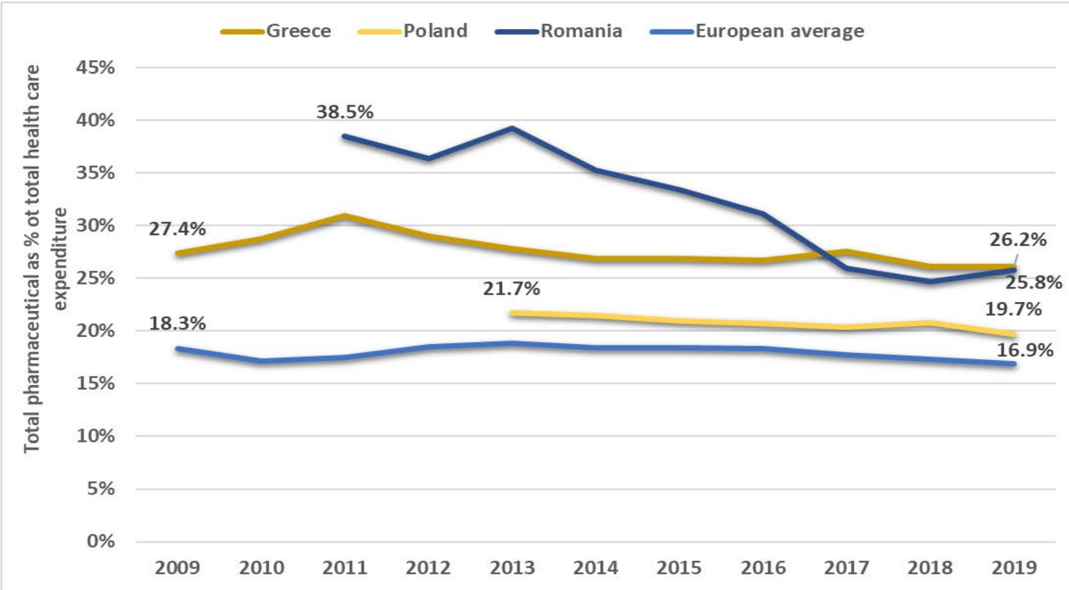
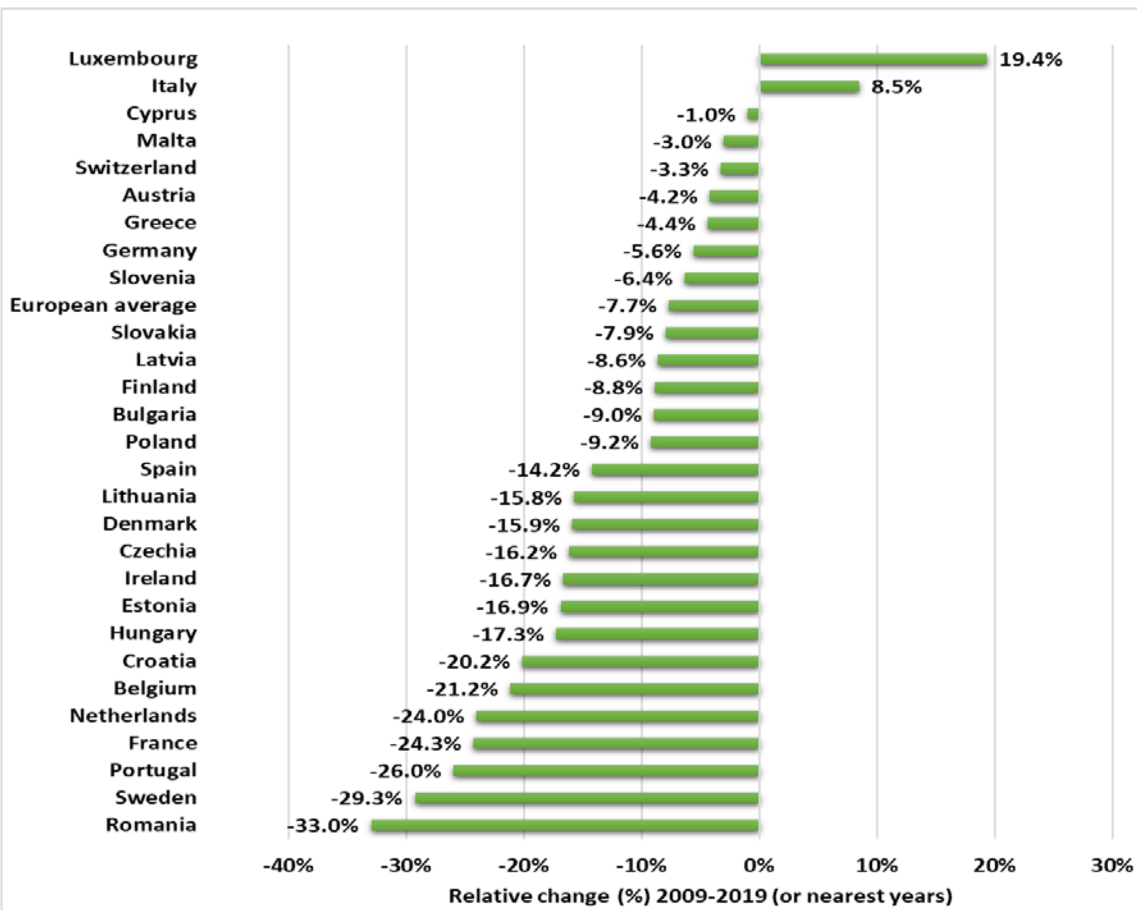


Figure 21 Relative changes (%) in the share of pharmaceutical health expenditure in total health expenditure (2009 or nearest year-2019)



As a consequence of the above analyzed trends, the share of public pharmaceutical expenditure in total pharmaceutical spending decreased from 65.9% to 59.3% in Europe and from 78.1% to 51% in Greece (Figure 21 and Figure 22). In contrast, it increased from 51.1% to 56.3% in Romania and from 32% to 35.9% in Poland. However, it should be noted that, despite these shifts, the share of public pharmaceutical expenditure remains below the European average, in Poland in particular.

Figure 22 Public pharmaceutical health expenditure as a % of total pharmaceutical health expenditure (2009 or nearest year-2019)

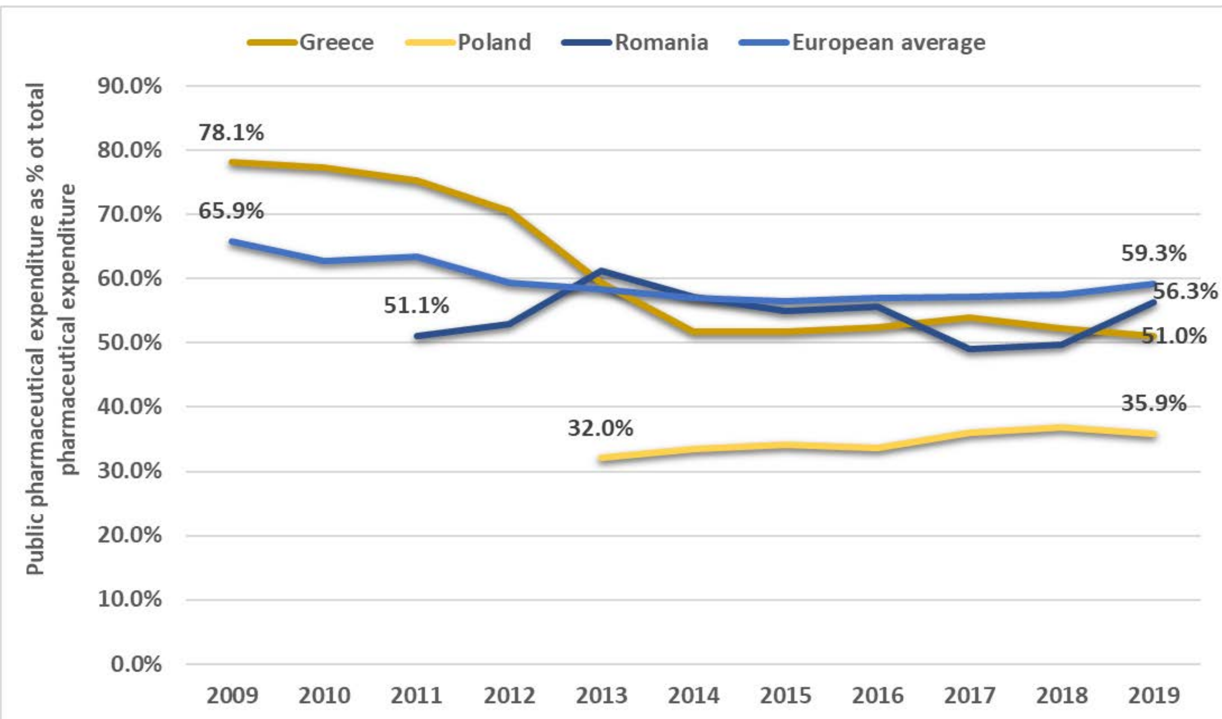
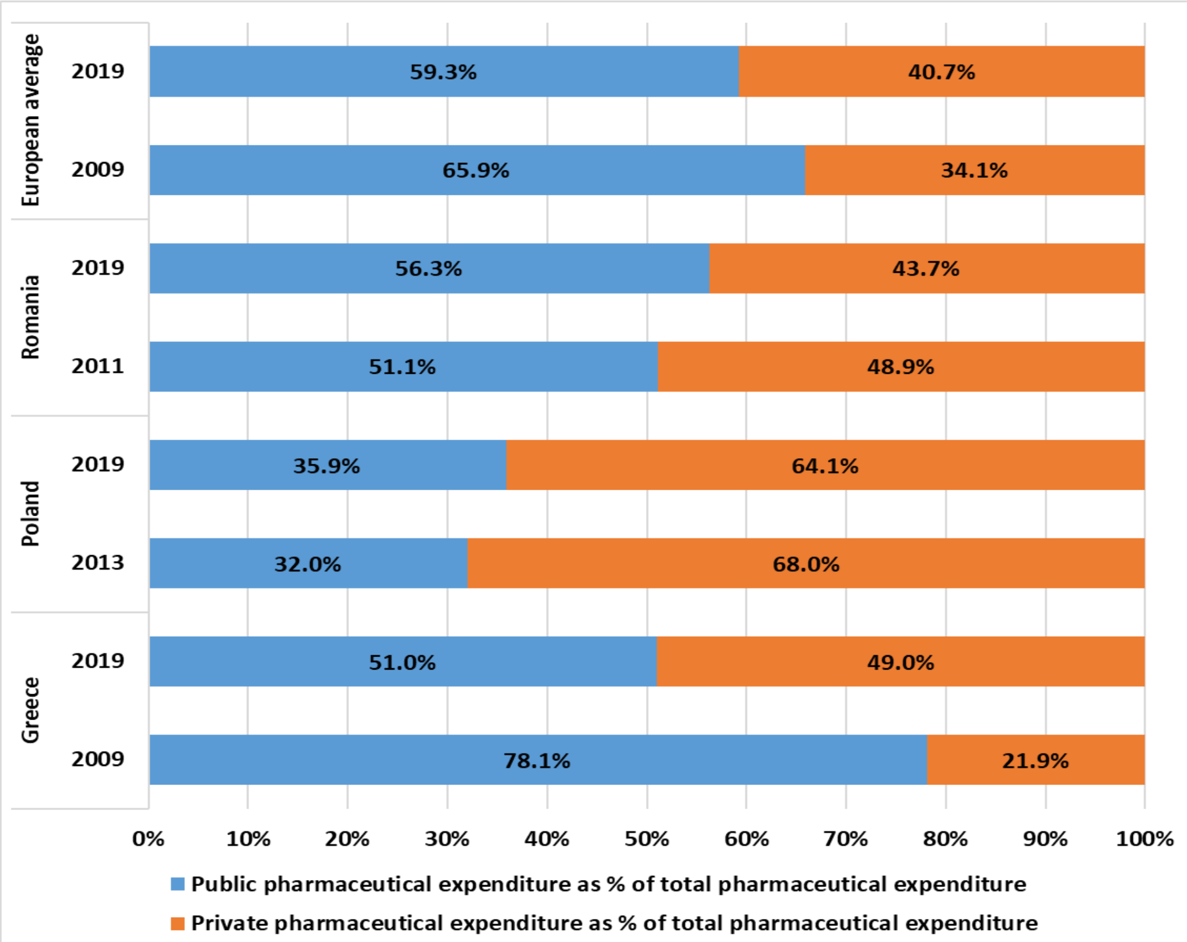


Figure 23 Public and private pharmaceutical health expenditure as a % of total pharmaceutical expenditure (2009 or nearest year & 2019)



Regarding the share of total pharmaceutical expenditure in GDP, a downward tendency is observed in all cases over time (Figure 24, Figure 25 and Figure 26). More specifically, the share has decreased from 1.7.% to 1.3% in Europe, from 2.6% to 1.1% in Greece, from 1.4% to 1.3% in Poland and from 1.8% to 1.5% in Romania.

Figure 24 Total pharmaceutical health expenditure as a % of GDP (2009 or nearest year-2019)

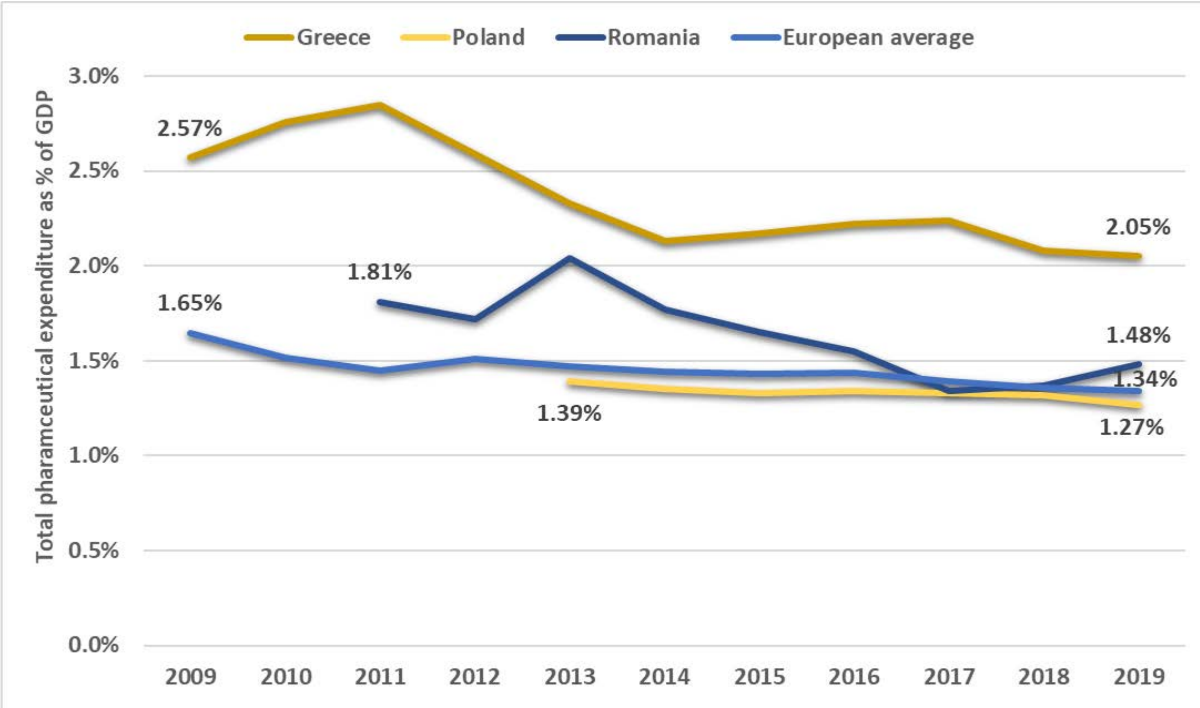


Figure 25 Public pharmaceutical health expenditure as a % of GDP (2009 or nearest year-2019)

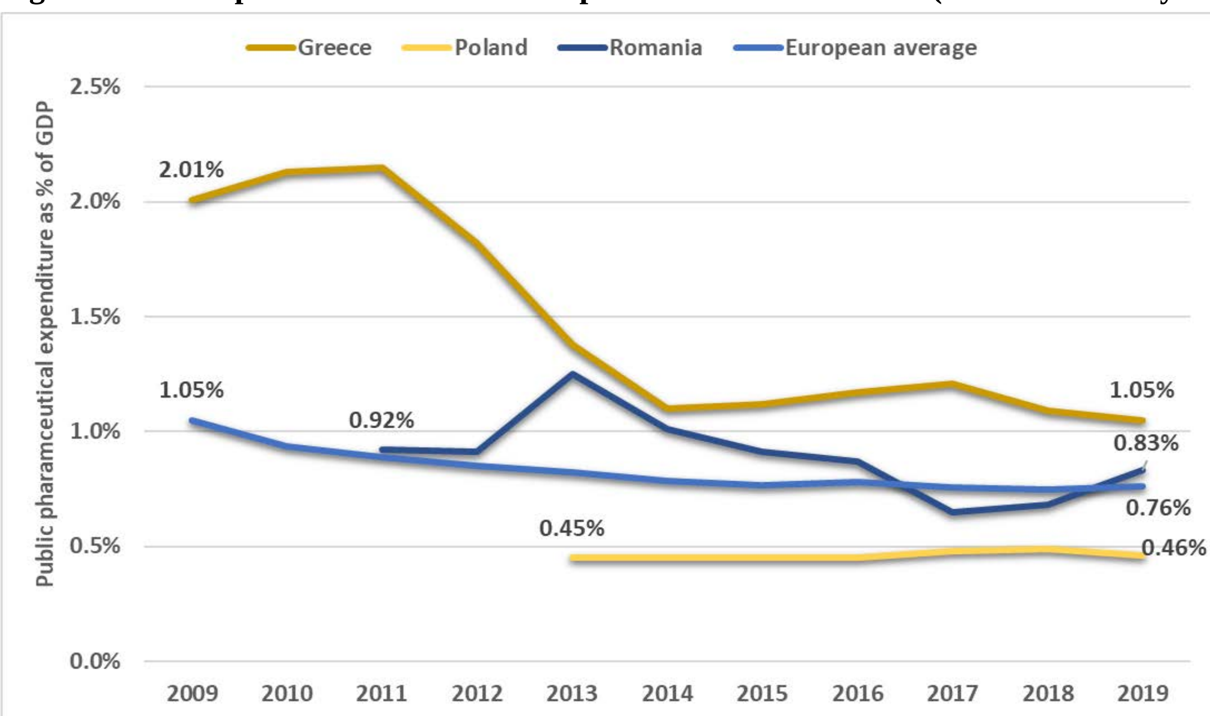
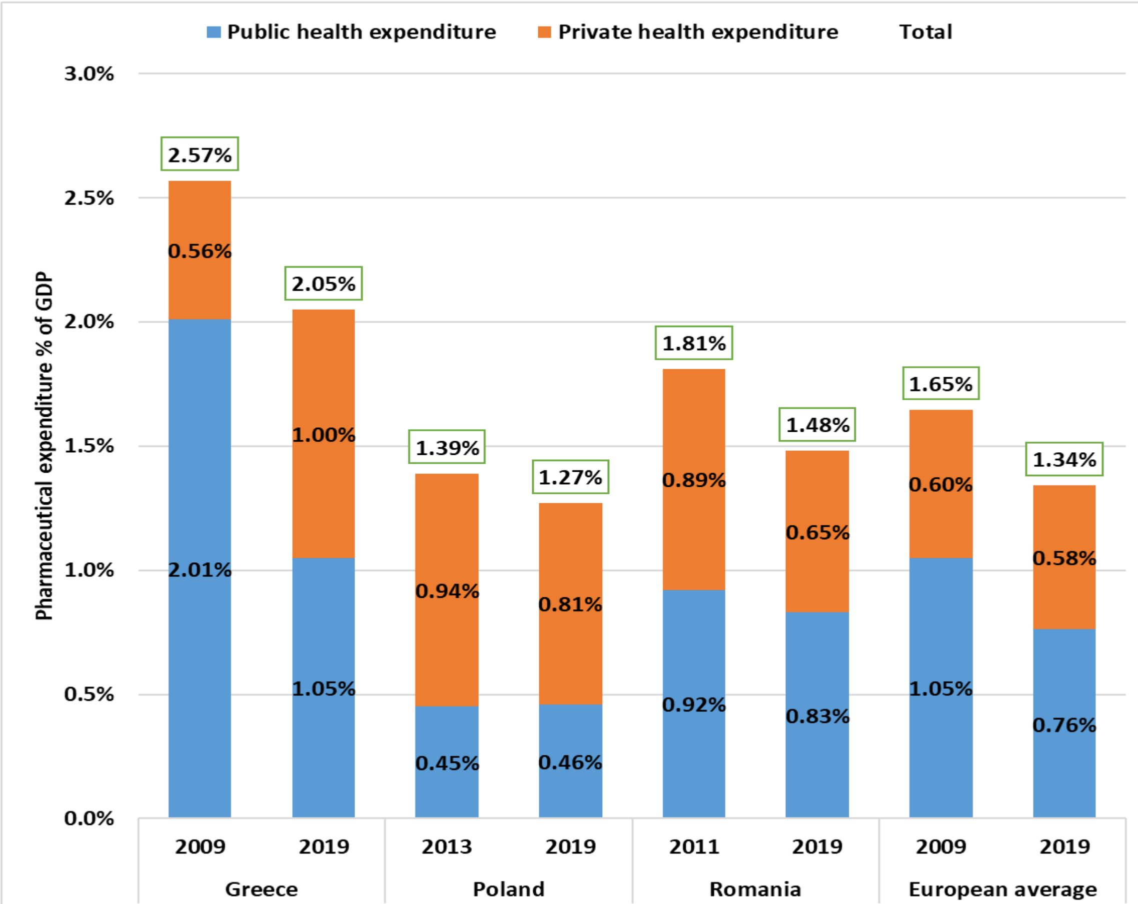


Figure 26 Public/private pharmaceutical health expenditure as a % of GDP (2009 or nearest year & 2019)



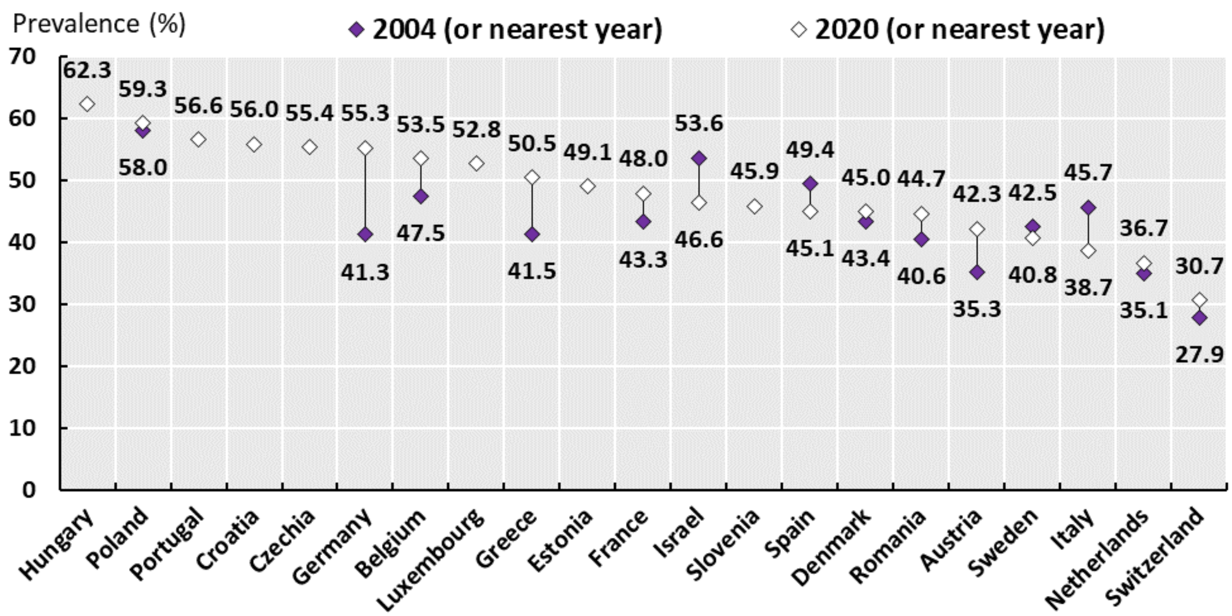
4.2. Trends and changes in morbidity and health profiles over time

This section presents the trends and changes in the prevalence of morbidity and in the health profiles in Europe using micro-epidemiological data.

4.2.1. Multimorbidity

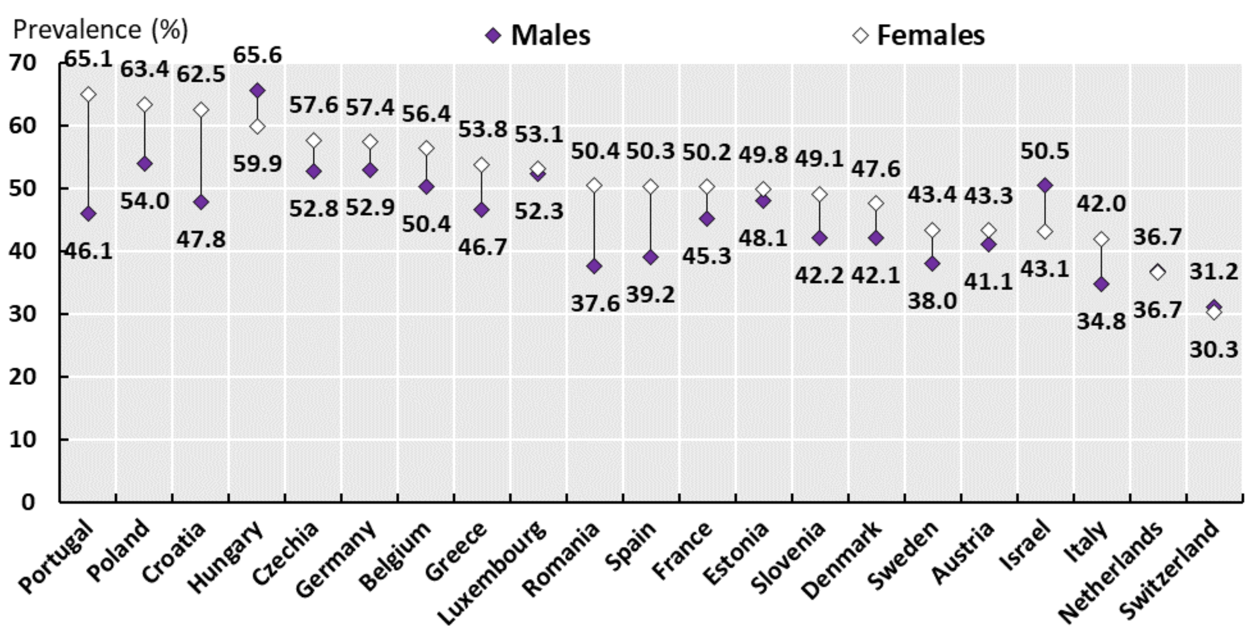
The changes in the unstandardized distributions of multimorbidity are presented in Figure 26. Overall, there appears to be an increase in the prevalence of multimorbidity in most countries over time. Poland has the second highest prevalence in 2020 (59.3%), Greece ranks somewhere in the middle of the list of countries (50.5%), while Romania lies in the bottom third of the rankings (44.7%). Furthermore, it is interesting that women are more likely to be afflicted with multimorbidity than men in almost all countries (Figure 27).

Figure 27 Changes in the prevalence (%) of multimorbidity per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 28 Prevalence (%) of multimorbidity per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

Table 5 displays the results of the estimated AAPCs in the prevalence of multimorbidity per country. It is important to note that the estimations are based on multiple segmented regression models using the standardized by age and gender distributions of multimorbidity. In essence, these results show the time trends in the prevalence of multimorbidity assuming no demographic changes over time and no demographic differences between countries. The standardization procedure facilitates comparisons of disease frequency over time and between countries assuming a similar demographic structure, which of course does not hold in practice. The following results can be interpreted as how multimorbidity changes irrespective of any changes/differences in the demographic structure of countries. Hence, it is a useful way to explore the effect of other important factors of morbidity, such as lifestyle, socioeconomic influences and environmental risk factors.

Romania has the second highest AAPC (5.2%) in the prevalence of multimorbidity among all countries, although the time period is small (2017-2020) due to data unavailability. Greece is also associated with a significant increase (0.9%) for a larger time span (2004-2020). In contrast, Poland shows a small reduction (0.2%) over the period of 2007-2020. or all these countries, men and higher age are drivers of the increases over time (Table 6).

Table 6 Trends (Average Annual Percentage Change) in the prevalence of multimorbidity per country

Region	Country	Period	AAPC total	95% CI	
				lower limit	upper limit
N.E.	**Denmark**	2004-2020	-0.8	-4.1	2.7
	Estonia	2011-2020	-2.2*	-3.1	-1.3
	Sweden	2004-2020	-0.5*	-0.6	-0.5
S.E.	**Greece**	2004-2020	0.9*	0.9	0.9
	Spain	2004-2020	-0.5	-1.1	0.1
	Italy	2004-2020	-1.4*	-1.5	-1.4
	Portugal	2011-2017	1.4	-4	7.1
	Israel	2004-2020	-1.2*	-1.4	-1
C.W.E.	**Austria**	2004-2020	0.8	-0.9	2.5
	Belgium	2004-2020	0.8	-1.4	3
	France	2004-2020	0.5*	0.4	0.5
	Germany	2004-2020	1.8*	1.2	2.4

	Switzerland	2004-2020	10.7*	10.5	10.8
	Croatia	2015-2020	2.7*	1	4.3
	Luxembourg	2013-2020	-1.8*	-2.2	-1.5
	Netherlands	2004-2020	-0.2*	-0.3	-0.2
	Slovenia	2011-2020	0.4	-0.4	1.2
E.E.	**Czechia**	2007-2020	0.1*	0	0.2
	Hungary	2011-2020	-0.5*	-0.5	-0.5
	Poland	2007-2020	-0.2*	-0.3	0
	Romania	2017-2020	5.2*	4.8	5.6

*Note: Estimates are based on sex- and age-standardized distributions. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in multimorbidity. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 7 Trends (Average Annual Percentage Change) in the prevalence of multimorbidity per country, gender and age group

Region	Countries	Period	AAPC total	95% CI lower limit	upper limit	AAPC 50-59	95% CI lower limit	upper limit	AAPC 60-69	95% CI lower limit	upper limit	AAPC 70-79	95% CI lower limit	upper limit	AAPC 80+	95% CI lower limit	upper limit
Males																	
N.E.	Denmark	2004-2020	-0.1	-1.1	0.9	-2.2*	-3.8	-0.6	1.0*	1	1.1	-0.5*	-0.6	-0.5	0.8*	0.5	1
	Estonia	2011-2020	-1.9*	-3.5	-0.3	-3.7*	-6.6	-0.6	-2.6*	-2.6	-2.5	-0.9	-2.2	0.4	-0.9*	-1	-0.9
	Sweden	2004-2020	-1.2*	-2	-0.4	-3.2	-7.8	1.5	-0.5*	-0.6	-0.5	-0.9*	-1.4	-0.4	-0.3	-1	0.5
S.E.	Greece	2004-2020	2.0*	1.8	2.1	0	-0.2	0.2	1.4*	1.4	1.5	2.6*	2.5	2.7	2.8*	1.4	4.3
	Spain	2004-2020	-0.2	-1.1	0.6	-1.0*	-1.9	-0.1	-1.5*	-1.7	-1.4	1.0*	0.4	1.7	1.6*	0.8	2.5
	Italy	2004-2020	-1.7*	-2.1	-1.3	-2.8*	-3.5	-2	-2.7*	-3.9	-1.6	-1.5*	-1.9	-1	0.1*	0	0.2
	Portugal	2011-2017	2.3*	2.3	2.4	8.8*	8.7	8.9	-1.6*	-1.7	-1.6	0.9*	0.9	0.9	2.5*	1.8	3.3
	Israel	2005-2020	0.4*	0.1	0.6	-4.4*	-7.6	-1	0.7*	0.6	0.9	-0.6*	-0.7	-0.5	-0.1	-2	2
C.W.E.	Austria	2004-2020	0.8	-0.7	2.4	-2.2	-5.7	1.5	1.9*	0.7	3.2	0.9	-0.1	1.8	3.1*	3.1	3.1
	Belgium	2004-2020	1.2	-0.7	3.2	0.3	-3.7	4.4	1.6*	1	2.2	0.4*	0.4	0.5	0.3*	0.3	0.3
	France	2004-2020	0.5*	0.5	0.6	2.0*	0.6	3.3	0.2*	0.2	0.2	0.9*	0.8	1	-0.2*	-0.2	-0.2
	Germany	2004-2020	1.8*	1.1	2.6	4.9*	4	5.8	1	-1.3	3.5	1.6*	1	2.1	-0.1	-0.7	0.4
	Switzerland	2004-2020	1.7*	0.7	2.8	-0.3*	-0.3	-0.3	1	-3.4	5.5	2.0*	1.8	2.2	2.4*	1.9	2.8
	Croatia	2015-2020	3.3	-0.1	6.7	5.4	-0.4	11.6	1.6	-2.8	6.1	4.9*	3.4	6.4	0.9	-0.2	2.1
	Luxembourg	2013-2020	-2.3*	-2.5	-2	-2.8*	-3.7	-2	-2.8	-7.3	2	-2.2*	-3.3	-1.1	0.4	-1.6	2.3
	Netherlands	2004-2020	0.4*	0.4	0.4	-2.0*	-2.3	-1.7	1.0*	1	1	0.5*	0.5	0.5	1.4*	1.2	1.6
	Slovenia	2011-2020	0.6	-0.4	1.6	-9.3*	-14.2	-4.1	0.7	-1.2	2.6	1.8*	1.8	1.8	2.8*	2.8	2.8
E.E.	Czechia	2007-2020	0.1*	0.1	0.1	-3.8*	-5.7	-1.9	0.1*	0	0.2	1.4*	0.7	2.2	1.9*	1.9	1.9
	Hungary	2011-2020	1.4*	1	1.7	8.2*	2.4	14.2	-1.3*	-1.3	-1.3	0.1*	0.1	0.1	1.4*	1.4	1.5
	Poland	2007-2020	0.2	-0.3	0.7	0.3	-0.4	1	-0.5*	-0.6	-0.4	0.6*	0.4	0.8	0.7*	0.4	1
	Romania	2017-2020	7.5*	6.7	8.3	17.8*	13.5	22.3	14.3*	11.4	17.3	5.4*	5	5.8	-0.5*	-0.5	-0.5
Females																	
N.E.	Denmark	2004-2020	-0.1	-1.3	1	1.4*	1.3	1.5	-0.1	-1.1	0.9	-0.1	-0.4	0.1	-2.2*	-3.6	-0.7
	Estonia	2011-2020	-3.1*	-3.2	-3.1	-8.6*	-13.4	-3.5	-2.7*	-2.7	-2.6	-2.8*	-2.9	-2.7	-0.2	-1.1	0.7
	Sweden	2004-2020	-0.5*	-0.5	-0.5	0.8*	0.1	1.5	-1.6*	-2.5	-0.6	-1.1*	-1.1	-1.1	-0.6*	-0.6	-0.5
S.E.	Greece	2004-2020	0.2*	0.1	0.3	-0.7	-3.2	2	-0.1*	-0.1	-0.1	0.5*	0.3	0.6	1.5*	1.5	1.5
	Spain	2004-2020	-0.5*	-1	-0.1	-3.0*	-3	-3	-0.2	-0.7	0.3	0	-1	1	0.5	-0.5	1.4

	Italy	2004-2020	-1.3*	-2	-0.6	-3.0*	-3.1	-3	-2.5*	-2.6	-2.4	-0.6	-2	0.8	1.1*	1.1	1.1
	Portugal	2011-2017	1.4*	1.3	1.5	0.9*	0.7	1.1	1.5*	1.3	1.7	2.8*	2.4	3.1	0.7*	0.6	0.8
	Israel	2005-2020	-2.3*	-2.5	-2.1	-5.9*	-6.7	-5.1	-2.7*	-2.7	-2.6	-1.9*	-2	-1.9	-0.3*	-0.3	-0.3
C.W.E.	**Austria**	2004-2020	0.9	-0.3	2.1	-0.4*	-0.4	-0.4	1.8*	0.5	3.2	1.5*	1.5	1.5	1.3*	1.2	1.4
	Belgium	2004-2020	0.4	-0.3	1.2	0.7*	0.7	0.7	0.2	0	0.4	0.3	-0.4	0.9	0.7*	0.1	1.2
	France	2004-2020	0.4*	0.3	0.5	0.2	-0.1	0.6	0.3	-0.1	0.6	0.4	-0.3	1.1	0.8*	0.7	0.8
	Germany	2004-2020	1.5*	0.3	2.7	3.2*	2.9	3.4	1.4*	1.4	1.4	1.4*	0.7	2.1	0.8*	0.8	0.8
	Switzerland	2004-2020	0.1	-0.9	1.2	-0.7	-3.2	1.8	-1.3*	-1.8	-0.7	1.4	-1.7	4.7	0.8	-1.5	3.1
	Croatia	2015-2020	2.4*	1.9	3	2.8*	1.2	4.3	3.3*	2.5	4.2	1.2*	0.6	1.9	1.2*	0.7	1.7
	Luxembourg	2013-2020	-1.7*	-2.5	-1	-3.2	-7.3	1	-2	-4.1	0.1	-0.8*	-0.9	-0.8	-2.0*	-3.8	-0.1
	Netherlands	2004-2020	-0.7*	-0.8	-0.6	-3.1*	-3.2	-3	-0.8*	-0.8	-0.8	0.5*	0.5	0.6	-0.2*	-0.2	-0.1
	Slovenia	2011-2020	0.1	-0.7	0.8	-3.7*	-5.3	-2.1	-1.4*	-2.6	-0.1	3.5*	2.3	4.7	3.3*	3.2	3.3
E.E.	**Czechia**	2007-2020	0	0	0	1.0*	0.5	1.5	-0.8*	-1	-0.6	0.2	-0.1	0.4	-0.1*	-0.2	-0.1
	Hungary	2011-2020	-1.8*	-1.8	-1.8	-10.2*	-10.5	-9.9	-2.2*	-2.2	-2.2	1.9*	1.9	1.9	1.6*	1.5	1.6
	Poland	2007-2020	-0.4*	-0.6	-0.2	-0.6*	-1	-0.3	-0.8*	-1.1	-0.6	-0.3*	-0.3	-0.2	0.7*	0.6	0.9
	Romania	2017-2020	3.6*	3.4	3.7	-2.4*	-2.5	-2.3	-2.5*	-2.5	-2.4	4.7*	4.4	5	18.5*	13.6	23.7

*Note: Estimates are based on sex- and age-standardized distributions. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in the prevalence over time. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

The following figures present the time trends in the prevalence of the standardized distribution of the prevalence of multimorbidity in Greece, Poland and Romania and the jointpoints of the respective segmented regression analyses.

Figure 29 Trends in the prevalence (%) of multimorbidity in Greece

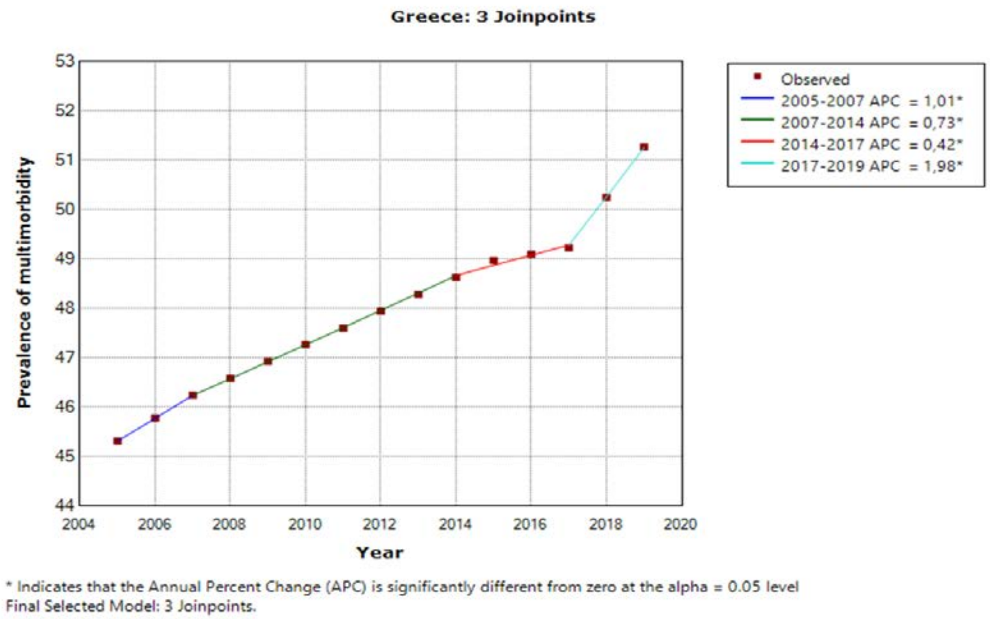


Figure 30 Trends in the prevalence (%) of multimorbidity in Greece per gender

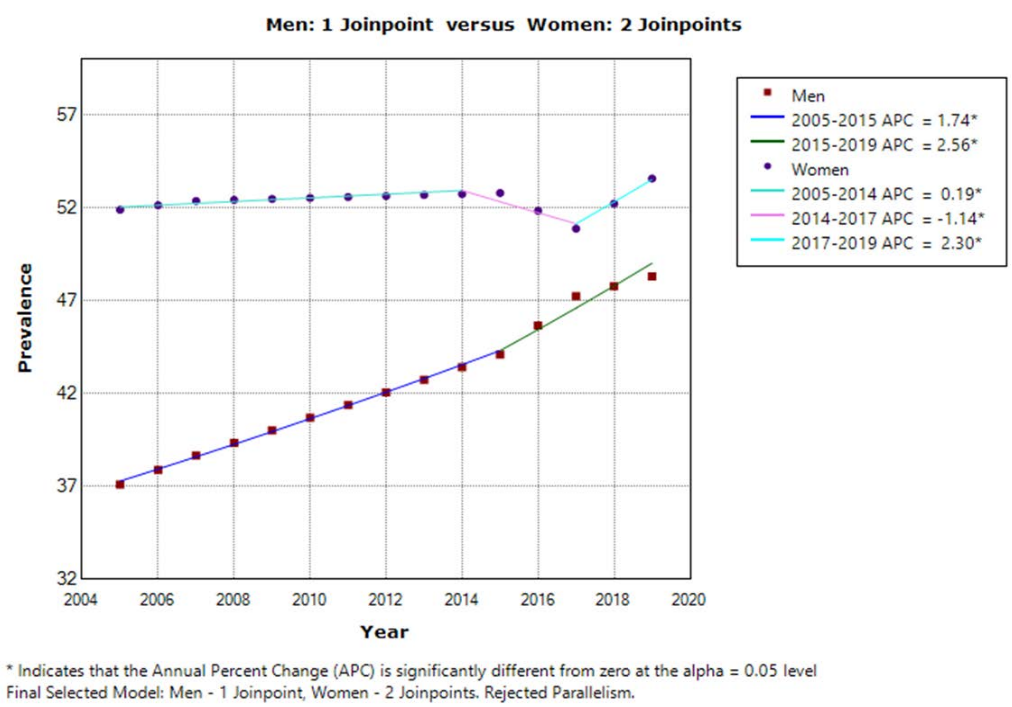
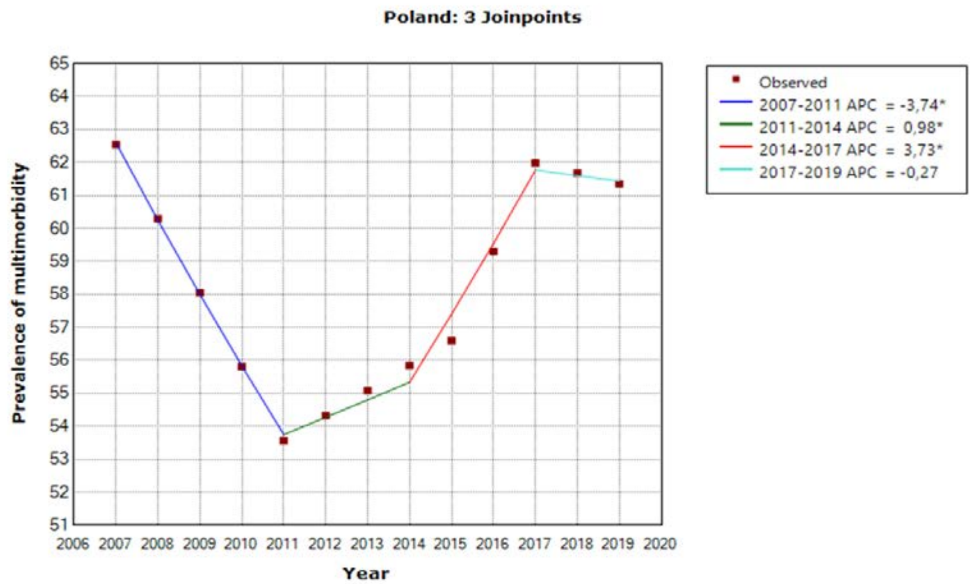
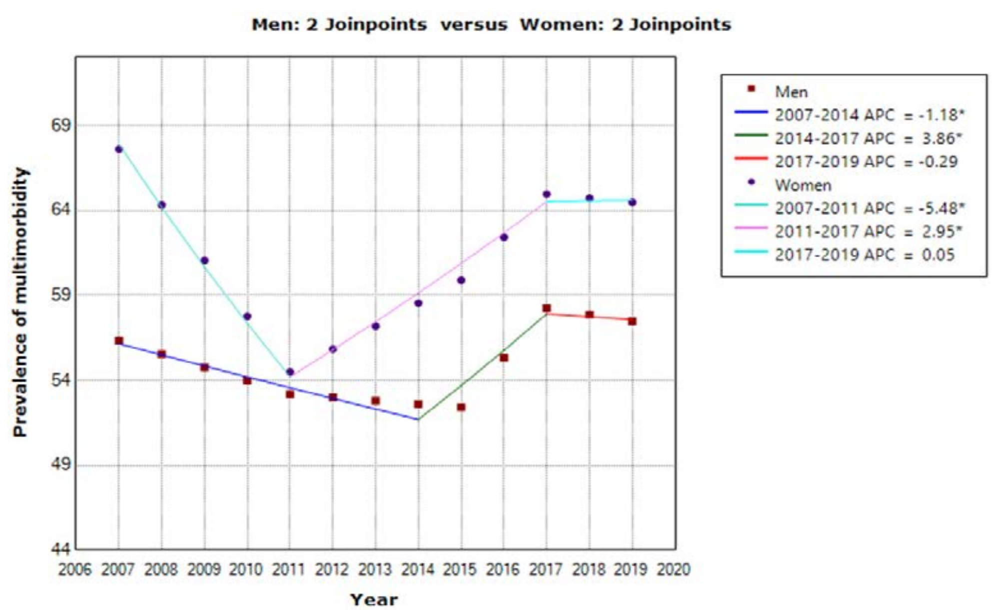


Figure 31 Trends in the prevalence (%) of multimorbidity in Poland



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: 3 Joinpoints.

Figure 32 Trends in the prevalence (%) of multimorbidity in Poland per gender



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: Men - 2 Joinpoints, Women - 2 Joinpoints. Rejected Parallelism.

Figure 33 Trends in the prevalence (%) of multimorbidity in Romania

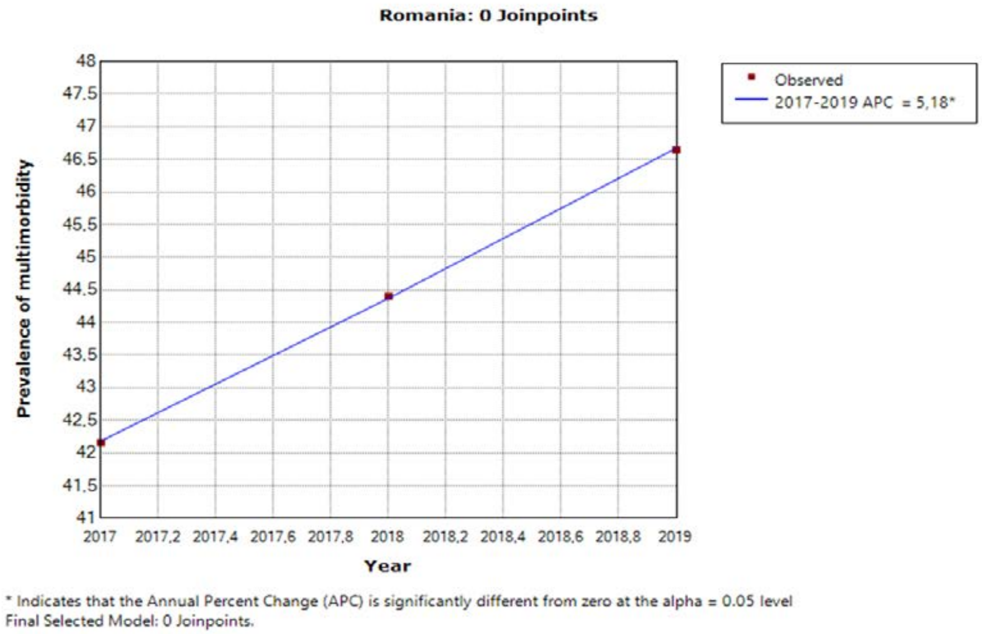
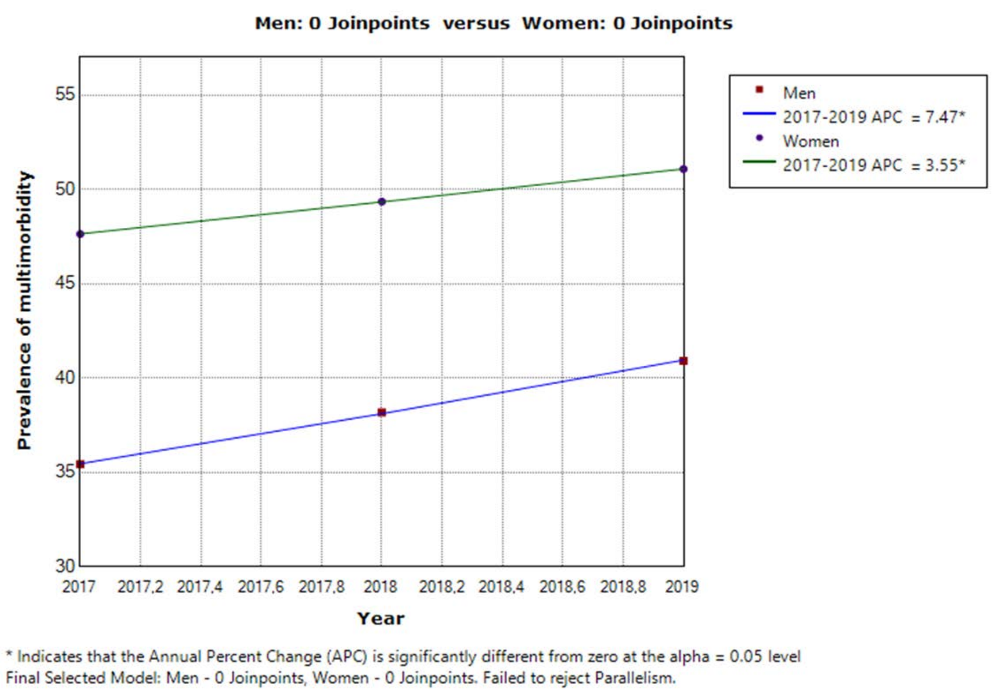


Figure 34 Trends in the prevalence (%) of multimorbidity in Romania per gender

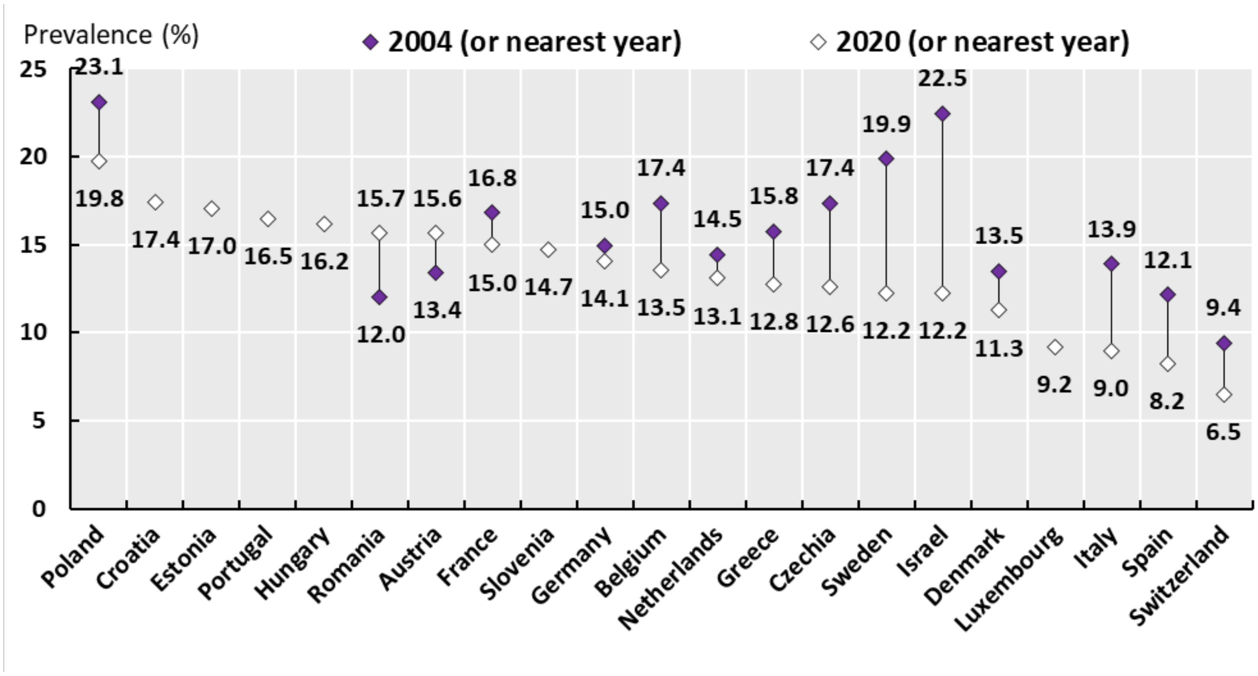


4.2.2. Chronic diseases

This section presents the results concerning the time trends and changes in the prevalence of various categories of chronic diseases.

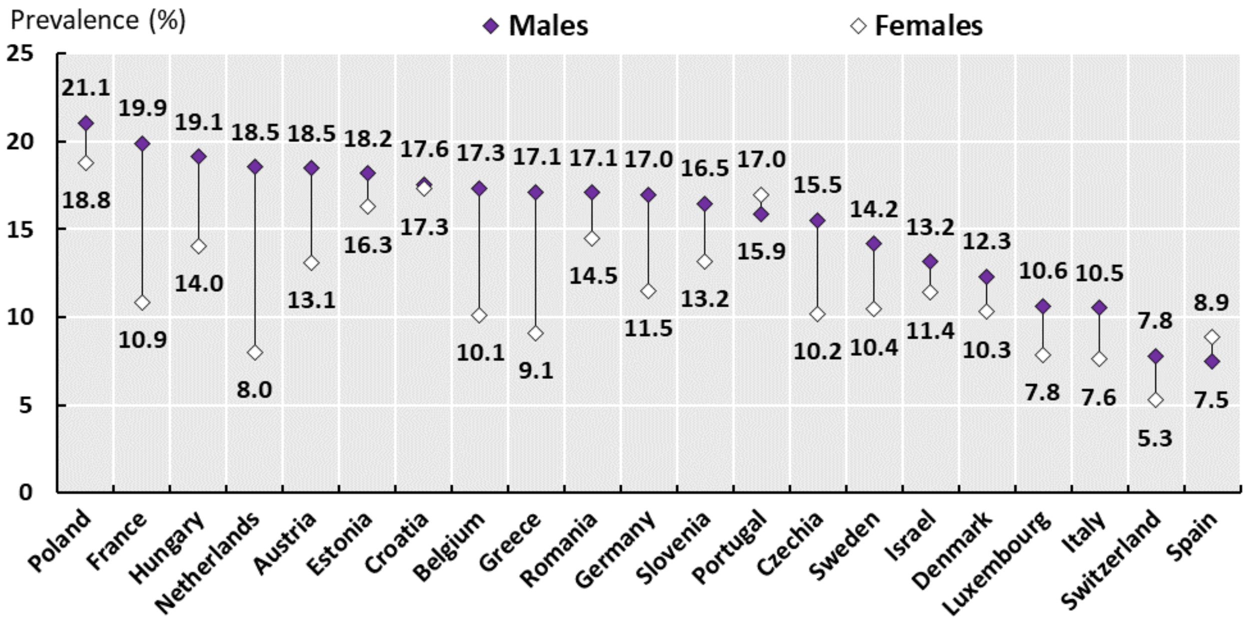
The prevalence of cardiovascular diseases (heart attack including myocardial infarction or coronary thrombosis or any other heart problem including congestive heart failure) has decreased in most European countries between 2004 and 2020 (Figure 34). Greece and Poland are among these countries; however, Poland still has the highest prevalence of cardiovascular diseases. In contrast, a sharp increase in the frequency is observed in Romania, although the time span is quite small (2017-2020). Furthermore, men appear to be associated with a higher probability of a cardiovascular disease than women (Figure 35).

Figure 35 Changes in the prevalence (%) of cardiovascular diseases per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

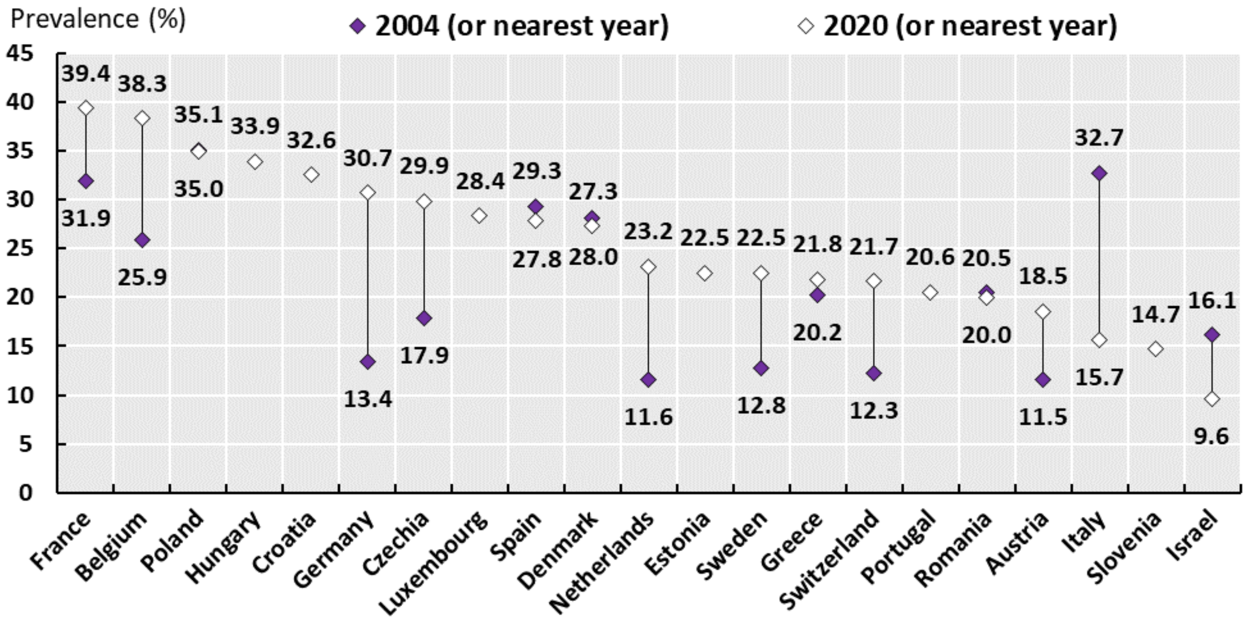
Figure 36 Prevalence (%) of cardiovascular diseases per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

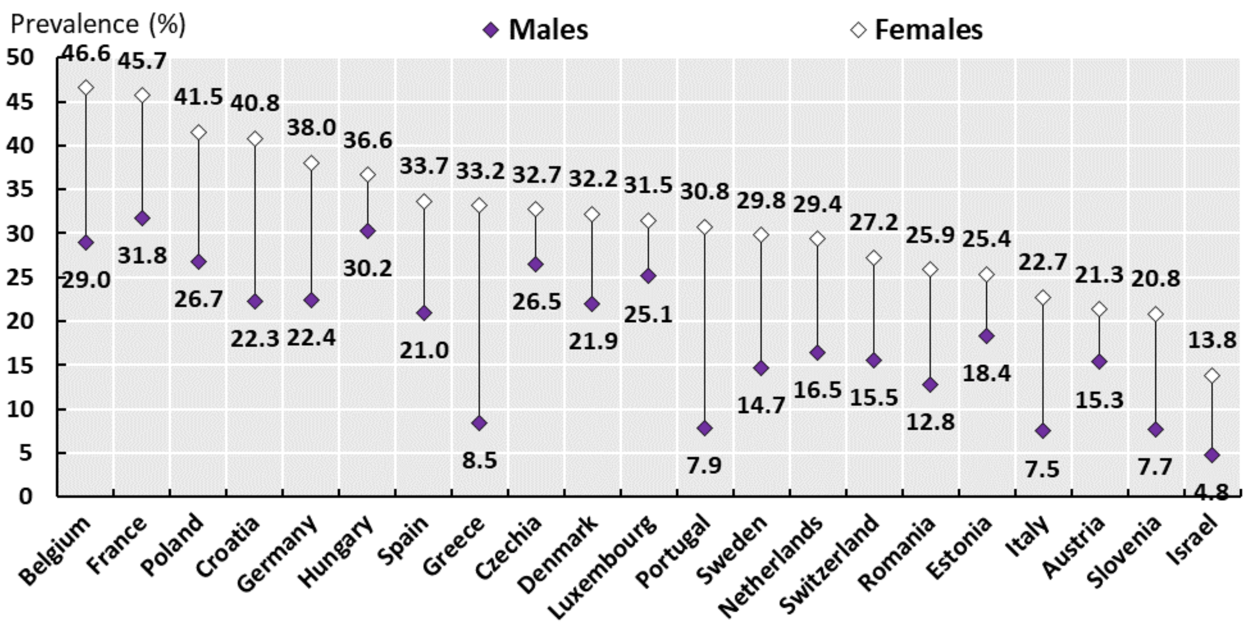
The prevalence of musculoskeletal diseases (rheumatoid arthritis, osteoarthritis, or other rheumatic or hip fracture) is increasing in most countries through time (Figure 36). No significant changes are observed in Greece, Poland and Romania. Notably, Poland has the third highest frequency in 2020, whereas the estimate is much lower in Greece and Romania. Also, the women gender appears to be a risk factor (Figure 37).

Figure 37 Changes in the prevalence (%) of musculoskeletal diseases per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

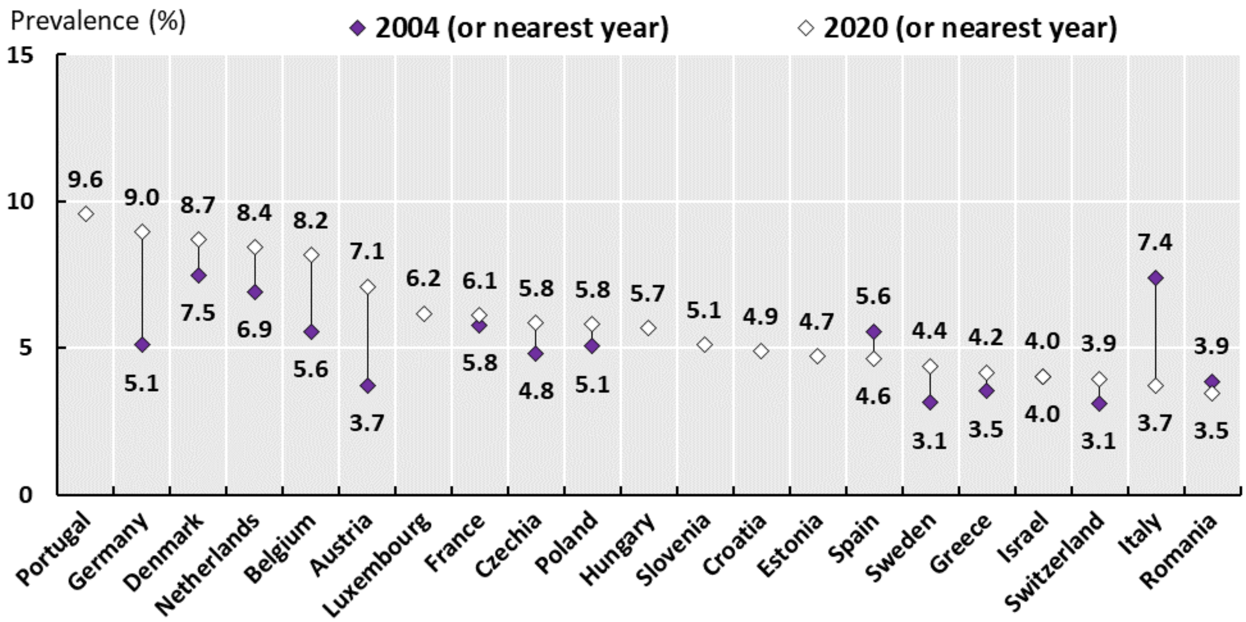
Figure 38 Prevalence (%) of musculoskeletal diseases per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

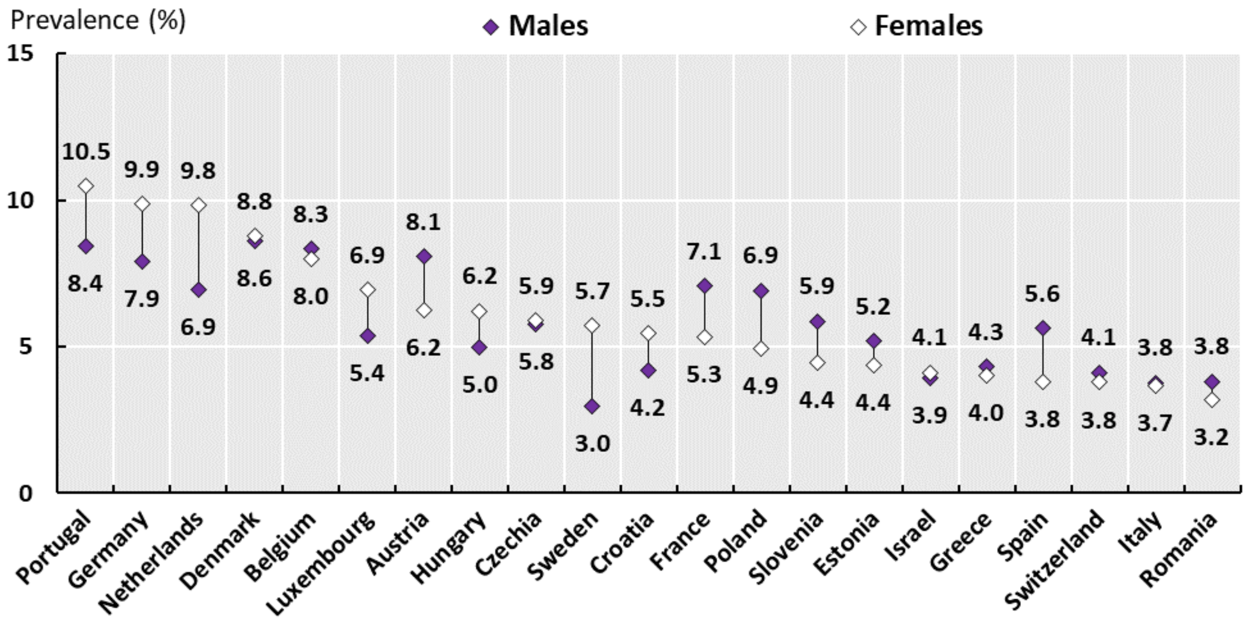
The prevalence of chronic lung disease has also increased over time (Figure 38). Nevertheless, Romania shows a small reduction, from 3.9% to 3.5%. Greece and Romania rank at the bottom of the list in 2020, while Poland is around the middle of the rankings. There is not a clear pattern concerning the relationship of gender and the prevalence of chronic lung disease (Figure 39). Nevertheless, the frequency of chronic lung disease in females is usually higher than men in countries that are associated with a high overall frequency.

Figure 39 Changes in the prevalence (%) of chronic lung disease per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

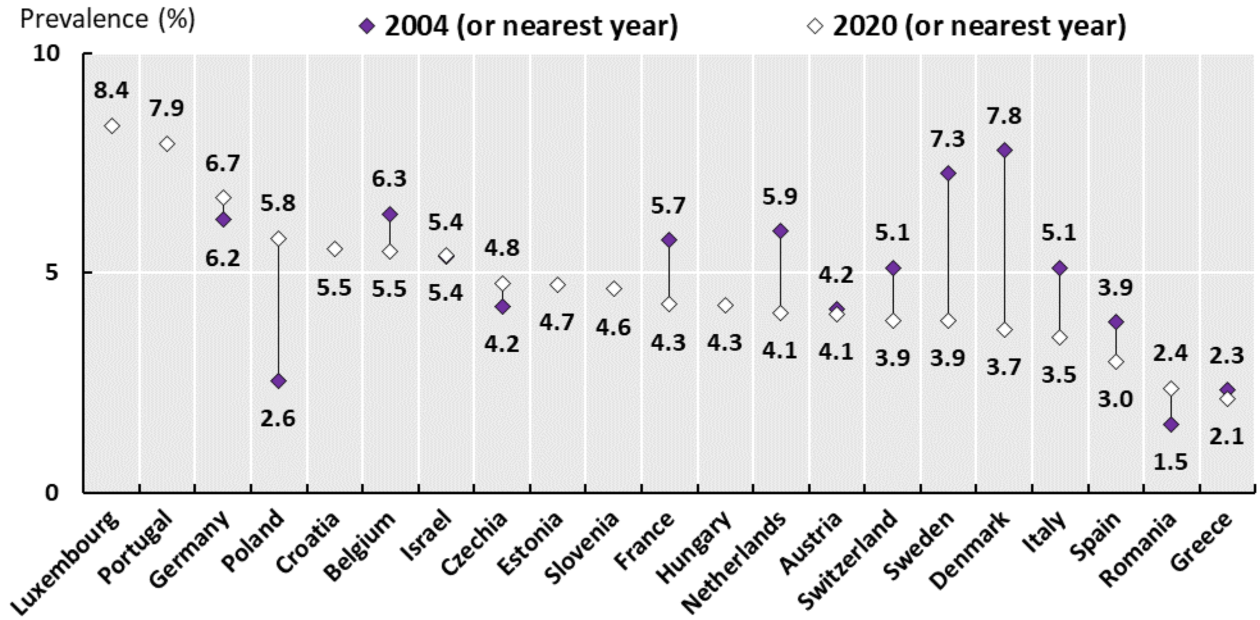
Figure 40 Prevalence (%) of chronic lung disease per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

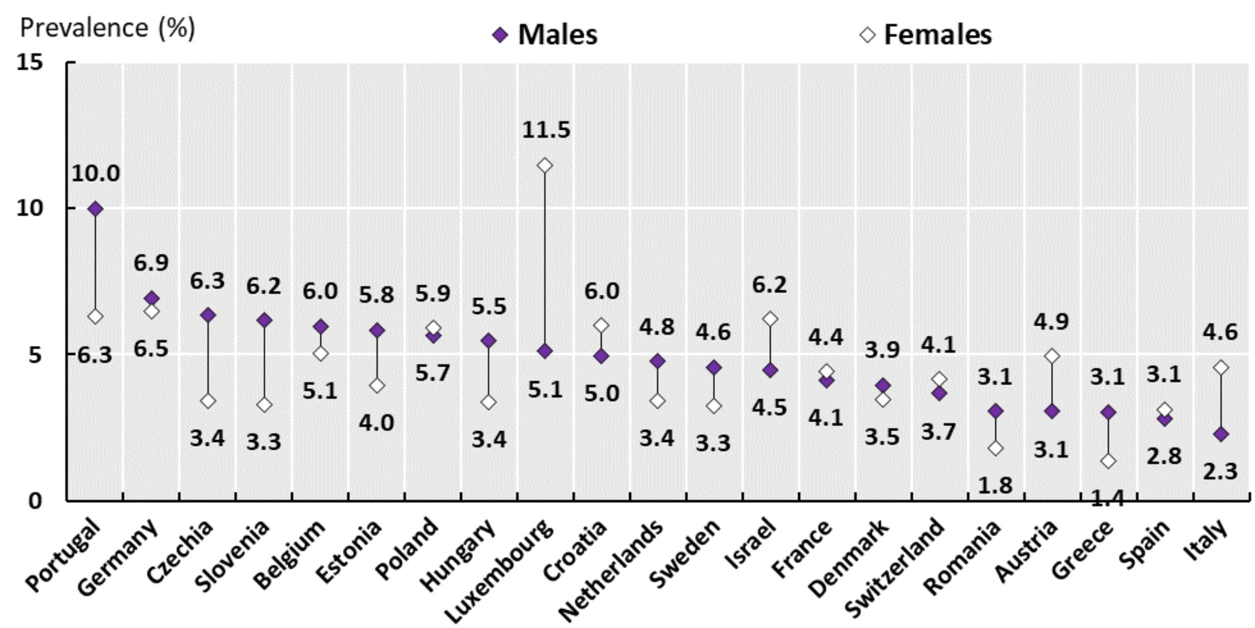
Interestingly, the prevalence of cancer (including leukaemia or lymphoma, but excluding minor skin cancers) has decreased in most countries (Figure 40). Poland and Romania, the former in particular, are associated with an increase and Greece with a small decrease. Also, Poland ranks fourth in the list of countries, while Romania and Greece are located at the very bottom. Finally, the prevalence of cancer is usually higher in men, with Poland being among the exceptions (Figure 41).

Figure 41 Changes in the prevalence (%) of cancer per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

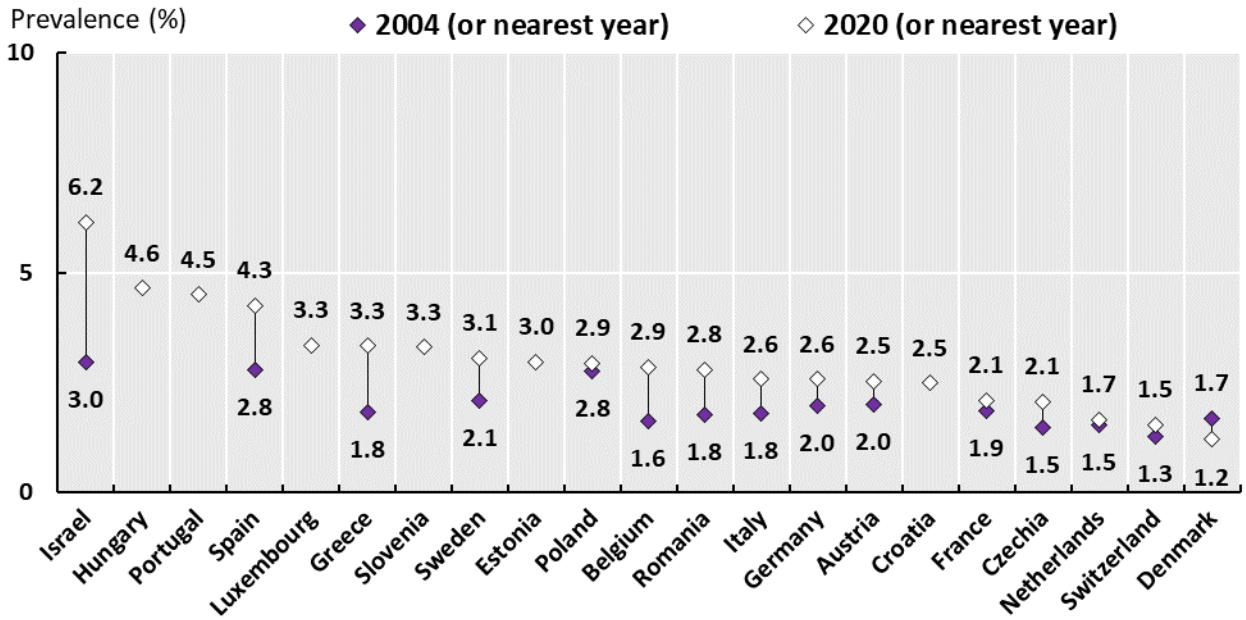
Figure 42 Prevalence (%) of cancer per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

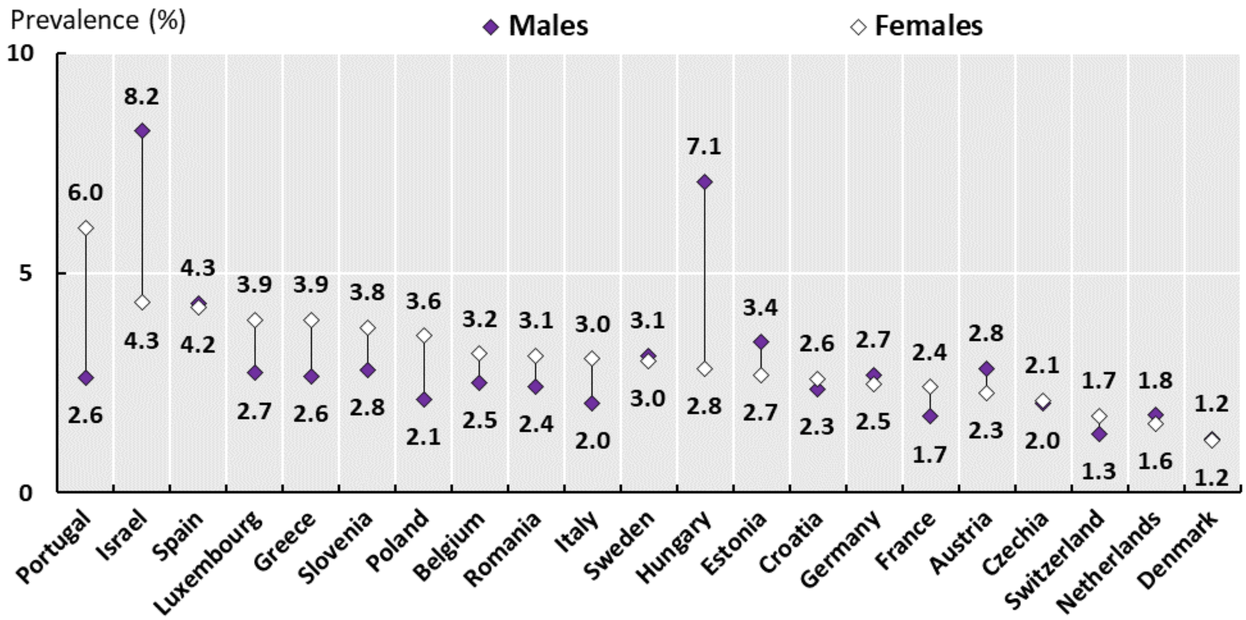
There is a sharp rise in the prevalence of neurodegenerative diseases (Alzheimer's disease, dementia, organic brain syndrome, senility or any other serious memory impairment or Parkinson disease) in all countries, except for Denmark (Figure 42). Greece belongs in the group of countries with a high frequency of neurodegenerative diseases, while Poland and Romania are at the middle of the rankings. Furthermore, neurodegenerative diseases are usually more frequent in women than men (Figure 43).

Figure 43 Changes in the prevalence (%) of neurodegenerative diseases per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

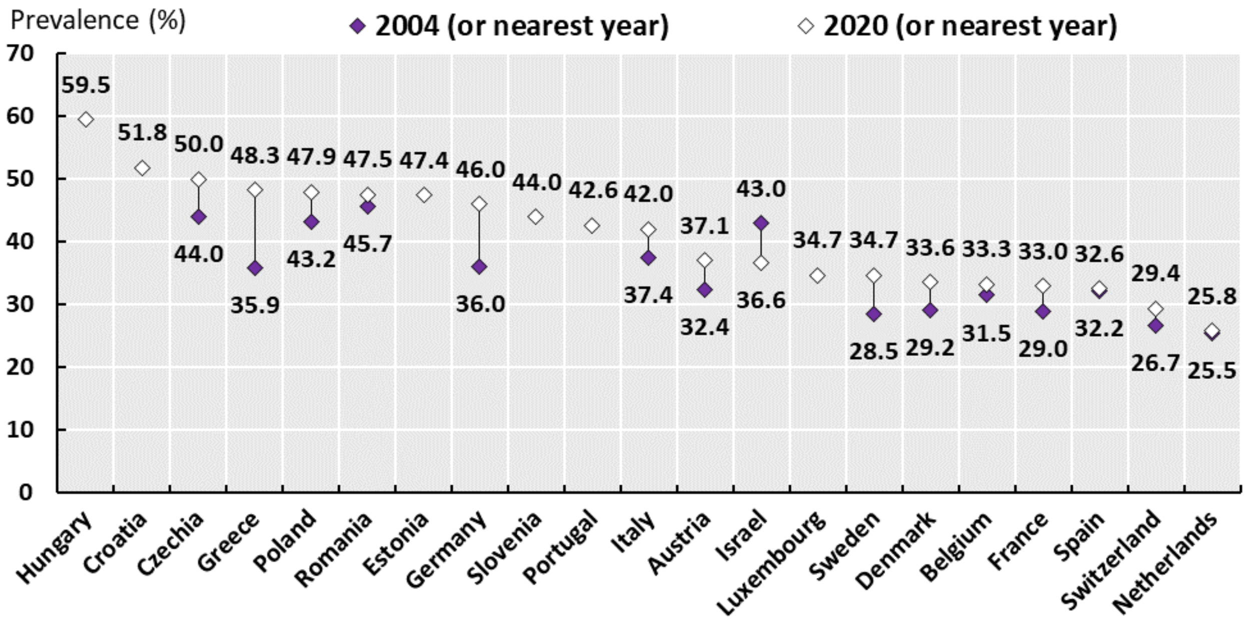
Figure 44 Prevalence (%) of neurodegenerative diseases per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

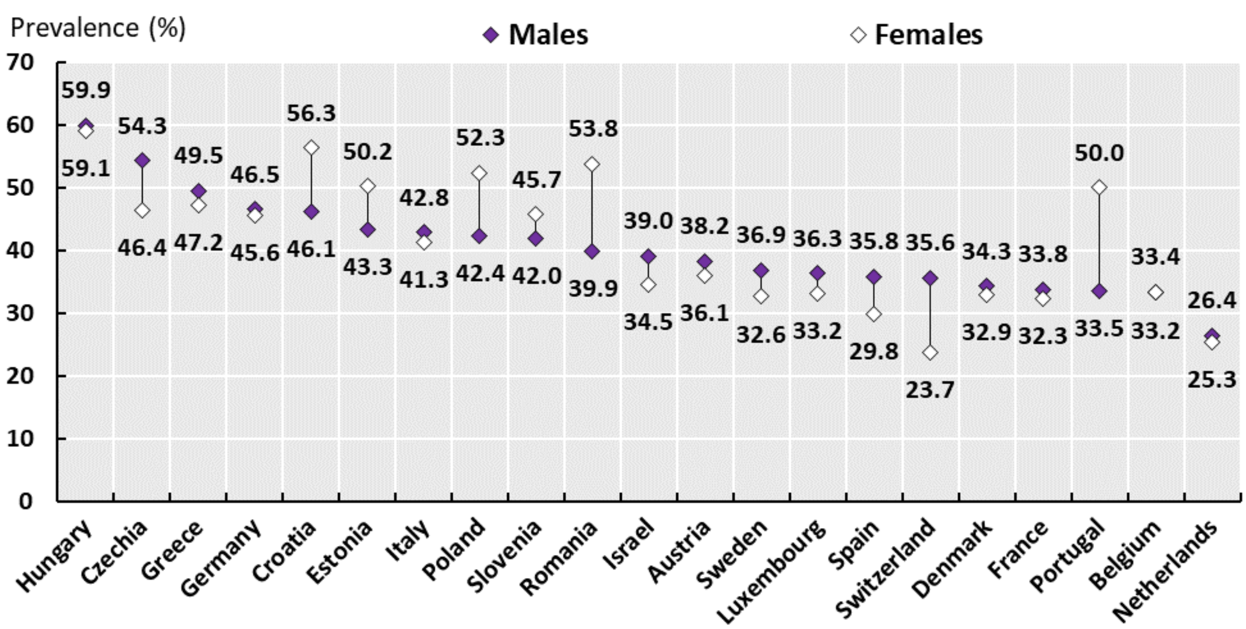
The prevalence of hypertension is quite high in all three countries of interest and it appears to have increased during the period of analysis, in Greece in particular (Figure 44). Furthermore, hypertension is usually more frequent in men than women, although this is not the case for Poland and Romania (Figure 45).

Figure 45 Changes in the prevalence (%) of hypertension per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

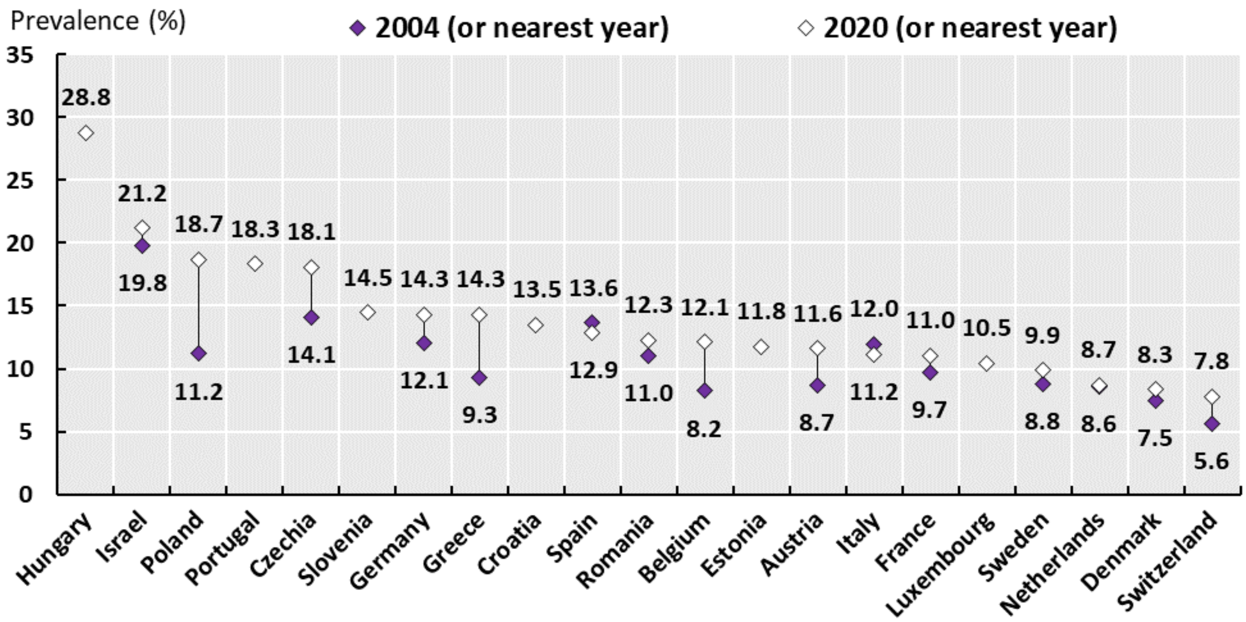
Figure 46 Prevalence (%) of hypertension per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

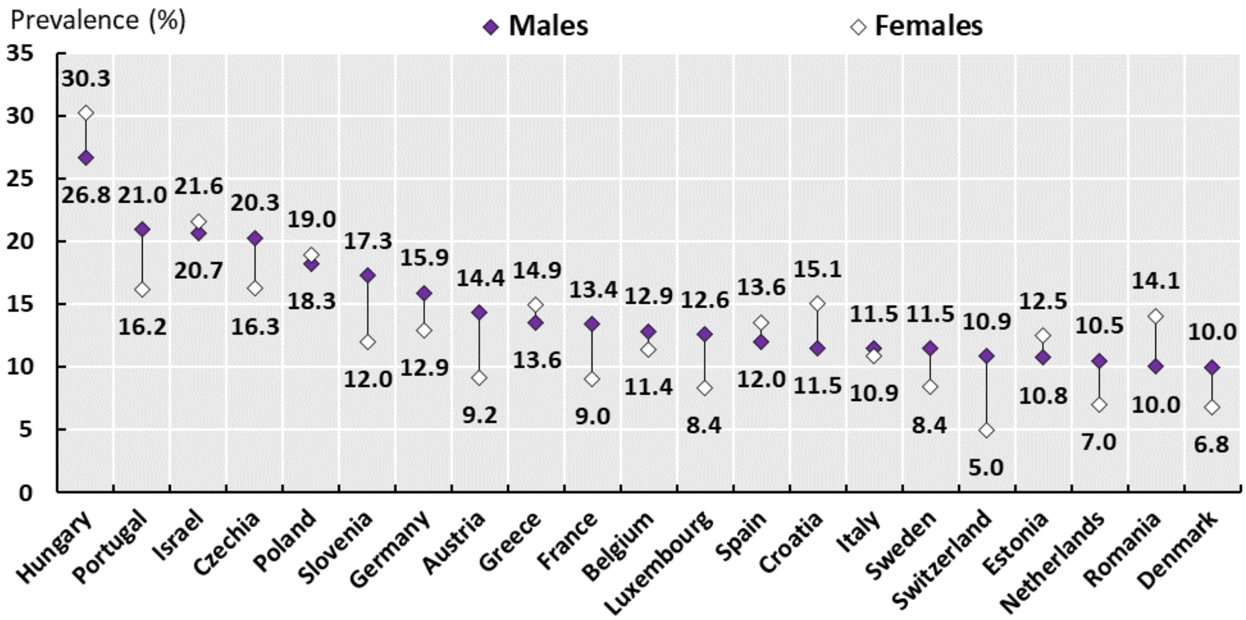
The frequency of diabetes appears to be increasing over time (Figure 46). It is found to be quite high in Poland, which is associated with the highest increase during the period of analysis; Greece and Romania are around the middle of the list of countries. Sex differences do not clearly favour one gender over the other (Figure 47); however, the prevalence is higher in men in Greece, Poland and Romania.

Figure 47 Changes in the prevalence (%) of diabetes per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

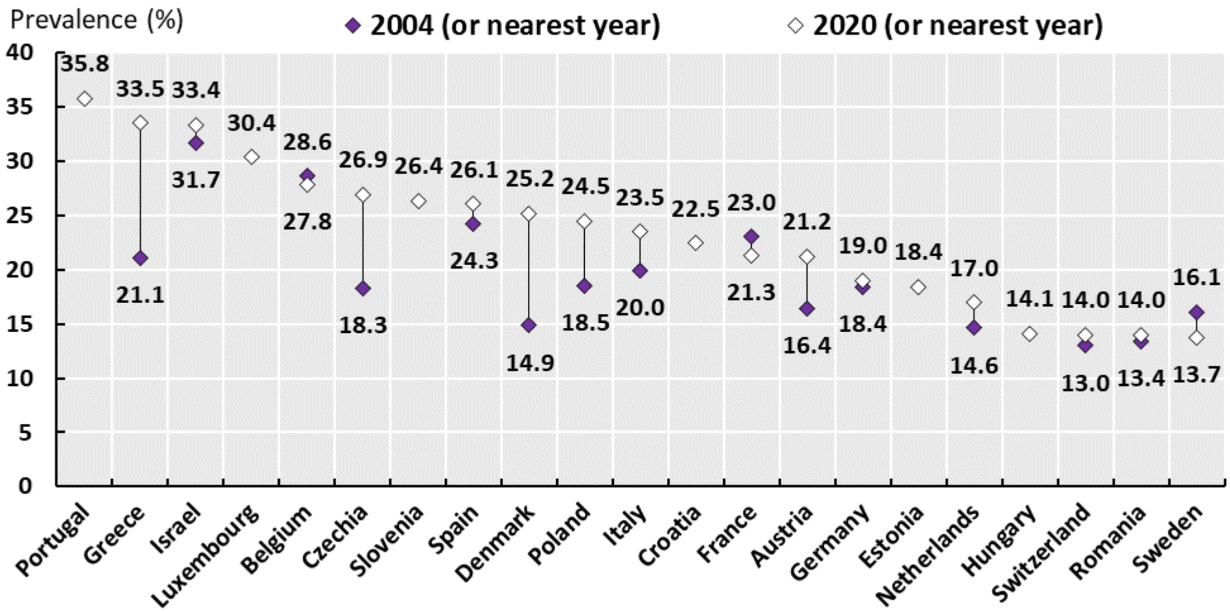
Figure 48 Prevalence (%) of diabetes per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

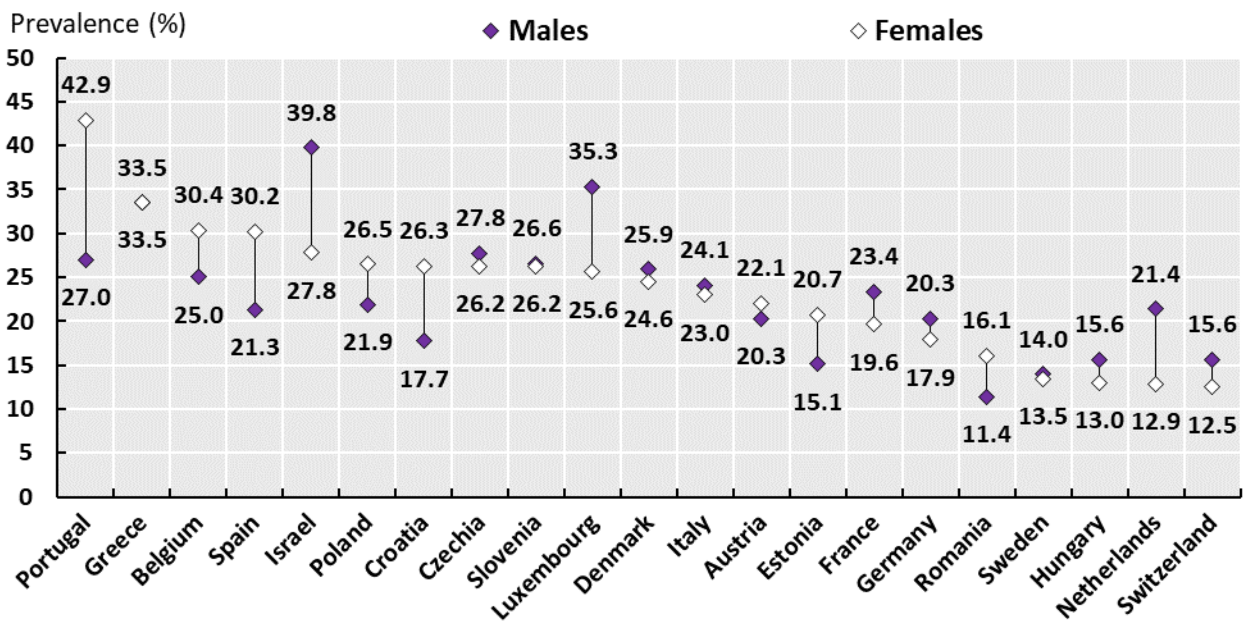
The prevalence of hyperlipidemia is increasing over time (Figure 48). Greece has the second highest frequency in 2020 and is associated with the largest increase during the period of analysis. Poland ranks around the middle and Romania is at the bottom of the list. Furthermore, the frequency is higher in men in the countries with the highest prevalence in 2020, while the opposite applies to the countries that have lower prevalence (Figure 49).

Figure 49 Changes in the prevalence (%) of hyperlipidemia per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 50 Prevalence (%) of hyperlipidemia per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

Table 7, Table 8, Table 9 and Table 10 present the time trends in the prevalence of the standardized distributions of the above mentioned categories of diseases.

During the period of 2004-2020, a downward trend in the prevalence of cardiovascular diseases, musculoskeletal diseases, chronic lung disease (not significant) and cancer is observed in Greece, while there is a significant increasing trend for neurodegenerative disorders, hypertension, diabetes and hyperlipidemia. Except for musculoskeletal disorders and chronic lung disease, the trends in the prevalence of chronic diseases are worse in men than women.

Between 2007 and 2020, a decreasing trend in cardiovascular diseases, musculoskeletal diseases and chronic lung disease (not significant) is registered in Poland, while an upward trend is established for cancer, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia. In Poland, the trends over time are worse in women compared with men only in musculoskeletal diseases, chronic lung disease and cancer.

Between the years 2017 and 2020, musculoskeletal disorders and chronic lung disease are associated with a decreasing trend in Romania, while cardiovascular diseases, cancer, neurodegenerative diseases, hypertension, diabetes and hyperlipidemia show a significant upward tendency. The changes in outcomes over time are worse in women compared with men only in musculoskeletal diseases, neurodegenerative disorders and diabetes.

Table 8 Trends (Average Annual Percentage Change) in the prevalence of categories of diseases per country (part A)

Region	Countries	Period	AAPC CVD	95% CI lower limit	95% CI upper limit	AAPC MD	95% CI lower limit	95% CI upper limit	AAPC CLD	95% CI lower limit	95% CI upper limit	AAPC CA	95% CI lower limit	95% CI upper limit
N.E.	Denmark	2004-2020	-2.5*	-3.5	-1.4	-0.4	-1.3	0.5	0.2	-2.4	2.9	-4.6*	-7	-2.1
	Estonia	2011-2020	-6.3*	-6.7	-5.8	-4.7*	-4.8	-4.6	-6.7*	-9.1	-4.4	-4.7*	-4.7	-4.7
	Sweden	2004-2020	-4.2*	-4.6	-3.9	4.8*	2.9	6.8	2.7*	2	3.3	-5.7*	-10	-1.1
S.E.	Greece	2004-2020	-2.4*	-2.4	-2.3	-0.2*	-0.2	-0.2	-0.4	-1.3	0.6	-0.7*	-1.1	-0.2
	Spain	2004-2020	-2.5*	-2.7	-2.3	-0.6	-2.4	1.2	0.1	-1.9	2.2	-1.3	-3	0.3
	Italy	2004-2020	-3.9*	-4.5	-3.2	-5.2*	-6.8	-3.7	-5.1*	-5.1	-5	-2.2	-4.3	0
	Portugal	2011-2017	2.3*	2.2	2.4	-5.7*	-5.8	-5.6	15.1*	14.4	15.8	6.1*	6.1	6.2
	Israel	2005-2020	-4.4*	-4.5	-4.2	-3.2*	-3.6	-2.7	0.6	-0.6	1.9	0.9*	0.4	1.4
C.W.E.	Austria	2004-2020	0.7	-0.3	1.6	2.2*	0.5	4	4.6*	3	6.1	-0.2	-1.7	1.2
	Belgium	2004-2020	-1.7*	-1.7	-1.7	2.3*	2.3	2.4	1.7*	1.2	2.3	-1.1	-2.3	0.1
	France	2004-2020	-1.3*	-1.5	-1	1.3*	0.4	2.2	0.1	-2.1	2.3	-2.0*	-2.2	-1.8
	Germany	2004-2020	-1.4*	-2.3	-0.5	5.5*	4.8	6.3	3.1*	2.2	3.9	-0.2	-1.9	1.5
	Switzerland	2004-2020	-2.6*	-2.6	-2.6	3.9*	3.1	4.7	1.1*	0.2	2	-1.4	-7.8	5.4
	Croatia	2015-2020	-1.5*	-1.8	-1.3	8.7*	6.4	11.1	4.7	-11.9	24.5	-6.5*	-10.8	-1.9
	Luxembourg	2013-2020	-4.5*	-7.1	-1.9	-5.0*	-8.8	-1	-5.1*	-5.5	-4.8	-3.1*	-3.9	-2.3
	Netherlands	2004-2020	-2.1*	-2.1	-2	4.7*	4.3	5	0.9*	0.8	1	-2.6*	-3.3	-1.9
	Slovenia	2011-2020	-2.3*	-2.8	-1.7	3.4*	0.6	6.4	-2.2	-4.8	0.6	-2.6	-5.9	0.8
E.E.	Czechia	2007-2020	-4.2*	-5.1	-3.3	4.0*	2.6	5.4	0.8	-0.8	2.4	0.3	-1.2	1.8
	Hungary	2011-2020	-6.7*	-7	-6.4	-3.1*	-3.2	-3.1	-3.4*	-3.9	-2.9	-4.3*	-4.5	-4
	Poland	2007-2020	-1.6*	-1.8	-1.5	-0.5*	-0.6	-0.4	-0.3	-1.3	0.7	7.6*	5.6	9.6
	Romania	2017-2020	13.5*	10.9	16.1	-0.1*	-0.1	-0.1	-0.3*	-0.3	-0.3	23.3*	15.7	31.3

*Note: Estimates are based on sex- and age-standardized distributions of categories of diseases. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, CA: cancer, CLD, chronic lung disease, CVD: cardiovascular diseases, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, MD: musculoskeletal diseases, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 9 Trends (Average Annual Percentage Change) in the prevalence of categories of diseases per country (part B)

Region	Countries	Period	AAPC ND	95% CI lower limit	95% CI upper limit	AAPC HT	95% CI lower limit	95% CI upper limit	AAPC DB	95% CI lower limit	95% CI upper limit	AAPC HL	95% CI lower limit	95% CI upper limit
N.E.	Denmark	2004-2020	-2.7*	-4.4	-1	0.6*	0.3	0.9	0.5*	0.3	0.6	3.4*	3.3	3.5
	Estonia	2011-2020	5.9*	4.7	7.2	-0.3	-0.6	0	1.2	-0.1	2.6	-0.7*	-1.3	-0.2
	Sweden	2004-2020	1.6	-1.5	4.8	1.4*	1.3	1.4	0.7*	0.3	1.1	-1.8*	-2.2	-1.3
S.E.	Greece	2004-2020	3.2*	1.5	4.9	1.6*	1.3	1.8	3.0*	3	3.1	3.4*	3.3	3.4
	Spain	2004-2020	1.6*	1	2.2	-0.2*	-0.3	-0.2	-0.3*	-0.6	-0.1	1.6*	1	2.1
	Italy	2004-2020	1.5*	1.2	1.9	0.5	0	1	-0.8*	-1.1	-0.5	0.9*	0.6	1.2
	Portugal	2011-2017	5.1*	5	5.1	1.7*	1.6	1.7	-0.8*	-0.8	-0.8	0.6*	0.5	0.7
	Israel	2005-2020	3.4*	3.3	3.5	-1.1*	-1.7	-0.4	1.0*	1	1	0.4	-0.7	1.6
C.W.E.	Austria	2004-2020	0.9*	0.9	0.9	0.6*	0.6	0.6	1.7*	1.1	2.3	2.0*	2	2
	Belgium	2004-2020	3.7*	3.3	4.1	0.4	-0.4	1.2	2.7*	2.3	3	-0.4	-0.9	0.2
	France	2004-2020	0.1	-0.5	0.8	0.8*	0.7	1	0.9*	0.8	1	-0.5	-1.1	0.1
	Germany	2004-2020	0.6*	0.2	1	1.5*	0.8	2.3	1.1*	1	1.2	0.7	-0.3	1.6
	Switzerland	2004-2020	1.1	-0.4	2.6	0.2	0	0.4	1.4*	1	1.8	0.9*	0.5	1.4
	Croatia	2015-2020	3	-9.6	17.4	3.2*	2	4.4	-0.4*	-0.8	0	5.5*	4.2	6.8
	Luxembourg	2013-2020	2.4	-7.4	13.3	2.1*	1.2	3.1	-2.3*	-3.7	-0.8	-0.3	-2.8	2.1
	Netherlands	2004-2020	0	-0.3	0.2	-0.5*	-0.6	-0.5	-0.5*	-0.6	-0.4	0.7*	0.5	0.8
	Slovenia	2011-2020	11.1*	10.3	11.8	0.0*	0	0	1.6*	0.5	2.6	2.7*	0.9	4.5
E.E.	Czechia	2007-2020	1.7	-0.8	4.2	0.7*	0.5	0.9	0.8*	0.7	0.9	2.2*	2	2.5
	Hungary	2011-2020	0.4*	0.1	0.6	0.1*	0.1	0.1	4.3*	4.3	4.3	-5.4*	-5.6	-5.2
	Poland	2007-2020	-0.9*	-0.9	-0.9	0.8*	0.8	0.8	4.0*	3.6	4.3	2.5*	0.8	4.2
	Romania	2017-2020	28.3*	17.8	39.7	2.5	2.4	2.6	4.7*	4.3	5	3.4*	3.2	3.6

*Note: Estimates are based on sex- and age-standardized distributions of categories of diseases. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, DB: diabetes, E.E.: Eastern Europe, HL: hyperlipidemia, HT: hypertension, ND: neurodegenerative diseases, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 10 Trends (Average Annual Percentage Change) in the prevalence of categories of diseases per country and gender (part A)

Region	Countries	Period	AAPC CVD	95% CI lower limit	95% CI upper limit	AAPC MD	95% CI lower limit	95% CI upper limit	AAPC CLD	95% CI lower limit	95% CI upper limit	AAPC CA	95% CI lower limit	95% CI upper limit
Males														
N.E.	Denmark	2004-2020	-2.4*	-3.3	-1.5	-0.9*	-1.6	-0.2	-0.1	-3.2	3.2	-2.2	-6	1.9
	Estonia	2011-2020	-5.6*	-6	-5.3	-4.6*	-5.3	-3.8	-6.4*	-8.4	-4.4	-2.1*	-4.1	-0.1
	Sweden	2004-2020	-4.8*	-4.8	-4.7	5.0*	2.5	7.5	-0.1	-1.1	1	-2.8*	-2.8	-2.8
S.E.	Greece	2004-2020	-1.2*	-1.2	-1.2	-3.2*	-3.6	-2.9	0.2	-3.6	4.3	1.9*	1.6	2.1
	Spain	2004-2020	-2.5*	-2.7	-2.3	0.5	-3.2	4.3	1.7	-1.1	4.4	-1.8*	-2.4	-1.2
	Italy	2004-2020	-3.1*	-3.7	-2.5	-7.3*	-8.3	-6.4	-6.2*	-6.7	-5.7	-0.6	-3.3	2.2
	Portugal	2011-2017	5.3*	5.2	5.3	-9.6*	-10.3	-8.9	15.4*	14.5	16.3	18.3*	17.3	19.4
	Israel	2005-2020	-4.1*	-4.5	-3.6	-3.3*	-5.1	-1.5	1.2	-0.1	2.5	0.9	-0.9	2.7
C.W.E.	Austria	2004-2020	-0.1	-0.8	0.6	3.1*	0.9	5.3	3.5*	2.2	4.8	2.6	-4.3	10
	Belgium	2004-2020	-0.6*	-0.9	-0.3	1.9	-1.2	5	0.5	-0.7	1.7	-2.2	-10.4	6.7
	France	2004-2020	-1.0*	-1	-1	1.2	0	2.5	0.8	-1.4	3	-2.1*	-3.1	-1
	Germany	2004-2020	-1.8*	-2.5	-1	4.7*	2.2	7.2	0.9	-0.3	2	-0.5	-4.6	3.8
	Switzerland	2004-2020	-2.3*	-2.4	-2.2	4.7*	4.1	5.3	-0.2	-1.6	1.3	-2	-4.7	0.8
	Croatia	2015-2020	-2.2*	-3.6	-0.8	17.0*	12.8	21.3	0.4	-21.5	28.6	-1	-4.3	2.4
	Luxembourg	2013-2020	-2.6*	-3.9	-1.4	-5.8*	-5.9	-5.6	-7.0*	-7.7	-6.3	-8.4*	-10.4	-6.3
	Netherlands	2004-2020	-1.2*	-1.2	-1.2	4.6*	2.8	6.5	0.5*	0.4	0.6	-1.3*	-1.4	-1.2
	Slovenia	2011-2020	-1.0*	-1.1	-1	1.3	-6.6	9.9	-1.4	-4.5	1.7	0.6	-2.9	4.3
	Czechia	2007-2020	-3.7*	-3.8	-3.7	4.1*	0.3	8	0.5	-0.4	1.4	1.1	-1.2	3.4
E.E.	Hungary	2011-2020	-4.2*	-4.6	-3.8	-2.0*	-2.1	-1.9	-2.1*	-2.4	-1.8	1.9*	1.6	2.2
	Poland	2007-2020	-1.3*	-1.8	-0.8	-1.1*	-1.1	-1.1	-1.1*	-1.9	-0.3	7.0*	6.3	7.8
	Romania	2017-2020	15.4*	12.1	18.8	-4.0*	-4.3	-3.8	7.0*	6.3	7.7	30.4*	17.9	44.3
Females														
N.E.	Denmark	2004-2020	-2.5*	-3.7	-1.2	-0.4*	-0.5	-0.3	1.6*	0.4	2.8	-9.3*	-15.1	-3.1
	Estonia	2011-2020	-6.9*	-7	-6.8	-4.8*	-5.3	-4.3	-8.0*	-8.2	-7.9	-7.7*	-8	-7.4
	Sweden	2004-2020	-3.7*	-4.1	-3.3	3.2	-1.6	8.3	4.7*	3.4	6	-7.3*	-9.7	-4.9
S.E.	Greece	2004-2020	-3.9*	-3.9	-3.8	0.6*	0.6	0.6	0.5	-0.8	1.7	-3.0*	-3.6	-2.5
	Spain	2004-2020	-2.6*	-2.8	-2.4	-0.9*	-1.3	-0.5	-0.7*	-0.7	-0.7	-0.7	-1.8	0.3

	Italy	2004-2020	-3.5*	-4	-3	-4.1*	-6	-2.1	-3.8*	-3.9	-3.8	-2.4*	-2.4	-2.4
	Portugal	2011-2017	0.2	-0.4	0.8	-5.0*	-5.2	-4.8	14.6*	13.9	15.4	-3.5*	-4.6	-2.3
	Israel	2005-2020	-4.1*	-4.1	-4.1	-3.1*	-3.8	-2.5	0	-3.2	3.3	1.5	-0.9	4.1
C.W.E.	Austria	2004-2020	1.1*	0.1	2.2	2	-0.3	4.4	6.1*	2.3	9.9	-0.6	-3.2	1.9
	Belgium	2004-2020	-2.9*	-3.4	-2.4	2.4*	2.4	2.4	3.3*	1.4	5.3	-2.0*	-2.3	-1.6
	France	2004-2020	-1.8*	-1.8	-1.8	1.3*	0.3	2.3	-1	-2.7	0.7	-1.8*	-2.2	-1.4
	Germany	2004-2020	-0.9*	-1.6	-0.2	6.0*	4.4	7.6	4.5*	3.7	5.4	0.7	-3.4	5
	Switzerland	2004-2020	-2.6*	-2.6	-2.6	3.6*	1.9	5.3	0.1	-0.8	0.9	-0.1	-2	1.8
	Croatia	2015-2020	-1.1*	-1.5	-0.6	5.6*	3.5	7.8	9.2	-1.8	21.3	-9.5*	-15.2	-3.5
	Luxembourg	2013-2020	-6.1*	-8.8	-3.3	-5.4	-11.5	1	-4.1*	-6.4	-1.8	0.9*	0.2	1.7
	Netherlands	2004-2020	-3.2*	-3.5	-3	4.6*	3.4	5.8	1.4*	0.2	2.6	-3.7*	-5.6	-1.7
	Slovenia	2011-2020	-3.4*	-3.7	-3.2	3.6*	1.9	5.2	-2.7	-6.7	1.4	-5.5*	-9.2	-1.6
E.E.	Czechia	2007-2020	-4.3*	-5.3	-3.3	3.7*	3.1	4.3	0.5	-1.7	2.9	-2.3*	-3.1	-1.5
	Hungary	2011-2020	-8.8*	-9	-8.6	-3.6*	-3.6	-3.6	-4.0*	-4.7	-3.4	-9.4*	-9.8	-9
	Poland	2007-2020	-2.0*	-2.2	-1.7	-0.1	-1	0.8	0.8	-1.9	3.5	7.2*	7	7.4
	Romania	2017-2020	11.0*	9.3	12.8	1.8*	1.7	1.8	-5.6*	-6.1	-5.2	15.7*	12.2	19.3

*Note: Estimates are based on sex- and age-standardized distributions of categories of diseases. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, CA: cancer, CLD, chronic lung disease, CVD: cardiovascular diseases, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, MD: musculoskeletal diseases, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 11 Trends (Average Annual Percentage Change) in the prevalence of categories of diseases per country and gender (part B)

Region	Countries	Period	AAPC ND	95% CI		AAPC HT	95% CI		AAPC DB	95% CI		AAPC HL	95% CI	
				lower limit	upper limit		lower limit	upper limit		lower limit	upper limit		lower limit	upper limit
Males														
N.E.	Denmark	2004-2020	-3.4*	-4.6	-2.3	0.8*	0.5	1.2	0.6*	0.1	1.1	3.0*	2.9	3.1
	Estonia	2011-2020	8.8*	6.1	11.5	0.5*	0.3	0.7	2.2*	1.1	3.3	1.9*	0.6	3.2
	Sweden	2004-2020	3	-1.9	8.2	2.0*	2	2.1	0.3	-0.6	1.2	-1.3*	-1.6	-1
S.E.	Greece	2004-2020	3.1*	2.3	3.9	2.6*	2.3	2.9	3.1*	3	3.1	4.3*	4.1	4.5
	Spain	2004-2020	4.3*	4.2	4.3	1.5*	0.7	2.4	-0.6	-1.9	0.7	1.5*	0.3	2.8
	Italy	2004-2020	2.2*	1.9	2.6	1.0*	0.7	1.2	-1.0*	-1.2	-0.9	1.5*	0.6	2.4

	Portugal	**2011-2017**	6.8*	6.8	6.8	1.5*	1.5	1.6	1.7*	1.7	1.7	-1.2*	-1.2	-1.1
	Israel	**2005-2020**	5.6*	5.5	5.6	0.3*	0.3	0.4	1.2*	1.1	1.3	3.5*	3.3	3.7
C.W.E.	**Austria**	**2004-2020**	3.0*	0.9	5	1.5*	0.9	2.1	1.7*	0.8	2.7	1.3*	0.8	1.9
	Belgium	**2004-2020**	6.8*	5.8	7.8	0.7*	0.7	0.7	4.8*	4.1	5.5	-0.5	-1.4	0.4
	France	**2004-2020**	2.3*	2.2	2.4	1.7*	1.6	1.9	1.0*	0.4	1.6	-0.3*	-0.3	-0.3
	Germany	**2004-2020**	1.3*	0.3	2.4	1.8*	0.4	3.2	2.7*	1.1	4.4	0.8	-0.5	2.1
	Switzerland	**2004-2020**	3.8*	3.8	3.8	1.1*	0.3	1.9	2.0*	1.4	2.6	1.0*	0.9	1.1
	Croatia	**2015-2020**	2.7	-13.2	21.4	4.2*	0.3	8.3	-4.1	-8.3	0.3	6.9*	4.7	9.1
	Luxembourg	**2013-2020**	0.8	-9.3	12	3.3*	2.2	4.5	-2.7*	-2.9	-2.5	0.8	-3	4.8
	Netherlands	**2004-2020**	0	-0.4	0.4	-0.1*	-0.1	0	1.5*	1.4	1.6	1.4*	1.3	1.5
	Slovenia	**2011-2020**	10.4*	8.2	12.7	0.3*	0.3	0.3	3.0*	2.7	3.3	4.8*	4.1	5.6
	Czechia	**2007-2020**	3.6*	0.4	6.9	0.9*	0.6	1.2	1.3*	0.9	1.7	2.9*	2.7	3.1
E.E.	**Hungary**	**2011-2020**	4.1*	0.9	7.5	0.9*	0.9	1	2.9*	2.9	2.9	-2.7*	-3.2	-2.1
	Poland	**2007-2020**	0.6*	0.6	0.6	1.6*	1.6	1.6	5.7*	4.6	6.8	3.7*	2.4	5
	Romania	**2017-2020**	26.2	16.7	36.5	9.4*	8.1	10.7	4.2*	3.9	4.5	20.4*	14.6	26.6
Females														
N.E.	**Denmark**	**2004-2020**	-3.2*	-5.8	-0.5	0.3	-0.3	0.9	0.2*	0.1	0.2	3.7*	3.7	3.7
	Estonia	**2011-2020**	2.8*	2.5	3	-1.0*	-1.2	-0.8	0.6	-1.1	2.4	-2.2*	-2.3	-2.1
	Sweden	**2004-2020**	0.5	-2.3	3.3	0.2	-0.7	1.1	0.4	-0.8	1.5	-2.2*	-2.6	-1.9
S.E.	**Greece**	**2004-2020**	3.2*	0.3	6.2	0.8*	0.7	0.8	3.0*	3	3	2.7*	2.4	3
	Spain	**2004-2020**	-0.2	-2.5	2.1	-1.6*	-1.8	-1.4	0.0*	0	0.1	1.6*	1.4	1.7
	Italy	**2004-2020**	0.7	-1.9	3.5	0.2	-0.4	0.9	-0.5	-1.8	0.7	0.6	-0.4	1.6
	Portugal	**2011-2017**	4.9*	4.7	5	1.6*	1.6	1.6	-2.8*	-2.9	-2.8	1.5*	1.4	1.6
	Israel	**2005-2020**	1.8*	1.7	1.8	-2.0*	-2.2	-1.8	0.4	-0.2	0.9	-1.7*	-1.8	-1.6
C.W.E.	**Austria**	**2004-2020**	0.7	-2.8	4.3	-0.1*	-0.1	-0.1	1.6*	1.6	1.6	2.5*	2.1	2.8
	Belgium	**2004-2020**	2.2*	2.2	2.2	-0.1	-0.5	0.4	0.8*	0.6	1.1	-0.2*	-0.3	-0.1
	France	**2004-2020**	-1.3*	-1.5	-1.1	0.2*	0.1	0.2	0.7*	0.5	0.8	-1.0*	-1.8	-0.2
	Germany	**2004-2020**	-0.1	-0.3	0.2	1.2*	0.7	1.7	-0.1	-0.7	0.4	-0.4*	-0.5	-0.3
	Switzerland	**2004-2020**	-2.3	-7.5	3.3	-0.4*	-0.4	-0.3	0.4*	0.1	0.7	0.8	-0.1	1.7
	Croatia	**2015-2020**	2.8	-6.9	13.5	2.8*	2.5	3.1	2.5	-1.4	6.6	4.9*	4.3	5.6
	Luxembourg	**2013-2020**	5.0*	0.9	9.2	1.3*	0.7	1.9	-1	-4.7	2.7	-1.7	-3.6	0.3

	Netherlands	**2004-2020**	0.2	-0.4	0.7	-0.8*	-0.9	-0.8	-2.4*	-2.4	-2.4	-0.1	-0.6	0.4
	Slovenia	**2011-2020**	11.7*	6.3	17.3	-0.3*	-0.3	-0.2	0.4	-1.2	2	1.5	-0.4	3.5
E.E.	**Czechia**	**2007-2020**	1.4	-2.7	5.7	0.3	-0.2	0.8	0.2*	0	0.4	1.8*	1.5	2.1
	Hungary	**2011-2020**	-4.5*	-4.7	-4.2	-0.5*	-0.5	-0.5	5.5*	5.4	5.6	-7.0*	-7.3	-6.8
	Poland	**2007-2020**	-1.9*	-2.3	-1.5	0.3*	0.2	0.3	2.7*	2.6	2.9	1.6*	1.6	1.7
	Romania	**2017-2020**	29.6*	18.4	41.7	-1.1*	-1.1	-1.1	5.0*	4.7	5.4	-3.9	-4.1	-3.6

*Note: Estimates are based on sex- and age-standardized distributions of categories of diseases. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, DB: diabetes, E.E.: Eastern Europe, HL: hyperlipidemia, HT: hypertension, ND: neurodegenerative diseases, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

The following figures display the trends in the prevalence of the standardized distributions of the prevalence of chronic diseases in Greece, Poland and Romania over time along with the jointpoints of the respective segmented regression analyses.

Figure 51 Trends in the prevalence (%) of cardiovascular diseases in Greece

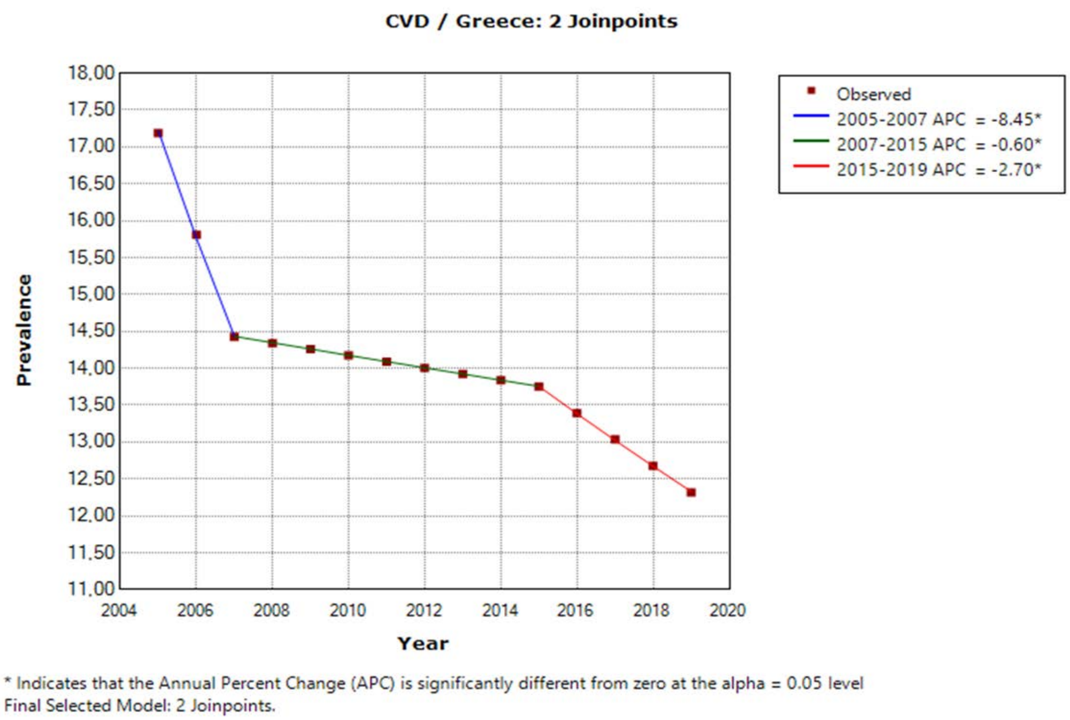


Figure 52 Trends in the prevalence (%) of cardiovascular diseases in Greece per gender

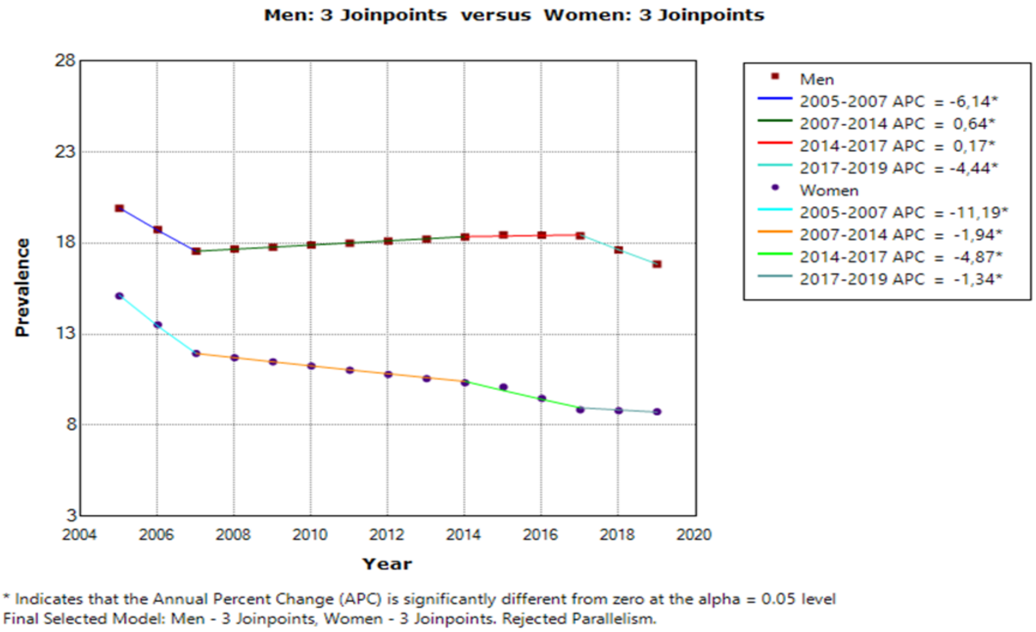


Figure 53 Trends in the prevalence (%) of cardiovascular diseases in Poland

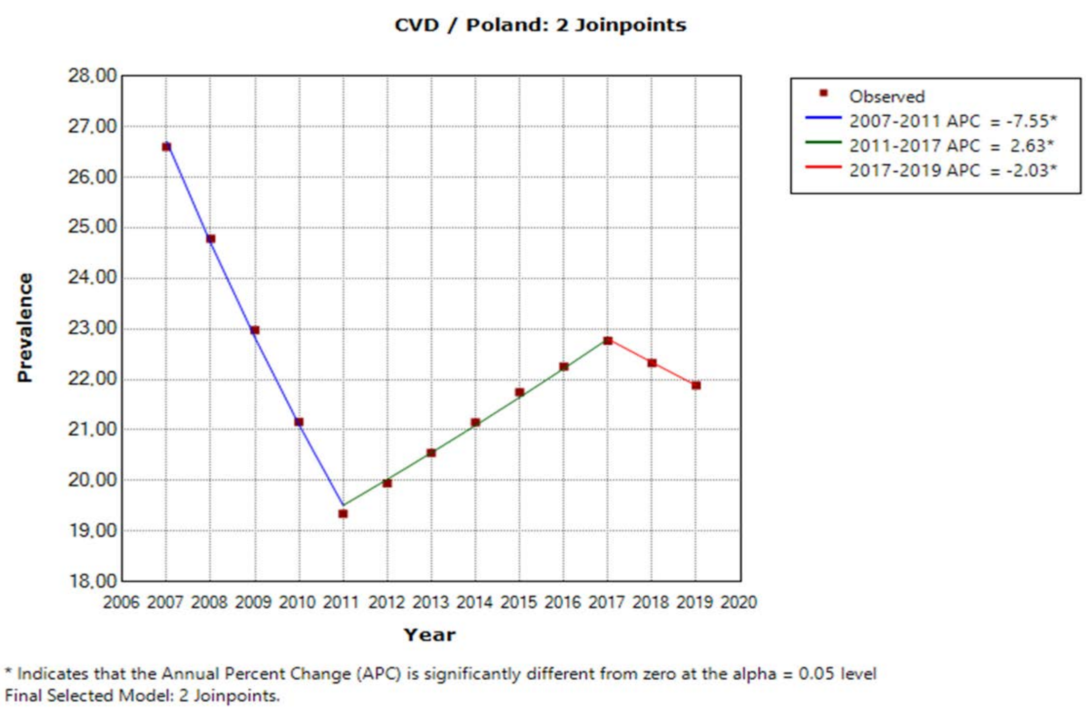


Figure 54 Trends in the prevalence (%) of cardiovascular diseases in Poland per gender

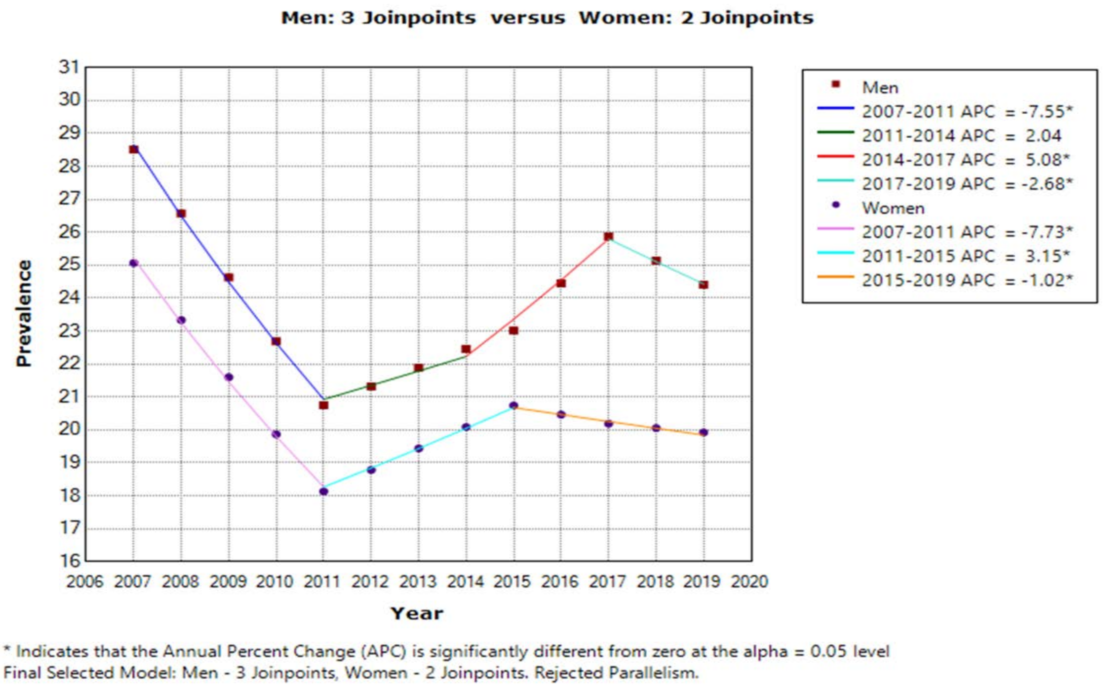


Figure 55 Trends in the prevalence (%) of cardiovascular diseases in Romania

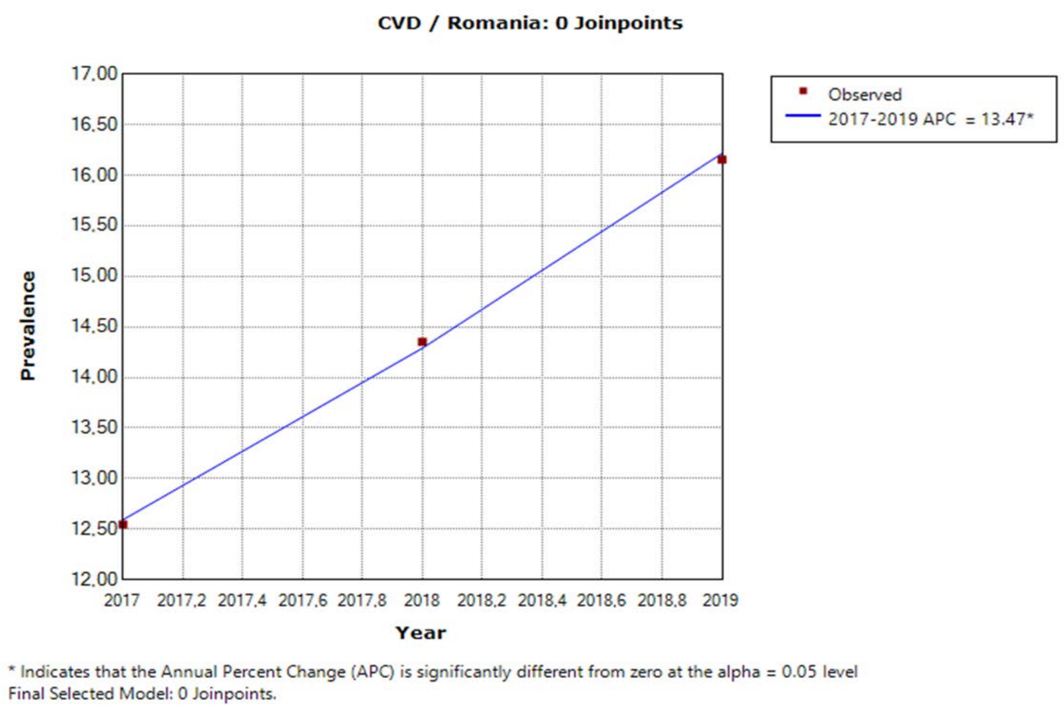


Figure 56 Trends in the prevalence (%) of cardiovascular diseases in Romania per gender

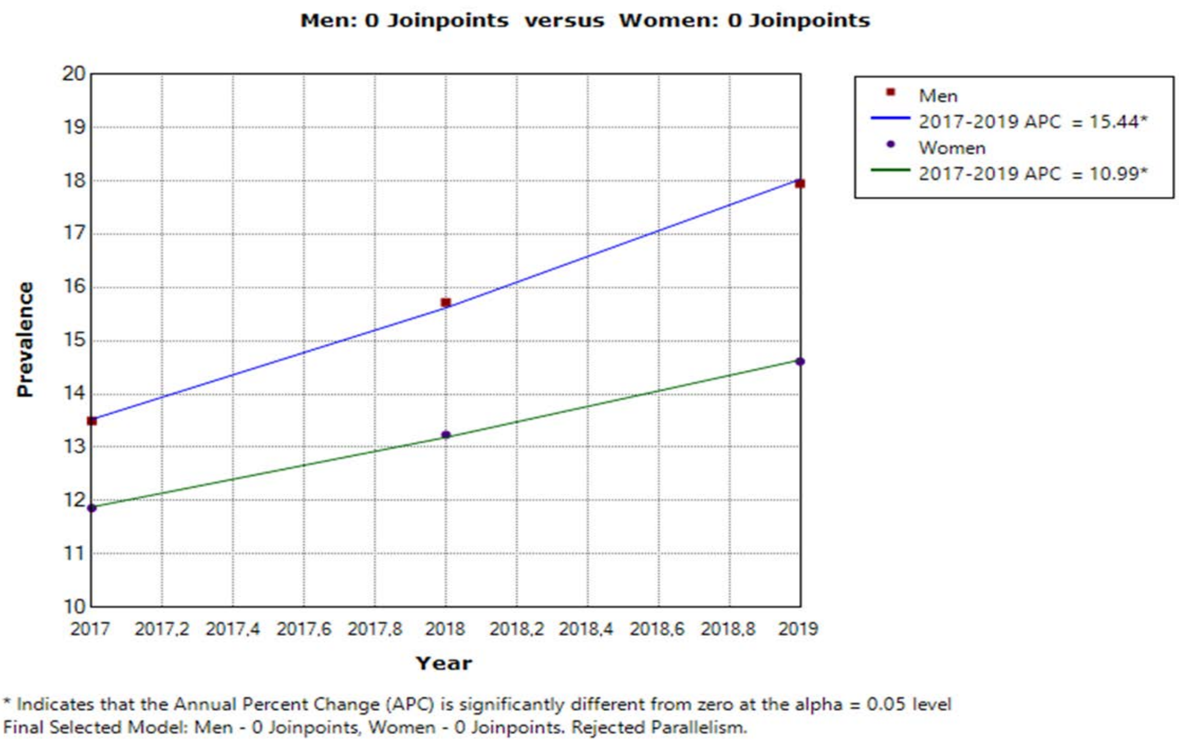


Figure 57 Trends in the prevalence (%) of musculoskeletal diseases in Greece

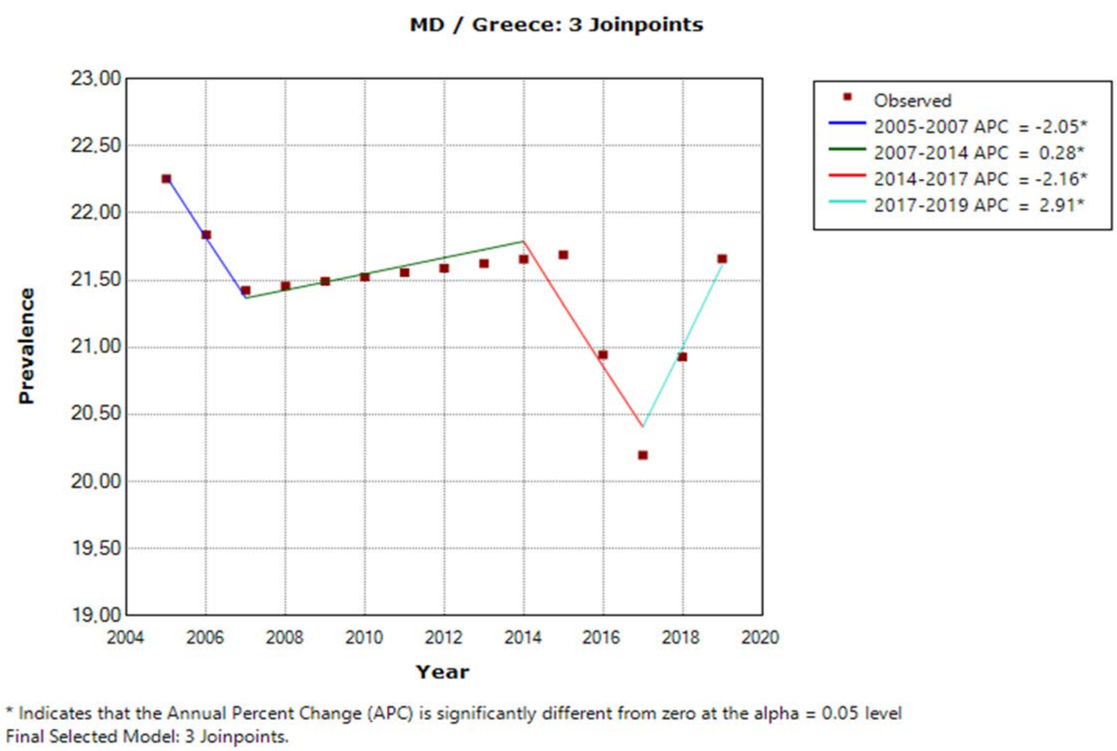


Figure 58 Trends in the prevalence (%) of musculoskeletal diseases in Greece per gender

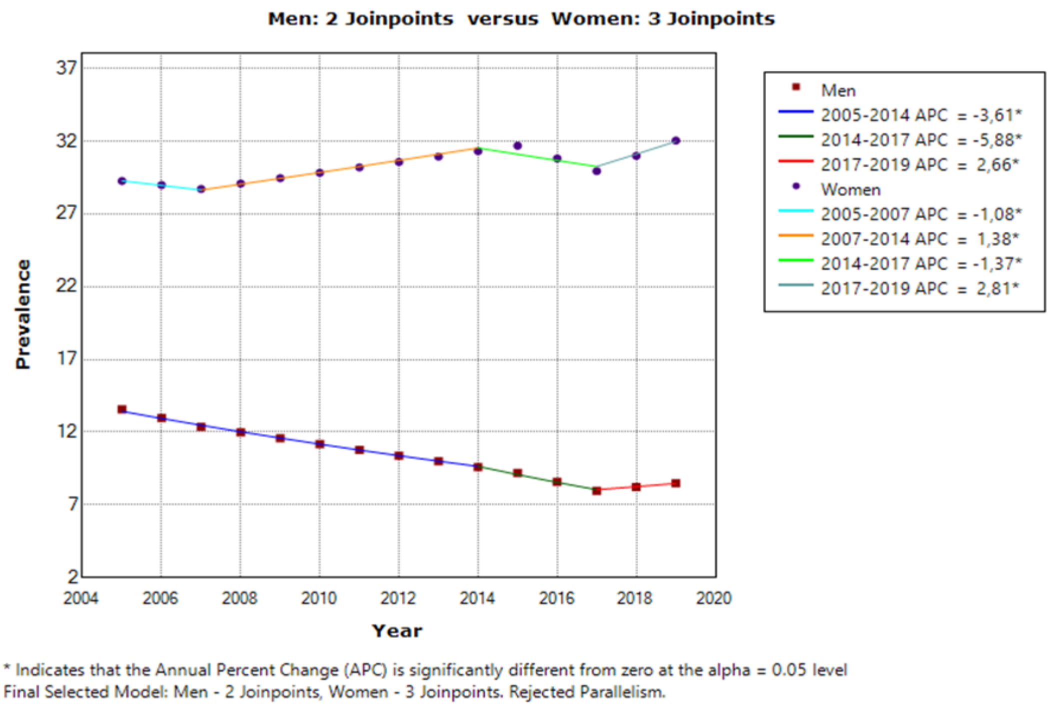


Figure 59 Trends in the prevalence (%) of musculoskeletal diseases in Poland

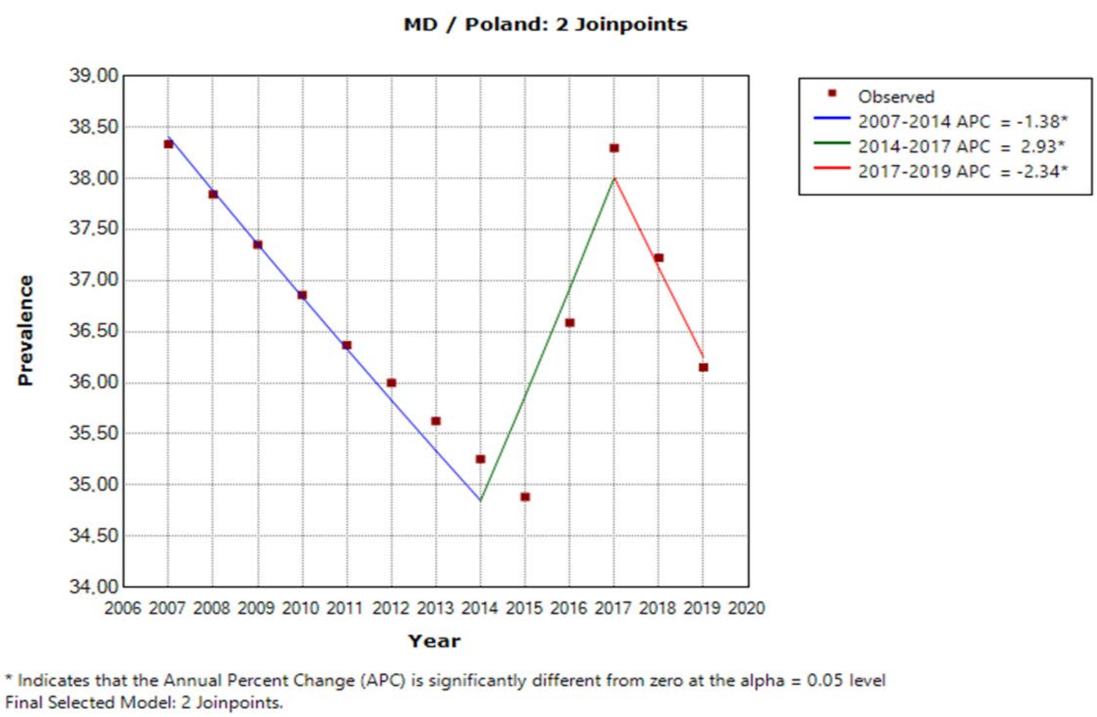


Figure 60 Trends in the prevalence (%) of musculoskeletal diseases in Poland per gender

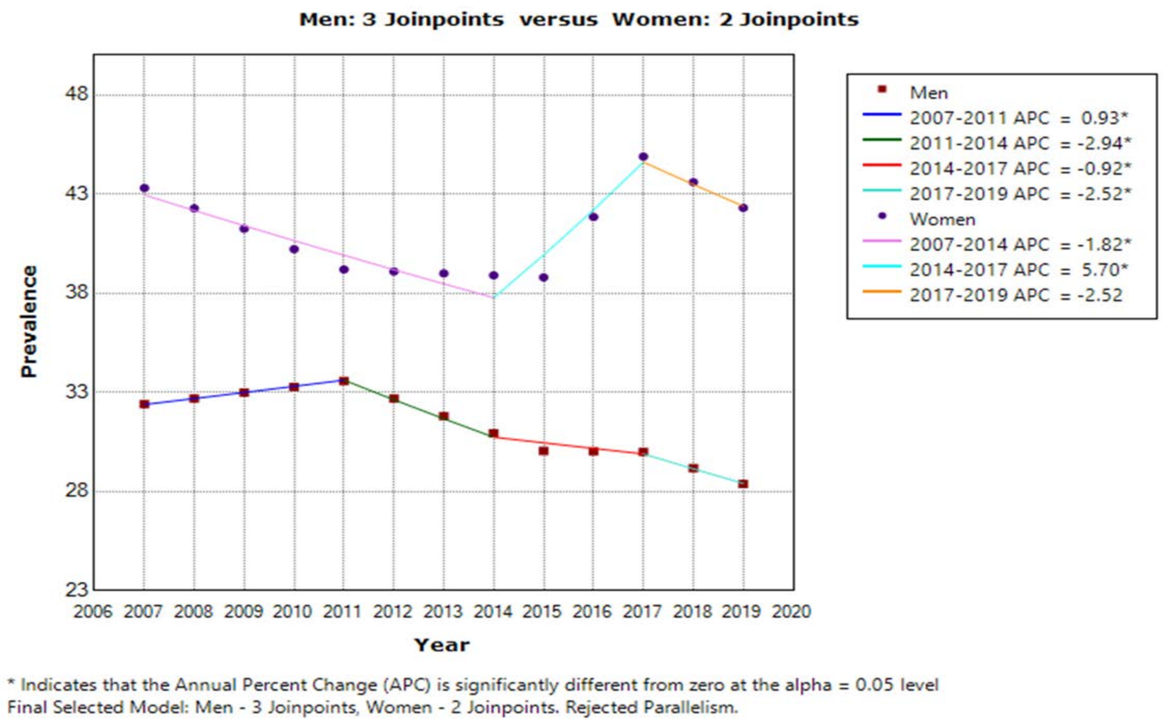


Figure 61 Trends in the prevalence (%) of musculoskeletal diseases in Romania

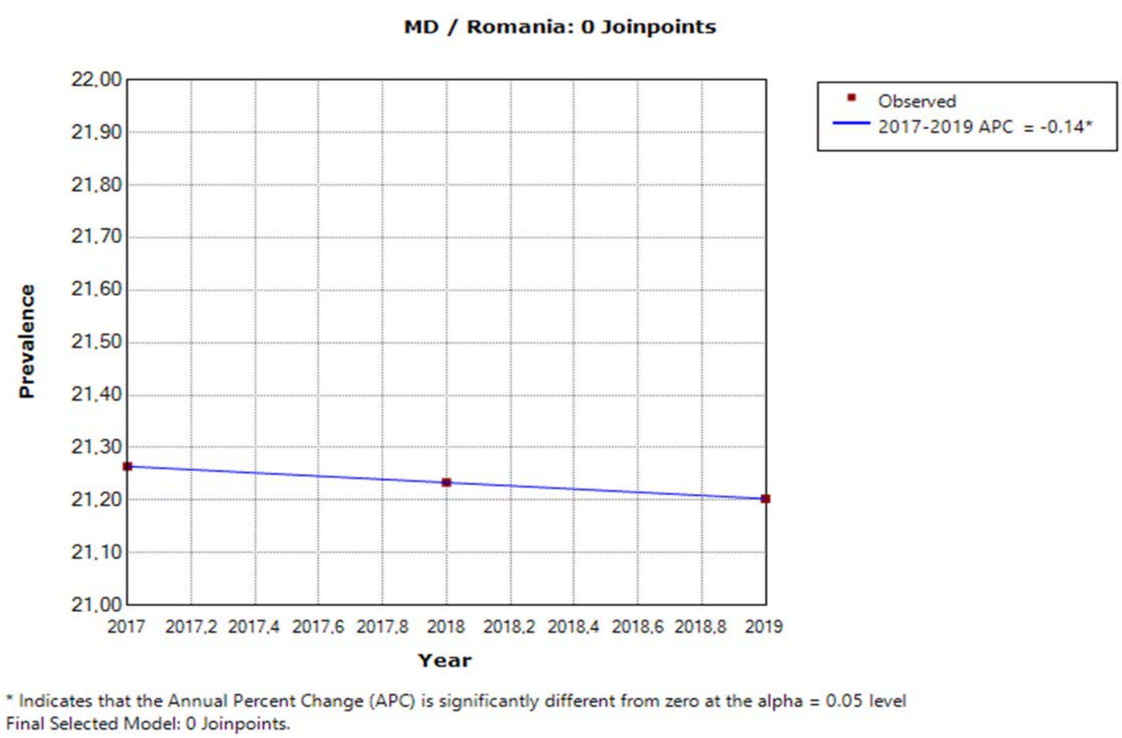


Figure 62 Trends in the prevalence (%) of musculoskeletal diseases in Romania per gender

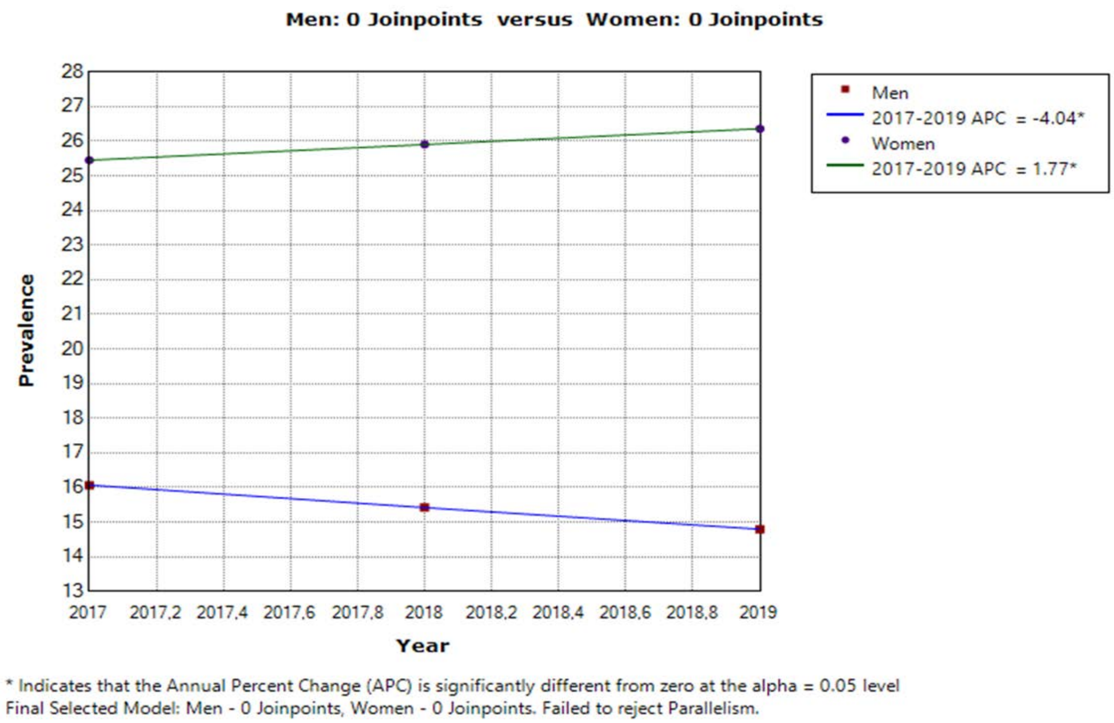


Figure 63 Trends in the prevalence (%) of chronic lung disease in Greece

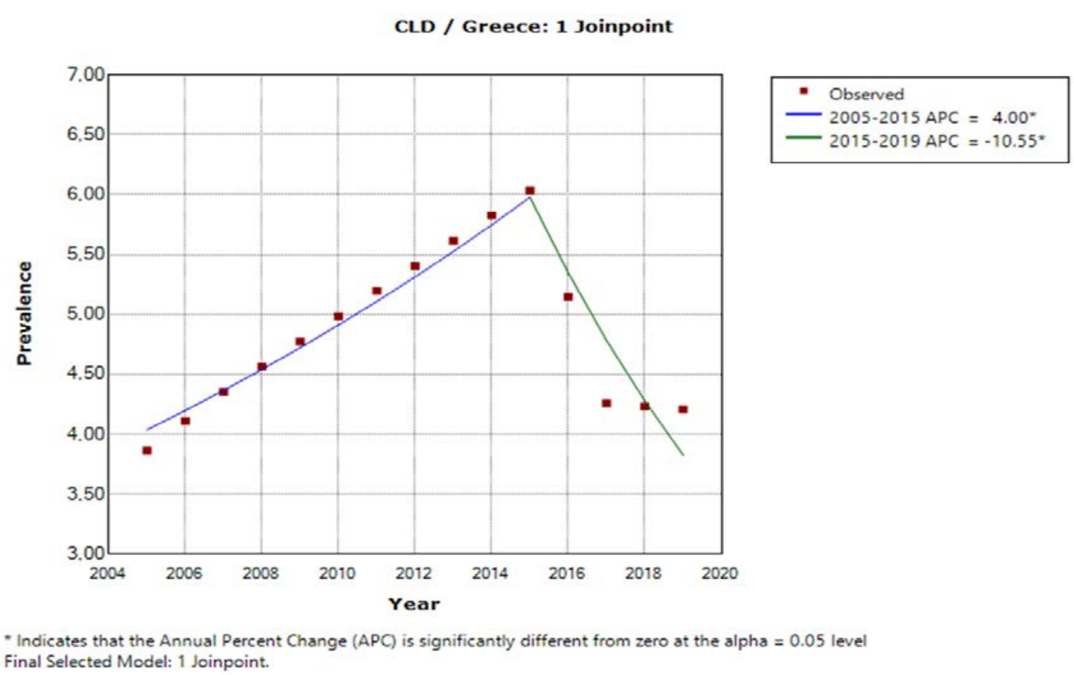


Figure 64 Trends in the prevalence (%) of chronic lung disease in Greece per gender

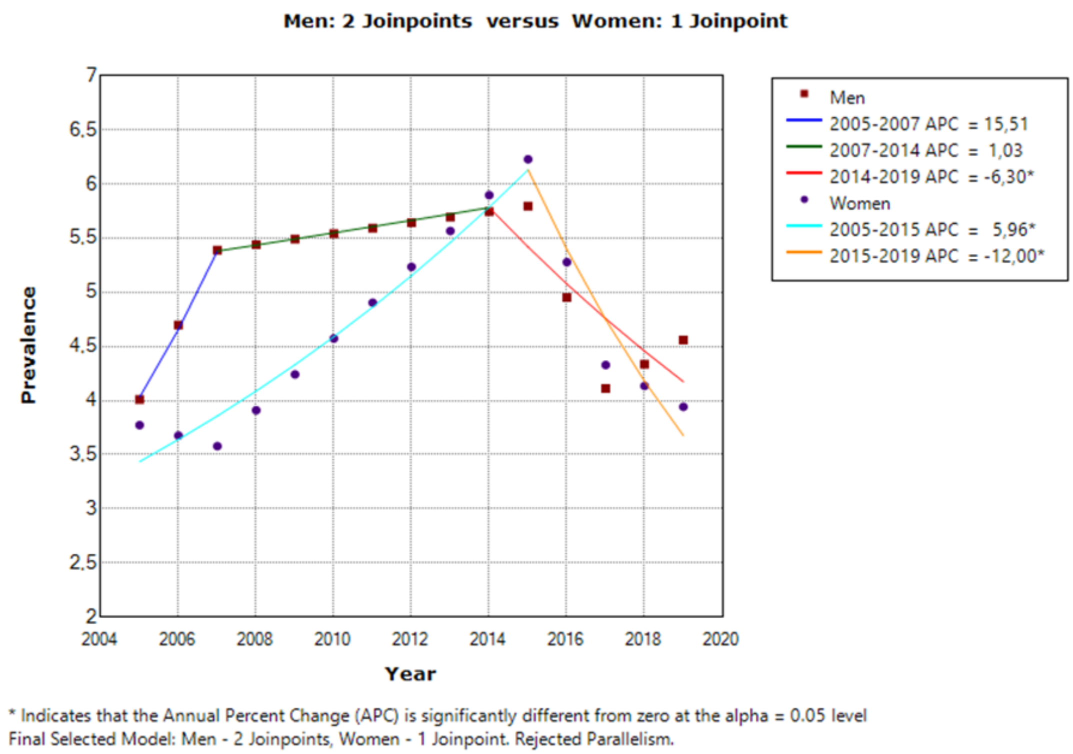


Figure 65 Trends in the prevalence (%) of chronic lung disease in Poland

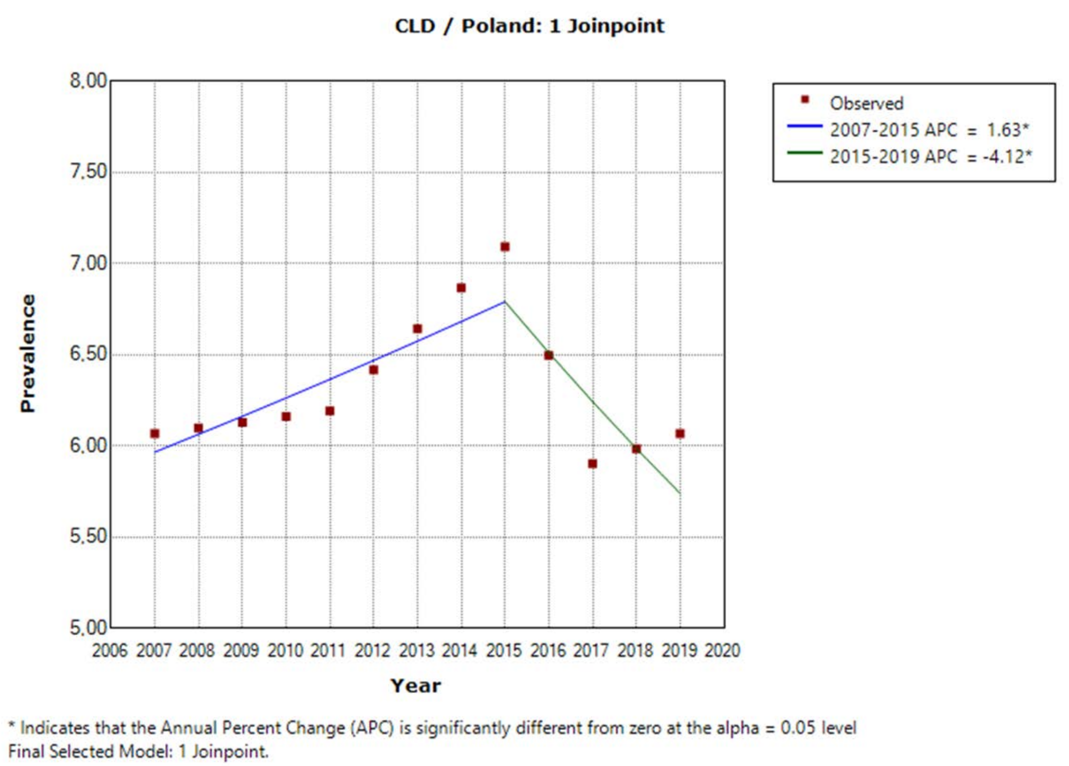


Figure 66 Trends in the prevalence (%) of chronic lung disease in Poland per gender

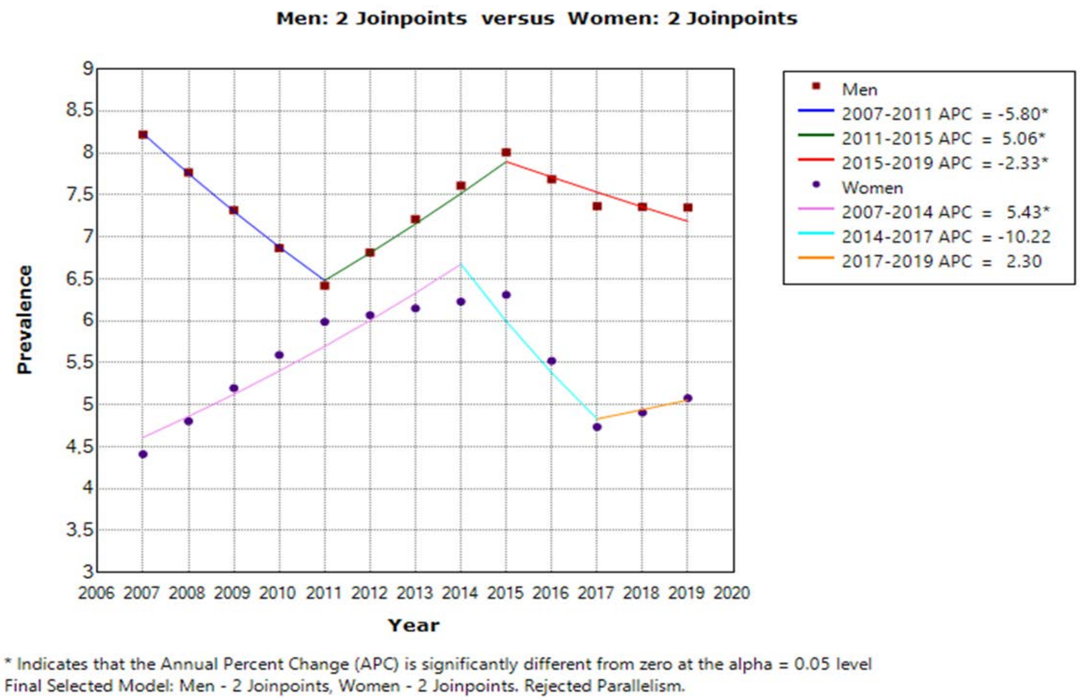


Figure 67 Trends in the prevalence (%) of chronic lung disease in Romania

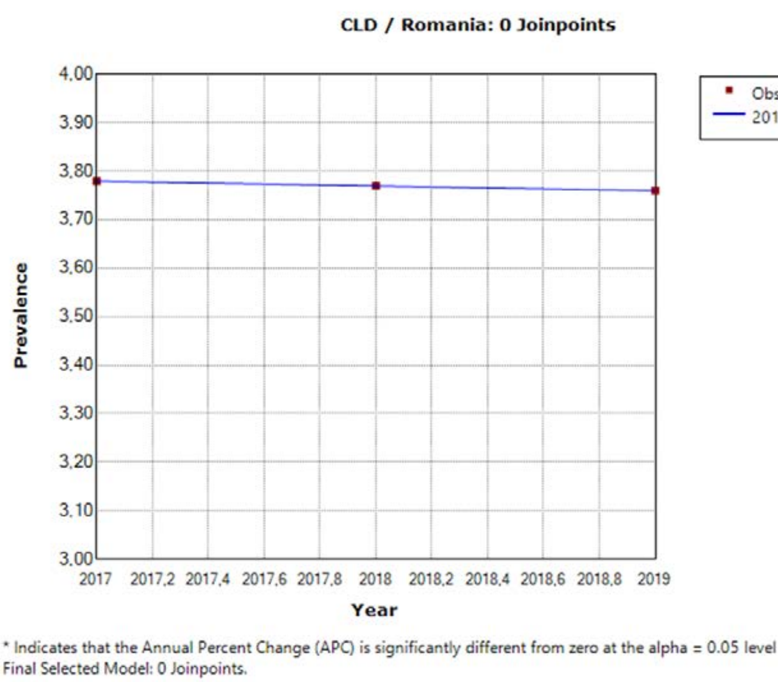


Figure 68 Trends in the prevalence (%) of chronic lung disease in Romania per gender

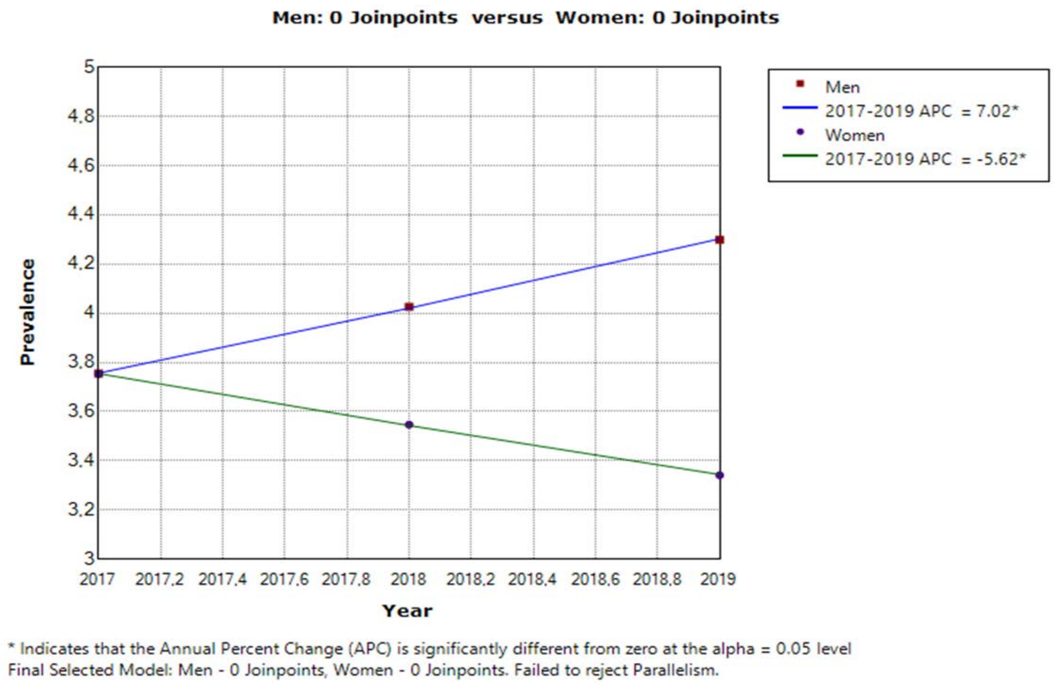


Figure 69 Trends in the prevalence (%) of cancer in Greece

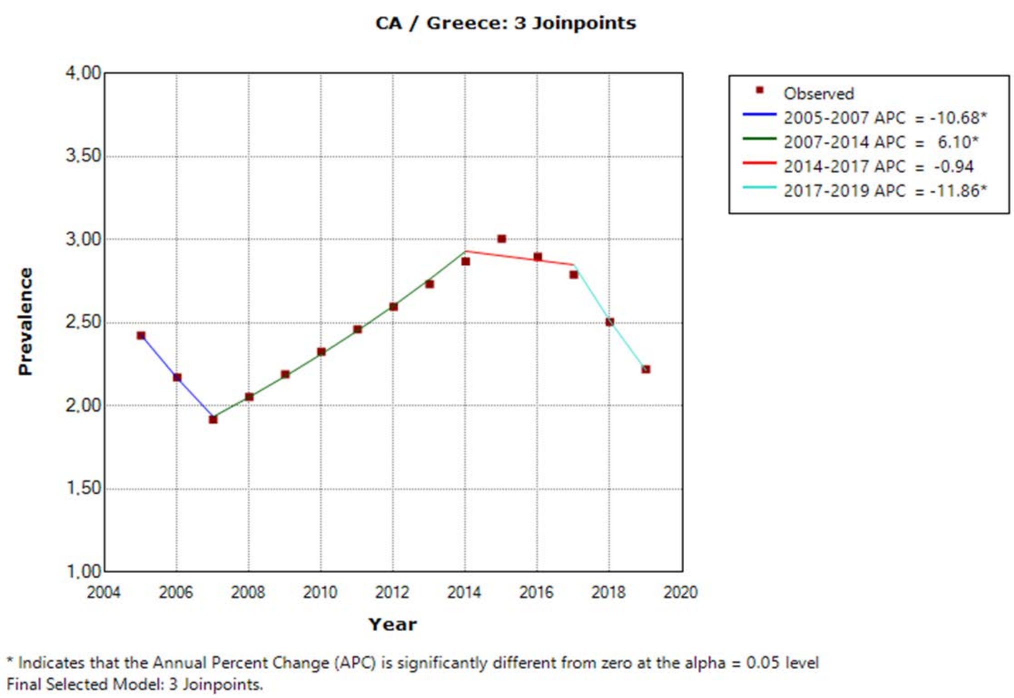


Figure 70 Trends in the prevalence (%) of cancer in Greece per gender

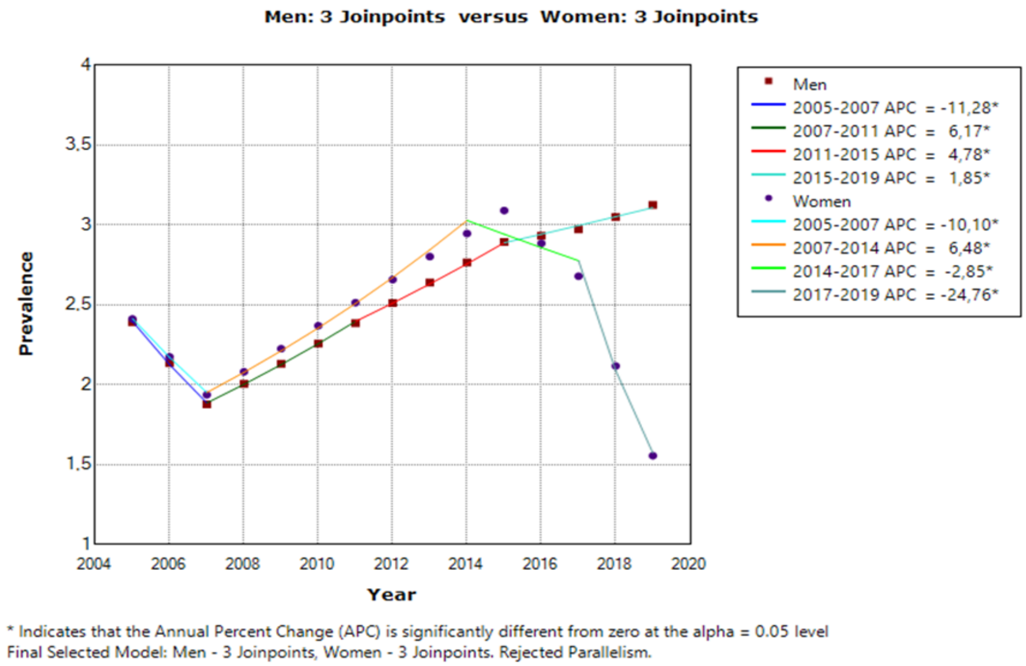


Figure 71 Trends in the prevalence (%) of cancer in Poland

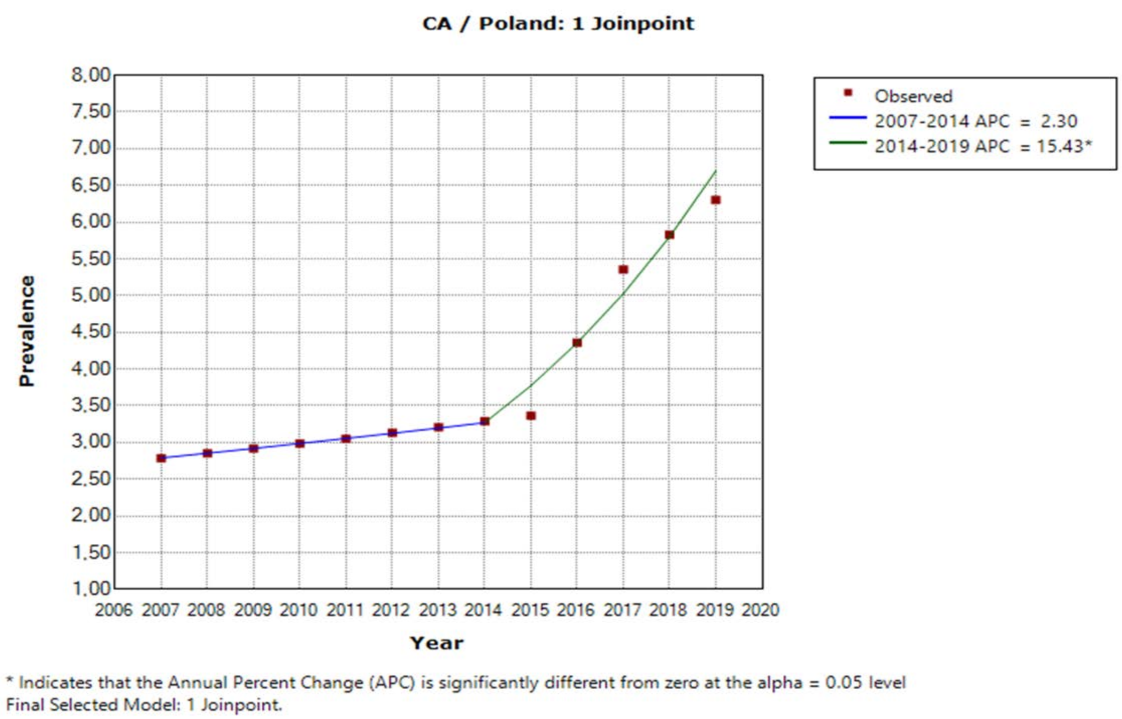


Figure 72 Trends in the prevalence (%) of cancer in Poland per gender

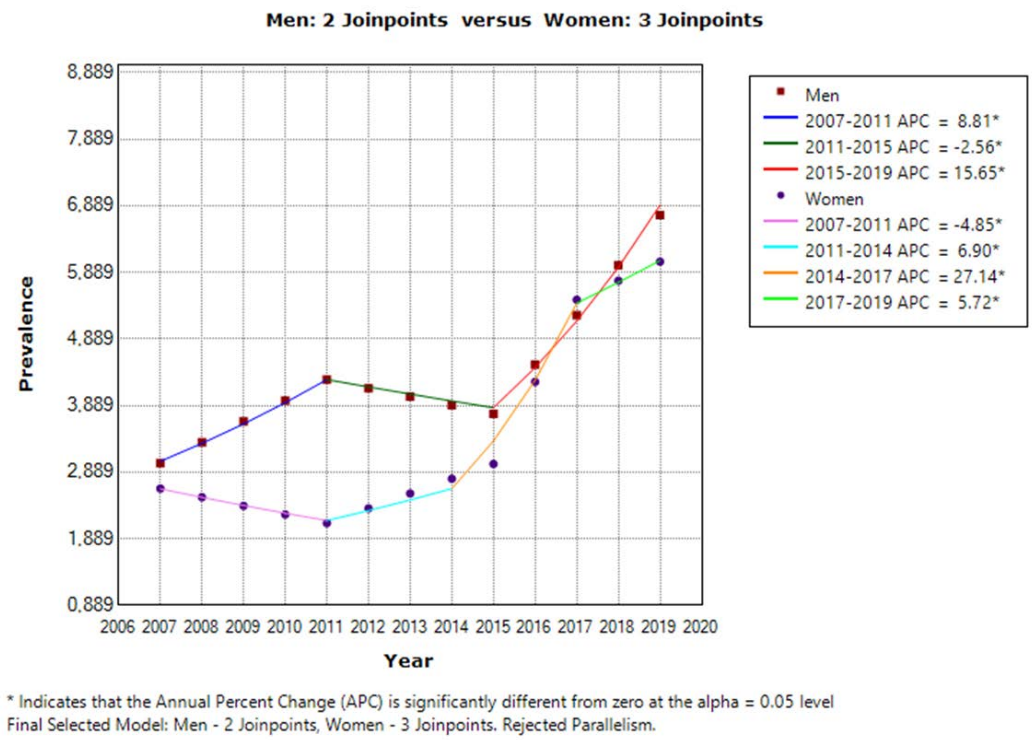


Figure 73 Trends in the prevalence (%) of cancer in Romania

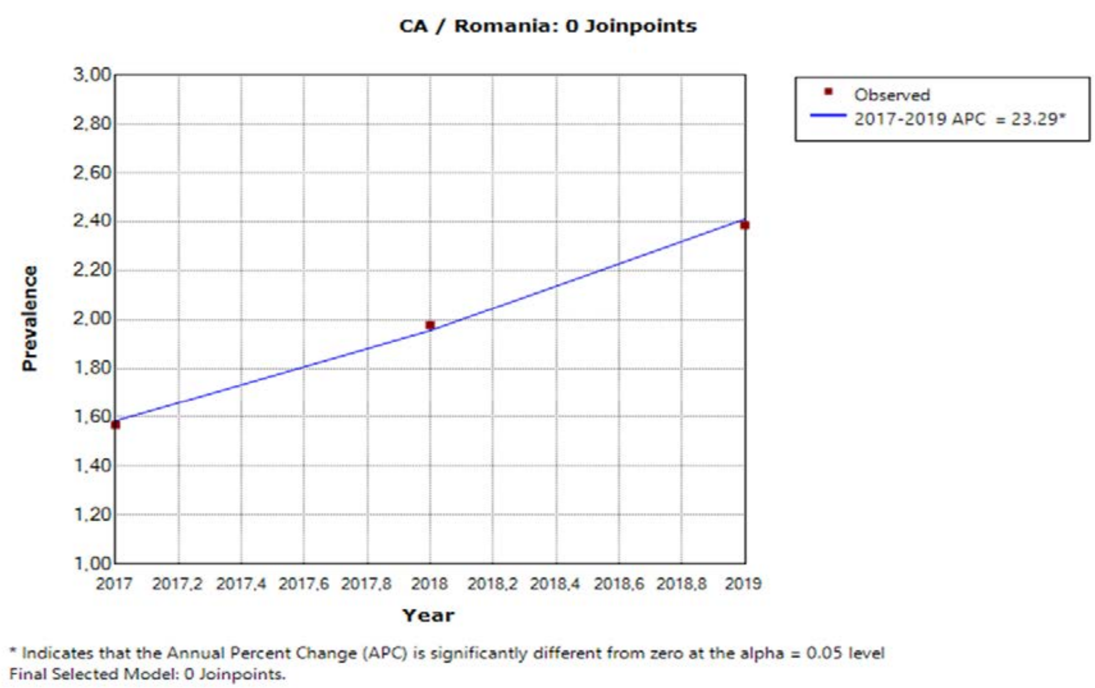


Figure 74 Trends in the prevalence (%) of cancer in Romania per gender

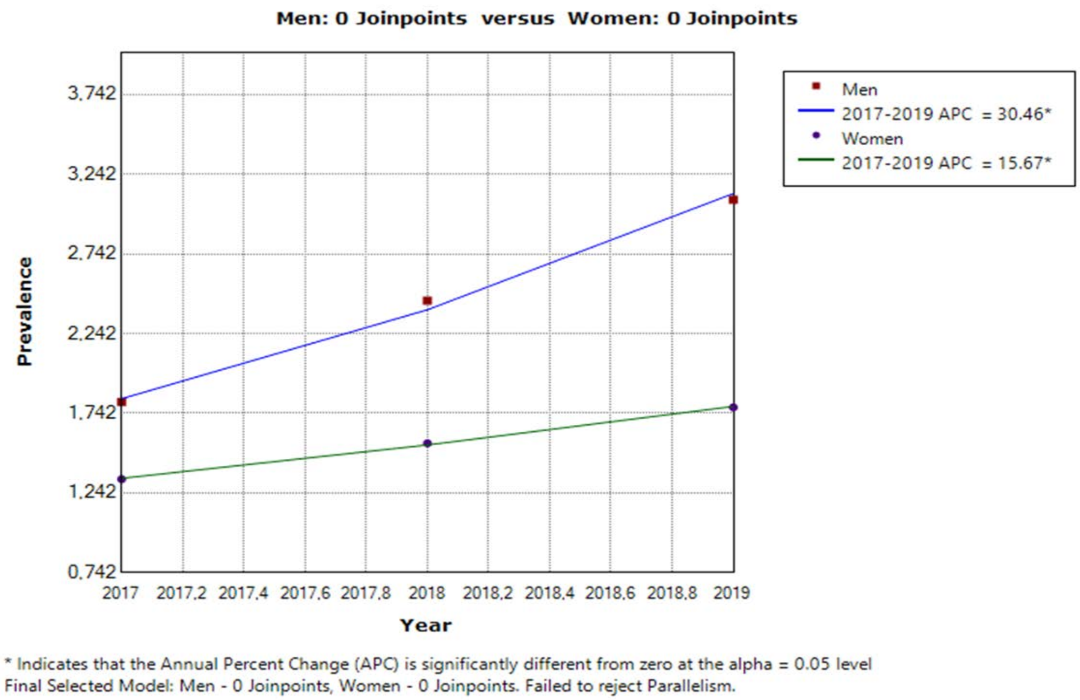


Figure 75 Trends in the prevalence (%) of neurodegenerative diseases in Greece

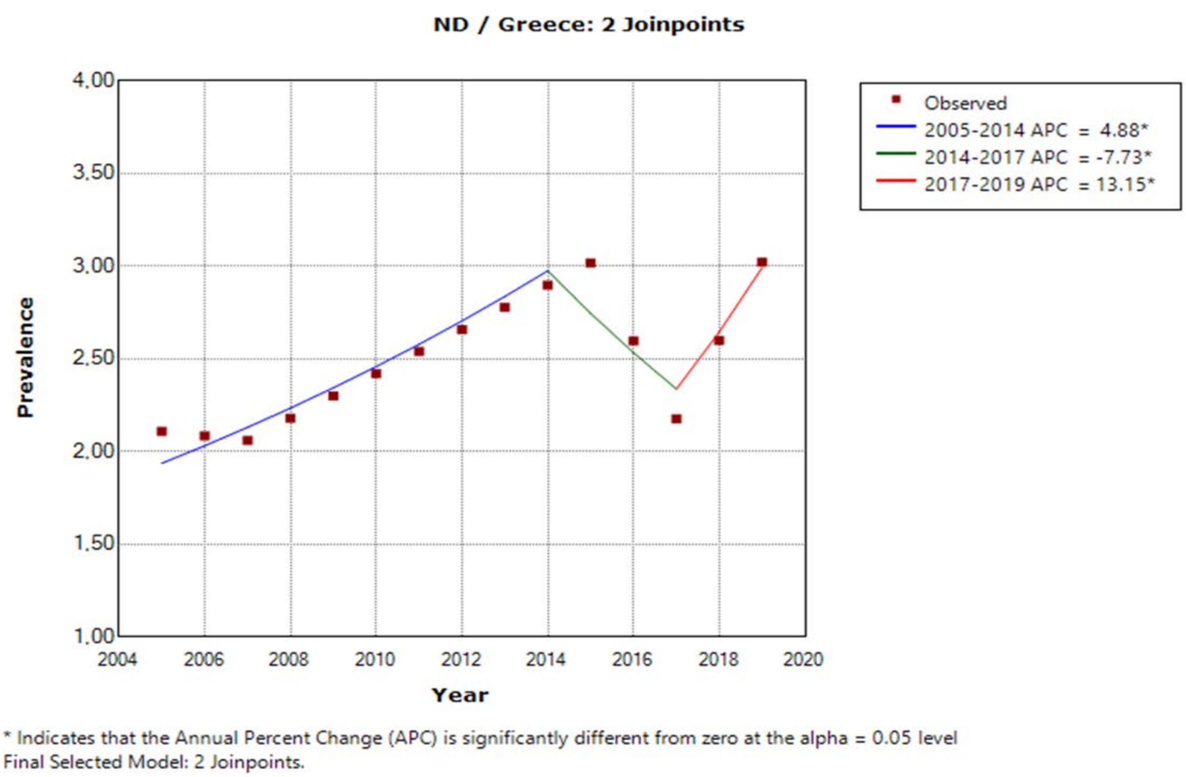


Figure 76 Trends in the prevalence (%) of neurodegenerative diseases in Greece per gender

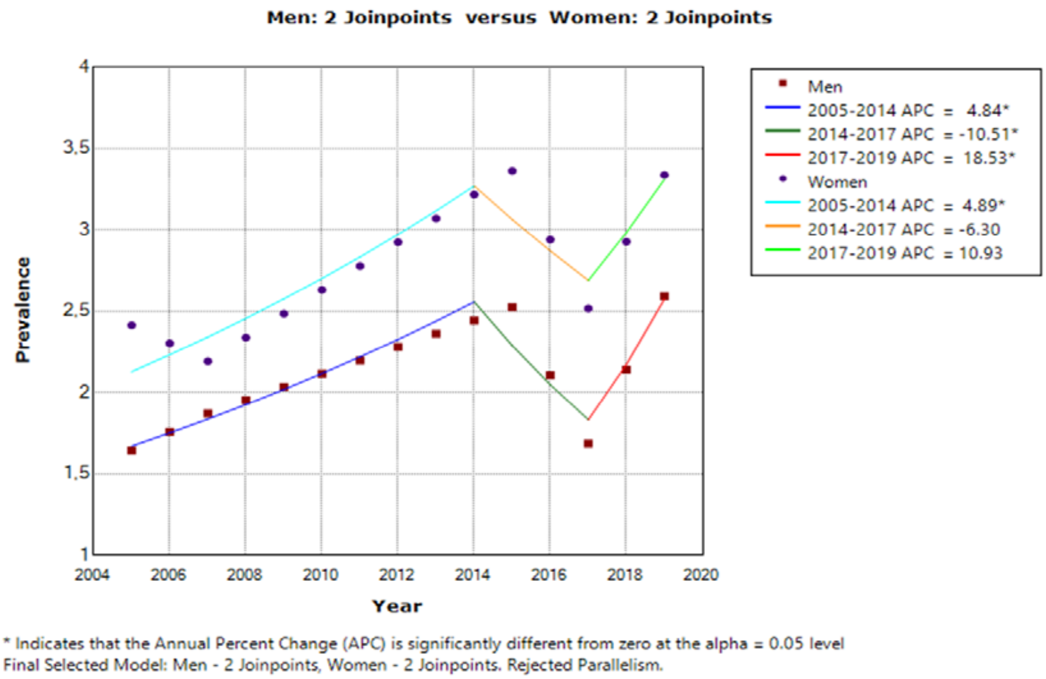


Figure 77 Trends in the prevalence (%) of neurodegenerative diseases in Poland

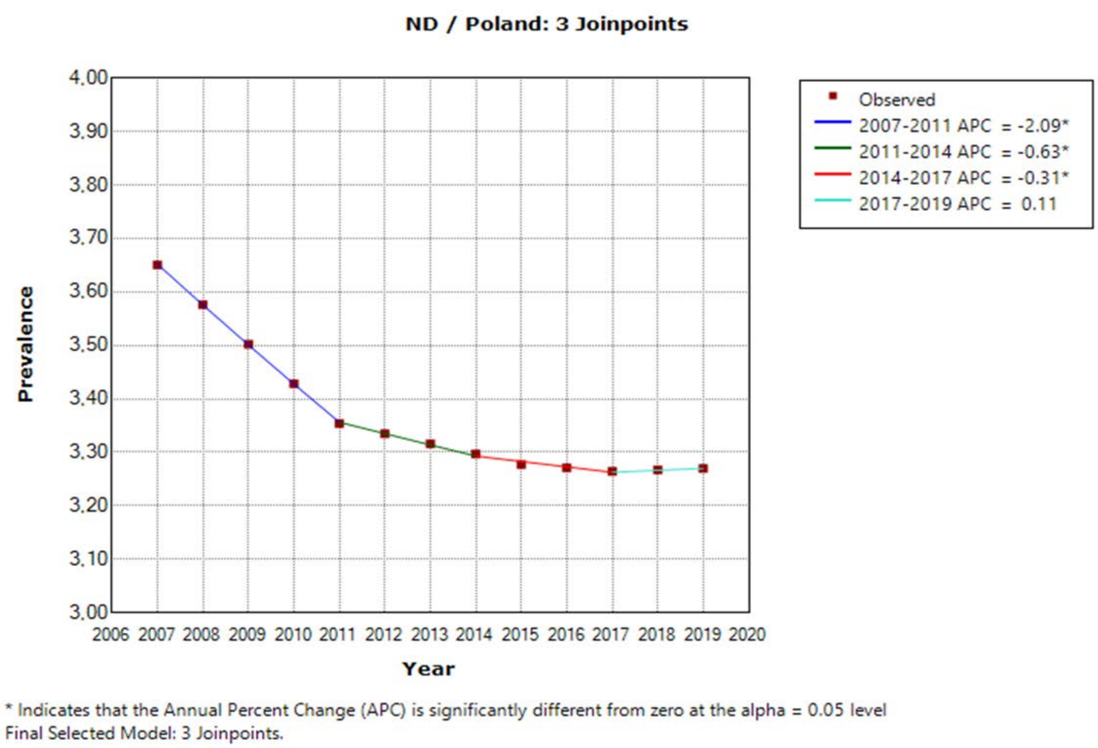


Figure 78 Trends in the prevalence (%) of neurodegenerative diseases in Poland per gender

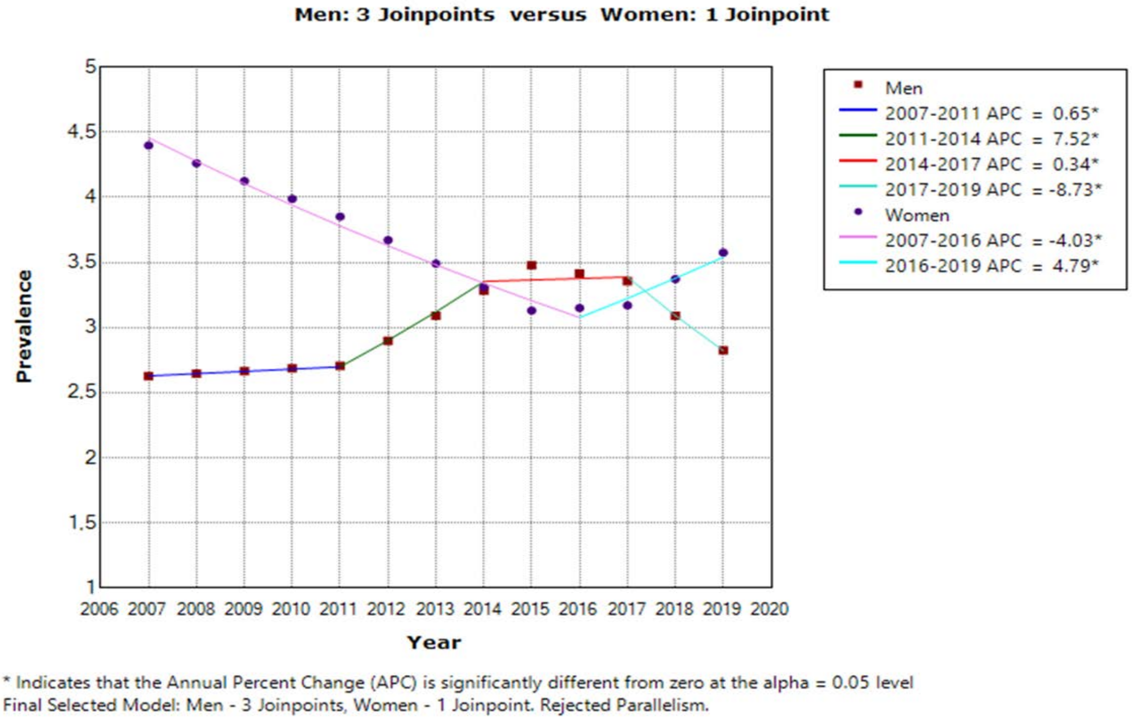


Figure 79 Trends in the prevalence (%) of neurodegenerative diseases in Romania

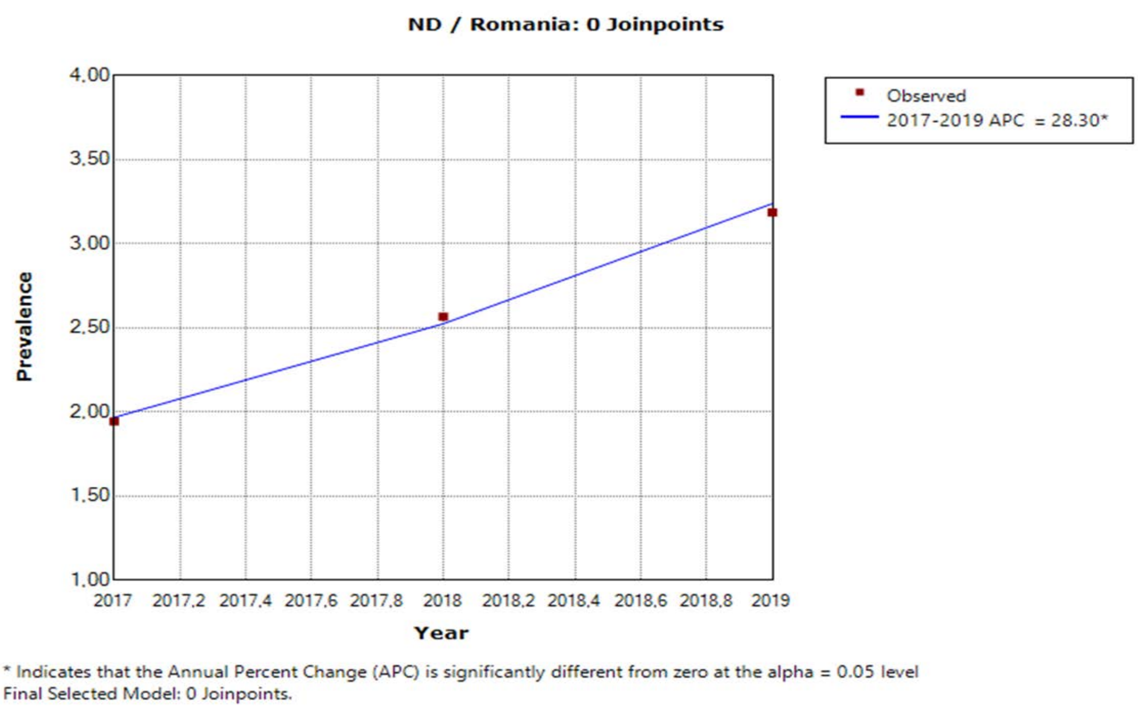
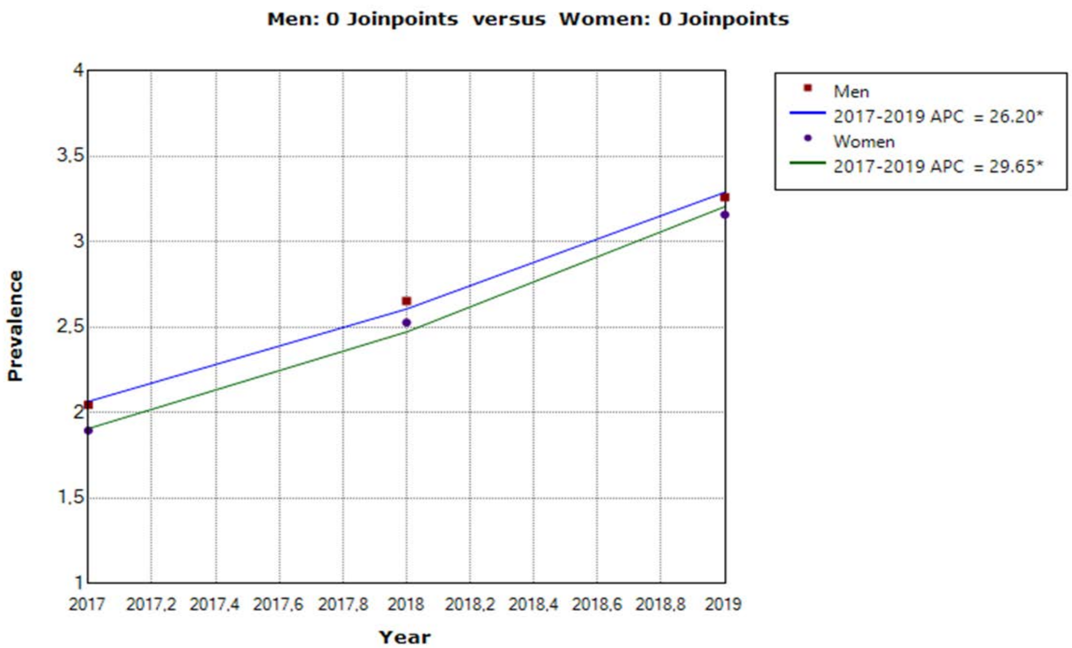
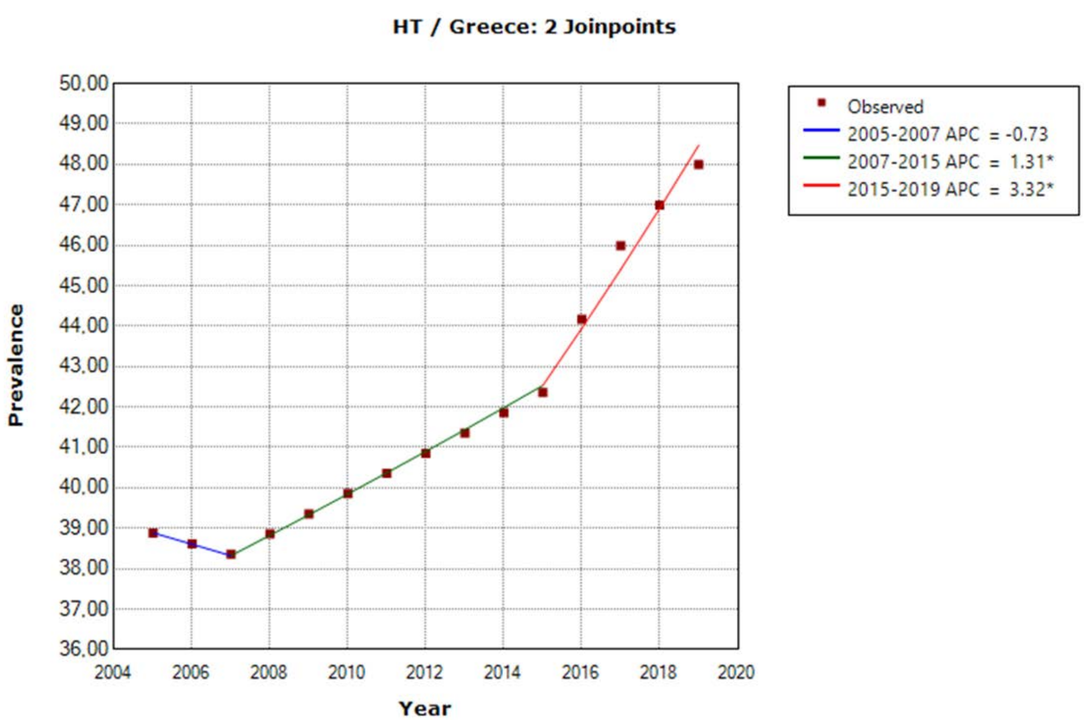


Figure 80 Trends in the prevalence (%) of neurodegenerative diseases in Romania per gender



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: Men - 0 Joinpoints, Women - 0 Joinpoints. Rejected Parallelism.

Figure 81 Trends in the prevalence (%) of hypertension in Greece



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: 2 Joinpoints.

Figure 82 Trends in the prevalence (%) of hypertension in Greece per gender

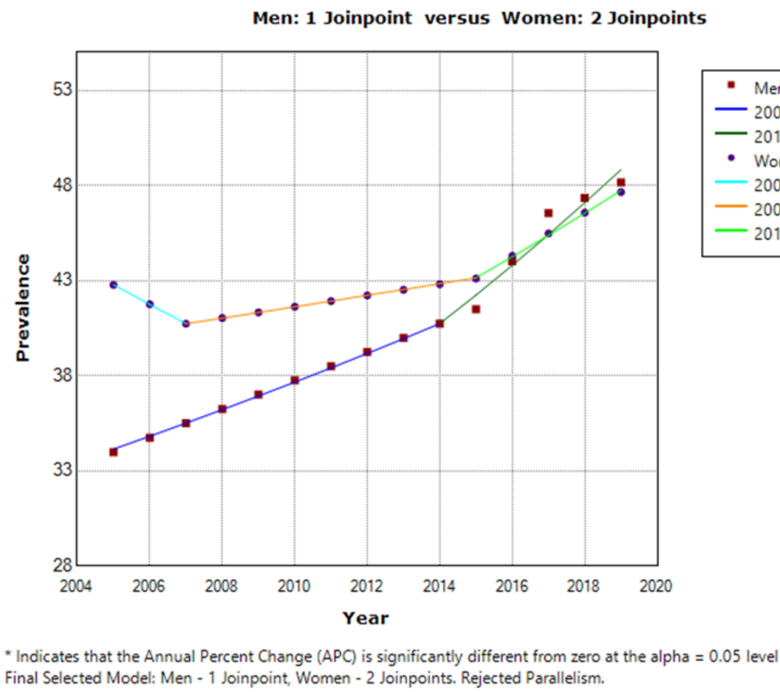


Figure 83 Trends in the prevalence (%) of hypertension in Poland

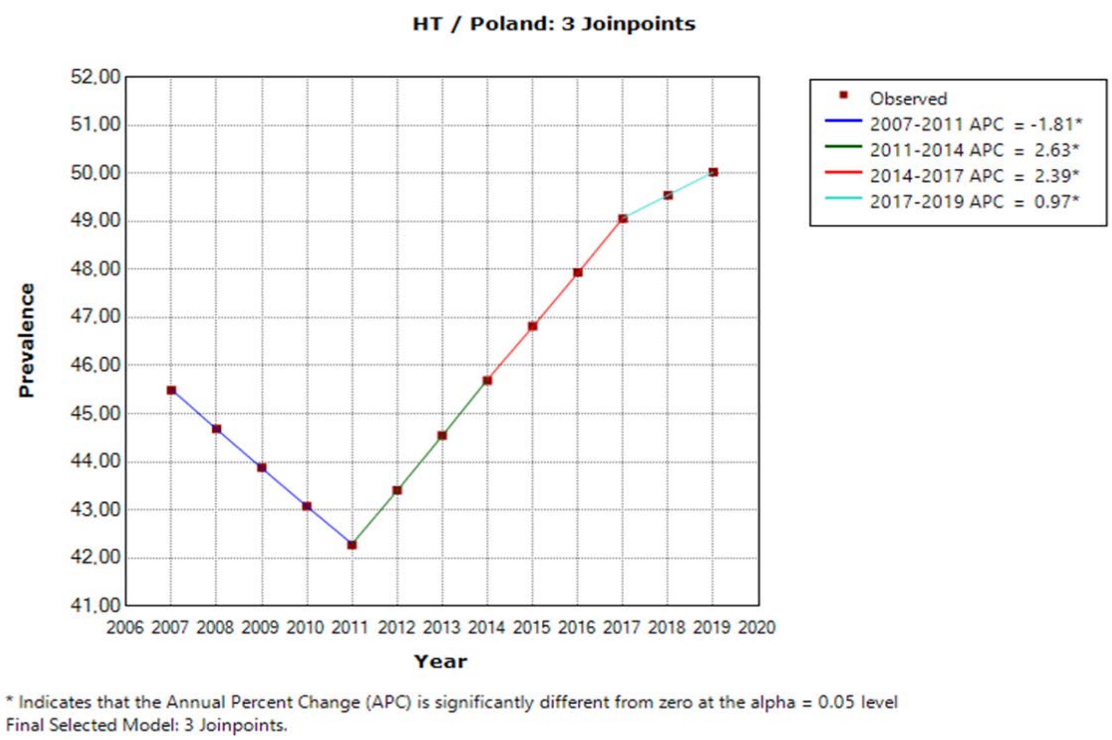


Figure 84 Trends in the prevalence (%) of hypertension in Poland per gender

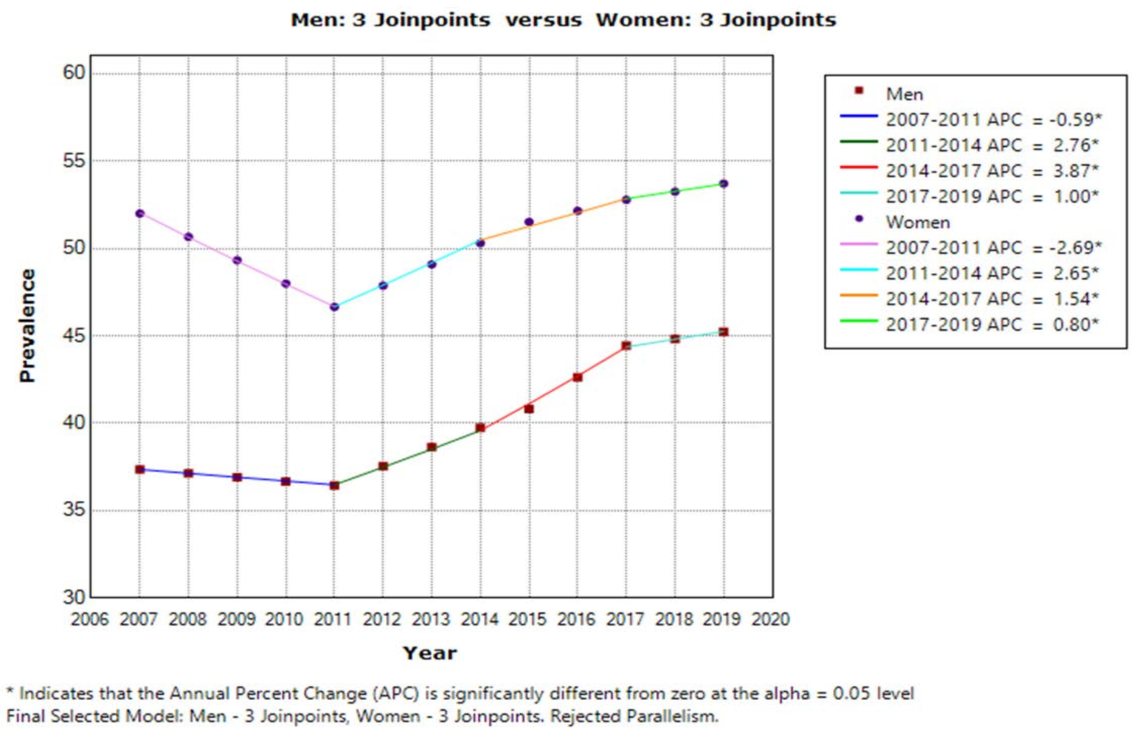


Figure 85 Trends in the prevalence (%) of hypertension in Romania

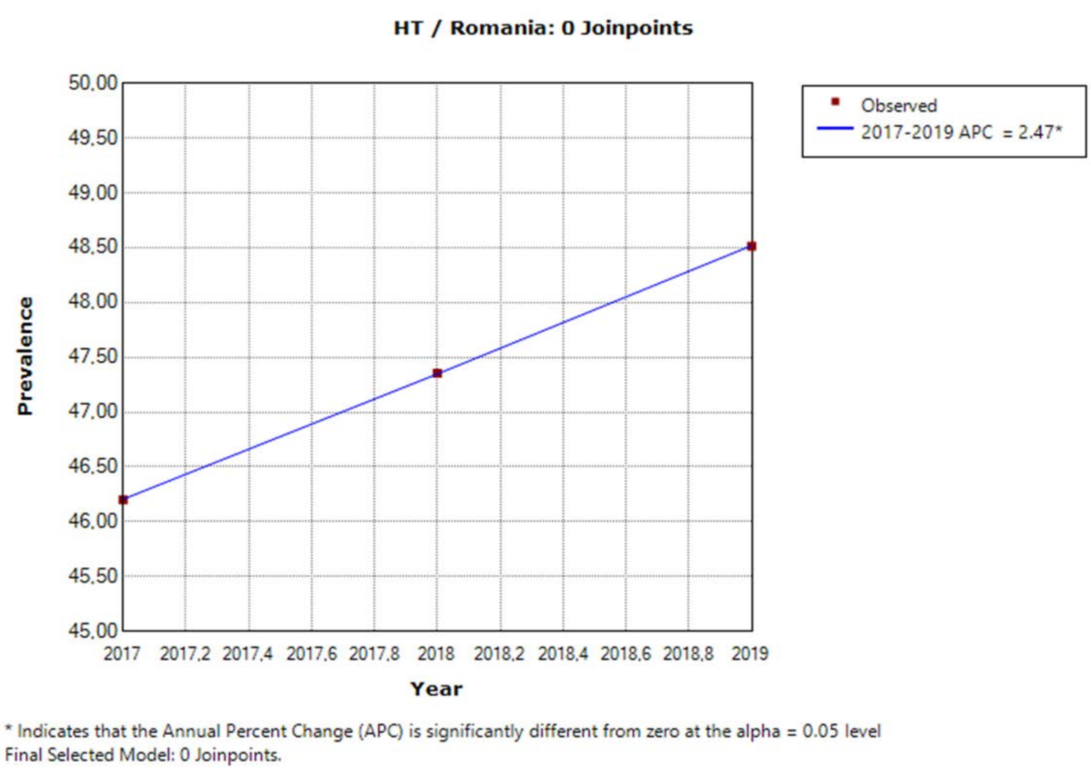


Figure 86 Trends in the prevalence (%) of hypertension in Romania per gender

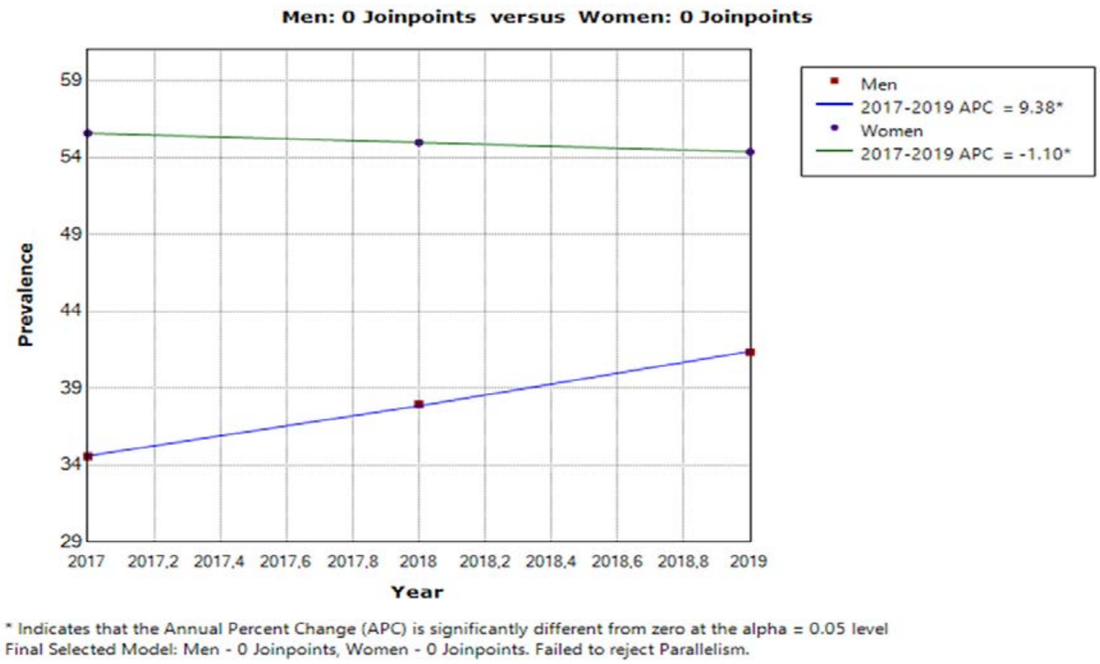


Figure 87 Trends in the prevalence (%) of diabetes in Greece

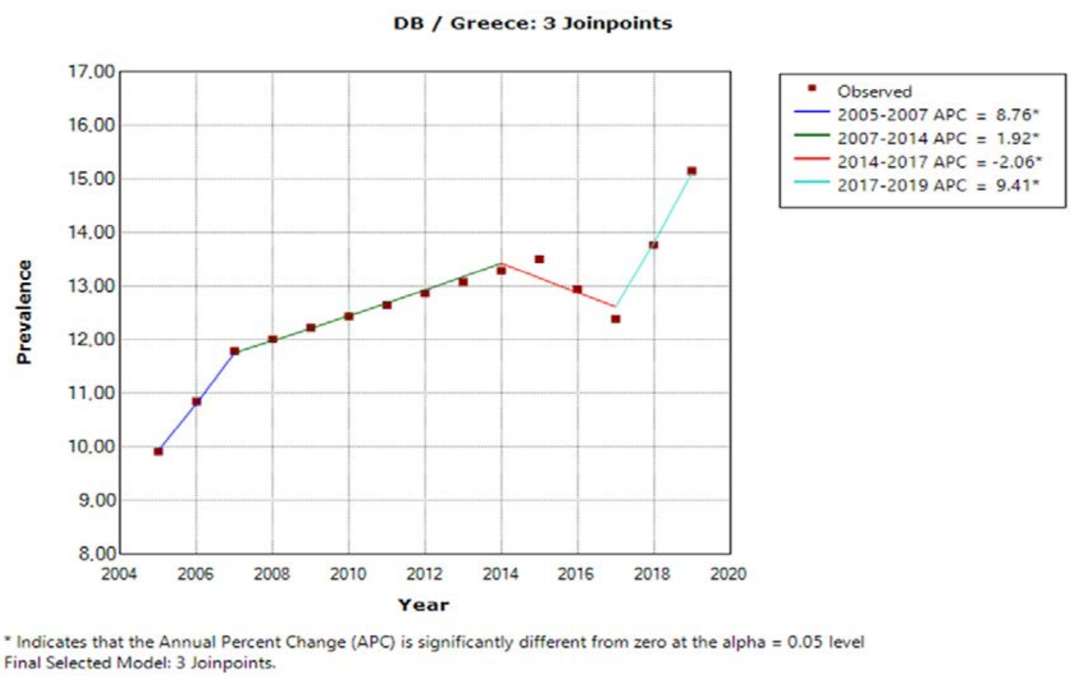


Figure 88 Trends in the prevalence (%) of diabetes in Greece per gender

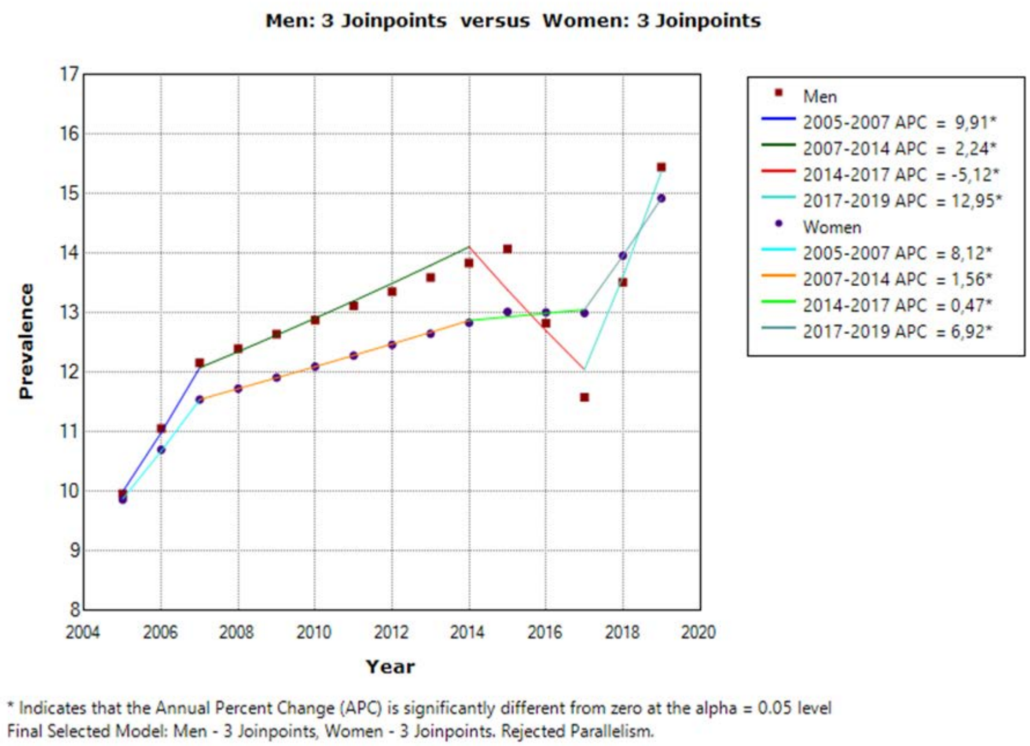


Figure 89 Trends in the prevalence (%) of diabetes in Poland

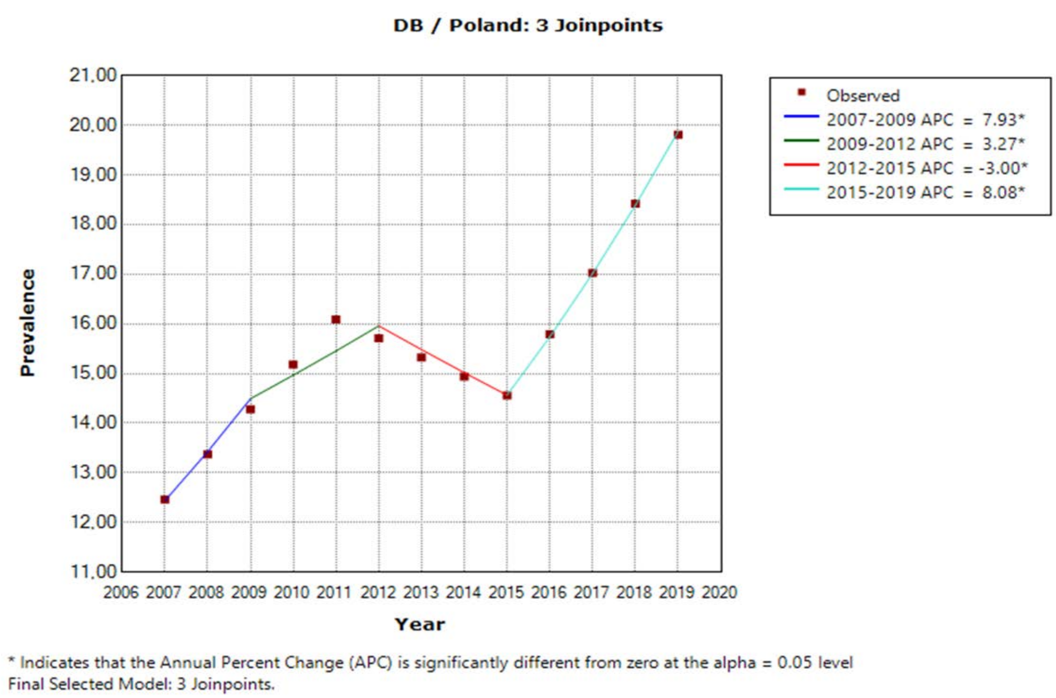


Figure 90 Trends in the prevalence (%) of diabetes in Poland per gender

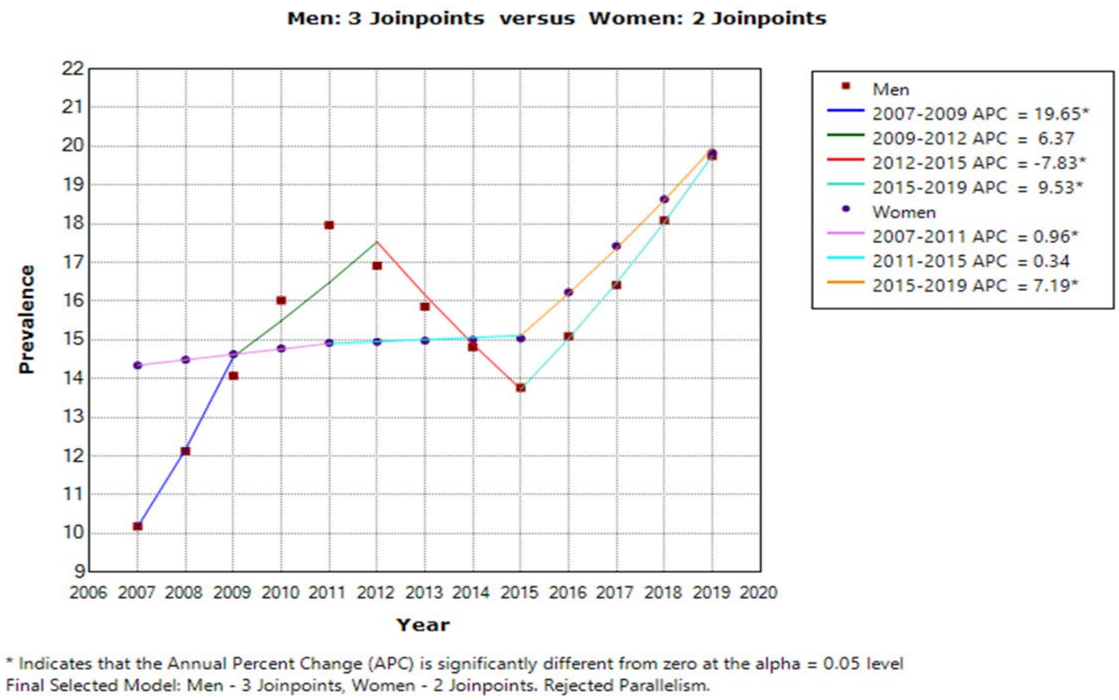


Figure 91 Trends in the prevalence (%) of diabetes in Romania

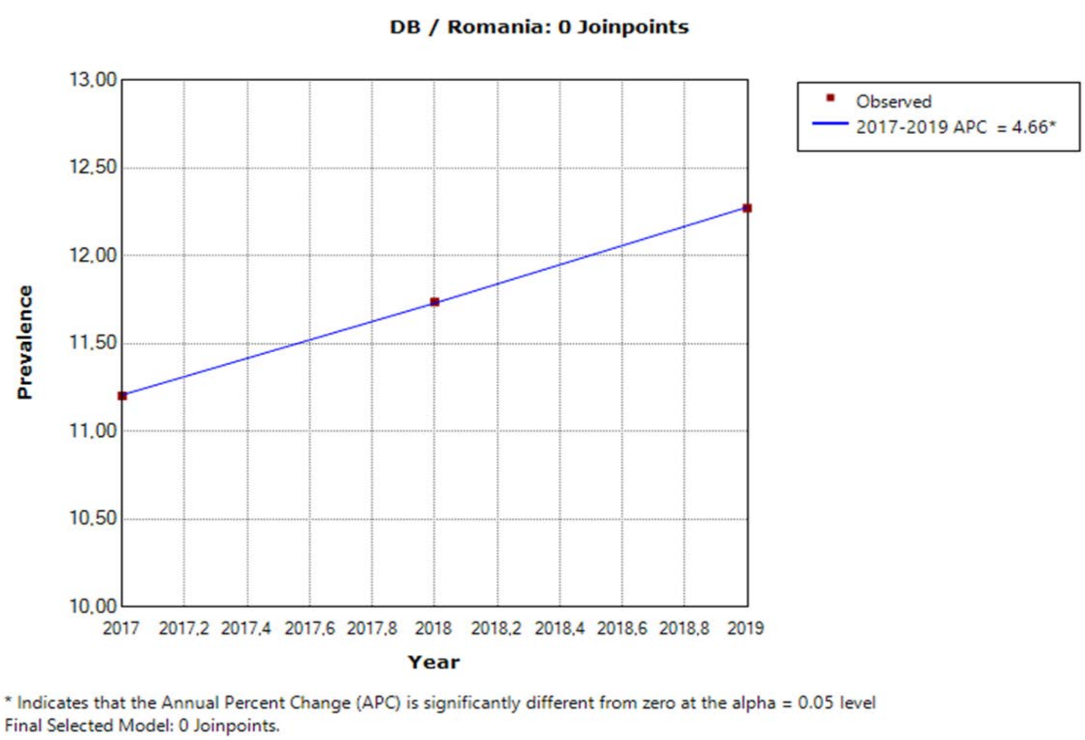


Figure 92 Trends in the prevalence (%) of diabetes in Romania per gender

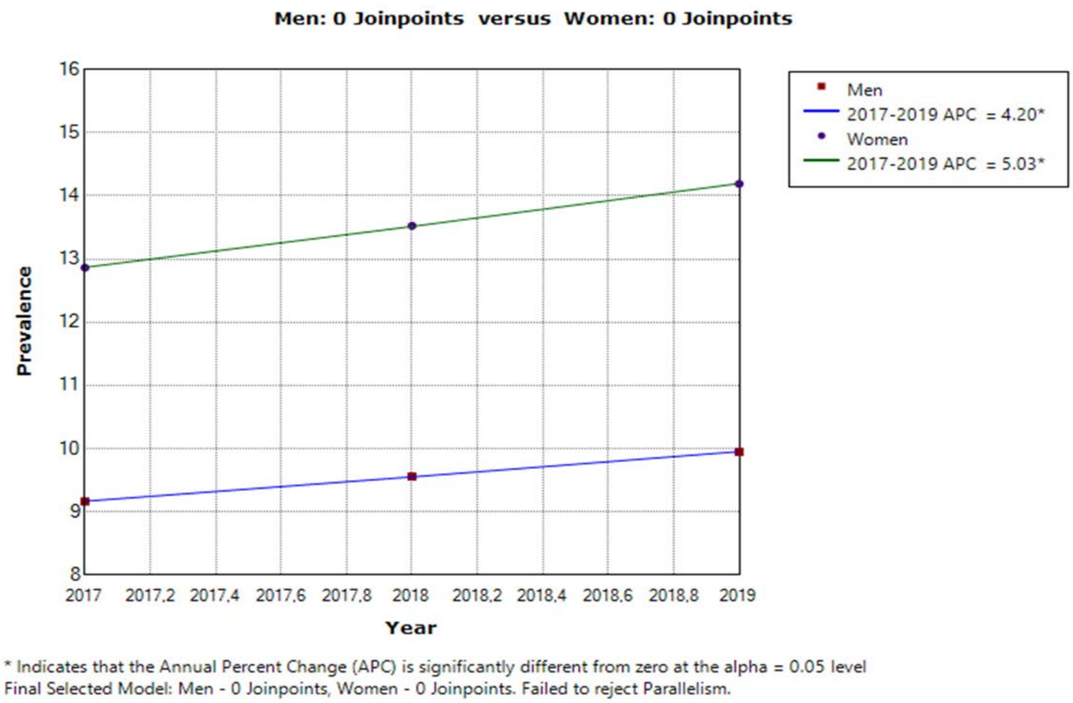


Figure 93 Trends in the prevalence (%) of hyperlipidemia in Greece

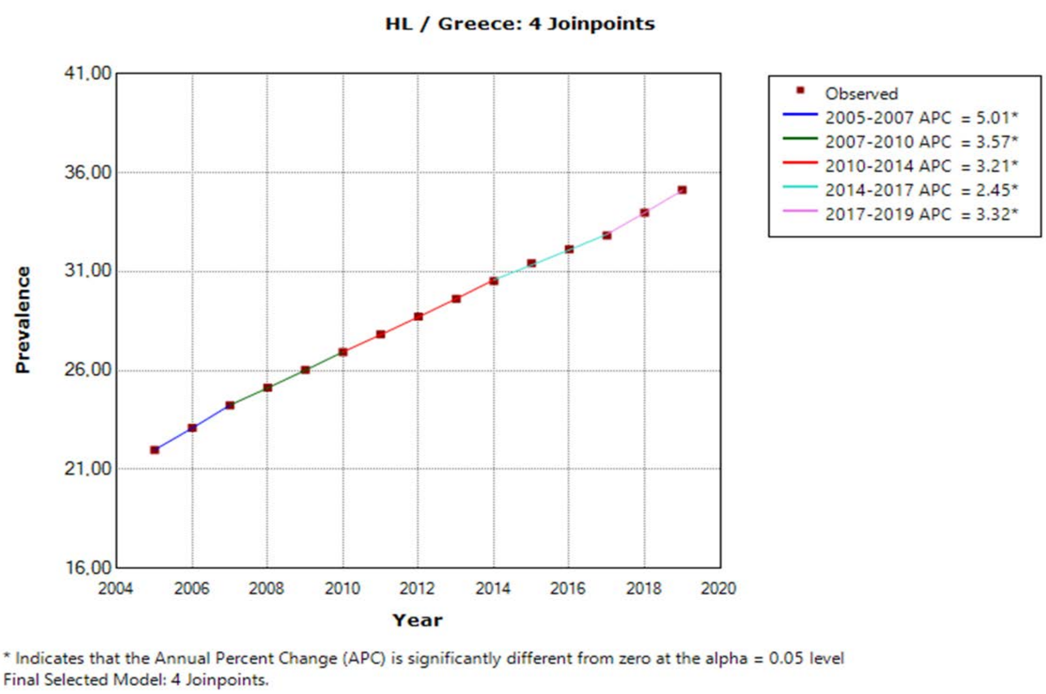
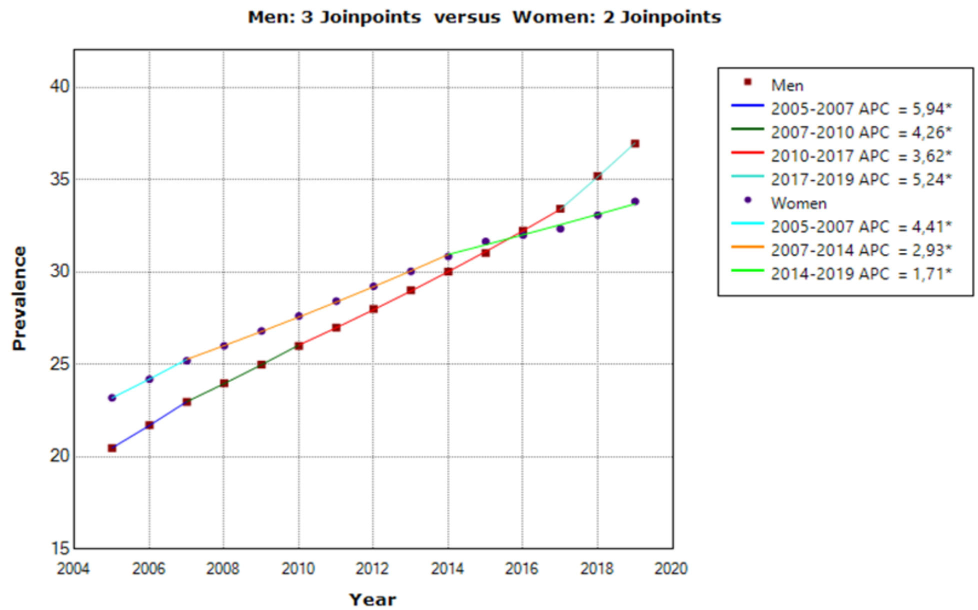
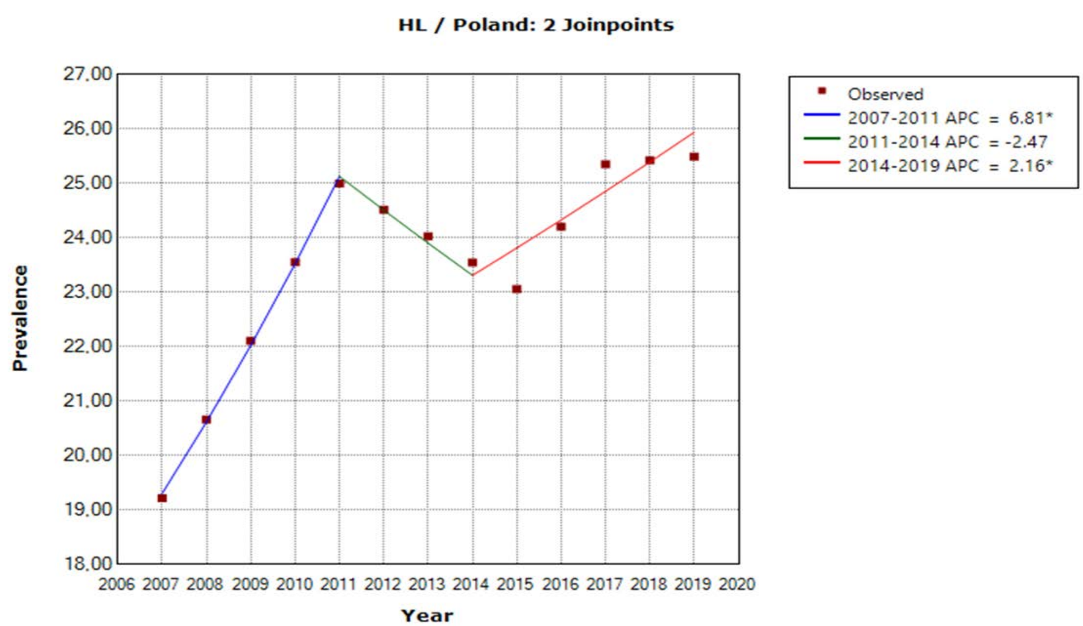


Figure 94 Trends in the prevalence (%) of hyperlipidemia in Greece per gender



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: Men - 3 Joinpoints, Women - 2 Joinpoints. Rejected Parallelism.

Figure 95 Trends in the prevalence (%) of hyperlipidemia in Poland



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: 2 Joinpoints.

Figure 96 Trends in the prevalence (%) of hyperlipidemia in Poland per gender

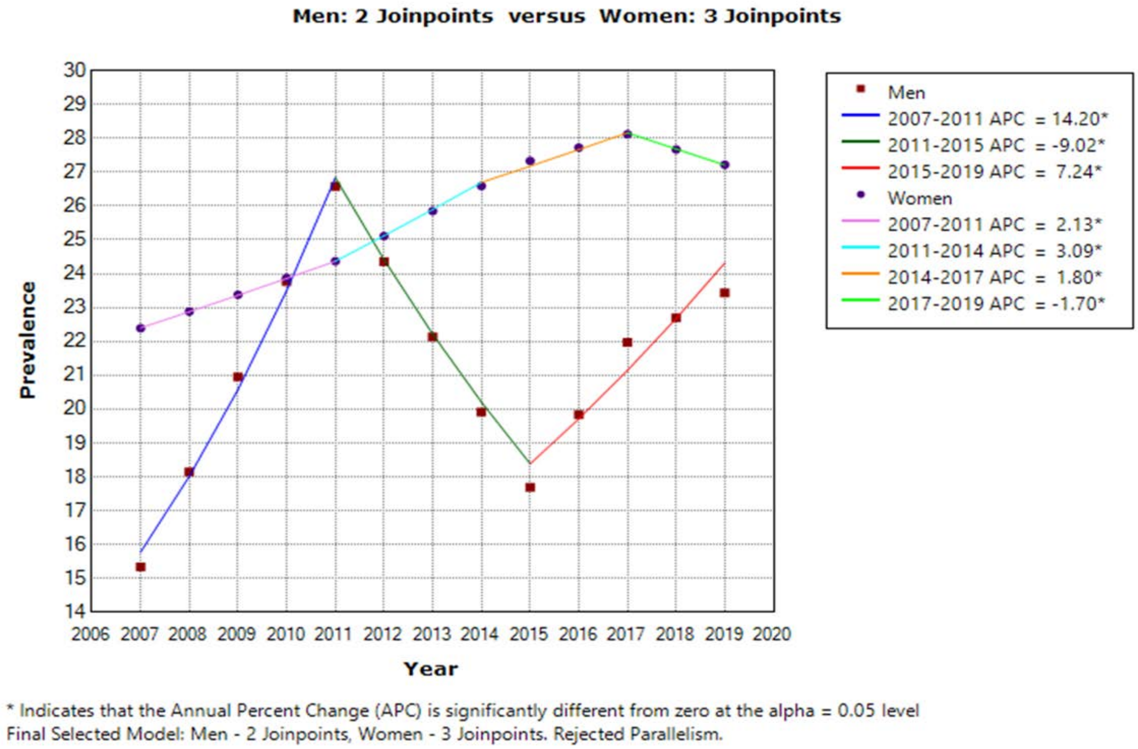


Figure 97 Trends in the prevalence (%) of hyperlipidemia in Romania

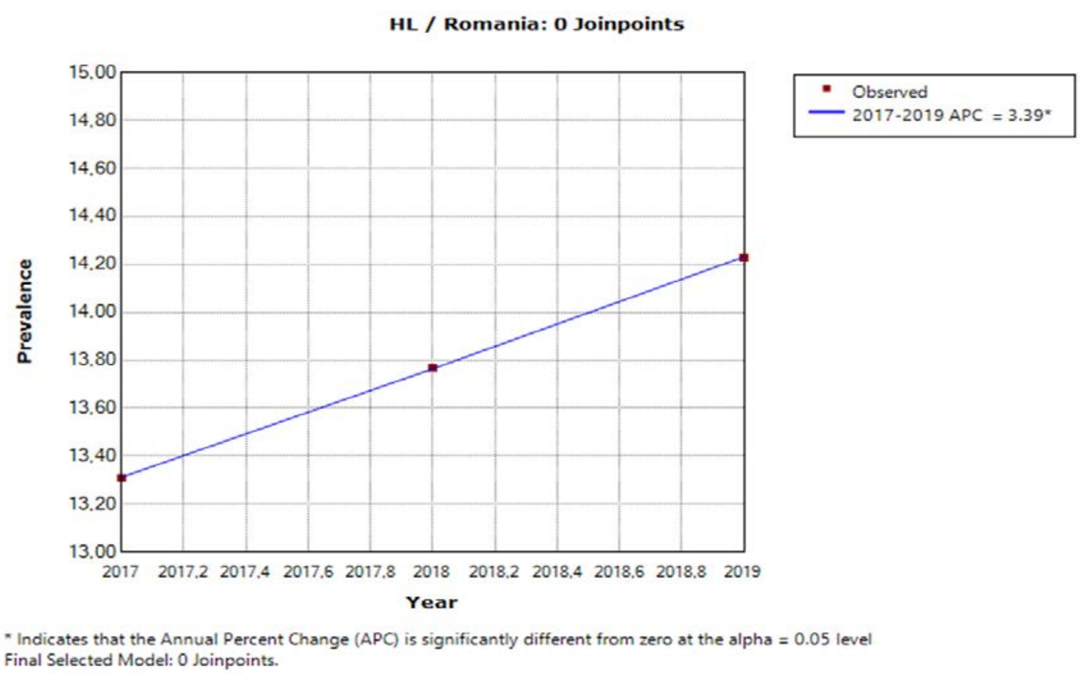
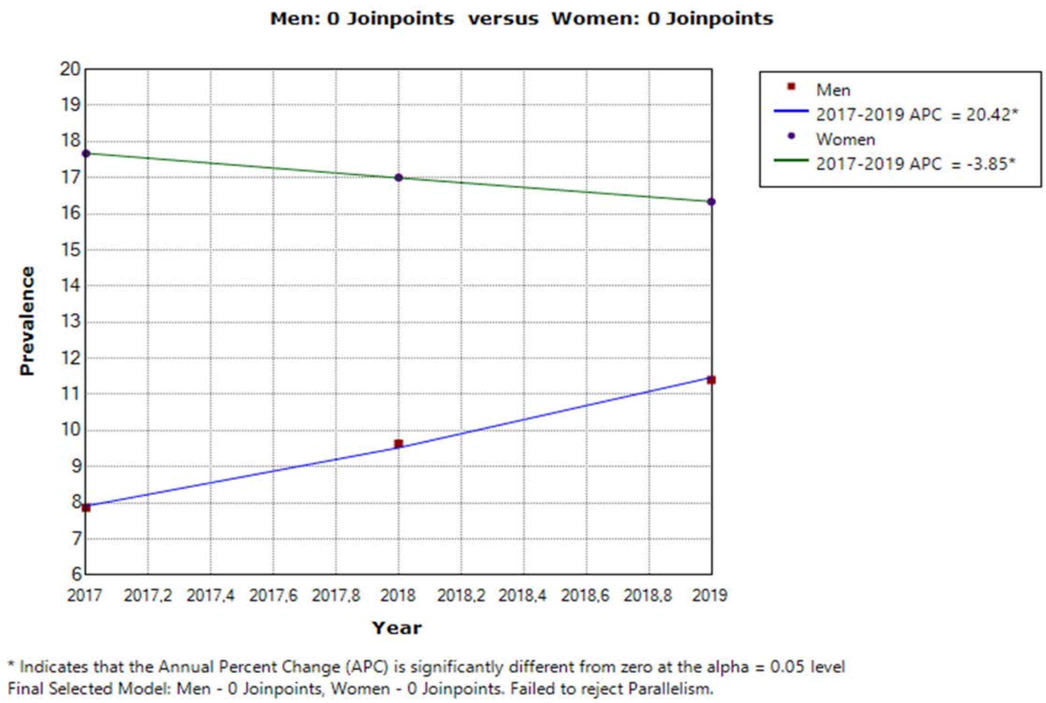


Figure 98 Trends in the prevalence (%) of hyperlipidemia in Romania per gender

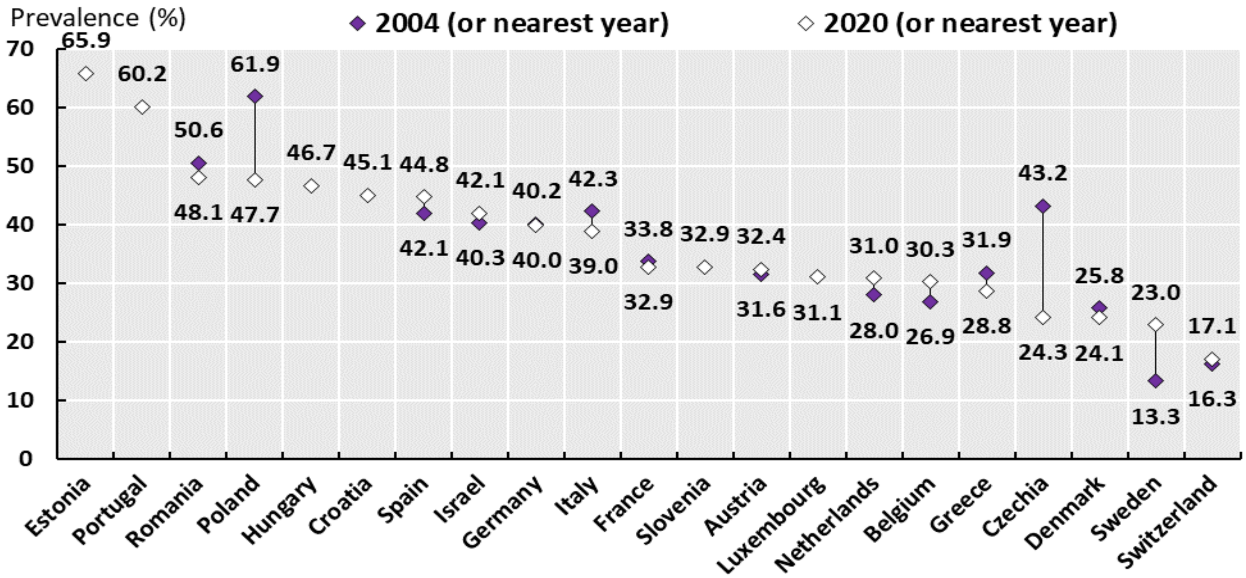


4.2.3. Other health indices

This section presents the changes and the trends in the prevalence of the ill-health using different health indices.

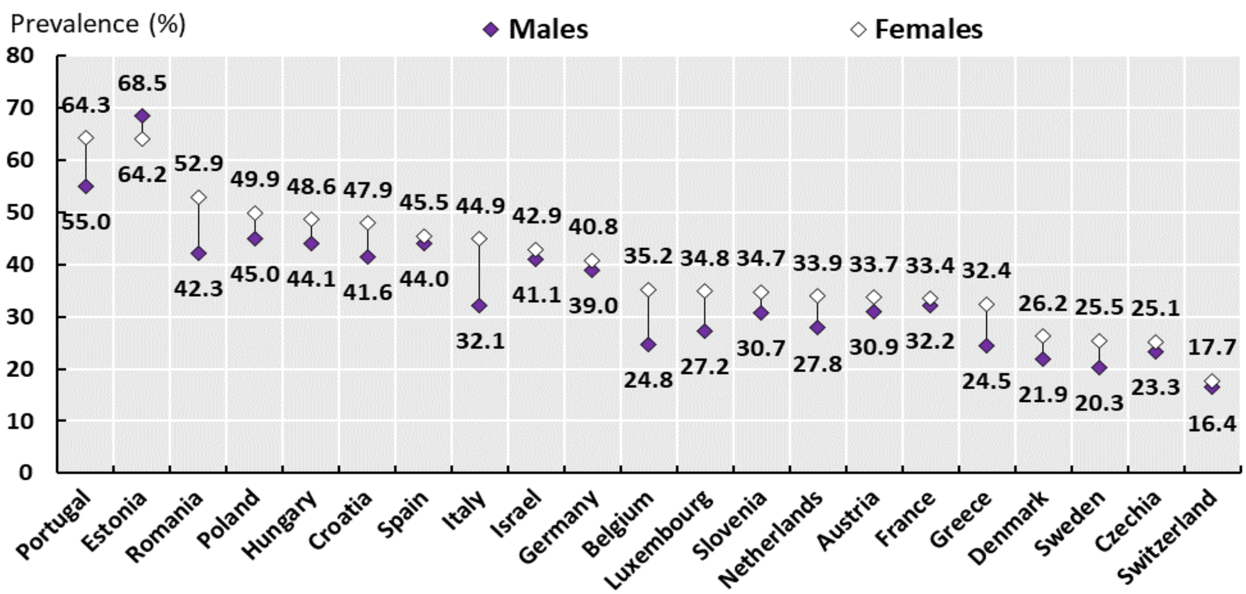
The prevalence of faire/poor self-reported health has slightly increased in most countries during the period of 2004-2020, but it has decreased in Greece, Poland and Romania (Figure 98). Poland and Romania rank at the third and fourth place in the list countries ordered from highest to lowest disease frequency, while Greece is at the bottom tail of the list. Furthermore, women report low self-reported health more frequently than men in almost all countries, except for Estonia (Figure 99).

Figure 99 Changes in the prevalence (%) of fair/poor self-reported health per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

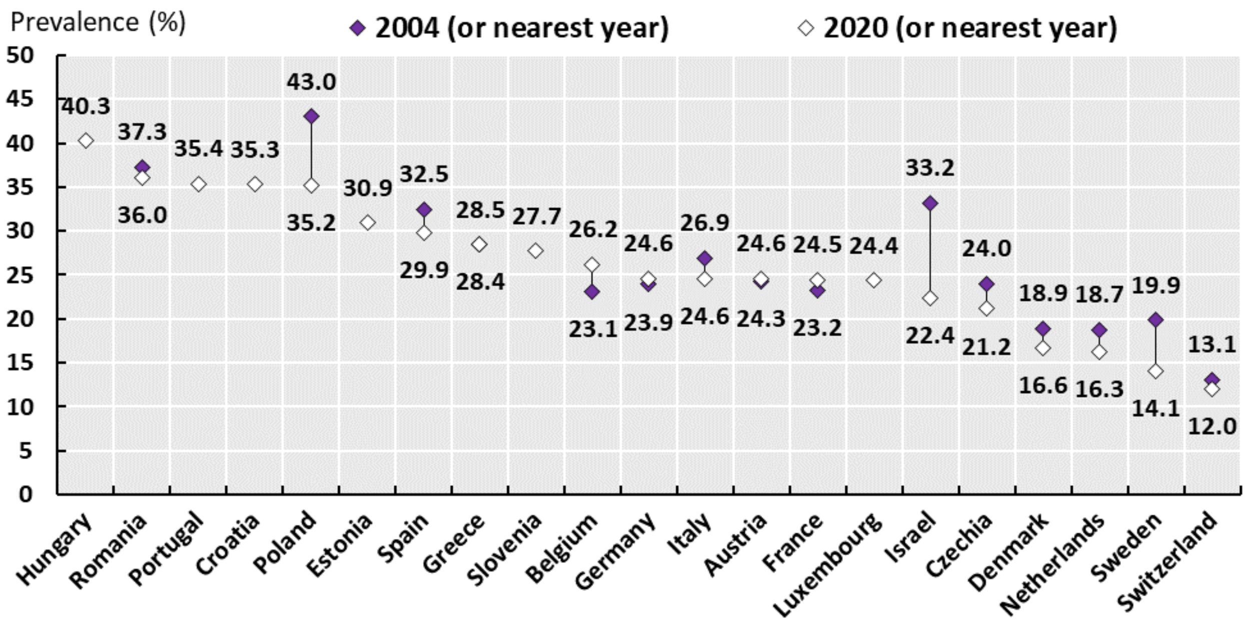
Figure 100 Prevalence (%) of fair/poor self-reported health per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

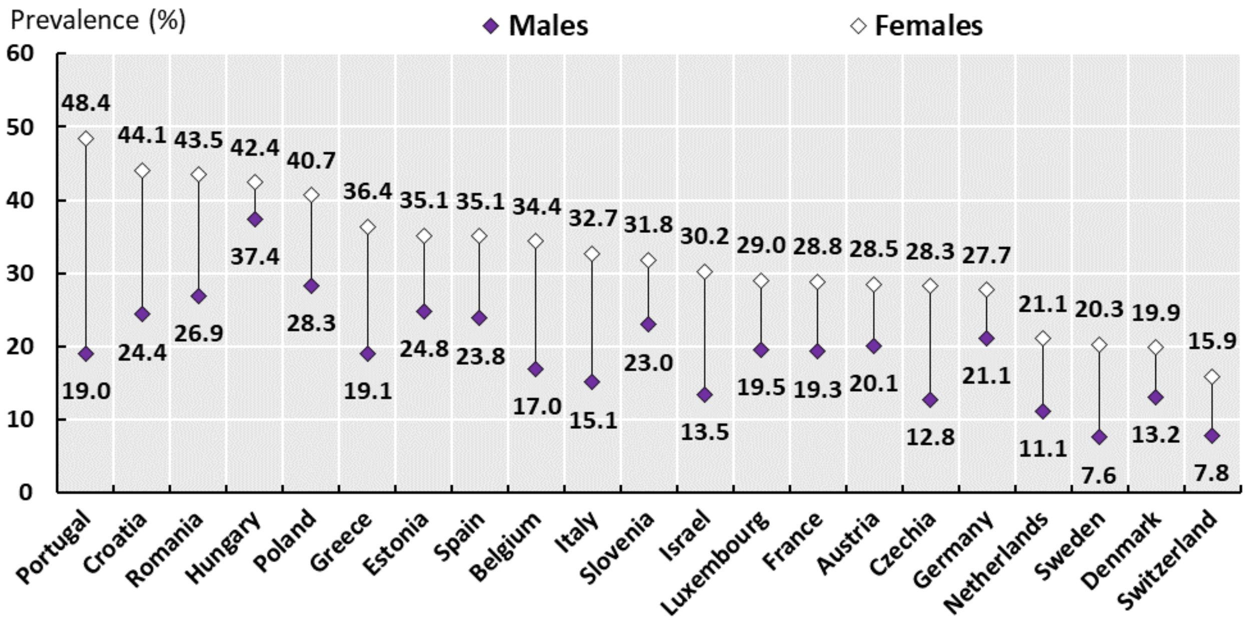
Mobility limitation are frequently reported in Romania, while the prevalence in also high in Poland and Greece (Figure 100). Furthermore, over the course of time, their frequency has decreased in most countries. Women report mobility limitation more often than men in all countries (Figure 101).

Figure 101 Changes in the prevalence (%) of mobility limitations per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

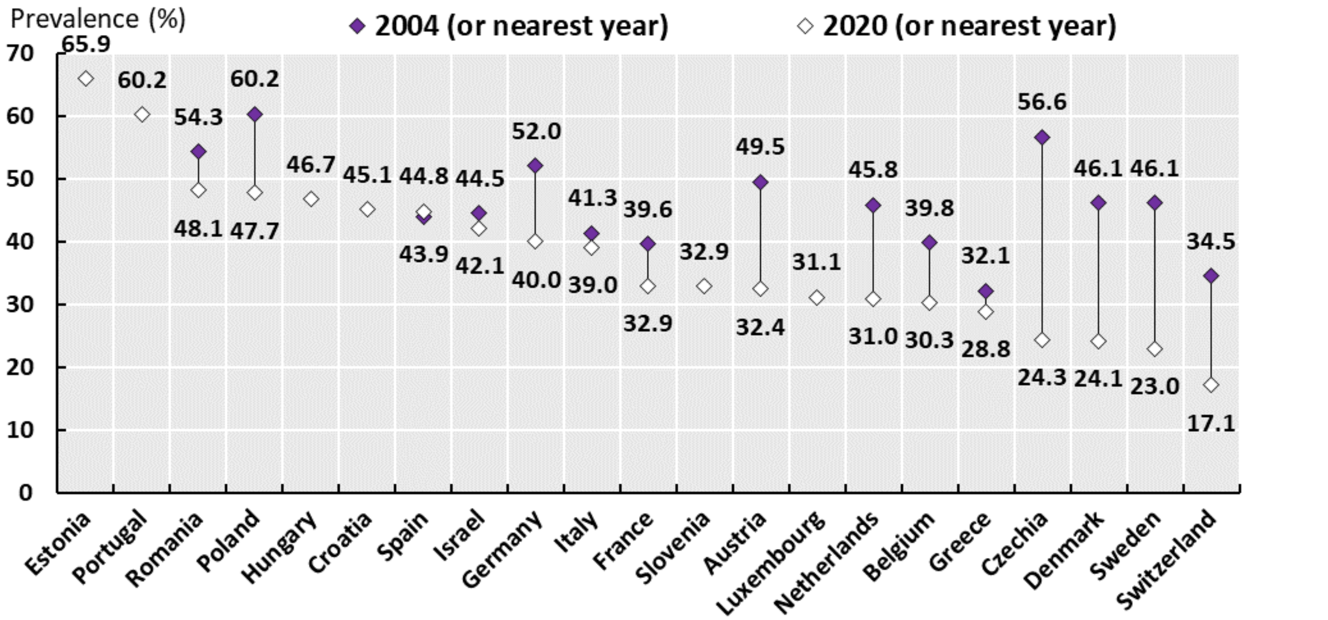
Figure 102 Prevalence (%) of mobility limitations per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

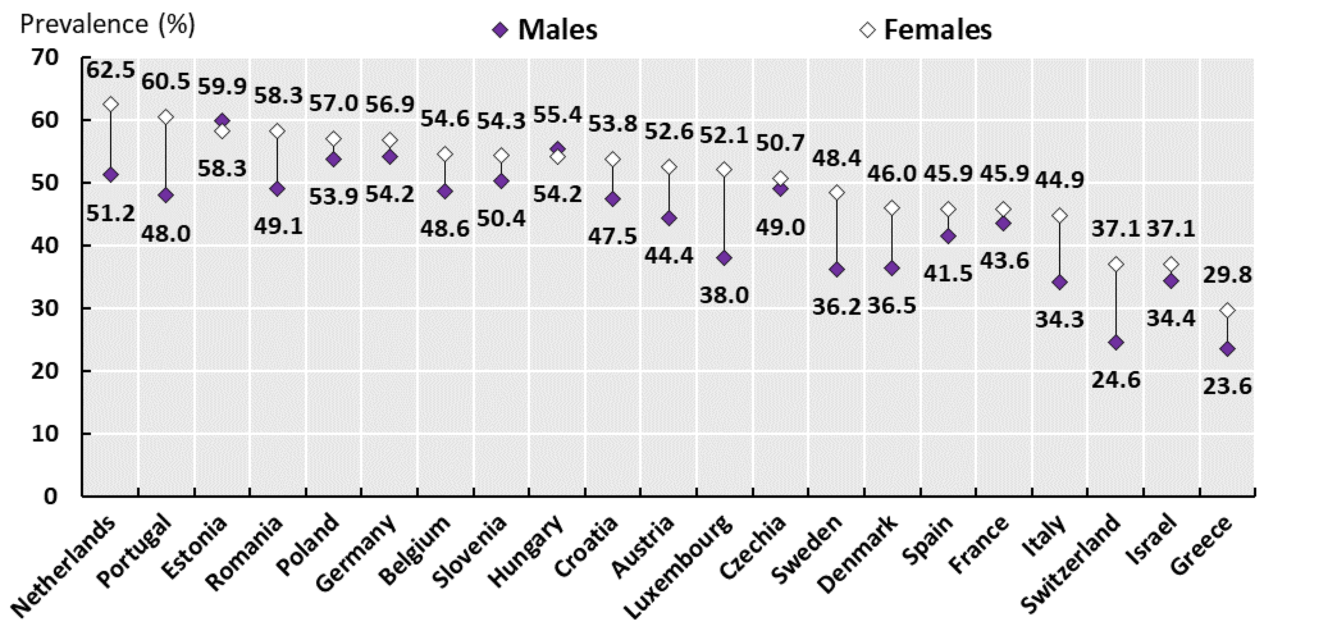
The prevalence of at least some long-term limitations in usual activities has decreased during the period of 2004-2020 in most countries (Figure 102). The frequency is quite high in Romania and Poland, while it is low in Greece, due to a significant increase over time. Furthermore, the prevalence in higher in women compared with men in almost all countries (Figure 103).

Figure 103 Changes in the prevalence (%) of global activity limitations (GALI) per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

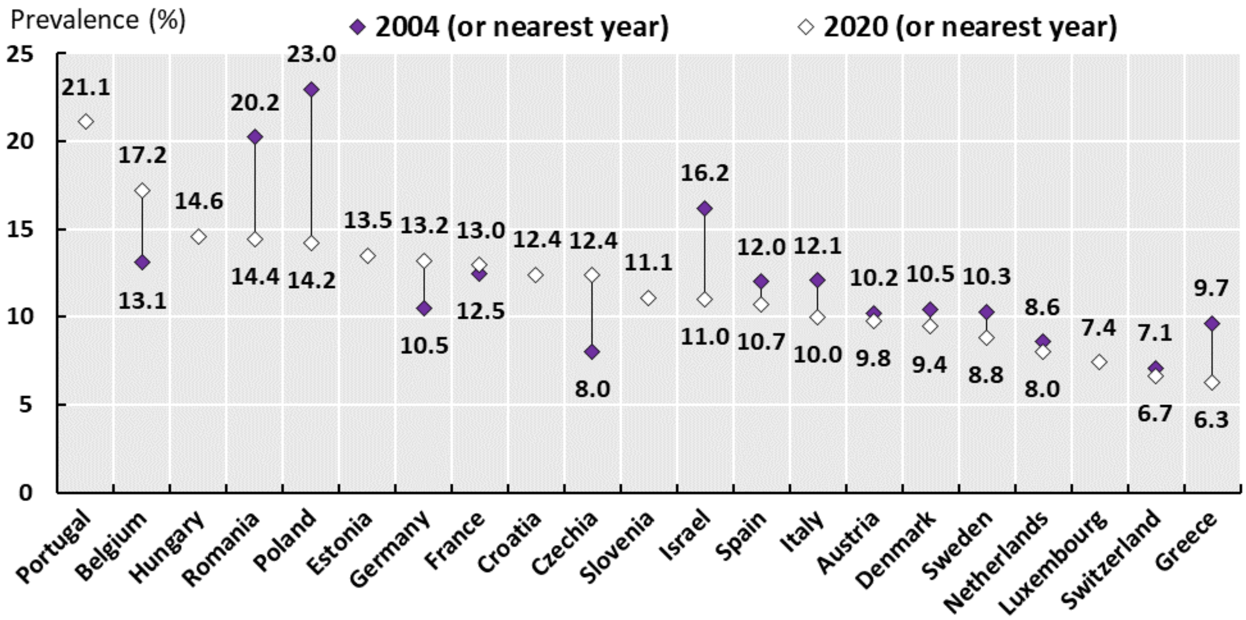
Figure 104 Prevalence (%) of global activity limitations (GALI) per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

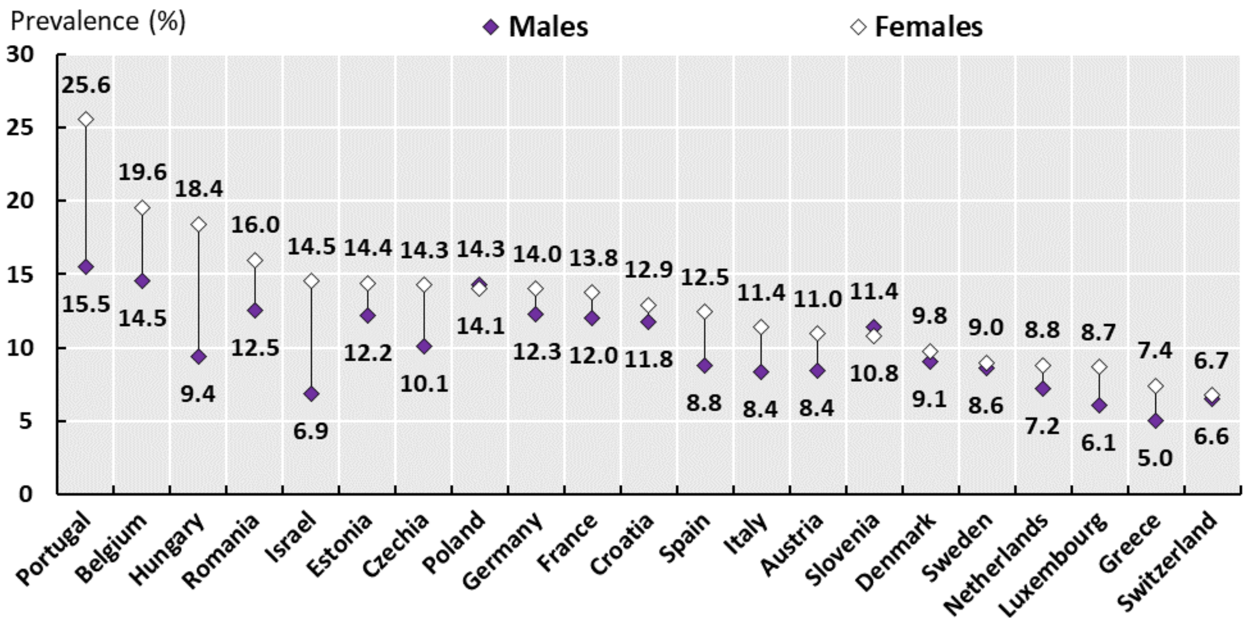
Regarding the limitations in basic activities of daily living, despite their decrease over time, their prevalence is high in Romania and Poland, while Greece ranks at the very bottom of the list of countries (Figure 104). Furthermore, the frequency is found to be usually higher in women than in men (Figure 105).

Figure 105 Changes in the prevalence (%) of limitations in activities of daily living (ADL) per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

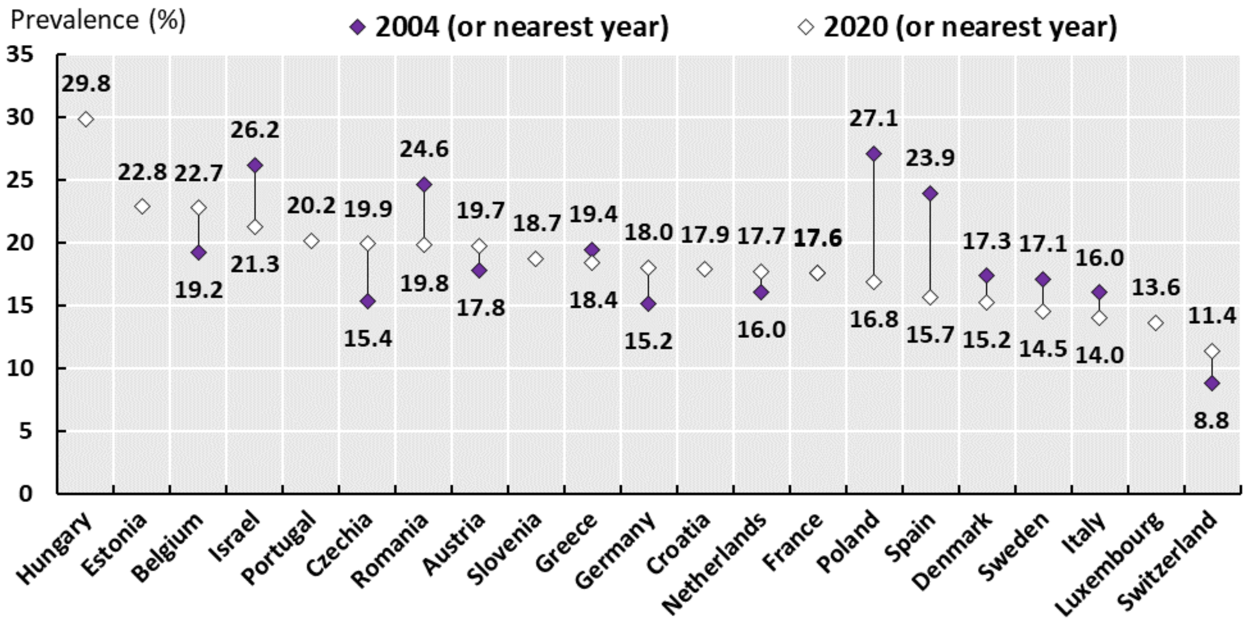
Figure 106 Prevalence (%) of limitations in activities of daily living (ADL) per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

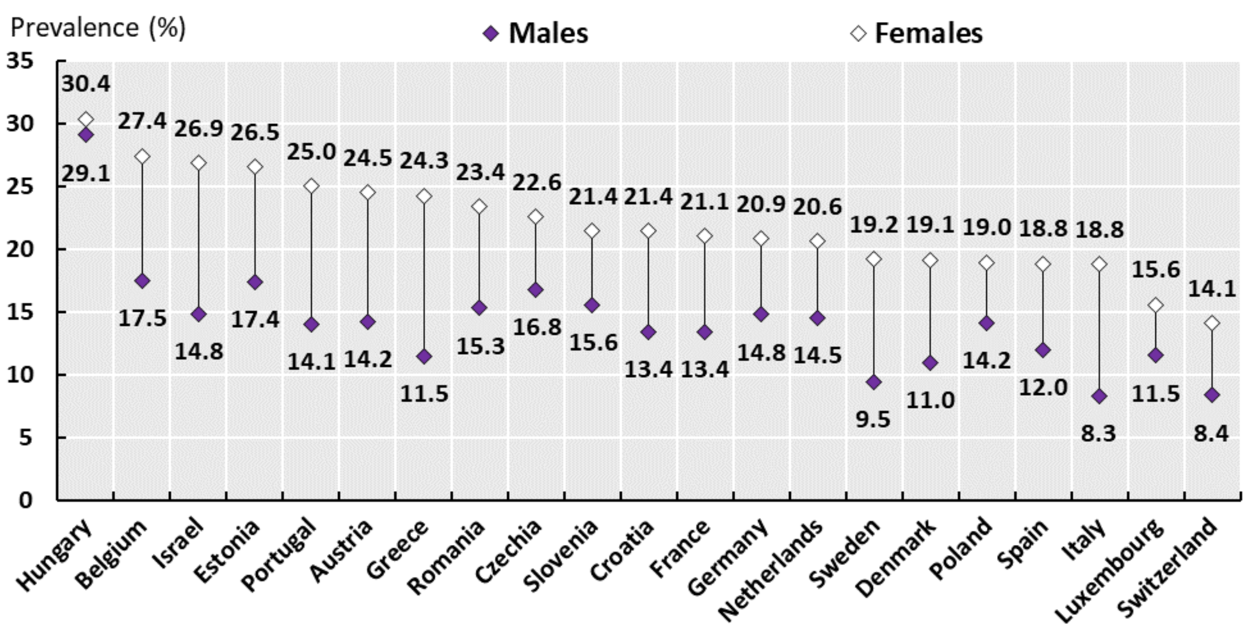
As far as the limitations in instrumental activities of daily living are concerned, the changes in their frequency varies per country (Figure 106). Nevertheless, it has decreased for all countries of interest. In 2020, Romania and Greece are placed at the upper half of the rankings, while Poland lies in the bottom half. Moreover, the prevalence is always higher in women compared with men (Figure 107).

Figure 107 Changes in the prevalence (%) of limitations in instrumental activities of daily living (IADL) per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

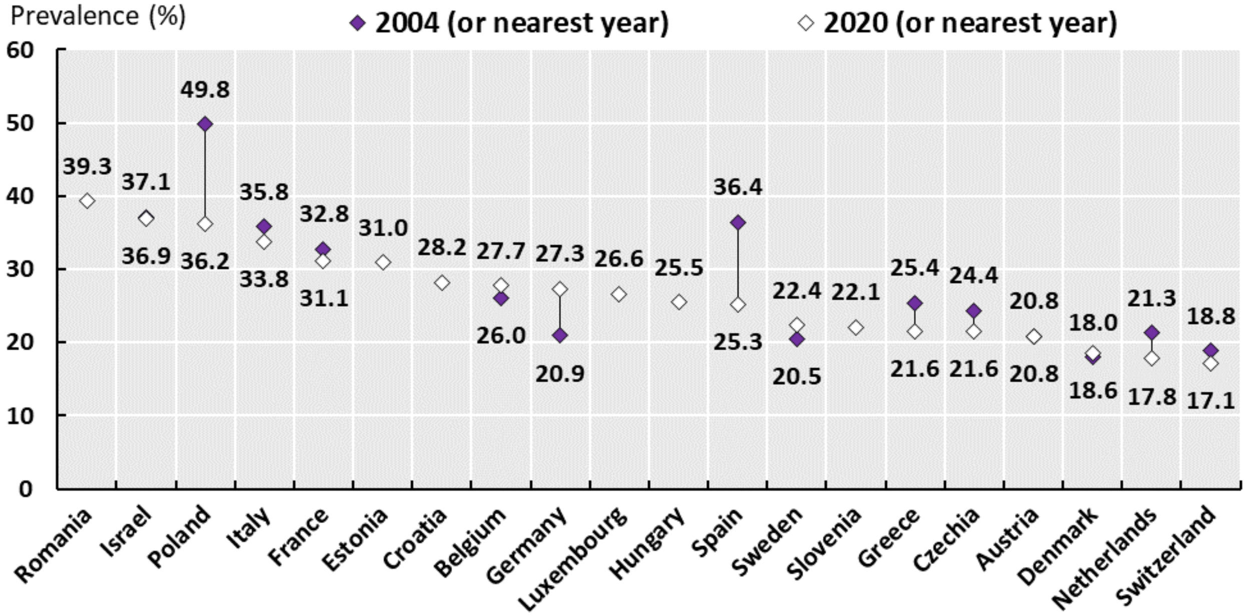
Figure 108 Prevalence (%) of limitations in instrumental activities of daily living (IADL) per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

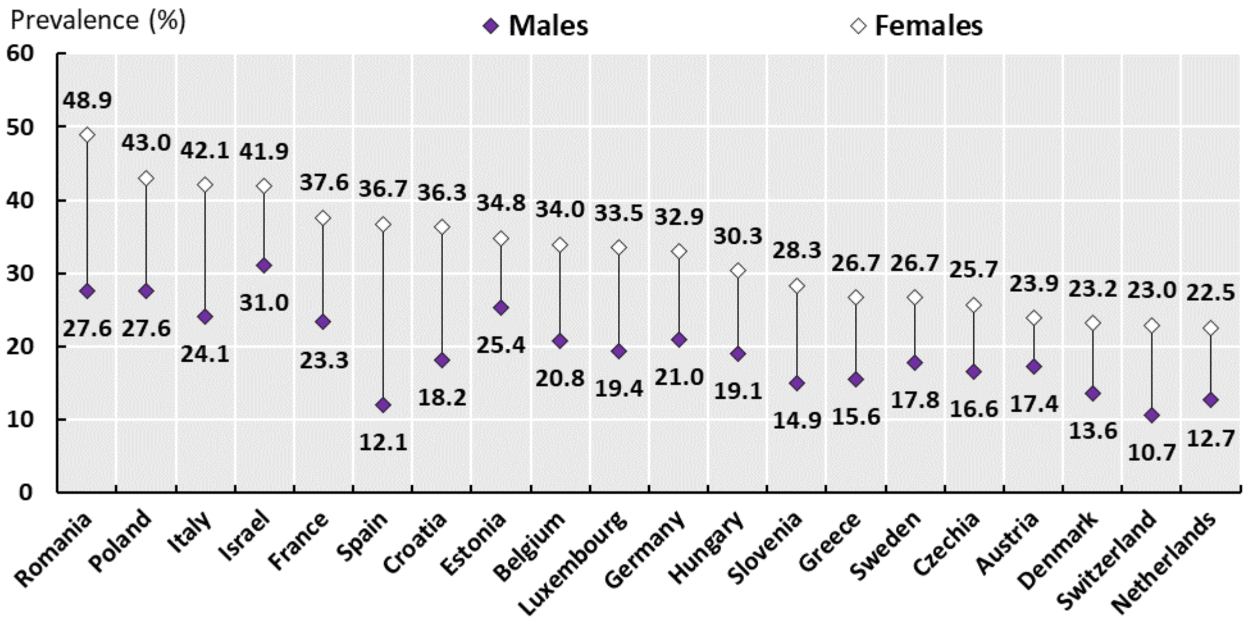
A decrease is observed in the prevalence of depression in almost all countries (Figure 108). Poland ranks third from the top of the rankings, while Greece belongs in the group of countries with the lowest estimates. Unfortunately, there were no data for Romania for this index. In addition, the frequency of depression is higher in women in all countries (Figure 109).

Figure 109 Changes in the prevalence (%) of depression (EURO-D) per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004 and Romania 2017 instead of 2004.

Figure 110 Prevalence (%) of depression (EURO-D) per country and gender (2020)



Note: Estimates are based on the unstandardized distributions.

Table 11, Table 12, Table 13 and Table 14 show the time trends in the prevalence of the standardized distributions of the ill-health indices.

During the period of 2004-2020, a downward trend in the prevalence of all ill-health indices, i.e. fair/poor self-reported health, mobility limitations, long-term limitation in usual activities, limitation in basic activities of daily living, limitations in instrumental activities of daily living and depression, is found in Greece. Furthermore, the time trends in the frequency of ill-health indices are more favourable for women than in men, with the exception of limitations in instrumental activities of daily living.

Between 2007 and 2020, a decreasing trend in the frequency of ill-health indices is also observed in Poland. Again, the time trends are more favourable for women compared with men, as women are associated with higher downward trends.

Between the years 2017 and 2020, there is a decreasing trend in all ill-health indices, except for long-term limitations in usual activities, in Romania. The adverse changes in the frequency of long-term limitations are due to the respective trend in men, while the trends in women are always favourable.

Table 12 Trends (Average Annual Percentage Change) in the prevalence of health indices per country (part A)

Region	Countries	Period	AAPC LGH	95% CI lower limit	95% CI upper limit	AAPC MOBIL3	95% CI lower limit	95% CI upper limit	AAPC GALI	95% CI lower limit	95% CI upper limit
N.E.	Denmark	2004-2020	-0.4	-1.5	0.8	-1.1*	-2.1	-0.1	-1.1*	-1.1	-1
	Estonia	2011-2020	-1.3*	-2.3	-0.2	-1.7*	-1.8	-1.6	-0.1	-0.3	0.1
	Sweden	2004-2020	3.2*	2.3	4.2	-2.8*	-3.4	-2.2	-0.7*	-0.8	-0.6
S.E.	Greece	2004-2020	-1.6*	-1.9	-1.3	-0.9*	-0.9	-0.9	-2.3*	-3.2	-1.4
	Spain	2004-2020	-0.4*	-0.6	-0.2	-1.7*	-2.7	-0.7	-0.5	-1.6	0.7
	Italy	2004-2020	-0.9*	-0.9	-0.8	-1.5*	-2.4	-0.5	-0.7*	-1	-0.3
	Portugal	2011-2017	-1.5*	-1.5	-1.5	-1.3*	-1.3	-1.3	0.6*	0.6	0.6
	Israel	2005-2020	0.1	-0.7	1	-2.8*	-3.1	-2.5	-1.2*	-1.9	-0.4
C.W.E.	Austria	2004-2020	-0.4*	-0.5	-0.4	-0.4	-1.4	0.6	-0.3	-0.7	0.1
	Belgium	2004-2020	0.3*	0.3	0.3	0.3	-0.1	0.8	1.7*	0.9	2.6
	France	2004-2020	-0.6*	-0.6	-0.6	-0.4*	-0.5	-0.3	0.6*	0.4	0.8
	Germany	2004-2020	-0.4*	-0.4	-0.4	-0.4	-0.9	0.2	-0.2	-1.5	1.1
	Switzerland	2004-2020	0	-0.9	1	-0.8	-1.9	0.2	-0.4	-1.3	0.5
	Croatia	2015-2020	-1.0*	-1	-0.9	1.9	-6.4	11	-0.6	-2.3	1.2
	Luxembourg	2013-2020	0.9	-1.8	3.7	0.7*	0.6	0.8	1.5*	0.7	2.3
	Netherlands	2004-2020	1.3*	1.3	1.4	-1.1*	-1.2	-1.1	1.7*	1.3	2.2
	Slovenia	2011-2020	-3.3*	-3.7	-3	-3.1*	-3.9	-2.2	0.8	-0.4	2
E.E.	Czechia	2007-2020	-5.3*	-6.6	-4	-1.6*	-1.6	-1.6	-1.4*	-1.8	-0.9
	Hungary	2011-2020	-4.3*	-4.4	-4.2	-1.1*	-1.1	-1	-2.3*	-2.3	-2.2
	Poland	2007-2020	-2.4*	-2.5	-2.3	-1.8*	-2.6	-1	-1.1*	-1.1	-1
	Romania	2017-2020	-2.9*	-3.2	-2.6	-0.5*	-0.5	-0.5	0.5*	0.5	0.5

*Note: Estimates are based on sex- and age-standardized distributions of health indices. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, GALI: Global Activities Limitations Indicator, E.E.: Eastern Europe, LGH: fair/poor self-reported health, MOBIL3: mobility limitations, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 13 Trends (Average Annual Percentage Change) in the prevalence of health indices per country (part B)

Region	Countries	Period	AAPC ADL	95% CI lower limit	95% CI upper limit	AAPC IADL	95% CI lower limit	95% CI upper limit	AAPC EUROD	95% CI lower limit	95% CI upper limit
N.E.	Denmark	2004-2020	-1.4*	-1.4	-1.4	-1.7*	-2.4	-1	0.9	0	1.8
	Estonia	2011-2020	-4.0*	-5.1	-2.9	-0.7*	-0.9	-0.4	-3.9*	-4.1	-3.8
	Sweden	2004-2020	-1.2*	-2.3	0	-1	-2.7	0.6	0.7	-0.1	1.6
S.E.	Greece	2004-2020	-4.2*	-5.2	-3.2	-1.5*	-1.5	-1.5	-2.3*	-3.7	-0.9
	Spain	2004-2020	-0.7	-1.8	0.4	-1.9*	-3.3	-0.5	-2.4*	-2.4	-2.3
	Italy	2004-2020	-2.8*	-3.8	-1.9	-2.1*	-2.1	-2	-1.1*	-1.5	-0.6
	Portugal	2011-2017	1.6*	1.5	1.8	-0.4*	-0.7	-0.2	-1.7*	-1.7	-1.7

	Israel	**2005-2020**	-2.7*	-2.7	-2.6	-1.5*	-2.6	-0.4	0.3*	0.1	0.5
C.W.E.	**Austria**	**2004-2020**	-0.5*	-0.6	-0.3	0	-0.9	0.8	-0.6	-1.3	0.2
	Belgium	**2004-2020**	1.2*	0.7	1.6	0.5*	0.5	0.6	0.4*	0	0.8
	France	**2004-2020**	-0.1	-0.9	0.7	-1.3*	-2.3	-0.3	-0.6	-1.6	0.3
	Germany	**2004-2020**	0.4	-0.1	1	0.2*	0.2	0.3	1.6*	1.3	1.8
	Switzerland	**2004-2020**	-0.8	-1.7	0.1	0.8	-0.1	1.6	-0.1	-1.4	1.2
	Croatia	**2015-2020**	0.1	-3	3.2	5.7	-7.9	21.4	-3.3*	-3.4	-3.2
	Luxembourg	**2013-2020**	-7.7*	-8.5	-6.8	-2.3*	-2.4	-2.2	-1.6*	-1.7	-1.5
	Netherlands	**2004-2020**	-1.1*	-1.6	-0.6	-0.2*	-0.2	-0.2	0.2*	0.1	0.3
	Slovenia	**2011-2020**	0.6	-3.1	4.5	-0.4	-3.1	2.5	-2.0*	-2.1	-1.9
E.E.	**Czechia**	**2007-2020**	2.7*	2	3.4	1.8*	0.7	2.9	-2.3*	-3.1	-1.4
	Hungary	**2011-2020**	-0.3*	-0.4	-0.1	-1.4*	-1.5	-1.4	-5.8*	-5.9	-5.6
	Poland	**2007-2020**	-4.7*	-5	-4.4	-5.0*	-6	-4.1	-2.8*	-2.9	-2.7
	Romania	**2017-2020**	-14.3*	-21.7	-6.3	-9.4*	-12.7	-6.1			

*Note: Estimates are based on sex- and age-standardized distributions of health indices. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, ADL: Activities of Daily Living, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, EUROD: case of depression IADL: Instrumental, Activities, of Daily Living, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 14 Trends (Average Annual Percentage Change) in the prevalence of health indices per country and gender (part A)

Region	Countries	Period	AAPC LGH	95% CI lower limit	95% CI upper limit	AAPC MOBIL3	95% CI lower limit	95% CI upper limit	AAPC GALI	95% CI lower limit	95% CI upper limit
Males											
N.E.	**Denmark**	**2004-2020**	-1.2	-2.8	0.4	-1	-2.4	0.4	-1.7*	-1.7	-1.7
	Estonia	**2011-2020**	-0.8*	-0.8	-0.8	-0.8*	-1.2	-0.4	-0.1	-0.7	0.5
	Sweden	**2004-2020**	3.6*	2.9	4.3	-4.1*	-4.6	-3.5	-1.4*	-1.5	-1.3
S.E.	**Greece**	**2004-2020**	-1.2*	-1.2	-1.1	-0.7*	-0.7	-0.7	-2.3*	-2.9	-1.7
	Spain	**2004-2020**	0.4*	0	0.8	-1.5*	-2	-1.1	-0.9	-2.3	0.5
	Italy	**2004-2020**	-1	-3.3	1.4	-1.3*	-1.6	-0.9	-0.6*	-0.6	-0.5
	Portugal	**2011-2017**	-0.2*	-0.2	-0.2	-0.6*	-0.7	-0.6	1.0*	1	1.1
	Israel	**2005-2020**	0.7*	0.6	0.9	-3.0*	-3.1	-3	-1.1*	-2.1	-0.1
C.W.E.	**Austria**	**2004-2020**	-1.1*	-1.4	-0.8	0.3*	0.3	0.4	-0.9*	-1	-0.8
	Belgium	**2004-2020**	-0.7*	-0.7	-0.7	0.6*	0.6	0.6	1.7*	0.6	2.7
	France	**2004-2020**	-0.7*	-0.7	-0.7	-0.2*	-0.2	-0.2	0.8*	0.8	0.9
	Germany	**2004-2020**	-0.3*	-0.3	-0.3	-0.2*	-0.2	-0.2	0.1*	0	0.1
	Switzerland	**2004-2020**	0.9*	0.8	0.9	-0.6*	-0.9	-0.3	-1.0*	-1.4	-0.6
	Croatia	**2015-2020**	-1.7*	-1.8	-1.7	0.8	-9.8	12.6	-0.2	-0.6	0.1
	Luxembourg	**2013-2020**	1.4	-2	5	5.2*	4.2	6.1	2.1*	1.7	2.6
	Netherlands	**2004-2020**	1.7*	1.6	1.7	-0.6*	-0.6	-0.6	2.6*	2.3	2.9
	Slovenia	**2011-2020**	-2.8	-6.5	1.1	-1.6*	-3.1	-0.1	0.5*	0.5	0.6
	Czechia	**2007-2020**	-5.5*	-6.5	-4.5	-1.6*	-1.6	-1.5	-1.3*	-1.9	-0.7

E.E.	**Hungary**	**2011-2020**	-3.5*	-3.6	-3.5	2.0*	1.5	2.6	-1.1*	-1.2	-1
	Poland	**2007-2020**	-2.4*	-2.5	-2.4	-2.0*	-2.6	-1.5	-0.9*	-1.1	-0.6
	Romania	**2017-2020**	0.0*	0	0	0.4*	0.4	0.5	4.4*	3.7	5.1
Females											
N.E.	**Denmark**	**2004-2020**	-0.3	-1.2	0.7	-1.4*	-2.6	-0.1	-0.6*	-0.9	-0.4
	Estonia	**2011-2020**	-1.8*	-3	-0.7	-2.2*	-2.2	-2.2	-0.6*	-0.8	-0.4
	Sweden	**2004-2020**	3.0*	1.9	4.1	-2.3*	-3.1	-1.6	-0.2	-0.9	0.4
S.E.	**Greece**	**2004-2020**	-2.0*	-2.5	-1.4	-1.0*	-1	-1	-2.4*	-3.4	-1.3
	Spain	**2004-2020**	-0.9*	-1.2	-0.7	-1.9*	-1.9	-1.9	-0.7	-2	0.6
	Italy	**2004-2020**	-0.8*	-1	-0.6	-1.3*	-1.9	-0.7	-0.7*	-1	-0.5
	Portugal	**2011-2017**	-2.3*	-2.3	-2.3	-1.7*	-1.7	-1.7	0.2*	0.2	0.2
	Israel	**2005-2020**	-0.3*	-0.4	-0.3	-2.8*	-3.3	-2.3	-1.4*	-1.5	-1.2
C.W.E.	**Austria**	**2004-2020**	0	-0.2	0.2	-1.1*	-1.9	-0.2	0	-0.2	0.1
	Belgium	**2004-2020**	1.1	-1.3	3.7	0	-0.4	0.4	1.8*	0.8	2.7
	France	**2004-2020**	-0.6*	-0.7	-0.5	-0.6	-1.4	0.2	0.6*	0.2	1
	Germany	**2004-2020**	0	-0.4	0.3	-0.8	-1.5	0	-0.3	-1.2	0.6
	Switzerland	**2004-2020**	-0.4*	-0.7	-0.1	-1.1	-2.8	0.6	-0.1*	-0.1	-0.1
	Croatia	**2015-2020**	-0.4*	-0.5	-0.4	2.5	-4.8	10.3	-0.7	-3.3	1.9
	Luxembourg	**2013-2020**	0.8	-1.4	3.1	-1.8*	-2.5	-1	1.2*	0.2	2.3
	Netherlands	**2004-2020**	1.1*	1.1	1.1	-1.4*	-1.4	-1.4	1.3*	1.2	1.5
	Slovenia	**2011-2020**	-3.5*	-3.7	-3.4	-4.0*	-5.1	-2.8	0.8	-0.6	2.1
E.E.	**Czechia**	**2007-2020**	-5.3*	-6.8	-3.9	-1.7*	-1.7	-1.6	-0.9	-3.2	1.4
	Hungary	**2011-2020**	-4.7*	-4.7	-4.6	-3.0*	-3.1	-2.9	-3.0*	-3	-3
	Poland	**2007-2020**	-2.4*	-2.5	-2.3	-2.5*	-2.8	-2.3	-1.2*	-1.3	-1.1
	Romania	**2017-2020**	-4.7*	-5.6	-3.9	-1.0*	-1	-1	-2.0*	-2.2	-1.9

*Note: Estimates are based on sex- and age-standardized distributions of health indices. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, GALI: Global Activities Limitations Indicator, E.E.: Eastern Europe, LGH: fair/poor self-reported health, MOBIL3: mobility limitations, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 15 Trends (Average Annual Percentage Change) in the prevalence of health indices per country and gender (part B)

Region	Countries	Period	AAPC ADL	95% CI		AAPC IADL	95% CI		AAPC EURO-D	95% CI	
				lower limit	upper limit		lower limit	upper limit		lower limit	upper limit
Males											
N.E.	**Denmark**	**2004-2020**	-1.9*	-2	-1.9	-2.9	-5.9	0.2	0.2	-1.2	1.5
	Estonia	**2011-2020**	-4.3*	-6.6	-2	-0.1*	-0.1	-0.1	-2.5*	-2.6	-2.5
	Sweden	**2004-2020**	-0.2	-1.6	1.2	-2.1*	-3.2	-0.9	2.9*	2.1	3.7
S.E.	**Greece**	**2004-2020**	-3.9*	-5.5	-2.2	-1.6*	-1.7	-1.4	-0.8	-2.2	0.6
	Spain	**2004-2020**	-0.2	-1.2	0.7	-2.1	-5	0.8	-2.6	-8	3.2
	Italy	**2004-2020**	-3.2*	-5.3	-1	-2.4*	-2.8	-2.1	-1.4*	-2	-0.8
	Portugal	**2011-2017**	9.2*	8.2	10.2	2.2*	1.9	2.6	-5.9*	-6.2	-5.6

	Israel	2005-2020	-3.8*	-3.8	-3.8	-1	-2.3	0.2	0.6*	0.3	1
C.W.E.	Austria	2004-2020	0	-0.6	0.6	0.2	-0.1	0.4	1.1*	1.1	1.1
	Belgium	2004-2020	1.7*	1	2.4	0.7*	0.4	1.1	1.0*	1	1.1
	France	2004-2020	-0.7	-3.6	2.3	-1	-2.1	0.1	-0.7	-3.1	1.8
	Germany	2004-2020	0.6*	0.1	1.1	0.2	-1	1.4	2.7*	2.6	2.9
	Switzerland	2004-2020	1.5*	1.4	1.6	0.8	-0.7	2.2	-0.2	-0.5	0
	Croatia	2015-2020	3.7	-0.8	8.5	9.7	-7	29.3	-0.1*	-0.1	-0.1
	Luxembourg	2013-2020	-4.4	-8.7	0.1	3.2*	1.9	4.5	-2.1*	-2.1	-2.1
	Netherlands	2004-2020	-0.0*	0	0	0.4*	0.3	0.5	2.4*	2.1	2.7
	Slovenia	2011-2020	1.6	-1.7	5.1	0.7	-2.3	3.7	-1.2*	-1.3	-1.1
	Czechia	2007-2020	3.4*	3.2	3.7	2.0*	1.1	3	-2.3*	-3	-1.5
E.E.	Hungary	2011-2020	-2.3*	-2.6	-2.1	1.3*	1.1	1.4	-5.0*	-5.1	-4.9
	Poland	2007-2020	-3.5*	-4.3	-2.6	-4.2*	-4.7	-3.7	-2.5*	-2.5	-2.5
	Romania	2017-2020	-11.4*	-16	-6.4	-4.2*	-4.8	-3.5			
Females											
N.E.	Denmark	2004-2020	-1.1*	-1.3	-0.9	-1.1*	-1.7	-0.6	1.2*	0.5	2
	Estonia	2011-2020	-3.9*	-4.3	-3.5	-1.2*	-1.3	-1.1	-4.7*	-4.7	-4.6
	Sweden	2004-2020	-1.8*	-3.1	-0.5	-0.8	-2	0.3	-0.1	-1.5	1.4
S.E.	Greece	2004-2020	-4.7*	-5.6	-3.9	-1.5*	-1.6	-1.5	-3.1*	-4.9	-1.2
	Spain	2004-2020	-1.6*	-3.1	-0.2	-2.3*	-3.7	-0.8	-2.1*	-2.1	-2.1
	Italy	2004-2020	-2.7*	-3.9	-1.5	-1.9*	-2.4	-1.4	-0.8*	-1.3	-0.3
	Portugal	2011-2017	-1.7*	-1.7	-1.7	-1.7*	-1.9	-1.4	0.1*	0.1	0.1
	Israel	2005-2020	-2.2*	-2.2	-2.1	-1.7*	-1.8	-1.7	0	-0.2	0.1
C.W.E.	Austria	2004-2020	-0.8	-1.8	0.2	-0.4	-1	0.2	-0.5	-1.4	0.4
	Belgium	2004-2020	0.7*	0.7	0.7	0.5*	0.4	0.5	-0.3*	-0.3	-0.2
	France	2004-2020	0.1*	0	0.1	-1.0*	-1.9	0	-0.7*	-1.2	-0.2
	Germany	2004-2020	0.3	-0.1	0.8	0.1*	0	0.2	1.0*	0.8	1.3
	Switzerland	2004-2020	-2.8*	-2.9	-2.7	0.6	-0.1	1.3	-0.2	-1.8	1.4
	Croatia	2015-2020	-2.6	-5.4	0.3	3.8	-8.8	18	-4.5*	-4.6	-4.3
	Luxembourg	2013-2020	-8.9*	-9.7	-8.2	-5.4*	-5.6	-5.2	-1.2*	-1.5	-0.9
	Netherlands	2004-2020	-1.7*	-2	-1.3	-0.5*	-0.5	-0.5	-0.8*	-0.8	-0.8
	Slovenia	2011-2020	0	-4.3	4.6	-0.7	-3.6	2.3	-2.4*	-2.5	-2.3
E.E.	Czechia	2007-2020	2.0*	1.8	2.2	0.9	-0.4	2.3	-2.6*	-2.9	-2.2
	Hungary	2011-2020	1.0*	0.9	1.2	-3.0*	-3	-2.9	-6.2*	-6.4	-6.1
	Poland	2007-2020	-5.9*	-6.1	-5.7	-5.7*	-6.9	-4.5	-3.0*	-3.3	-2.7
	Romania	2017-2020	-16.6*	-26.3	-5.5	-12.2*	-17.5	-6.6			

*Note: Estimates are based on sex- and age-standardized distributions of health indices. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, ADL: Activities of Daily Living, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, EUROD: case of depression IADL: Instrumental, Activities, of Daily Living, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

The following figures portray the trends in the frequency of the standardized distributions of the ill-health indices in Greece, Poland and Romania during the period of analysis, along with the jointpoints of the respective segmented regression analyses.

Figure 111 Trends in the prevalence (%) of fair/poor self-reported health in Greece

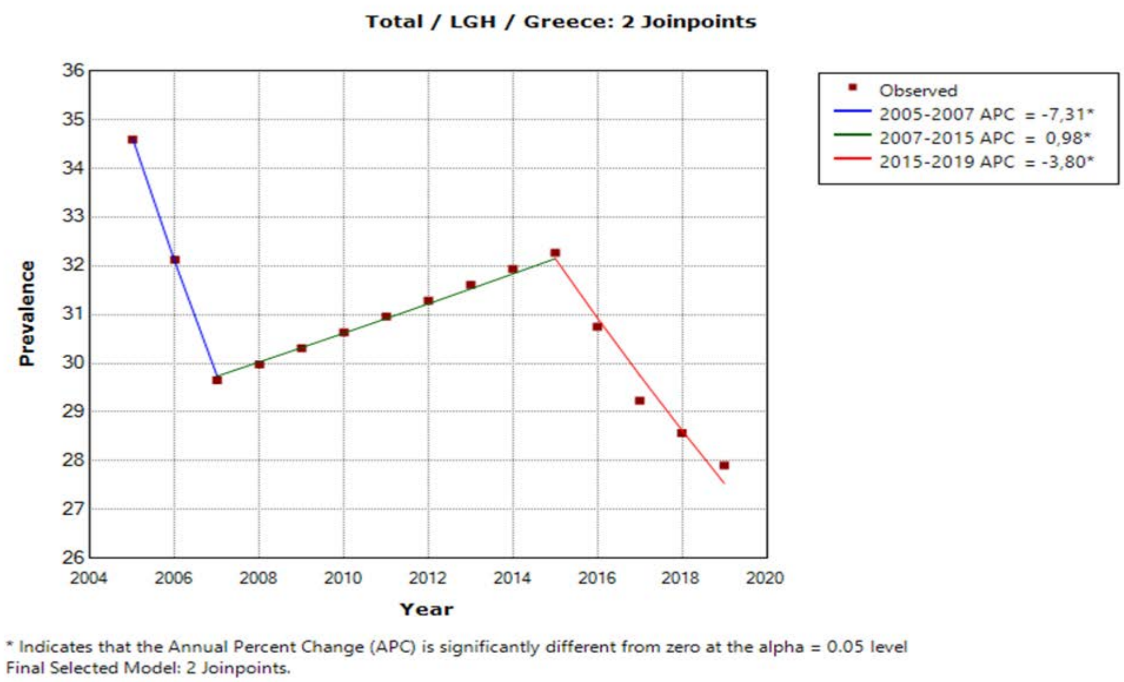


Figure 112 Trends in the prevalence (%) of fair/poor self-reported health in Greece per gender

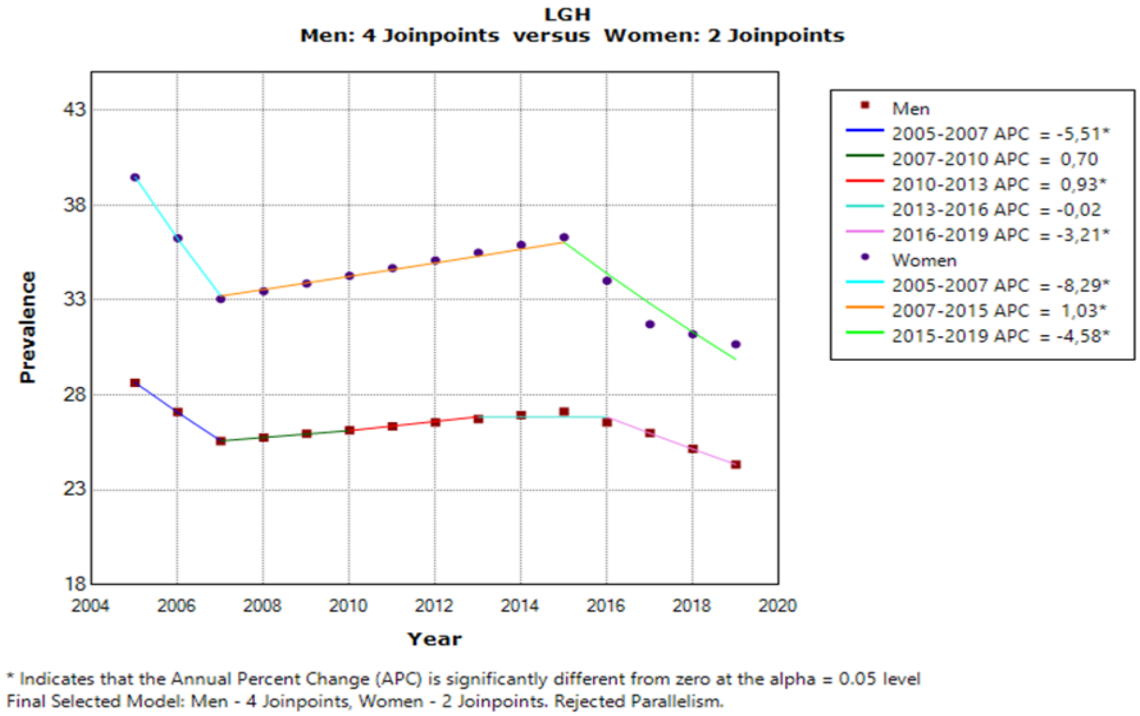


Figure 113 Trends in the prevalence (%) of fair/poor self-reported health in Poland

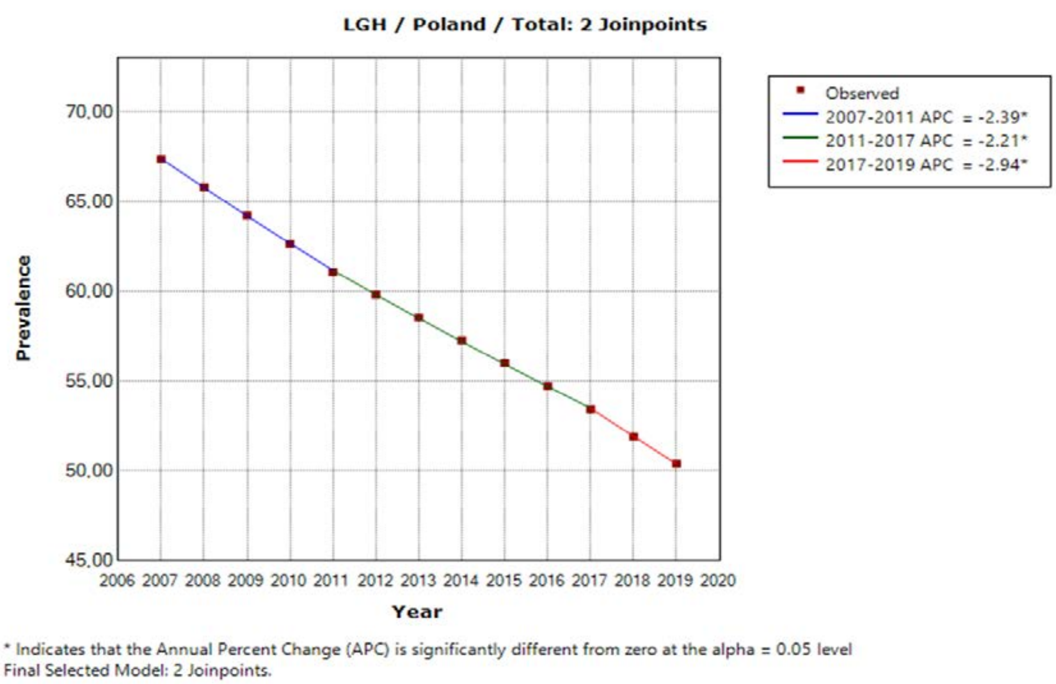


Figure 114 Trends in the prevalence (%) of fair/poor self-reported health in Poland per gender

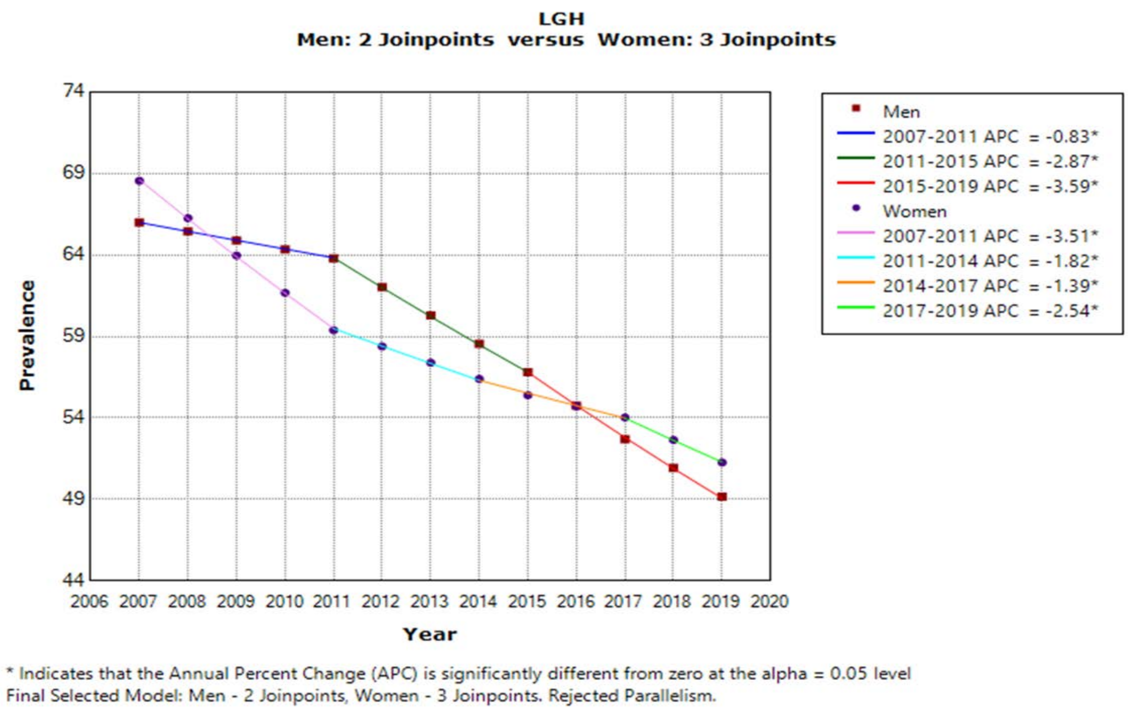


Figure 115 Trends in the prevalence (%) of fair/poor self-reported health in Romania

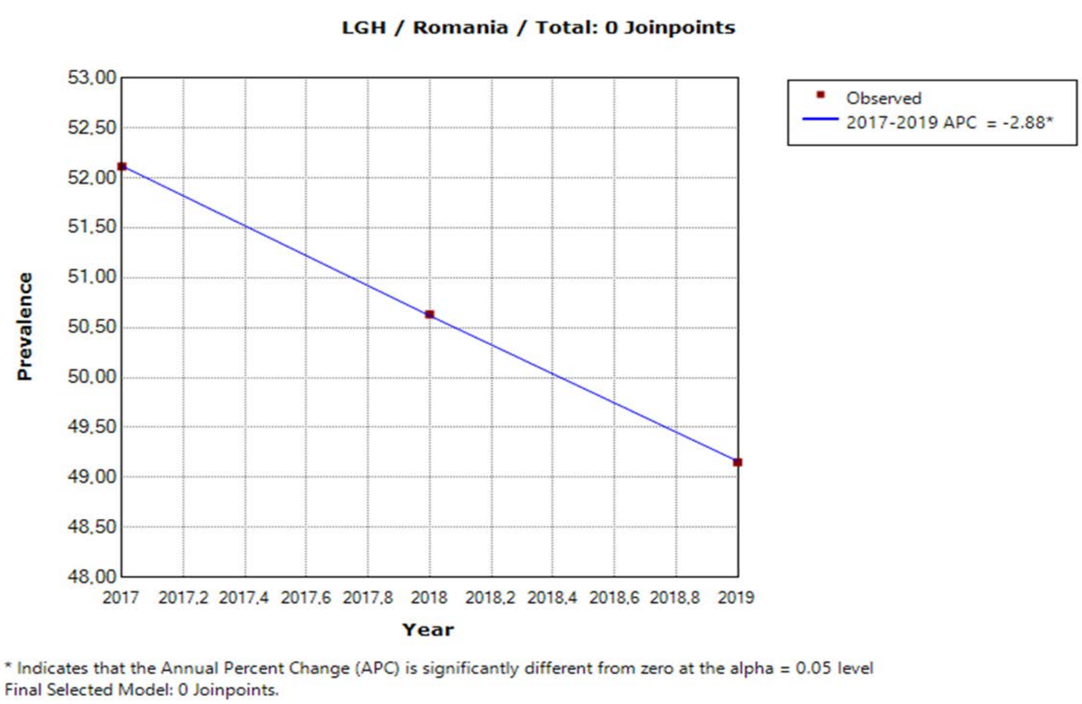


Figure 116 Trends in the prevalence (%) of fair/poor self-reported health in Romania per gender

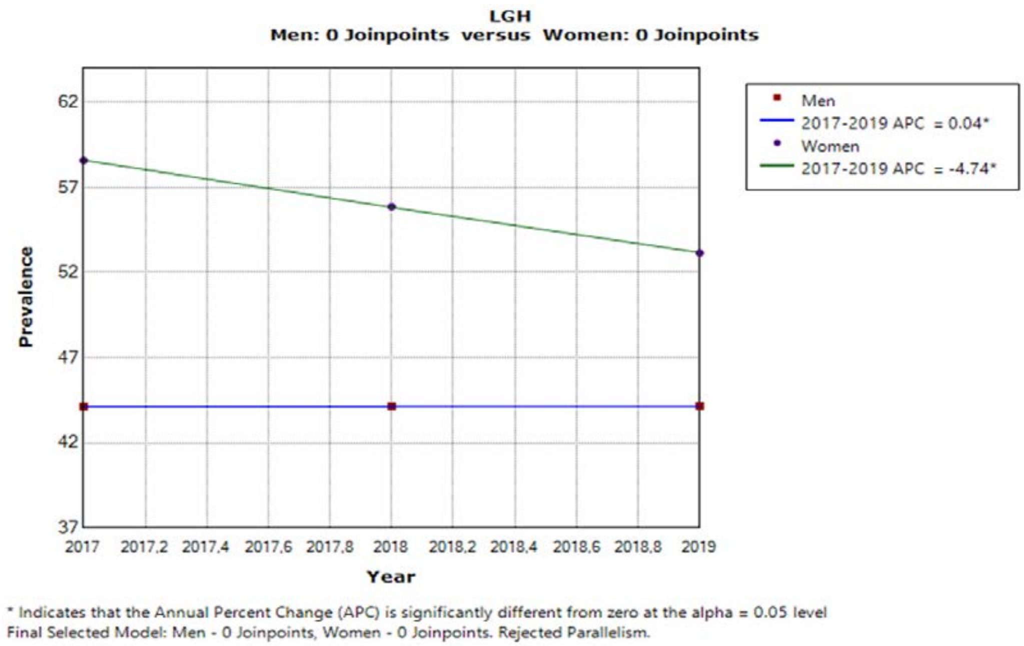


Figure 117 Trends in the prevalence (%) of mobility limitations in Greece

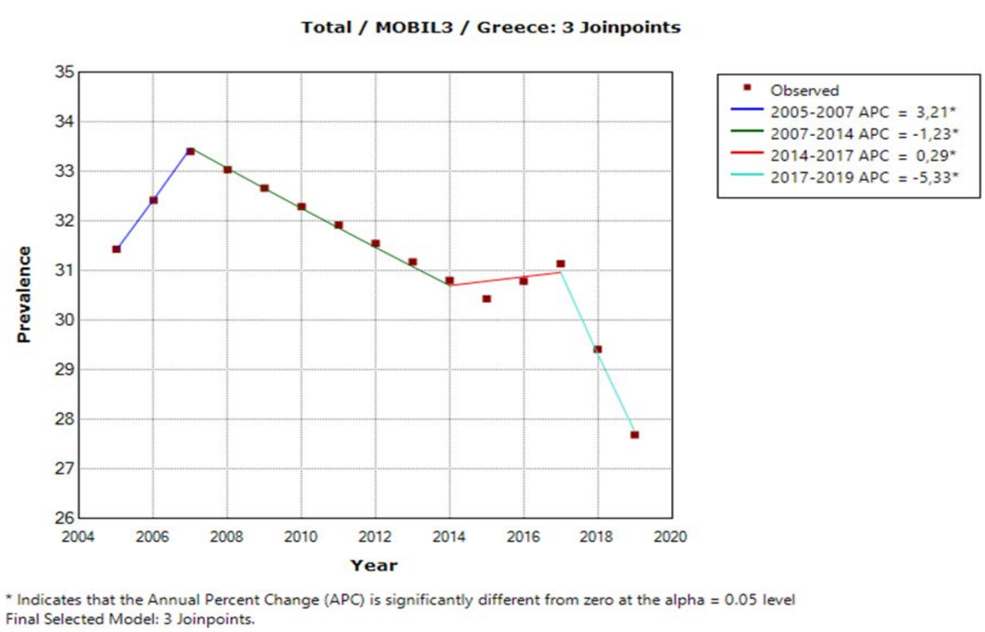


Figure 118 Trends in the prevalence (%) of mobility limitations in Greece per gender

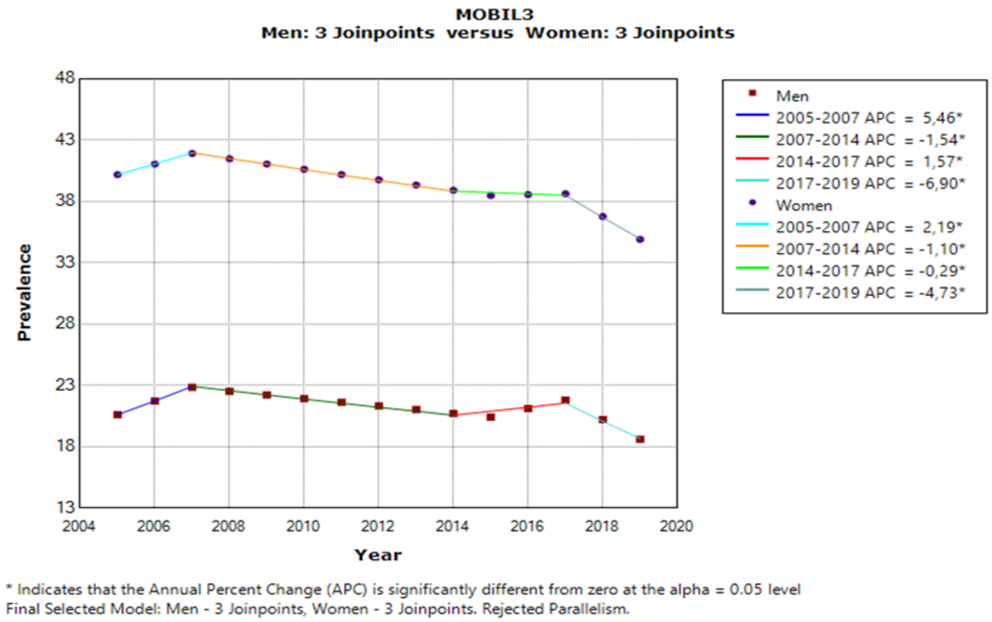


Figure 119 Trends in the prevalence (%) of mobility limitations in Poland

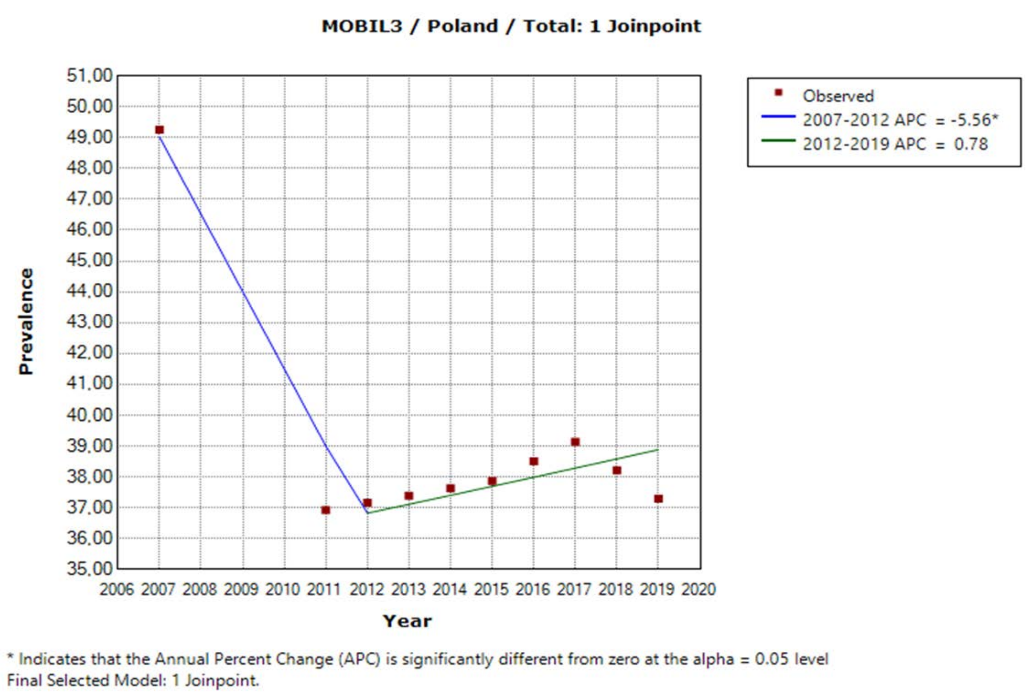


Figure 120 Trends in the prevalence (%) of mobility limitations in Poland per gender

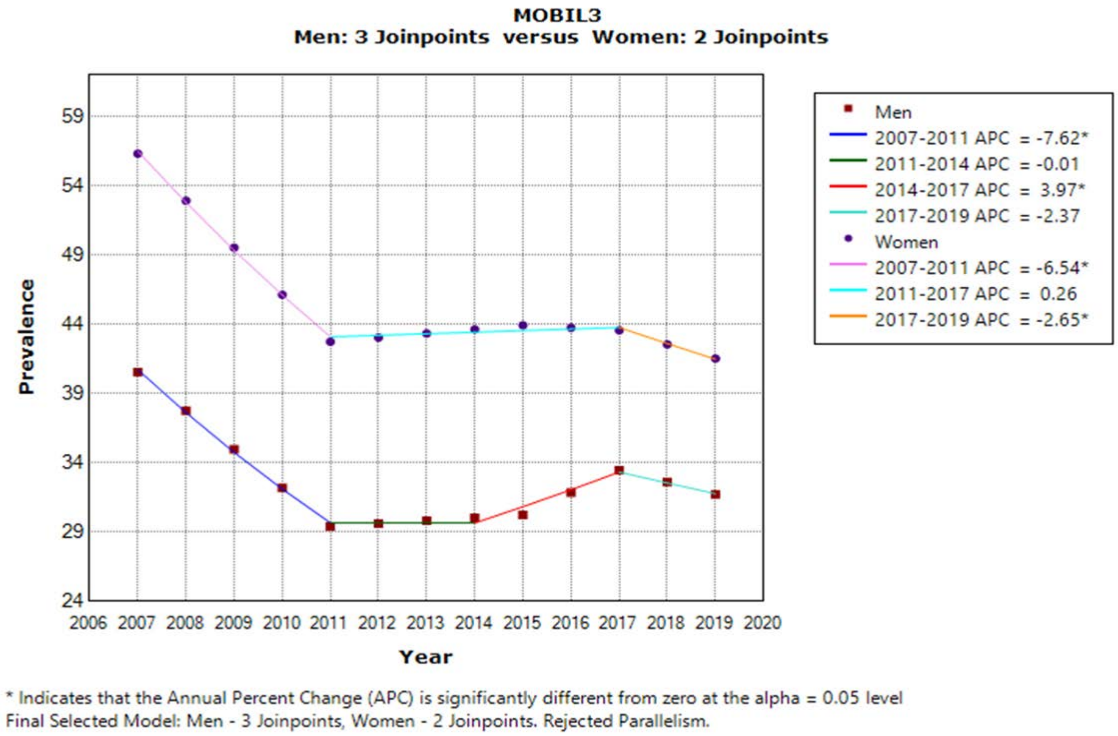


Figure 121 Trends in the prevalence (%) of mobility limitations in Romania

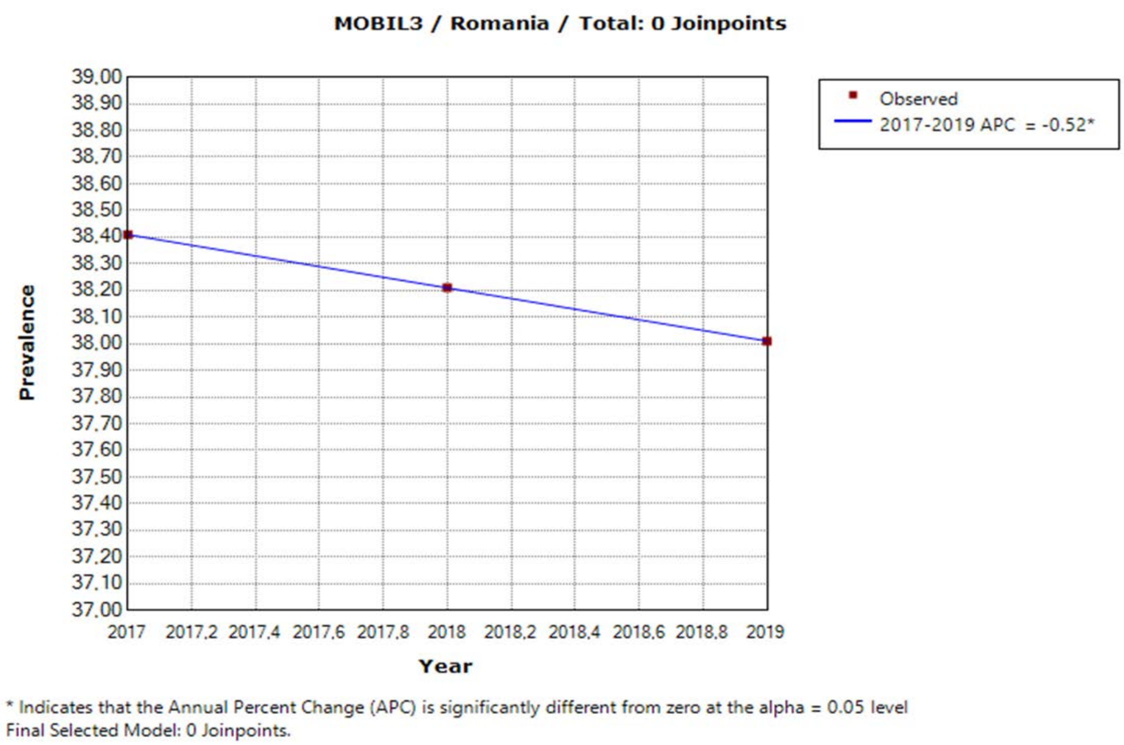


Figure 122 Trends in the prevalence (%) of mobility limitations in Romania per gender

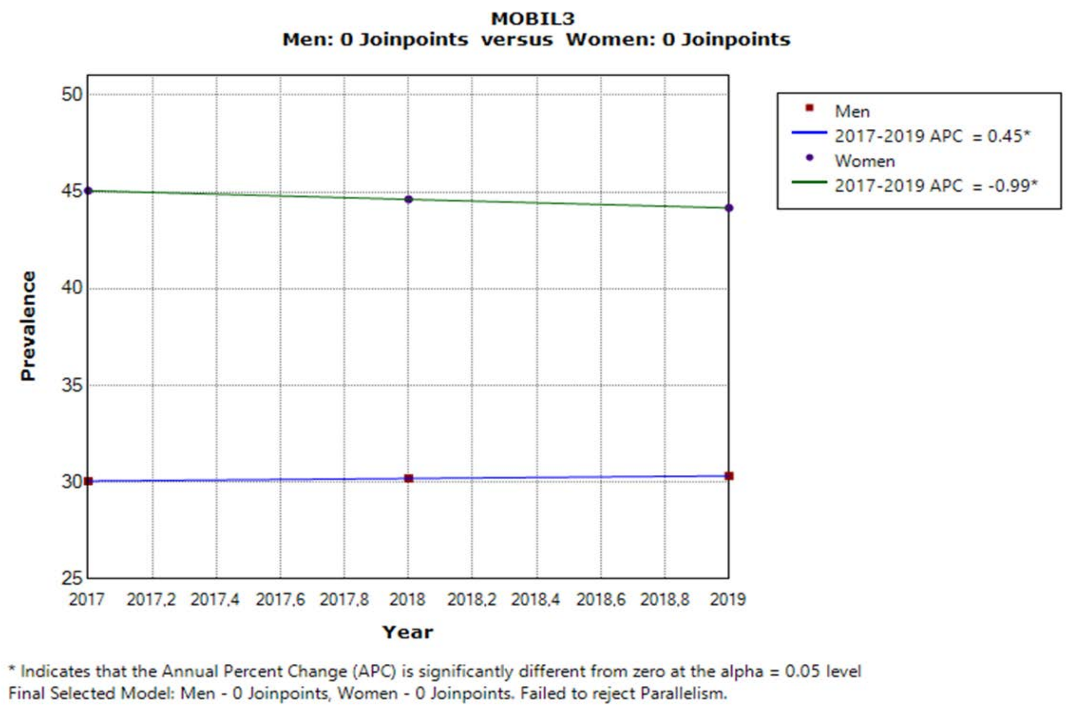


Figure 123 Trends in the prevalence (%) of global activity limitations (GALI) in Greece

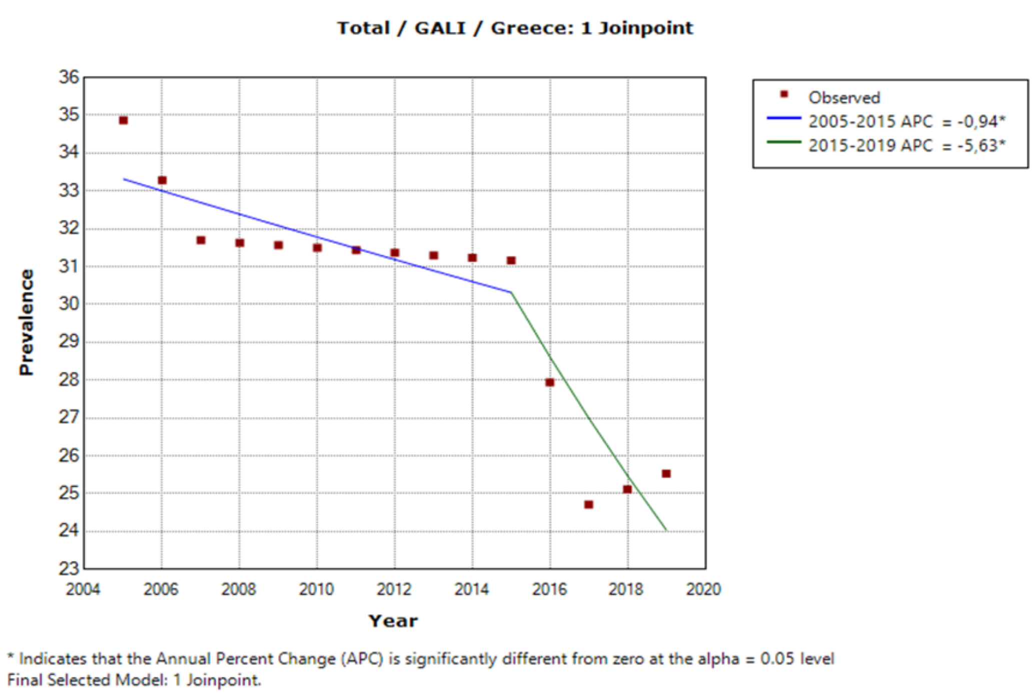


Figure 124 Trends in the prevalence (%) of global activity limitations (GALI) in Greece per gender

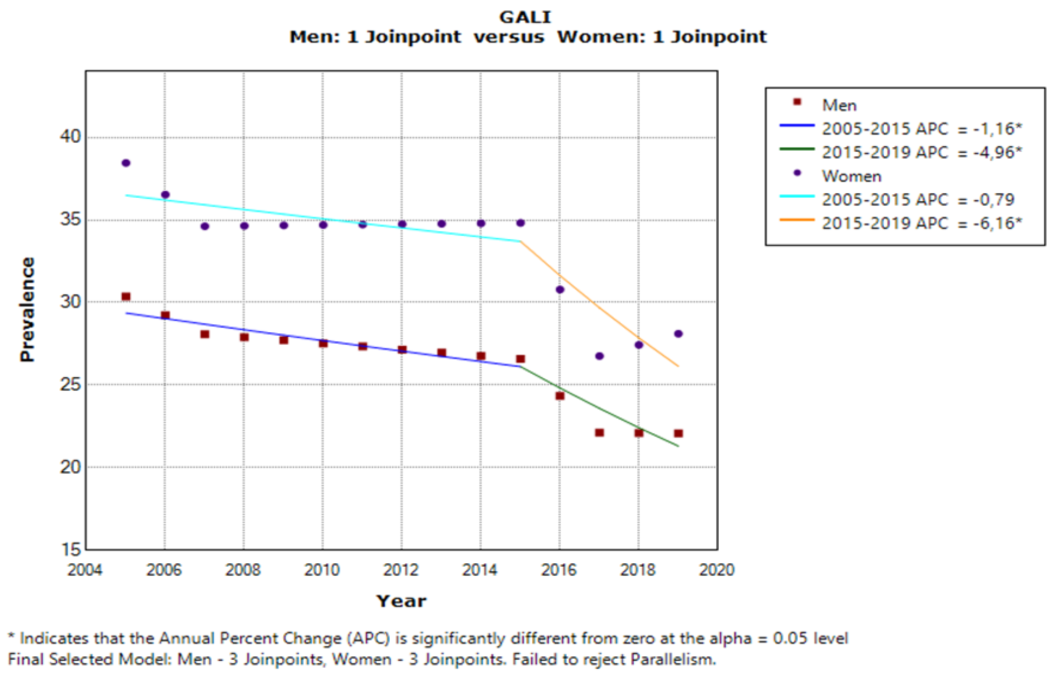


Figure 125 Trends in the prevalence (%) of global activity limitations (GALI) in Poland

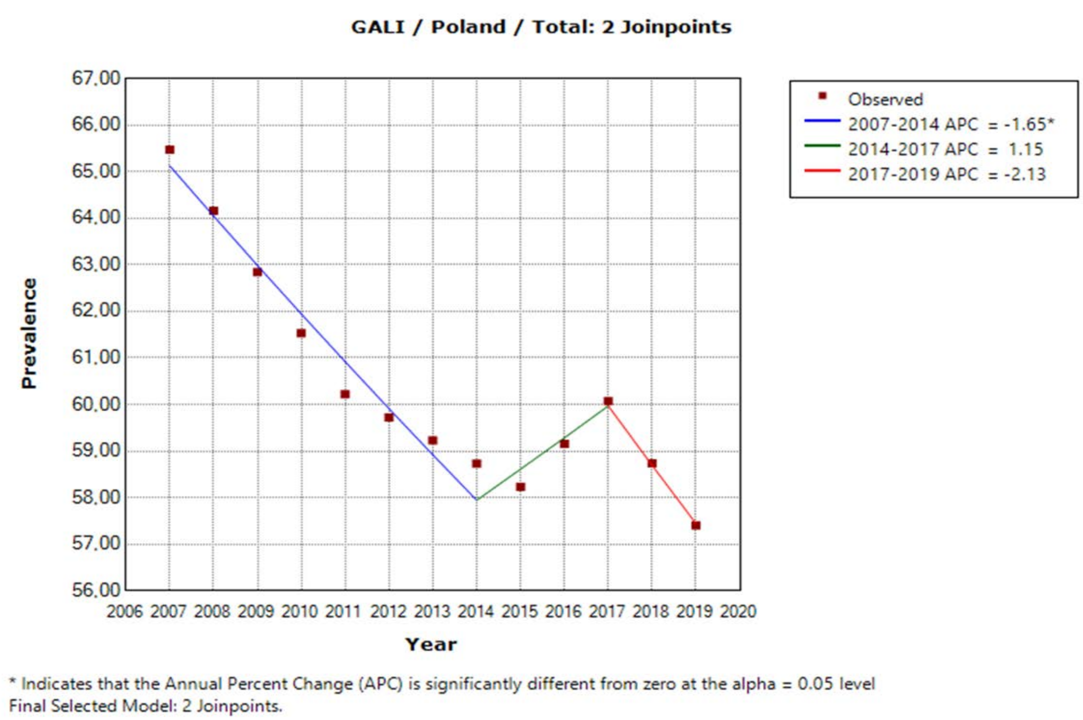


Figure 126 Trends in the prevalence (%) of global activity limitations (GALI) in Poland per gender

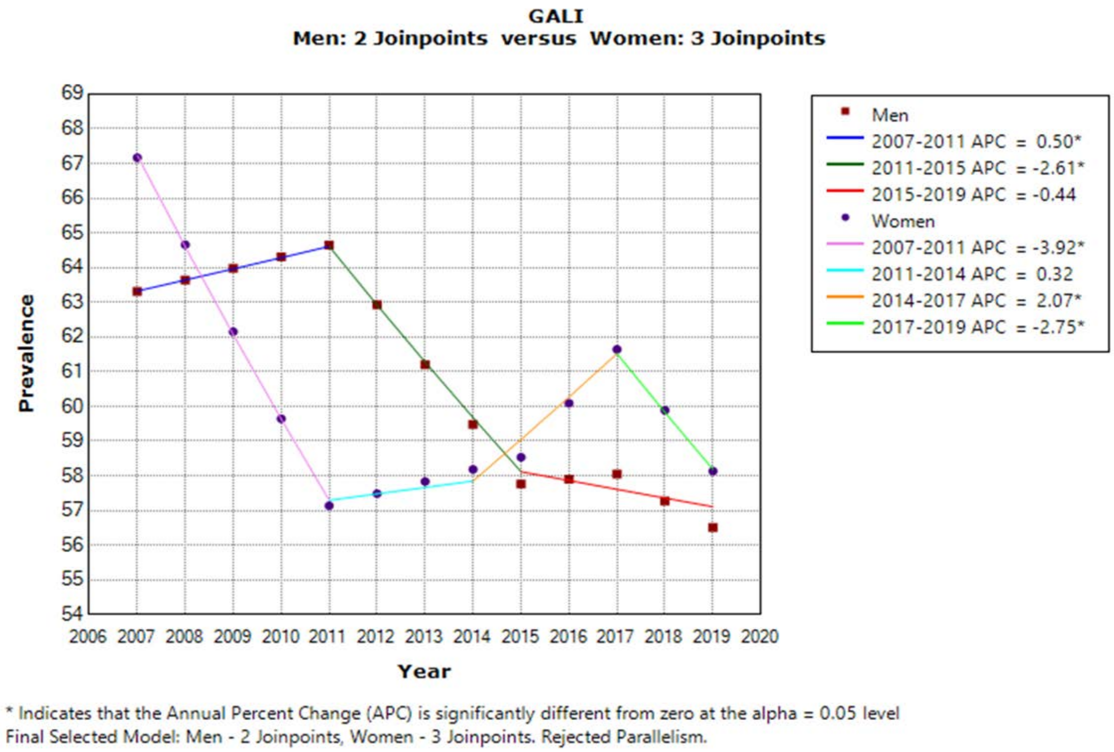


Figure 127 Trends in the prevalence (%) of global activity limitations (GALI) in Romania

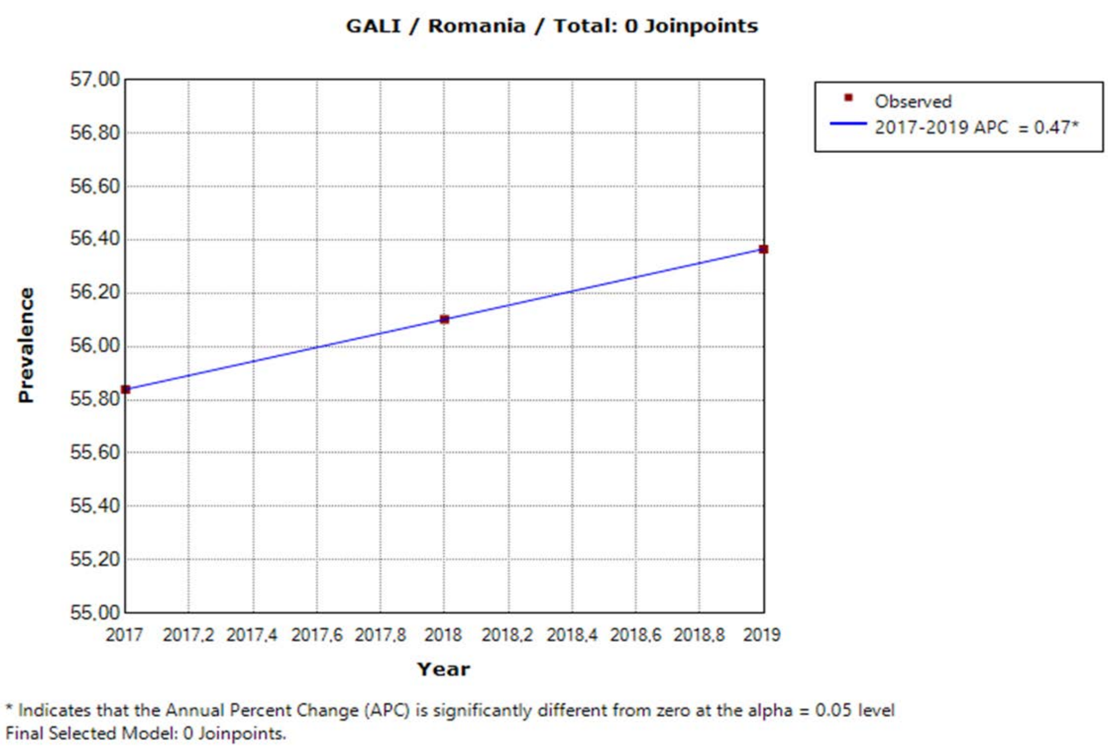


Figure 128 Trends in the prevalence (%) of global activity limitations (GALI) in Romania per gender

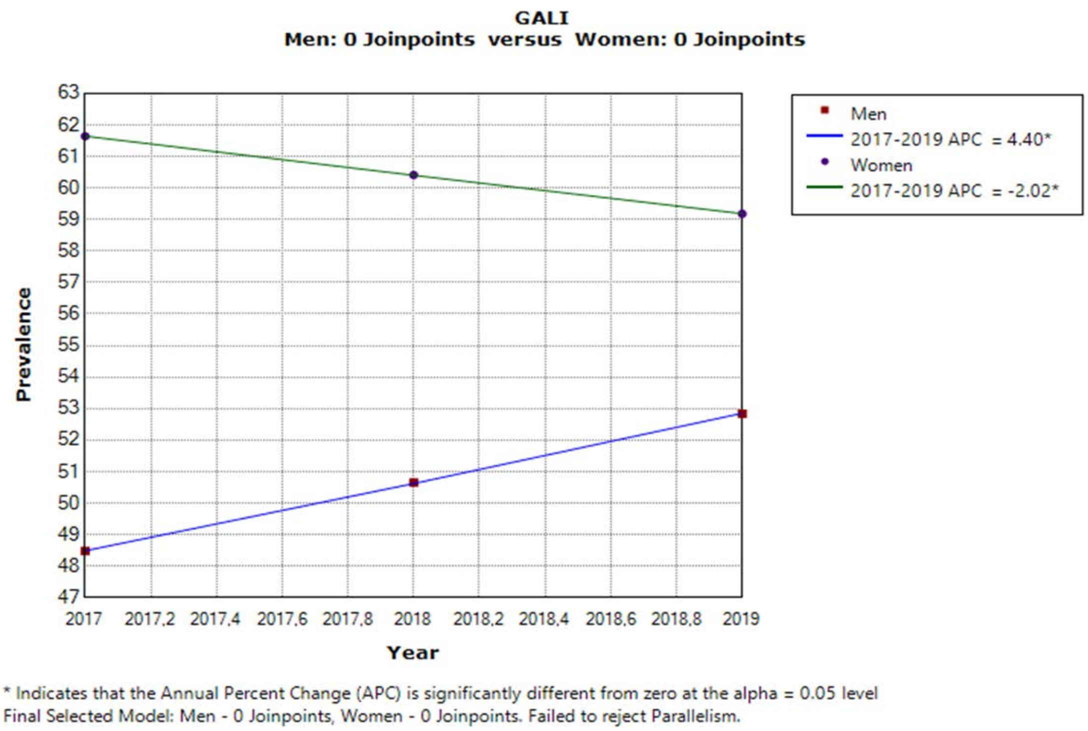


Figure 129 Trends in the prevalence (%) of limitations in activities of daily living (ADL) in Greece

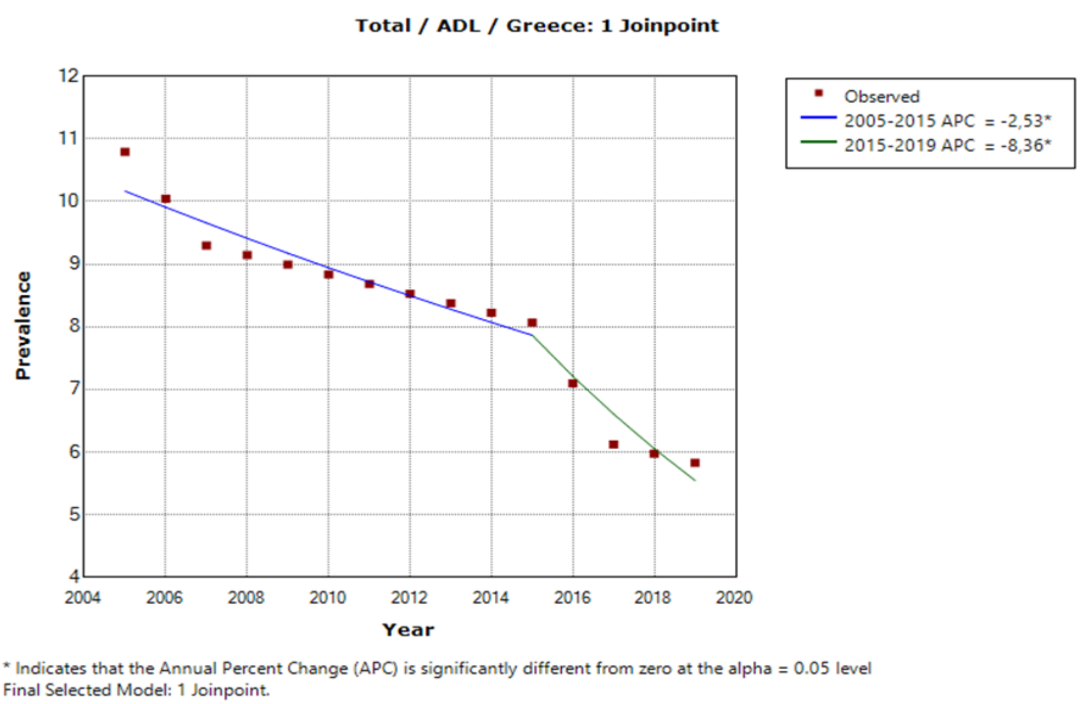


Figure 130 Trends in the prevalence (%) of limitations in activities of daily living (ADL) in Greece per gender

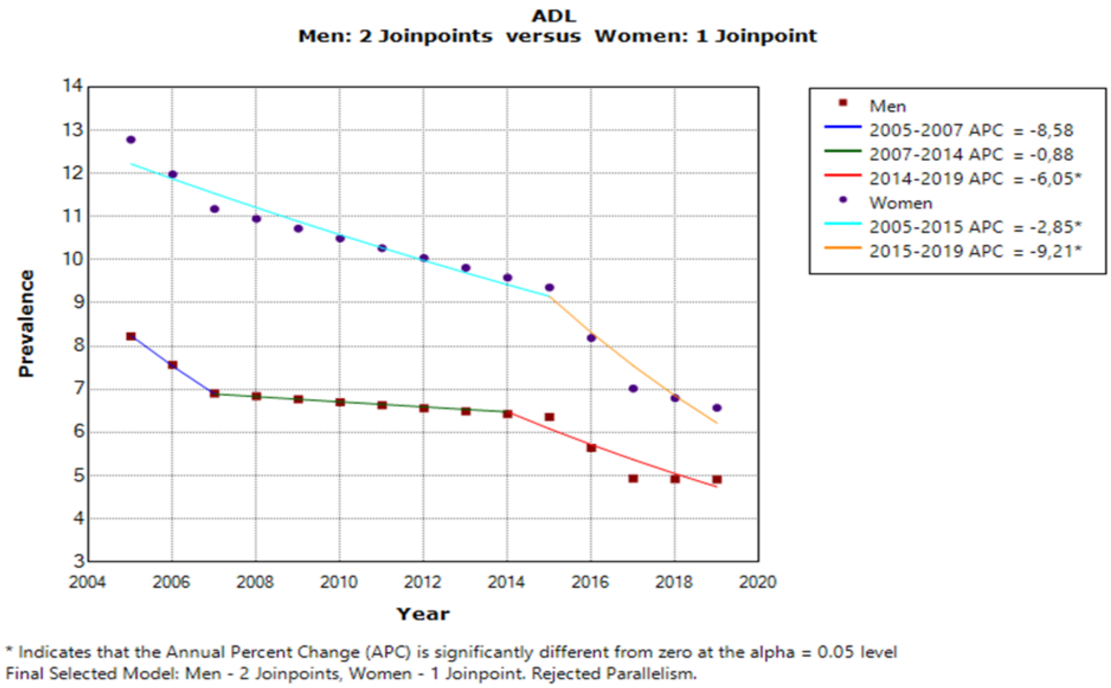


Figure 131 Trends in the prevalence (%) of limitations in activities of daily living (ADL) in Poland

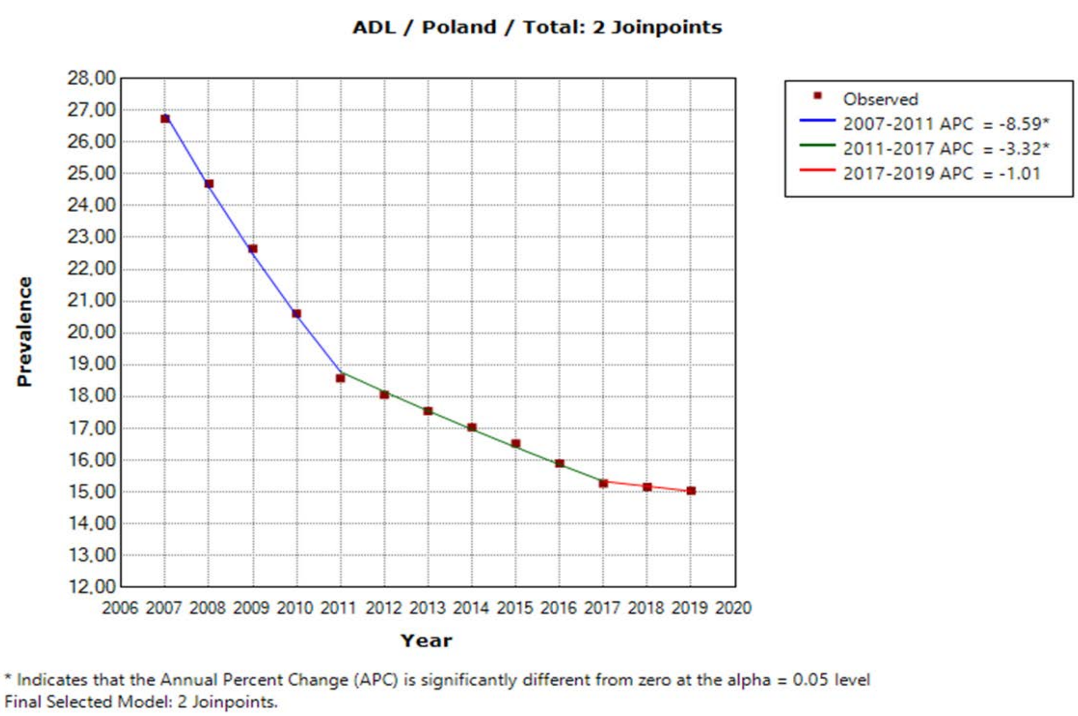


Figure 132 Trends in the prevalence (%) of limitations in activities of daily living (ADL) in Poland per gender

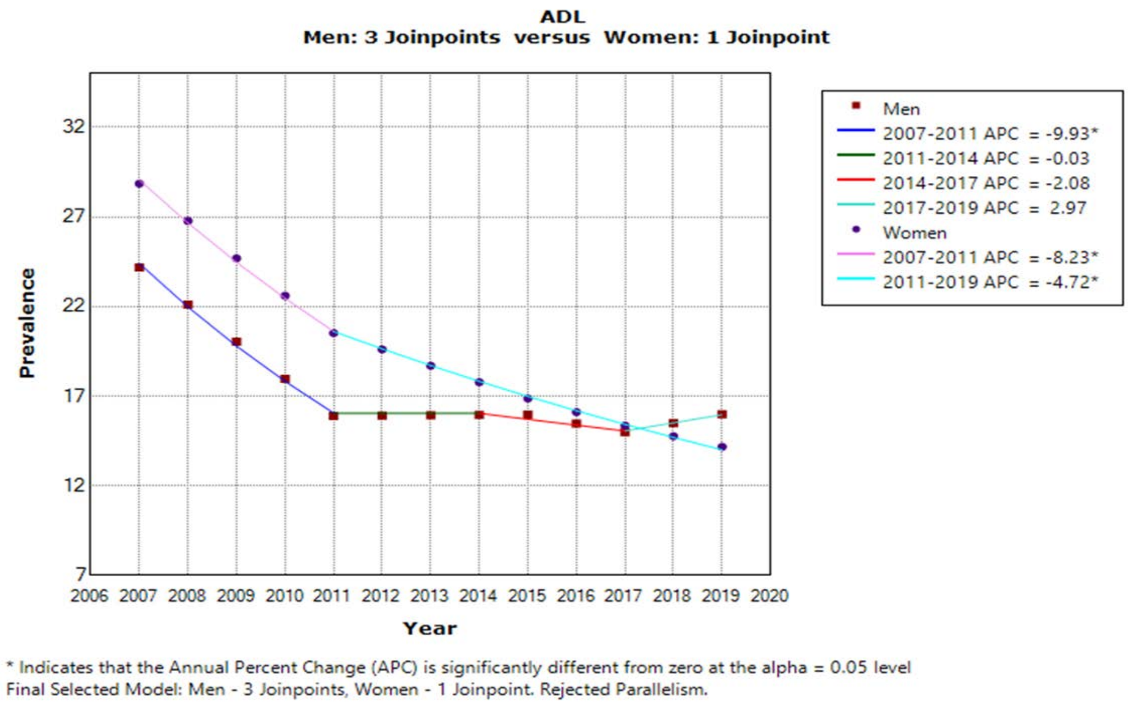


Figure 133 Trends in the prevalence (%) of limitations in activities of daily living (ADL) in Romania

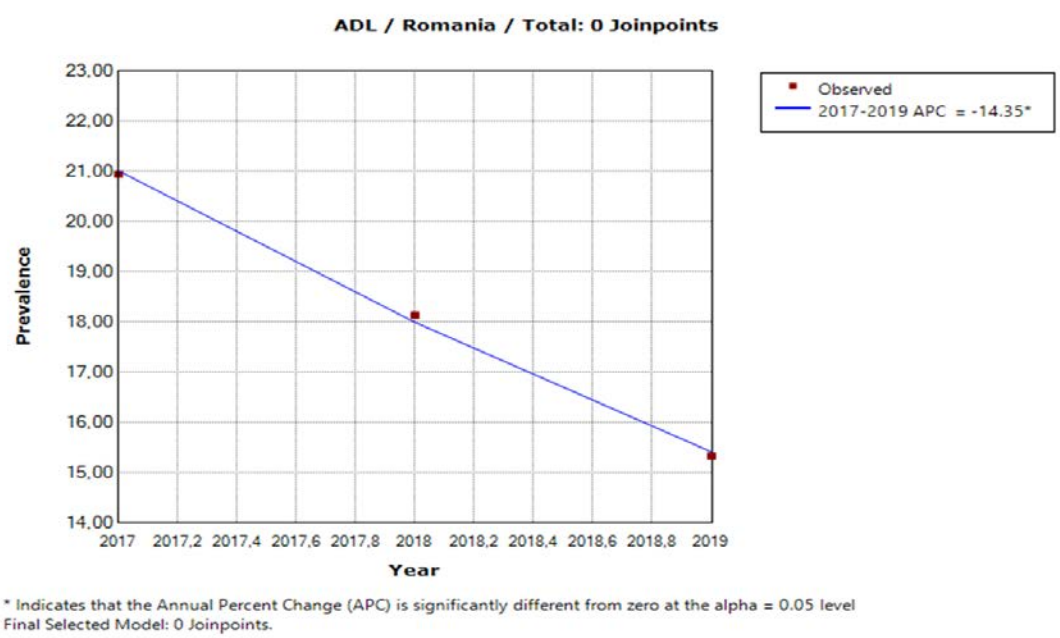


Figure 134 Trends in the prevalence (%) of limitations in activities of daily living (ADL) in Romania per gender

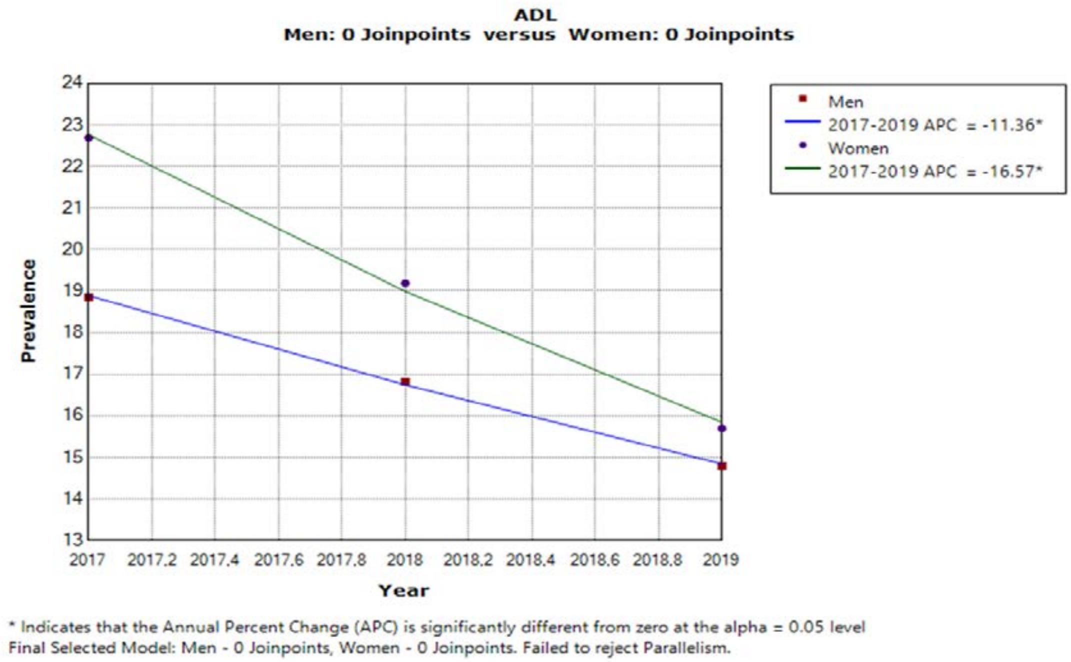


Figure 135 Trends in the prevalence (%) of instrumental activities of daily living (IADL) in Greece

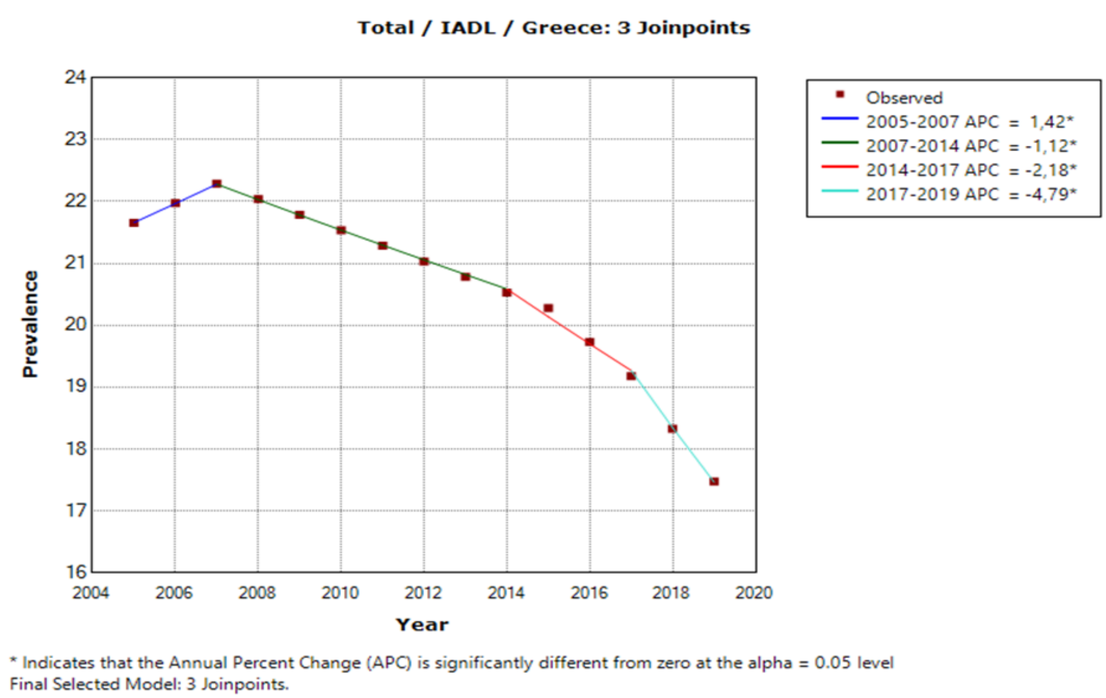


Figure 136 Trends in the prevalence (%) of instrumental activities of daily living (IADL) in Greece per gender

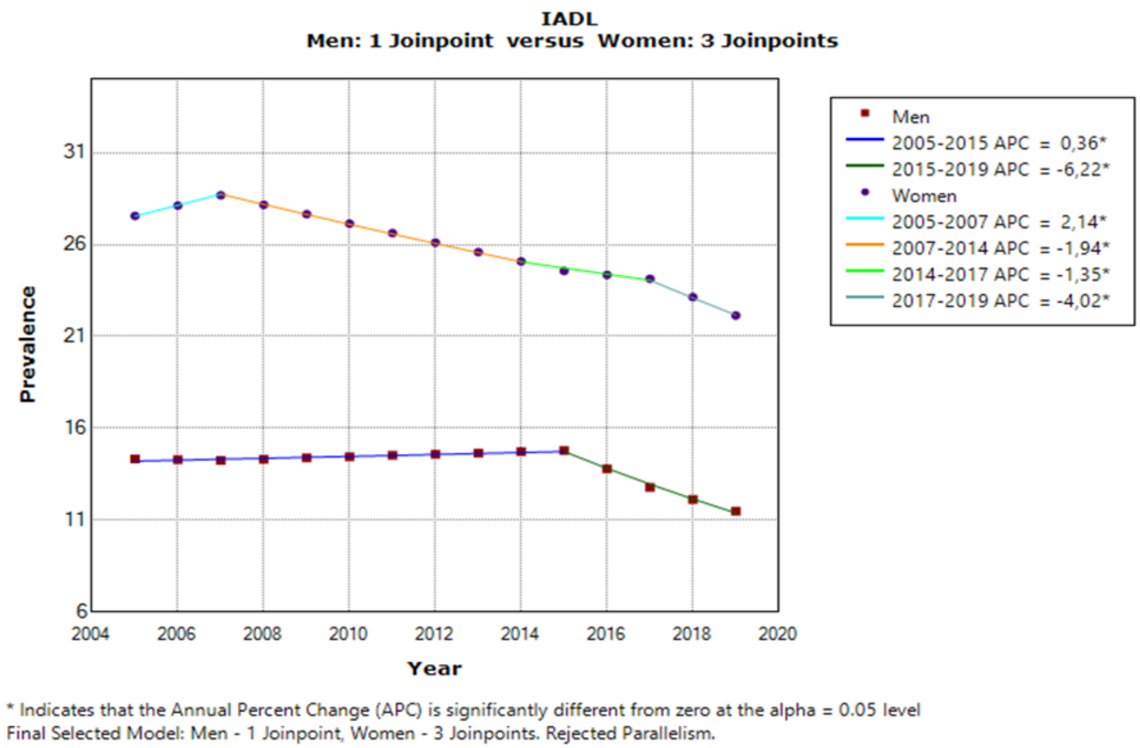


Figure 137 Trends in the prevalence (%) of instrumental activities of daily living (IADL) in Poland

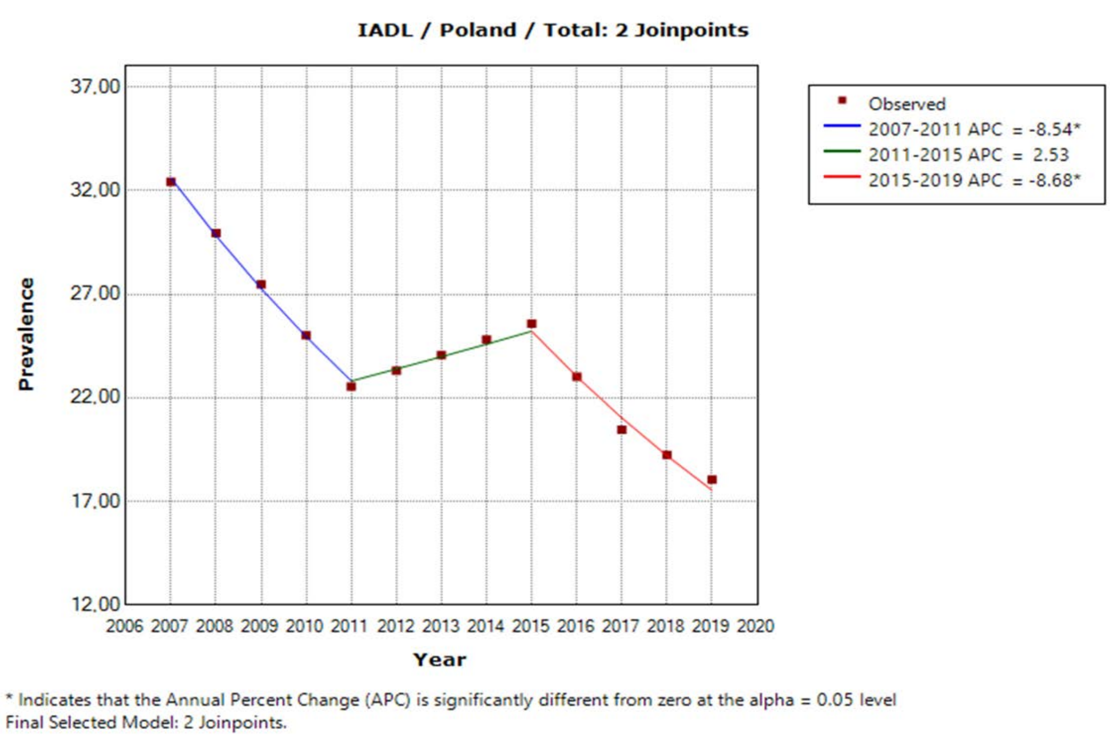


Figure 138 Trends in the prevalence (%) of instrumental activities of daily living (IADL) in Poland per gender

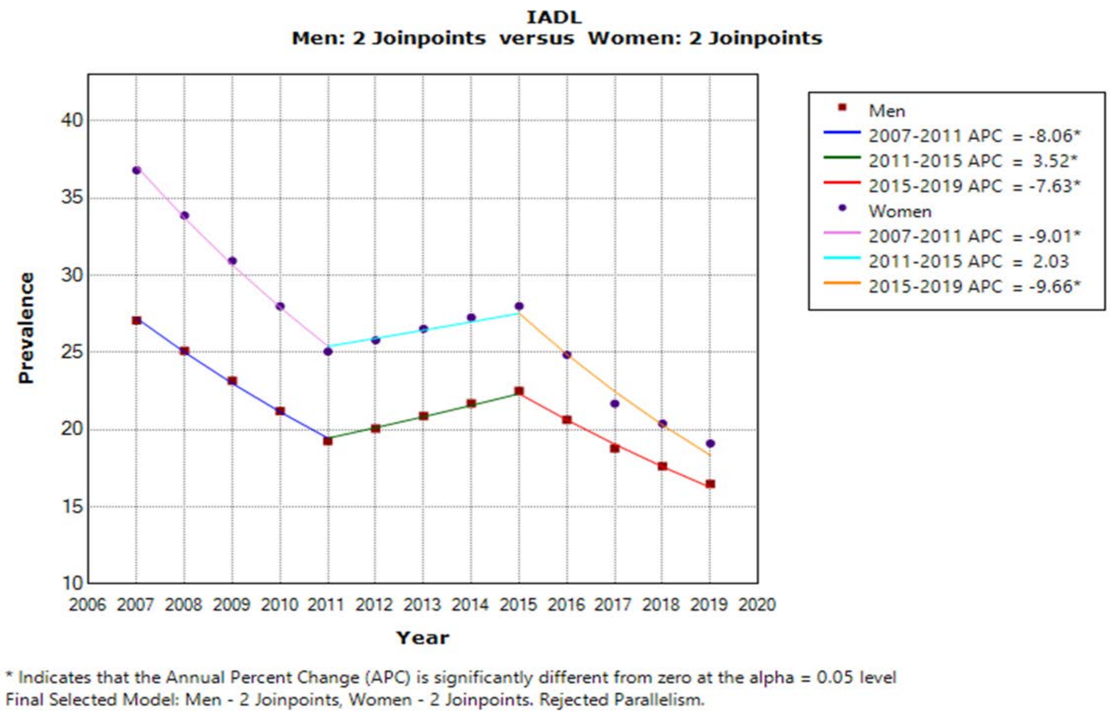


Figure 139 Trends in the prevalence (%) of instrumental activities of daily living (IADL) in Romania

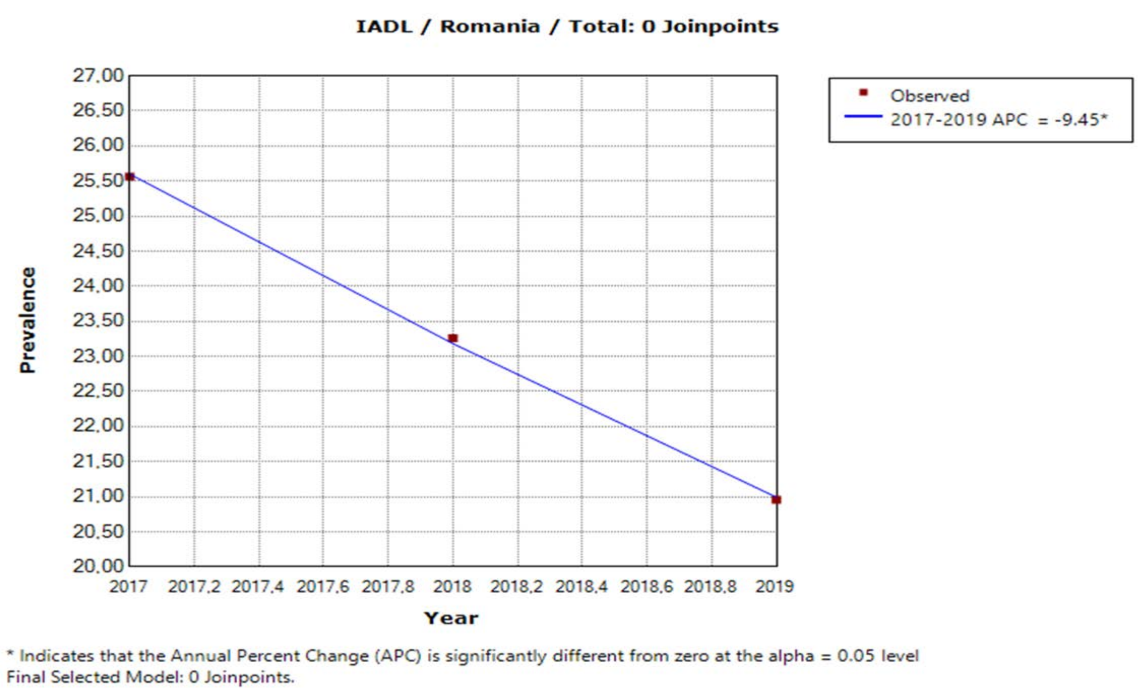


Figure 140 Trends in the prevalence (%) of instrumental activities of daily living (IADL) in Romania per gender

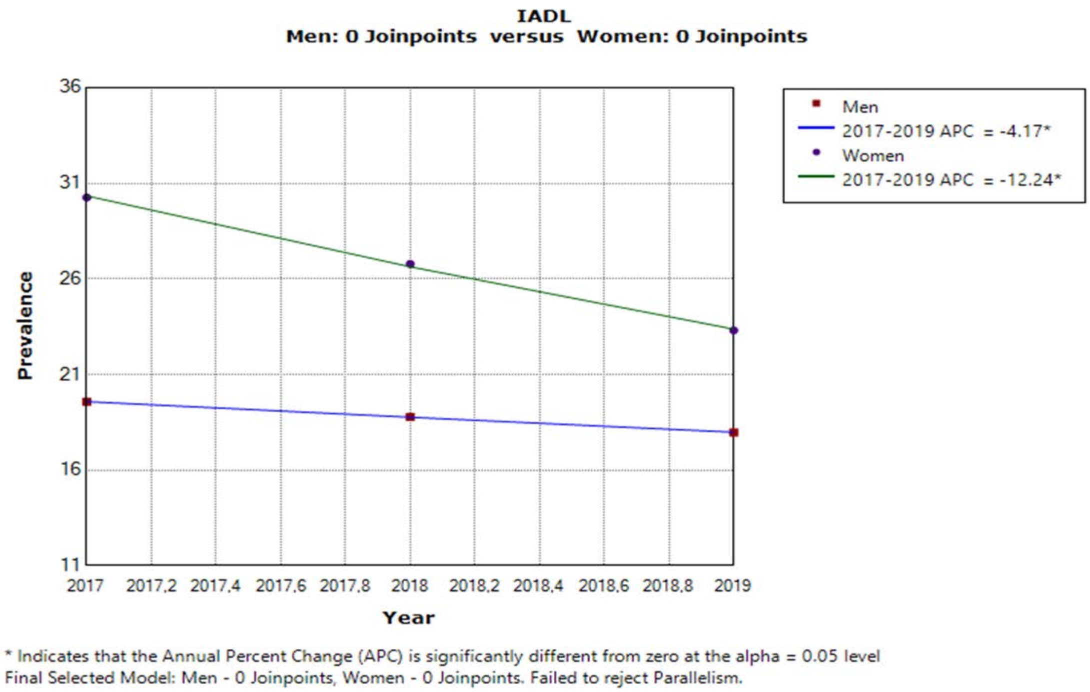


Figure 141 Trends in the prevalence (%) of depression (EURO-D) in Greece

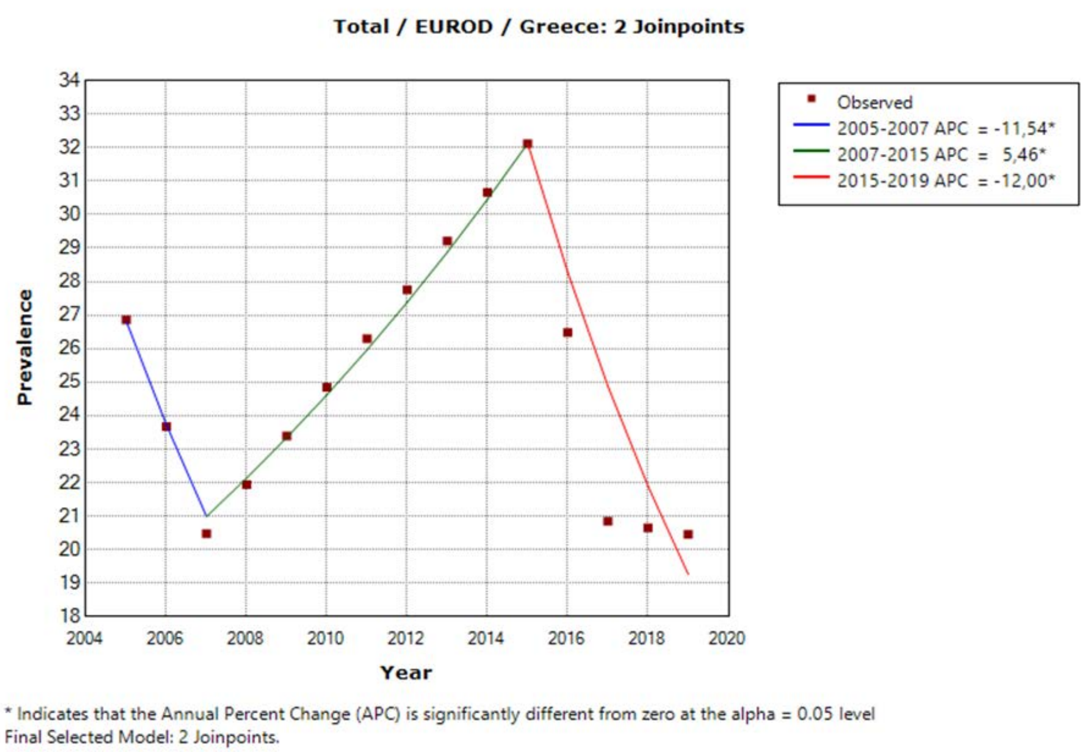


Figure 142 Trends in the prevalence (%) of depression (EURO-D) in Greece per gender

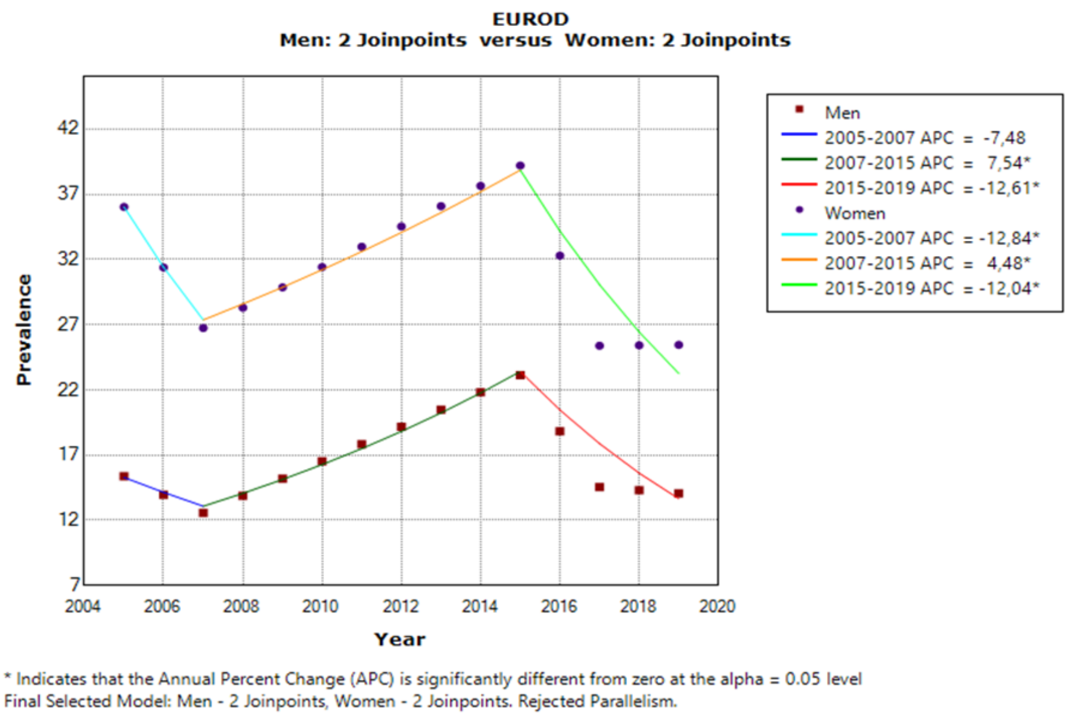


Figure 143 Trends in the prevalence (%) of depression (EURO-D) in Poland

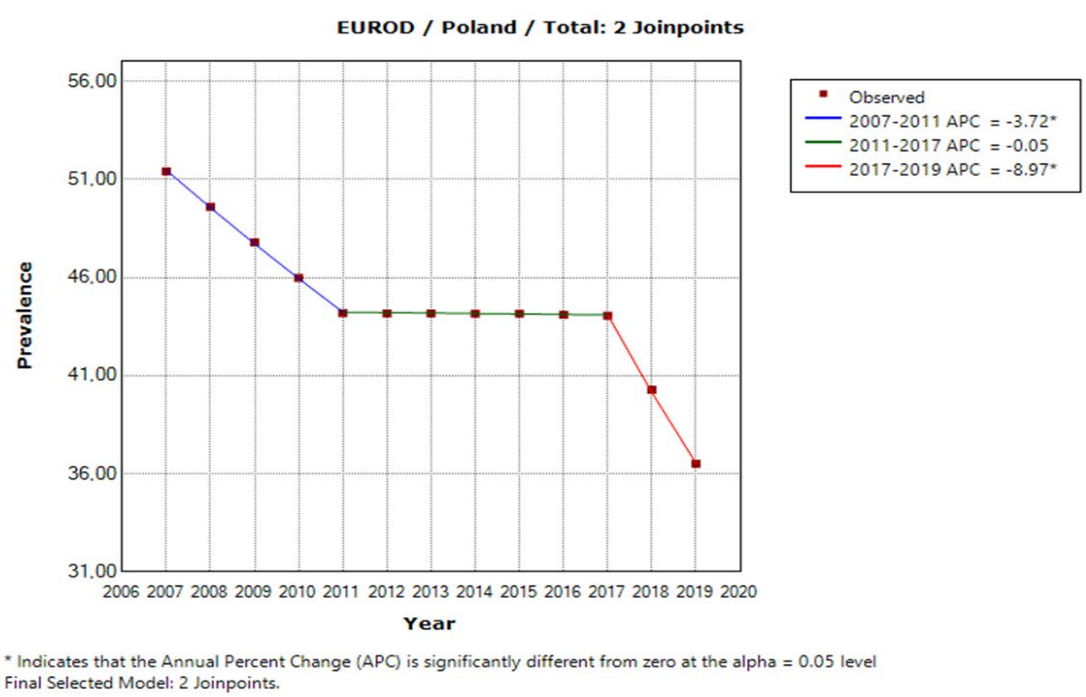
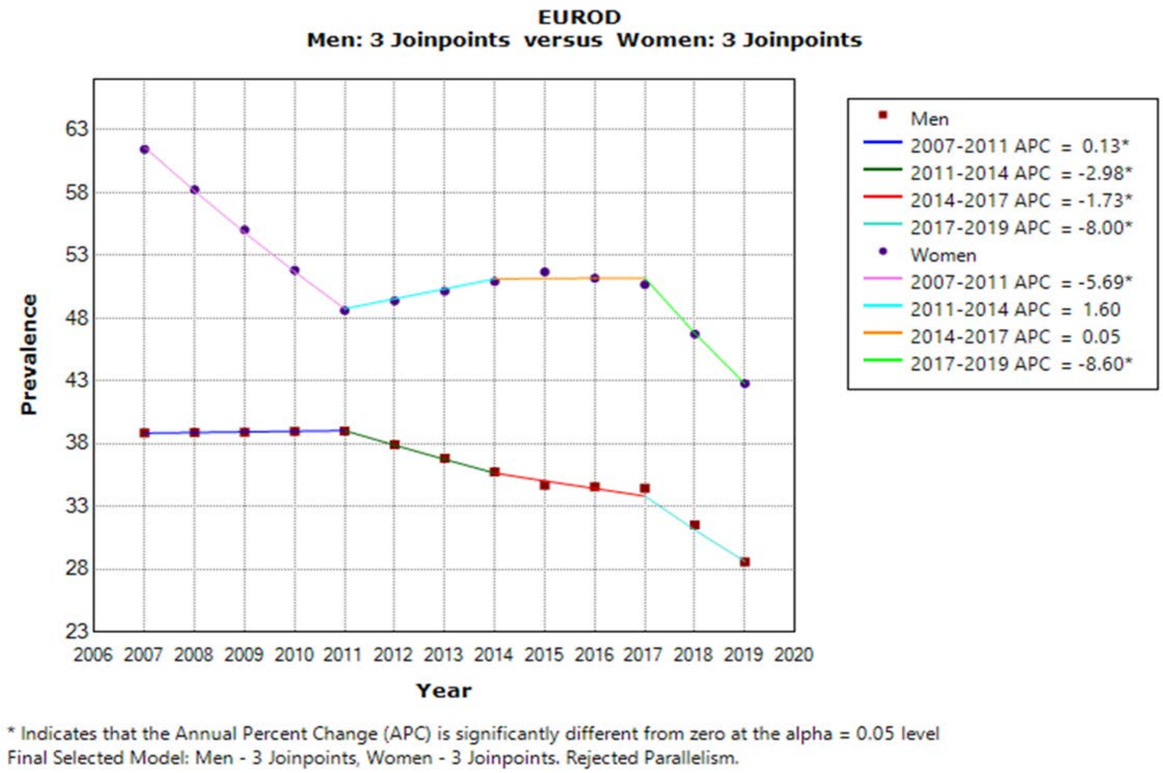


Figure 144 Trends in the prevalence (%) of depression (EURO-D) in Poland per gender

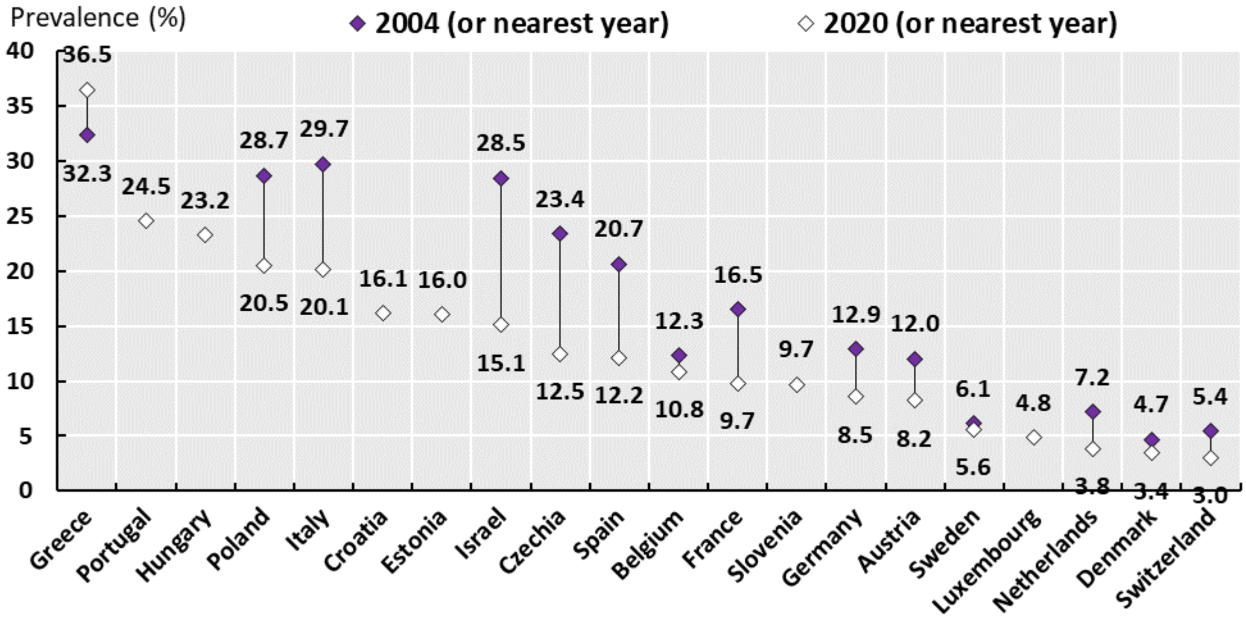


4.2.4. Quality of life

This section explores the changes in the prevalence of low quality of life, as it was measure with the CASP-12 instrument. Unfortunately, no data were gathered for Romania for this index.

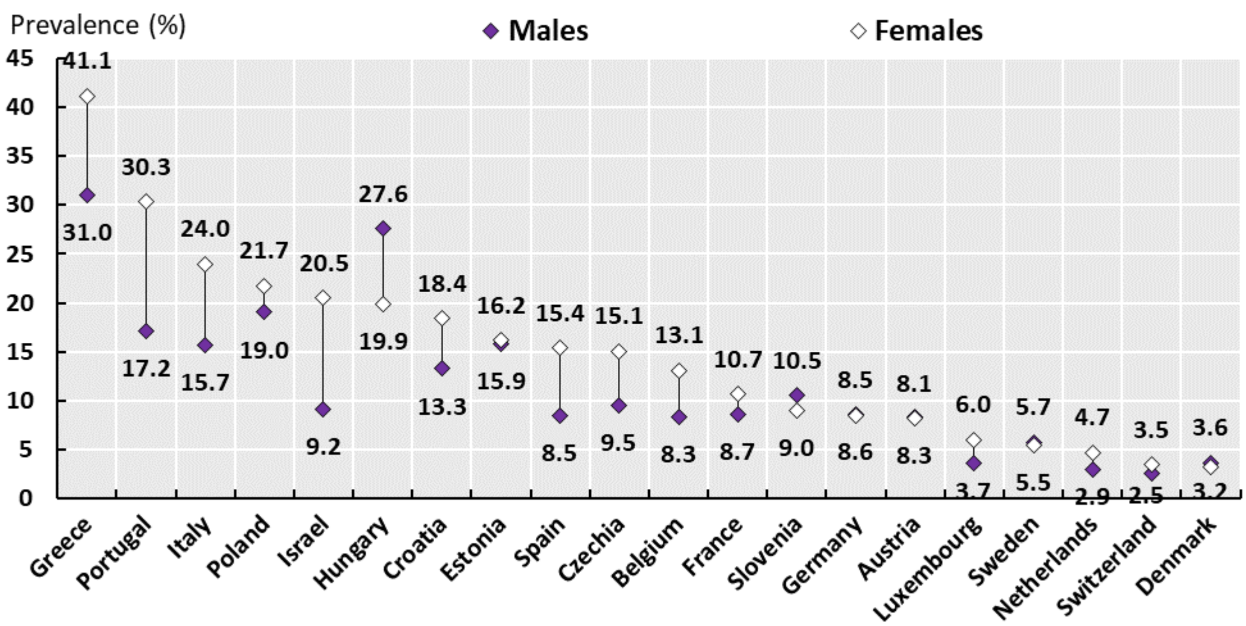
The prevalence of low quality of life decreases in almost all European countries, with the exception of Greece. Greece records a deterioration between 2004 and 2020 and it ranks at the top of the list, registering the worst performance among all countries considered (Figure 144). Poland is fourth in the list, although it is associated with an improvement over time. Women tend to report lower quality of life than men and the gap is quite pronounced in the case of Greece (Figure 144).

Figure 145 Changes in the prevalence (%) of low quality of life (CASP-12) per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004 and Portugal 2018 instead of 2020.

Figure 146 Prevalence (%) of low quality of life (CASP-12) per country and gender (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020

Again, the trend analysis shows the deterioration of quality of life that is observed only in Greece over time (Table 15). It is also interesting that this development is driven by the respective changes in the group of men (Table 16).

Table 16 Trends (Average Annual Percentage Change) in the prevalence of low quality of life (CASP-12) per country

Region	Countries	Period	AAPC CASP12	95% CI	
				lower limit	upper limit
N.E.	**Denmark**	**2004-2020**	-3.9	-5.1	-2.8
	Estonia	**2011-2020**	-5.7	-5.8	-5.6
	Sweden	**2004-2020**	-1.8	-1.9	-1.7
S.E.	**Greece**	**2004-2020**	0.2	-0.1	0.5
	Spain	**2004-2020**	-4.2	-4.7	-3.7
	Italy	**2004-2020**	-2.9	-4.5	-1.3
	Portugal	**2011-2017**	-6.7	-7.1	-6.4
	Israel	**2005-2020**	-5.8	-8.1	-3.4
C.W.E.	**Austria**	**2004-2020**	-4.7	-5.5	-3.9
	Belgium	**2004-2020**	-2.5	-4.4	-0.5
	France	**2004-2020**	-4.1	-4.4	-3.9
	Germany	**2004-2020**	-2.7	-3.1	-2.2
	Switzerland	**2004-2020**	-3	-6.3	0.4
	Croatia	**2015-2020**	-6.2	-12.9	1
	Luxembourg	**2013-2020**	-4	-4.5	-3.5
	Netherlands	**2004-2020**	-4.2	-4.6	-3.9
	Slovenia	**2011-2020**	-1.2	-1.6	-0.8
E.E.	**Czechia**	**2007-2020**	-5.1	-5.1	-5.1
	Hungary	**2011-2020**	-4.1	-4.1	-4.1
	Poland	**2007-2020**	-3.2	-3.6	-2.8

*Note: Estimates are based on sex- and age-standardized distributions of health indices. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, N.E.: Northern Europe, SE: Southern Europe & Israel. * p-value<0.05*

Table 17 Trends (Average Annual Percentage Change) in the prevalence of low quality of life (CASP-12) per country and gender

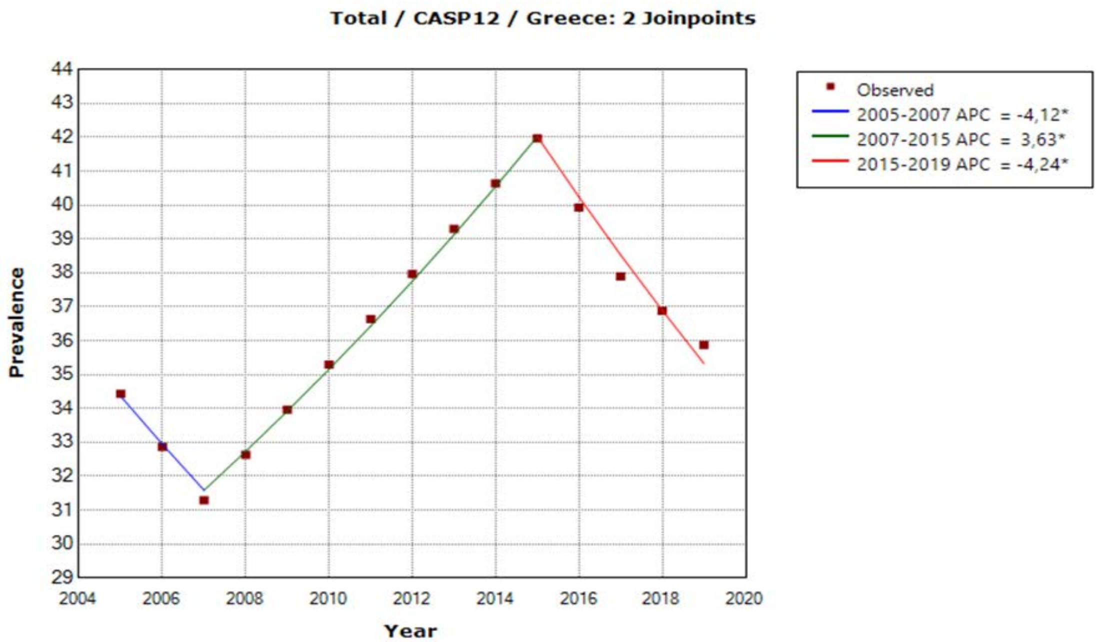
Region	Countries	Period	AAPC CASP12	95% CI	
				lower limit	upper limit
Males					
N.E.	**Denmark**	**2004-2020**	-4	-6.9	-0.9
	Estonia	**2011-2020**	-4.6	-5.2	-4

	Sweden	**2004-2020**	-1.1	-1.2	-1.1
S.E.	**Greece**	**2004-2020**	0.7	0.5	0.9
	Spain	**2004-2020**	-3.9	-5.1	-2.7
	Italy	**2004-2020**	-4.2	-5.4	-3
	Portugal	**2011-2017**	-7.1	-7.9	-6.2
	Israel	**2005-2020**	-5.8	-6.2	-5.4
C.W.E.	**Austria**	**2004-2020**	-4.2	-4.9	-3.5
	Belgium	**2004-2020**	-2.2	-3.7	-0.6
	France	**2004-2020**	-3.6	-3.9	-3.4
	Germany	**2004-2020**	-1.6	-2.9	-0.2
	Switzerland	**2004-2020**	-5.6	-6.2	-4.9
	Croatia	**2015-2020**	-5.1	-12.9	3.5
	Luxembourg	**2013-2020**	-2.6	-6.3	1.3
	Netherlands	**2004-2020**	-5.9	-6.6	-5.2
	Slovenia	**2011-2020**	1.2	1	1.5
	Czechia	**2007-2020**	-4.2	-4.7	-3.8
E.E.	**Hungary**	**2011-2020**	-1.6	-1.6	-1.6
	Poland	**2007-2020**	-2.6	-3.1	-2.1
	Romania	**2017-2020**			
Females					
N.E.	**Denmark**	**2004-2020**	-4.9	-6.4	-3.4
	Estonia	**2011-2020**	-6.5	-6.7	-6.4
	Sweden	**2004-2020**	-2.2	-3.2	-1.1
S.E.	**Greece**	**2004-2020**	-0.1	-0.6	0.5
	Spain	**2004-2020**	-4.2	-4.2	-4.2
	Italy	**2004-2020**	-2.8	-3.4	-2.3
	Portugal	**2011-2017**	-6.6	-6.8	-6.4
	Israel	**2005-2020**	-4	-4	-4
C.W.E.	**Austria**	**2004-2020**	-4.6	-5.5	-3.7
	Belgium	**2004-2020**	-2	-3.2	-0.7
	France	**2004-2020**	-4.4	-5	-3.8
	Germany	**2004-2020**	-2.8	-3.9	-1.8
	Switzerland	**2004-2020**	-0.9	-2.3	0.6
	Croatia	**2015-2020**	-6.8	-13.1	-0.1
	Luxembourg	**2013-2020**	-6.6	-8	-5.1
	Netherlands	**2004-2020**	-3.2	-3.4	-2.9
	Slovenia	**2011-2020**	-1.8	-4.8	1.2
E.E.	**Czechia**	**2007-2020**	-5.6	-5.6	-5.6
	Hungary	**2011-2020**	-5.7	-5.8	-5.6
	Poland	**2007-2020**	-3.6	-3.9	-3.3

Note: Estimates are based on sex- and age-standardized distributions of health indices. The intensity of the red (green) color reflects the magnitude of the increasing (decreasing) trend in prevalence over time. AAPC: Average Annual Percentage Change, C.W.E.: Central and Western Europe, E.E.: Eastern Europe, N.E.: Northern Europe, SE: Southern Europe & Israel.
** p-value<0.05*

The next few figures present the time trends in the prevalence of low quality of life in Greece and Poland. Notably, the worsening in quality of life in Greece is observed mainly during the period of the economic crisis.

Figure 147 Trends in the prevalence (%) of low quality of life (CASP-12) in Greece



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level
Final Selected Model: 2 Joinpoints.

Figure 148 Trends in the prevalence (%) of low quality of life (CASP-12) in Greece per gender

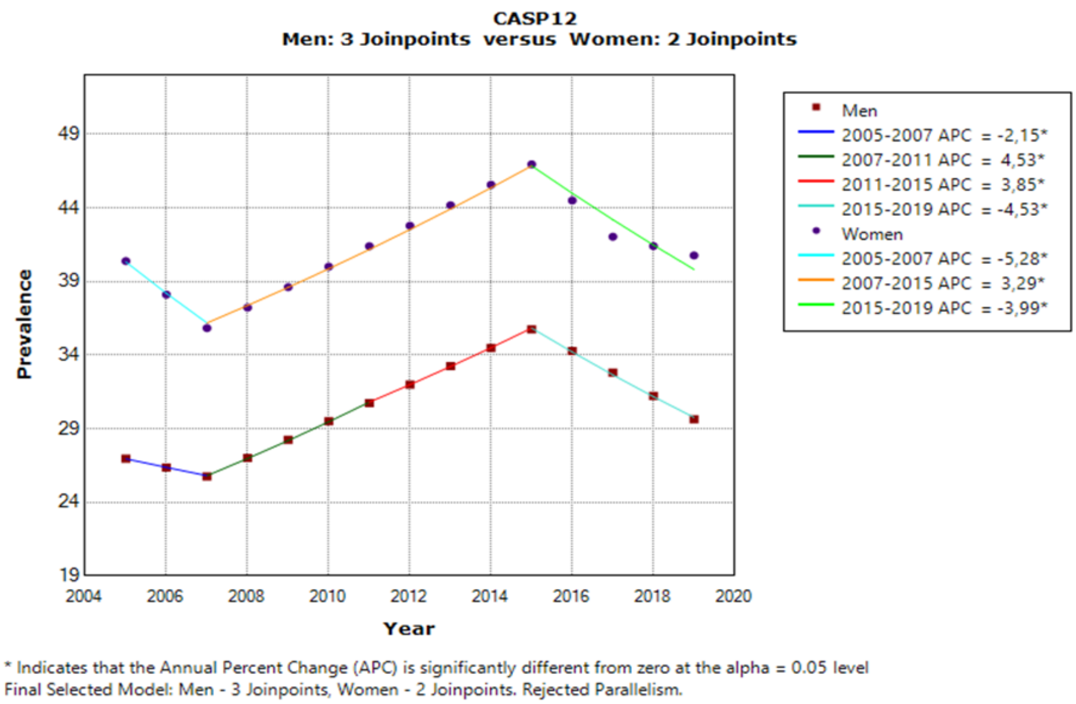


Figure 149 Trends in the prevalence (%) of low quality of life (CASP-12) in Poland

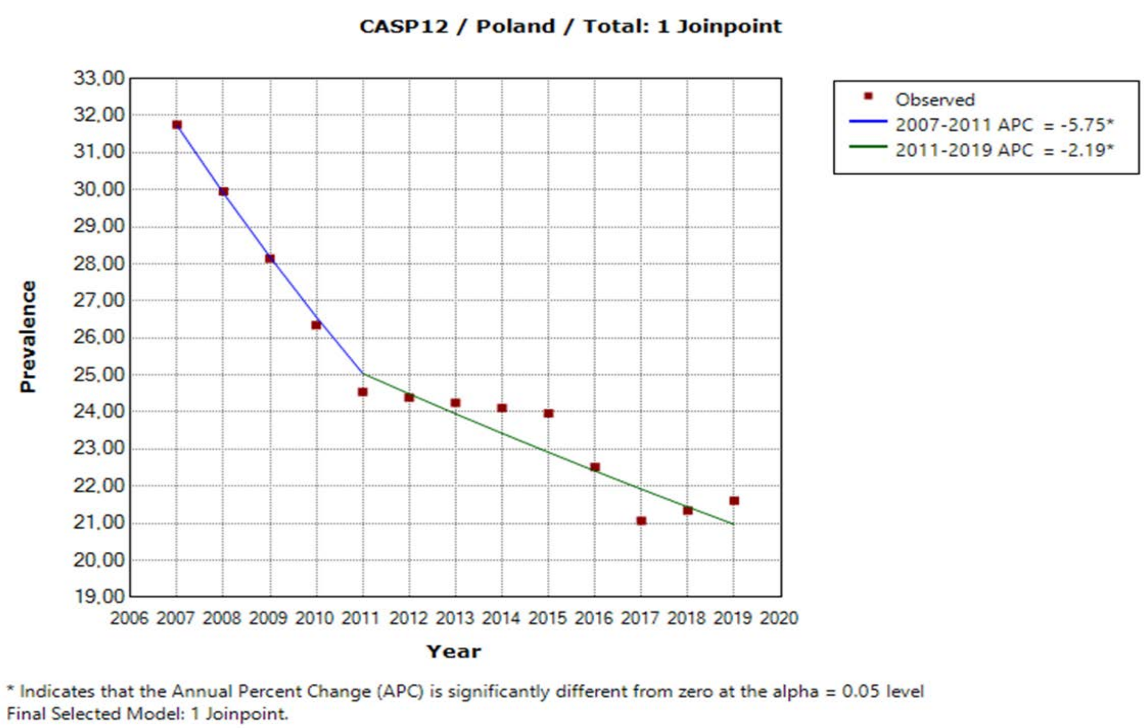
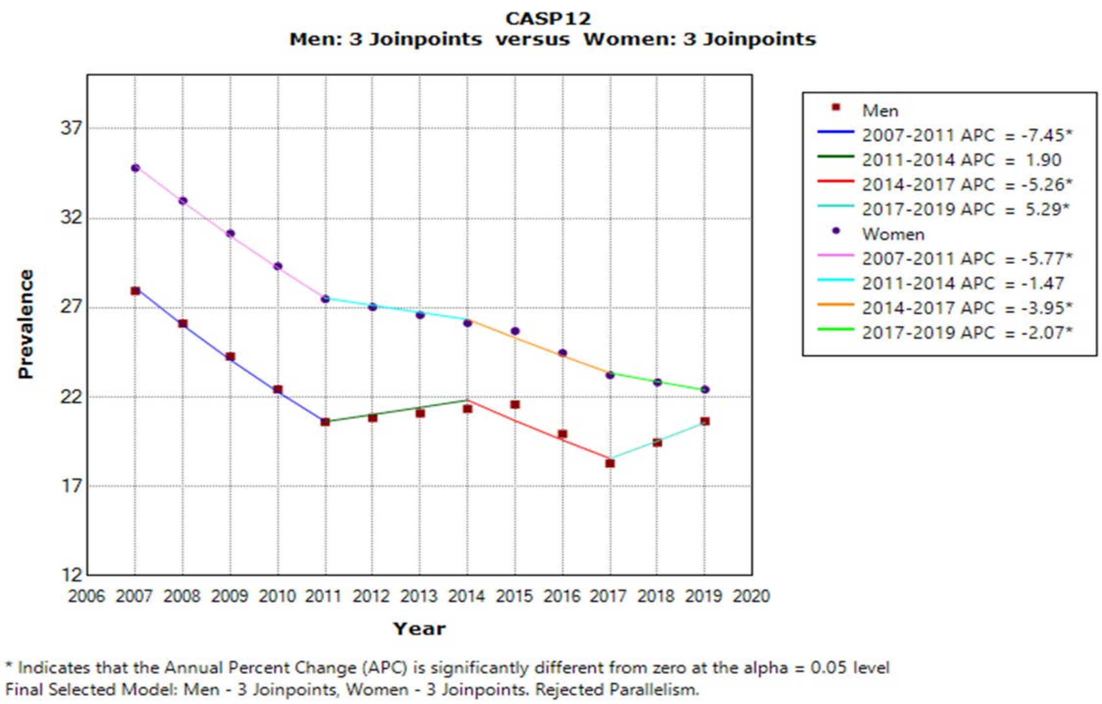


Figure 150 Trends in the prevalence (%) of low quality of life (CASP-12) in Poland per gender



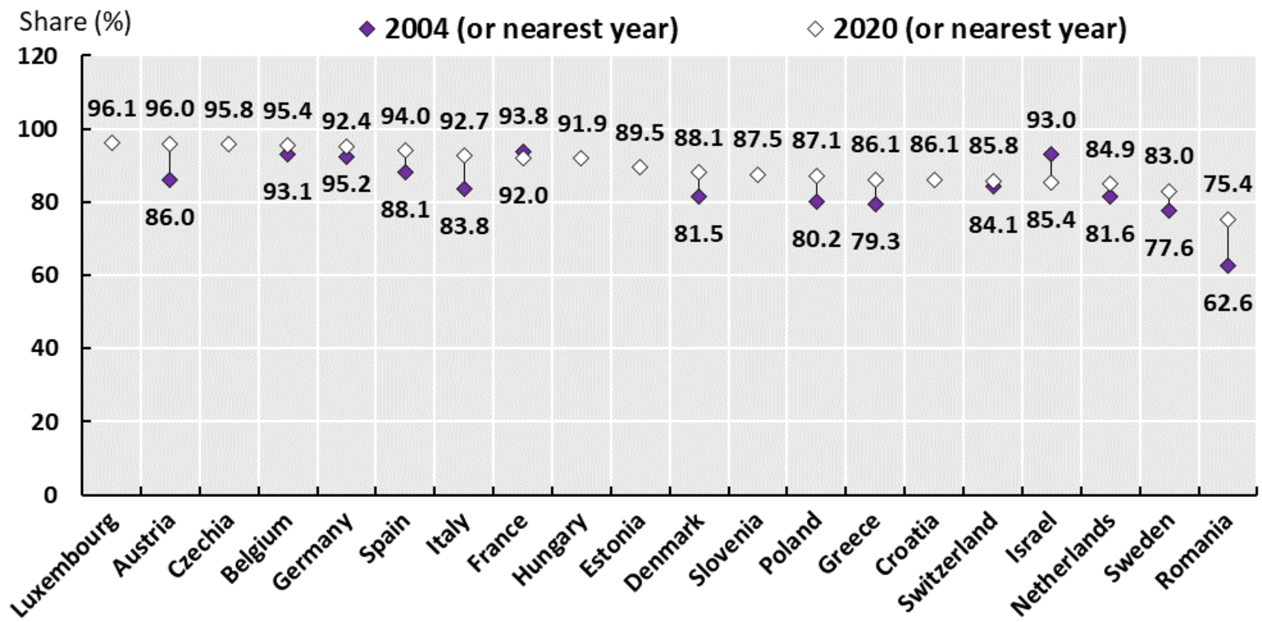
4.3. Changes in the use of healthcare services over time

This section investigates the changes in the use of healthcare services over time and, more specifically, with respect to inpatient and outpatient care, pharmaceutical care and long-term care.

4.3.1. Inpatient and outpatient care

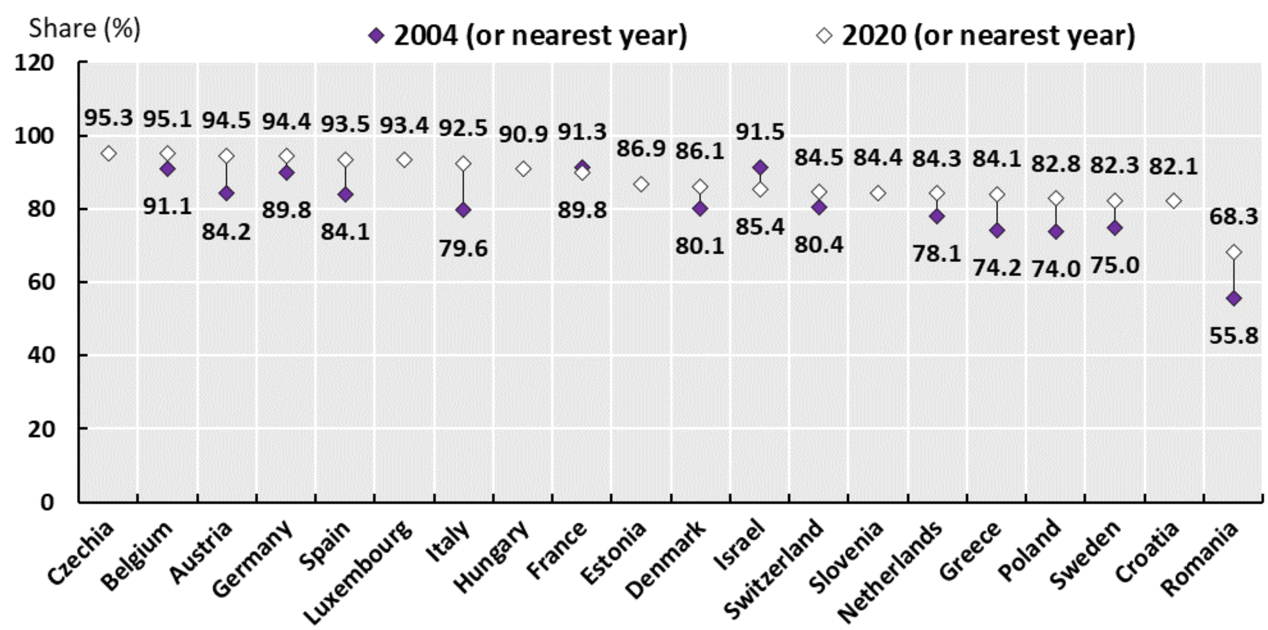
The share of individuals with a visit or contact with a doctor during the last 12 months has risen in most countries (Figure 150). An increase is also observed in Greece, Poland and Romania, although they remain at the lowest places in the ranking, Romania in particular. Furthermore, the proportion has increased in both genders, although it continues to be higher in women (Figure 151 and Figure 152).

Figure 151 Changes in the share (%) of individuals with a doctor visit in the previous year per country



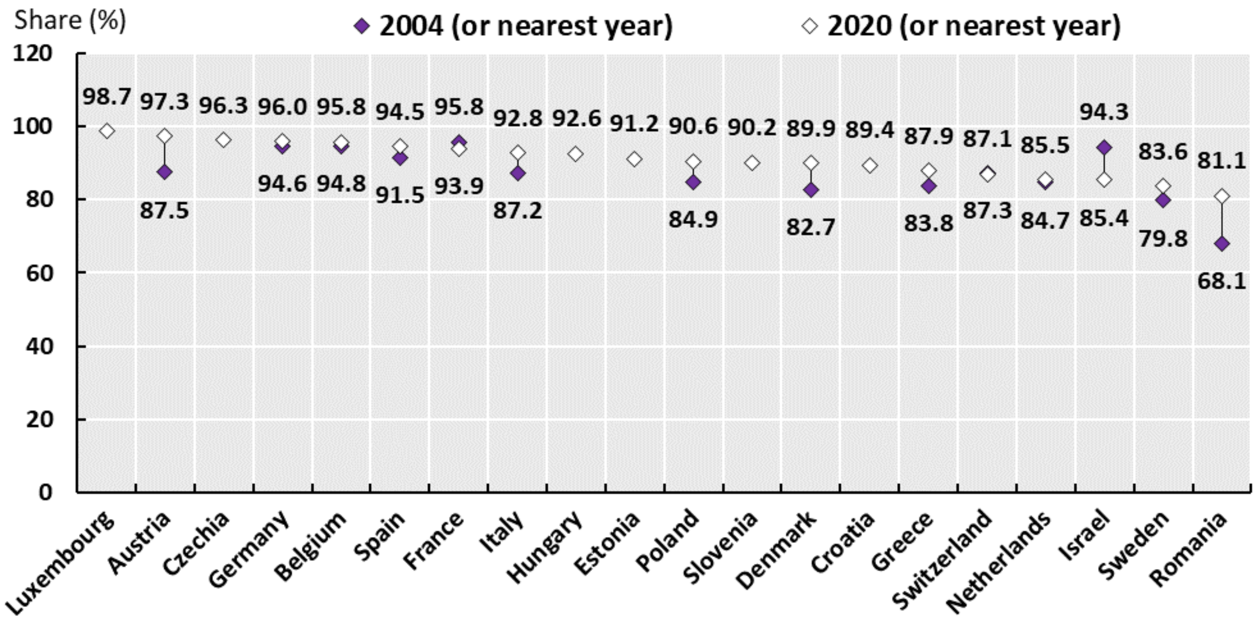
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 152 Changes in the share (%) of males with a doctor visit in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

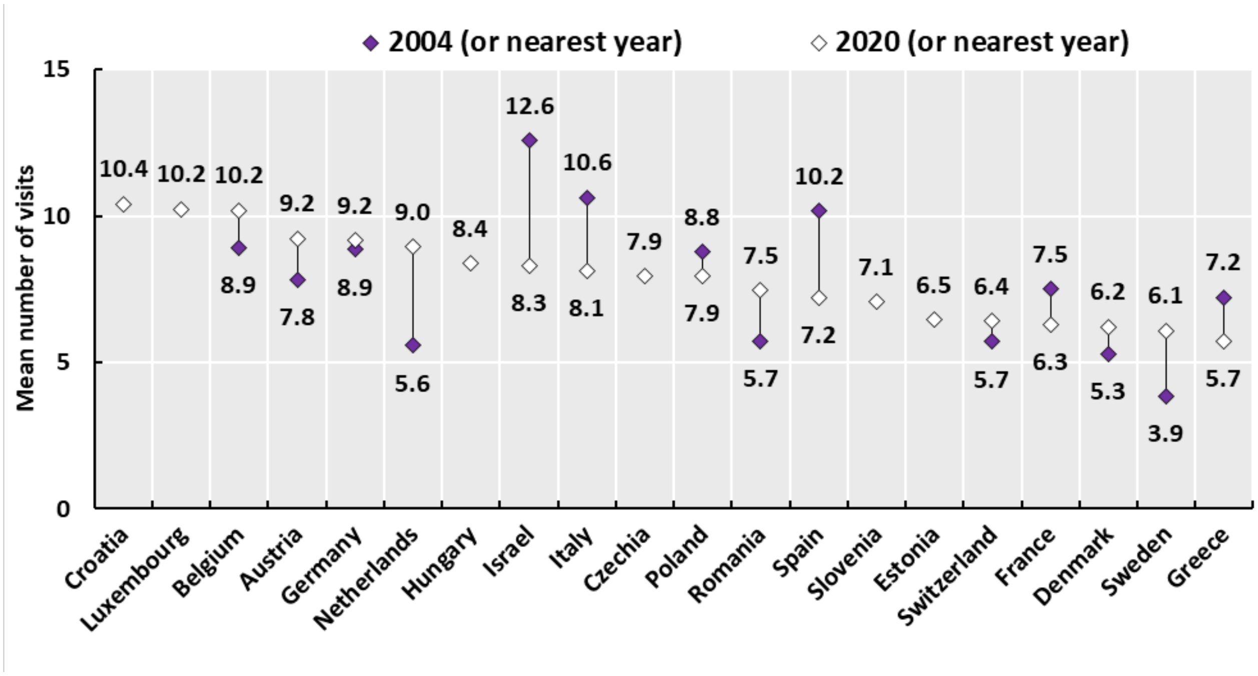
Figure 153 Changes in the share (%) of females with a doctor visit in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

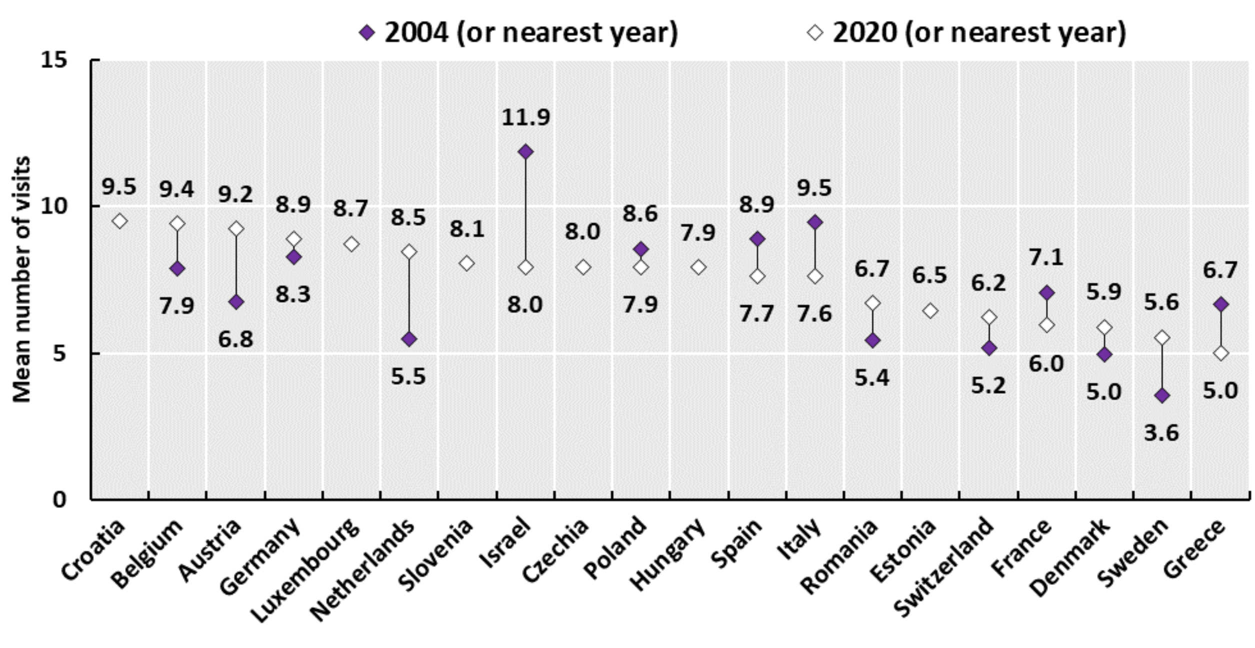
The pattern in the changes in the mean number of doctor visits is more obscure, as some countries register an increase, such as Romania, and others a decrease, like Greece and Poland, during the period of analysis (Figure 153). Again, all three countries lie in the bottom half of the rankings, with Greece being placed at the very bottom. Also, the mean number of doctor visits is higher among women compared with men (Figure 154 and Figure 155).

Figure 154 Changes in the mean number of doctor visits in the previous year per country



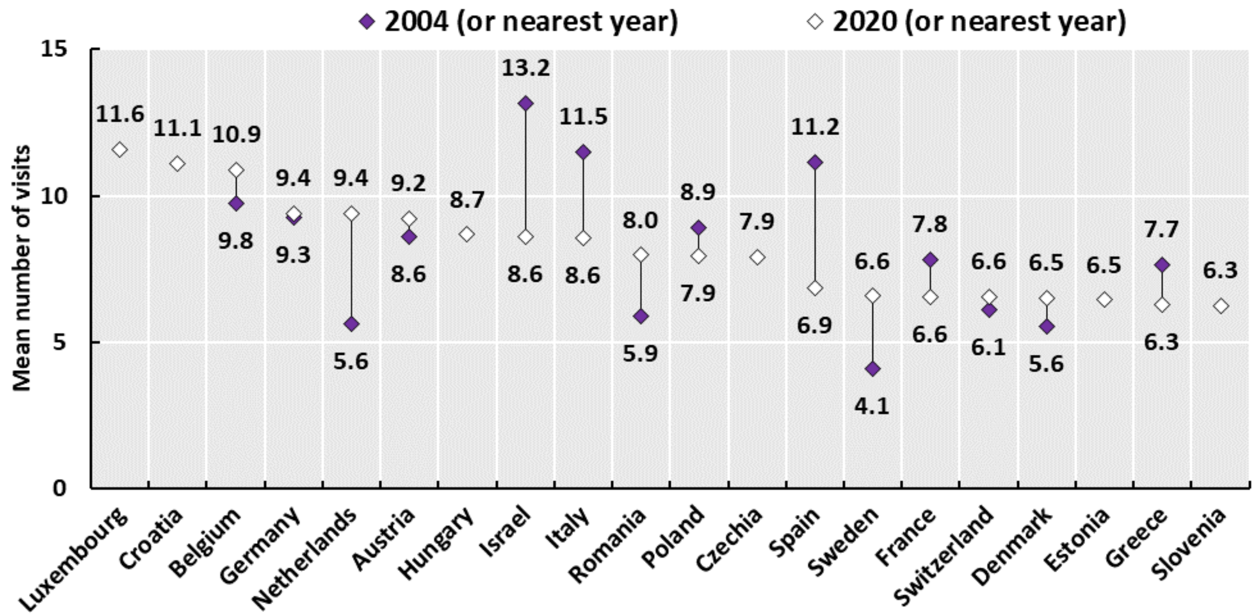
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 155 Changes in the mean number of doctor visits of males in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

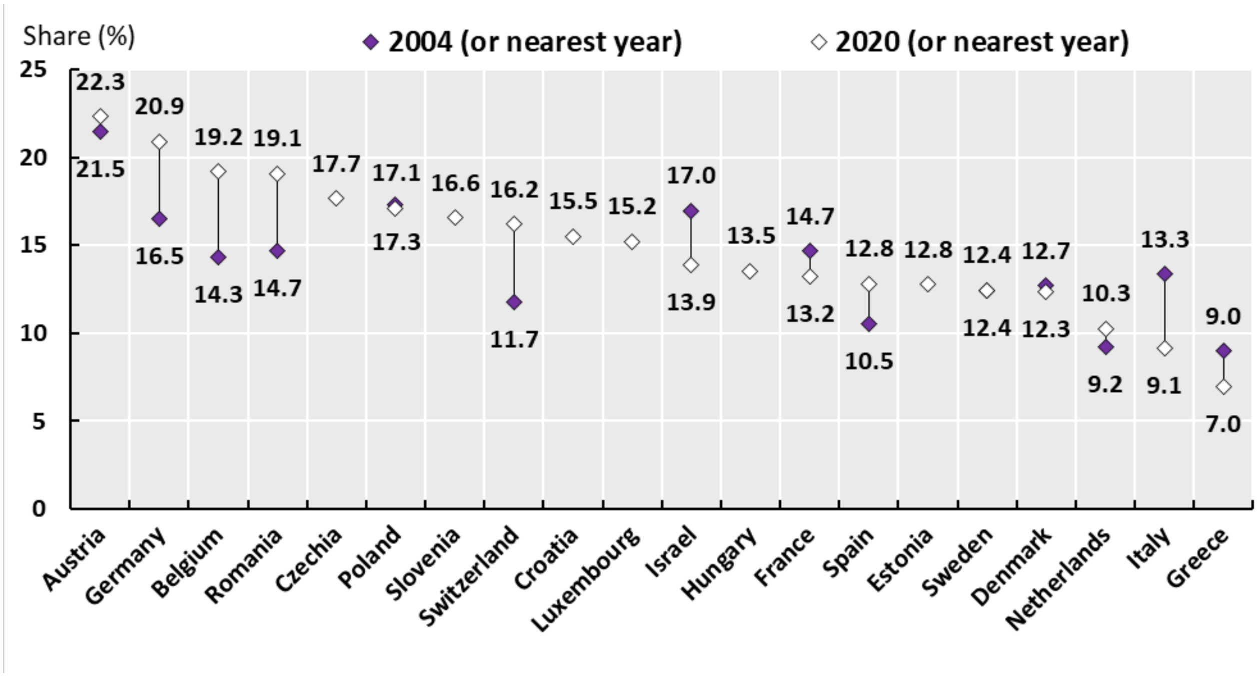
Figure 156 Changes in the mean number of doctor visits of females in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

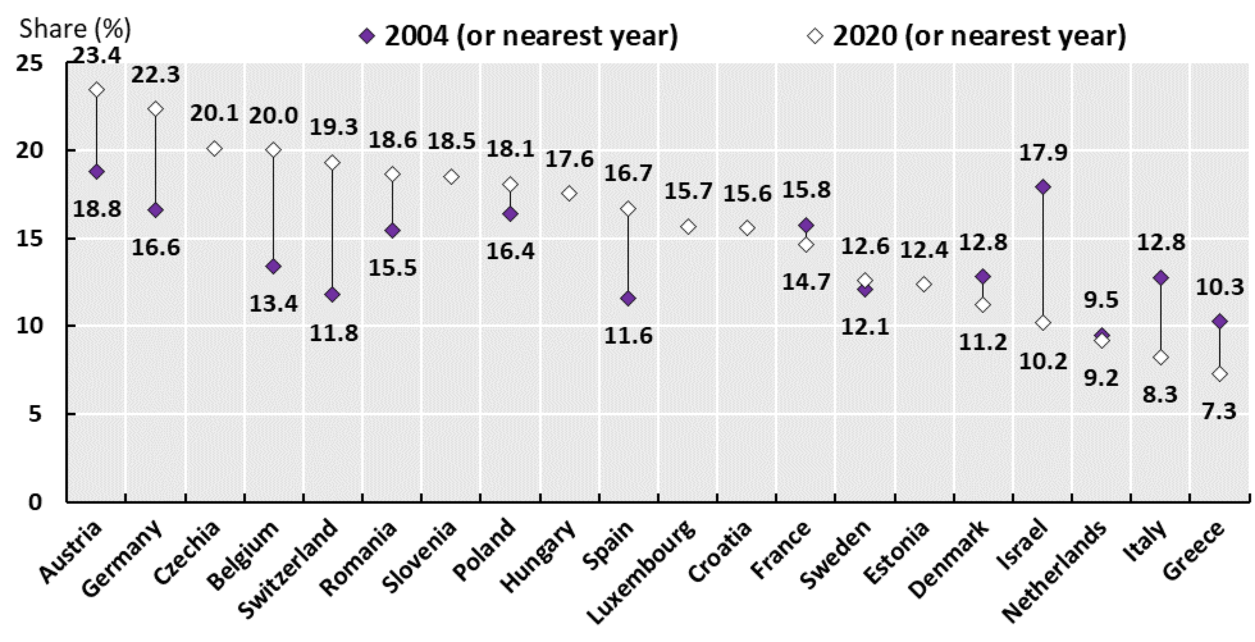
The share of individuals with a hospitalization in the previous year in Greece and Poland showed a decrease during the period of analysis (Figure 156). The decline was higher in Greece, which records the lowest share in the list of countries considered. Romania, in contrast, is associated with a significant increase during a small period of time (2017-2020) and it is placed among the countries with the highest shares of hospitalization. Interestingly, the share is higher in men compared with women in Poland and Greece, while the opposite applies to Romania

Figure 157 Changes in the share (%) of individuals with a hospitalization in the previous year per country



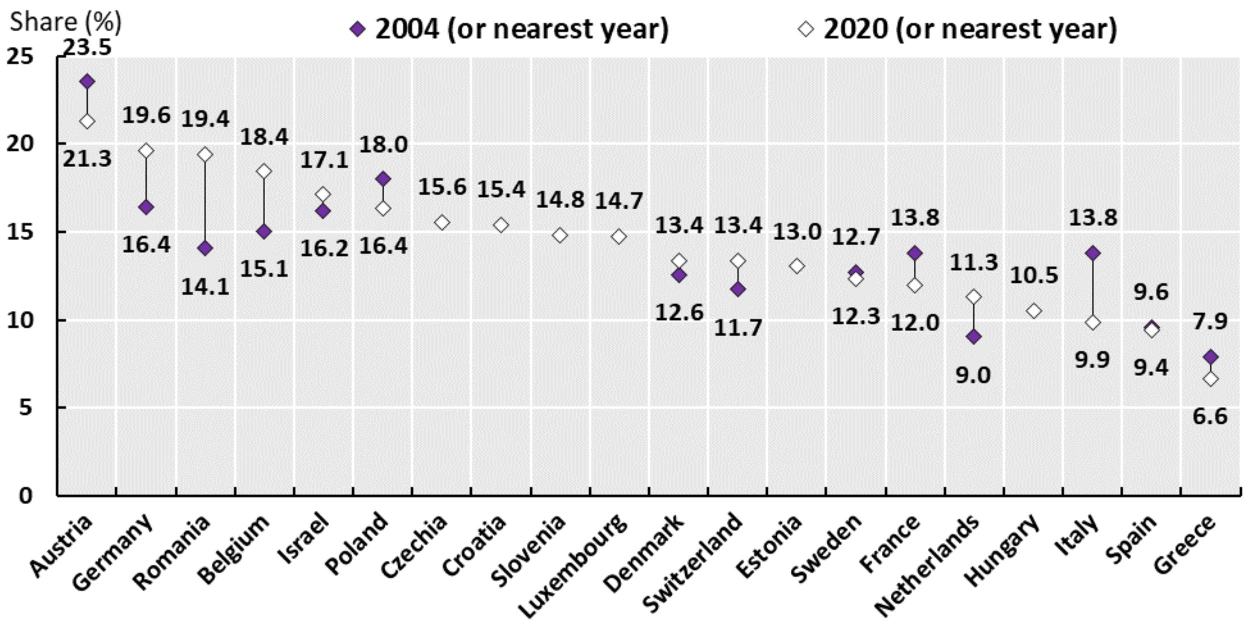
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 158 Changes in the share (%) of males with a hospitalization in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

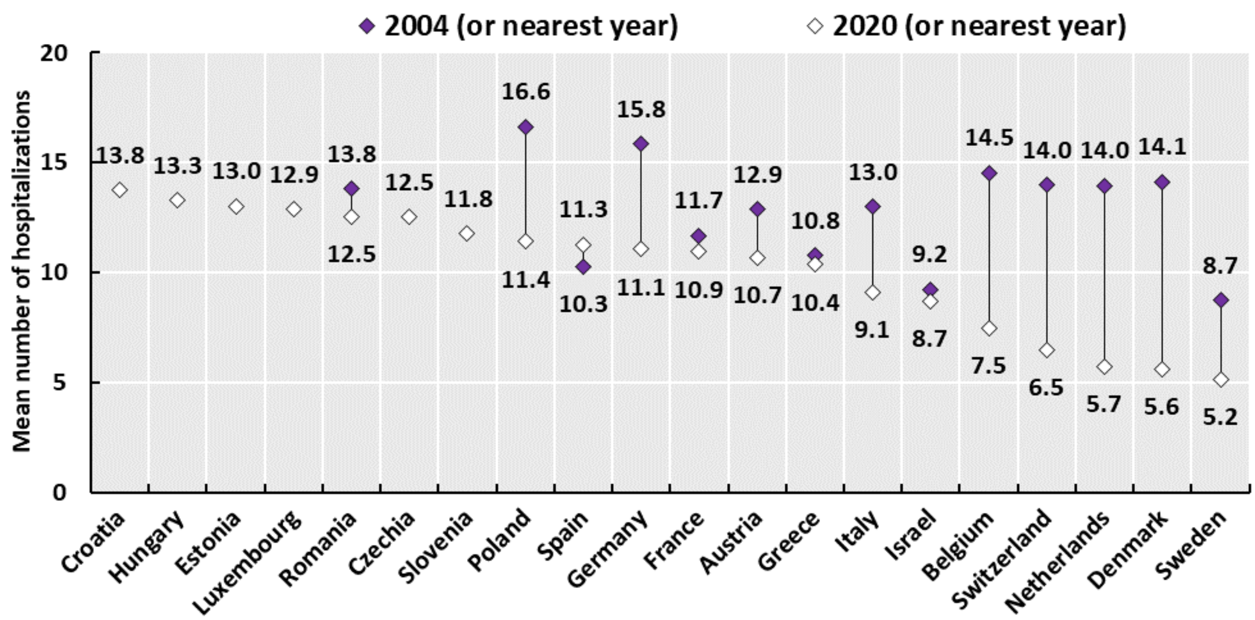
Figure 159 Changes in the share (%) of females with a hospitalization in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

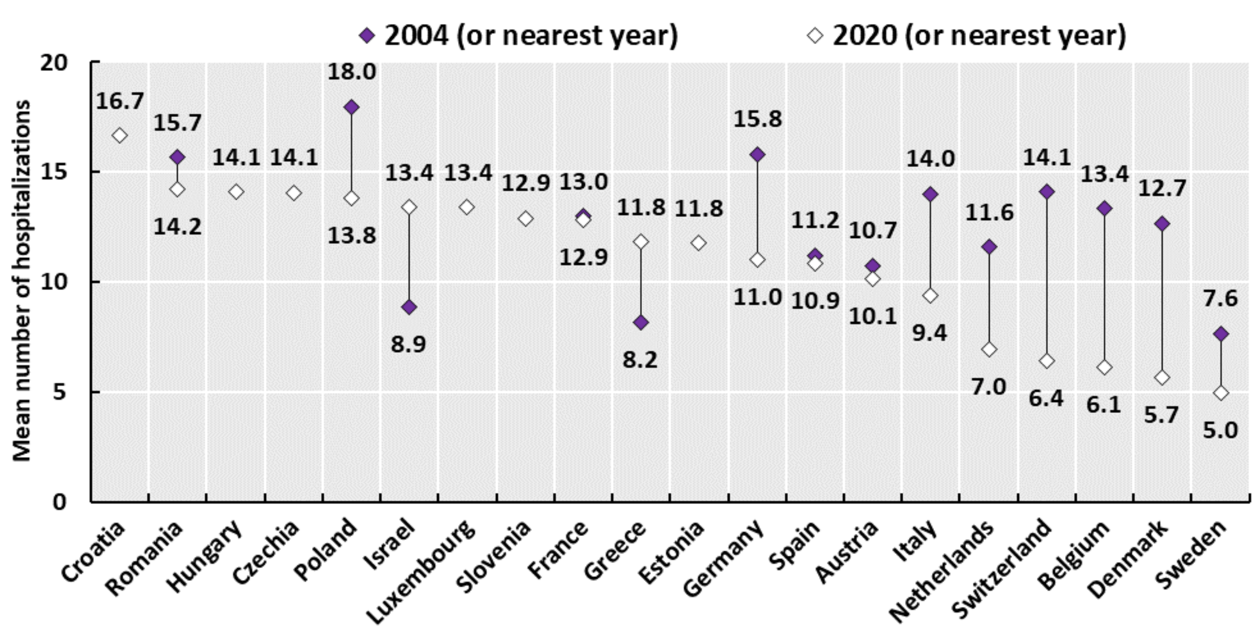
The mean number of hospitalizations has decreased in almost all countries, including Greece, Poland and Romania (Figure 159). Romania and Poland rank high in the list of countries, while Greece is placed somewhat lower in the rankings. Furthermore, the mean is higher in men than women in Poland and Romania, while it is lower in Greece (Figure 160 and Figure 161).

Figure 160 Changes in the mean number of hospitalizations in the previous year per country



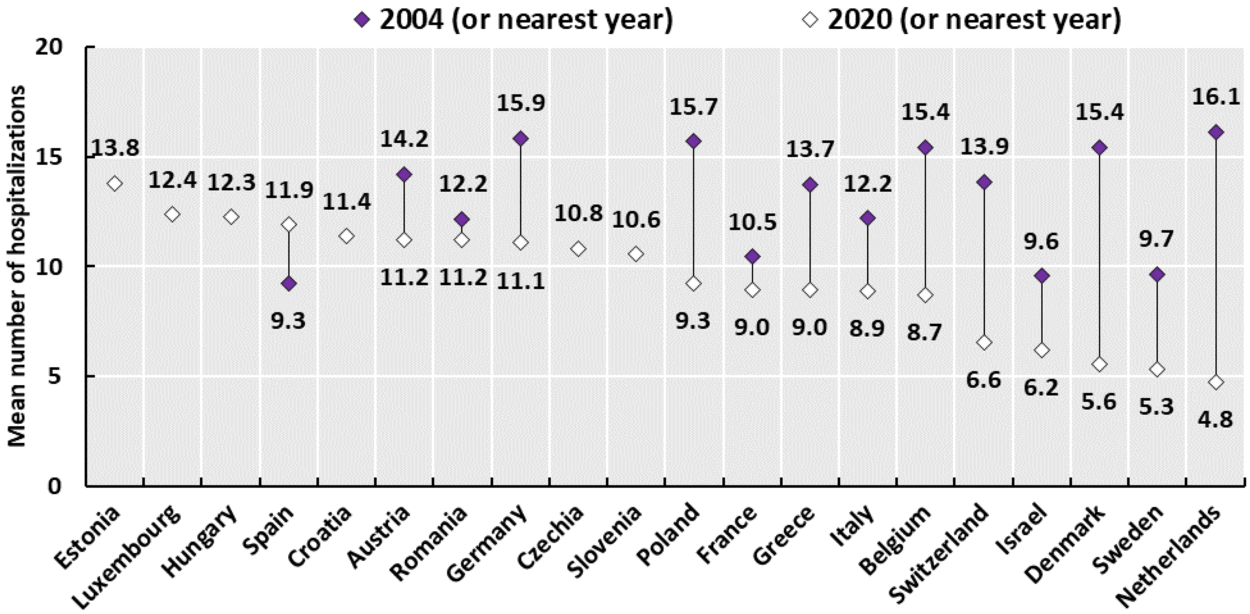
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 161 Changes in the mean number of hospitalizations of males in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

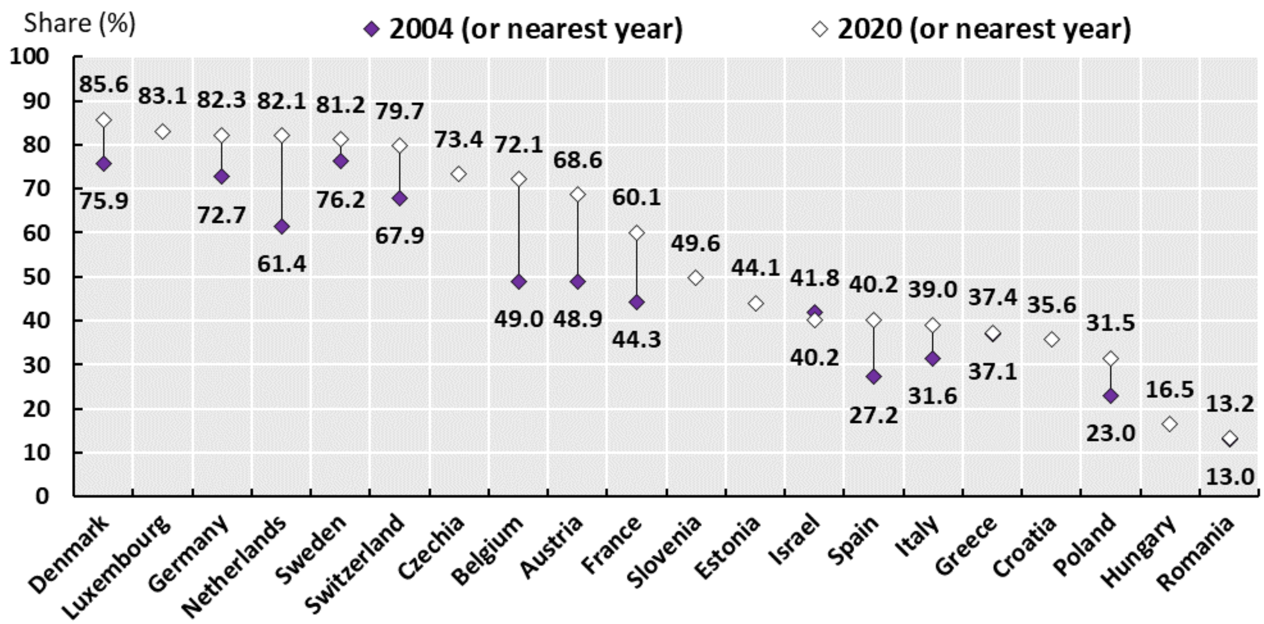
Figure 162 Changes in the mean number of hospitalizations of females in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

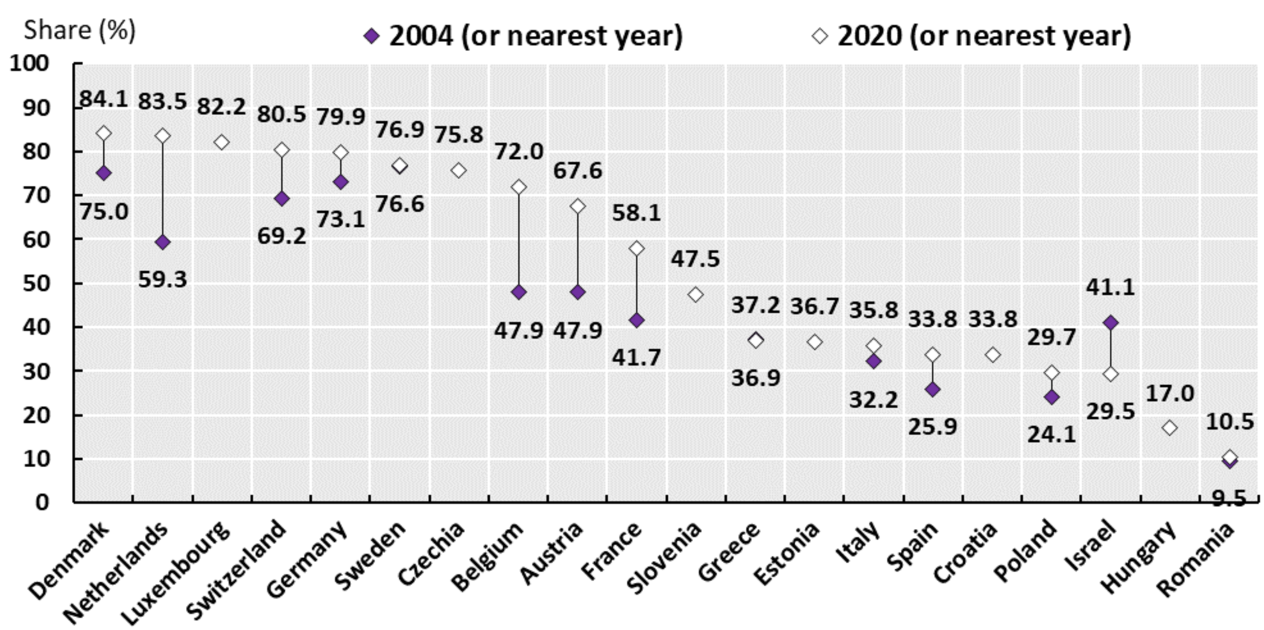
Regarding the share of individuals with a dentist visit, Greece, Poland and Romania rank very low in the rankings (Figure 162). Most countries are associated with an increase in the proportion over time and a higher share among men than women (Figure 163 and Figure 164).

Figure 163 Changes in the share (%) of individuals with a dentist visit in the previous year per country



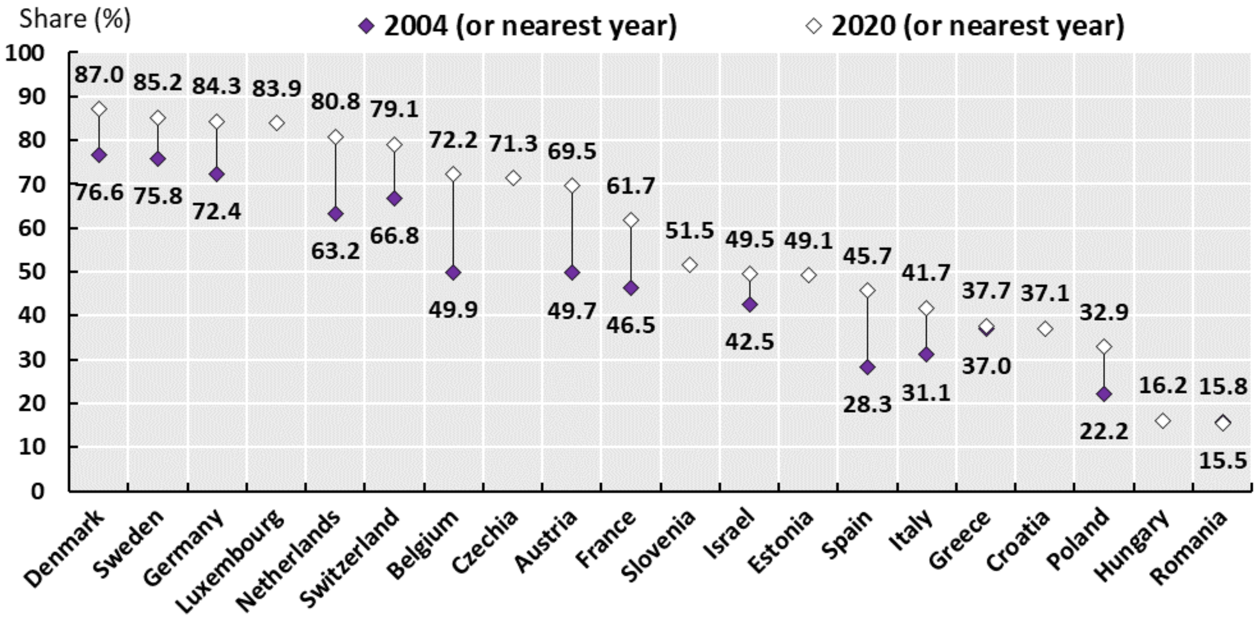
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 164 Changes in the share (%) of males with a dentist visit in the previous year per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 165 Changes in the share (%) of females with a dentist visit in the previous year per country

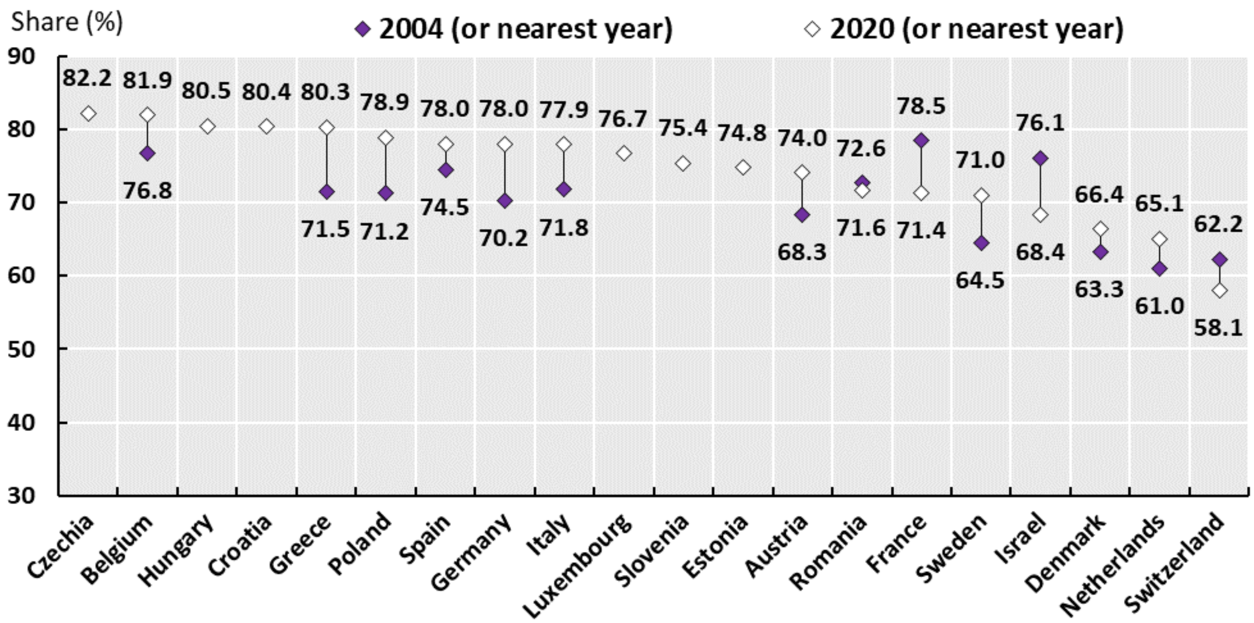


Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

4.3.2. Pharmaceutical care

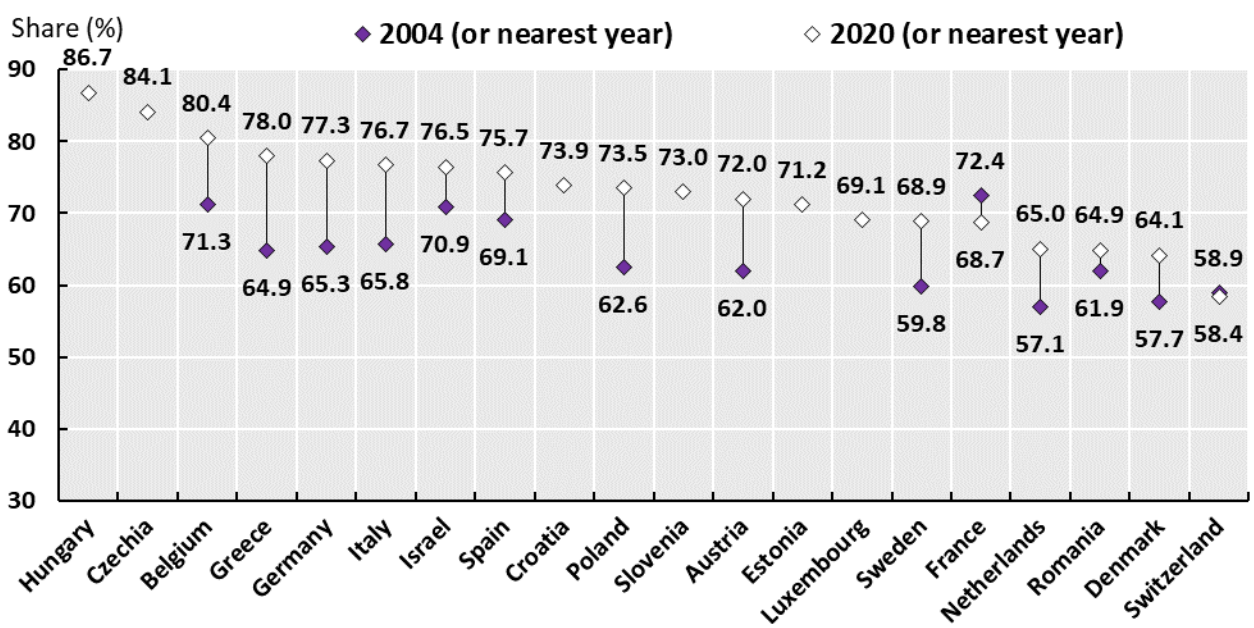
As far as the pharmaceutical consumption is concerned, the share of individuals taking a drug for any disease at least weekly has increased in most countries, while Romania is among the exceptions (Figure 165). Greece and Poland are associated with a high share, whereas it is lower in Romania. The share of individuals with pharmaceutical consumption is higher among women compared with men (Figure 166 and Figure 167). Notably, the disparity between Romanian men and women is quite large.

Figure 166 Changes in the share (%) of individuals taking a drug (for any disease) at least weekly per country



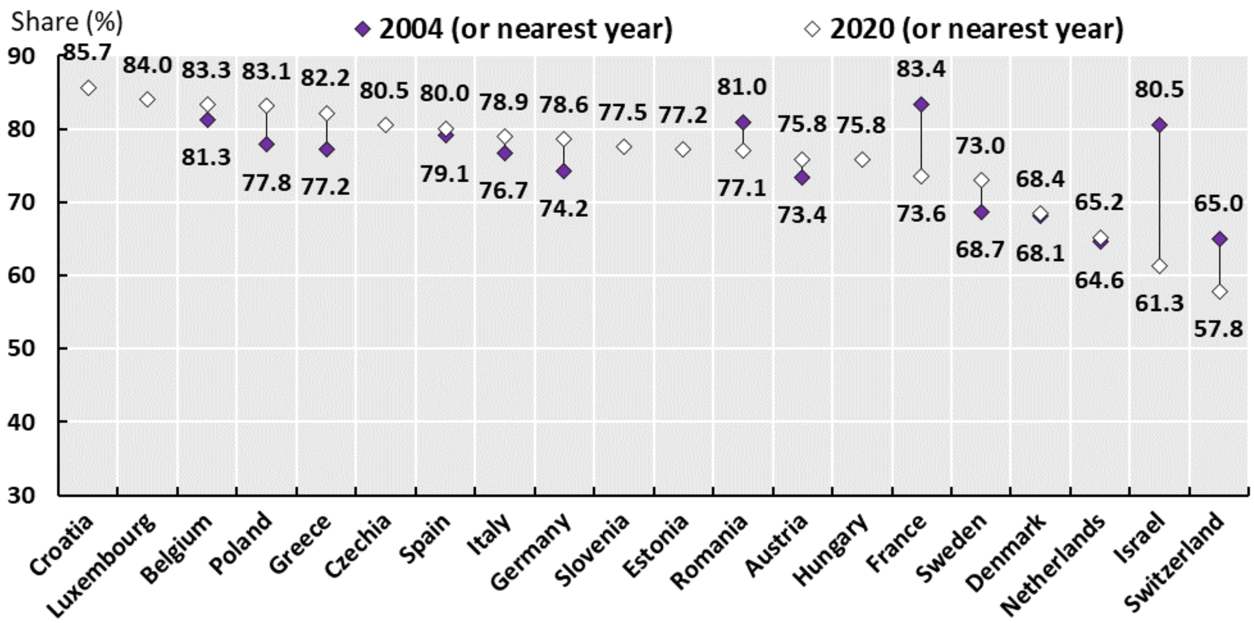
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 167 Changes in the share (%) of males taking a drug (for any disease) at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

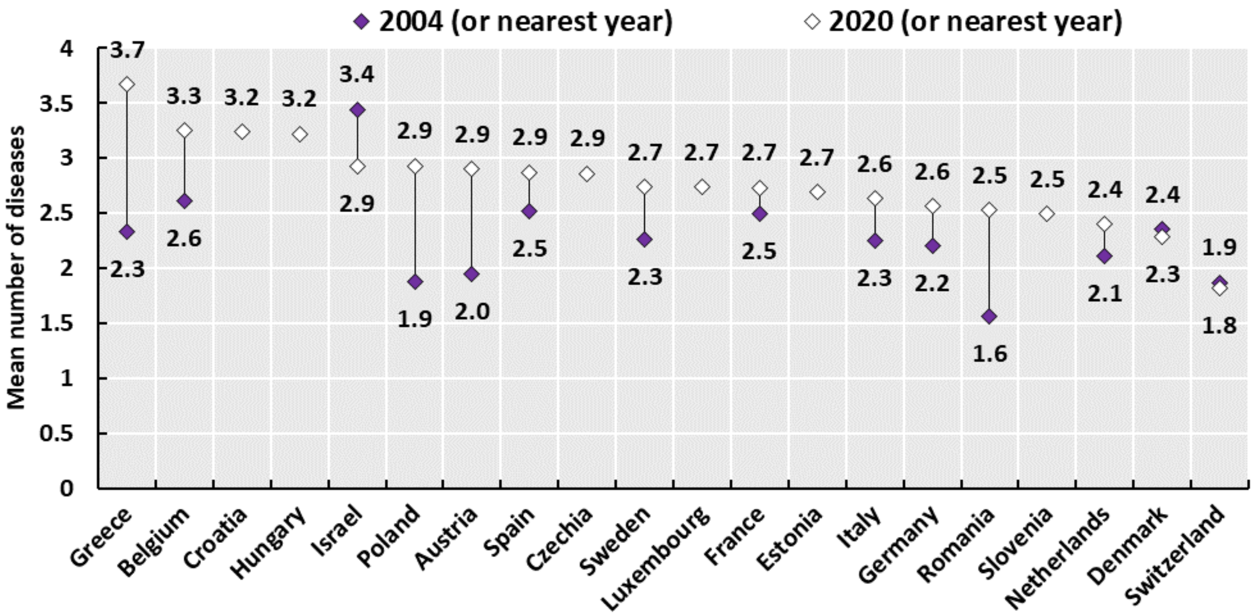
Figure 168 Changes in the share (%) of females taking a drug (for any disease) at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

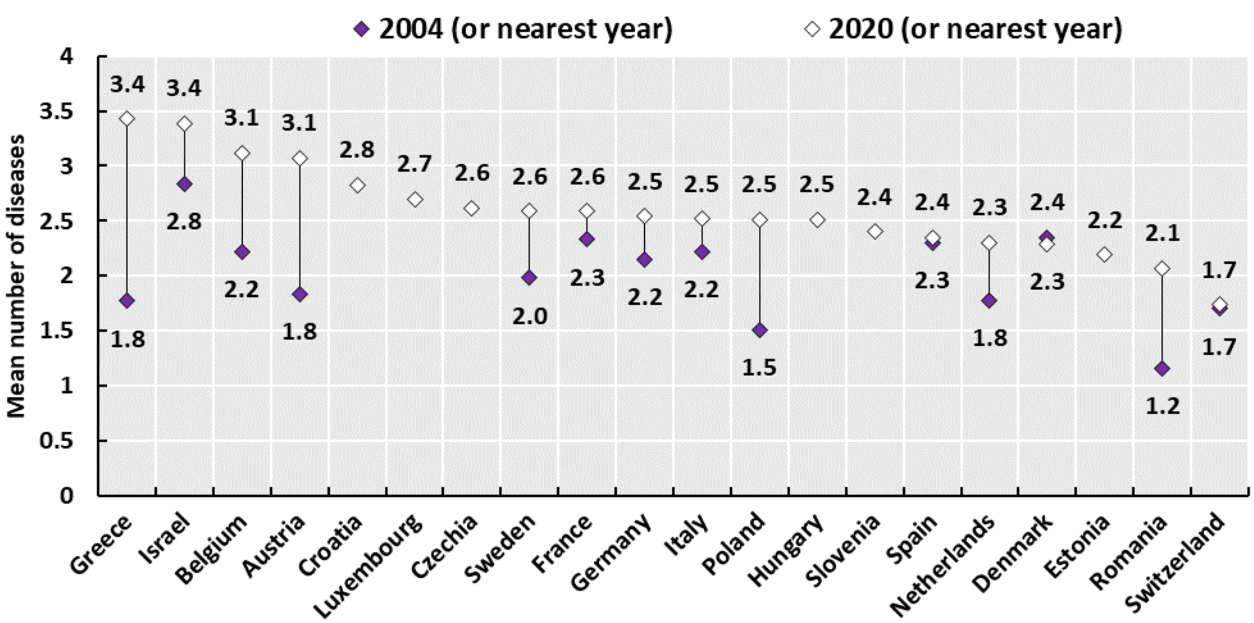
The mean number of diseases per person for which a drug is taken at least weekly has risen in most countries during the period of analysis (Figure 168). This variable is also a measure of the pharmaceutical consumption related to multimorbidity. Greece ranks at the top of the rankings, with the highest mean number of diseases, Poland also registers a high mean number, while Romania is in a lower position. For all three countries a significant increase is observed over time, which is even more striking in the case of Romania, due to the narrow time span of the analysis. The mean number is usually higher in women compared with men, and increases over time are observed for both genders (Figure 169 and Figure 170); the difference in the estimates between men and women is quite pronounced in Poland and Romania.

Figure 169 Changes in the mean number of diseases per person for which a drug is taken at least weekly per country



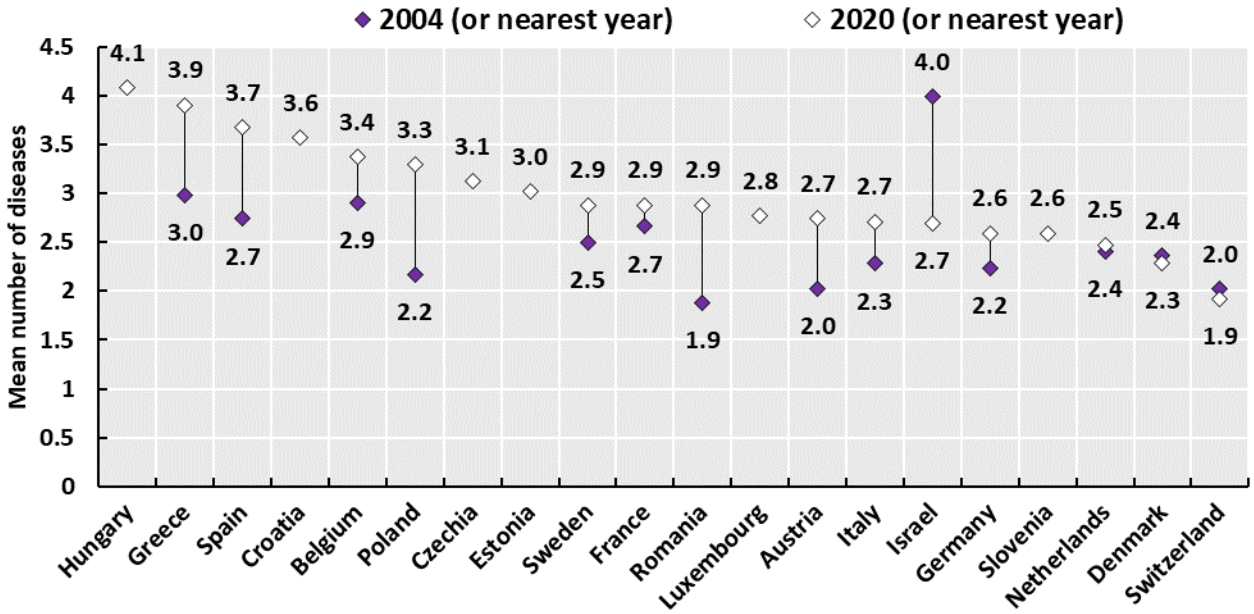
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 170 Changes in the mean number of diseases per male participant for which a drug is taken at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

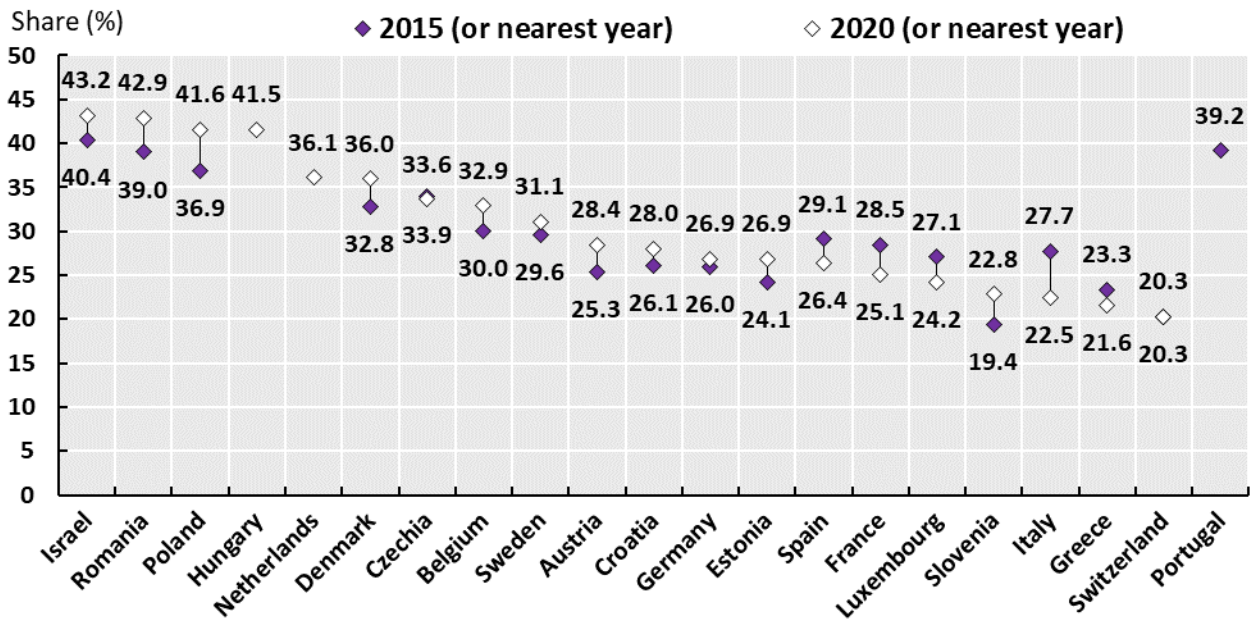
Figure 171 Changes in the mean number of diseases per female participant for which a drug is taken at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

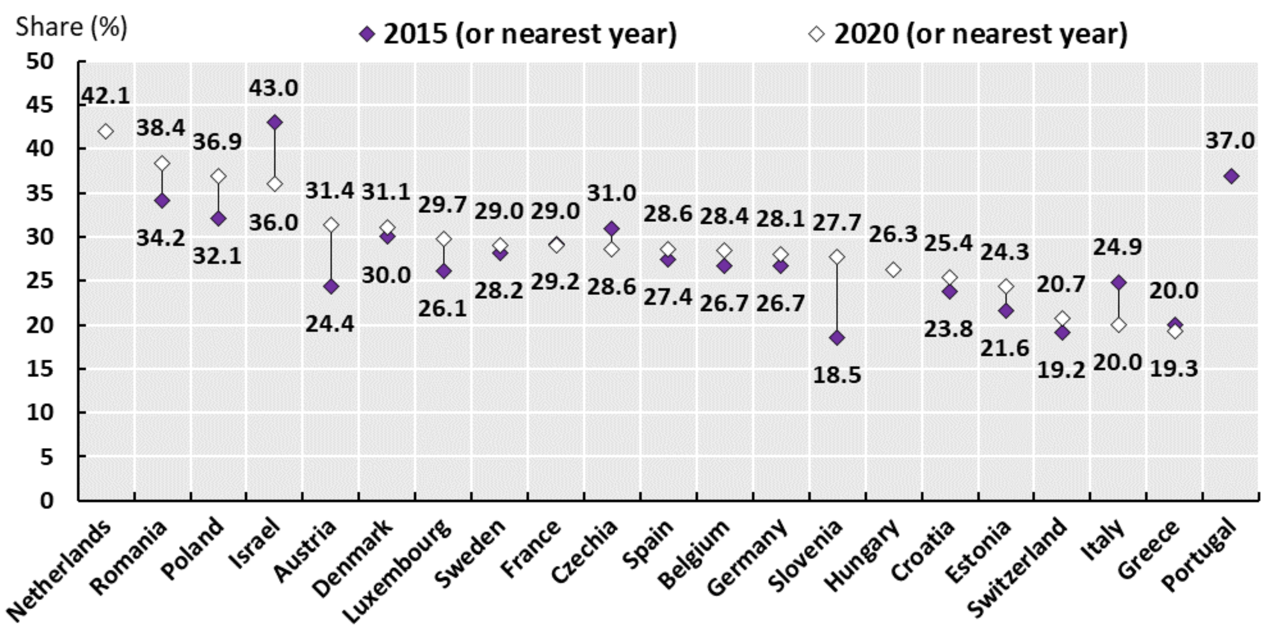
Regarding polypharmacy, the share of individuals taking at least five different drugs on a typical day has risen in most countries (Figure 171). Romania and Poland are ranked second and third, respectively, in the ordered list of countries, while Greece is third from the bottom and shows a reduction over time. Furthermore, polypharmacy is more frequent among women compared with men (Figure 172 and Figure 173).

Figure 172 Changes in the share (%) of individuals taking at least five different drugs on a typical day (polypharmacy) per country



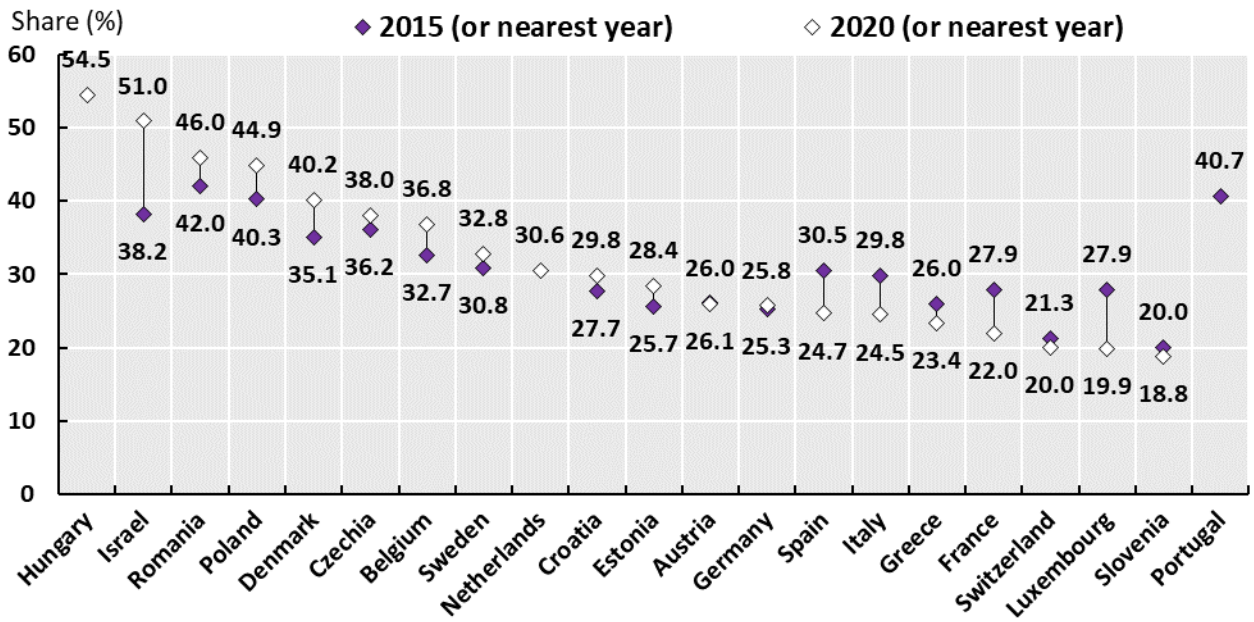
Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020 and Romania 2017 instead of 2015.

Figure 173 Changes in the share (%) of males taking at least five different drugs on a typical day (polypharmacy) per country



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020 and Romania 2017 instead of 2015.

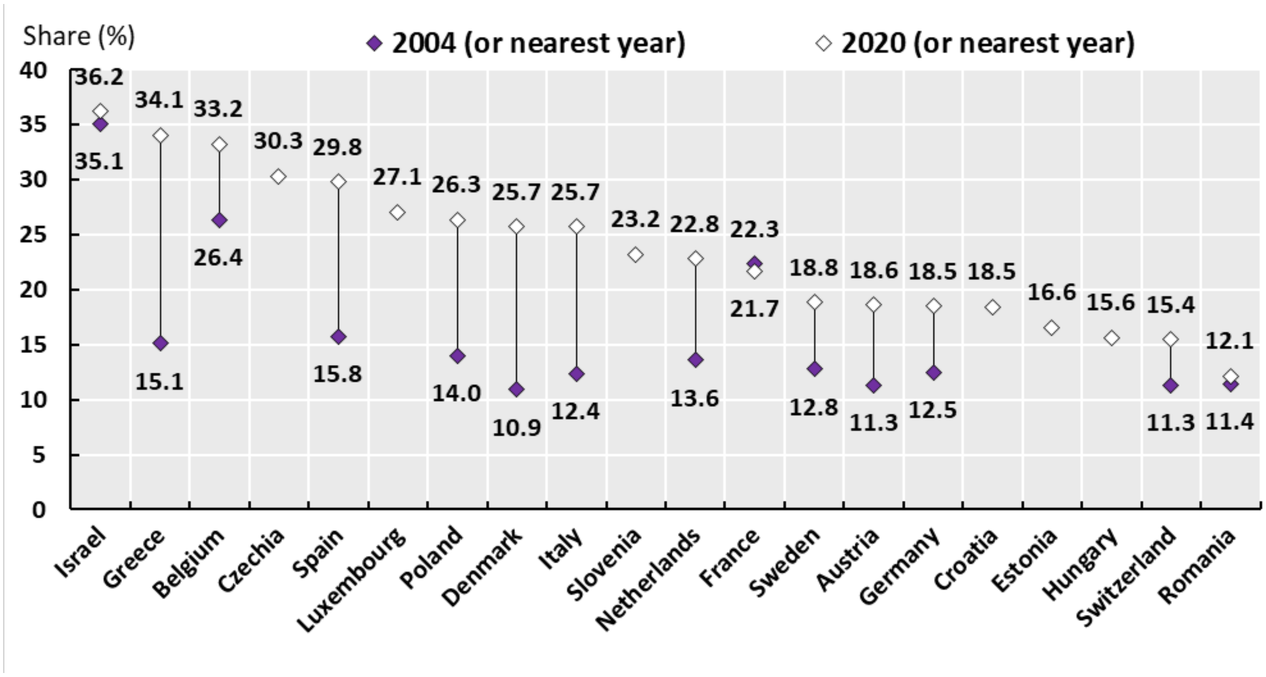
Figure 174 Changes in the share (%) of females taking at least five different drugs on a typical day (polypharmacy) per country



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020 and Romania 2017 instead of 2015.

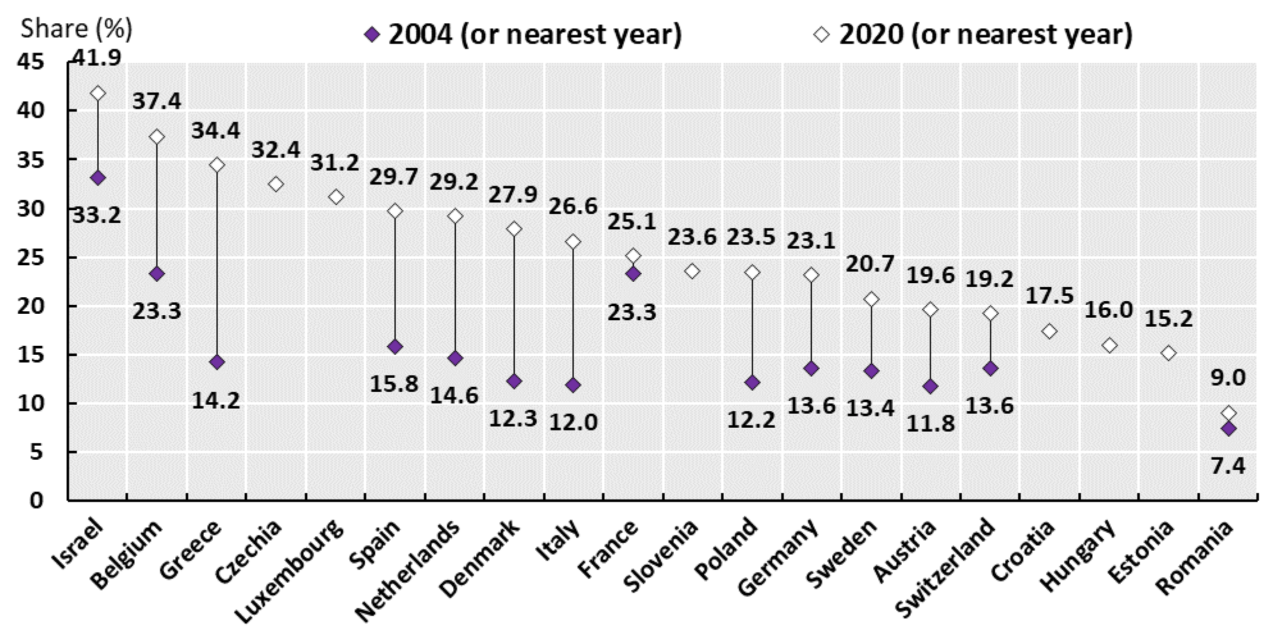
The share of individuals receiving pharmaceutical care for hyperlipidemia has increased in almost all countries over time, in Greece in particular (Figure 174). Greece is ranked second in the ordered list of countries, Poland has also a high rate of pharmaceutical consumption for hyperlipidemia, while Romania is associated with the lowest share among all countries. Notably, while in most countries the pharmaceutical consumption for hyperlipidemia is more frequent in men than women, that does not apply to Romania (Figure 175 and Figure 176).

Figure 175 Changes in the share (%) of individuals taking a drug for hyperlipidemia at least weekly per country



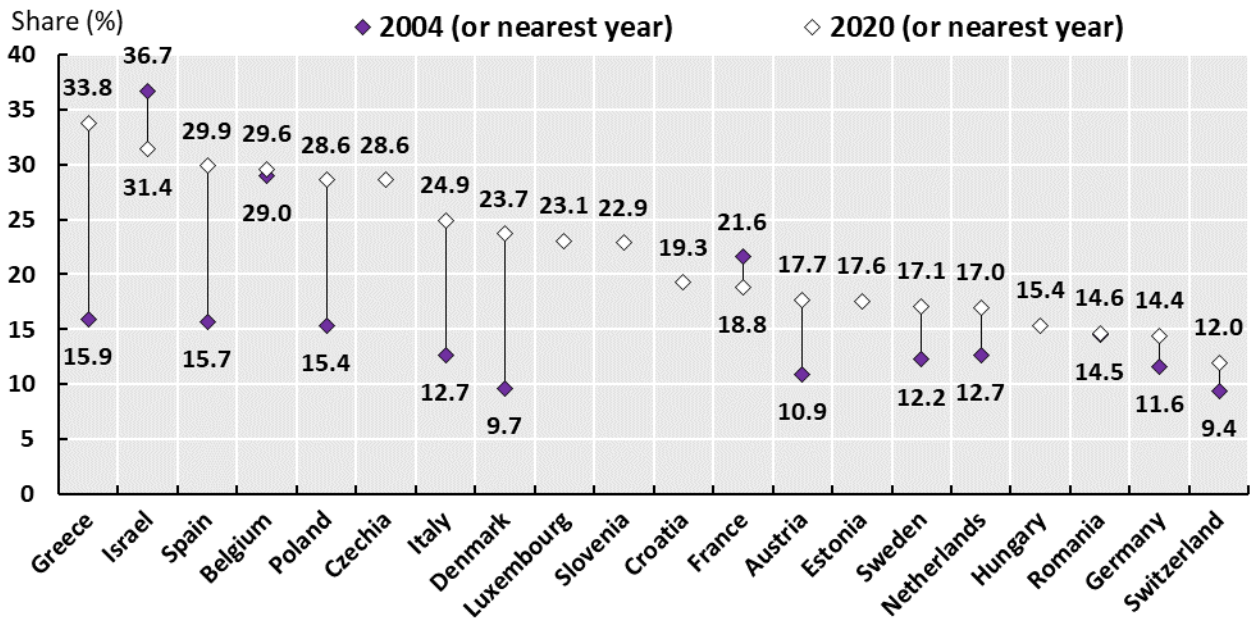
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 176 Changes in the share (%) of males taking a drug for hyperlipidemia at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

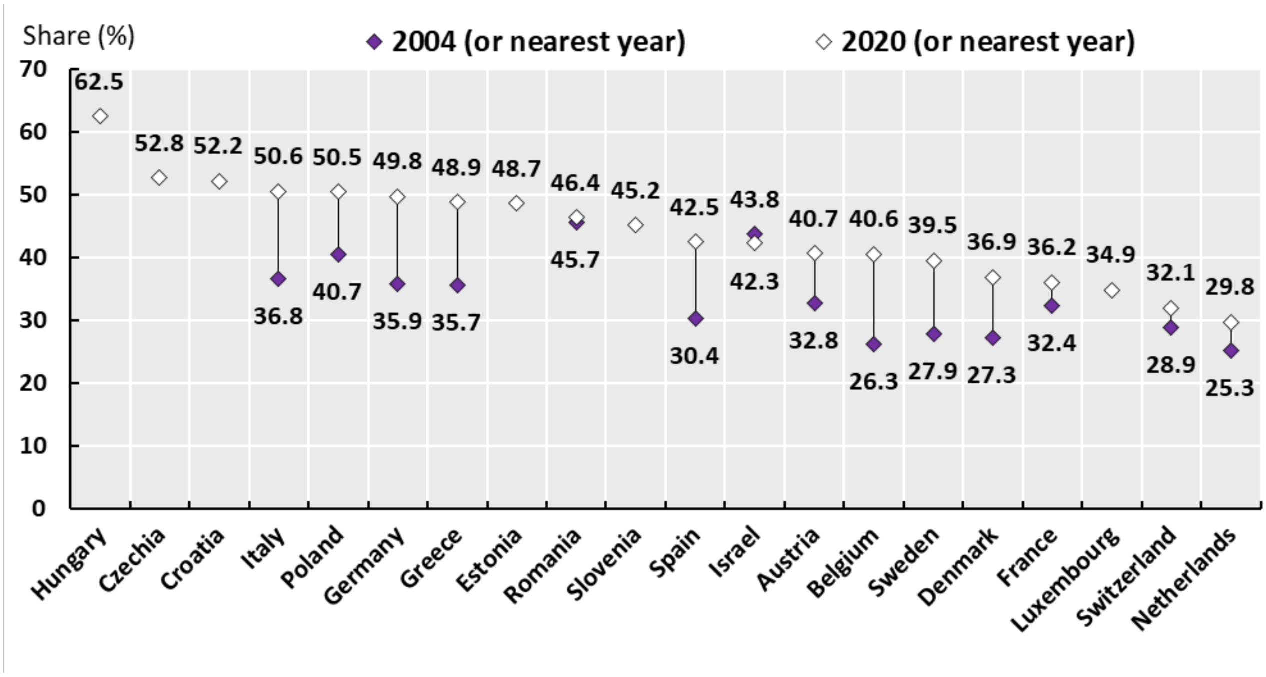
Figure 177 Changes in the share (%) of females taking a drug for hyperlipidemia at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

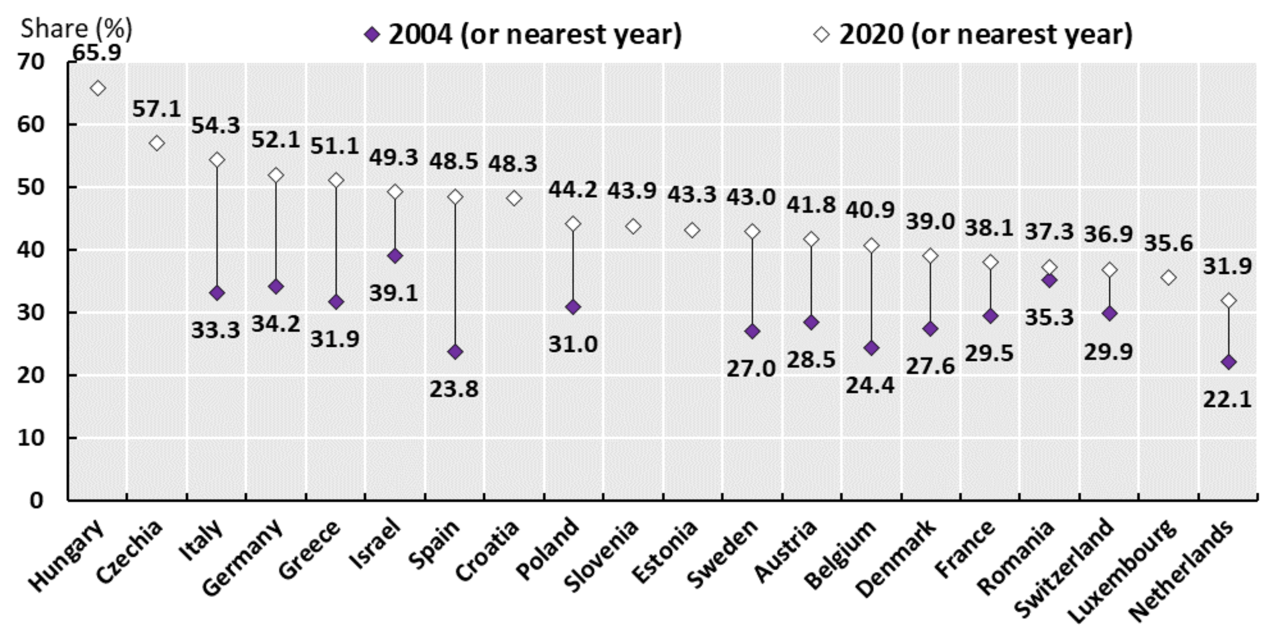
Pharmaceutical consumption has become more frequent over time in hypertension as well (Figure 177). Poland is associated with a high share of individuals taking a drug for hypertension, while Greece and Romania are a few places lower in the rankings. Interestingly, the share is higher in women compared with men in Poland and Romania, while the opposite is observed in Greece.

Figure 178 Changes in the share (%) of individuals taking a drug for hypertension at least weekly per country



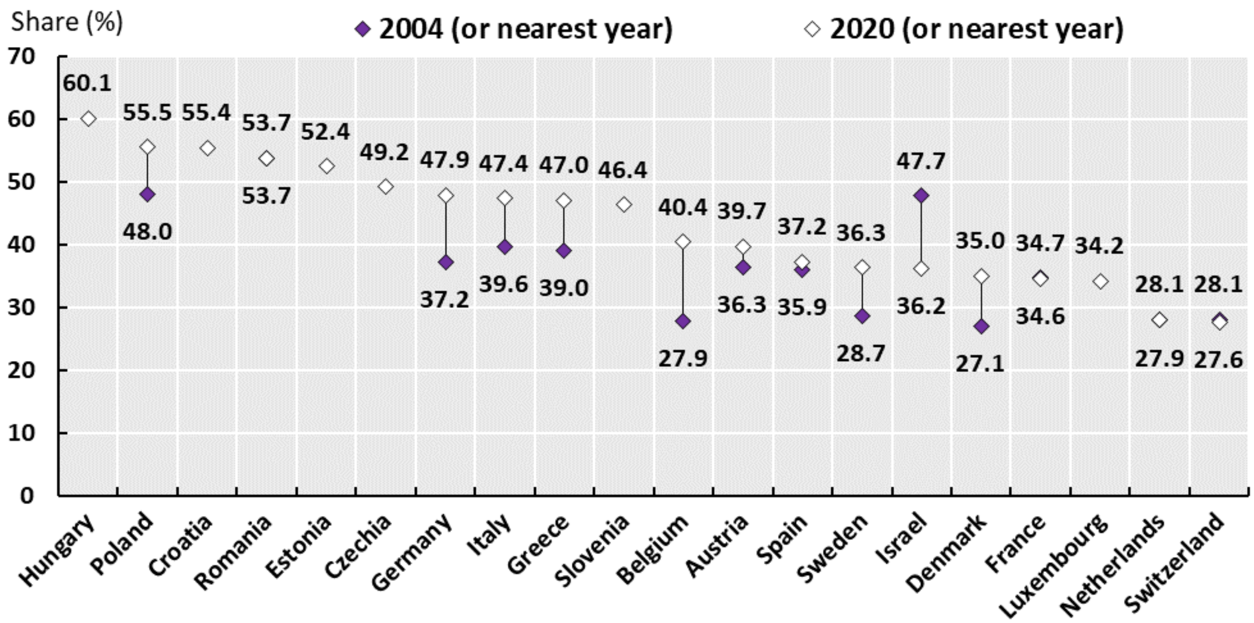
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 179 Changes in the share (%) of males taking a drug for hypertension at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

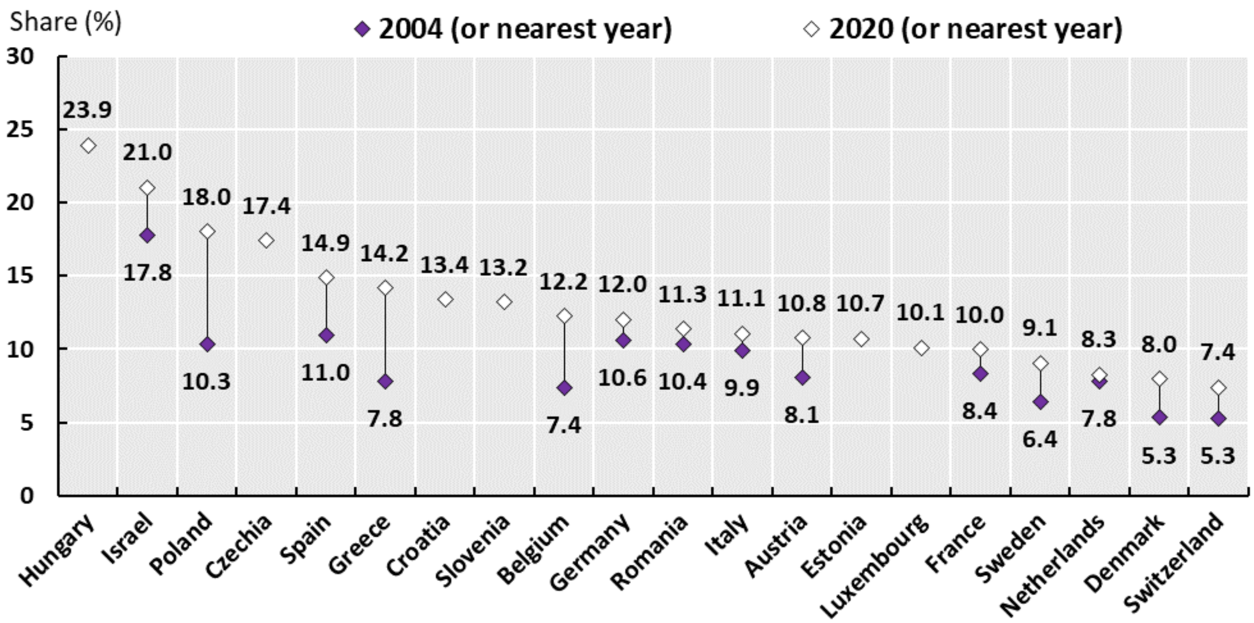
Figure 180 Changes in the share (%) of females taking a drug for hypertension at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

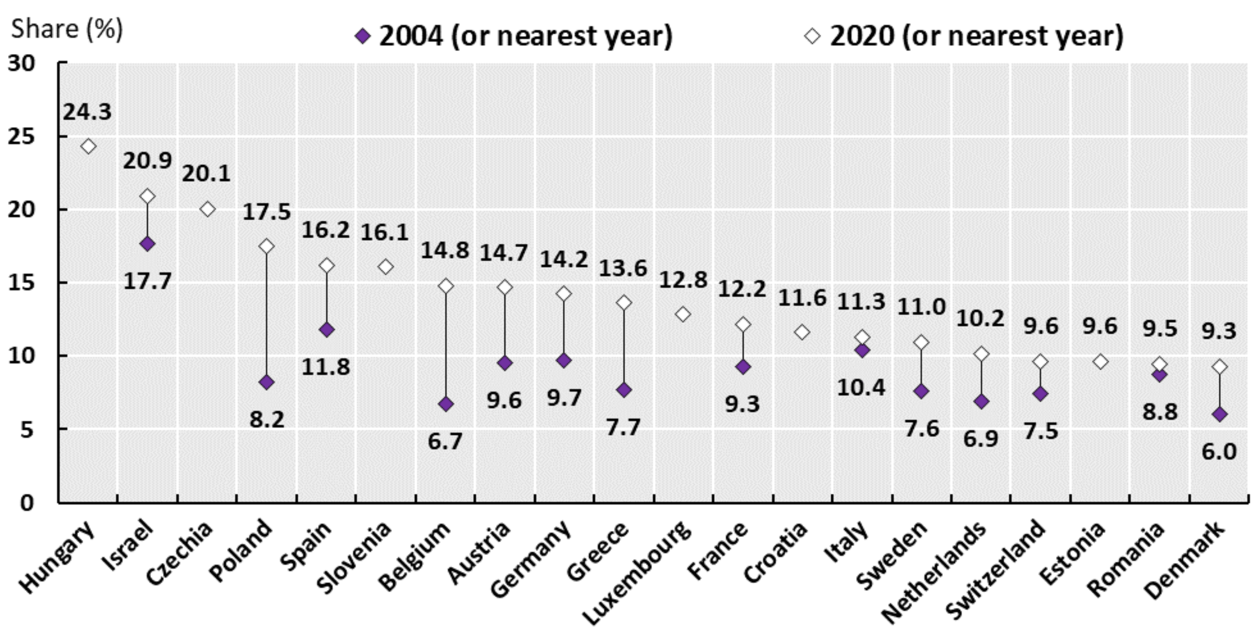
The share of individuals taking a drug for diabetes has increased in all countries considered (Figure 180). Poland is third in the ordered list of countries and Greece is also associated with a high share, while Romania is at the middle of the rankings. In addition, the share of females with pharmaceutical consumption for diabetes is higher compared with that of men (Figure 181 and Figure 182).

Figure 181 Changes in the share (%) of individuals taking a drug for diabetes at least weekly per country



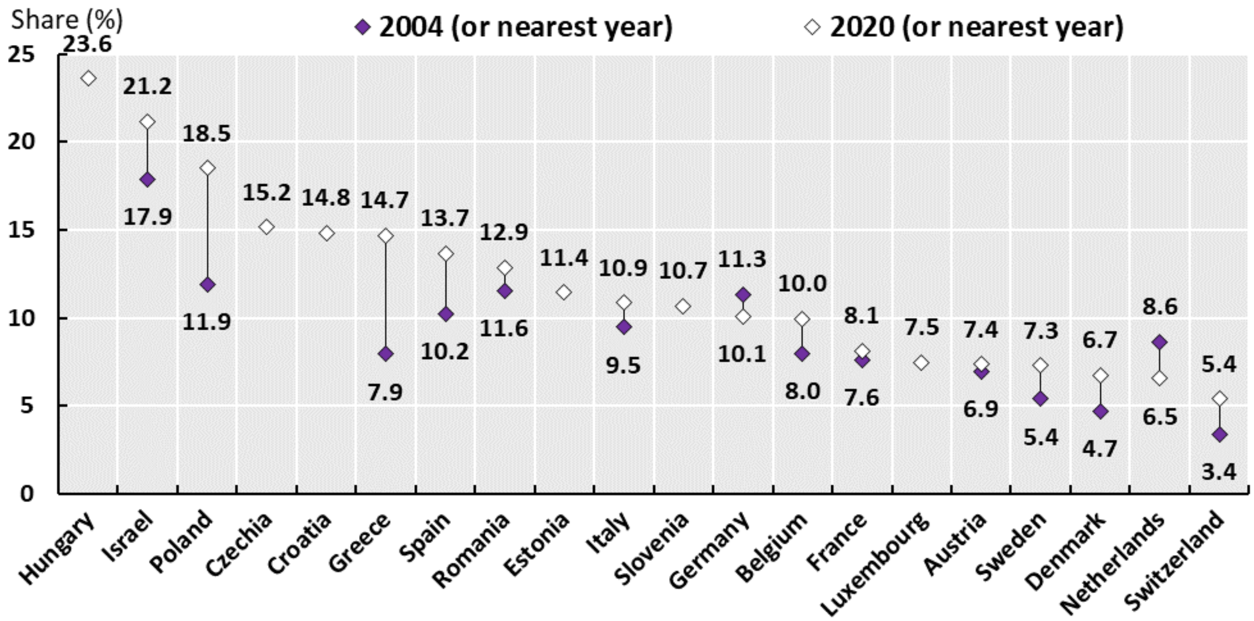
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 182 Changes in the share (%) of males taking a drug for diabetes at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

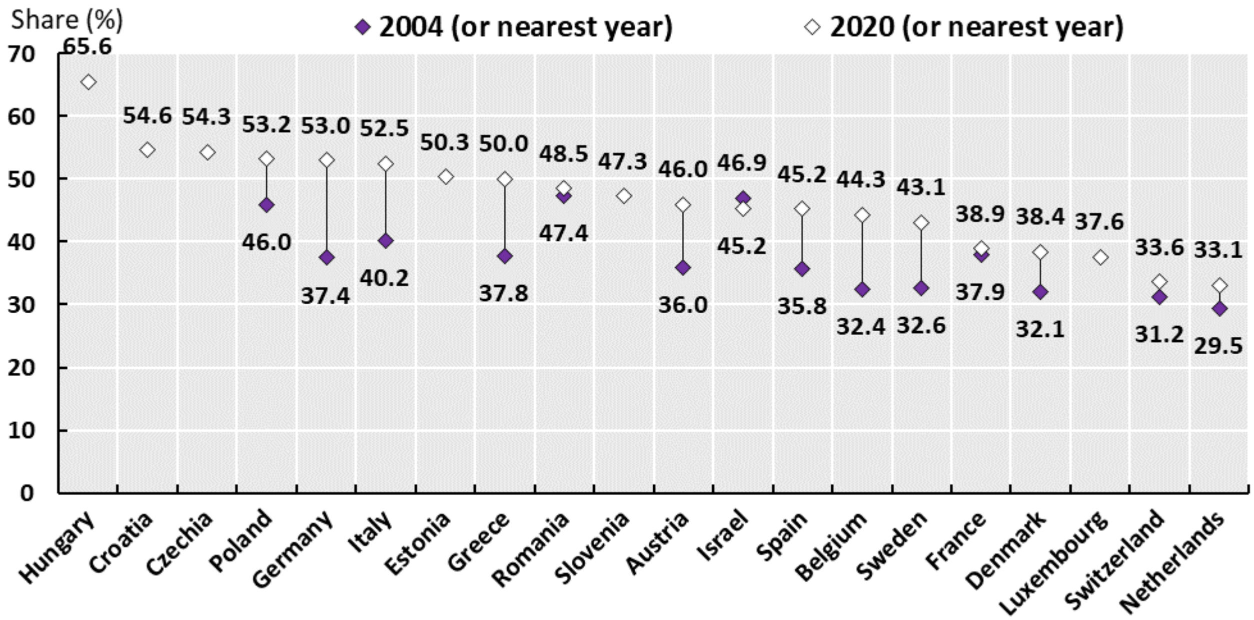
Figure 183 Changes in the share (%) of females taking a drug for diabetes at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

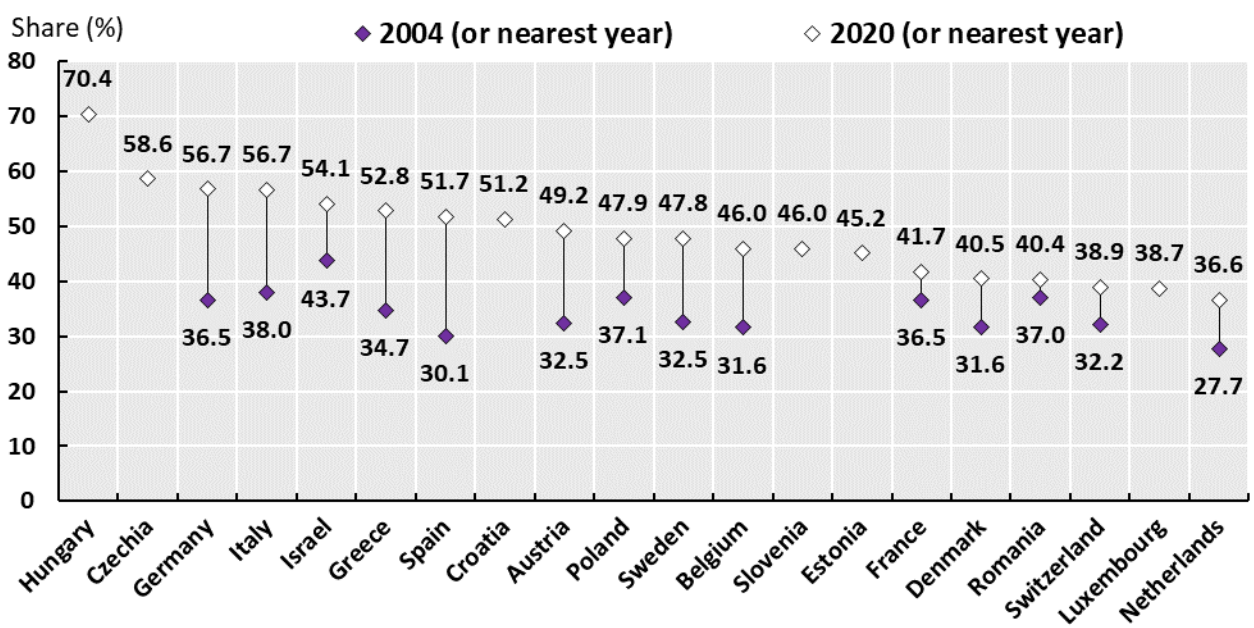
The share individuals receiving pharmaceutical therapy for hearth disease has increased in almost all countries, except for Israel (Figure 183). Once more Poland ranks high in the list of countries, followed by Greece and Romania. The estimate is higher among women than in men in Poland and Romania, while it is lower in the case of Greece (Figure 184 and Figure 185).

Figure 184 Changes in the share (%) of individuals taking a drug for a heart disease at least weekly per country



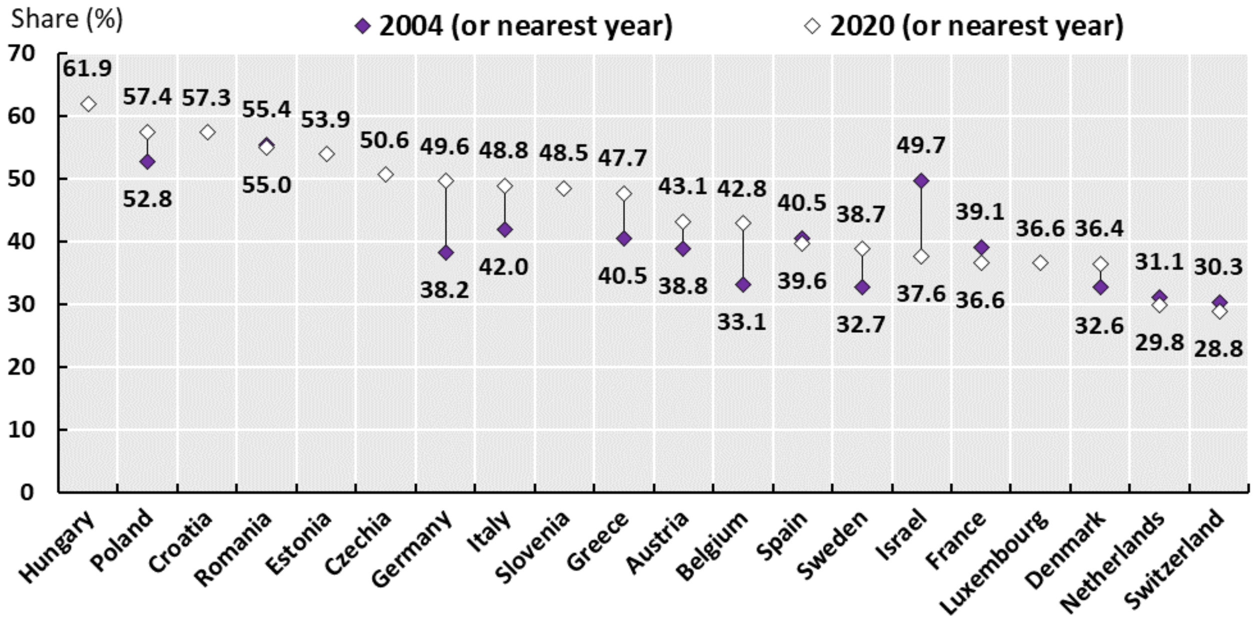
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 185 Changes in the share (%) of males taking a drug for a heart disease at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

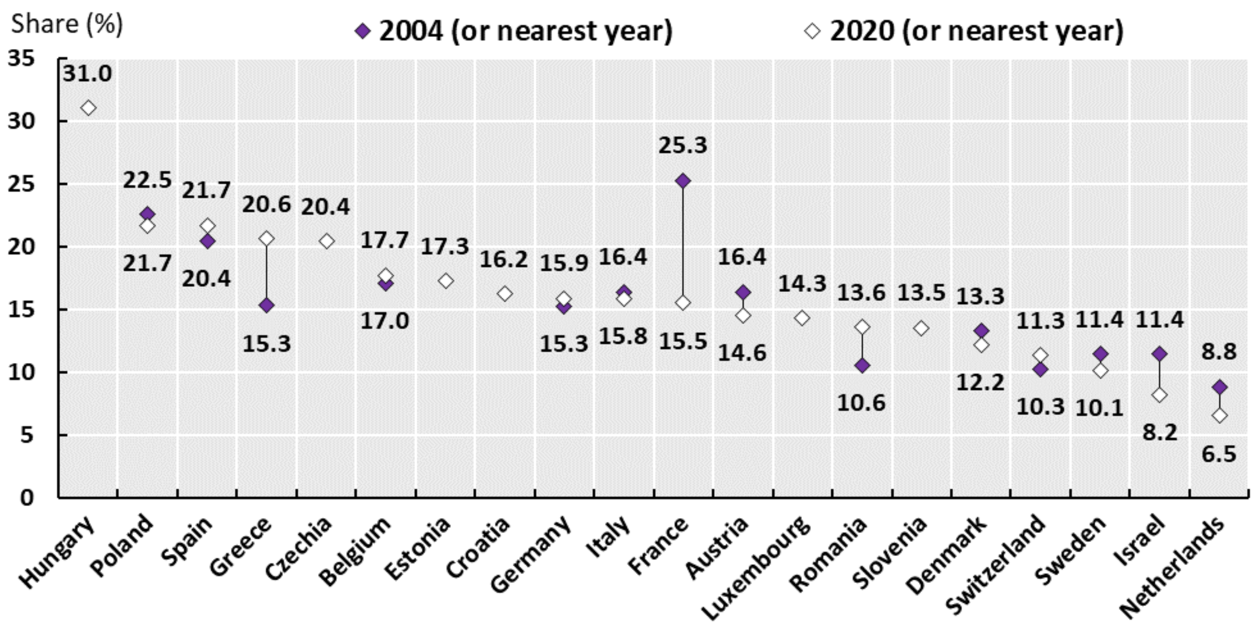
Figure 186 Changes in the share (%) of females taking a heart disease at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

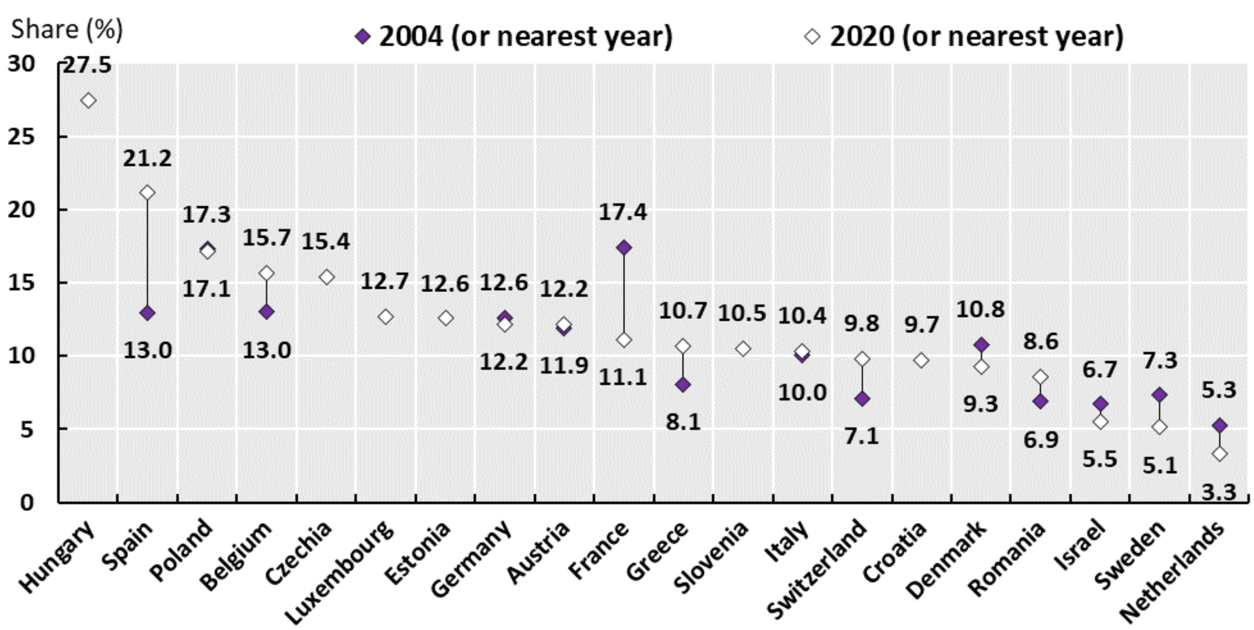
Regarding joint pain, the frequency of individuals taking a drug for the condition has increased in some countries, such as Greece and Romania, while it has decreased in others, like Poland (Figure 186). Poland is ranked second in the rankings, Greece is fourth, while Romania belongs in the bottom half cluster of countries. Furthermore, the proportion is higher in women than in men (Figure 187 and Figure 188).

Figure 187 Changes in the share (%) of individuals taking a drug for joint pain or for joint inflammation at least weekly per country



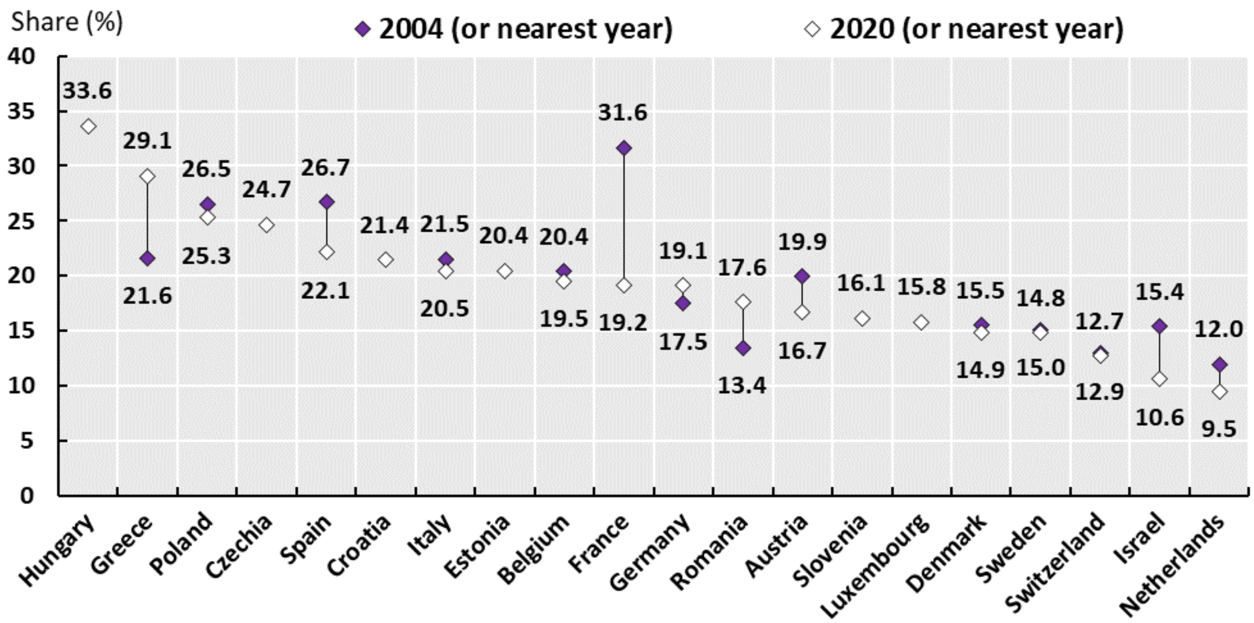
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 188 Changes in the share (%) of males taking a drug for joint pain or for joint inflammation at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

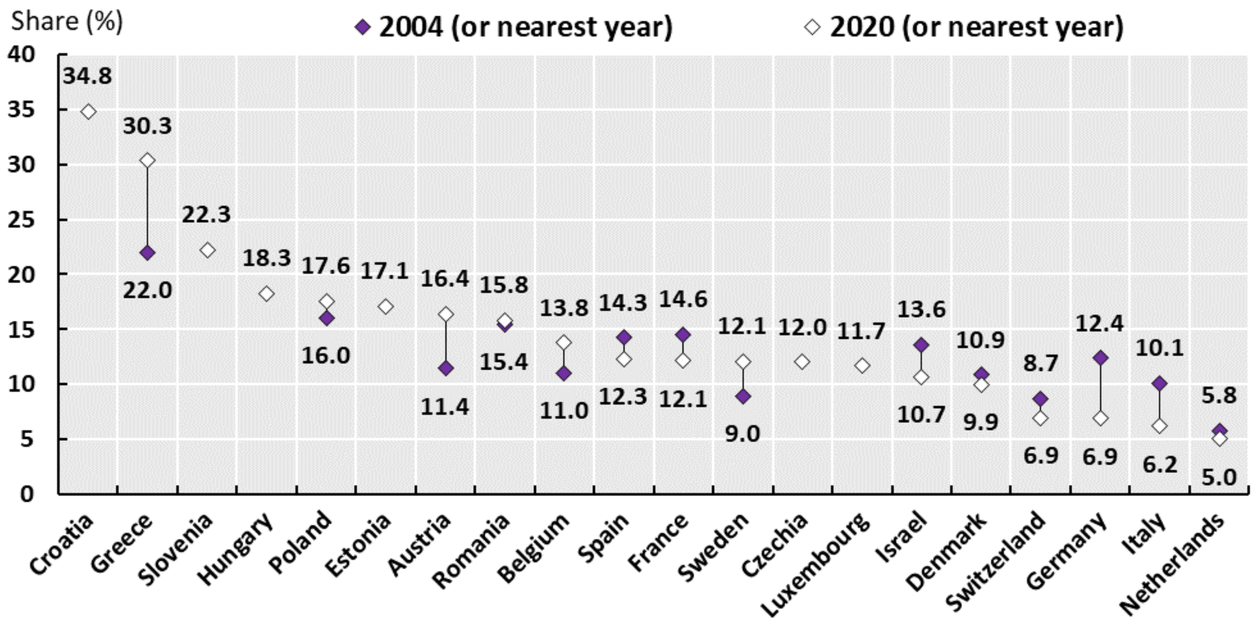
Figure 189 Changes in the share (%) of females taking drug for joint pain or for joint inflammation at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

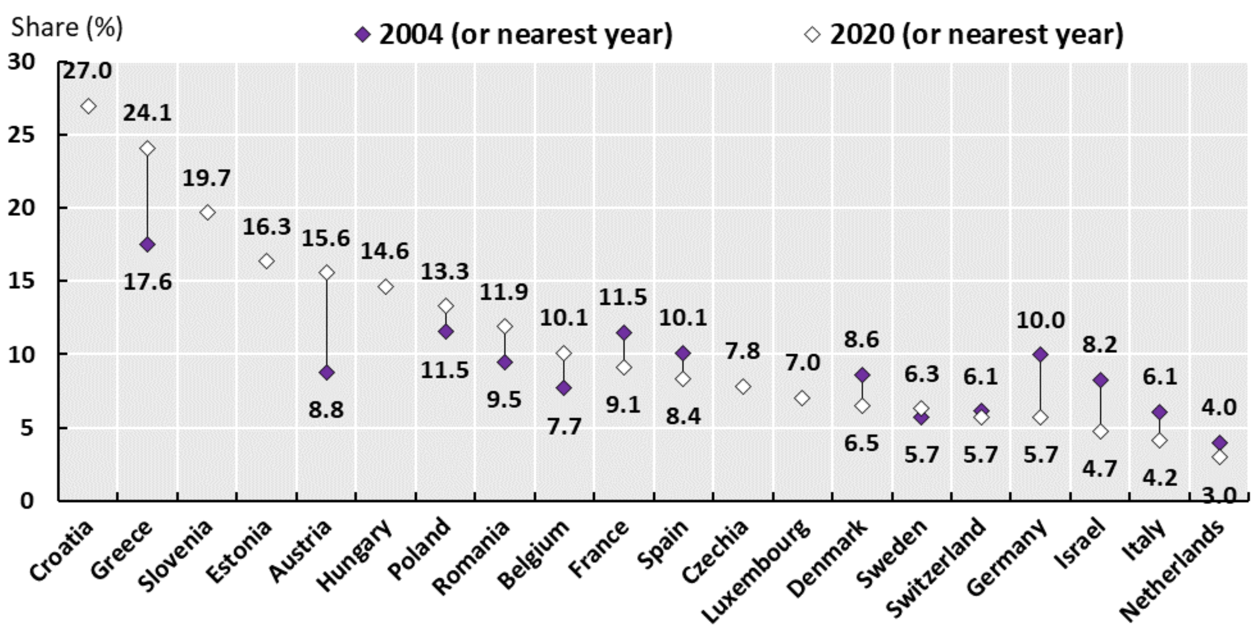
As far as the consumption of medicines for other pain (e.g. headache), the share of individuals taking a drug has increased in most countries over time (Figure 189). A high share is observed in Greece and Poland, while Romania is also ranked in the upper half of the ordered list of countries. In addition, the share is higher in women compared with men (Figure 190 and Figure 191).

Figure 190 Changes in the share (%) of individuals taking a drug for other pain (e.g. headache, back pain, etc.) at least weekly per country



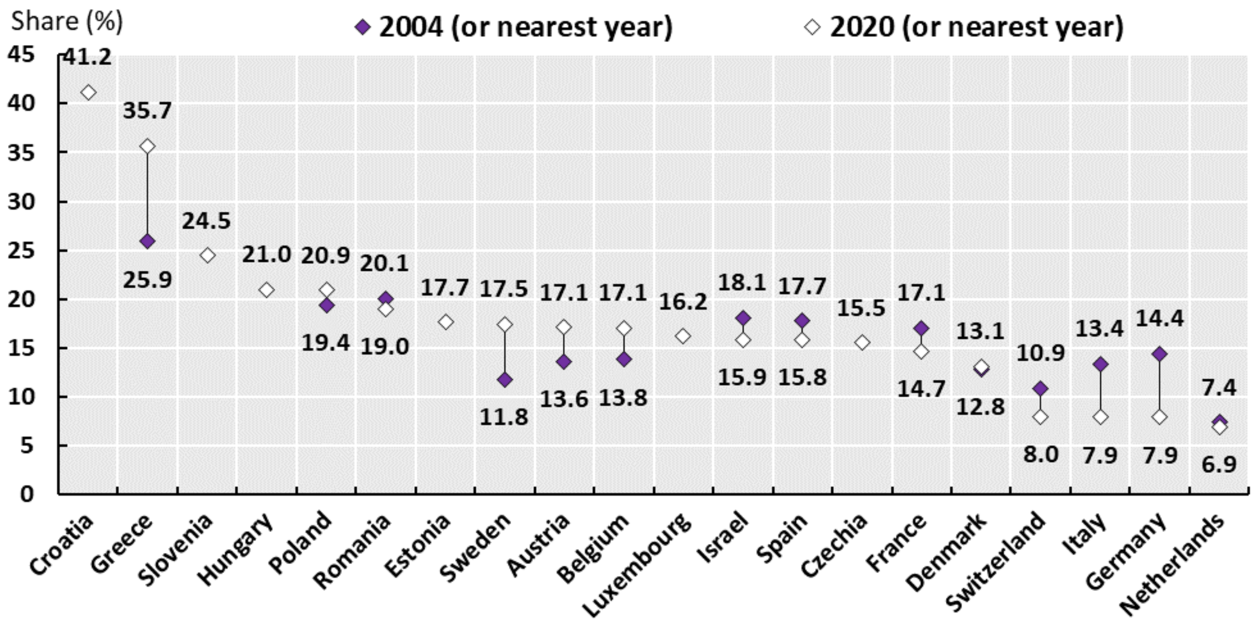
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 191 Changes in the share (%) of males taking a drug for other pain (e.g. headache, back pain, etc.) at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

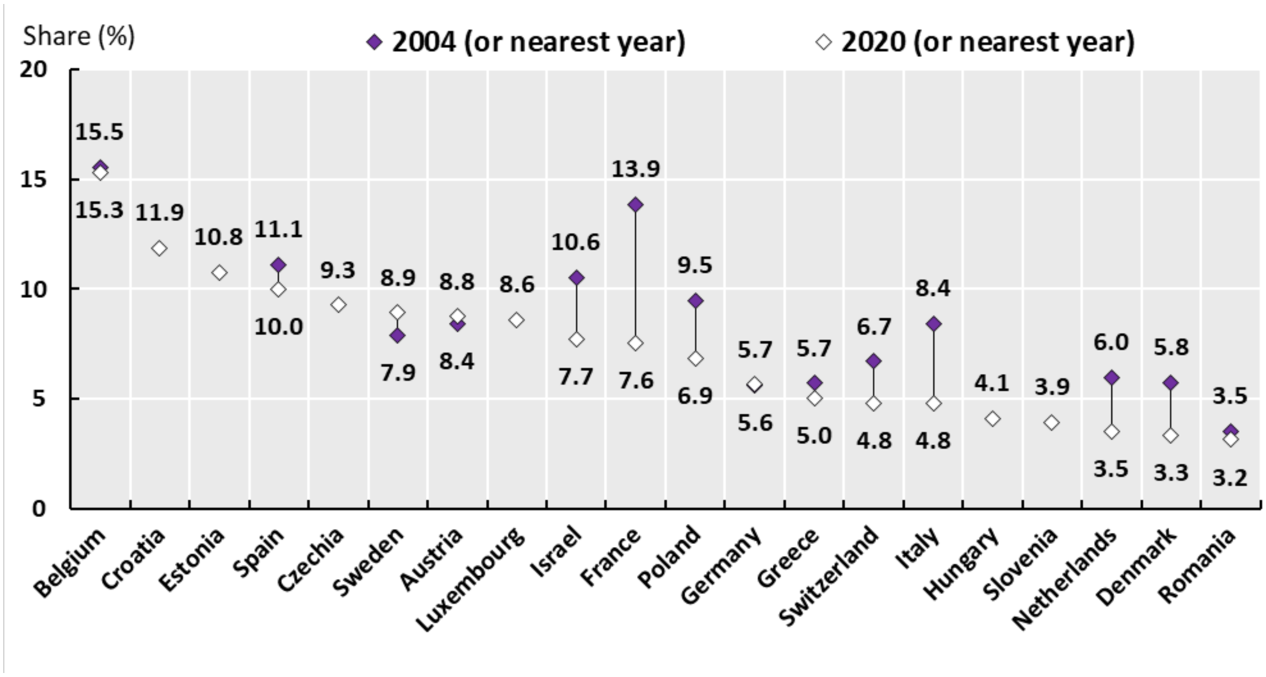
Figure 192 Changes in the share (%) of females taking a drug for other pain (e.g. headache, back pain, etc.) at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

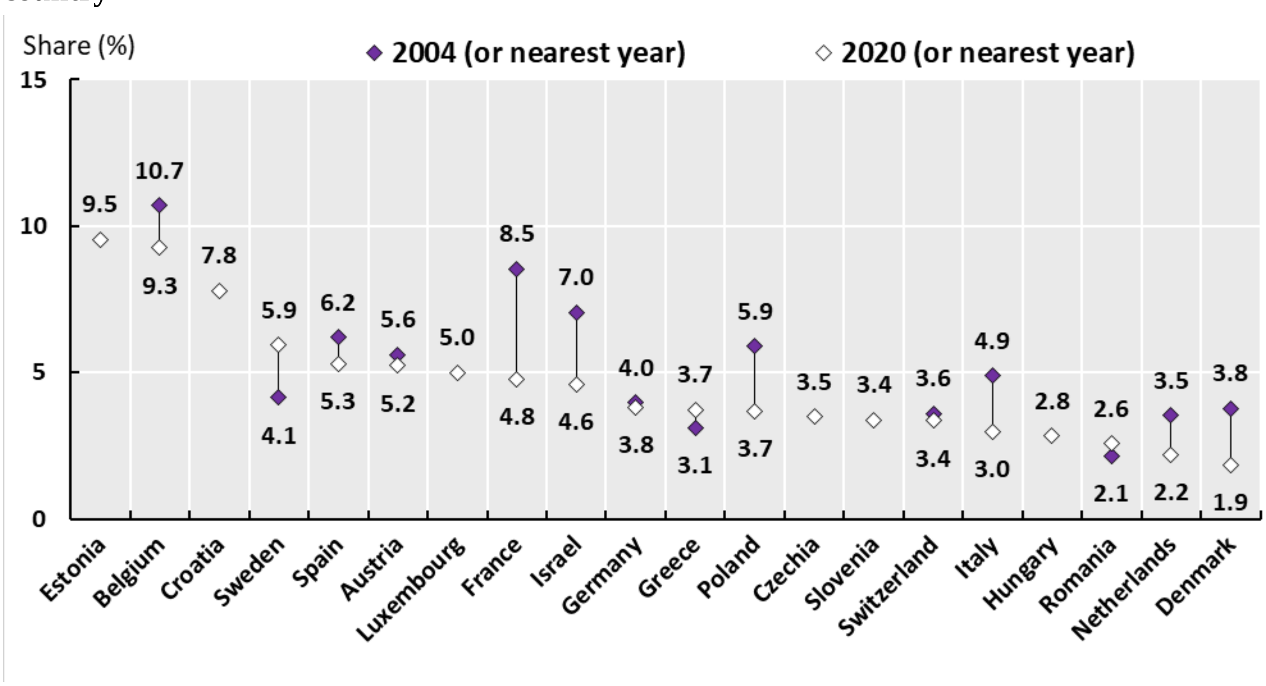
Pharmaceutical consumption for sleep problems appears to have decreased in most countries during the period of analysis (Figure 192). Poland and Greece are placed at the bottom half of the list of countries and Romania records the lowest share among all countries. Furthermore, the share of males taking a drug for sleep problems is lower compared with that of females (Figure 193 and Figure 194).

Figure 193 Changes in the share (%) of individuals taking a drug for sleep problems at least weekly per country



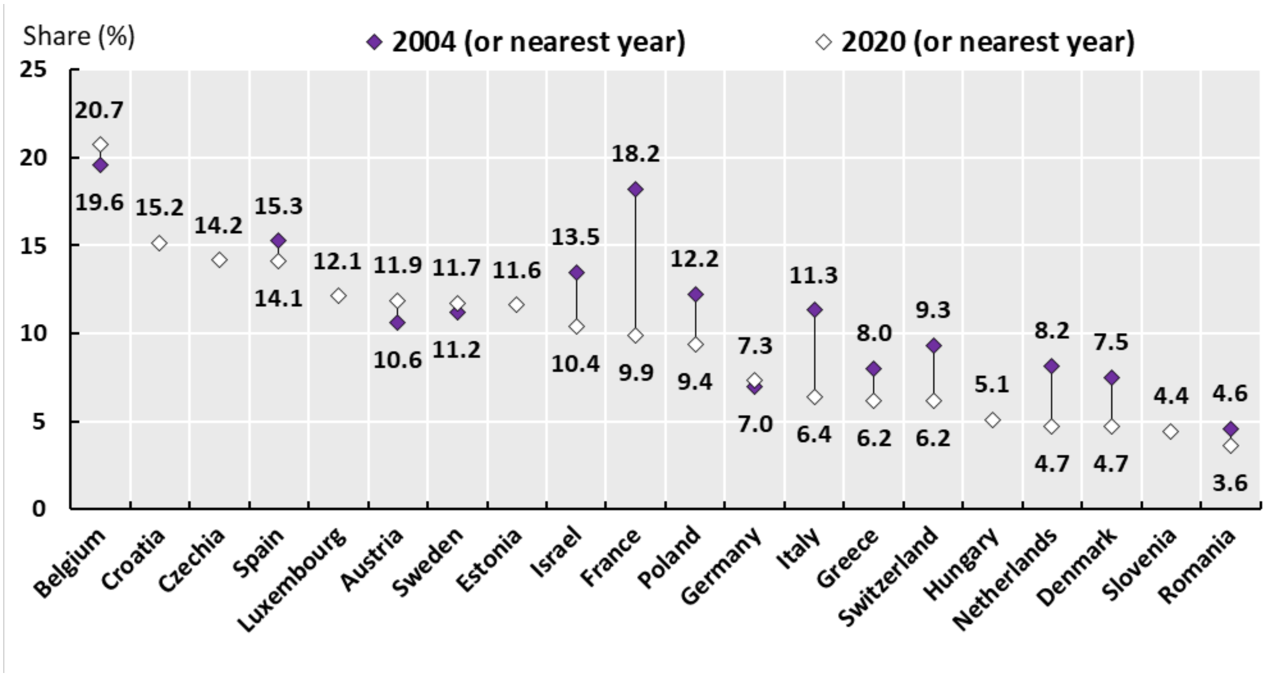
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 194 Changes in the share (%) of males taking a drug for sleep problems at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

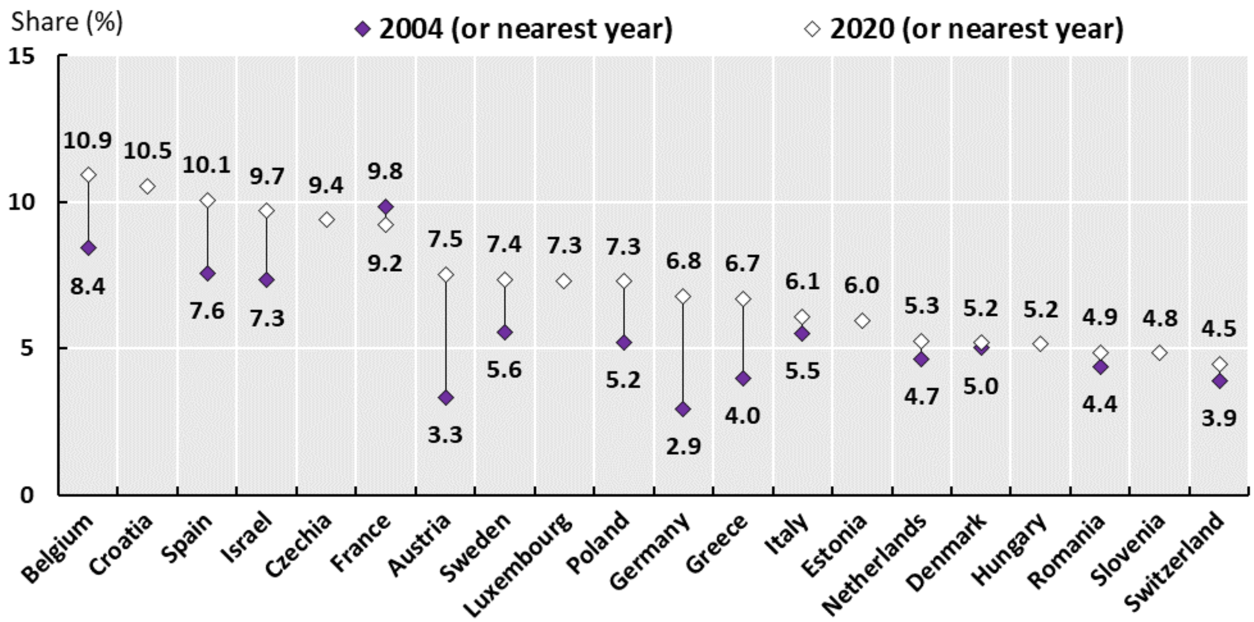
Figure 195 Changes in the share (%) of females taking a drug for sleep problems at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

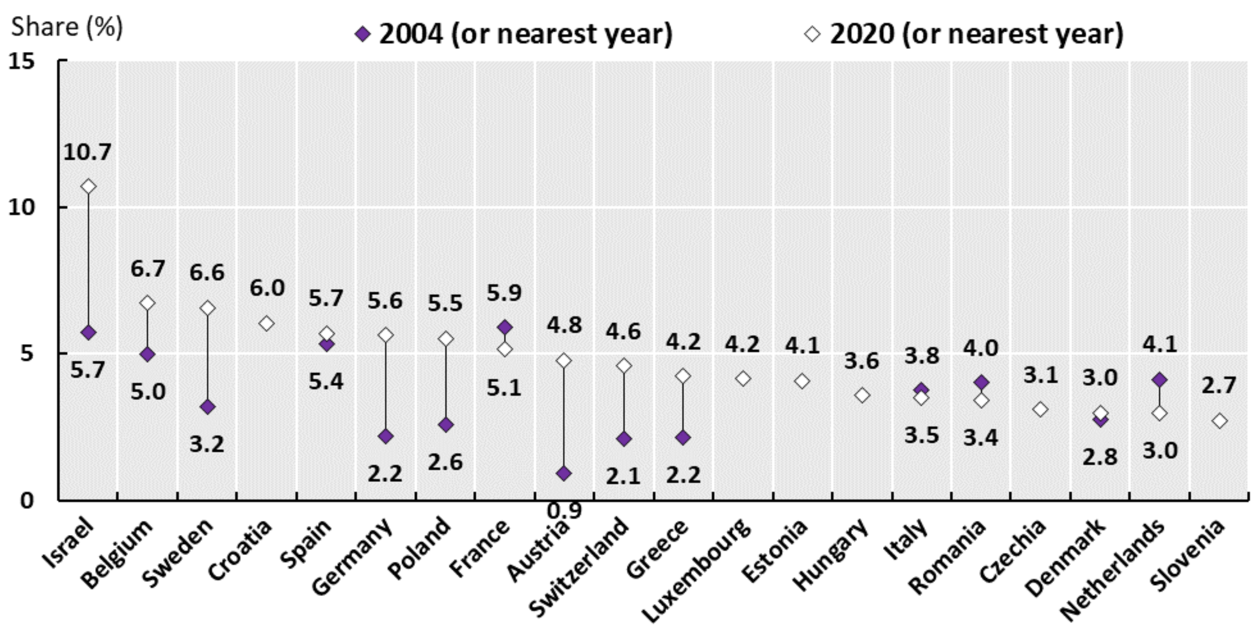
The share of individuals taking a drug for anxiety/depression has risen in all countries, except for France (Figure 195). Poland and Greece lie in the middle of the rankings, while Romania is third from the bottom. In addition, the share is found to be higher in women compared with men (Figure 196 and Figure 197).

Figure 196 Changes in the share (%) of individuals taking a drug for anxiety or depression at least weekly per country



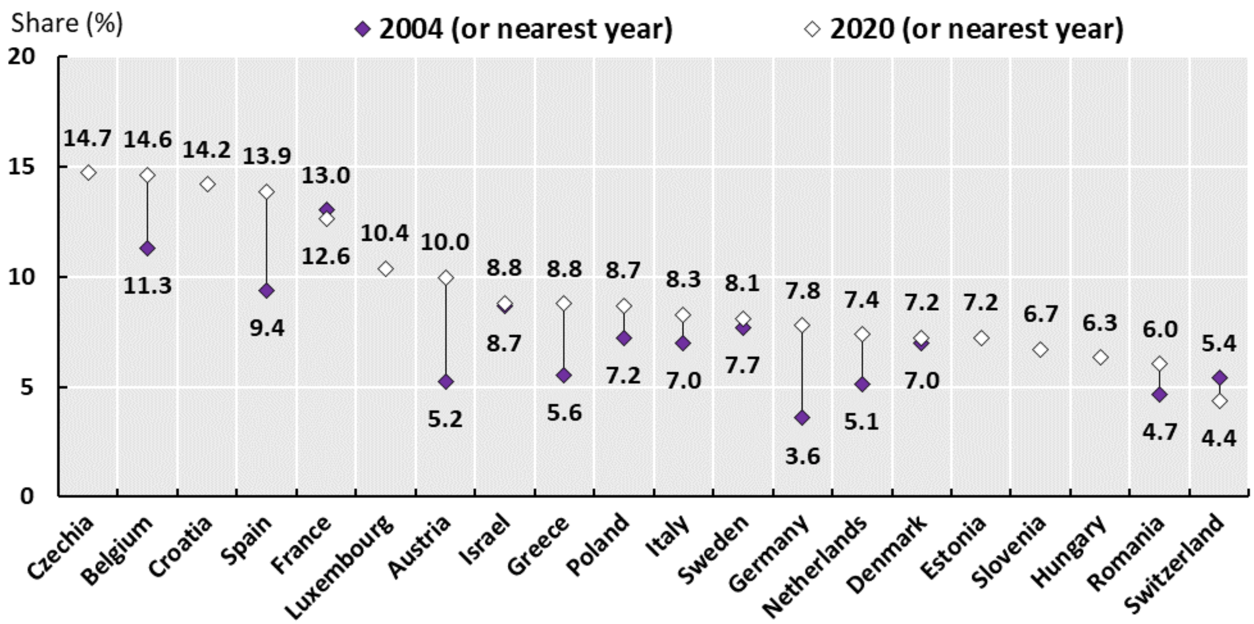
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 197 Changes in the share (%) of males taking a drug for anxiety or depression at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

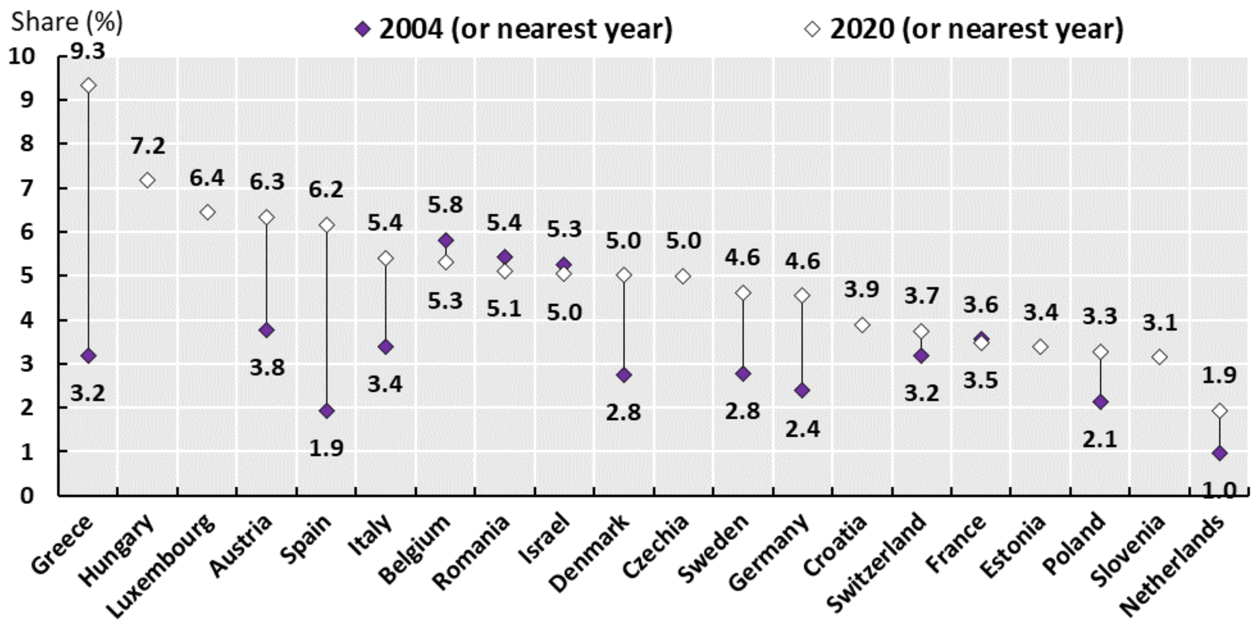
Figure 198 Changes in the share (%) of females taking a drug for anxiety or depression at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

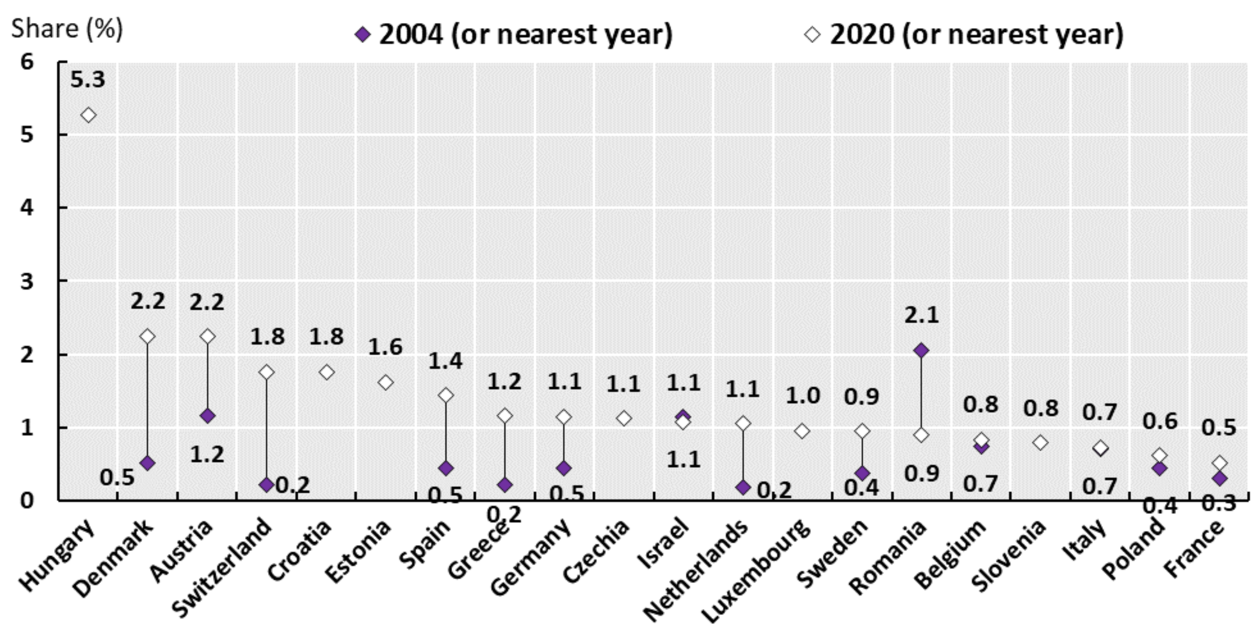
The share of individuals taking a drug for osteoporosis (Figure 198). Greece is associated with the highest share, Romania lies in the upper half of the ordered list of countries, while Poland is third from the bottom. As expected, pharmaceutical consumption for osteoporosis is more frequent in women than in men (Figure 199 and Figure 200).

Figure 199 Changes in the share (%) of individuals taking a drug for osteoporosis at least weekly per country



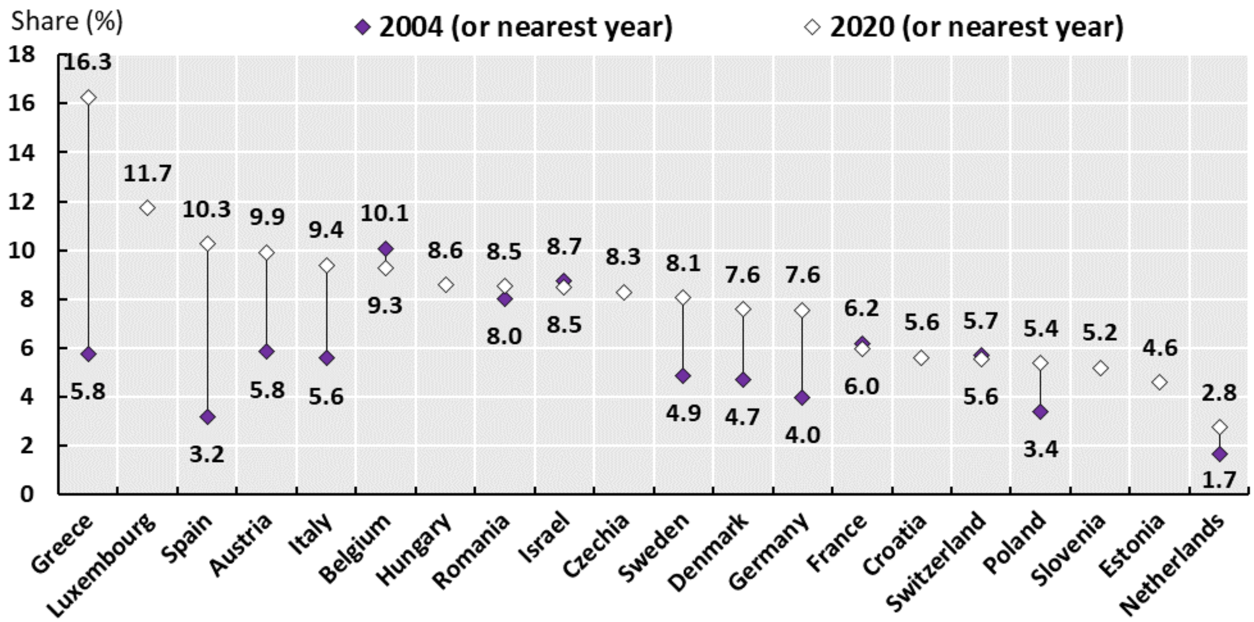
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 200 Changes in the share (%) of males taking a drug for osteoporosis at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

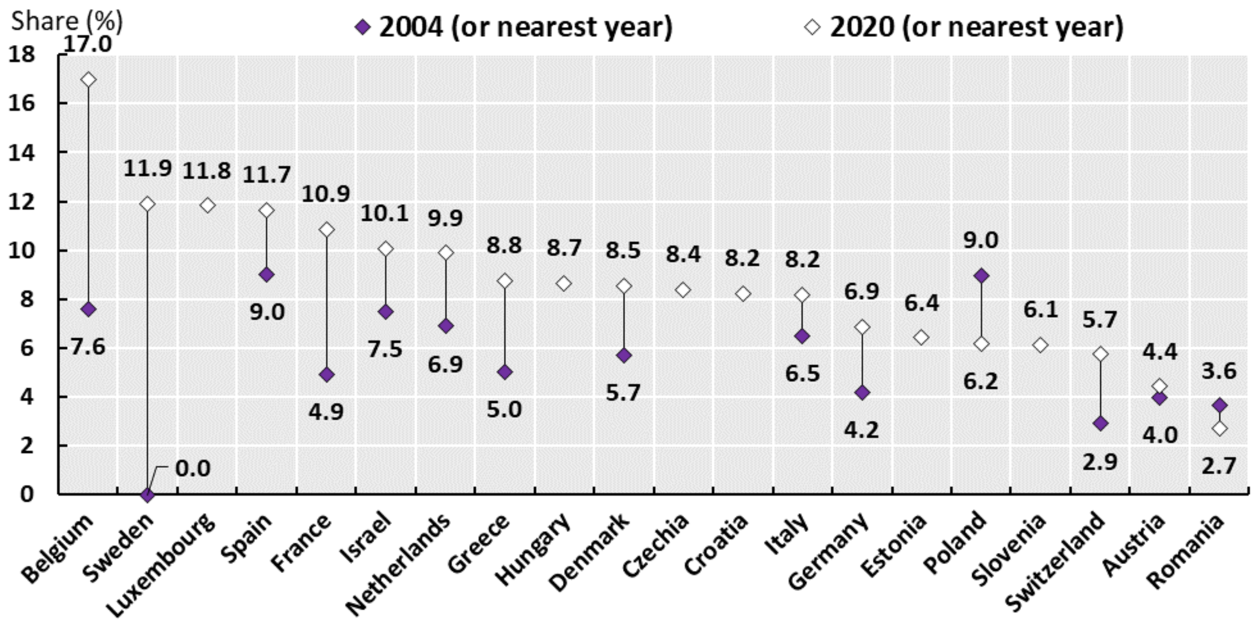
Figure 201 Changes in the share (%) of females taking a drug for osteoporosis at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

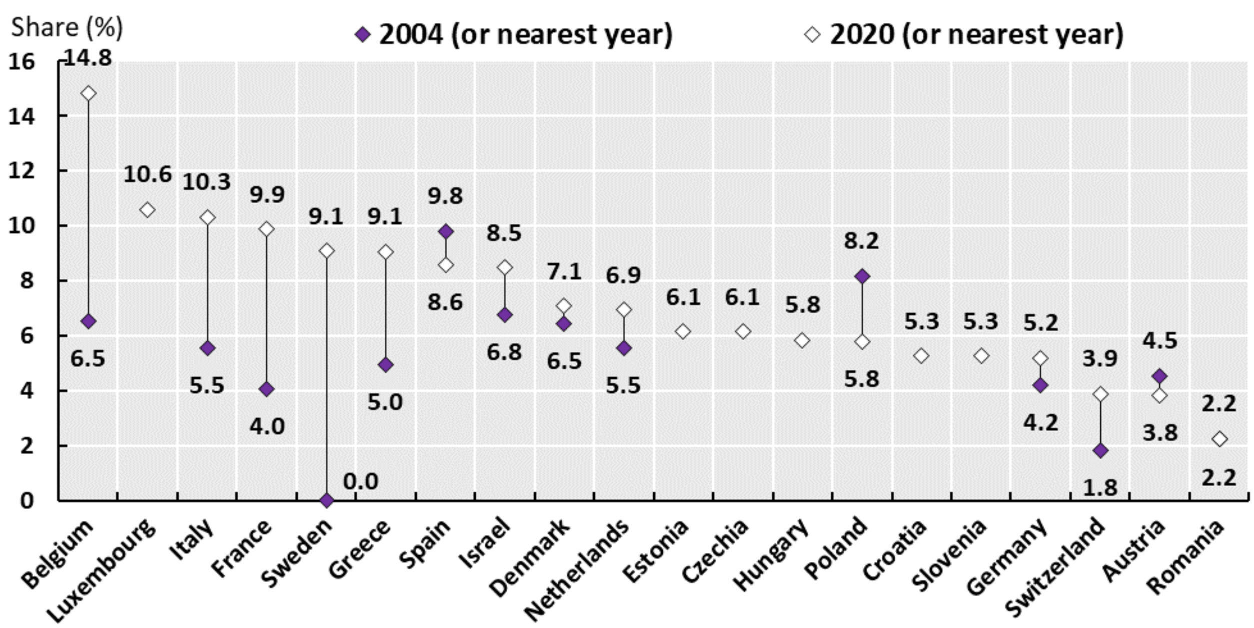
Pharmaceutical consumption for stomach burns has increased in most countries over time, but not in Poland and Romania (Figure 201). Romania is ranked at the bottom of the list of countries, Poland a few positions higher and Greece at the middle of the distribution. Furthermore, pharmaceutical consumption is usually more frequent in women than in men, but the opposite is observed in Greece (Figure 202 and Figure 203).

Figure 202 Changes in the share (%) of individuals taking a drug for stomach burns at least weekly per country



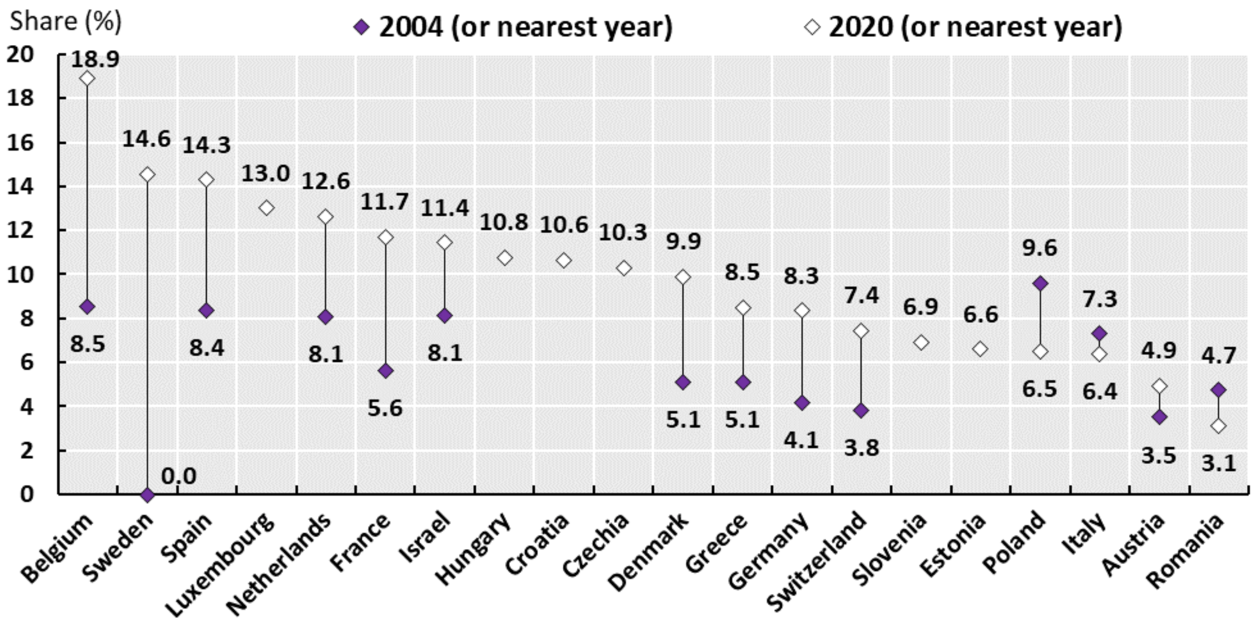
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 203 Changes in the share (%) of males taking a drug for stomach burns at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

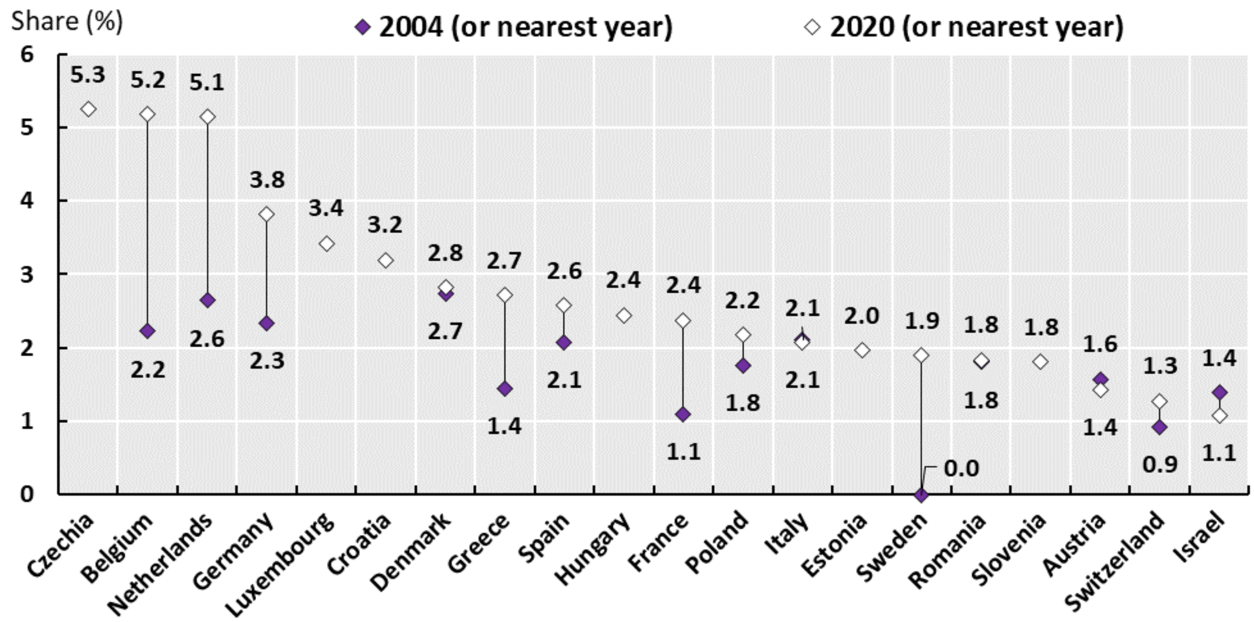
Figure 204 Changes in the share (%) of females taking a drug for stomach burns at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

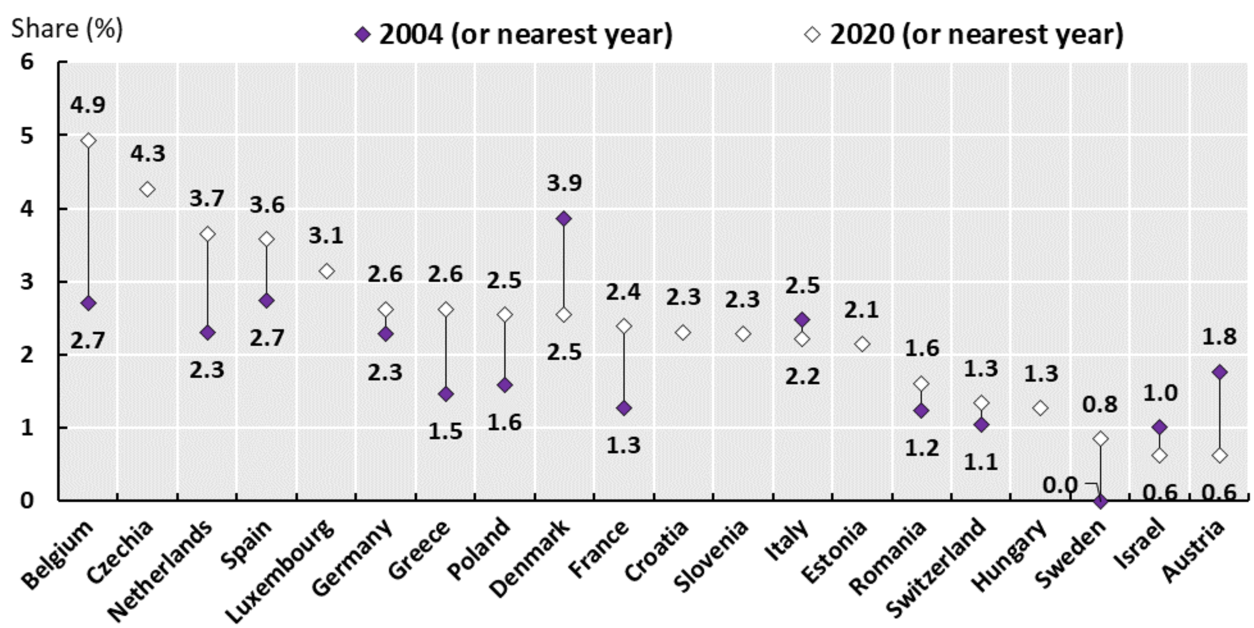
The share of individuals taking a medicine for chronic bronchitis has increased in almost all countries over time (Figure 204). Greece and Poland are ranked around the middle of the distribution of countries, while Romania lies a few positions lower. In addition, the share is usually higher in women than among men, although the opposite applies to Poland (Figure 205 and Figure 206).

Figure 205 Changes in the share (%) of individuals taking a drug for chronic bronchitis at least weekly per country



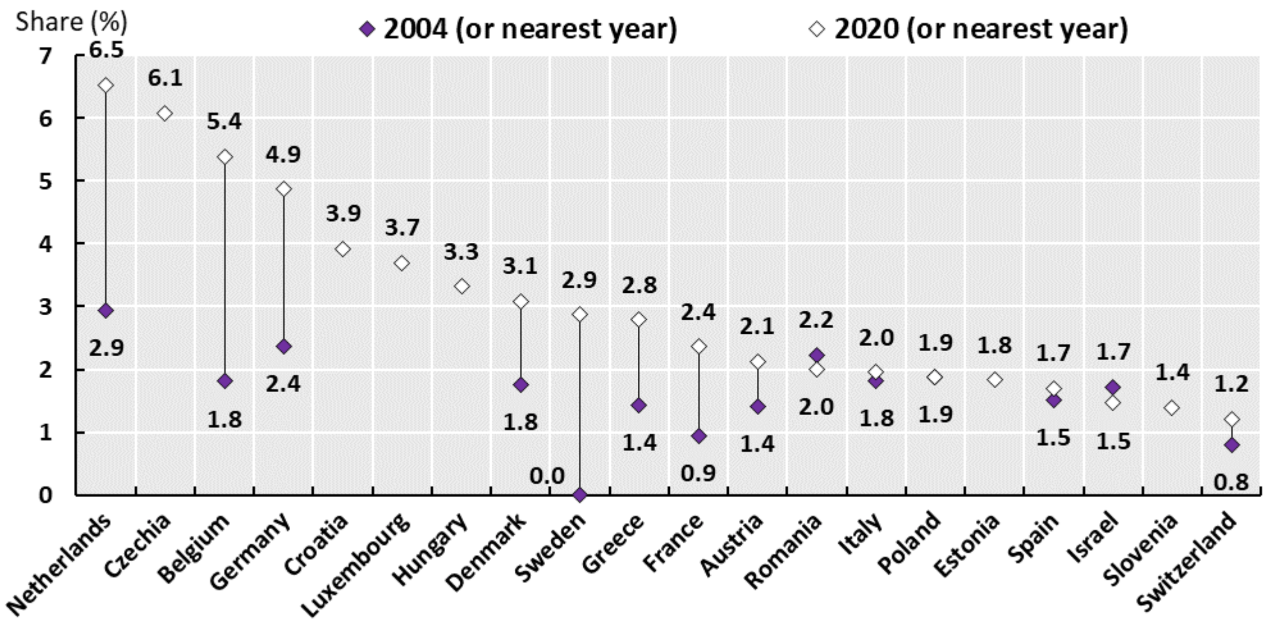
Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 206 Changes in the share (%) of males taking a drug for chronic bronchitis at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

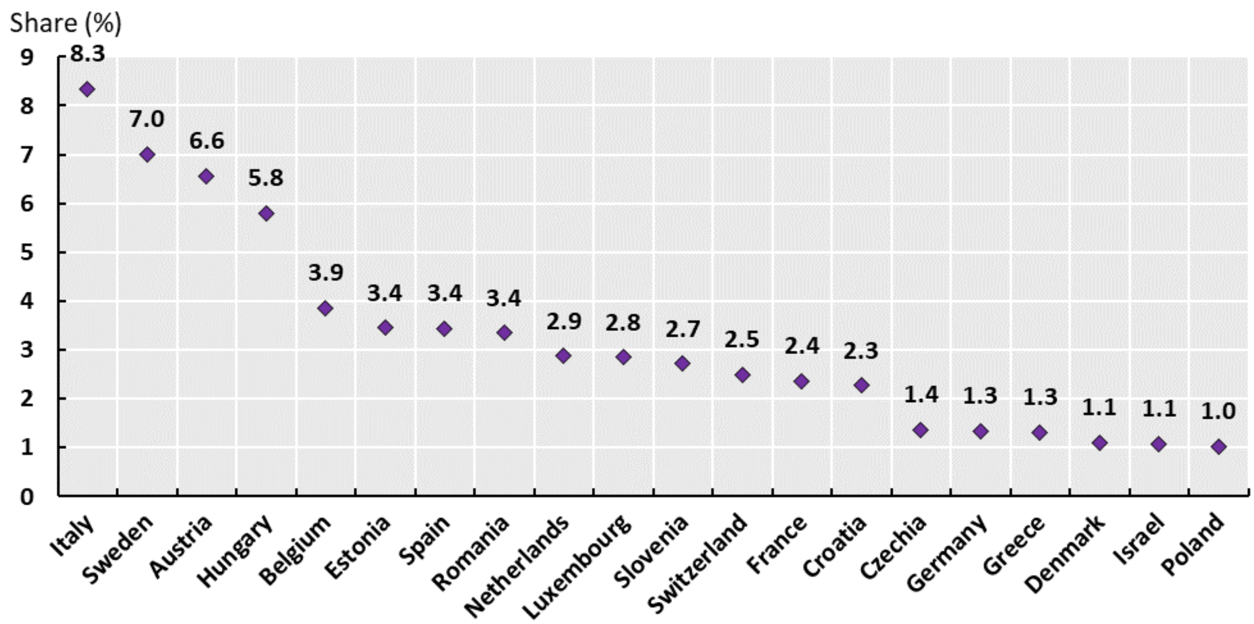
Figure 207 Changes in the share (%) of females taking a drug for chronic bronchitis at least weekly per country



Note: Estimates are based on the unstandardized distributions. Czechia and Poland 2007 instead of 2004, Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

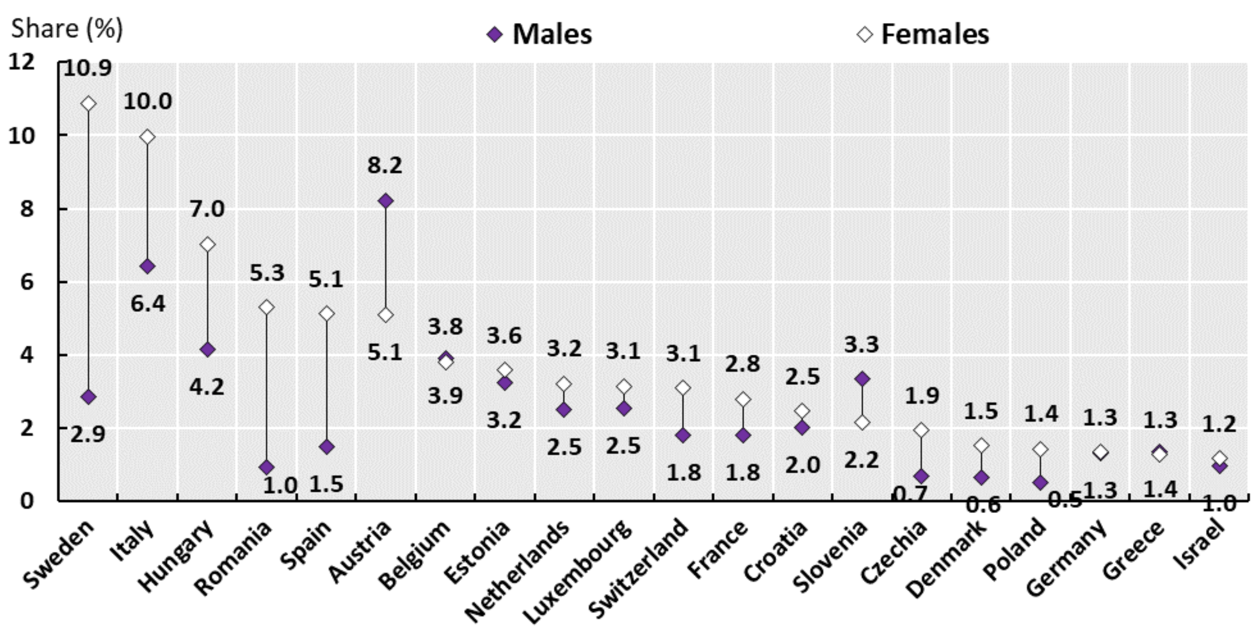
Finally, Poland has the lowest share of individuals taking a medicine for suppressing inflammation among all countries included in the analysis (Figure 207). Greece is fourth from the bottom and Romania lies in the upper half of the ordered list of countries. Furthermore, the share is usually higher in women than in men (Figure 208).

Figure 208 Share (%) of individuals taking a drug for suppressing inflammation (only glucocorticoids or steroids) at least weekly per country (2020)



Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

Figure 209 Share (%) of individuals taking a drug for suppressing inflammation (only glucocorticoids or steroids) at least weekly per country and gender (2020)

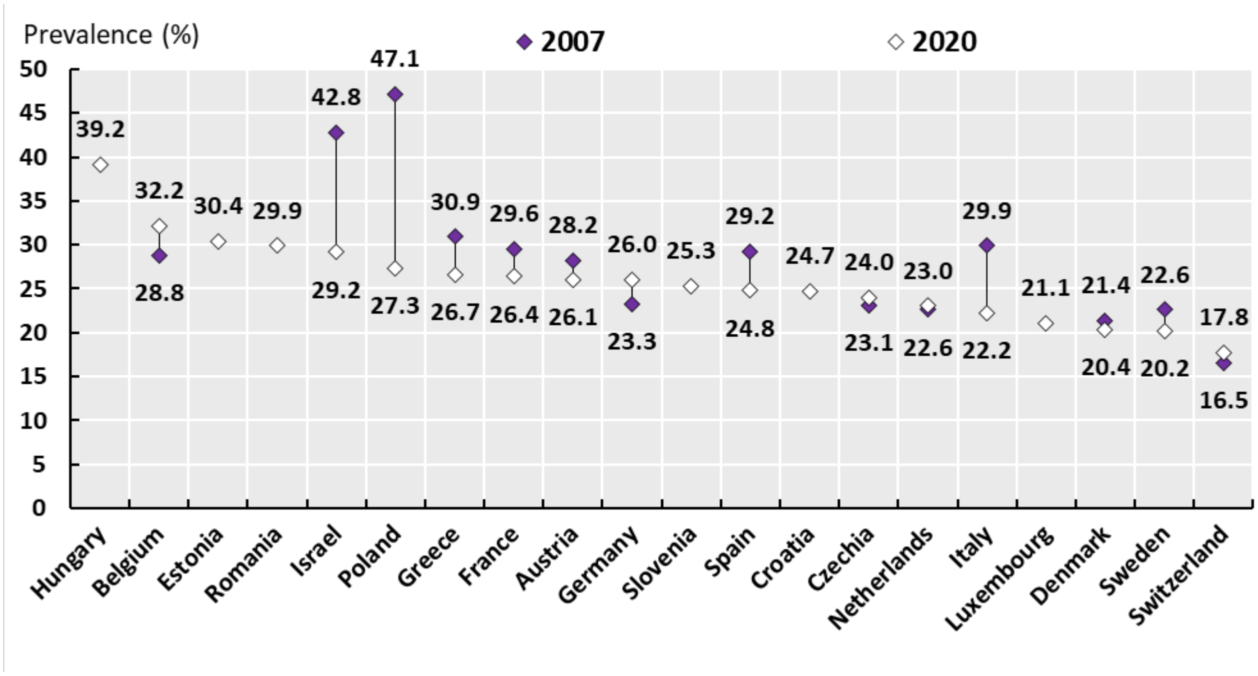


Note: Estimates are based on the unstandardized distributions. Portugal 2018 instead of 2020 and Romania 2017 instead of 2004.

4.3.3. Long-term care

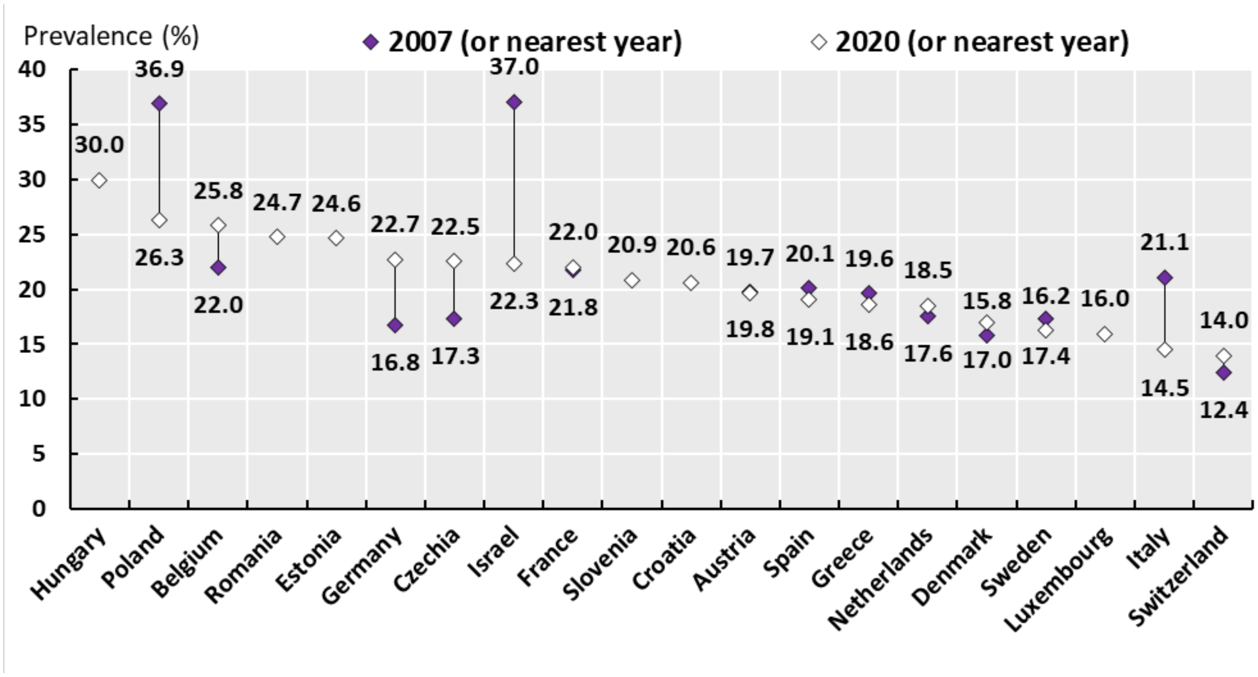
This section explores the changes in the long-term care in European countries. Long-term care needs, defined as one or more ADL/IADL limitations, have decreased in the elderly population in most countries during the period of analysis (Figure 209). However, the prevalence of long-term care needs remains quite high in Romania, Poland and Greece relatively to the other European countries. Furthermore, it appears that these changes are mainly due to a decreasing trend observed in women over time, while the pattern is more mixed among men (Figure 210 and Figure 211).

Figure 210 Changes in the prevalence (%) of long-term care needs (1+ ADL/IADL limitations) for individuals 60+ per country



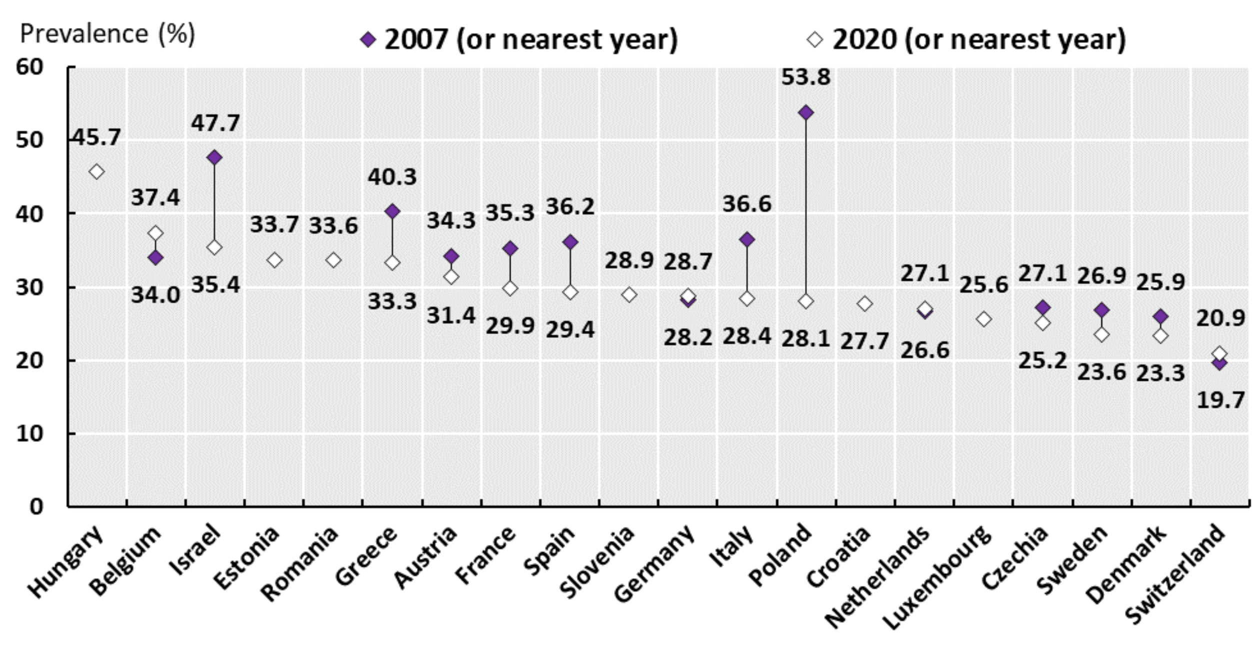
Note: Estimates are based on the unstandardized distributions.

Figure 211 Changes in the prevalence (%) of long-term care needs (1+ ADL/IADL limitations) for males 60+ per country



Note: Estimates are based on the unstandardized distributions.

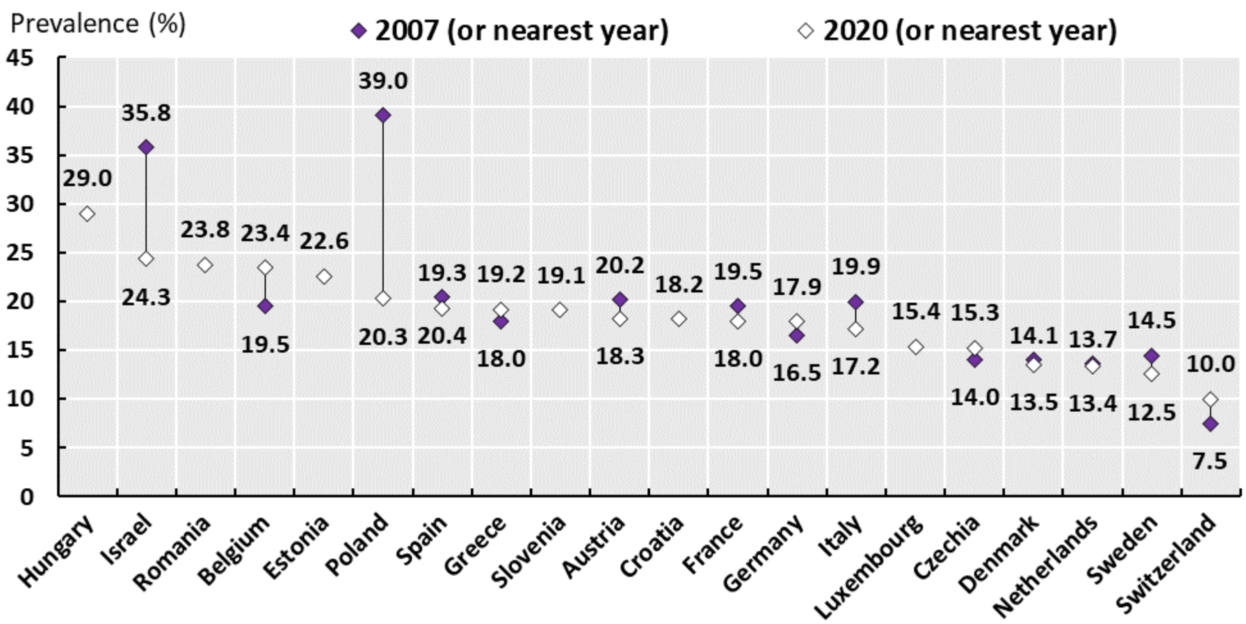
Figure 212 Changes in the prevalence (%) of long-term care needs (1+ ADL/IADL limitations) for females 60+ per country



Note: Estimates are based on the unstandardized distributions.

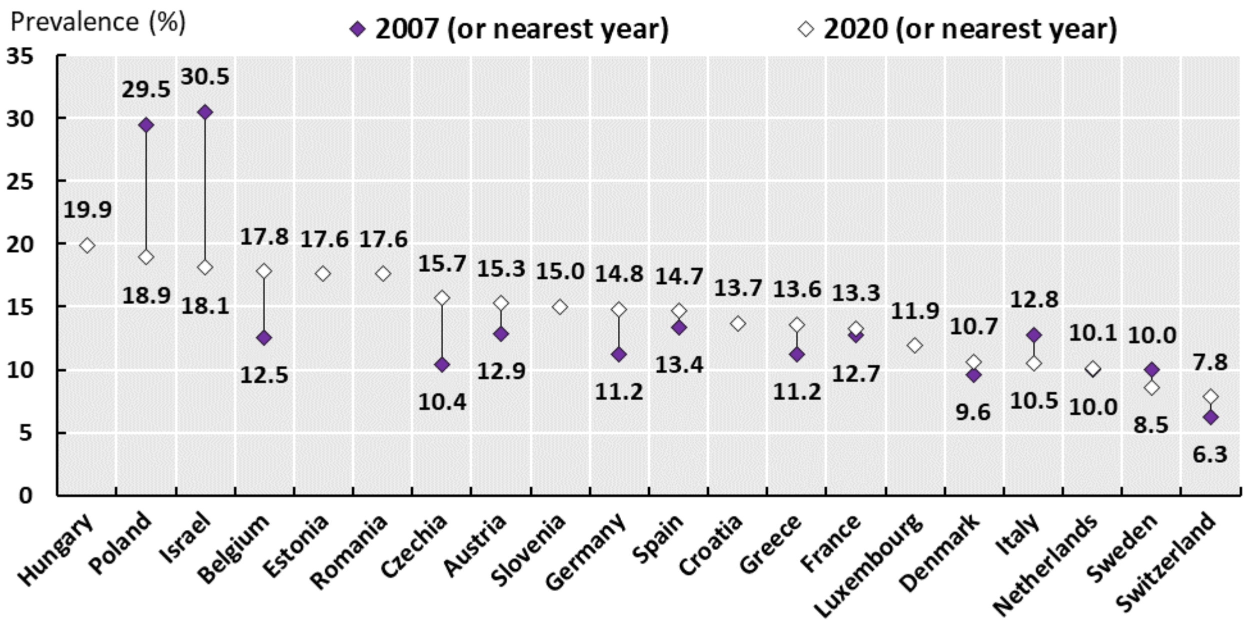
When long-term care needs are defined as two or more ADL/IADL limitations, the changes over time are less favourable, although they have decreased in most countries (Figure 212). Once more, the prevalence of long-term care needs is very high in Romania (third in the rankings), Poland and Greece. In addition, the lower share of individuals reporting long-term care needs in 2020 compared with 2007 is again the result of the corresponding improvements observed among women (Figure 213 and Figure 214).

Figure 213 Changes in the prevalence (%) of long-term care needs (2+ ADL/IADL limitations) for individuals 60+ per country



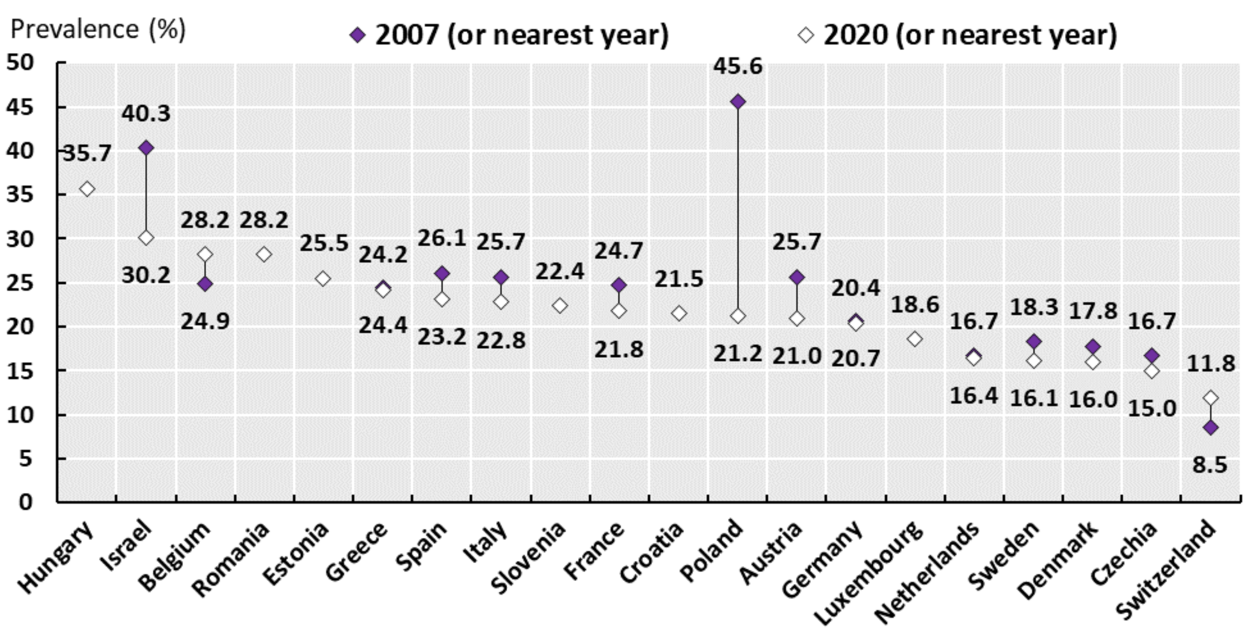
Note: Estimates are based on the unstandardized distributions.

Figure 214 Changes in the prevalence (%) of long-term care needs (2+ ADL/IADL limitations) for males 60+ per country



Note: Estimates are based on the unstandardized distributions.

Figure 215 Changes in the prevalence (%) of long-term care needs (2+ ADL/IADL limitations) for females 60+ per country



Note: Estimates are based on the unstandardized distributions.

Regarding the type of care used to meet long-term care needs, formal care alone or combined with informal care has increased in most countries, including Greece and Poland (Table 17). Overall, informal care remains the predominant type of care of long-term care needs in Romania, Poland and Greece. Furthermore, it is interesting that informal care has decreased more among women than in men (Table 18 and Table 19). A similar pattern is observed when defining long-term care needs as two or more ADL/IADL limitations (Table 20, Table 21 and Table 22).

Table 18 Changes in the type of care (%) for long-term care needs (1+ ADL/IADL limitations) for individuals 60+ per country

Countries	2007			2020		
	Only formal	Formal & informal	Only informal	Only formal	Formal & informal	Only informal
Austria	19.0	31.3	49.7	12.1	32.7	55.3
Germany	10.1	31.3	58.6	16.6	40.5	42.9
Sweden	15.8	30.8	53.4	20.3	35.1	44.6
Netherlands	26.0	40.3	33.7	21.1	39.2	39.7
Spain	14.3	23.2	62.5	20.8	40.9	38.3
Italy	6.1	25.9	68.0	17.9	26.4	55.7
France	29.0	44.1	26.9	16.3	40.5	43.2
Denmark	24.0	40.0	36.1	15.3	36.7	48.0
Greece	8.0	11.7	80.3	11.1	23.5	65.4
Switzerland	5.5	20.0	74.5	20.0	39.5	40.6
Belgium	16.3	45.2	38.5	22.6	41.8	35.6
Israel	13.8	38.9	47.3	27.1	36.5	36.4
Czechia	1.8	18.6	79.6	3.0	21.8	75.2
Poland	0.0	0.0	100.0	5.9	18.4	75.7
Luxembourg				23.1	42.9	34.1
Hungary				6.9	23.6	69.5
Slovenia				7.9	16.3	75.8
Estonia				7.5	12.6	79.9
Croatia				10.6	25.9	63.5
Romania				2.2	7.4	90.4

Note: Estimates are based on the unstandardized distributions.

Table 19 Changes in the type of care (%) for long-term care needs (1+ ADL/IADL limitations) for males 60+ per country

Countries	2007			2020		
	Only formal	Formal & informal	Only informal	Only formal	Formal & informal	Only informal
Austria	9.2	30.1	60.7	11.0	20.6	68.4
Germany	2.6	26.0	71.4	22.5	37.6	39.9
Sweden	12.5	27.5	60.0	17.6	28.0	54.5
Netherlands	20.9	33.3	45.8	9.0	37.3	53.7
Spain	7.5	20.3	72.2	25.3	38.5	36.3
Italy	6.6	27.0	66.4	12.0	25.7	62.3
France	32.1	37.1	30.7	14.8	32.5	52.7
Denmark	19.3	36.0	44.7	20.1	28.4	51.5
Greece	7.6	14.5	77.9	8.6	23.3	68.1
Switzerland	0.0	31.5	68.5	23.2	34.9	41.9
Belgium	17.0	36.4	46.6	17.4	34.4	48.2
Israel	9.5	34.7	55.8	19.7	32.6	47.7
Czechia	1.0	13.9	85.1	2.1	20.3	77.6
Poland	0.0	0.0	100.0	3.5	26.1	70.4
Luxembourg				33.8	43.4	22.8
Hungary				5.2	14.1	80.7
Slovenia				10.0	17.7	72.3
Estonia				5.8	13.7	80.4
Croatia				5.5	23.7	70.8
Romania				1.2	4.6	94.2

Note: Estimates are based on the unstandardized distributions.

Table 20 Changes in the type of care (%) for long-term care needs (1+ ADL/IADL limitations) for females 60+ per country

Countries	2007			2020		
	Only formal	Formal & informal	Only informal	Only formal	Formal & informal	Only informal
Austria	22.0	31.7	46.3	12.5	38.0	49.5
Germany	13.0	33.4	53.6	13.3	42.1	44.6
Sweden	17.0	32.0	50.9	21.8	39.1	39.1
Netherlands	28.5	43.8	27.7	26.7	40.1	33.1
Spain	17.3	24.5	58.1	18.8	42.0	39.2
Italy	5.8	25.4	68.8	20.2	26.7	53.0
France	27.7	47.0	25.3	17.1	44.9	38.0
Denmark	26.2	41.9	31.9	12.6	41.3	46.0
Greece	8.1	10.6	81.3	12.3	23.6	64.1
Switzerland	7.9	15.1	77.1	18.7	41.3	40.0

Belgium	16.1	48.7	35.3	25.4	45.9	28.8
Israel	16.4	41.4	42.2	30.9	38.6	30.5
Czechia	2.2	20.6	77.2	3.6	22.7	73.8
Poland	0.0	0.0	100.0	7.3	13.7	78.9
Luxembourg				17.4	42.6	40.0
Hungary				7.6	27.3	65.1
Slovenia				6.7	15.4	77.9
Estonia				8.1	12.2	79.6
Croatia				13.0	26.9	60.1
Romania				2.7	9.2	88.1

Note: Estimates are based on the unstandardized distributions.

Table 21 Changes in the type of care (%) for long-term care needs (2+ ADL/IADL limitations) for individuals 60+ per country

Countries	2007			2020		
	Only formal	Formal & informal	Only informal	Only formal	Formal & informal	Only informal
Austria	21.1	34.4	44.6	11.5	40.0	48.5
Germany	12.6	35.4	52.0	13.7	47.6	38.6
Sweden	17.0	35.9	47.1	19.0	40.2	40.8
Netherlands	23.7	45.5	30.8	14.8	46.8	38.4
Spain	13.7	29.5	56.8	19.6	41.4	39.0
Italy	6.1	34.8	59.1	14.0	28.8	57.2
France	24.0	53.0	23.0	18.1	47.7	34.2
Denmark	23.1	45.9	31.0	15.2	45.0	39.8
Greece	7.8	15.2	77.0	9.8	27.2	63.1
Switzerland	4.6	29.1	66.2	15.8	46.6	37.6
Belgium	15.1	53.3	31.5	19.9	45.9	34.2
Israel	14.2	44.0	41.9	28.0	40.0	32.0
Czechia	1.0	20.2	78.8	1.9	27.9	70.3
Poland	0.0	0.0	100.0	6.4	21.8	71.9
Luxembourg				23.0	47.6	29.4
Hungary				9.2	31.9	58.9
Slovenia				8.3	19.7	72.0
Estonia				7.6	15.4	77.0
Croatia				11.9	24.8	63.3
Romania				1.0	8.4	90.5

Note: Estimates are based on the unstandardized distributions.

Table 22 Changes in the type of care (%) for long-term care needs (2+ ADL/IADL limitations) for males 60+ per country

Countries	2007			2020		
	Only formal	Formal & informal	Only informal	Only formal	Formal & informal	Only informal
Austria	10.9	29.4	59.7	9.9	23.6	66.4
Germany	3.4	30.3	66.3	18.8	43.6	37.6
Sweden	16.1	35.2	48.8	19.7	30.7	49.6
Netherlands	19.8	45.1	35.1	5.7	48.4	45.9
Spain	6.6	25.3	68.1	22.8	42.0	35.3
Italy	8.4	32.6	59.0	7.5	25.1	67.4
France	25.1	44.5	30.4	18.3	41.5	40.3
Denmark	14.7	41.1	44.3	21.9	30.1	48.0
Greece	6.4	18.1	75.4	7.3	25.1	67.7
Switzerland	0.0	40.1	59.9	20.4	42.4	37.3
Belgium	18.1	45.4	36.6	17.6	31.8	50.6
Israel	10.2	38.7	51.1	21.4	36.2	42.5
Czechia	0.8	16.7	82.5	0.5	25.4	74.1
Poland	0.0	0.0	100.0	4.3	31.7	64.0
Luxembourg				31.6	47.1	21.2
Hungary				9.8	13.8	76.3
Slovenia				9.8	22.0	68.2
Estonia				6.3	15.7	78.0
Croatia				6.9	20.0	73.1
Romania				1.5	4.0	94.5

Note: Estimates are based on the unstandardized distributions.

Table 23 Changes in the type of care (%) for long-term care needs (2+ ADL/IADL limitations) for females 60+ per country

Countries	2007			2020		
	Only formal	Formal & informal	Only informal	Only formal	Formal & informal	Only informal
Austria	24.6	36.1	39.4	12.3	49.3	38.4
Germany	16.5	37.6	45.9	10.9	49.9	39.2
Sweden	17.4	36.1	46.5	18.7	44.9	36.4
Netherlands	25.7	45.7	28.6	18.8	46.1	35.1
Spain	16.9	31.4	51.7	18.1	41.1	40.8
Italy	5.0	35.8	59.2	16.4	30.3	53.3
France	23.5	56.6	20.0	18.0	50.6	31.3
Denmark	27.3	48.2	24.5	11.8	52.6	35.6
Greece	8.4	14.0	77.6	11.1	28.3	60.6
Switzerland	6.7	24.1	69.1	13.6	48.7	37.8

Belgium	14.1	56.1	29.8	21.1	53.5	25.4
Israel	16.5	47.1	36.4	31.6	42.1	26.4
Czechia	1.1	21.7	77.2	2.9	29.8	67.3
Poland	0.0	0.0	100.0	7.6	15.7	76.7
Luxembourg				17.4	47.9	34.7
Hungary				9.1	37.0	53.9
Slovenia				7.4	18.5	74.1
Estonia				8.1	15.4	76.5
Croatia				14.0	26.9	59.1
Romania				0.8	11.1	88.1

Note: Estimates are based on the unstandardized distributions.

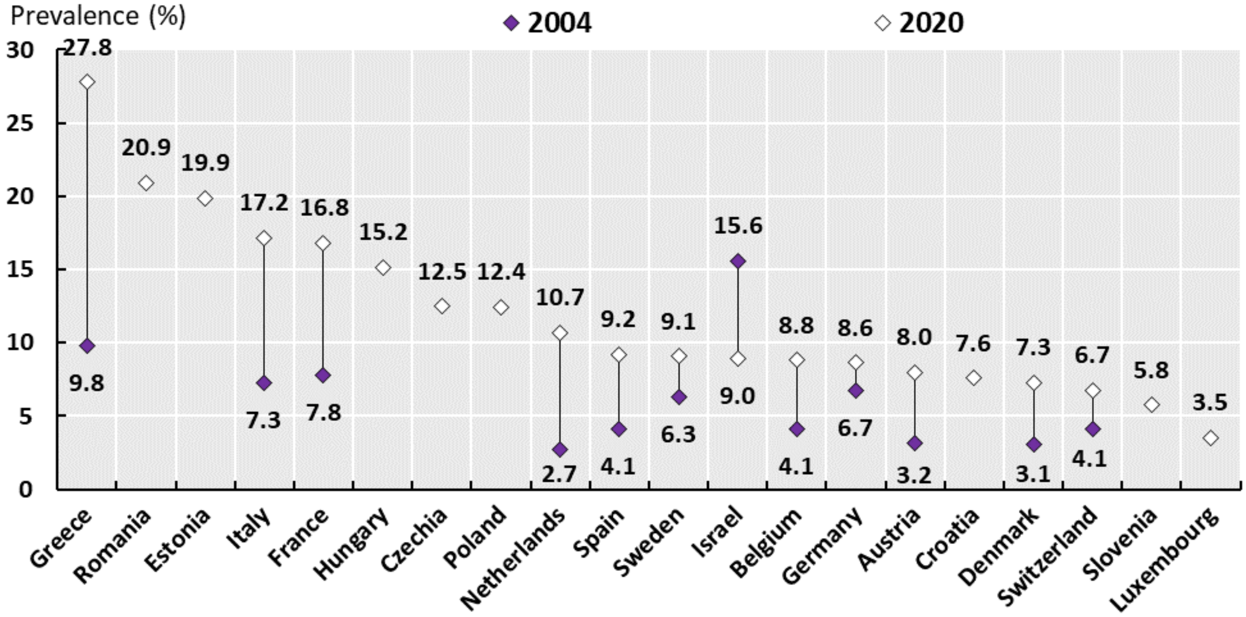
4.4. Changes in unmet healthcare needs over time

This section investigates the changes in unmet needs in healthcare services, pharmaceutical care and long-term care.

4.4.1. Healthcare services

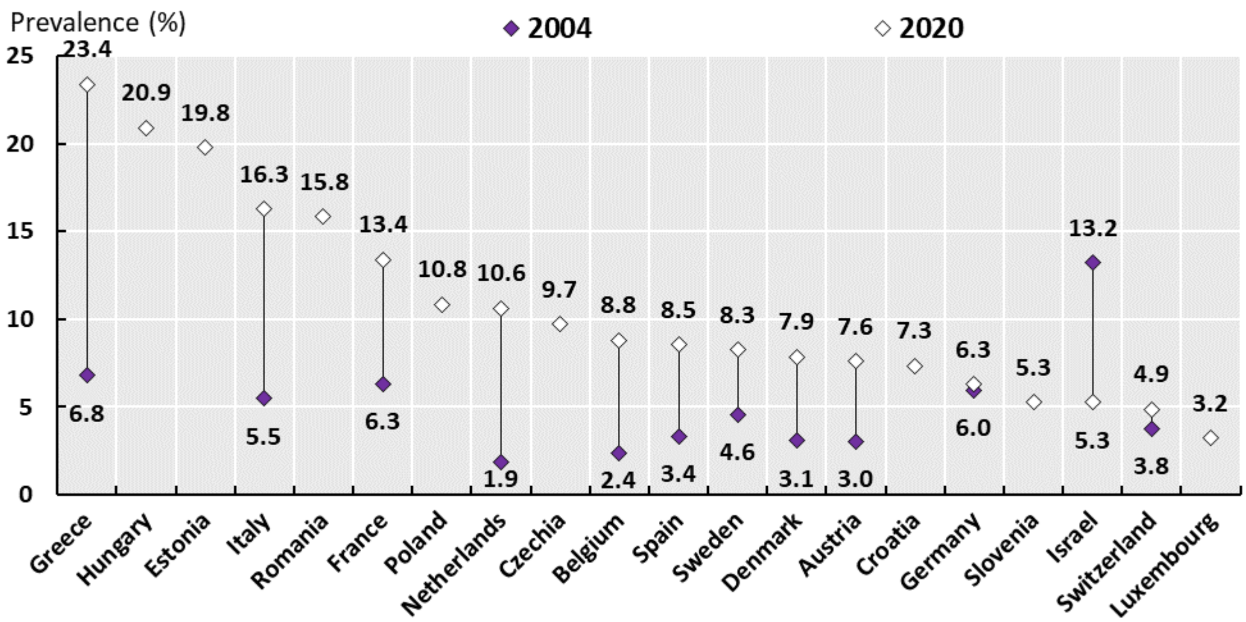
When considering the prevalence of overall unmet needs (including pharmaceutical care, but not long-term care), Greece is ranked first in the ordered list of countries and Romania second in 2020, while Poland also has a high share of individuals reporting unmet needs (Figure 215). Almost all countries show an increase over time (except for Israel), Greece in particular. Notably, unmet needs are more frequently observed among women than in men (Figure 216 and Figure 217).

Figure 216 Changes in the prevalence (%) of total unmet needs per country



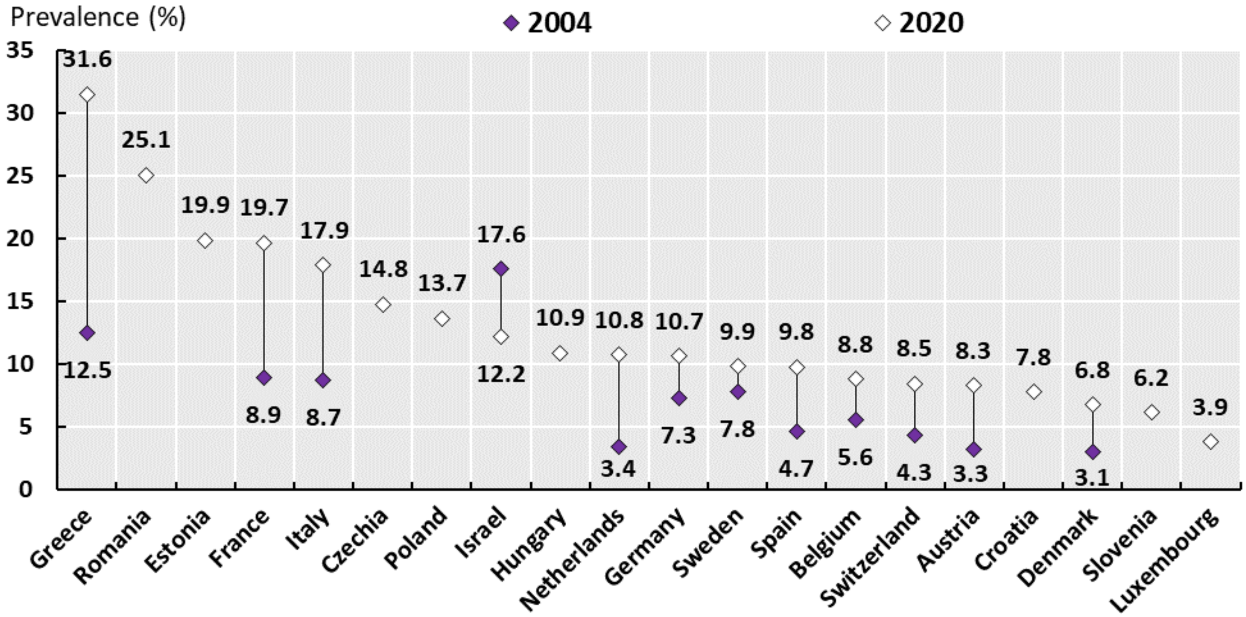
Note: Estimates are based on the unstandardized distributions.

Figure 217 Changes in the prevalence (%) of total unmet needs for males per country



Note: Estimates are based on the unstandardized distributions.

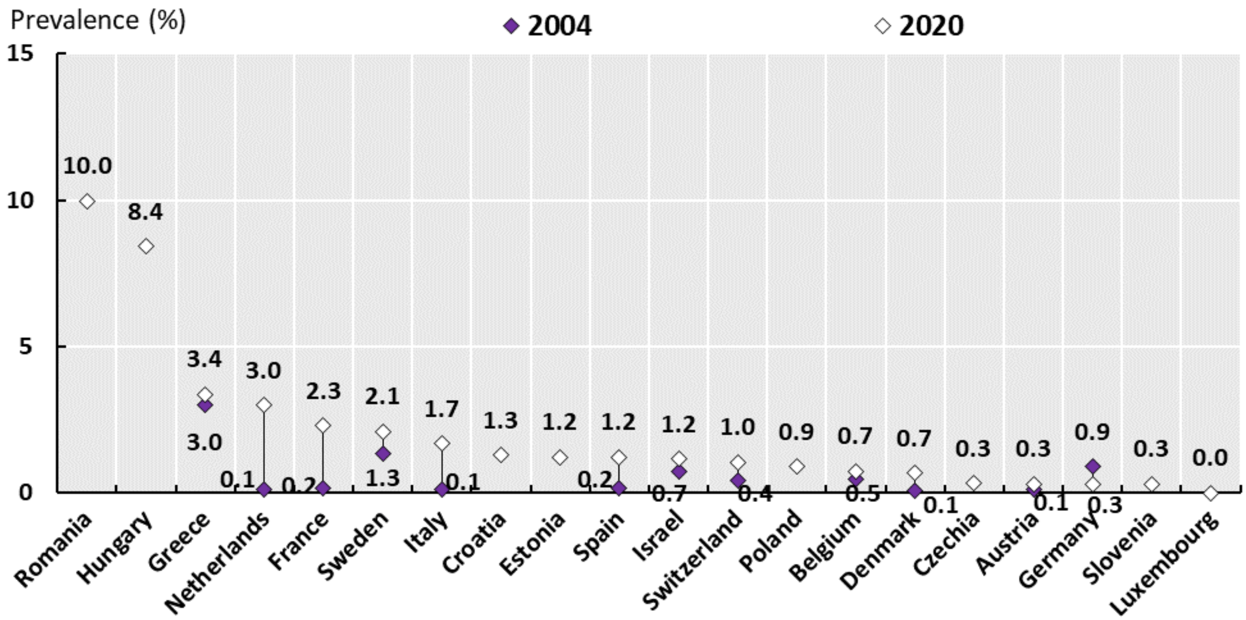
Figure 218 Changes in the prevalence (%) of total unmet needs for females per country



Note: Estimates are based on the unstandardized distributions.

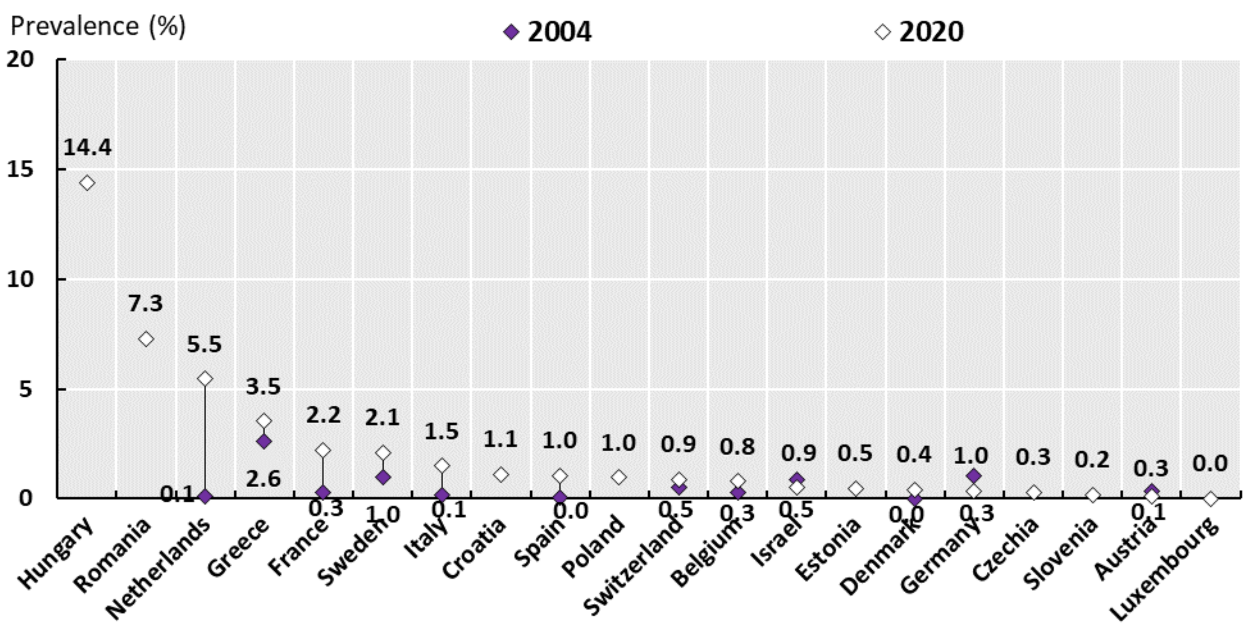
Romania is associated with the highest prevalence of unmet needs for general practitioner among all European countries, while Greece is third in the rankings and Poland lies in the middle of distribution (Figure 218). An increase is observed in almost all countries, with the exception of Germany. In Romania, unmet needs for general practitioner are more frequent in women compared with men, while the opposite applies to Greece and Poland (Figure 219 and Figure 220).

Figure 219 Changes in the prevalence (%) of unmet needs for general practitioner per country



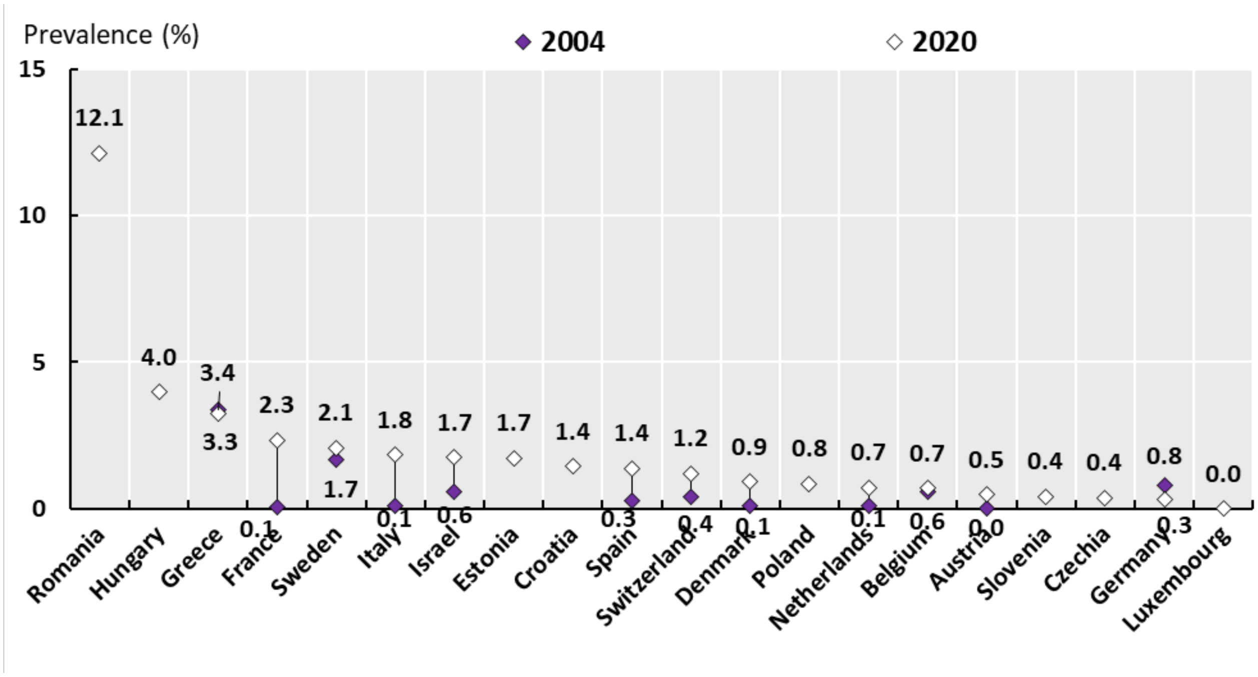
Note: Estimates are based on the unstandardized distributions.

Figure 220 Changes in the prevalence (%) of unmet needs for general practitioner for males per country



Note: Estimates are based on the unstandardized distributions.

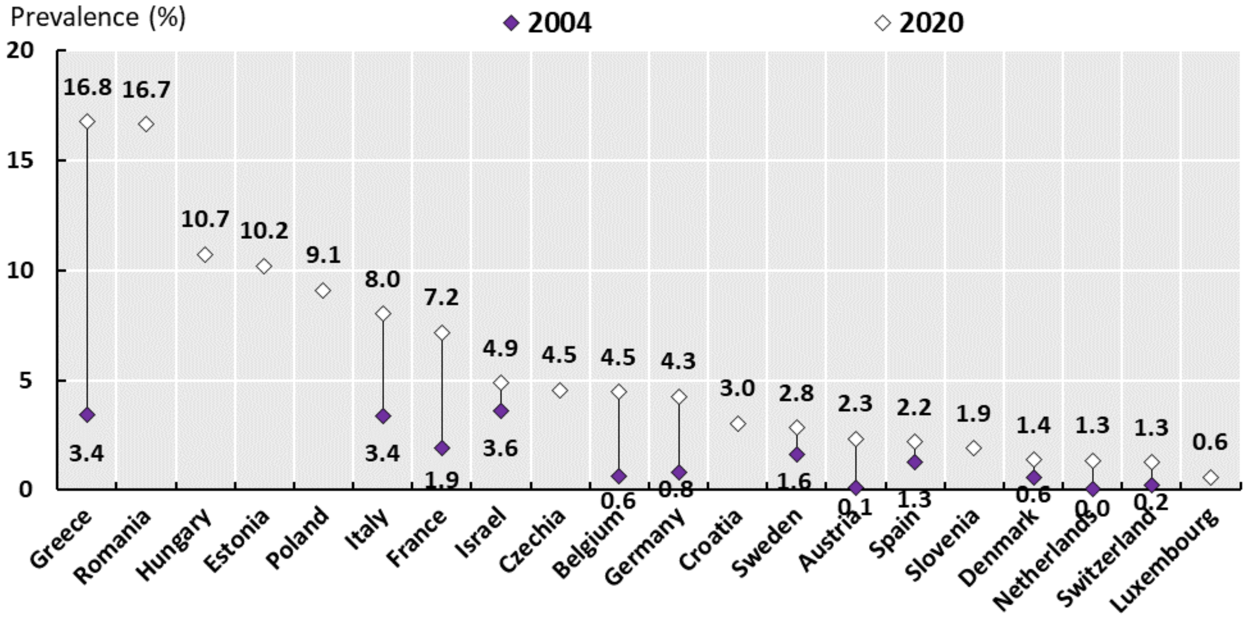
Figure 221 Changes in the prevalence (%) of unmet needs for general practitioner for females per country



Note: Estimates are based on the unstandardized distributions.

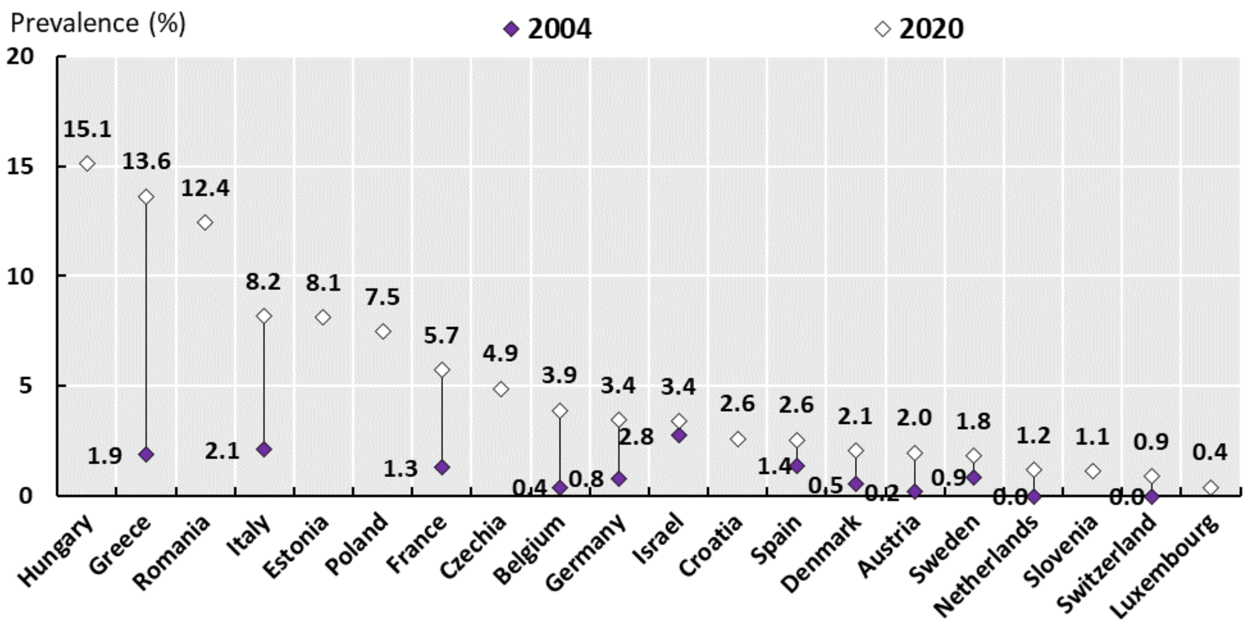
Regarding the services of specialist physicians, the prevalence of unmet needs is highest in Greece, which is closely followed in the second position by Romania, while Poland is also associated with a high share (Figure 221). Notably, the rise the share of individuals reporting unmet needs related to care provided by specialist physicians is substantial in Greece. In addition, the prevalence is higher in women compared with men (Figure 222 and Figure 223).

Figure 222 Changes in the prevalence (%) of unmet needs for specialist physician per country



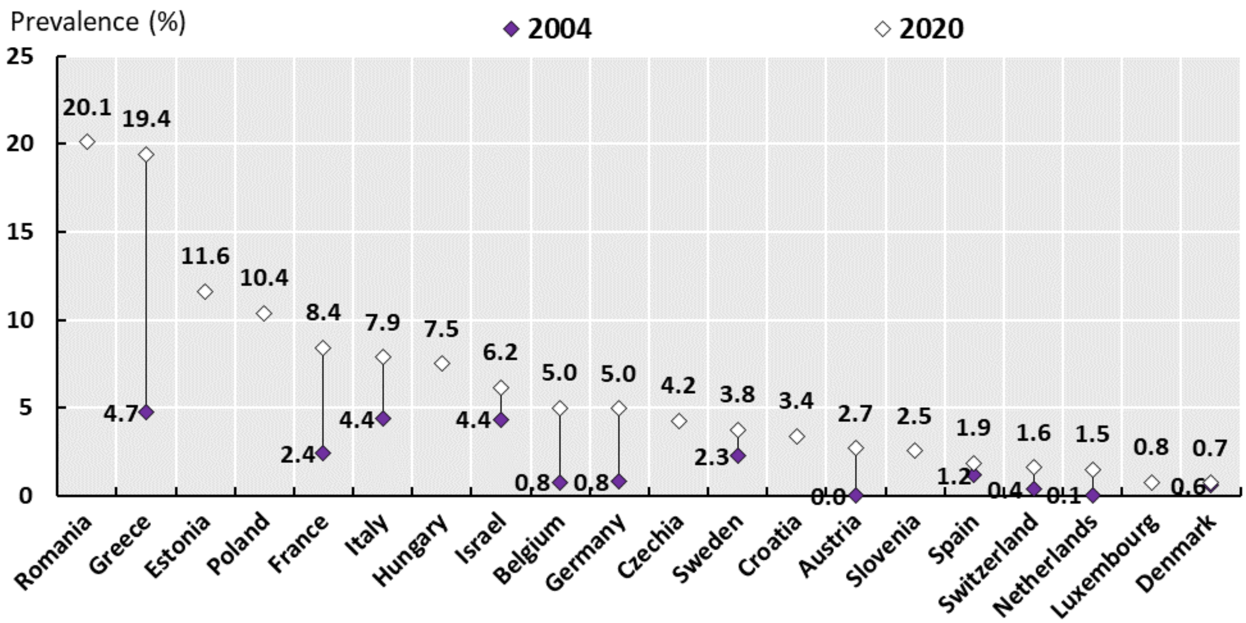
Note: Estimates are based on the unstandardized distributions.

Figure 223 Changes in the prevalence (%) of unmet needs for specialist physician for males per country



Note: Estimates are based on the unstandardized distributions.

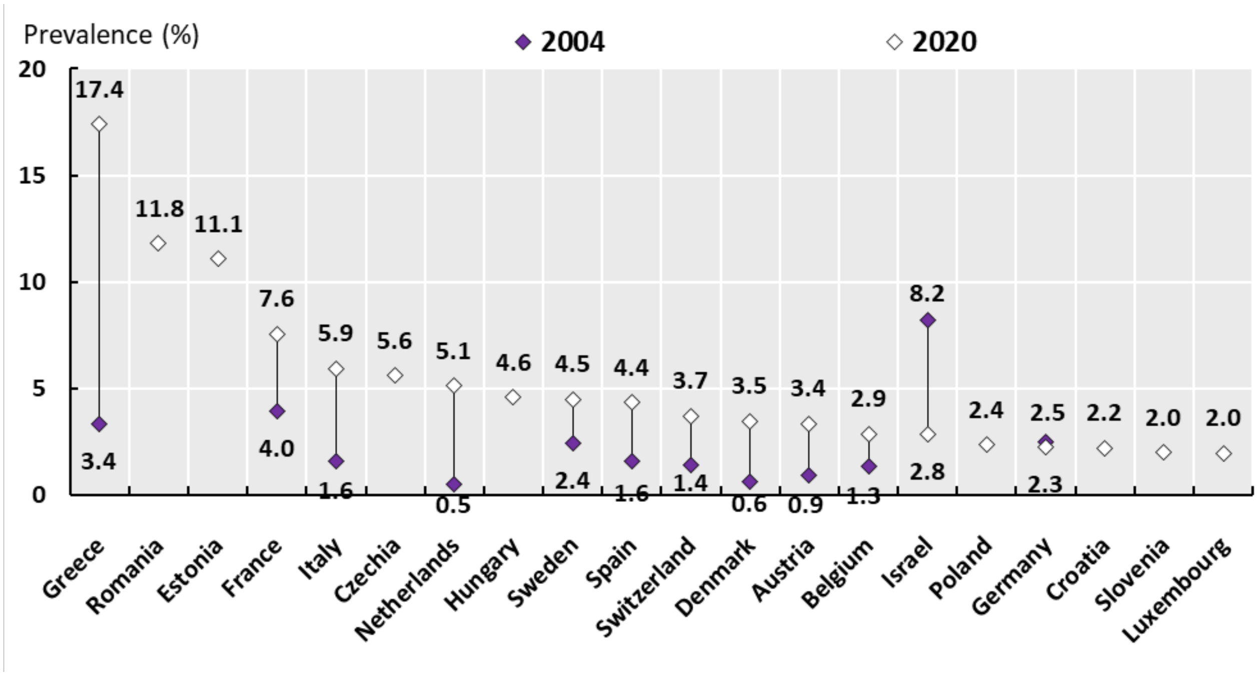
Figure 224 Changes in the prevalence (%) of unmet needs for specialist physician for females per country



Note: Estimates are based on the unstandardized distributions.

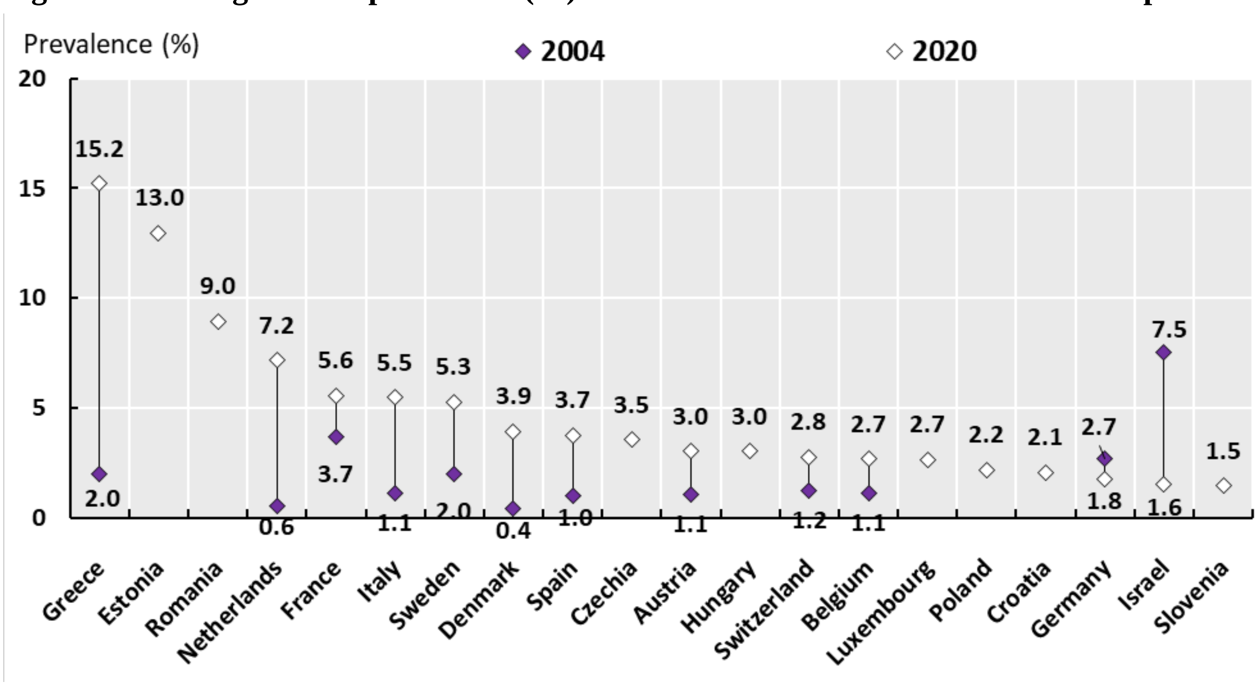
As far as dental care is concerned, Greece tops all countries with the highest prevalence of unmet needs, Romania is third in the rankings, while Poland belongs in the cluster of countries associated with the lowest frequencies (Figure 224). An increase is observed in almost all countries over time. Furthermore, the prevalence is higher among women than in men in Greece, Poland and Romania (Figure 225 and Figure 226).

Figure 225 Changes in the prevalence (%) of unmet needs for dental care per country



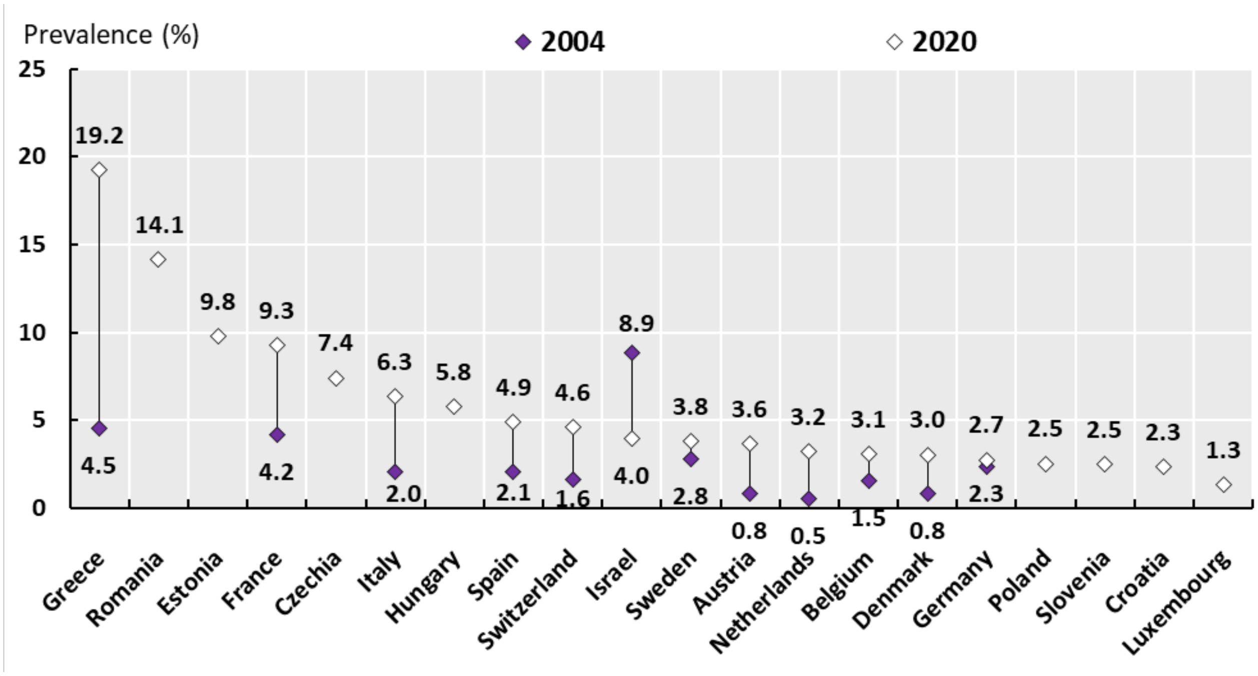
Note: Estimates are based on the unstandardized distributions.

Figure 226 Changes in the prevalence (%) of unmet needs for dental care for males per country



Note: Estimates are based on the unstandardized distributions.

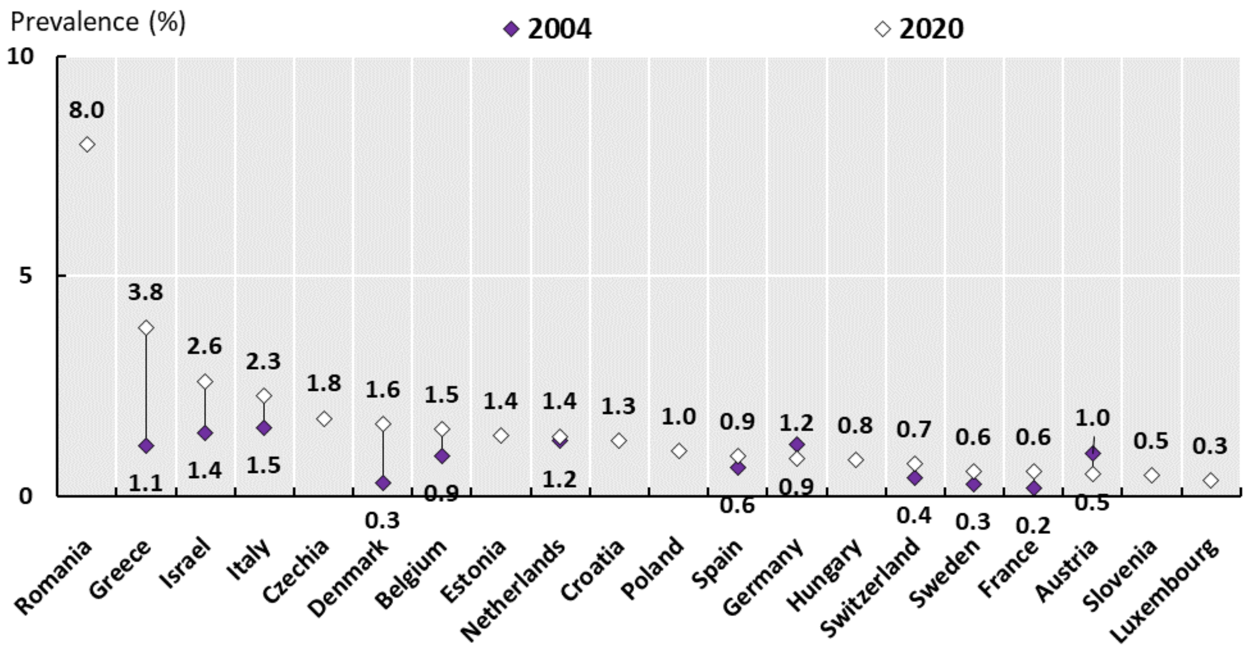
Figure 227 Changes in the prevalence (%) of unmet needs for dental care for females per country



Note: Estimates are based on the unstandardized distributions.

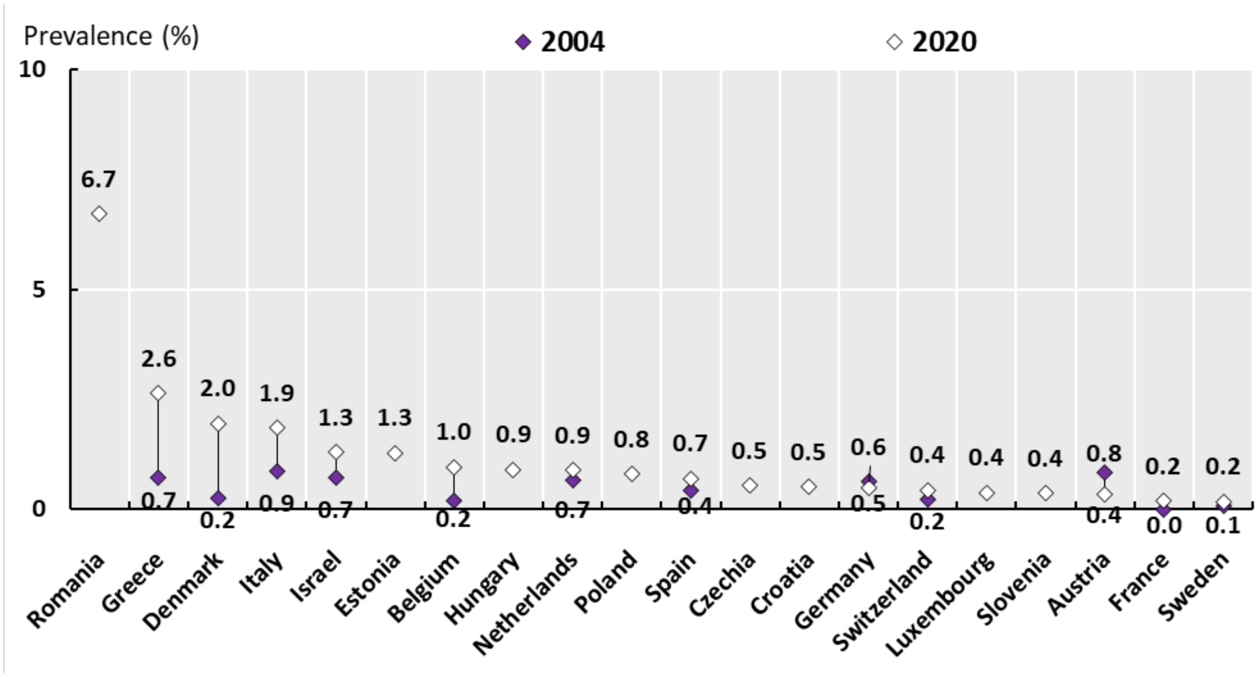
The prevalence of unmet needs for home care (including paid help) is highest in Romania, with the estimate being more than double that of Greece, which lies in the second place, while Poland is around the middle of the ordered list of countries (Figure 227). An increase is observed in almost all countries during the period of analysis. In addition, the probability of reporting unmet needs related to home care is higher in women compared with men (Figure 228 and Figure 229).

Figure 228 Changes in the prevalence (%) of unmet needs for home care (including paid help) per country



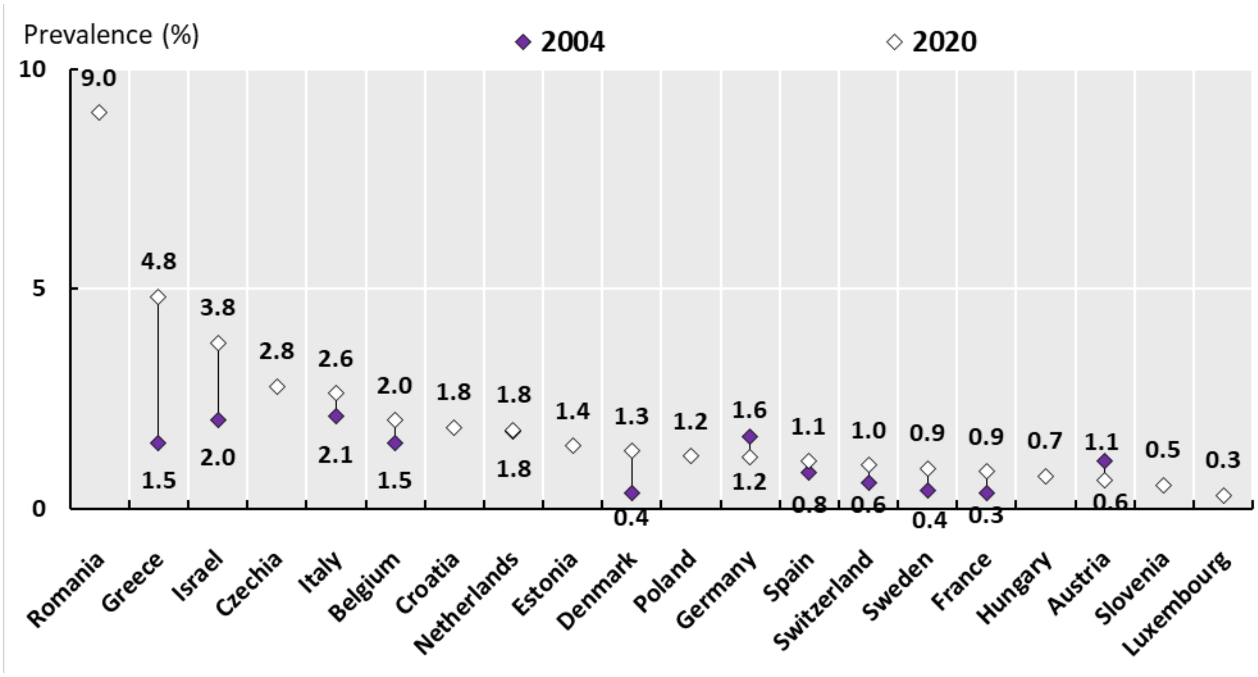
Note: Estimates are based on the unstandardized distributions.

Figure 229 Changes in the prevalence (%) of unmet needs for home care (including paid help) for males per country



Note: Estimates are based on the unstandardized distributions.

Figure 230 Changes in the prevalence (%) of unmet needs for home care (including paid help) for females per country

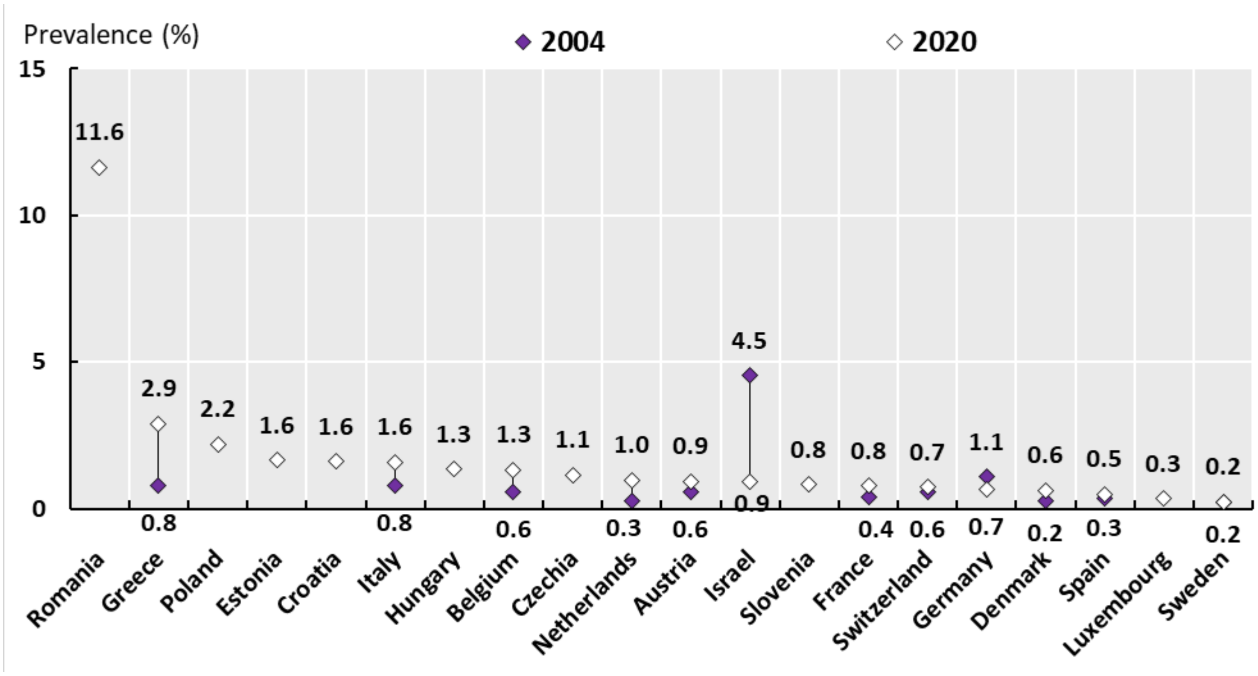


Note: Estimates are based on the unstandardized distributions.

4.4.2. Pharmaceutical care

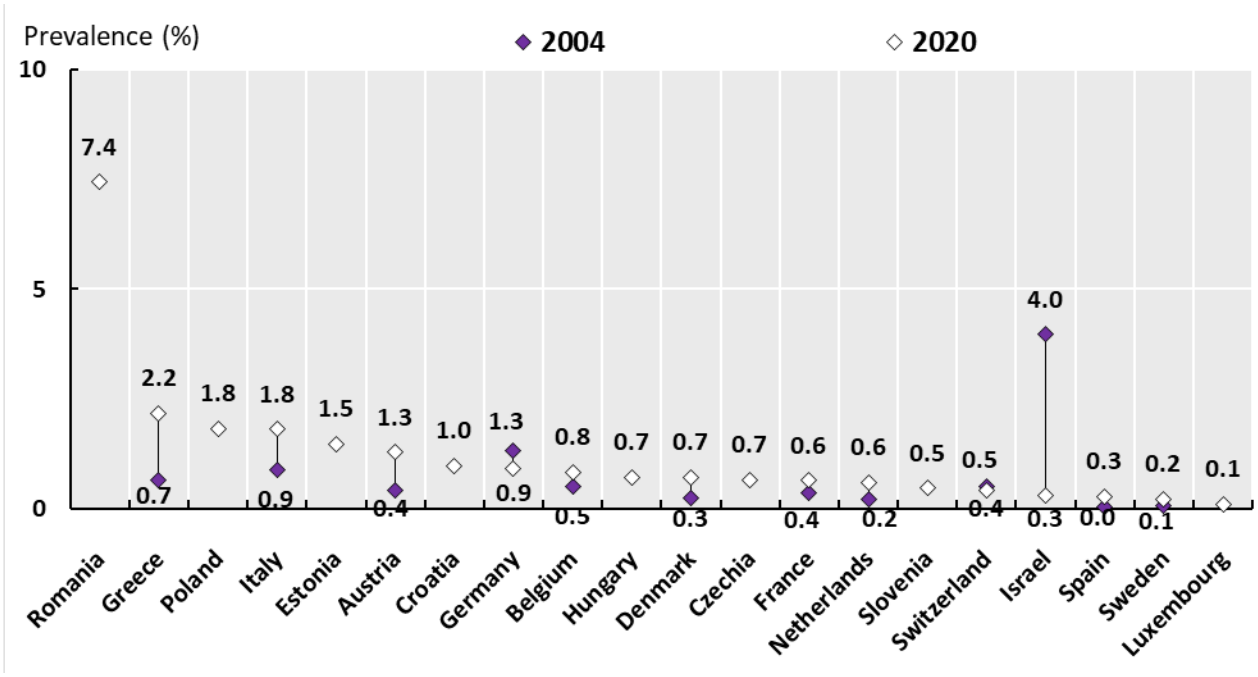
The prevalence of unmet needs related to pharmaceutical care is found to be highest in Romania, Greece and Poland among all European countries (Figure 230). Notably, the estimate in Romania is almost four times as much that of Greece, despite the fact that Greece is associated with the highest increase over time in Europe during the period of analysis. In addition, the percentage of female respondents who declare at least one pharmaceutical unmet need is higher compared with that of men (Figure 231 and Figure 232).

Figure 231 Changes in the prevalence (%) of unmet needs for medicines per country



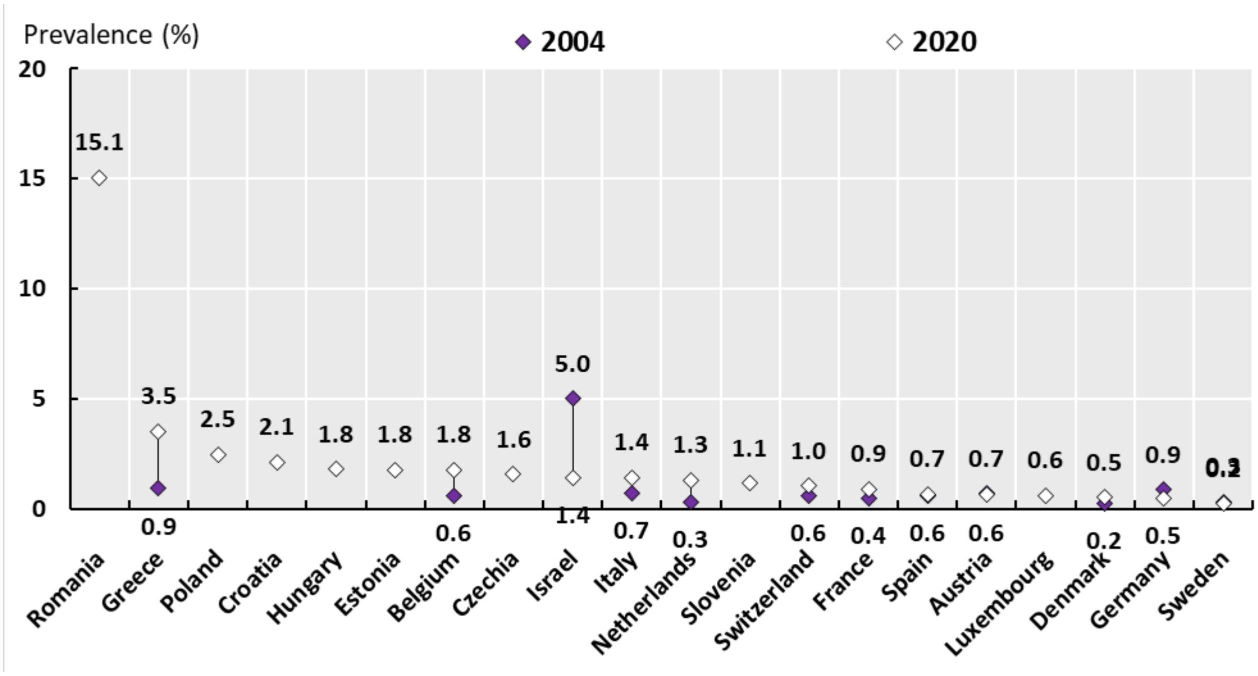
Note: Estimates are based on the unstandardized distributions.

Figure 232 Changes in the prevalence (%) of unmet needs for medicines for males per country



Note: Estimates are based on the unstandardized distributions.

Figure 233 Changes in the prevalence (%) of unmet needs for medicines for females per country

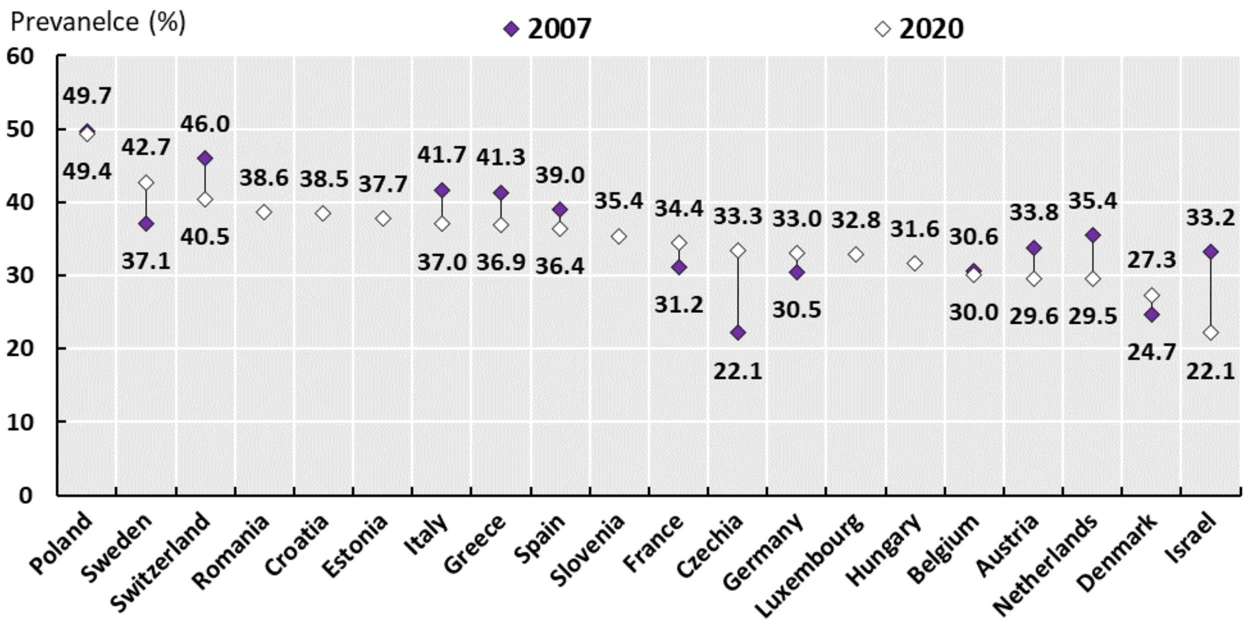


Note: Estimates are based on the unstandardized distributions.

4.4.3. Long-term care gap in the elderly

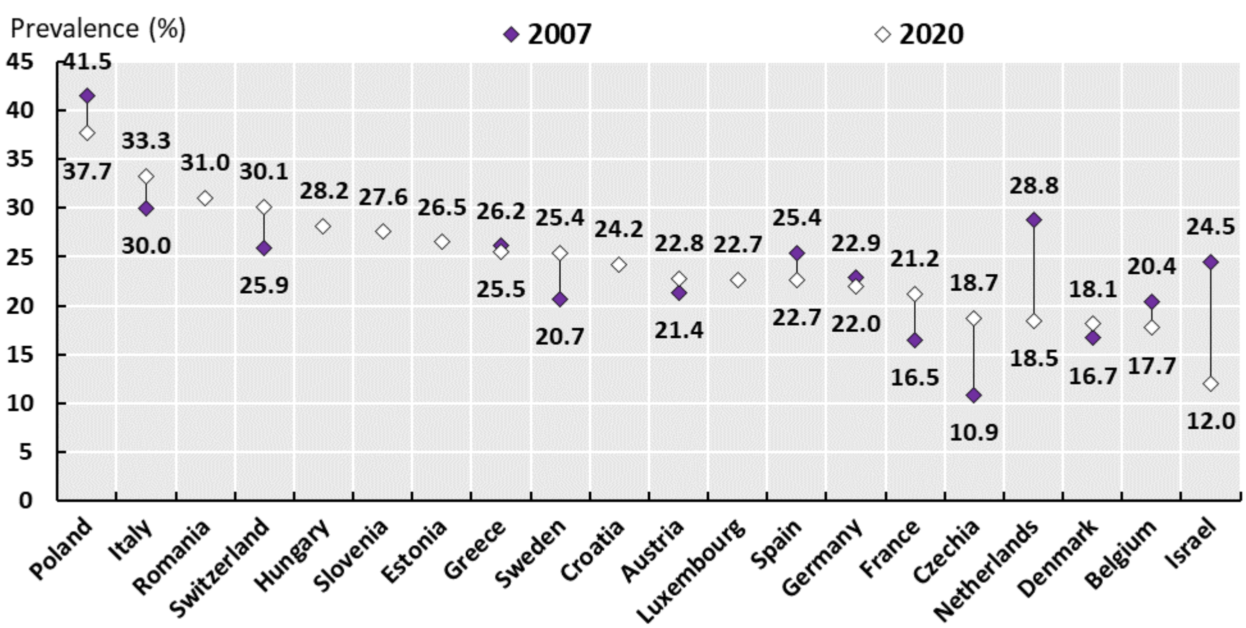
The long-term care gap for one or more ADL/IADL limitations has increased in some countries, while it has decreased in others, such as Poland and Greece (Figure 233). It is found to be highest in Poland, while Romania lies in the fourth place in the rankings and Greece a few places lower. In addition, the long-term care gap is larger among women compared with men (Figure 234 and Figure 235). When considering long-term care gap for two or more ADL/IADL limitations, Poland tops all other countries, Romania is second in the rankings and Greece is fourth (Figure 236).

Figure 234 Changes in the prevalence (%) of long-term care gap (1+ ADL/IADL limitations) per country



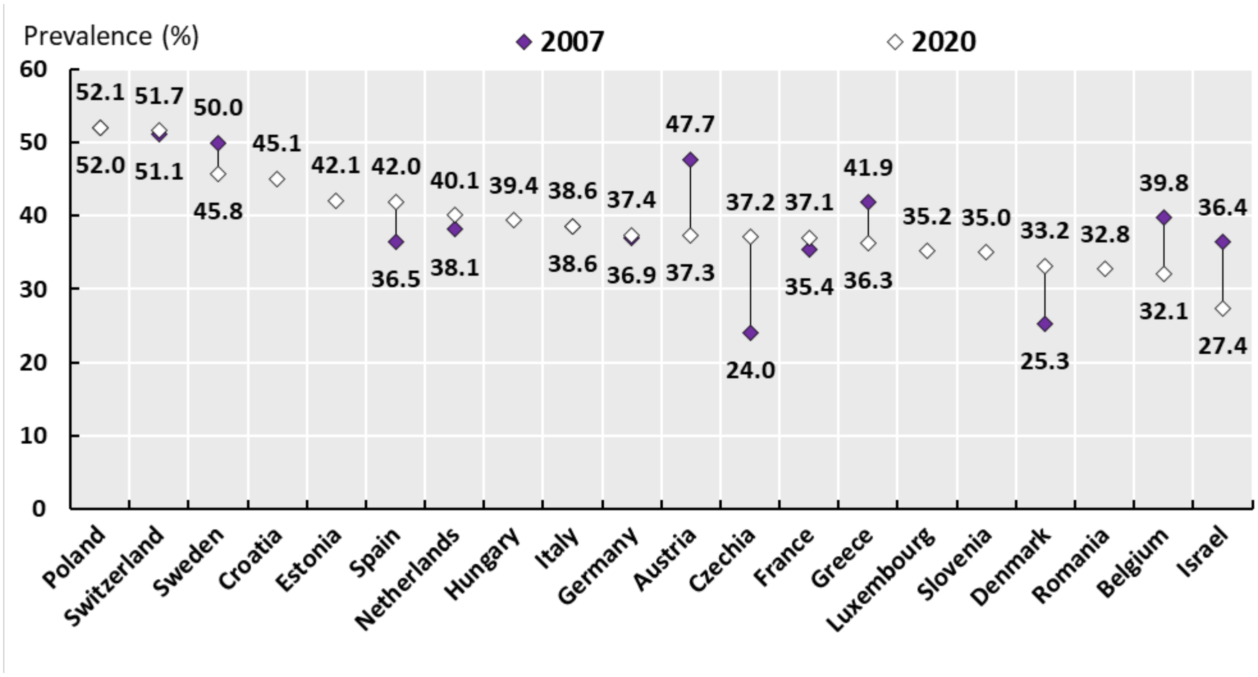
Note: Estimates are based on the unstandardized distributions.

Figure 235 Changes in the prevalence (%) of long-term care gap (1+ ADL/IADL limitations) for males per country



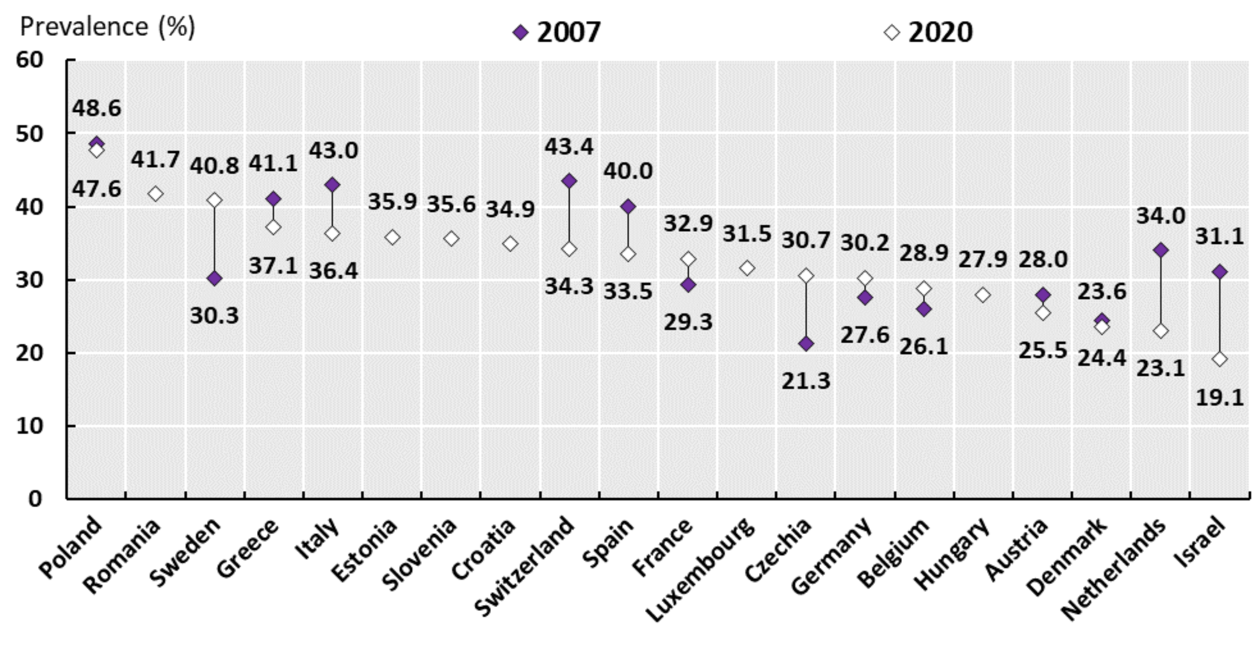
Note: Estimates are based on the unstandardized distributions.

Figure 236 Changes in the prevalence (%) of long-term care gap (1+ ADL/IADL limitations) for females per country



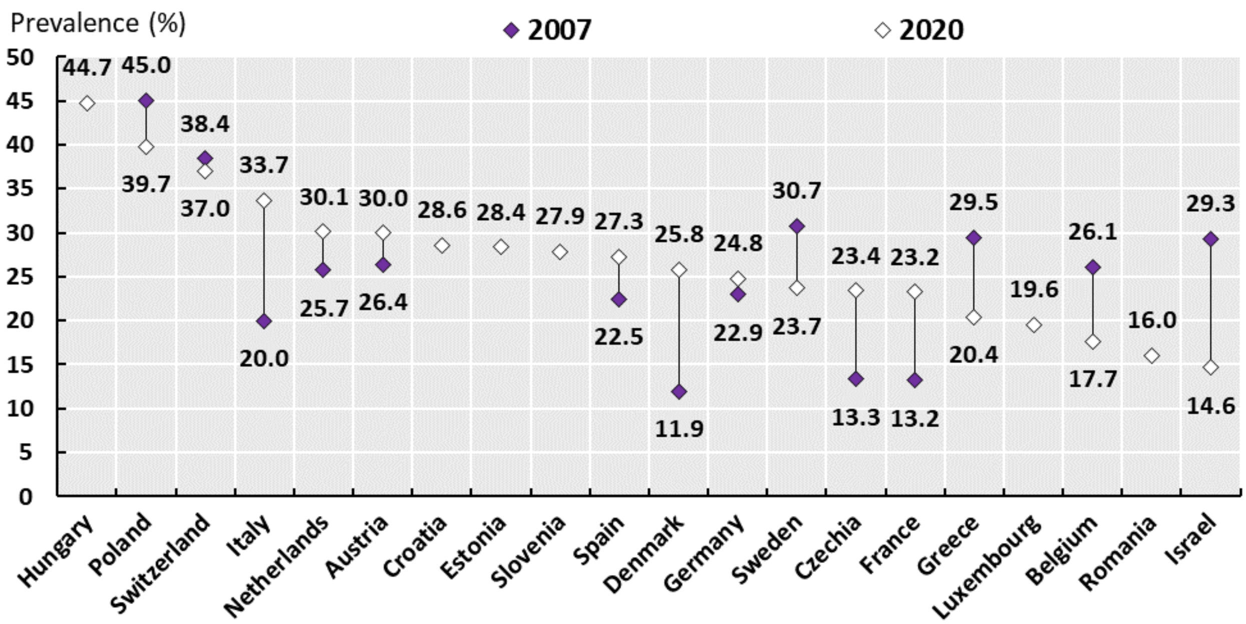
Note: Estimates are based on the unstandardized distributions.

Figure 237 Changes in the prevalence (%) of long-term care gap (2+ ADL/IADL limitations) per country



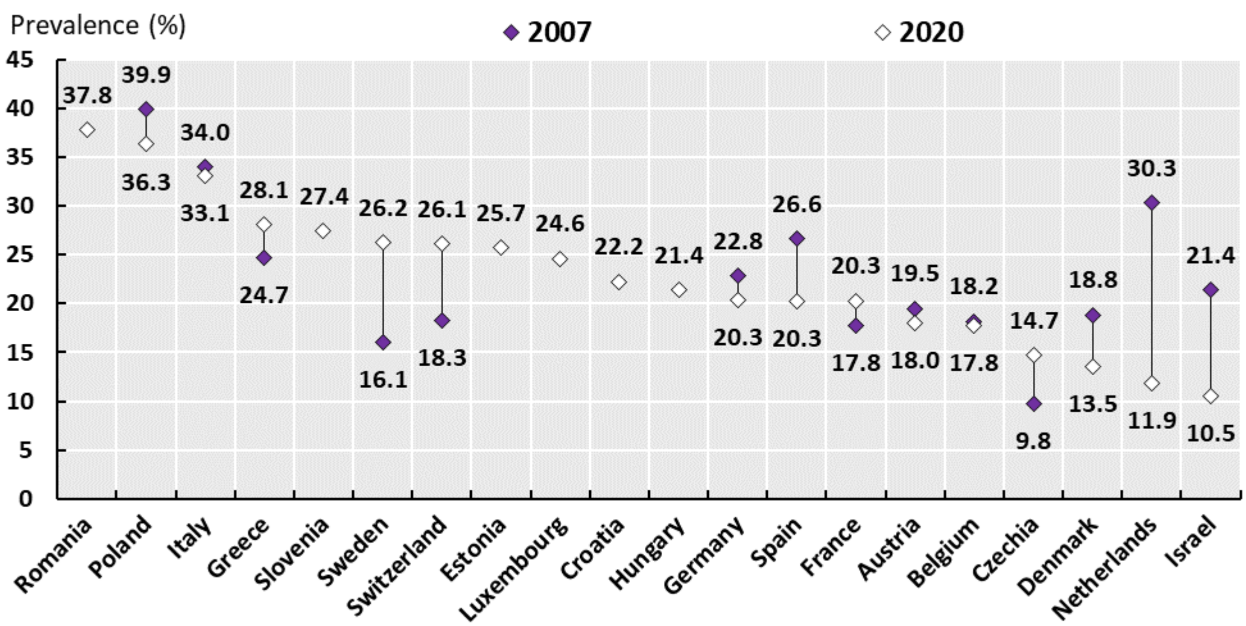
Note: Estimates are based on the unstandardized distributions.

Figure 238 Changes in the prevalence (%) of long-term care gap (2+ ADL/IADL limitations) for males per country



Note: Estimates are based on the unstandardized distributions.

Figure 239 Changes in the prevalence (%) of long-term care gap (2+ ADL/IADL limitations) for females per country



Note: Estimates are based on the unstandardized distributions.

4.5. Out-of-pocket payments

This section contains the results concerning OOPP. More specifically, it presents and discusses the descriptive statistics of OOPP and its components, the impact of chronic diseases on total and pharmaceutical OOPP and the burden and catastrophe associated with total and pharmaceutical OOPP.

4.5.1. Total out-of-pocket payments and its components

Table 23 presents some summary statistics concerning total OOPP per country. About 90% of respondents in Greece and Poland reported they have incurred OOPP during the previous year. The average OOPP per person was estimated at 408.6 € and 502.8 € for Greece and Poland, respectively. Both countries lie in the middle of ordered list of countries. Furthermore, the mean OOPP for those with positive OOPP was 452.9 € and 560.8 € for Greece and Poland, respectively. It's interesting that the position of Poland is much higher when considering the average OOPP. This indicates a high amount of OOPP relatively to the already high proportion of individuals that actually incur OOPP.

Table 24 Total OOPP in the previous year per country (wave 6)

Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Portugal	98.3	612.1	622.6
Denmark	98.1	330.6	337.1
Sweden	98.0	318.7	325.1
Belgium	97.3	479.5	492.8
Czechia	97.1	197.9	203.9
Estonia	95.0	414.6	436.4
Switzerland	93.5	784.5	839.5
Luxembourg	91.8	482.5	525.5
Germany	90.3	322.8	357.6
Greece	90.2	408.6	452.9
Poland	89.7	502.8	560.8
Austria	88.8	541.8	609.9
Italy	81.2	523.1	644.7
Spain	80.2	267.8	334.1
France	79.0	201.6	255.1
Slovenia	74.4	167.6	225.4
Croatia	67.3	139.4	207.2
Israel	66.5	463.8	697.3

Note: OOPP: Out-of-pocket payments

About 86.3% and 79.3% of the Polish and Greek respondents, respectively, were subjected to pharmaceutical OOPP during the previous 12 months (Table 24). The average pharmaceutical OOPP per person was 191.2 € and 390.4 € and the average OOPP for those with non-zero expenditure was 241.3 € and 452.2 € for Poland and Greece, respectively. Notably, Poland is associated with the highest estimate of average OOPP among all European countries considered, while Greece is also among the highest paying countries.

Table 25 Pharmaceutical OOPP in the previous year per country (wave 6)

Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Portugal	94.2	367.4	390.2
Czechia	92.9	122.0	131.3
Estonia	91.4	264.6	289.7
Belgium	90.6	234.3	258.7
Denmark	87.9	125.7	143.0
Sweden	87.3	85.5	97.9
Poland	86.3	390.4	452.2
Germany	82.1	92.7	112.8
Greece	79.3	191.2	241.3
Luxembourg	78.7	165.9	210.7
Austria	76.3	146.5	192.0
Spain	72.4	66.2	91.4
Italy	67.8	129.9	191.6
Slovenia	63.4	51.2	80.8
France	62.6	46.4	74.2
Croatia	61.7	75.8	123.0
Switzerland	60.0	95.3	158.9
Israel	56.7	175.4	309.5

Note: OOPP: Out-of-pocket payments

The share of population with inpatient OOPP was 2.4% and 2.3% in Greece and Poland (Table 25). The average inpatient OOPP was 10.5 € and 9.3 € and the average inpatient OOPP for those individuals with positive expenses was 438.1 € and 403.9 € for Greece and Poland, respectively.

Table 26 Inpatient OOPP in the previous year per country (wave 6)

Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Austria	27.6	55.4	201.0
Germany	22.2	24.8	111.9
Estonia	17.5	10.5	59.7
Sweden	14.5	6.2	42.8
Belgium	13.8	31.0	224.7
Switzerland	9.3	39.2	419.5
Luxembourg	9.2	18.4	200.7
Czechia	5.5	6.4	116.4
France	4.0	10.6	268.3
Portugal	3.4	23.6	697.8
Greece	2.4	10.5	438.1
Poland	2.3	9.3	403.9
Israel	1.7	8.6	498.2
Croatia	1.2	3.5	295.5
Slovenia	1.0	2.9	273.2
Italy	0.8	6.9	854.7
Denmark	0.4	4.0	896.1
Spain	0.4	23.1	5371.6

Note: OOPP: Out-of-pocket payments

Approximately 75.4% and 42.4% of individuals have incurred OOPP for outpatient care during the previous year (Table 26); Poland hos one of the lowest shares among all countries. The average outpatient OOPP was 190.5 € and 94.3 € and the average OOPP for those individuals with non-zero expenditure was 252.7 € and 222.1 € for Greece and Poland, respectively.

Table 27 Outpatient OOPP in the previous year per country (wave 6)

Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Sweden	95.3	209.9	220.2
Belgium	93.5	156.9	167.9
Switzerland	89.6	599.7	669.1
Denmark	86.2	175.2	203.2
Luxembourg	86.0	269.9	313.8
Portugal	78.1	145.0	185.6
Czechia	76.4	59.9	78.4
Greece	75.4	190.5	252.7
Estonia	69.8	129.0	184.8
Italy	65.4	367.6	562.2

Austria	59.2	273.0	461.5
Germany	58.7	175.8	299.6
France	52.4	125.1	238.9
Israel	44.6	251.7	564.3
Poland	42.4	94.3	222.1
Spain	35.7	164.0	459.9
Slovenia	33.9	101.3	298.5
Croatia	24.1	55.4	229.2

Note: OOPP: Out-of-pocket payments

About 5.8% and 1.3% of Greek and Polish individuals have incurred OOPP for nursing care during the previous year (Table 27). Poland is associated with the lowest share in the list of countries. The average outpatient OOPP was 81.7 € and 7.8 € and the average OOPP for those individuals with non-zero expenses was 1403.4 € and 622.4 € for Greece and Poland, respectively.

Table 28 Nursing home care OOPP in the previous year per country (wave 6)

Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Belgium	21.9	221.7	1011.2
Luxembourg	12.5	191.2	1527.5
France	10.5	117.9	1118.4
Portugal	8.9	251.4	2833.6
Austria	8.8	205.0	2333.1
Switzerland	8.1	140.8	1736.5
Israel	8.1	200.8	2477.8
Sweden	8.0	53.2	666.9
Spain	7.4	157.1	2124.8
Czechia	6.4	42.8	672.6
Germany	6.2	95.9	1538.5
Greece	5.8	81.7	1403.4
Italy	5.6	109.7	1947.6
Denmark	4.8	41.7	871.1
Slovenia	2.3	37.5	1634.1
Croatia	2.2	18.8	837.2
Estonia	1.8	12.7	726.4
Poland	1.3	7.8	622.4

Note: OOPP: Out-of-pocket payments

Finally, Table 28 presents the summary statistics for OOPP for aids, appliances and physical therapy. The share of population with those type of OOPP was 9.5% and 6.8% for Greece and Poland, respectively. The average OOPP was 16.4 € and 8.8 € and the average OOPP for those individuals with non-zero expenses was 172.0 € and 130.0 € for Greece and Poland, respectively.

Table 29 OOPP for aids, appliances and physical therapy in the previous year per country (wave 6)

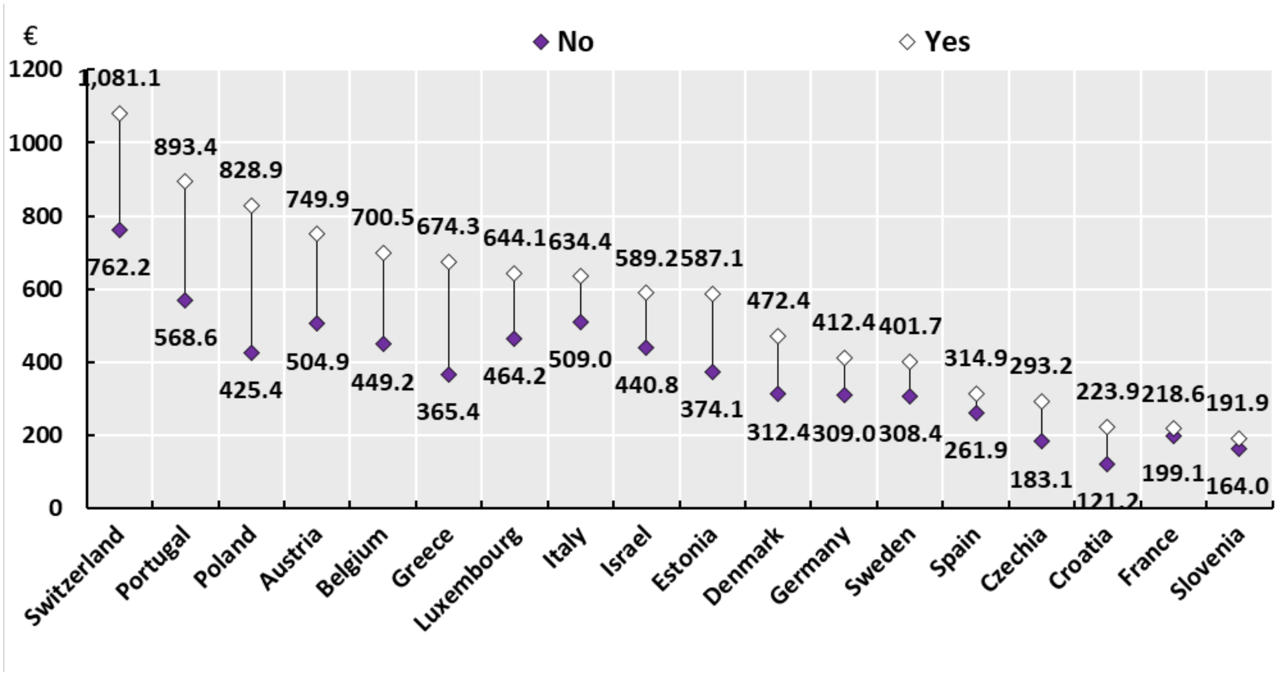
Countries	Share (%) of population with OOPP	Average OOPP (€) per person	Average OOPP (€) per person (OOPP>0)
Belgium	33.4	57.3	171.4
Germany	29.1	29.6	101.5
Austria	23.8	66.9	280.4
Switzerland	20.9	50.3	240.5
Sweden	19.9	17.1	85.8
France	19.6	19.5	99.4
Luxembourg	18.2	28.2	155.2
Portugal	17.1	76.1	445.1
Denmark	16.7	25.8	154.2
Czechia	11.8	9.8	82.7
Estonia	11.3	10.5	92.7
Israel	9.8	28.1	285.7
Greece	9.5	16.4	172.0
Italy	8.0	18.7	233.4
Slovenia	7.1	12.3	172.2
Poland	6.8	8.8	130.0
Spain	5.7	14.5	253.4
Croatia	3.7	4.7	129.8

Note: OOPP: Out-of-pocket payments

4.5.2. Total out-of-pocket payments and chronic diseases

This section presents the results concerning the impact of chronic diseases on total OOPP. Cardiovascular diseases have a large impact on total OOPP in both Poland and Greece (Figure 239). Poland has the fourth (828.9 €) and Greece the sixth (674.3 €) highest average total OOPP for individuals with a cardiovascular disease. Furthermore, Poland is associated with the largest difference in the average OOPP between those diagnosed with a cardiovascular disease and those not diagnosed with one (403.4 €) and Greece has the fourth (308.9 €).

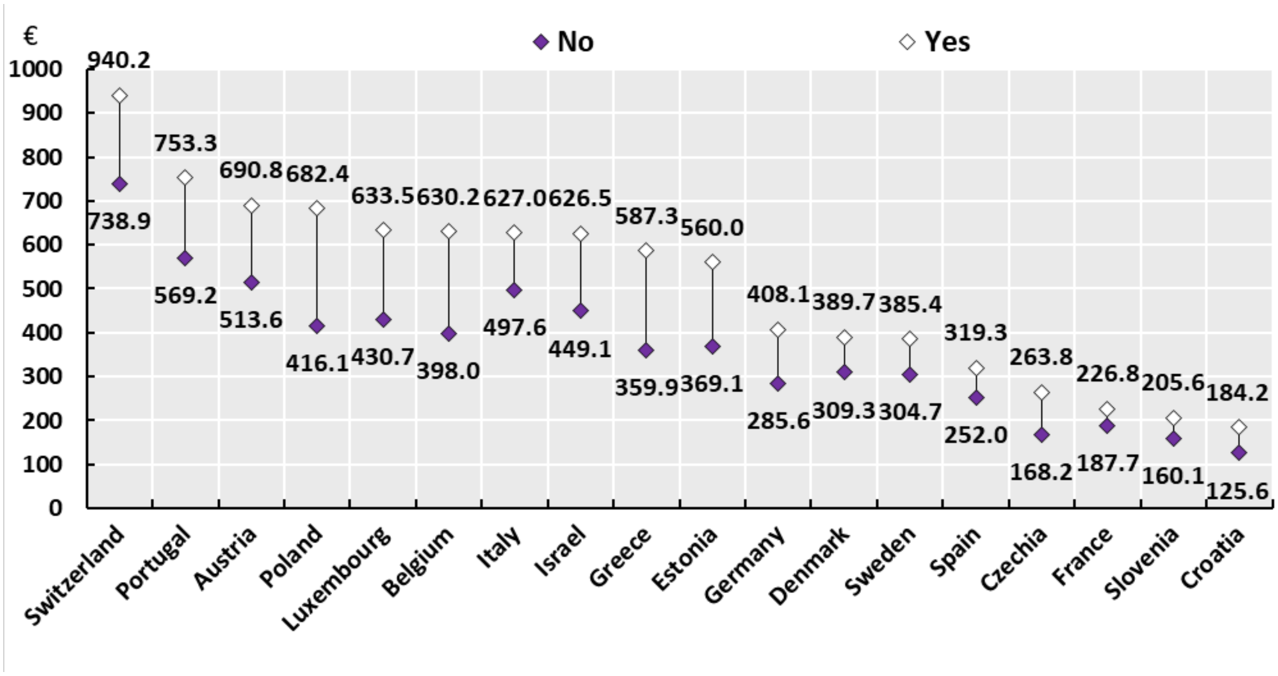
Figure 240 Average total OOPP (€) for individuals with cardiovascular disease per country (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 240 show the average total OOPP for individuals with a musculoskeletal disease per country. Poland is fourth with 682.4 € per person in the ordered list of countries and Greece is ranked in the middle of the distribution (587.3 €). Once more, the largest gap in the average total OOPP between those with and those without a musculoskeletal disease is observed in Poland.

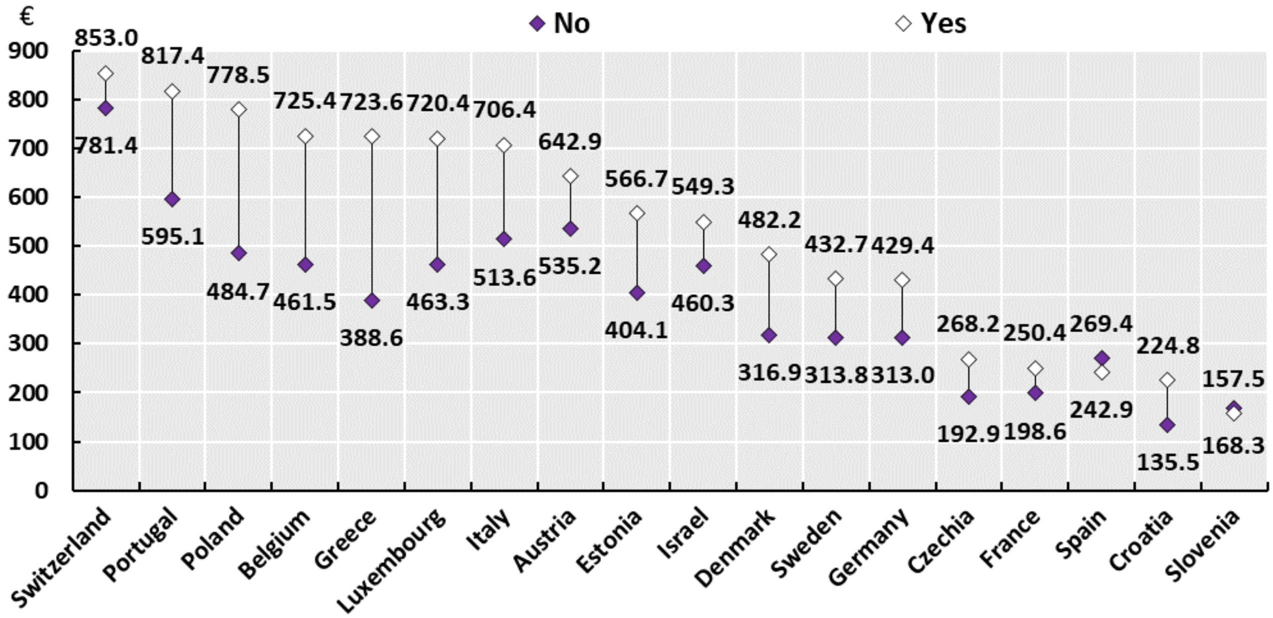
Figure 241 Average total OOPP (€) for individuals with musculoskeletal disease per country (wave 6)



Note: OOPP: Out-of-pocket payments

Poland has the third (778.5 €) and Greece the fifth (723.6 €) highest average total OOPP for individuals afflicted with chronic lung disease among European countries (Figure 241). Both countries are associated with two of the largest differences in OOPP between those with chronic lung disease and those without the condition.

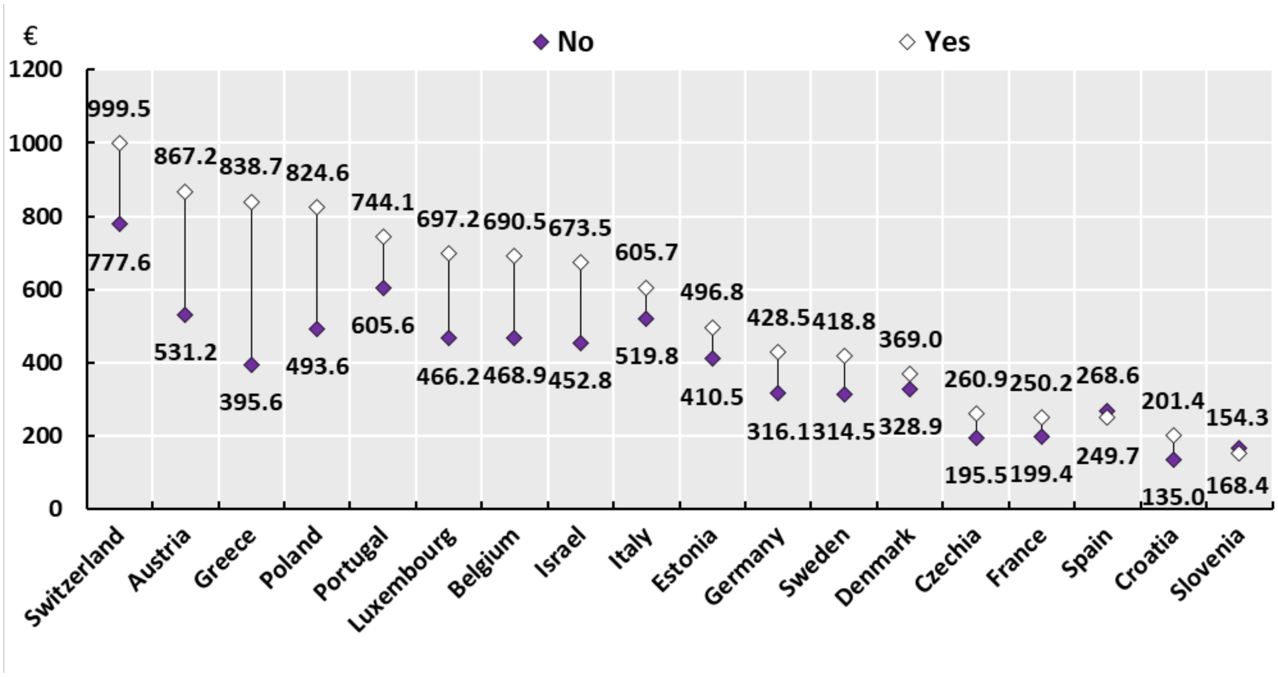
Figure 242 Average total OOPP (€) for individuals with chronic lung disease per country (wave 6)



Note: OOPP: Out-of-pocket payments

Greece has the third (838.7 €) and Poland the fourth (824.6 €) highest average total OOPP for respondents with cancer (Figure 242). In addition, the largest difference between those with and those without cancer is found in Greece, while Poland is ranked in the third position.

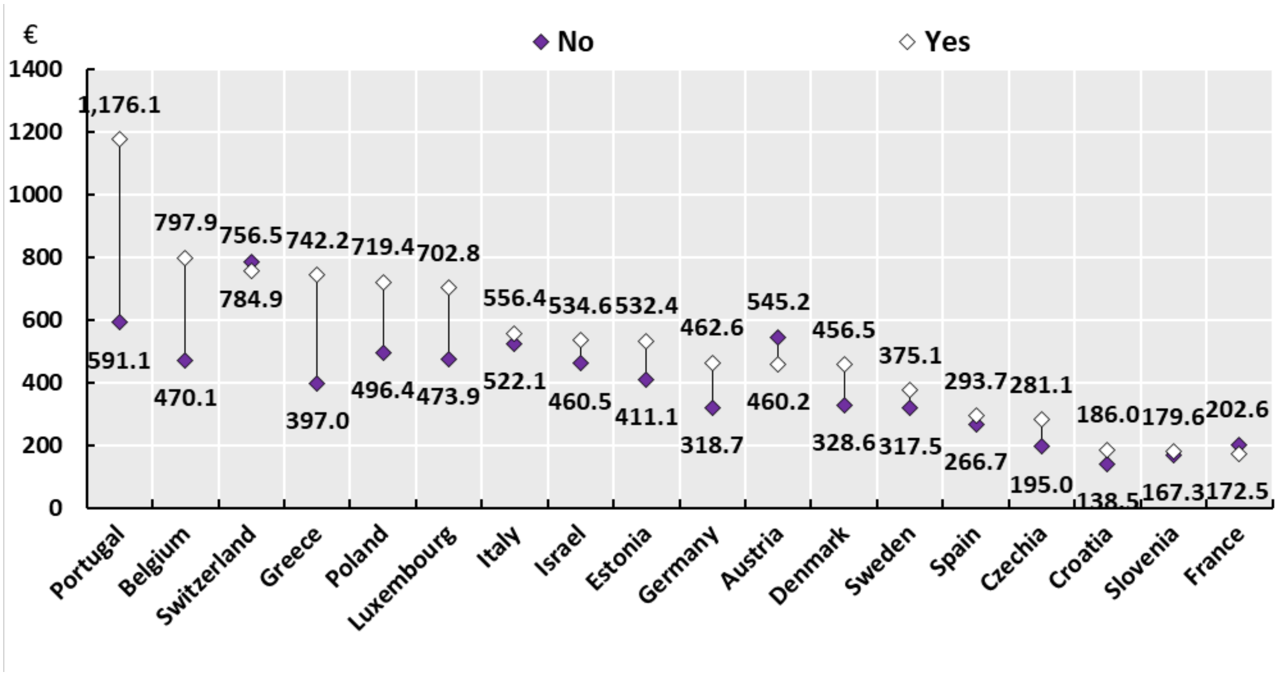
Figure 243 Average total OOPP (€) for individuals with cancer per country (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 243 presents the average total OOPP for individuals with a neurodegenerative disease. Greece has the fourth (742.2 €) and Poland the fifth highest (719.4 €) average OOPP. Furthermore, when considering the average difference between those with a neurodegenerative disease and those without, Greece moves up two places.

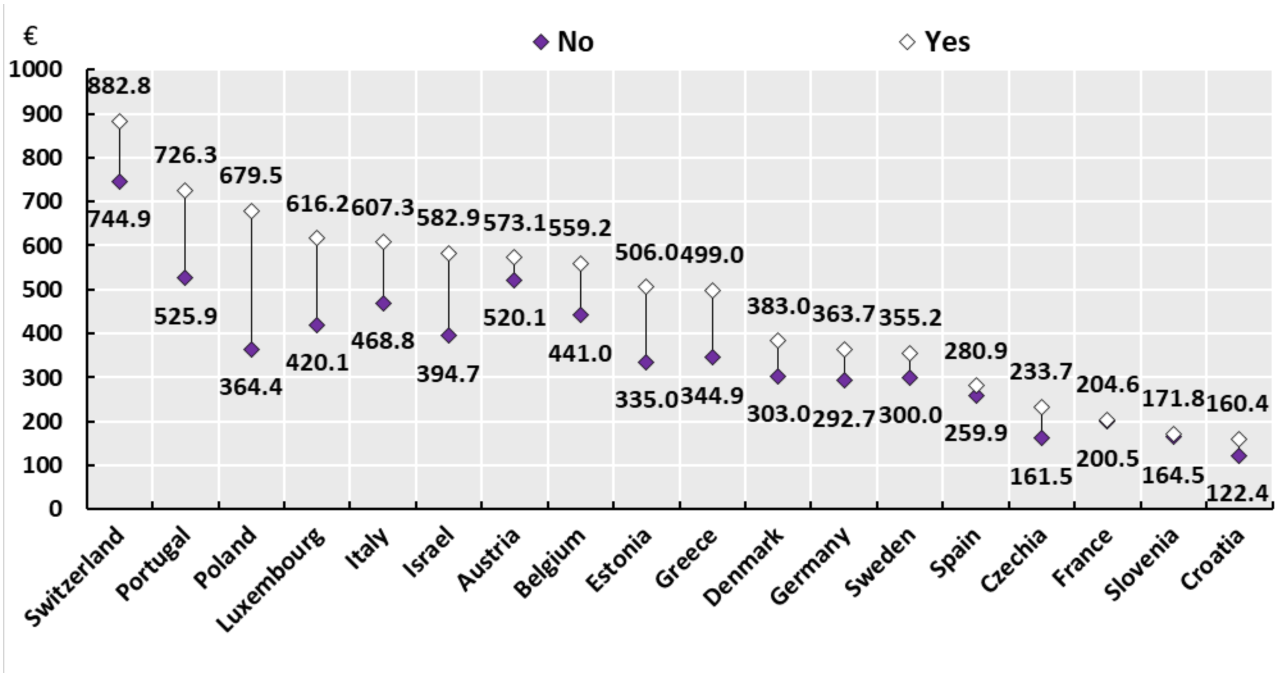
Figure 244 Average total OOPP (€) for individuals with neurodegenerative disease per country (wave 6)



Note: OOPP: Out-of-pocket payments

Regarding hypertension (Figure 244), Poland is associated with the third highest average total OOPP (679.5 €) for respondents afflicted with the disease, while Greece lies in the middle of the ordered list of countries (499 €). However, the largest impact on OOPP in absolute terms is found in Poland (315.1 €).

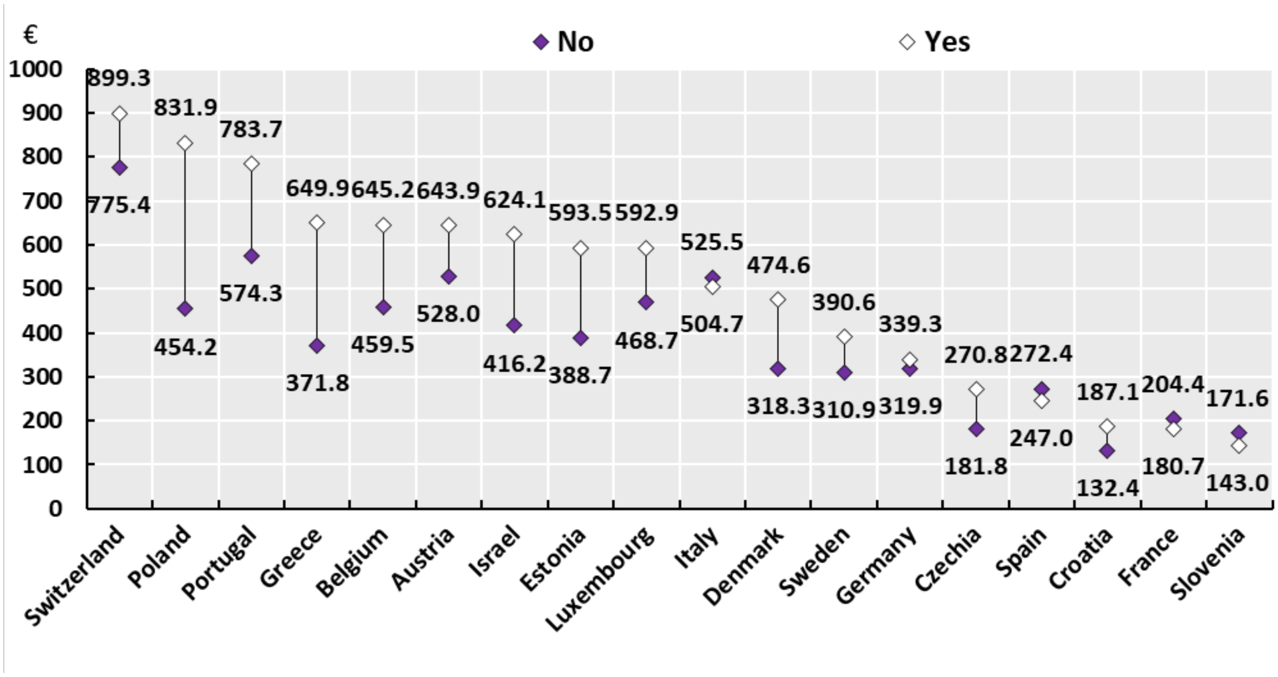
Figure 245 Average total OOPP (€) for individuals with hypertension per country (wave 6)



Note: OOPP: Out-of-pocket payments

Poland has the second (831.9 €) and Greece the fourth (649.9 €) highest average total OOPP for respondents with diabetes (Figure 245). In addition, both countries are at the top of the rankings regarding the difference in OOPP between those with diabetes and those without.

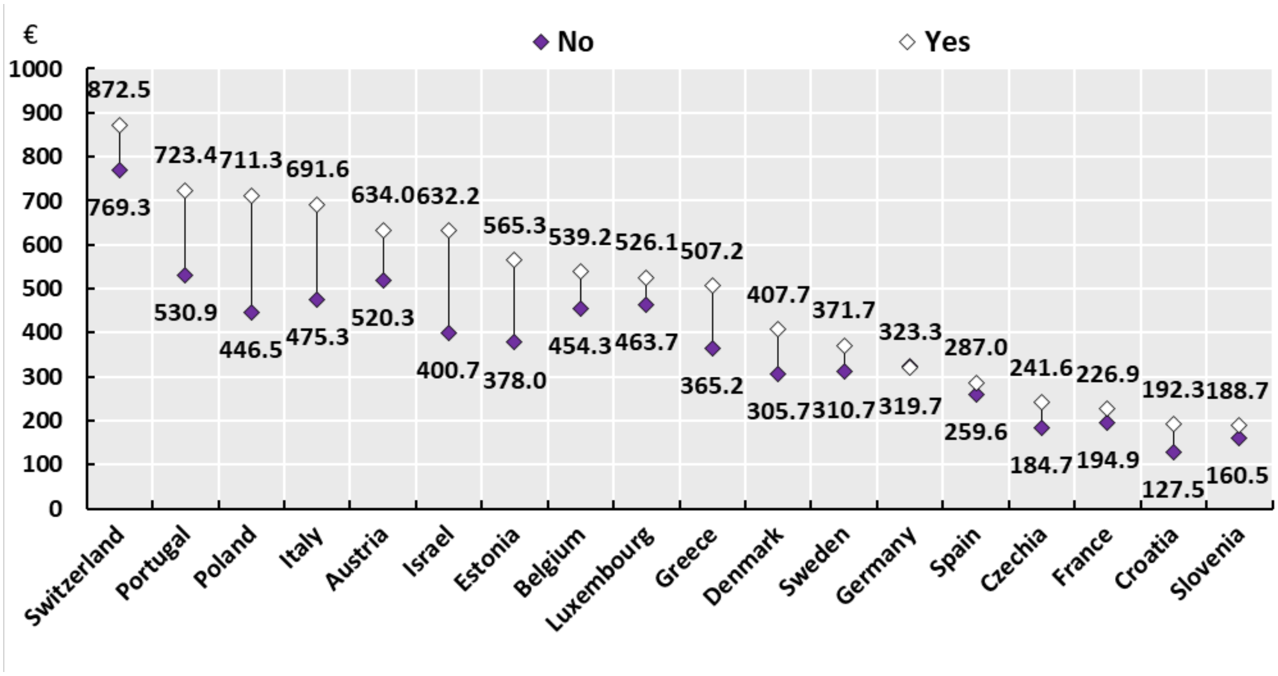
Figure 246 Average total OOPP (€) for individuals with diabetes per country (wave 6)



Note: OOPP: Out-of-pocket payments

Finally, Figure 246 show the average total OOPP for respondents with hyperlipidemia per country. Poland has the third highest average OOPP (711.3 €), while Greece is in the middle of the distribution (507.2 €). Furthermore, Poland is associated with the largest gap in the average total OOPP between those with hyperlipidemia and those without the condition.

Figure 247 Average total OOPP (€) for individuals with hyperlipidemia per country (wave 6)

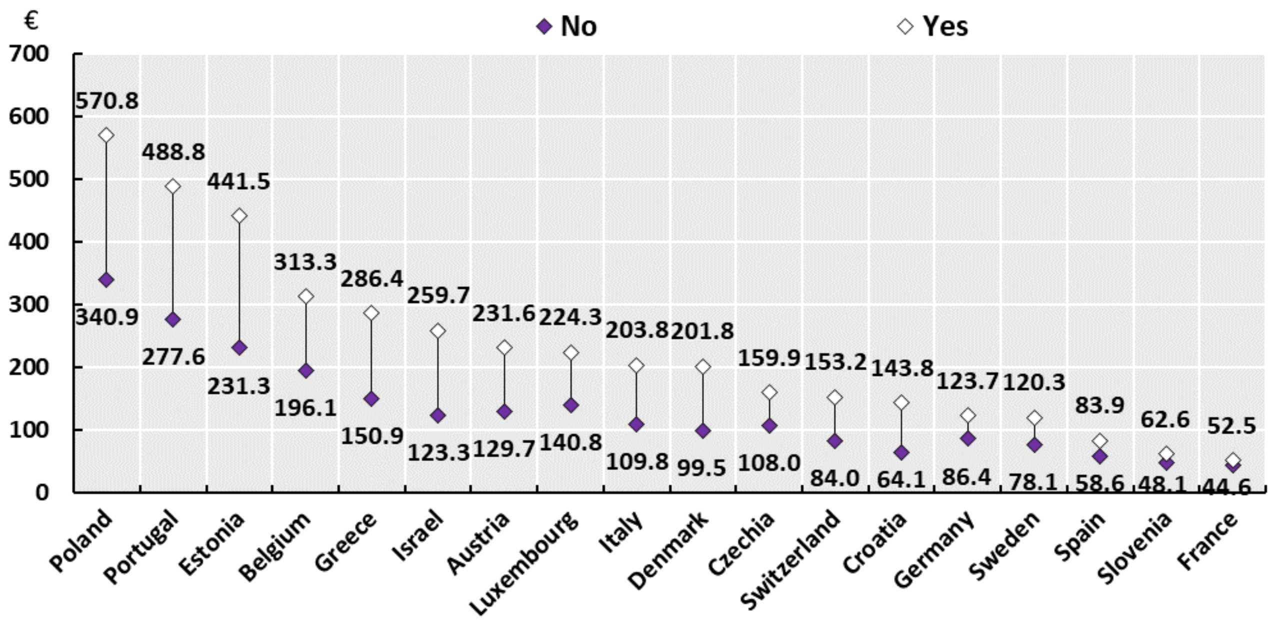


Note: OOPP: Out-of-pocket payments

4.5.3. Pharmaceutical out-of-pocket payments and chronic diseases

This section presents the impact of chronic diseases on pharmaceutical OOPP. Poland is associated with the highest average pharmaceutical OOPP among individuals taking pharmaceutical therapy for hyperlipidemia (570.8 €), while Greece is fifth (286.4 €) in the ordered list of countries (Figure 247). The largest impact of hyperlipidemia on pharmaceutical OOPP is also found in Poland.

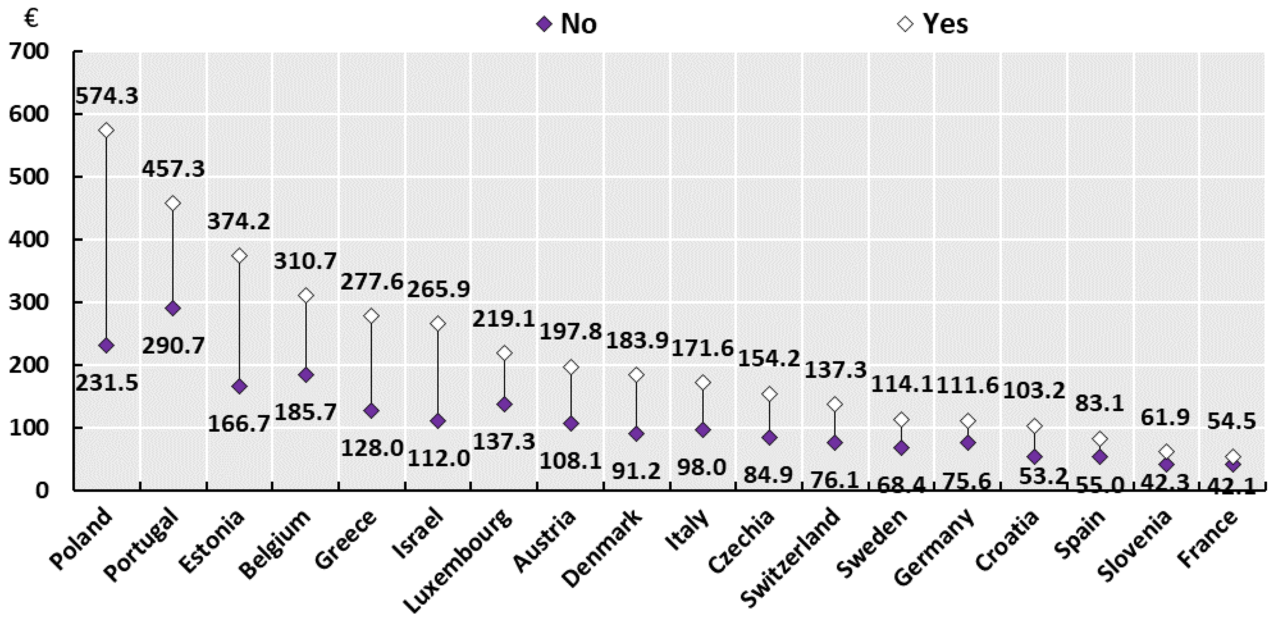
Figure 248 Average pharmaceutical OOPP (€) for individuals taking medicines for hyperlipidemia per country (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 248 shows the average pharmaceutical OOPP for individuals taking medicines for hypertension per country. The highest estimate is found in Poland (574.3 €), while Greece is ranked in the fifth place (277.6 €) in the ordered list of countries. In addition, the largest difference in pharmaceutical OOPP between those with hypertension and those without is also observed in Poland.

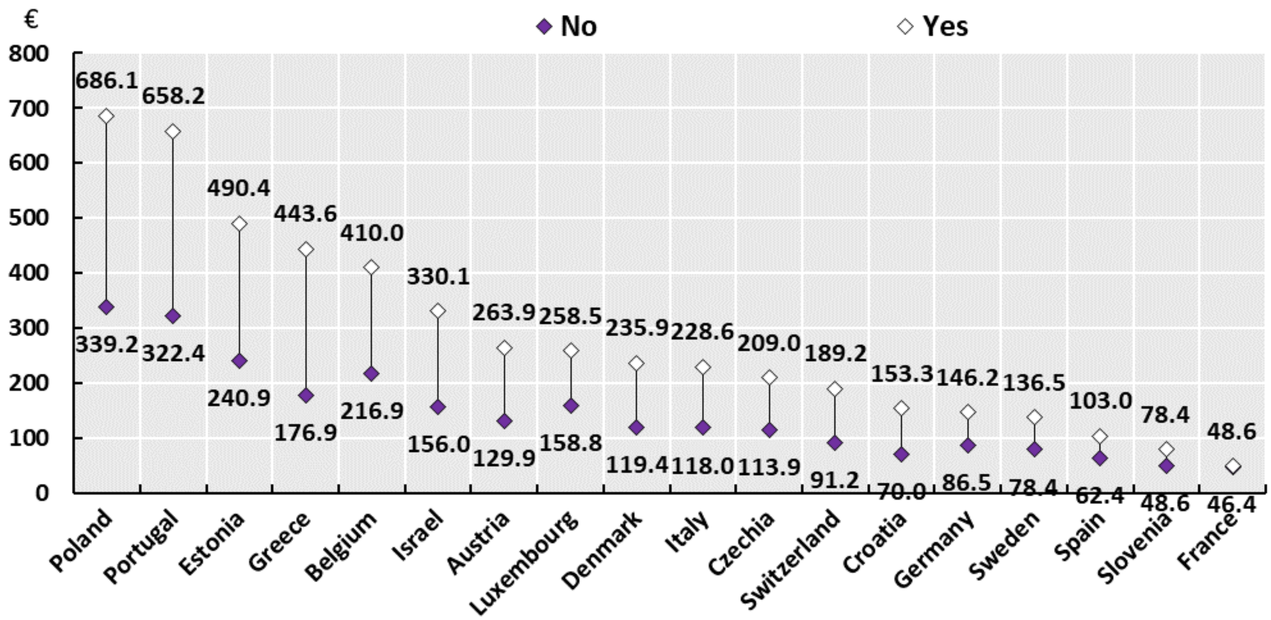
Figure 249 Average pharmaceutical OOPP (€) for individuals taking medicines for hypertension per country (wave 6)



Note: OOPP: Out-of-pocket payments

Poland is ranked at the top of the ordered list of countries with respect to the average pharmaceutical OOPP for coronary diseases (686.1 €) and Greece is at the fifth place (443.6 €). The largest gap in pharmaceutical OOPP between those with a coronary disease and those without is also observed in Poland (Figure 249).

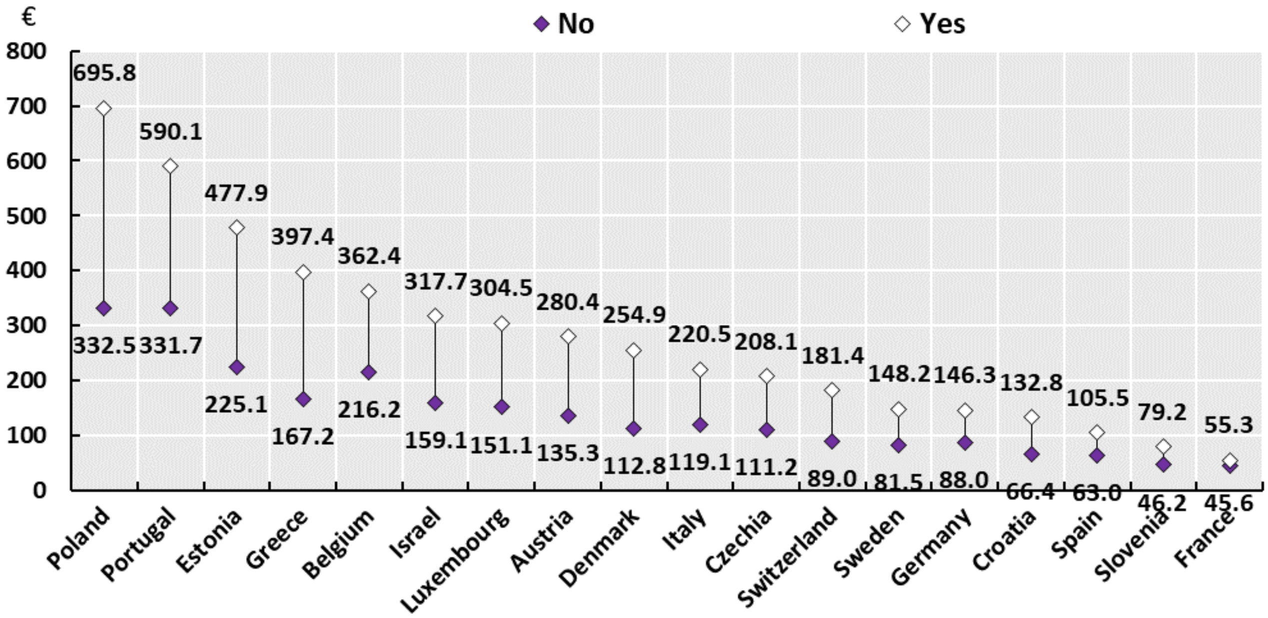
Figure 250 Average pharmaceutical OOPP (€) for individuals taking medicines for coronary diseases per country (wave 6)



Note: OOPP: Out-of-pocket payments

The average pharmaceutical OOPP for other heart diseases is found to be highest in Poland (695.8 €), while Greece is at the fourth place in the rankings of countries (Figure 250). Once more, Poland has the largest gap between those with other heart condition and those without.

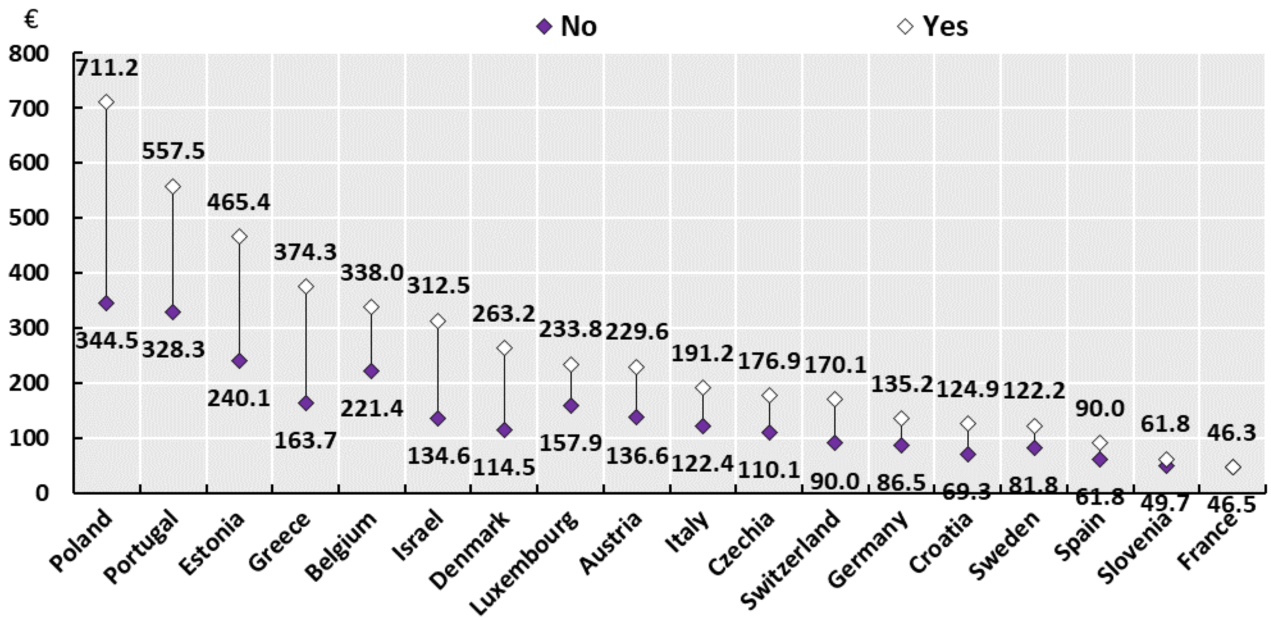
Figure 251 Average pharmaceutical OOPP (€) for individuals taking medicines for other heart diseases per country (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 251 presents the average pharmaceutical OOPP for diabetes per country. Poland tops all other countries (711.2 €). while Greece lies in the fourth place in the rankings. Additionally, the largest difference in pharmaceutical OOPP is also observed in Poland.

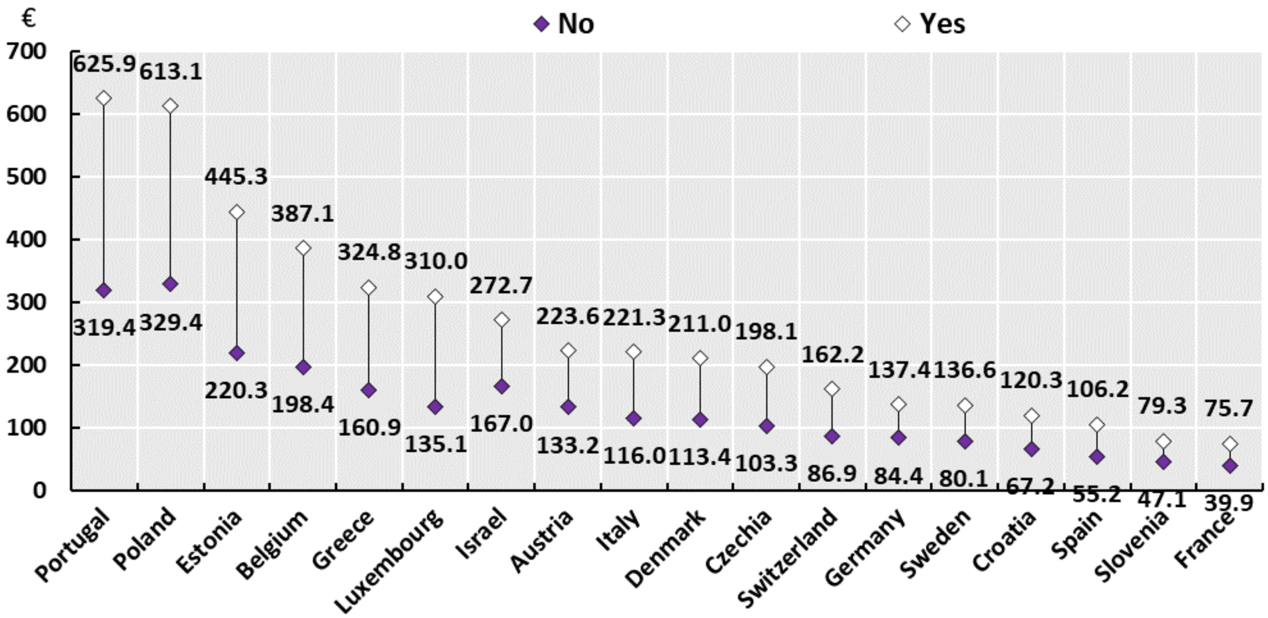
Figure 252 Average pharmaceutical OOPP (€) for individuals taking medicines for diabetes per country (wave 6)



Note: OOPP: Out-of-pocket payments

Poland has the second highest average pharmaceutical OOPP for joint pain, while Greece lies in the fifth place in the rankings (Figure 252). Poland is also associated with the second large impact of joint pain in pharmaceutical OOPP.

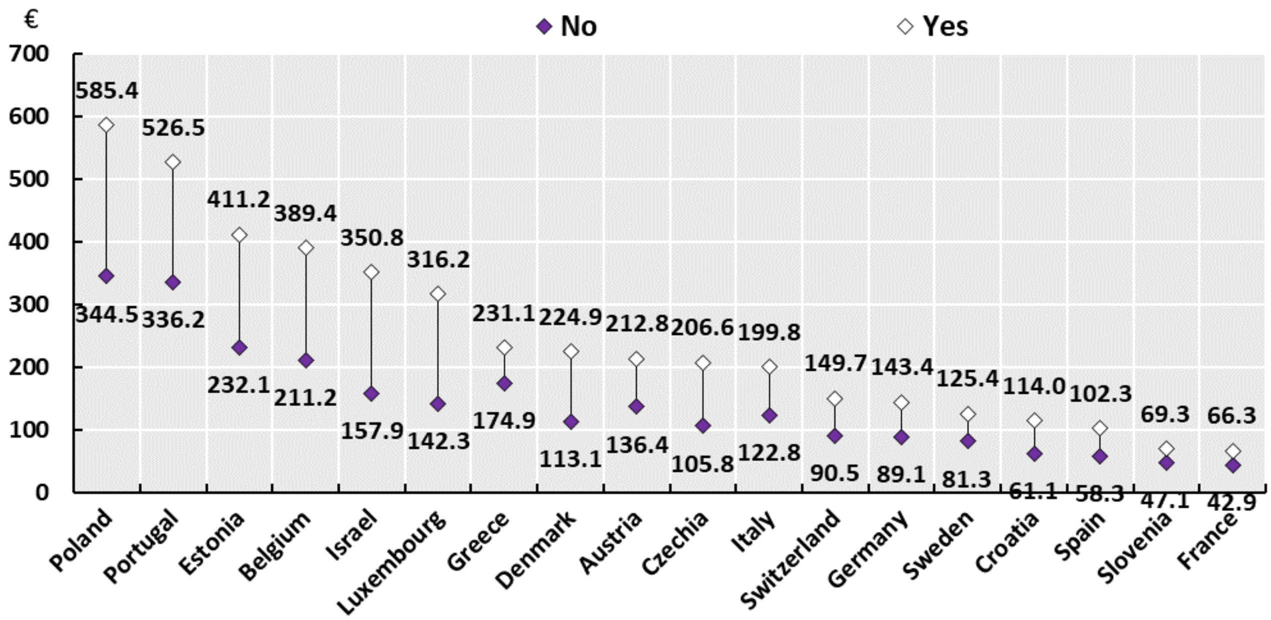
Figure 253 Average pharmaceutical OOPP (€) for individuals taking medicines for joint pain per country (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 253 shows the average pharmaceutical OOPP for individuals taking medicines for other pain per country. Again, Poland is first in the rankings (585.4 €), while Greece is in the seventh place (231.1 €). The impact of taking medicines for other pain on pharmaceutical OOPP is also found to be highest in Poland.

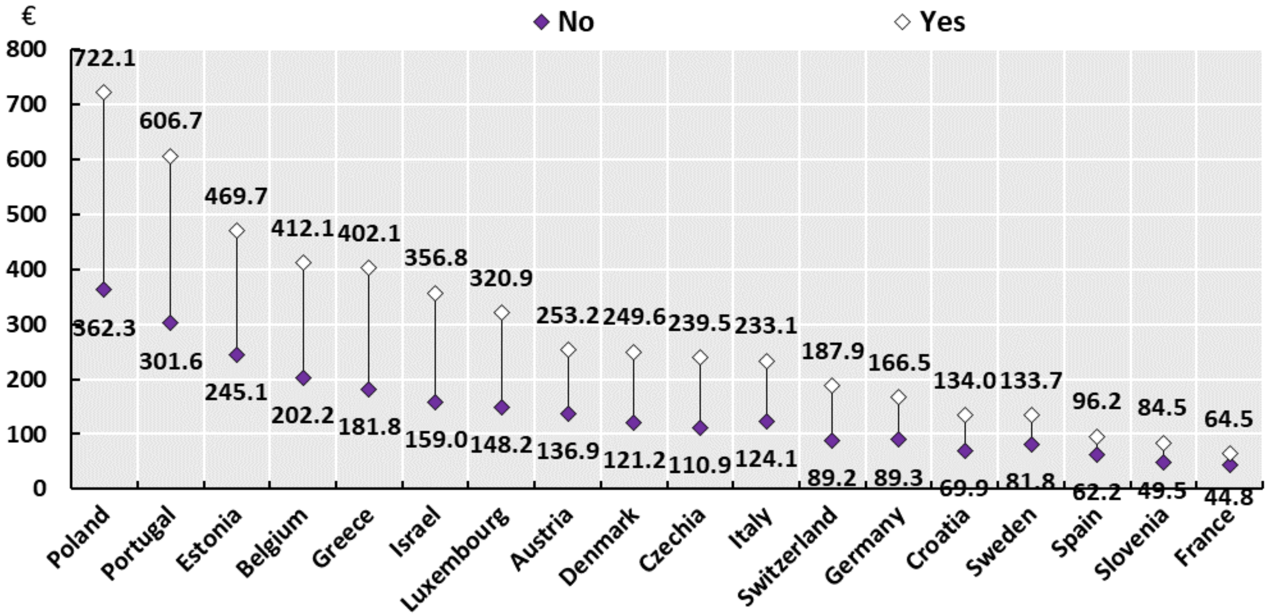
Figure 254 Average pharmaceutical OOPP (€) for individuals taking medicines for other pain per country (wave 6)



Note: OOPP: Out-of-pocket payments

The average pharmaceutical OOPP for sleep problems is found to be highest in Poland (722.1 €), while Greece is at the fifth place (402.1 €) in the rankings (Figure 254). Poland also tops the other countries with respect to the difference in the average pharmaceutical OOPP between those taking medicines for sleep problems and those that do not.

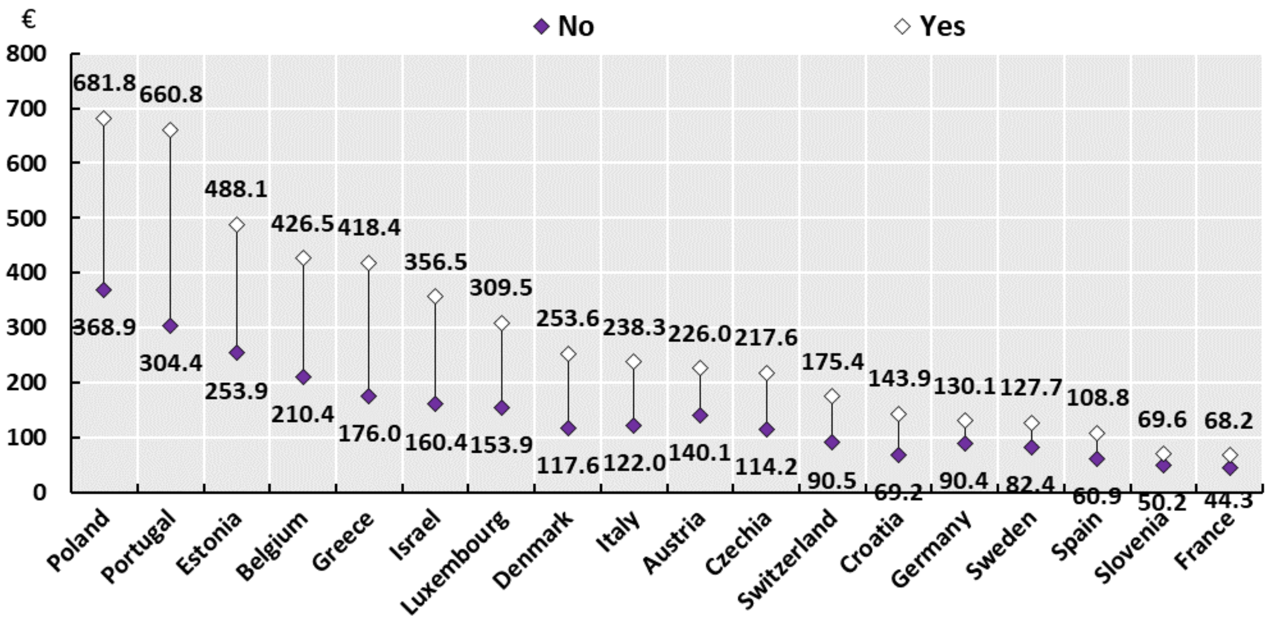
Figure 255 Average pharmaceutical OOPP (€) for individuals taking medicines for sleep problems per country (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 255 displays the average pharmaceutical OOPP (€) for individuals taking medicines for anxiety/depression problems per country. Poland is first in the rankings (681.8 €) and Greece is fifth (418.4 €). Moreover, Poland is associated with the second and Greece with the third largest impact of anxiety/depression on pharmaceutical OOPP.

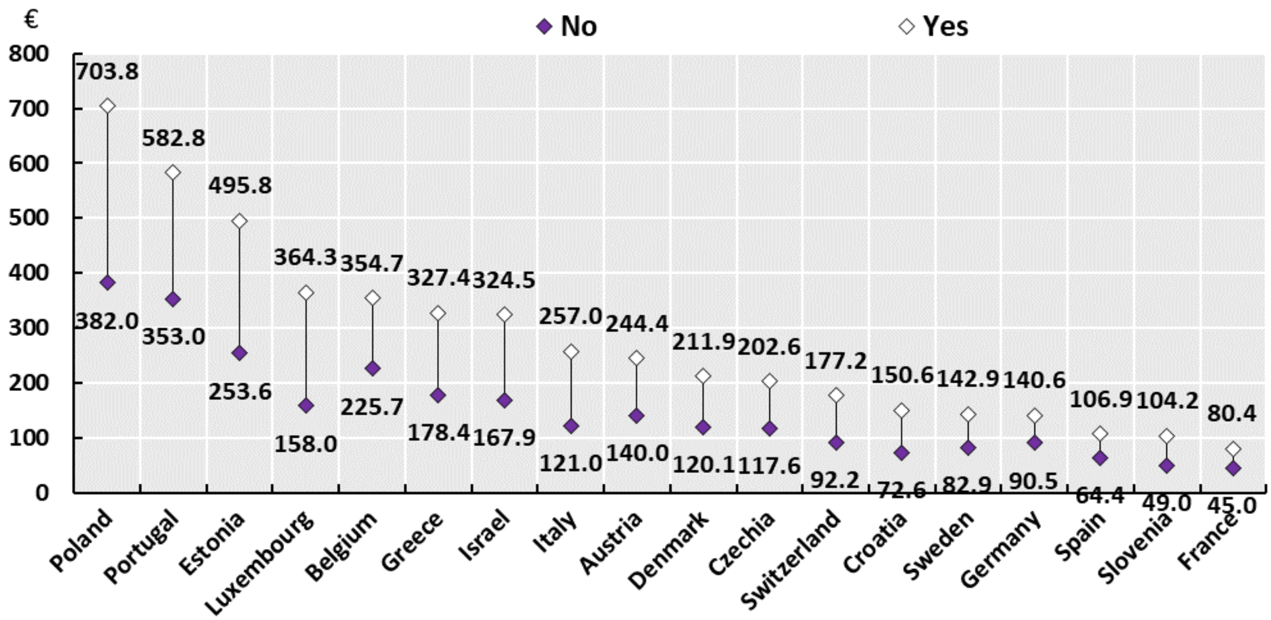
Figure 256 Average pharmaceutical OOPP (€) for individuals taking medicines for anxiety/depression per country (wave 6)



Note: OOPP: Out-of-pocket payments

Poland has the highest average pharmaceutical OOPP for individuals with osteoporosis (703.8 €), while Greece lies in the sixth place (327.4 €) in the rankings (Figure 256). Poland is also associated with the largest gap in pharmaceutical OOPP between those with osteoporosis and those without the condition.

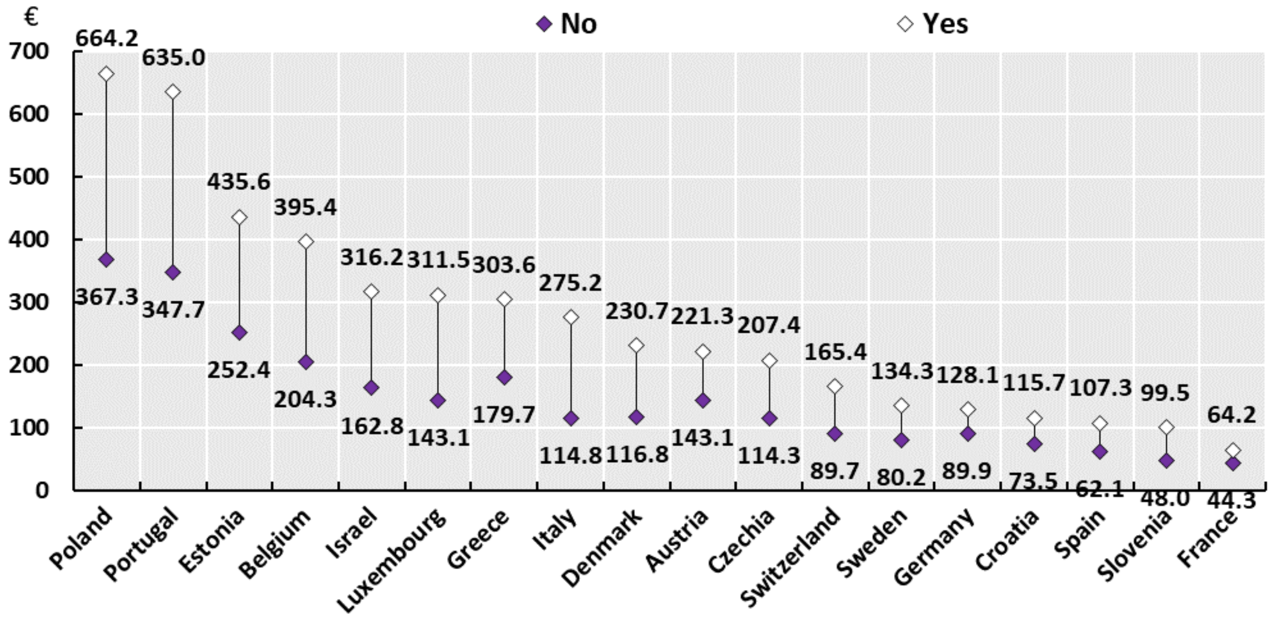
Figure 257 Average pharmaceutical OOPP (€) for individuals taking medicines for osteoporosis per country (wave 6)



Note: OOPP: Out-of-pocket payments

The average pharmaceutical OOPP for stomach burns were found to be highest in Poland (664.2 €), while Greece is at the seventh place (303.6 €) in the rankings (Figure 257). The largest impact of stomach burns on pharmaceutical OOPP is also observed in Poland.

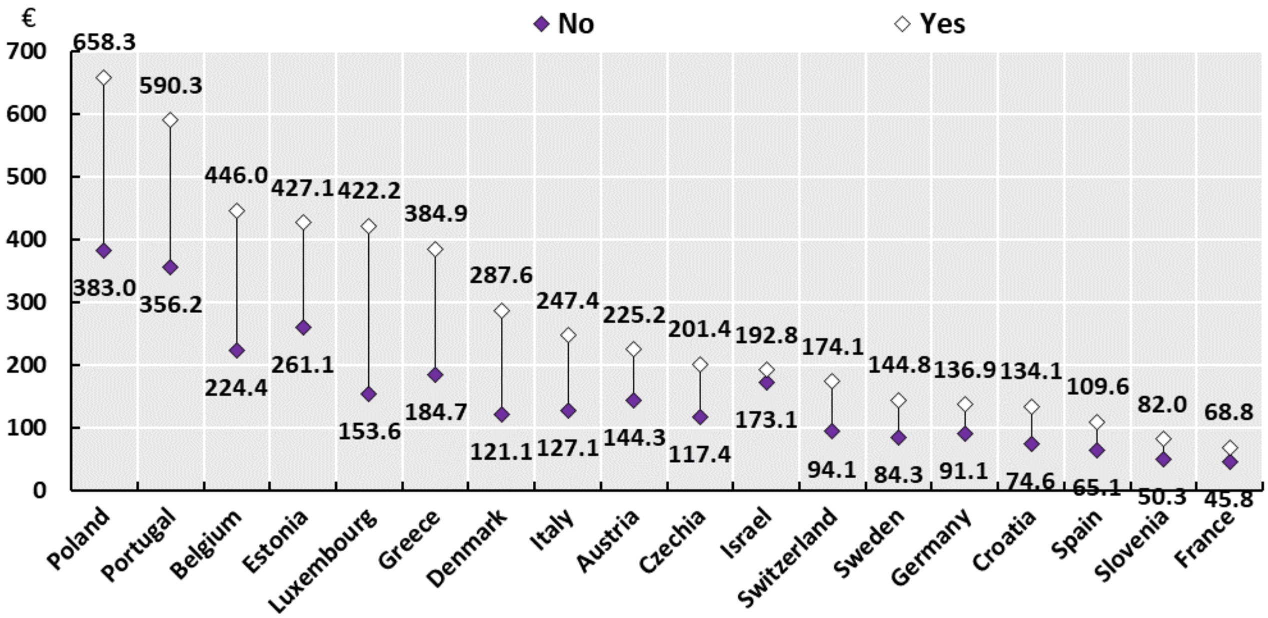
Figure 258 Average pharmaceutical OOPP (€) for individuals taking medicines for stomach burns per country (wave 6)



Note: OOPP: Out-of-pocket payments

Figure 258 presents the average pharmaceutical OOPP (€) for individuals taking medicines for chronic bronchitis per country. Poland tops all countries in the rankings (658.3 €), while Greece is in the sixth place (384.9 €). The largest impact of chronic bronchitis on pharmaceutical OOPP is also found in Poland.

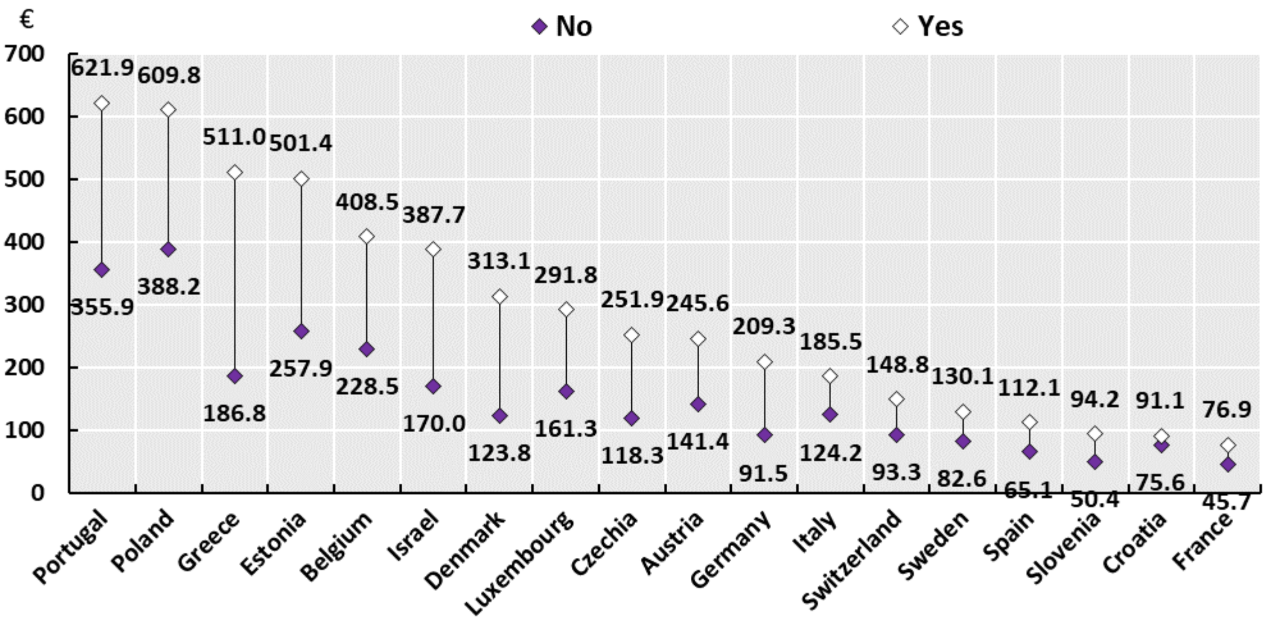
Figure 259 Average pharmaceutical OOPP (€) for individuals taking medicines for chronic bronchitis per country (wave 6)



Note: OOPP: Out-of-pocket payments

Regarding medicines for suppressing inflammation, Poland and Greece are at the second (609.8 €) and third (511 €) place, respectively, in the rankings of countries with respect to average pharmaceutical OOPP (Figure 259). The largest impact of medicines for suppressing inflammation on the average pharmaceutical OOPP is observed in Greece, while Poland is at the fourth place.

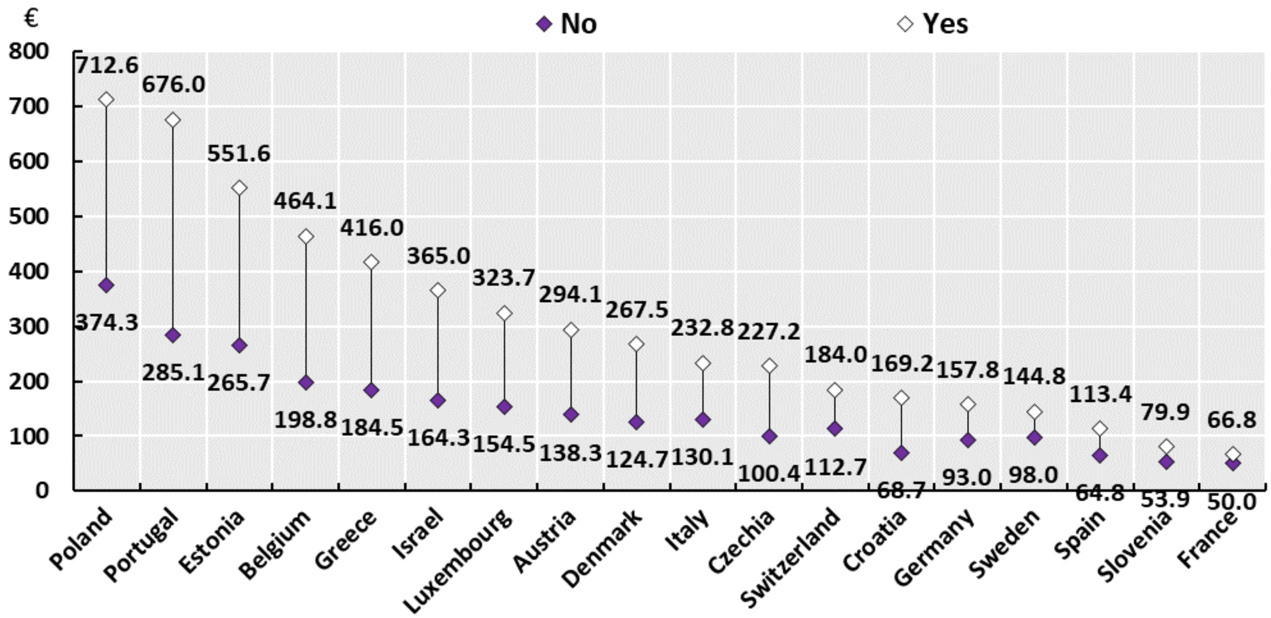
Figure 260 Average pharmaceutical OOPP (€) for individuals taking medicines for suppressing inflammation per country (wave 6)



Note: OOPP: Out-of-pocket payments

Finally, Figure 260 shows the average pharmaceutical OOPP for individuals taking at least 5 medicines on a typical day (polypharmacy) per country. Poland is first in the rankings (712.6 €), while Greece is fifth (416.0 €). Moreover, Poland and Greece are at the second and fifth place with respect to the impact of polypharmacy on pharmaceutical OOPP.

Figure 261 Average pharmaceutical OOPP (€) for individuals taking at least 5 medicines on a typical day (polypharmacy) per country (wave 6)

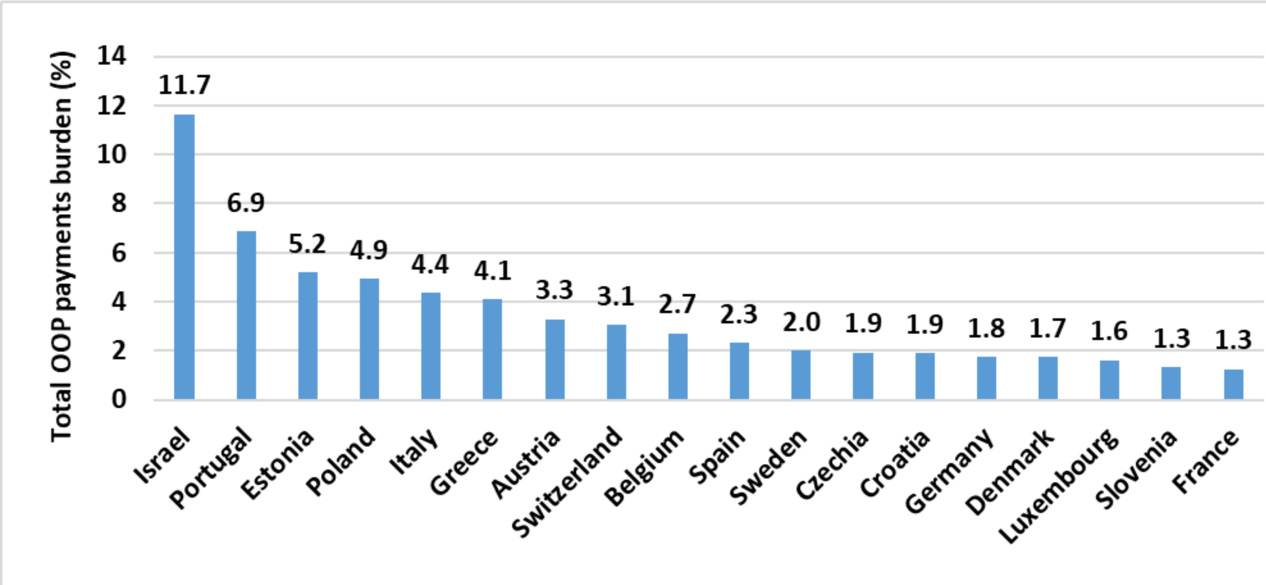


Note: OOPP: Out-of-pocket payments

4.5.4. Total and pharmaceutical out-of-pocket payments burden and catastrophe

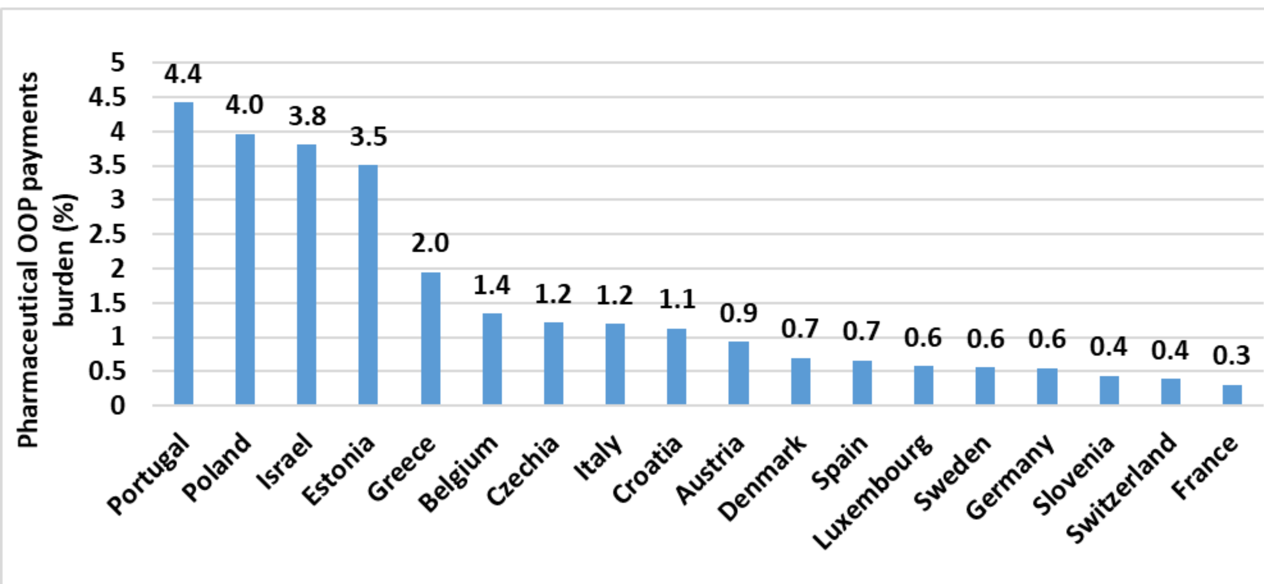
This section presents the burden and catastrophe related to total and pharmaceutical OOPP. Total OOPP burden appears to be higher in Israel (11.7%), followed by Portugal (6.9%). Poland is in the fourth place in the rankings (4.9%) and Greece in the sixth (4.1%) in the ordered list of countries (Figure 261). Pharmaceutical OOPP burden is found to be highest in Portugal (4.4%), followed by Poland (4%), while Greece is in the fifth place (2%) among all European countries considered (Figure 262).

Figure 262 Total OOPP burden (%) per country (wave 6)



Note: Total OOPP burden is defined as the share (%) net equivalized income spent on OOPP. OOPP: Out-of-pocket payments.

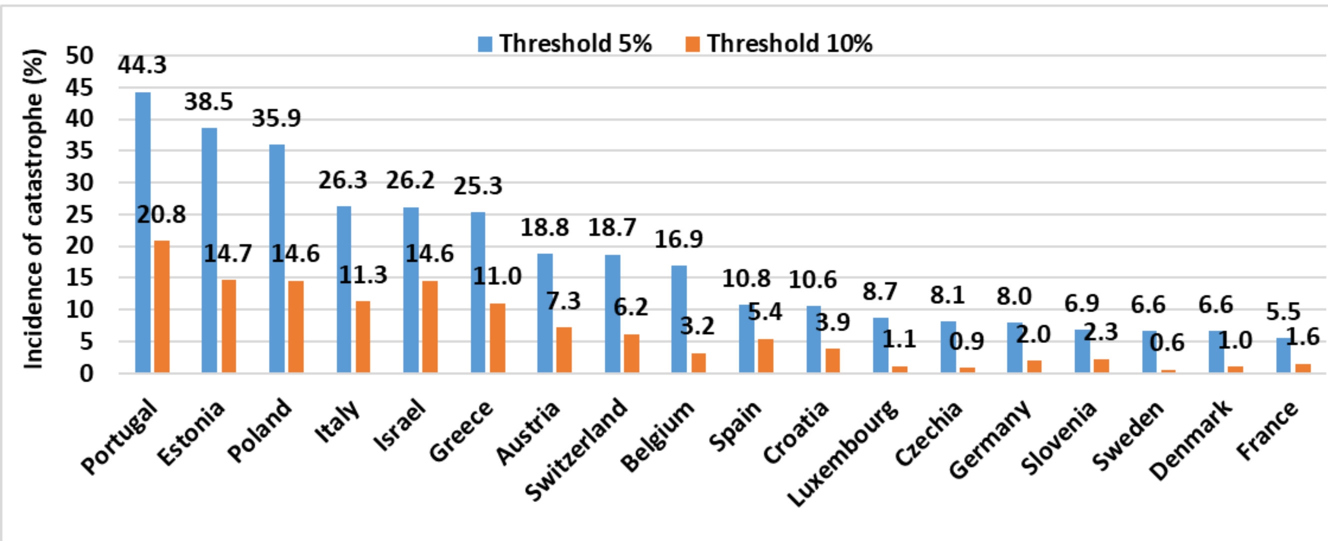
Figure 263 Pharmaceutical OOPP burden (%) per country (wave 6)



Note: Pharmaceutical OOPP burden is defined as the share (%) net equivalized income spent on pharmaceutical OOPP. OOPP: Out-of-pocket payments.

The results concerning the incidence of catastrophic OOPP focus on the share of individuals whose OOPP burden exceeds a particular threshold of their income. Starting with catastrophic total OOPP defined at the 5% level (Figure 263), the highest incidence of catastrophe is found in Portugal (44.3%), followed by Estonia (38.5%) and Poland (35.9%), while Greece is in the sixth place (25.3%). When the threshold of 10% is used, a similar pattern is observed. Portugal tops all the other countries (20.8%), while Poland is third (14.6%) and Greece sixth (11%) in the rankings.

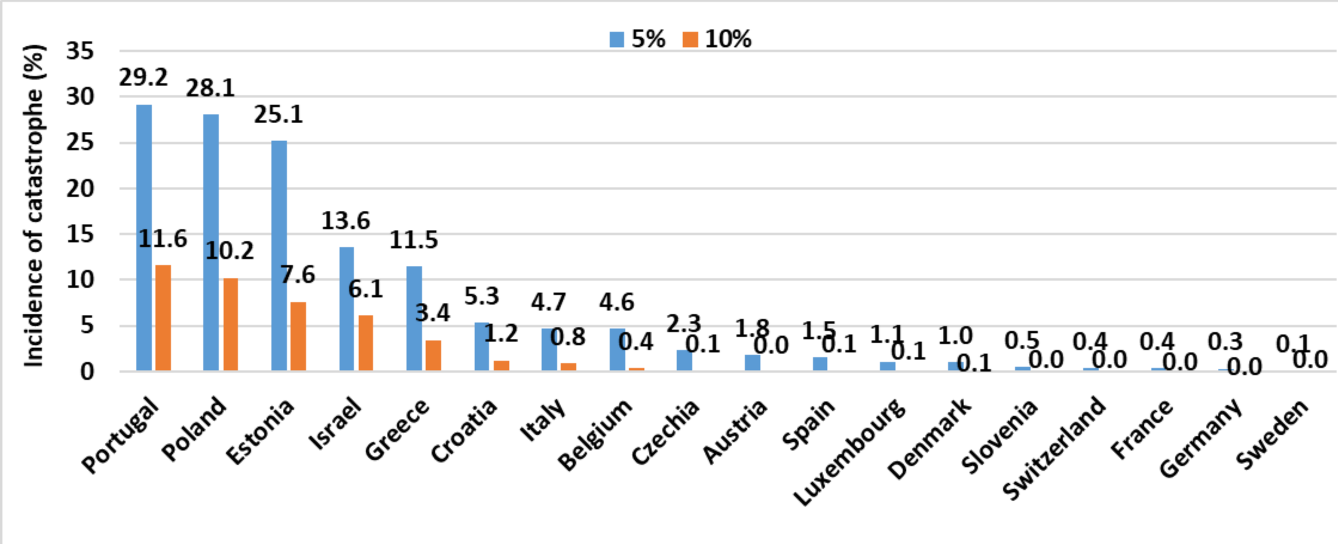
Figure 264 Incidence of catastrophic total OOPP per country (wave 6)



Note: OOPP: Out-of-pocket payments.

Regarding catastrophic pharmaceutical OOPP (Figure 264), Portugal is associated with the highest incidence of catastrophe (29.2%) at the 5% level, followed by Poland (28.1%), while Greece is fifth (11.5%) in the ordered list of countries. Moreover, at the level of 10%, the rankings do not change meaningfully. Portugal is ranked first (11.6%), Poland second (10.2%), while Greece is in the fifth place (3.4%).

Figure 265 Incidence of catastrophic pharmaceutical OOPP per country (wave 6)



Note: OOPP: Out-of-pocket payments.

4.6. Satisfaction with the health system

Notably, Greece and Poland are the countries with the lowest share of respondents reporting as being satisfied with their basic health coverage / health system in 2020 (Table 29). Low satisfaction is also observed in Romania, which lies in the fourth place from the bottom of the list of countries ordered by their satisfaction level.

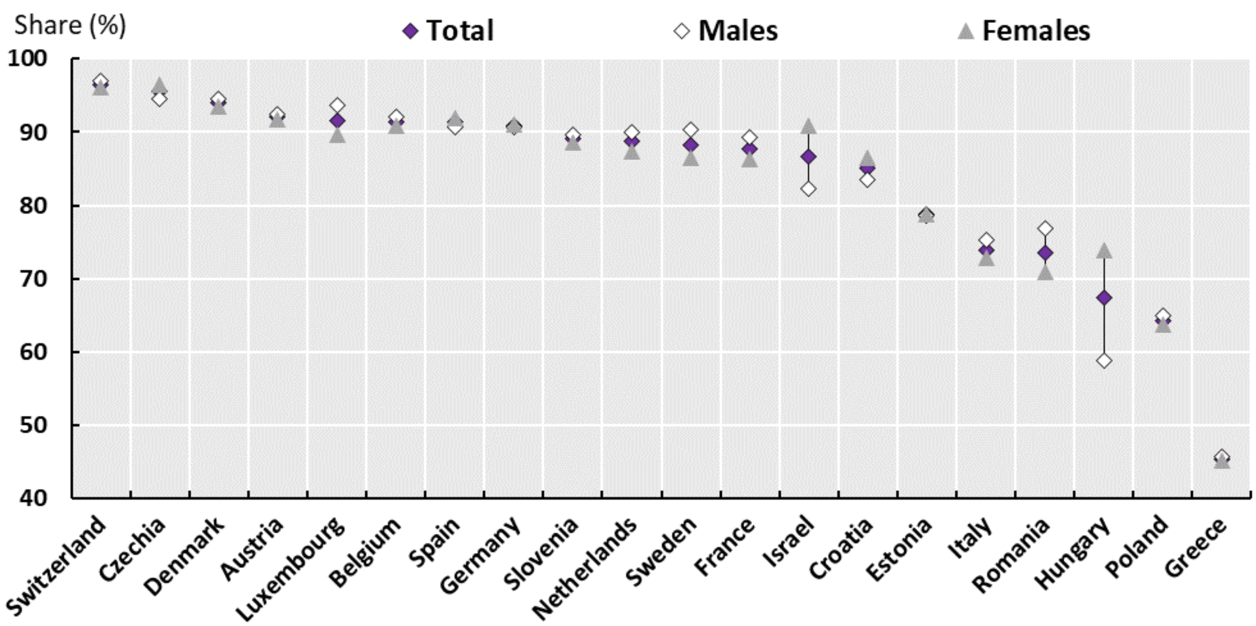
Table 30 Share (%) of individuals that are satisfied with their health coverage / health system per country and gender (2020)

Countries	Total	Males	Females
Switzerland	96.5	97.0	96.1
Czechia	95.5	94.5	96.4
Denmark	93.9	94.5	93.4
Austria	92.1	92.4	91.8
Luxembourg	91.6	93.6	89.7
Belgium	91.4	92.1	90.8
Spain	91.3	90.7	91.8

Germany	90.9	90.6	91.1
Slovenia	89.1	89.7	88.7
Netherlands	88.7	90.0	87.4
Sweden	88.3	90.3	86.4
France	87.7	89.2	86.3
Israel	86.6	82.3	90.9
Croatia	85.1	83.4	86.5
Estonia	78.7	78.6	78.8
Italy	73.9	75.2	72.8
Romania	73.6	76.8	71.0
Hungary	67.4	58.8	73.9
Poland	64.3	65.1	63.7
Greece	45.4	45.7	45.2

Note: Estimates are based on the unstandardized distributions.

Figure 266 Share (%) of individuals that are satisfied with their health coverage / health system per country and gender (2020)



Note: Estimates are based on the unstandardized distributions.

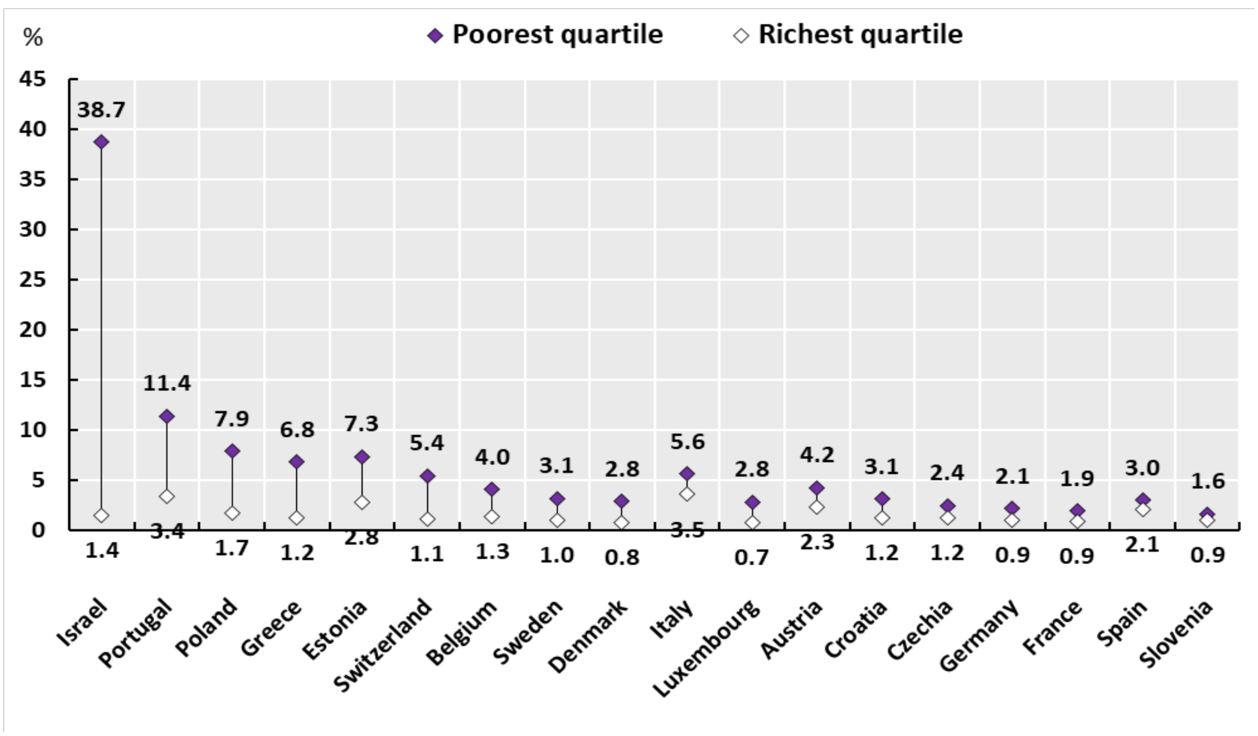
4.7. Income- and education-related inequalities in health outcomes

This section presents the results concerning the income- and education-related health outcomes inequalities. Since our focus is on disparities, the countries are ranked based on the size of absolute socioeconomic inequalities for each health outcome.

4.7.1. Health outcomes inequalities among income groups

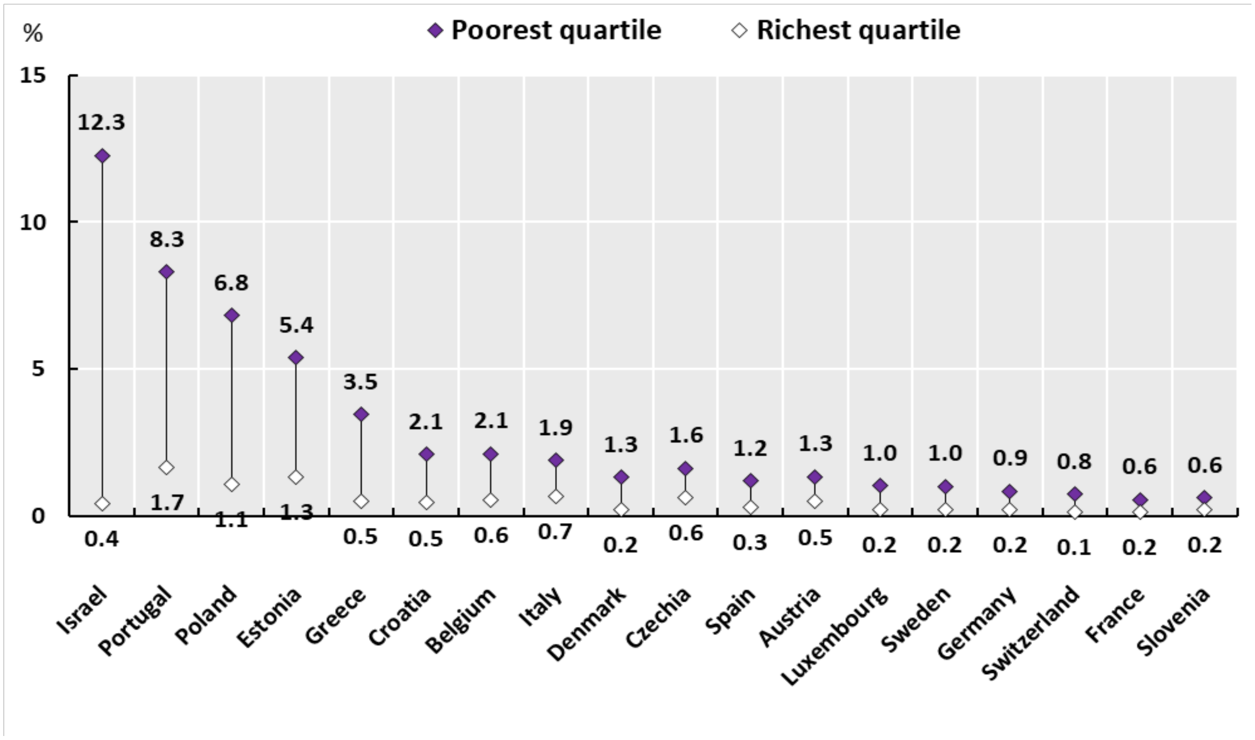
At first, the income-related inequalities are explored and, more specifically, the absolute gap between the poorest and the richest quartile. The largest absolute income-related inequalities in total OOPP burden were found in Israel and Portugal, followed by Poland and Greece (Figure 266). Regarding pharmaceutical OOPP burden the pattern is similar, with Israel, Portugal and Poland in the first three places and Greece in the fifth (Figure 267).

Figure 267 Inequalities in total OOPP burden (%) by country and income group (wave 6)



Note: OOPP: Out-of-pocket payments.

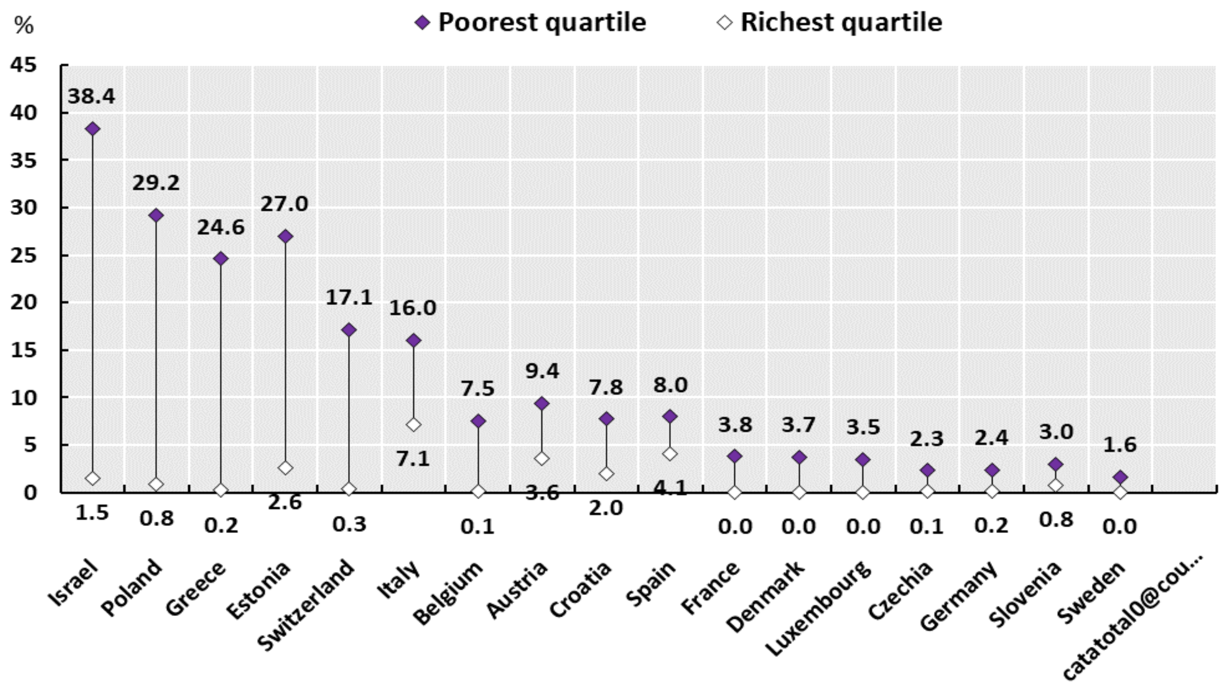
Figure 268 Inequalities in pharmaceutical OOPP burden (%) by country and income group (wave 6)



Note: OOPP: Out-of-pocket payments.

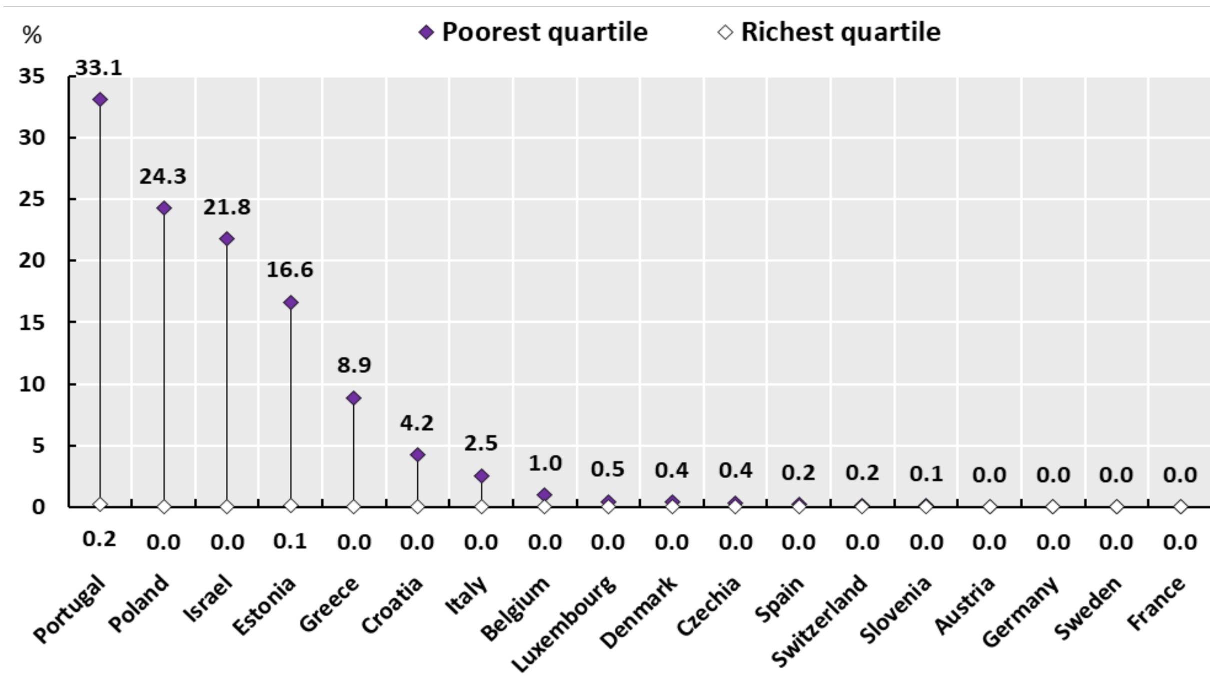
Regarding the incidence of catastrophe (10% threshold) due to total OOPP (Figure 268), Portugal is associated with the largest absolute disparities between the lowest and the highest income quartiles, followed by Poland and Greece. The income-related inequalities in the incidence of catastrophic pharmaceutical OOPP were found to be largest in Portugal, followed by Poland, while Greece is in the fifth place in the ordered list of countries (Figure 269).

Figure 269 Inequalities in the incidence (%) of catastrophic (10% threshold) total OOPP by country and income group (wave 6)



Note: OOPP: Out-of-pocket payments.

Figure 270 Inequalities in the incidence (%) of catastrophic (10% threshold) pharmaceutical OOPP by country and income group (wave 6)



Note: OOPP: Out-of-pocket payments.

The largest absolute inequalities between the poorest and the richest quartiles in the prevalence of unmet needs were observed in Hungary, followed by Romania, while Greece was in the fourth place and Poland in the third from the bottom of the list of countries (Figure 270). Romania was the country found to have the largest income-related inequalities in the prevalence of unmet needs for medicines, Poland was at the eighth place and Greece at the bottom of the list of countries (Figure 271).

Figure 271 Inequalities in the prevalence (%) of unmet needs by country and income group (2020)

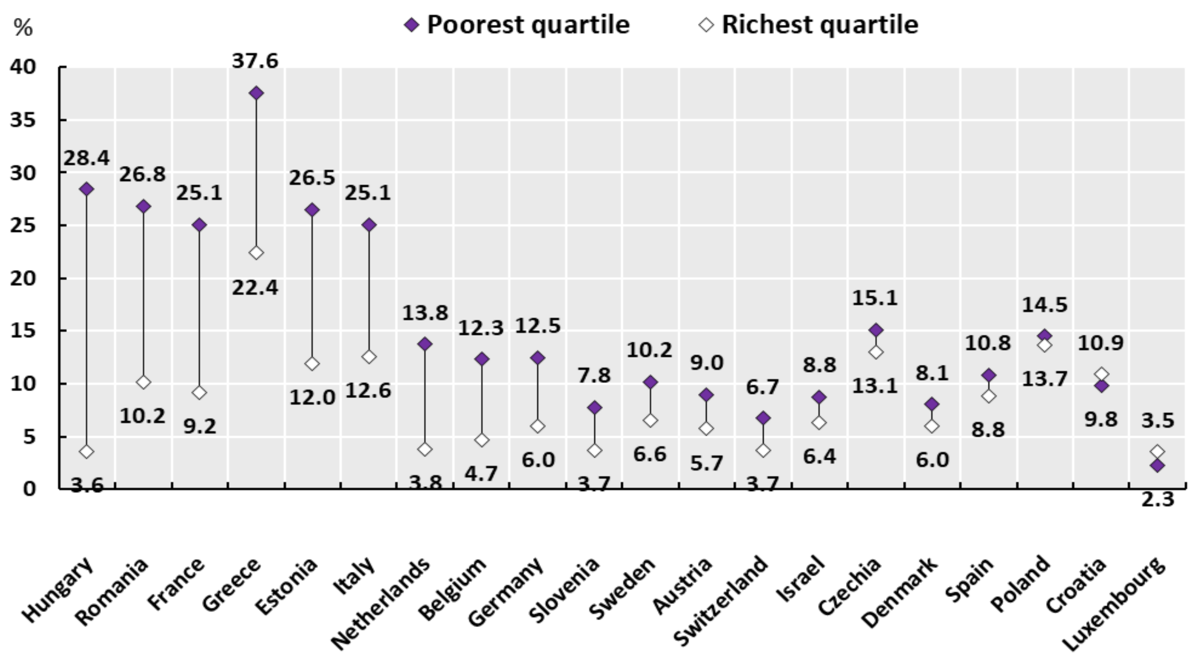
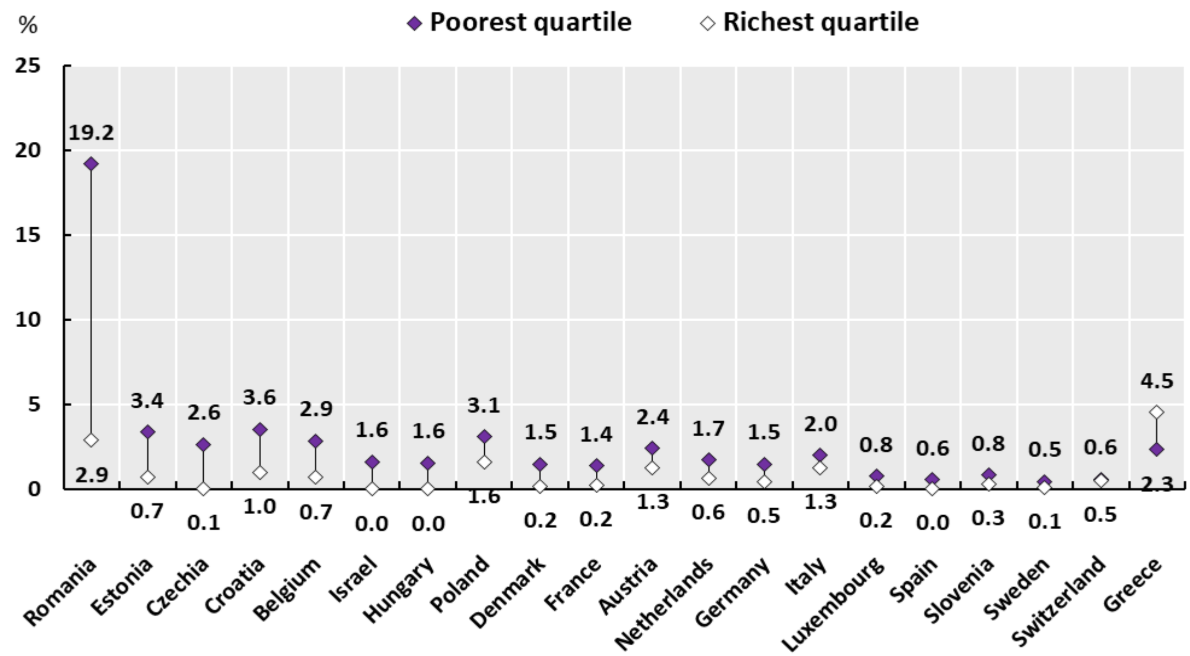


Figure 272 Inequalities in the prevalence (%) of unmet needs for medicines by country and income group (2020)



Regarding the income-related inequalities in multimorbidity, Romania, Greece and Poland are at the lower end of the ordered list of countries (Figure 272). Furthermore, Romania and Poland are at the middle of the distribution of inequalities in fair/poor health, while Greece is at the bottom (Figure 273). The absolute disparities in the prevalence of low quality of life between the highest and the lowest income quartiles are high in Poland, which has the fifth largest gap, while Greece is at the middle of the distribution (Figure 274).

Figure 273 Inequalities in the prevalence (%) of multimorbidity by country and income group (2020)

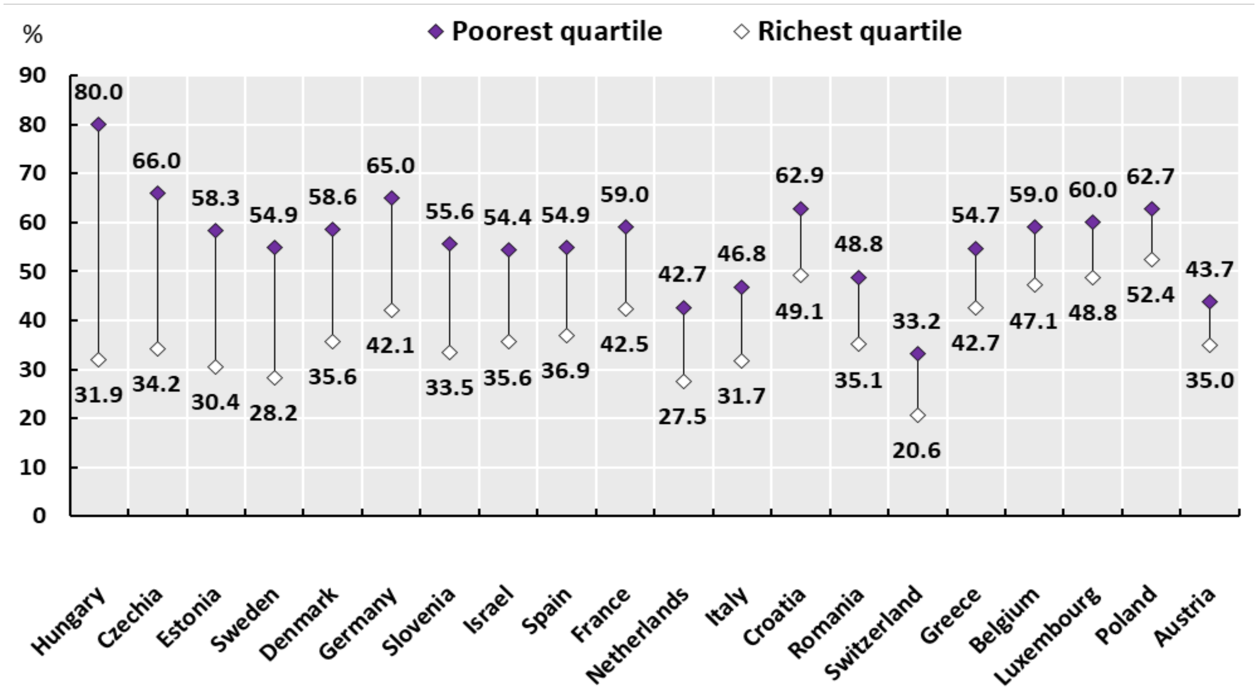


Figure 274 Inequalities in the prevalence (%) of fair/poor self-reported health by country and income group (2020)

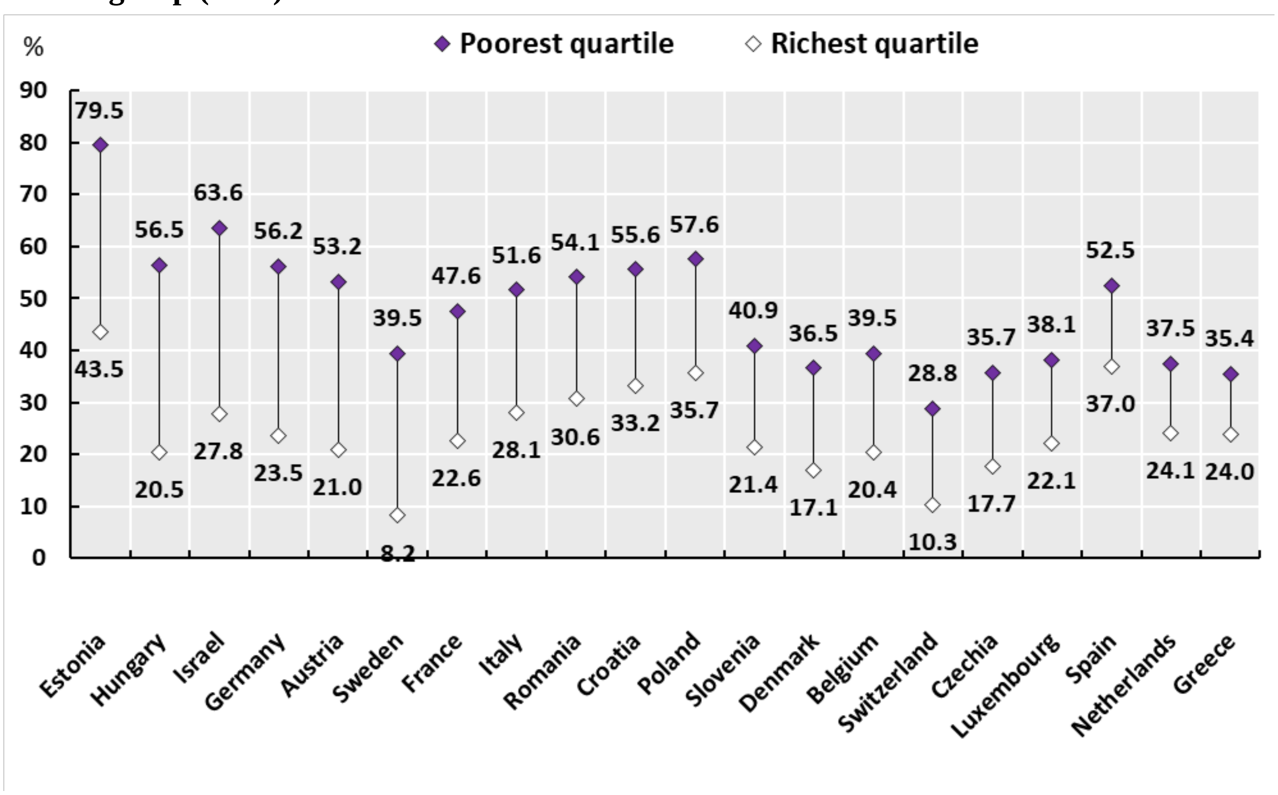
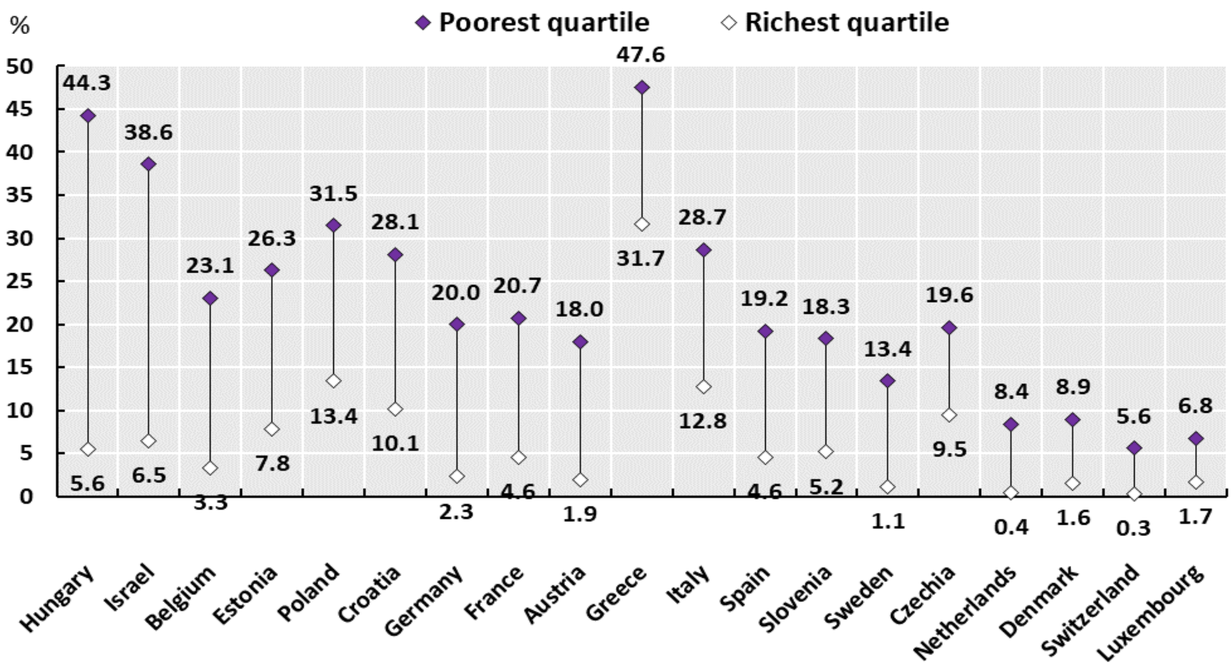
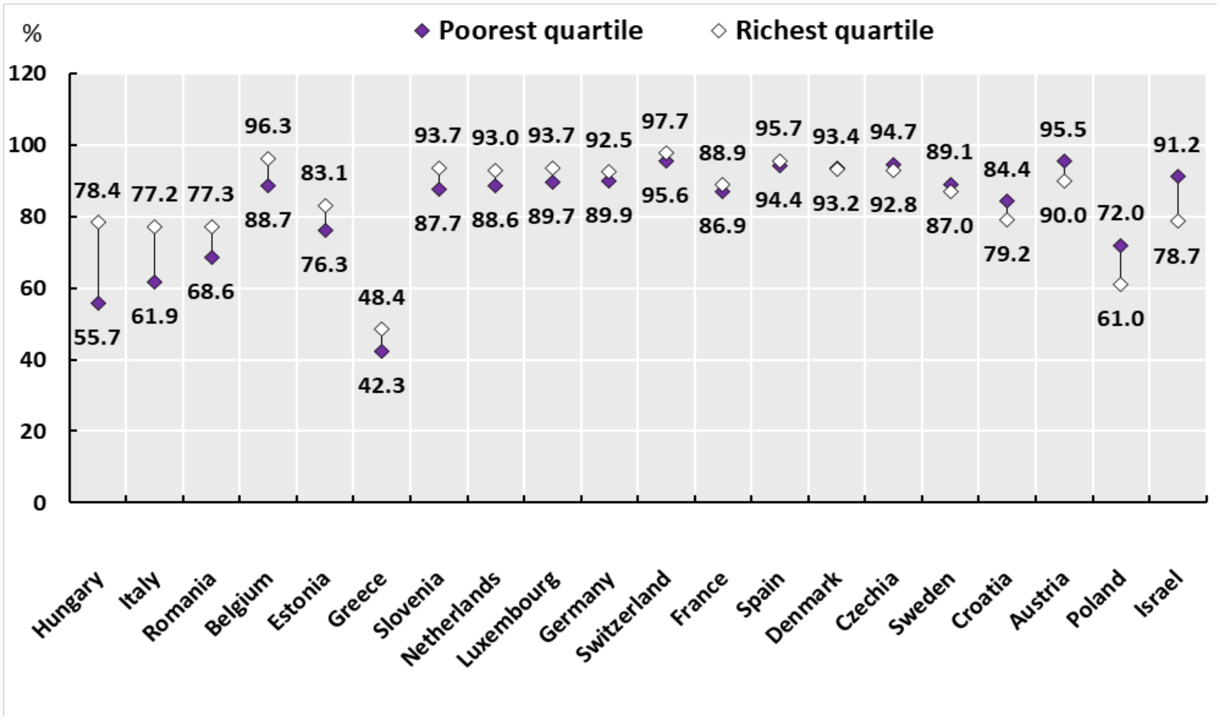


Figure 275 Inequalities in the prevalence (%) of low quality of life by country and income group (2020)



Finally, Romania is associated with the third highest income-related inequalities in the satisfaction with the health system (Figure 275). Greece is at the sixth place, while Poland is second from the bottom.

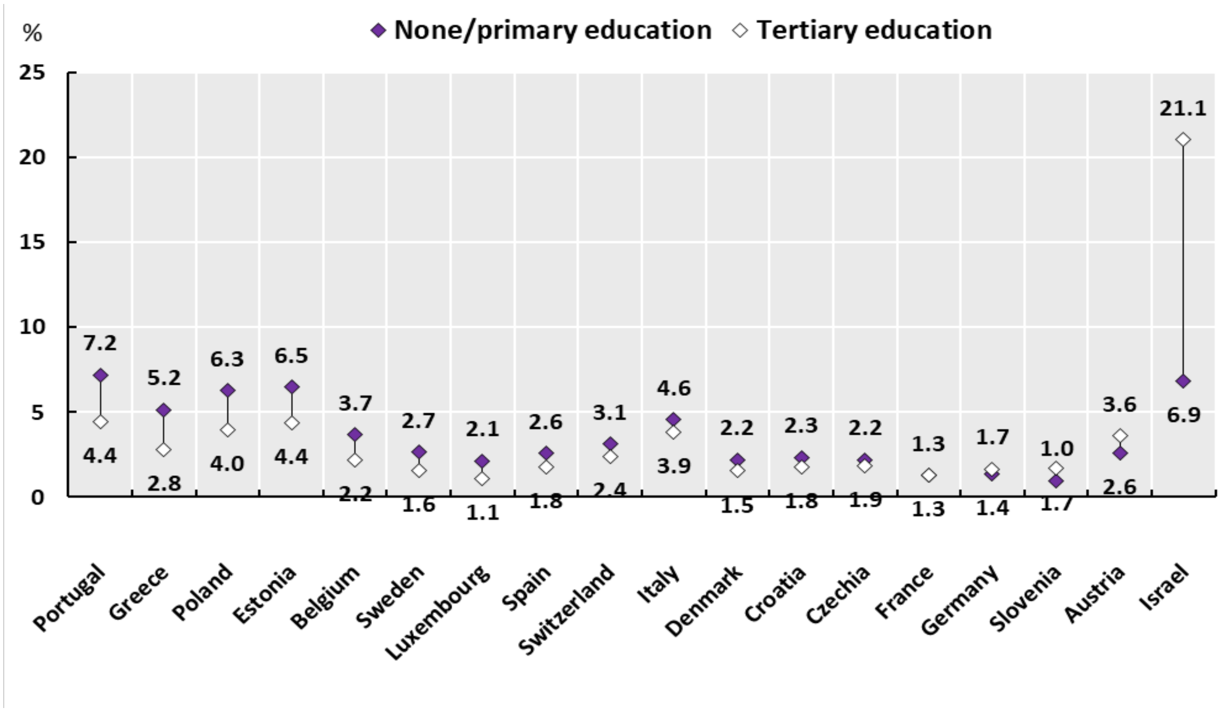
Figure 276 Inequalities in the share (%) of individuals satisfied with health system by country and income group (2020)



4.7.2. Health outcomes inequalities among education attainment groups

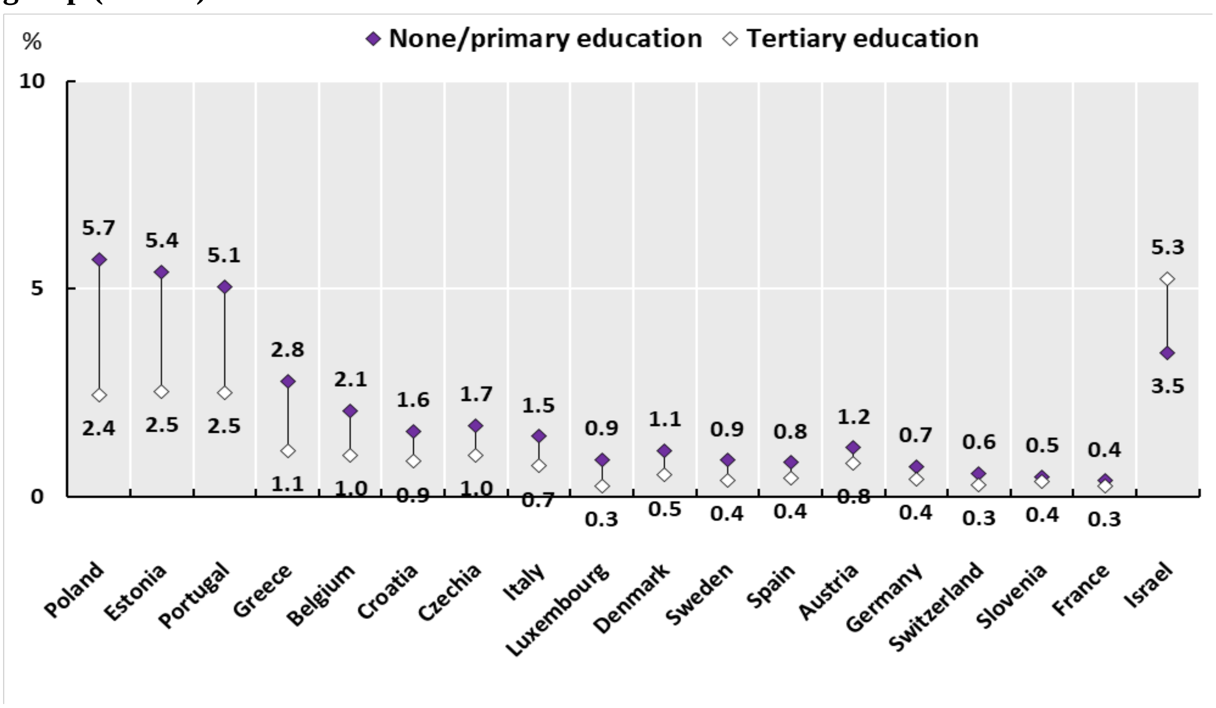
Greece and Poland are associated with the second the third highest gap in the total OOPP burden between the non/primary and tertiary education levels (Figure 276). Moreover, the largest inequalities in the pharmaceutical OOPP burden are found in Poland, while Greece has the fourth highest gap (Figure 277).

Figure 277 Inequalities in total OOPP burden (%) by country and education attainment group (wave 6)



Note: OOPP: Out-of-pocket payments.

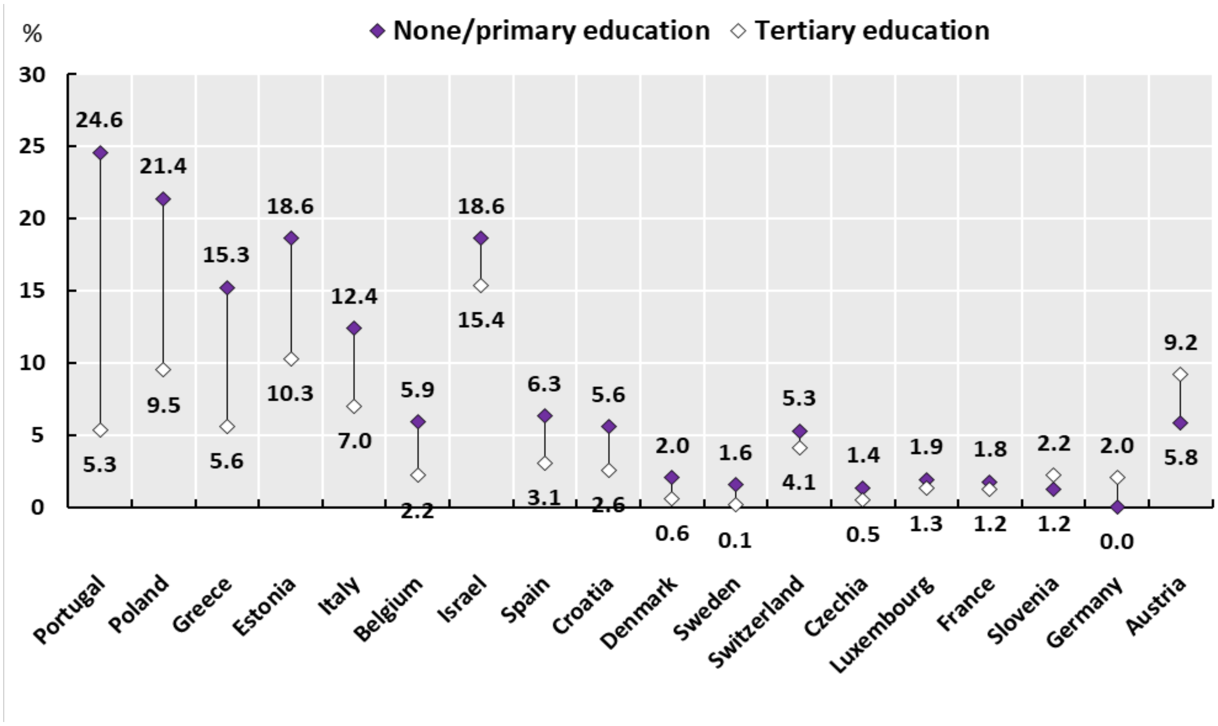
Figure 278 Inequalities in pharmaceutical OOPP burden (%) by country and education attainment group (wave 6)



Note: OOPP: Out-of-pocket payments.

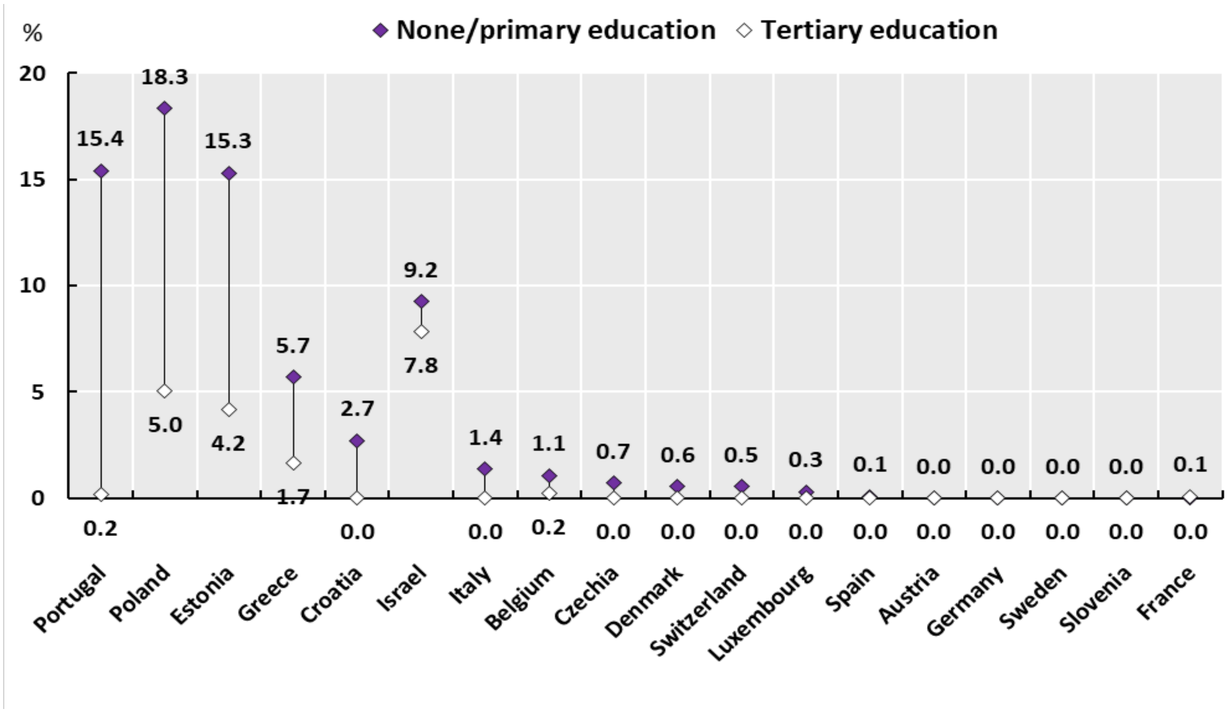
Poland and Greece have the second and third, respectively, highest education-related inequalities in the incidence of catastrophic total OOPP (Figure 278). and the second and fourth, respectively highest education-related inequalities in the incidence of catastrophic pharmaceutical OOPP (Figure 279).

Figure 279 Inequalities in the incidence (%) of catastrophic (10% threshold) total OOPP by country and education attainment group (wave 6)



Note: OOPP: Out-of-pocket payments.

Figure 280 Inequalities in the incidence (%) of catastrophic (10% threshold) pharmaceutical OOPP by country and education attainment group (wave 6)



Note: OOPP: Out-of-pocket payments.

Greece is associated with the fourth largest inequalities between education levels in the prevalence of unmet needs and Romania with the fifth largest, while Poland is second from the bottom in the ordered list of countries (Figure 280). As far as the pharmaceutical unmet needs are concerned, the highest education-related inequalities are observed in Romania, while Greece is in the seventh place and Poland in the fourth from the bottom (Figure 281).

Figure 281 Inequalities in the prevalence (%) of unmet needs by country and education attainment group (2020)

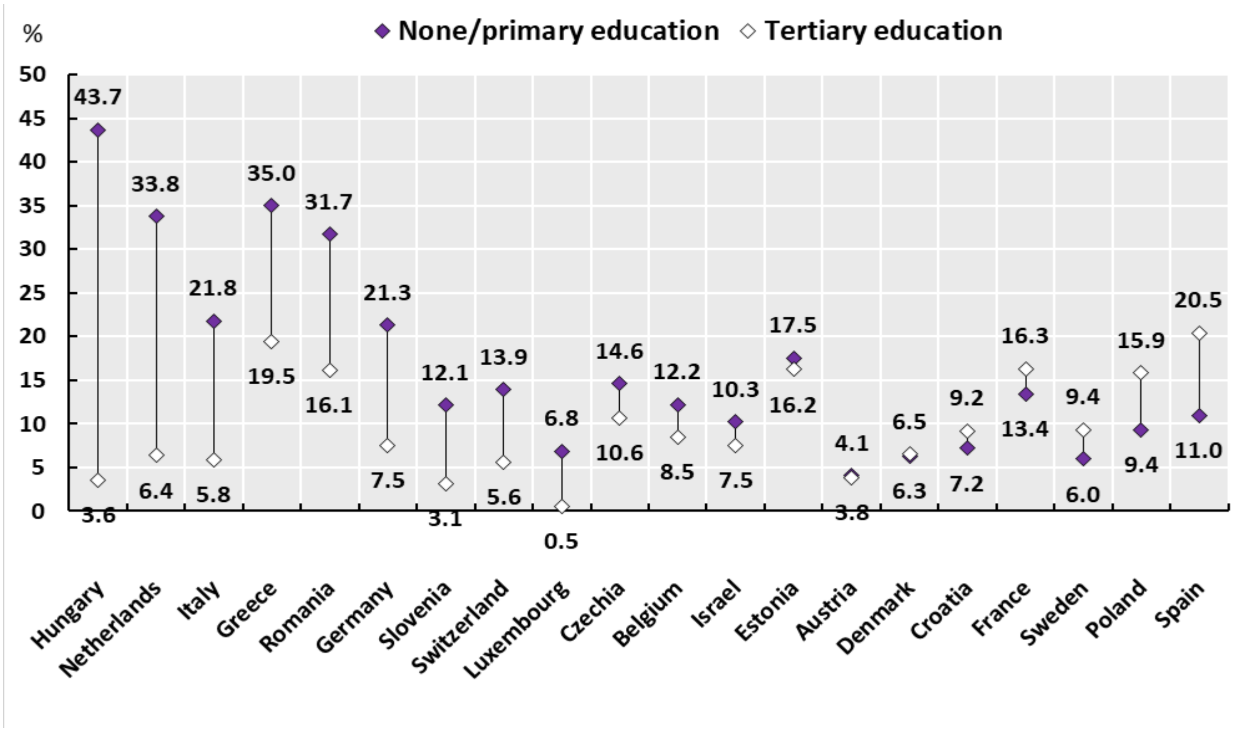
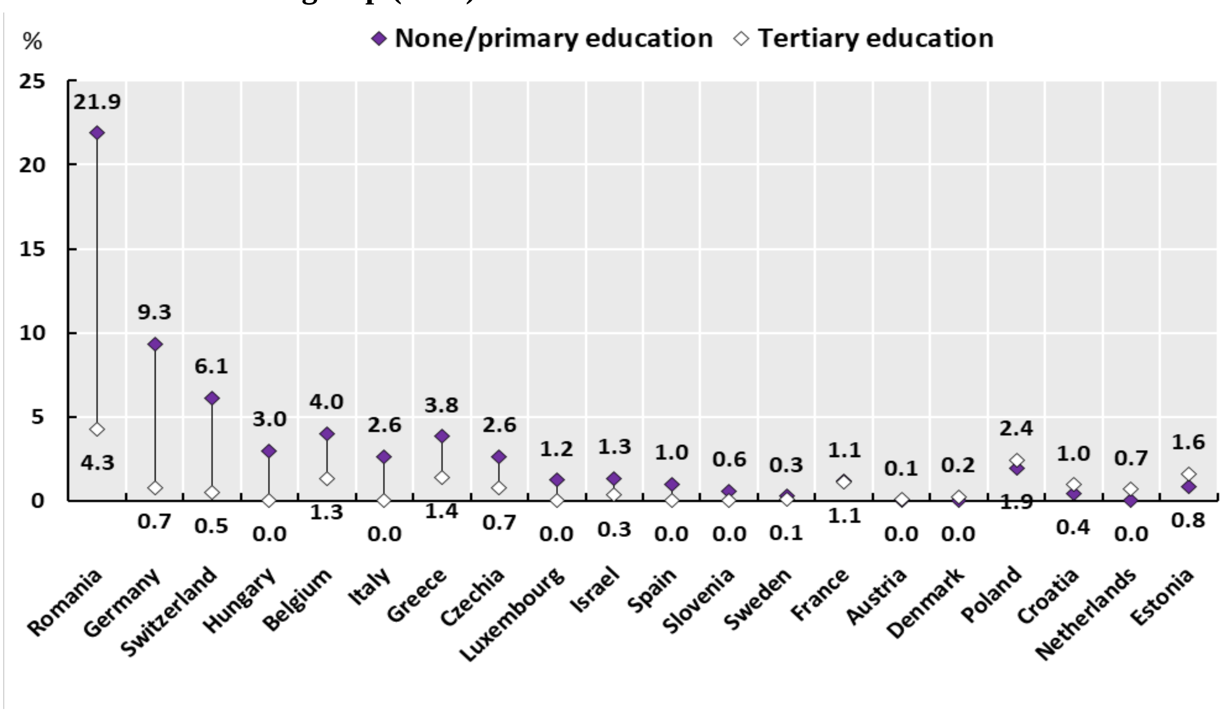


Figure 282 Inequalities in the prevalence (%) of unmet needs for medicines by country and education attainment group (2020)



The gap in the prevalence of multimorbidity between the lowest and the highest education levels is very large in Greece and Poland, which are in the third and fourth place, respectively, in the ordered list of countries, while it is much narrower in Romania, which is in the fourth place from the bottom (Figure 282). Romania is also associated with the largest inequalities in fair/poor self-reported health and Poland with the third largest, while Greece lies in the middle of the distribution (Figure 283). Moreover, Poland and Greece are associated with the fifth and sixth highest inequalities in the prevalence of low quality of life (Figure 284).

Figure 283 Inequalities in the prevalence (%) of multimorbidity by country and education attainment group (2020)

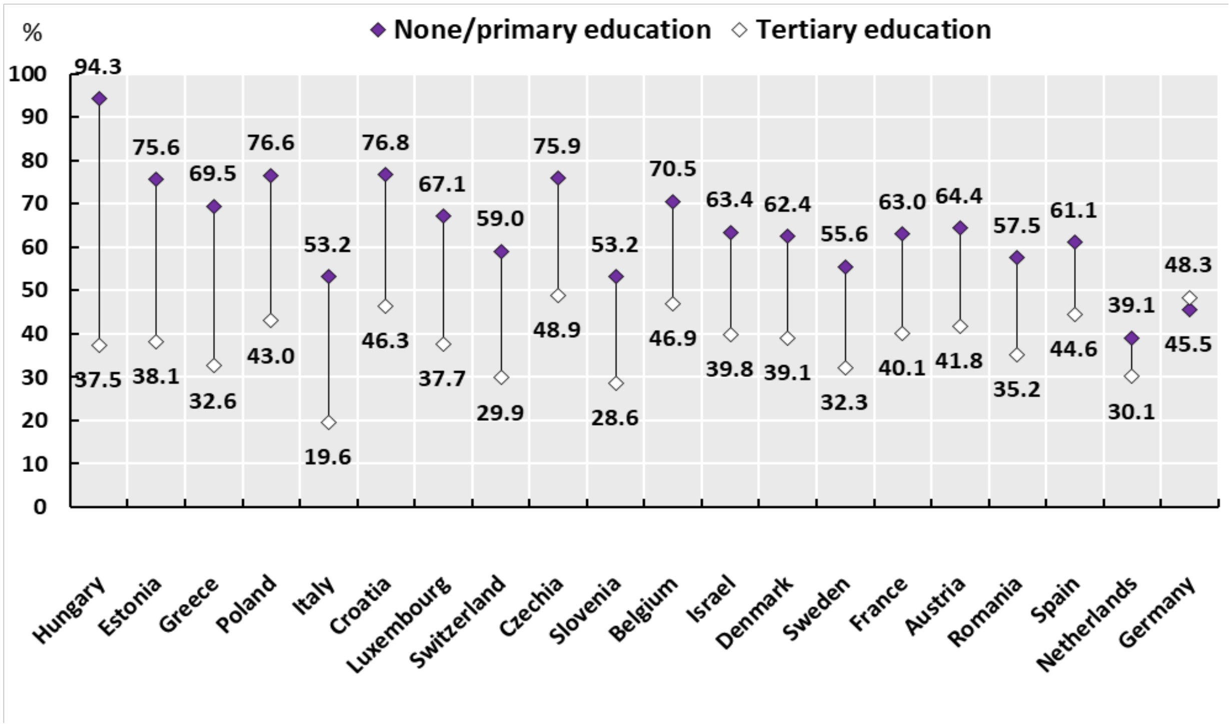


Figure 284 Inequalities in the prevalence (%) of fair/poor self-reported health by country and education attainment group (2020)

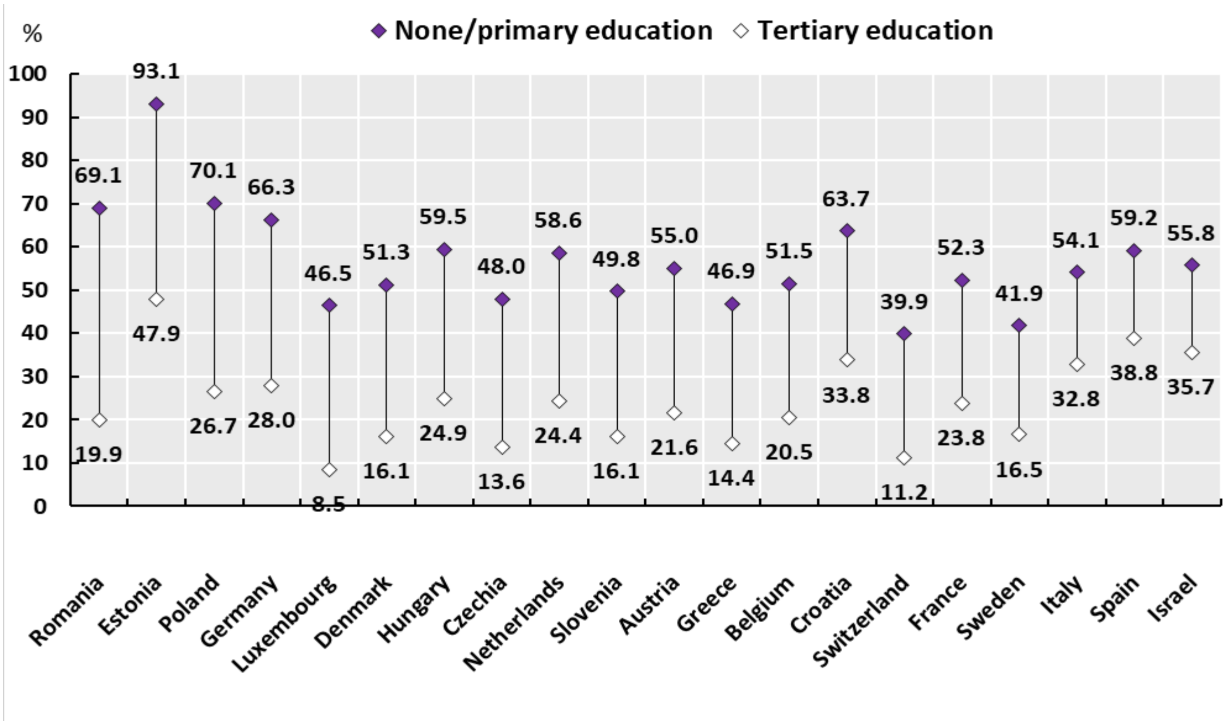
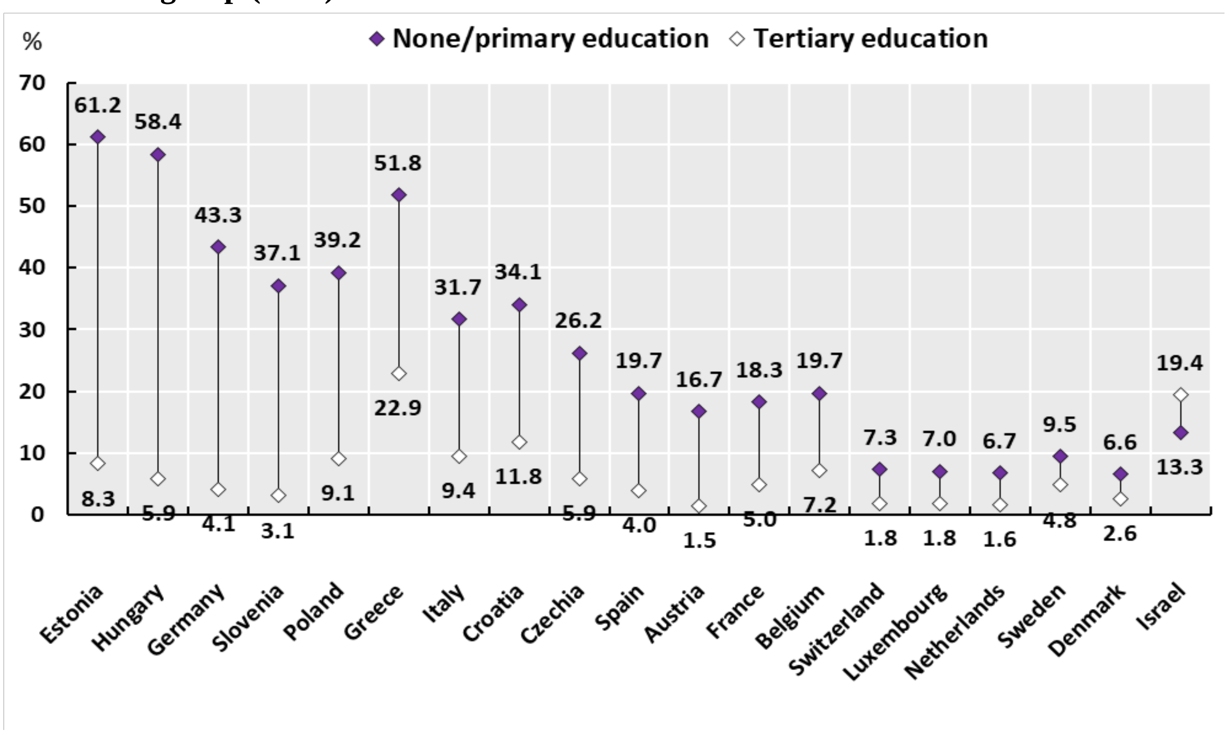
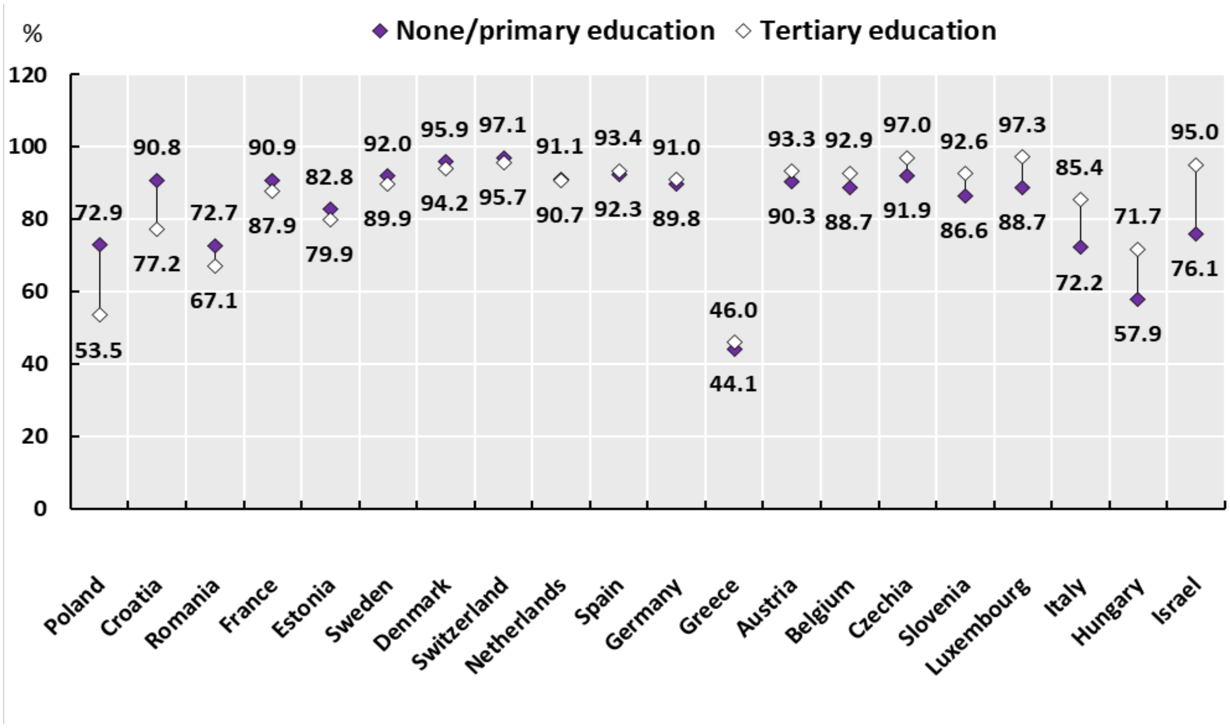


Figure 285 Inequalities in the prevalence (%) of low quality of life by country and education attainment group (2020)



Finally, the largest education-related inequalities in the share of individuals satisfied with the health system is found in Poland, while Romania is in the third highest place and Greece is found in the middle of the distribution (Figure 285).

Figure 286 Inequalities in the share (%) of individuals satisfied with health system by country and education attainment group (2020)



4.8. Econometric modelling of health outcomes and public investment in health

This section presents the results of the regression models and the effect of public investment on health outcomes.

4.8.1. Total and pharmaceutical out-of-pocket payments

Table 30 shows the average marginal effects of the determinants of total and pharmaceutical OOPP. For this health outcome with employed a two-part model regression analysis. The second and the fourth columns presents the average marginal effects of the Probit part of the model, which can be interpreted as the effect of a change in a variable on the probability of incurring OOPP. The third and the fifth columns include the average marginal effects of the GLM part of the model, which show the effect of a change in a variable on the expected value of OOPP conditional upon a positive outcome (i.e. OOPP>0).

Regarding the probability to incur (any) OOPP, female gender, working, higher education and income level, multimorbidity, arthritis, hypertension, emotional disorders, cataracts, polypharmacy and having difficulties in daily living were significantly increasing it, while supplementary health insurance, diabetes and a not Social Democratic welfare regime were decreasing it. Furthermore, higher age, female gender, being married, working, higher education and income level, multimorbidity, cardiovascular diseases, arthritis, chronic lung disease, cancer, emotional disorders, polypharmacy, limitations in usual activities and a Mediterranean or Eastern welfare regime were associated with significantly higher OOPP, whereas supplementary health insurance and diabetes were found to be significant predictors of lower OOPP.

Female gender, working, higher education and income (4th income quartile not significant) level, arthritis, hypertension, emotional disorders, cataracts, polypharmacy, limitations in daily living and a Social Democratic welfare regime were increasing the probability of incurring pharmaceutical OOPP, while supplementary health insurance was decreasing it.

Moreover, female gender, marriage, urban area of residence, higher education (significant only the tertiary group) and income level, multimorbidity, cardiovascular diseases, arthritis, chronic lung disease, cancer, diabetes, emotional disorders, cataracts, polypharmacy, limitations in daily living and a Mediterranean or an Eastern welfare regime were significant predictors of higher pharmaceutical OOPP, whereas supplementary health insurance and a Social Democratic or a Bismarckian welfare regime were associated with lower pharmaceutical OOPP.

Table 31 Average marginal effects of independent predictors of total and pharmaceutical OOPP (€) following two-part models' estimation (wave 6)

	Total OOPP (€)		**Pharmaceutical OOPP (€)**	
Variables	**Prob. (Probit)**	**Cond. (GLM)**	**Prob. (Probit)**	**Cond. (GLM)**
Age	-0.0003 (0.0005)	1.81** (0.82)	-0.0004 (0.0006)	0.28 (0.25)
Gender (ref.: Male)				
Female	0.0261*** (0.0071)	46.13*** (12.90)	0.0347*** (0.0083)	15.57*** (3.71)
Married (ref.: No)				
Yes	0.0033 (0.0084)	35.72** (14.01)	0.0132 (0.0101)	13.44*** (4.37)
Urban area (ref.: No)				
Yes	0.0089 (0.0099)	15.18 (15.40)	0.0148 (0.0123)	15.15*** (5.86)
Employment status (ref.: Not working)				

Working	0.0564*** (0.0105)	53.25** (21.87)	0.0603*** (0.0136)	5.02 (6.26)
Education (ref.: None/primary)				
Secondary	0.0498*** (0.0099)	97.33*** (14.77)	0.0428*** (0.0117)	6.75 (4.95)
Tertiary	0.0781*** (0.0115)	167.68*** (22.01)	0.0873*** (0.0138)	28.39*** (6.53)
Income (ref.: 1st quartile)				
2nd quartile	0.0419*** (0.0108)	57.36*** (15.62)	0.0395*** (0.0123)	9.55* (5.19)
3rd quartile	0.0528*** (0.0108)	103.01*** (16.64)	0.0405*** (0.0130)	15.29*** (5.43)
4th quartile	0.0476*** (0.0118)	165.86*** (18.93)	0.0261* (0.0142)	17.91*** (5.99)
Suppl. health insurance (ref.: No)				
Yes	-0.0690*** (0.0089)	-39.83*** (15.20)	-0.1186*** (0.0112)	-22.84*** (5.03)
Multimorbidity (ref.: No)				
Yes	0.0243** (0.0106)	45.21*** (17.16)	0.0211* (0.0123)	31.86*** (5.01)
Cardiovascular diseases (ref.: No)				
Yes	-0.0033 (0.0097)	52.57*** (16.84)	-0.0026 (0.0115)	18.68*** (4.87)
Arthritis (ref.: No)				
Yes	0.0279*** (0.0085)	49.96*** (14.91)	0.0367*** (0.0102)	14.70*** (4.60)
Neurodegenerative diseases (ref.: No)				
Yes	0.0242* (0.0146)	5.10 (27.06)	0.0127 (0.0226)	6.98 (10.08)
Chronic lung disease (ref.: No)				
Yes	0.0160 (0.0118)	63.92*** (23.82)	0.0211 (0.0150)	25.61*** (6.32)
Cancer (ref.: No)				
Yes	0.0140 (0.0131)	52.56** (26.58)	-0.0031 (0.0184)	18.46** (8.41)
Hypertension (ref.: No)				
Yes	0.0244*** (0.0076)	6.44 (13.44)	0.0274*** (0.0093)	-2.86 (4.17)
Diabetes (ref.: No)				
Yes	-0.0205** (0.0098)	-44.62*** (13.89)	-0.0125 (0.0118)	12.29*** (4.72)
Hyperlipidemia (ref.: No)				
Yes	0.0089 (0.0085)	-1.55 (14.70)	0.0188* (0.0098)	2.60 (4.24)
Emotional disorders (ref.: No)				
Yes	0.0466*** (0.0121)	72.99*** (20.09)	0.0651*** (0.0156)	38.73*** (6.66)
Cataracts (ref.: No)				
Yes	0.0228** (0.0114)	16.40 (18.25)	0.0308** (0.0135)	12.57** (5.92)
Polypharmacy (ref.: No)				
Yes	0.0252*** (0.0085)	123.49*** (15.36)	0.0338*** (0.0106)	78.37*** (5.04)
ADL/IADL (ref.: None)				
1+	0.0100 (0.0088)	38.36** (15.28)	0.0149 (0.0110)	30.65*** (4.76)
Welfare regime (ref.: Soc. Democratic)				
Bismarckian	-0.1439*** (0.0064)	-22.00* (11.55)	-0.2052*** (0.0095)	-26.20*** (3.76)
Mediterranean	-0.1603*** (0.0095)	136.25*** (19.02)	-0.2280*** (0.0129)	24.72*** (6.15)
Eastern	-0.0979*** (0.0082)	103.62*** (16.73)	-0.0895*** (0.0102)	215.70*** (11.45)

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*
GLM: generalized linear model, OOPP: Out-of-pocket payments, Prob.: probability

4.8.2. Total and pharmaceutical out-of-pocket payments burden

Table 31 shows the average marginal effects of the independent predictors of total and pharmaceutical OOPP burden, for which a two-part model regression analysis was used. OOPP burden is the share of (total or pharmaceutical) OOPP in equivalised household net income. Female gender, working, higher education and income level, multimorbidity, arthritis, hypertension, emotional disorders, polypharmacy, limitations in daily living, a Social Democratic welfare regime and higher public health expenditure were found to be significant predictors of a higher probability of incurring (any) OOPP burden, whereas, supplementary health insurance and diabetes were significantly decreasing the probability. Furthermore, higher age, female gender, marriage, urban area of residence, working, higher education level, multimorbidity, cardiovascular disease, arthritis, chronic lung disease, emotional disorders, polypharmacy and a Mediterranean or an Eastern welfare regime were associated with higher expected total OOPP burden, while higher income level, supplementary health insurance, diabetes, a Social Democratic or a Bismarckian welfare regime and higher public health expenditure were decreasing total OOPP burden.

The probability of having any pharmaceutical OOPP burden was increasing with female gender, working, higher education and income level, multimorbidity, arthritis, hypertension, hyperlipidemia, emotional disorders, cataracts, polypharmacy, a Social Democratic welfare regime and higher public pharmaceutical health expenditure, while it was found to be decreasing with supplementary health insurance and a Mediterranean, Eastern or Bismarckian welfare regime. Furthermore, higher age, female gender, marriage, urban area, working, higher education (significant only tertiary) level, multimorbidity, cardiovascular diseases, arthritis, chronic lung disease, emotional disorders, polypharmacy, limitations in daily living and a Bismarckian, Mediterranean or Eastern welfare regime were associated with higher expected pharmaceutical OOPP burden, while higher income level, supplementary health insurance, a Social Democratic welfare regime and higher public pharmaceutical spending were significant predictors of lower expected pharmaceutical OOPP burden.

Table 32 Average marginal effects of independent predictors of total and pharmaceutical OOPP burden following two-part models' estimation (wave 6)

	Total OOPP burden		Pharmaceutical OOPP burden	
Variables	**Prob. (Logit)**	**Cond. (GLM)**	**Prob. (Logit)**	**Cond. (GLM)**
Age	-0.0000 (0.0006)	0.0002*** (0.0001)	-0.0001 (0.0007)	0.0001*** (0.0000)
Gender (ref.: Male)				

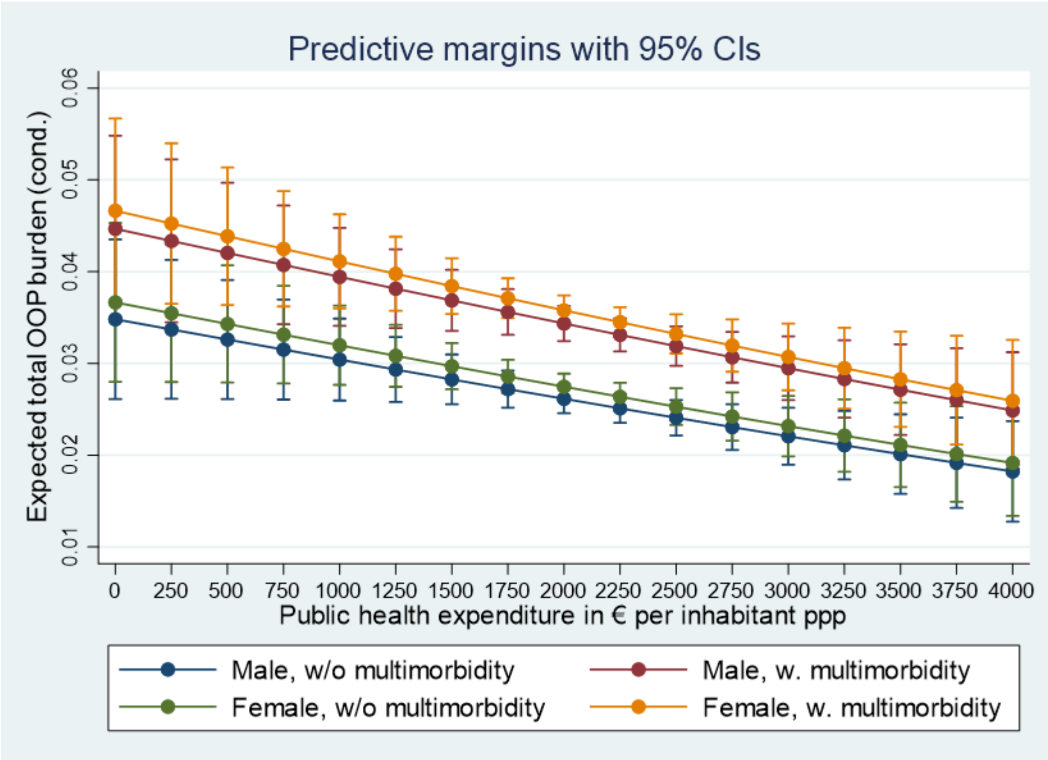
Female	0.0269*** (0.0074)	0.0014** (0.0007)	0.0358*** (0.0084)	0.0005** (0.0002)
Married (ref.: No)				
Yes	0.0045 (0.0087)	0.0069*** (0.0010)	0.0144 (0.0104)	0.0027*** (0.0003)
Urban area (ref.: No)				
Yes	0.0151 (0.0103)	0.0028** (0.0013)	0.0196 (0.0126)	0.0014*** (0.0004)
Employment status (ref.: Not working)				
Working	0.0567*** (0.0110)	0.0033** (0.0015)	0.0607*** (0.0141)	0.0010*** (0.0004)
Education (ref.: None/primary)				
Secondary	0.0478*** (0.0107)	0.0052*** (0.0013)	0.0419*** (0.0123)	0.0002 (0.0004)
Tertiary	0.0780*** (0.0123)	0.0090*** (0.0018)	0.0891*** (0.0144)	0.0014*** (0.0005)
Income (ref.: 1st quartile)				
2nd quartile	0.0417*** (0.0111)	-0.0085*** (0.0016)	0.0384*** (0.0126)	-0.0046*** (0.0005)
3rd quartile	0.0541*** (0.0112)	-0.0146*** (0.0015)	0.0416*** (0.0133)	-0.0076*** (0.0006)
4th quartile	0.0471*** (0.0123)	-0.0231*** (0.0015)	0.0241 (0.0147)	-0.0108*** (0.0006)
Suppl. health insurance (ref.: No)				
Yes	-0.0655*** (0.0099)	-0.0031*** (0.0010)	-0.1143*** (0.0121)	-0.0024*** (0.0003)
Multimorbidity (ref.: No)				
Yes	0.0251** (0.0110)	0.0036** (0.0014)	0.0214* (0.0126)	0.0012*** (0.0004)
Cardiovascular diseases (ref.: No)				
Yes	-0.0020 (0.0101)	0.0026** (0.0011)	-0.0023 (0.0118)	0.0008** (0.0004)
Arthritis (ref.: No)				
Yes	0.0275*** (0.0088)	0.0020** (0.0010)	0.0369*** (0.0104)	0.0010*** (0.0003)
Neurodegenerative diseases (ref.: No)				
Yes	0.0242 (0.0150)	0.0008 (0.0018)	0.0115 (0.0231)	0.0010 (0.0009)
Chronic lung disease (ref.: No)				
Yes	0.0152 (0.0124)	0.0045*** (0.0016)	0.0208 (0.0154)	0.0014*** (0.0004)
Cancer (ref.: No)				
Yes	0.0140 (0.0139)	0.0019 (0.0015)	-0.0047 (0.0189)	0.0009* (0.0005)
Hypertension (ref.: No)				
Yes	0.0235*** (0.0079)	0.0008 (0.0009)	0.0256*** (0.0095)	0.0003 (0.0003)
Diabetes (ref.: No)				
Yes	-0.0207** (0.0103)	-0.0038*** (0.0010)	-0.0127 (0.0122)	0.0007* (0.0004)
Hyperlipidemia (ref.: No)				
Yes	0.0100 (0.0089)	-0.0005 (0.0011)	0.0199** (0.0101)	0.0000 (0.0003)
Emotional disorders (ref.: No)				

Yes	0.0471*** (0.0127)	0.0038*** (0.0014)	0.0647*** (0.0161)	0.0021*** (0.0005)
Cataracts (ref.: No)				
Yes	0.0208* (0.0121)	-0.0007 (0.0013)	0.0278** (0.0141)	0.0005 (0.0004)
Polypharmacy (ref.: No)				
Yes	0.0241*** (0.0089)	0.0048*** (0.0010)	0.0333*** (0.0108)	0.0033*** (0.0003)
ADL/IADL (ref.: None)				
1+	0.0115 (0.0091)	0.0008 (0.0010)	0.0163 (0.0112)	0.0012*** (0.0003)
Welfare regime (ref.: Soc. Democratic)				
Bismarckian	-0.1705*** (0.0139)	-0.0019** (0.0009)	-0.2322*** (0.0133)	0.0034*** (0.0005)
Mediterranean	-0.1414*** (0.0143)	0.0147*** (0.0033)	-0.2241*** (0.0136)	0.0065*** (0.0004)
Eastern	-0.0777*** (0.0121)	0.0106** (0.0043)	-0.0815*** (0.0104)	0.0189*** (0.0011)
Public total HE	0.0027** (0.0013)	-0.0005** (0.0002)		
Public pharmaceutical HE			0.0150* (0.0079)	-0.0023*** (0.0002)

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*
ADL/IADL: limitations in Activities of Daily Living or in Instrumental Activities in Daily Living, GLM: generalized linear model, HE: health expenditure, OOPP: Out-of-pocket payments, Prob.: probability

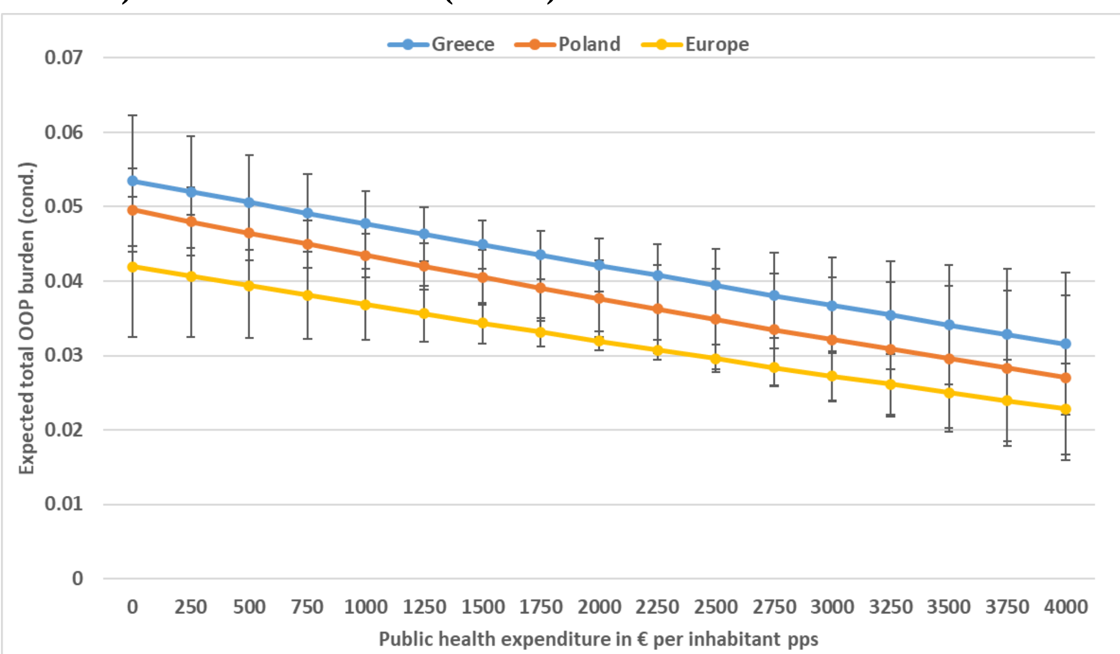
Figure 286 illustrates the impact of public total health expenditure, i.e. public investment in health, on total OOPP burden by gender and multimorbidity status by using the predictive values of the abovementioned regression models. It is clear that increased public health expenditure reduces total OOPP burden for both sexes, with or without multimorbidity. Furthermore, women are associated with higher total OOPP burden compared with men, whether being afflicted with multimorbidity or not. In addition, regardless of their sex, individuals with multimorbidity have higher total OOPP burden, but they also appear to benefit more by increases in public investment in health, since the downward slope is slightly steeper compared with that of individuals without multimorbidity. A steeper slope also applies to females in comparison with males. Figure 287 further investigates the impact of public investment in health on total OOPP burden in Greece and Poland specifically. It appears that both countries have higher total OOPP burden compared with the European average. In addition, for both countries, the positive effect of increased public investment on reducing total OOPP burden is evident, namely as public health expenditure increases, total OOPP burden decreases. Furthermore, a closer look reveals that the slope is steeper in the case of Poland, which means that it can gain more from public health investment in terms of reducing its citizens’ total OOPP burden.

Figure 287 Impact of public health expenditure on total OOPP burden (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

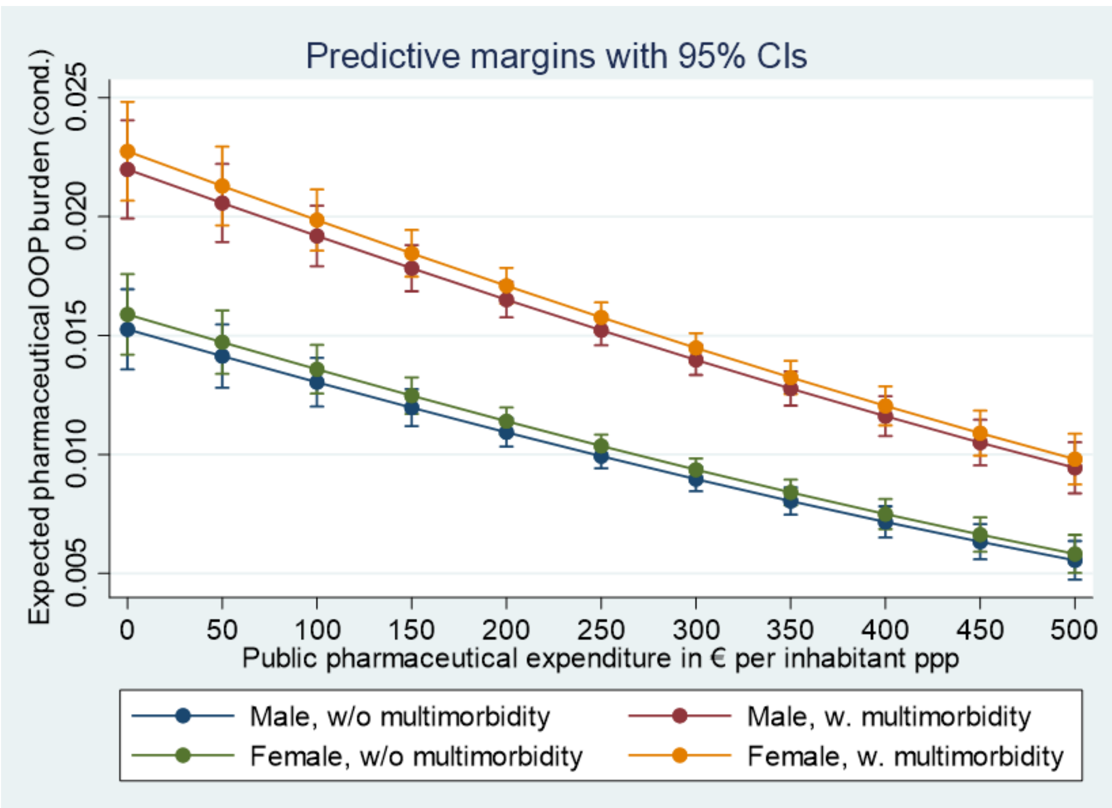
Figure 288 Impact of public health expenditure on total OOPP burden (predictive margins with 95% CIs) in Greece and Poland (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

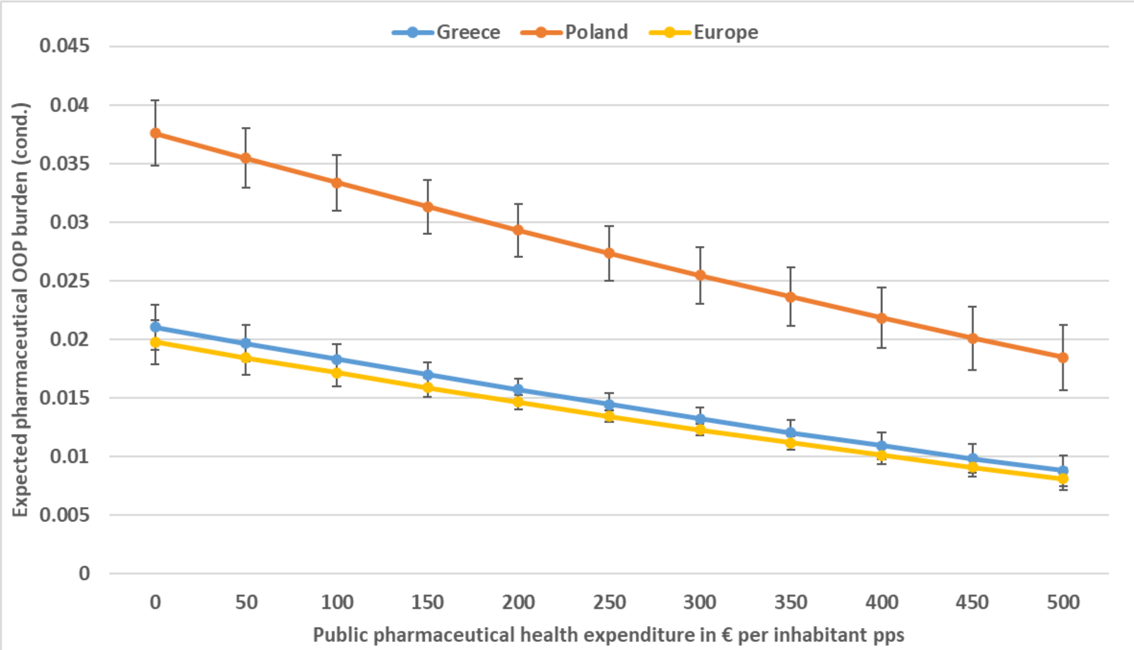
Figure 288 displays the impact of public investment in pharmaceutical care on pharmaceutical OOPP burden by gender and multimorbidity status. Increased public pharmaceutical spending decreases pharmaceutical OOPP burden regardless of sex and multimorbidity status. Again, women and those with multimorbidity are associated with higher pharmaceutical OOPP burden. In addition, women compared with men and individuals with multimorbidity compared with those without multimorbidity are associated with a steeper slope. Figure 289 focus on the impact of public pharmaceutical payments on pharmaceutical OOPP burden in Greece and Poland. Higher public investment in pharmaceutical care reduces the pharmaceutical OOPP burden in both countries. In addition, the effect appears to be larger in Poland, which lies considerably higher compared with the European average and Greece.

Figure 289 Impact of pharmaceutical health expenditure on pharmaceutical OOPP burden (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 290 Impact of pharmaceutical health expenditure on pharmaceutical OOPP burden (predictive margins with 95% CIs) in Greece and Poland (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

4.8.3. Total and pharmaceutical catastrophic out-of-pocket payments

Table 32 presents the average marginal effects of the determinants of the probability of catastrophic total and pharmaceutical OOPP, which were derived from probit regression analyses. As a reminder, the threshold of catastrophe was set at 10% of equivalized net household income. Regarding catastrophic total OOPP, higher age, female gender, marriage, multimorbidity, chronic lung disease, polypharmacy and a Bismarckian, Mediterranean or Eastern welfare regime were significant risk factors, whereas, higher income level, supplementary health insurance, diabetes and higher public health expenditure were decreasing the probability. As far as the probability of catastrophic pharmaceutical OOPP is concerned, higher age, marriage, cardiovascular diseases, chronic lung disease, diabetes, emotional disorders, polypharmacy and a Bismarckian, Mediterranean or Eastern welfare regime were increasing it, while higher income level and higher public pharmaceutical health expenditure were significantly associated with lower risk.

Table 33 Average marginal effects of independent predictors of the probability of total and pharmaceutical catastrophic OOPP following probit models' estimation (wave 6)

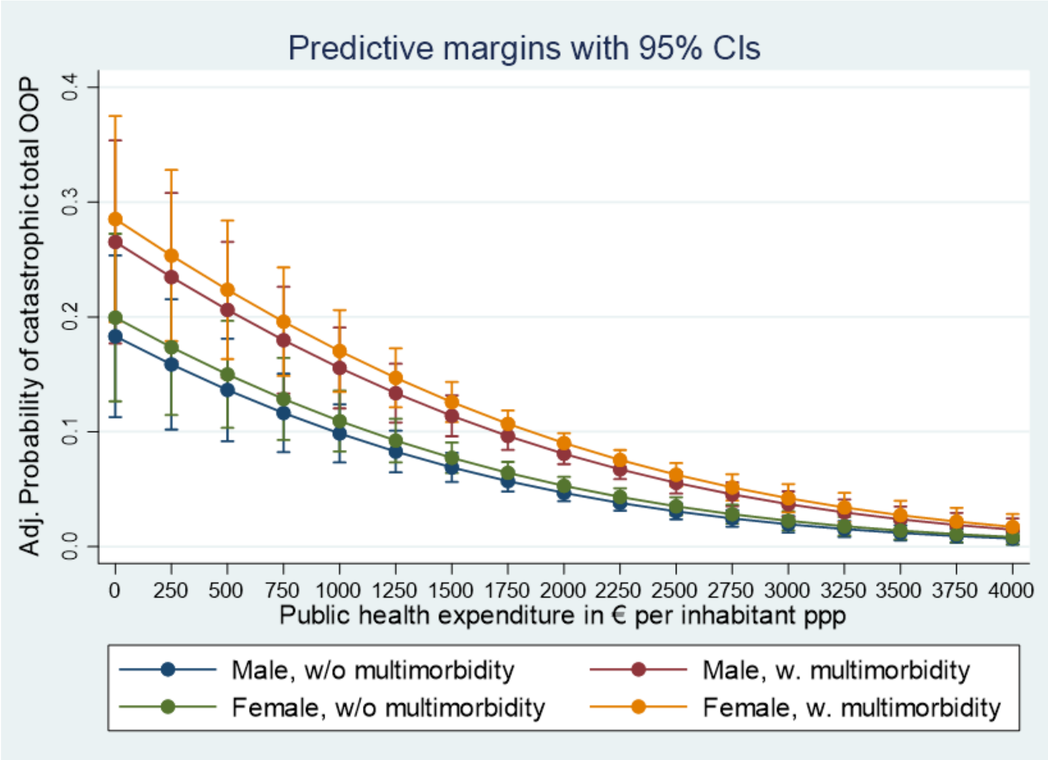
	Catastrophic total OOPP	Catastrophic pharmaceutical OOPP
Variables	**Prob. (Probit)**	**Prob. (Probit)**
Age	0.0006** (0.0003)	0.0003*** (0.0001)
Gender (ref.: Male)		
Female	0.0078** (0.0036)	0.0007 (0.0017)
Married (ref.: No)		
Yes	0.0269*** (0.0055)	0.0060** (0.0026)
Urban area (ref.: No)		
Yes	-0.0108* (0.0059)	-0.0042* (0.0024)
Employment status (ref.: Not working)		
Working	0.0013 (0.0087)	-0.0054 (0.0037)
Education (ref.: None/primary)		
Secondary	0.0075 (0.0058)	-0.0028 (0.0024)
Tertiary	0.0123 (0.0092)	0.0027 (0.0051)
Income (ref.: 1st quartile)		
2nd quartile	-0.0414*** (0.0085)	-0.0253*** (0.0041)
3rd quartile	-0.0615*** (0.0084)	-0.0372*** (0.0037)
4th quartile	-0.0933*** (0.0074)	-0.0464*** (0.0032)
Suppl. health insurance (ref.: No)		
Yes	-0.0214*** (0.0070)	-0.0029 (0.0026)
Multimorbidity (ref.: No)		
Yes	0.0145** (0.0064)	0.0012 (0.0031)
Cardiovascular diseases (ref.: No)		
Yes	0.0117* (0.0062)	0.0061** (0.0027)
Arthritis (ref.: No)		
Yes	0.0048 (0.0056)	0.0020 (0.0026)
Neurodegenerative diseases (ref.: No)		
Yes	0.0030 (0.0114)	0.0048 (0.0051)
Chronic lung disease (ref.: No)		
Yes	0.0198** (0.0081)	0.0091** (0.0036)
Cancer (ref.: No)		
Yes	0.0093 (0.0095)	0.0081 (0.0052)
Hypertension (ref.: No)		
Yes	0.0020 (0.0051)	-0.0006 (0.0022)
Diabetes (ref.: No)		
Yes	-0.0128** (0.0056)	0.0068** (0.0026)
Hyperlipidemia (ref.: No)		
Yes	-0.0044 (0.0049)	-0.0020 (0.0021)
Emotional disorders (ref.: No)		
Yes	0.0110 (0.0084)	0.0078** (0.0032)

Cataracts (ref.: No)		
Yes	0.0074 (0.0076)	0.0013 (0.0032)
Polypharmacy (ref.: No)		
Yes	0.0168*** (0.0058)	0.0094*** (0.0026)
ADL/IADL (ref.: None)		
1+	0.0081 (0.0056)	0.0029 (0.0025)
Welfare regime (ref.: Soc. Democratic)		
Bismarckian	0.0426*** (0.0079)	0.0759*** (0.0104)
Mediterranean	0.0553*** (0.0117)	0.0552*** (0.0031)
Eastern	0.0398*** (0.0120)	0.0154*** (0.0013)
Public total HE	-0.0050*** (0.0008)	
Public pharmaceutical HE		-0.0555*** (0.0025)

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*
ADL/IADL: limitations in Activities of Daily Living or in Instrumental Activities in Daily Living, HE: health expenditure, OOPP: Out-of-pocket payments, Prob.: probability

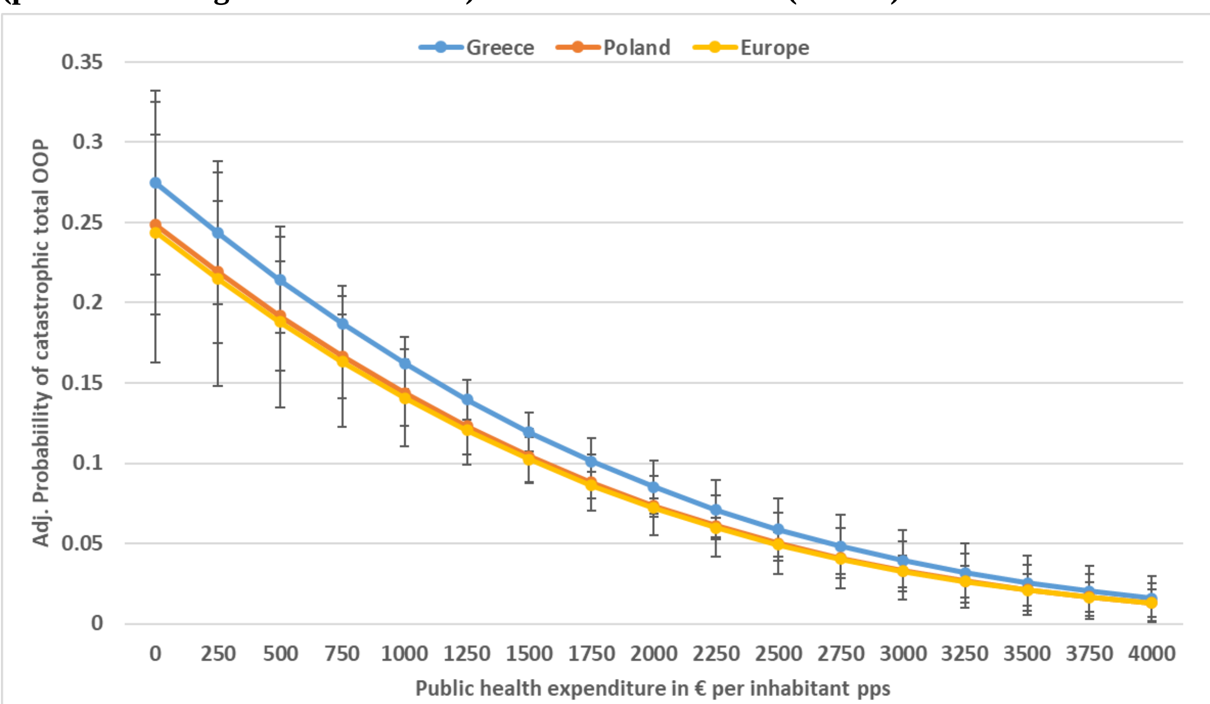
Figure 290 shows the impact of public health expenditure on the incidence of catastrophic total OOPP by gender and multimorbidity status. It is evident that higher investment in health reduces the risk of catastrophic total OOPP. Furthermore, a non-linear relationship exists between the probability of catastrophic total OOPP and public health expenditure, where higher public investment in health reduces the risk of catastrophe, but with decreasing returns. This applies to both sexes and regardless of multimorbidity status. Also, it appears that the positive effect of higher public health expenditure is greater of women and those individuals with multimorbidity, since the downward slopes are steeper. Figure 291 places the focus on Greece and Poland. The probability of catastrophic total OOPP is higher in Greece compared with that observed in Poland and Europe. Nevertheless, higher public health expenditure decreases the risk of catastrophe for both countries, in Greece in particular.

Figure 291 Impact of public health expenditure on the incidence of catastrophic total OOPP (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

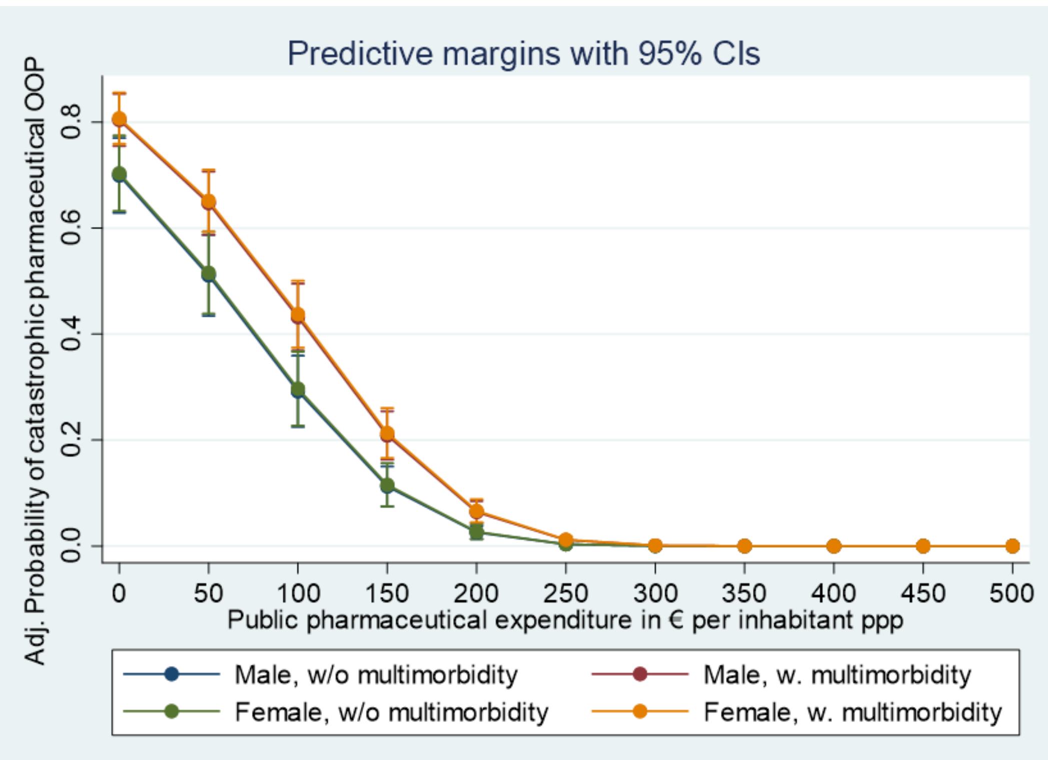
Figure 292 Impact of public health expenditure on the probability of catastrophic total OOPP (predictive margins with 95% CIs) in Greece and Poland (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

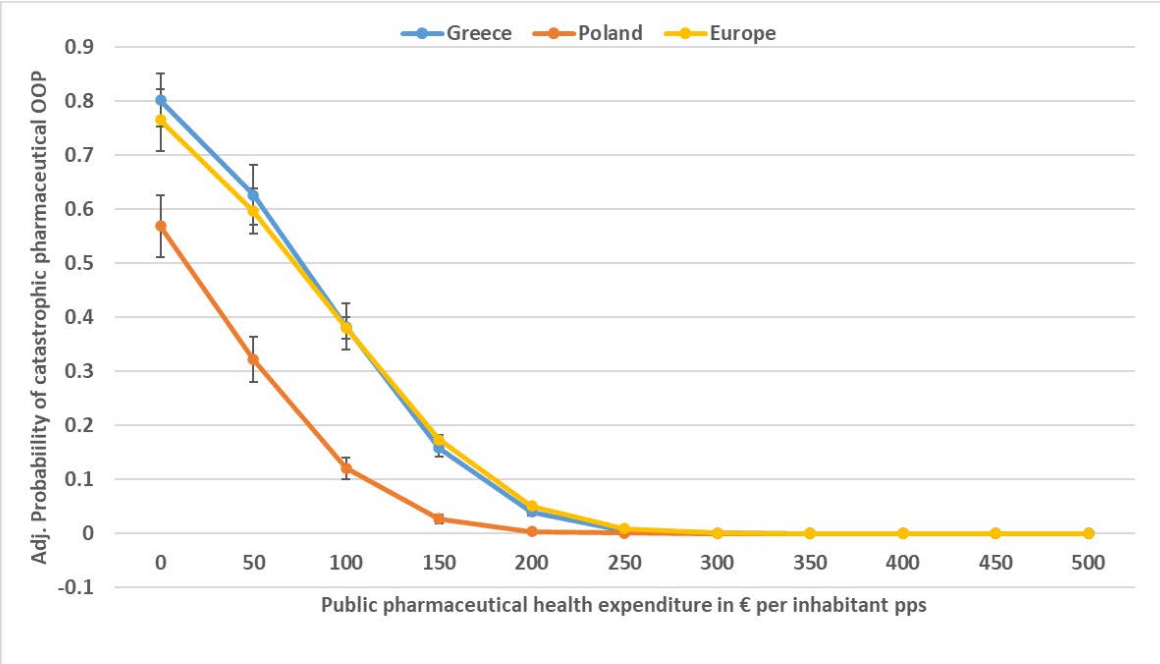
Figure 292 presents the impact of pharmaceutical health expenditure on the probability of catastrophic pharmaceutical OOPP by gender and multimorbidity status. It is clear that higher public investment in pharmaceutical care reduces the risk of catastrophe, more so for individuals with multimorbidity; there appears to be no difference between sexes concerning the probability of catastrophic pharmaceutical OOPP. In addition, the returns are diminishing following 150 euros per inhabitant. Figure 293 focuses on Greece and Poland. Higher investment in pharmaceutical care leads to decreases in the probability of catastrophe for both countries. Furthermore, the slope for Greece coincides with that of the European average, while the probability of catastrophe is lower for Poland.

Figure 293 Impact of pharmaceutical health expenditure on the probability of catastrophic pharmaceutical OOPP (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 294 Impact of pharmaceutical health expenditure on the probability of pharmaceutical catastrophic OOPP (predictive margins with 95% CIs) in Greece and Poland (wave 6)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments, pps: purchasing power standard.

4.8.4. Total and pharmaceutical unmet needs

Table 33 displays the average marginal effects of the determinants of the probability of total and pharmaceutical unmet needs, which were derived from probit model regression analyses. Regarding overall unmet needs, urban area, arthritis, emotional disorders, limitations in daily activities and Social Democratic or a Bismarckian welfare regime were significant risk factors, whereas higher age, higher income level, hyperlipidemia, an Eastern welfare regime and higher public total health expenditure were decreasing the probability. As far as pharmaceutical unmet needs are concerned, limitations in daily living and a Bismarckian, Mediterranean or Eastern welfare regime were increasing the probability, whereas, higher age, working, higher income level, a Social Democratic welfare regime and higher public pharmaceutical spending were decreasing it.

Table 34 Average marginal effects of independent predictors of the probability of total and pharmaceutical unmet needs following probit models' estimation (wave 8)

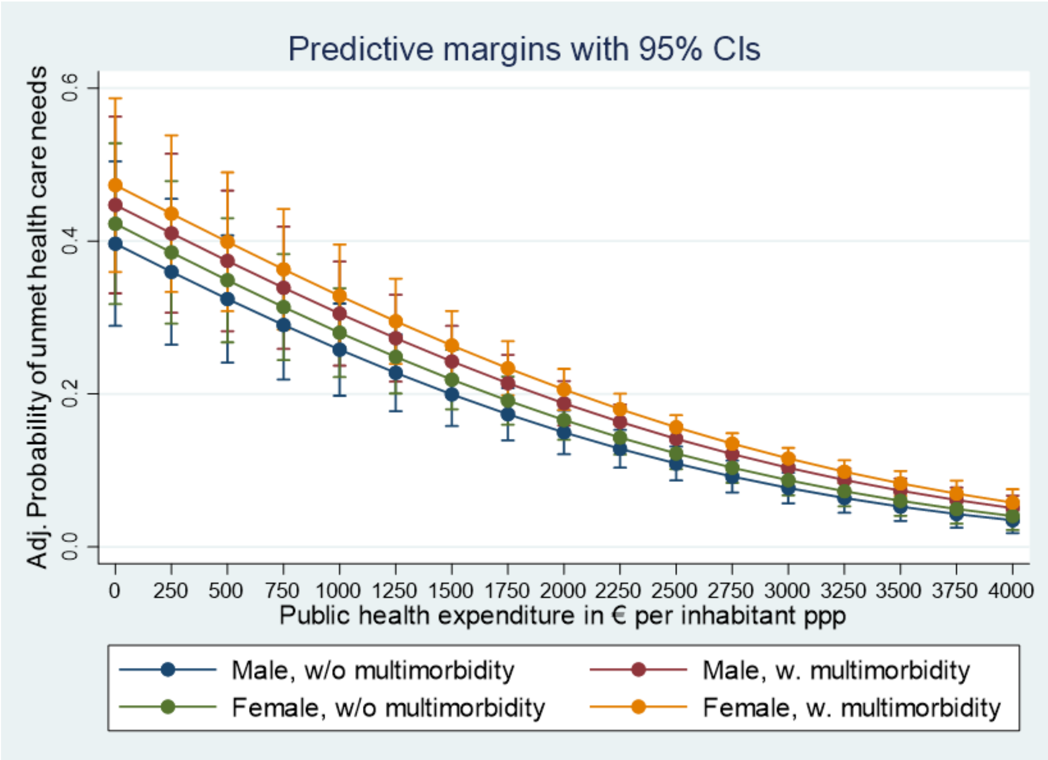
	Unmet needs for health care	Unmet needs for pharmaceutical care
Variables	**Prob. (Probit)**	**Prob. (Probit)**
Age	-0.0050*** (0.0012)	-0.0006*** (0.0002)
Gender (ref.: Male)		
Female	0.0149 (0.0102)	-0.0017 (0.0029)
Married (ref.: No)		
Yes	-0.0230* (0.0118)	-0.0017 (0.0028)
Urban area (ref.: No)		
Yes	0.0424** (0.0171)	0.0024 (0.0046)
Employment status (ref.: Not working)		
Working	-0.0224 (0.0189)	-0.0146*** (0.0037)
Education (ref.: None/primary)		
Secondary	-0.0140 (0.0177)	-0.0083 (0.0054)
Tertiary	-0.0117 (0.0199)	-0.0069 (0.0067)
Income (ref.: 1st quartile)		
2nd quartile	-0.0322** (0.0146)	-0.0051 (0.0040)
3rd quartile	-0.0369** (0.0181)	-0.0096*** (0.0037)
4th quartile	-0.0670*** (0.0155)	-0.0090** (0.0044)
Suppl. health insurance (ref.: No)		
Yes	0.0148 (0.0136)	-0.0038 (0.0029)
Multimorbidity (ref.: No)		
Yes	0.0053 (0.0144)	0.0014 (0.0037)
Cardiovascular diseases (ref.: No)		
Yes	0.0077 (0.0123)	0.0024 (0.0033)
Arthritis (ref.: No)		
Yes	0.0371*** (0.0119)	0.0029 (0.0031)
Neurodegenerative diseases (ref.: No)		
Yes	-0.0073 (0.0252)	-0.0027 (0.0063)
Chronic lung disease (ref.: No)		
Yes	0.0189 (0.0154)	0.0046 (0.0045)
Cancer (ref.: No)		
Yes	0.0185 (0.0195)	0.0008 (0.0055)
Hypertension (ref.: No)		
Yes	-0.0064 (0.0100)	-0.0013 (0.0028)
Diabetes (ref.: No)		
Yes	0.0274 (0.0168)	-0.0019 (0.0031)
Hyperlipidemia (ref.: No)		
Yes	-0.0322*** (0.0106)	-0.0029 (0.0031)
Emotional disorders (ref.: No)		
Yes	0.0340** (0.0169)	0.0068 (0.0052)
Cataracts (ref.: No)		

Yes	0.0106 (0.0134)	0.0055 (0.0044)
Polypharmacy (ref.: No)		
Yes	0.0172 (0.0138)	0.0013 (0.0027)
ADL/IADL (ref.: None)		
1+	0.0723*** (0.0136)	0.0170*** (0.0049)
Welfare regime (ref.: Soc. Democratic)		
Bismarckian	0.0365* (0.0191)	0.0092*** (0.0035)
Mediterranean	-0.0425 (0.0293)	0.0061** (0.0031)
Eastern	-0.0977*** (0.0251)	0.0282*** (0.0073)
Public total HE	-0.0086*** (0.0013)	
Public pharmaceutical HE		-0.0043** (0.0019)

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*
ADL/IADL: limitations in Activities of Daily Living or in Instrumental Activities in Daily Living, HE: health expenditure, Prob.: probability

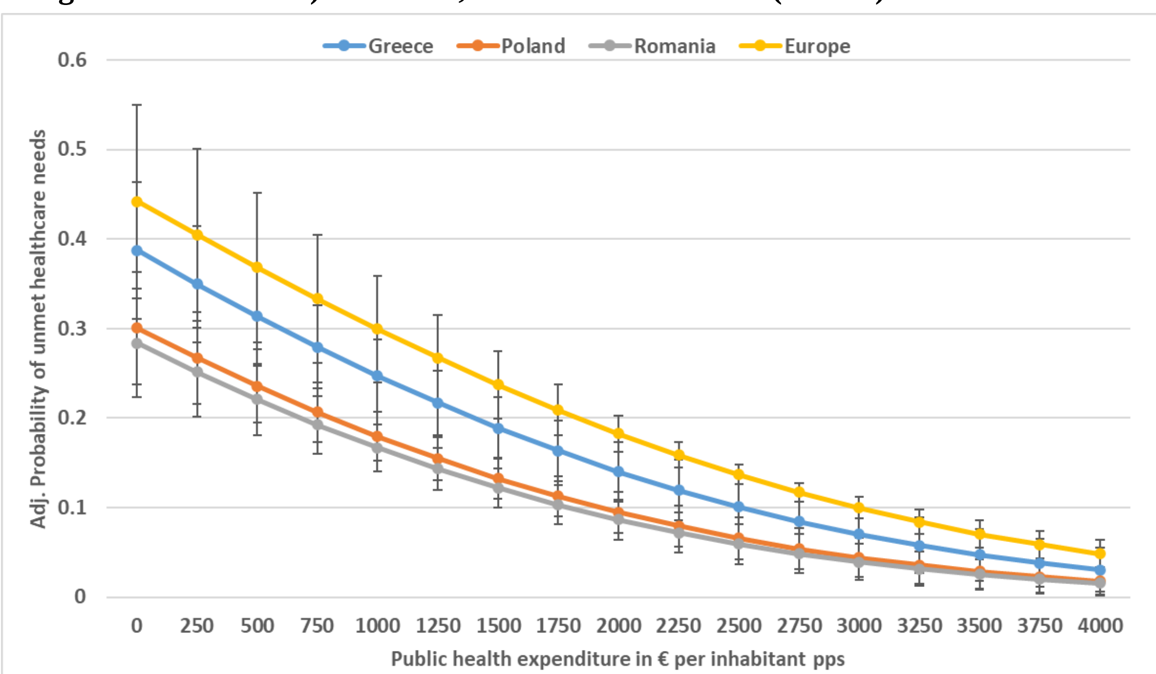
Figure 294 shows the impact of public health expenditure on the risk of having an unmet need for healthcare by gender and multimorbidity status. Larger public investment in health reduces the probability of having an unmet need. The relationship is non-linear, namely there are diminishing returns. Although women and individuals are associated with a higher risk on unmet needs, the probability differences between men and women and between individuals with and without multimorbidity tend to decrease as public health expenditure increases. This means that those with a higher risk of unmet needs tend to benefit more with increases in public investment in health. It is also interesting that the uncertainty of the estimates, i.e. the confidence interval, also declines with higher public health spending. Figure 295 further focuses on Greece, Poland and Romania. Public investment in health decreases the risk of unmet needs for healthcare in all three countries. Furthermore, the adjusted probability is higher in Europe overall (compared with the three countries), followed by Greece, Poland and Romania. Due to the diminishing returns, all slopes tend to converge as public health expenditure increases.

Figure 295 Impact of public health expenditure on the probability of unmet needs (predictive margins with 95% CIs) by gender and multimorbidity status (wave 8)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

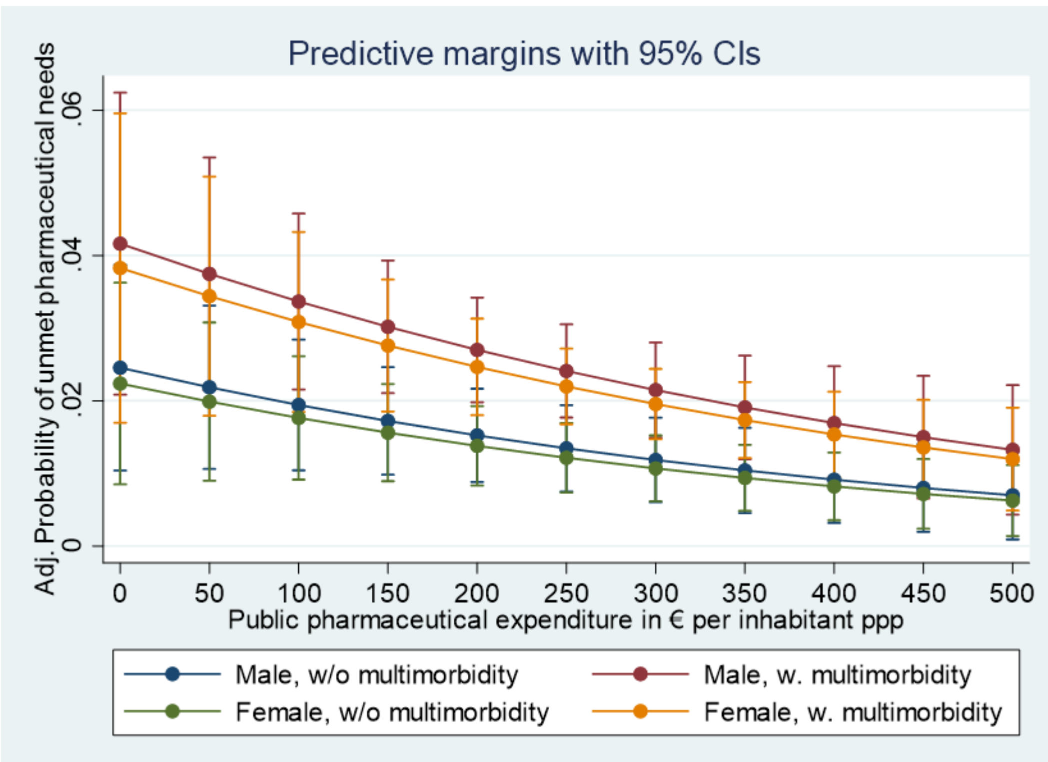
Figure 296 Impact of public health expenditure on the probability of unmet needs (predictive margins with 95% CIs) in Greece, Poland and Romania (wave 8)



Note: CIs: confidence intervals, pps: purchasing power standard.

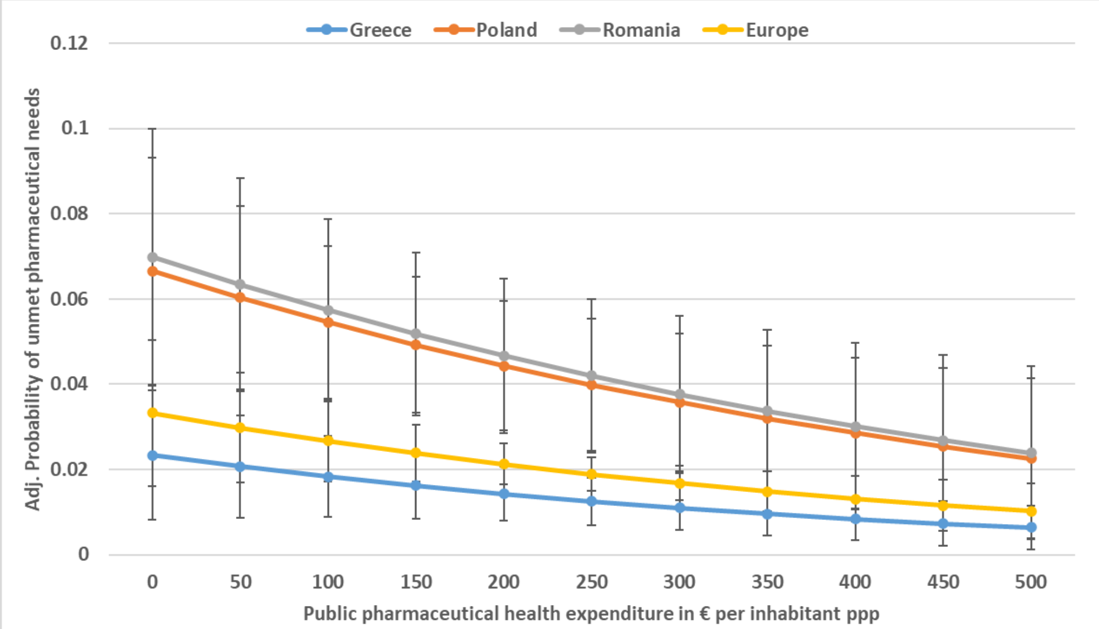
Figure 296 presents the effect of pharmaceutical health expenditure on the probability of unmet needs for pharmaceutical care by gender and multimorbidity status. A rise in public investment in pharmaceutical care reduces the risk of unmet pharmaceutical needs regardless of sex or multimorbidity status. The risk is higher among women and those with multimorbidity, however, these groups benefit more from increases in public pharmaceutical spending. Figure 297 displays the effect of pharmaceutical health spending on pharmaceutical unmet needs in Greece, Poland and Romania. Increases in public investment in pharmaceutical care decreases the probability of pharmaceutical unmet needs in all three countries, in Romania and Poland in particular.

Figure 297 Impact of pharmaceutical health expenditure on the probability of unmet needs for medicines (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



Note: CIs: confidence intervals.

Figure 298 Impact of pharmaceutical health expenditure on the probability of unmet needs for medicines (predictive margins with 95% CIs) in Greece, Poland and Romania (wave 6)



Note: CIs: confidence intervals, pps: purchasing power standard.

4.8.5. Self-reported health and quality of life

Table 34 presents the average marginal effects of independent predictors of the probability of fair/poor self-reported health and low quality of life, which were derived for probit model regression analyses. Multimorbidity, cardiovascular diseases, arthritis, neurodegenerative diseases, chronic lung disease, cancer, diabetes, emotional disorders, polypharmacy, limitations in daily living, obesity, sedentary life and a Bismarckian, Mediterranean or Eastern welfare regime were significant risk factors of fair/poor self-reported health, whereas working, higher education and income level, supplementary health insurance, hypertension, hyperlipidemia and a Social Democratic welfare regime were significantly decreasing the risk. Regarding low quality of life, cardiovascular diseases, neurodegenerative diseases, emotional disorders, polypharmacy, limitations in daily activities, drinking, sedentary life and a Bismarckian welfare regime were significantly increasing the risk, while marriage, higher education and income level, supplementary health insurance, a Social Democratic welfare regime and higher public total health spending were decreasing it.

Table 35 Average marginal effects of independent predictors of the probability of fair/poor self-reported health and low quality of life following probit models' estimation (wave 8)

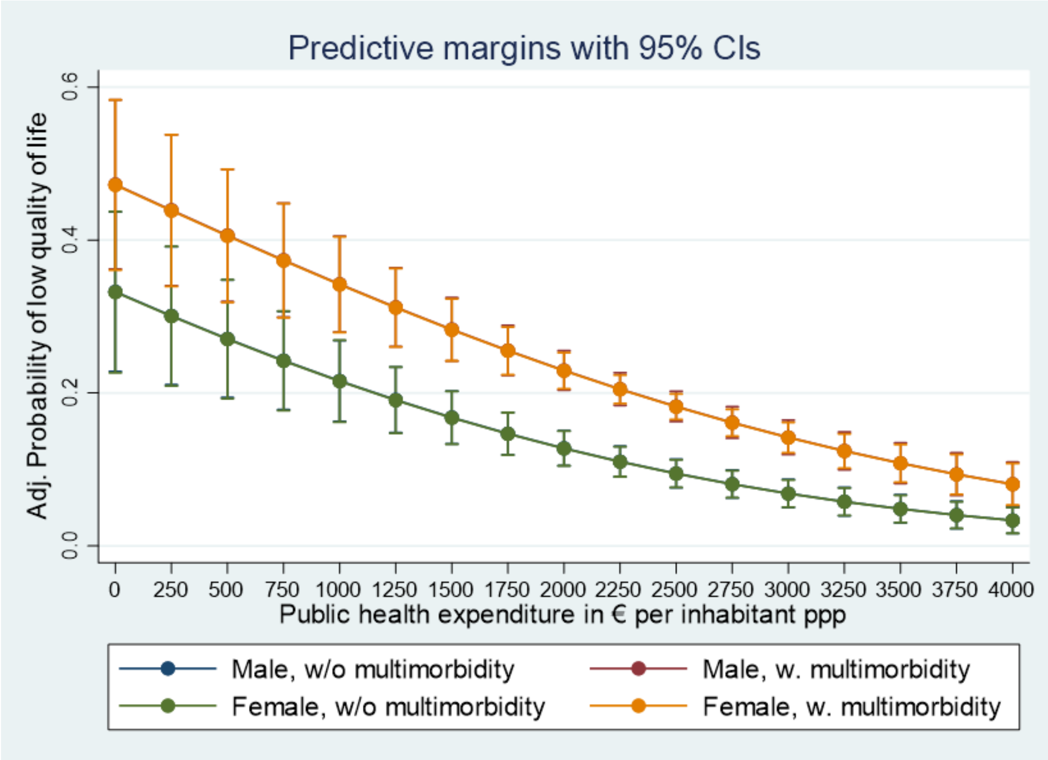
	Fair/poor self-reported health	Low quality of life
Variables	**Prob. (Probit)**	**Prob. (Probit)**
Age	-0.0021* (0.0011)	-0.0013* (0.0008)
Gender (ref.: Male)		
Female	-0.0119 (0.0136)	-0.0026 (0.0105)
Married (ref.: No)		
Yes	-0.0229 (0.0146)	-0.0316*** (0.0110)
Urban area (ref.: No)		
Yes	-0.0118 (0.0161)	0.0325* (0.0173)
Employment status (ref.: Not working)		
Working	-0.0814*** (0.0253)	-0.0116 (0.0199)
Education (ref.: None/primary)		
Secondary	-0.0513** (0.0226)	-0.0268* (0.0154)
Tertiary	-0.0744** (0.0294)	-0.0624*** (0.0163)
Income (ref.: 1st quartile)		
2nd quartile	-0.0296* (0.0178)	-0.0473*** (0.0159)
3rd quartile	-0.0500** (0.0206)	-0.0958*** (0.0156)
4th quartile	-0.0817*** (0.0203)	-0.0986*** (0.0171)
Suppl. health insurance (ref.: No)		
Yes	-0.0465*** (0.0165)	-0.0372*** (0.0144)
Multimorbidity (ref.: No)		
Yes	0.1182*** (0.0192)	0.0147 (0.0157)
Cardiovascular diseases (ref.: No)		
Yes	0.0698*** (0.0151)	0.0289** (0.0120)
Arthritis (ref.: No)		
Yes	0.1036*** (0.0182)	0.0131 (0.0116)
Neurodegenerative diseases (ref.: No)		
Yes	0.1294*** (0.0293)	0.0959*** (0.0308)
Chronic lung disease (ref.: No)		
Yes	0.0832*** (0.0224)	0.0034 (0.0143)
Cancer (ref.: No)		
Yes	0.1898*** (0.0269)	0.0248 (0.0201)
Hypertension (ref.: No)		
Yes	-0.0435*** (0.0126)	-0.0123 (0.0097)
Diabetes (ref.: No)		
Yes	0.0523*** (0.0189)	0.0055 (0.0126)
Hyperlipidemia (ref.: No)		
Yes	-0.0508*** (0.0150)	-0.0072 (0.0098)
Emotional disorders (ref.: No)		
Yes	0.1320*** (0.0279)	0.1441*** (0.0251)
Cataracts (ref.: No)		
Yes	-0.0082 (0.0167)	0.0270* (0.0141)

Polypharmacy (ref.: No)		
Yes	0.1618*** (0.0190)	0.0398*** (0.0116)
ADL/IADL (ref.: None)		
1+	0.1833*** (0.0160)	0.0979*** (0.0121)
Obesity (ref.: No)		
Yes	0.0296** (0.0140)	0.0134 (0.0121)
Drinking (ref.: No)		
Yes	-0.0315 (0.0195)	0.0584** (0.0243)
Smoking (ref.: No)		
Yes	0.0077 (0.0130)	-0.0034 (0.0101)
Sedentary life (ref.: No)		
Yes	0.1140*** (0.0162)	0.0932*** (0.0129)
Welfare regime (ref.: Soc. Democratic)		
Bismarckian	0.0659*** (0.0170)	0.0772*** (0.0169)
Mediterranean	0.1567*** (0.0335)	0.0389 (0.0254)
Eastern	0.1542*** (0.0356)	-0.0097 (0.0218)
Public total HE	0.0026 (0.0017)	-0.0078*** (0.0013)

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*
ADL/IADL: limitations in Activities of Daily Living or in Instrumental Activities in Daily Living, HE: health expenditure, Prob.: probability

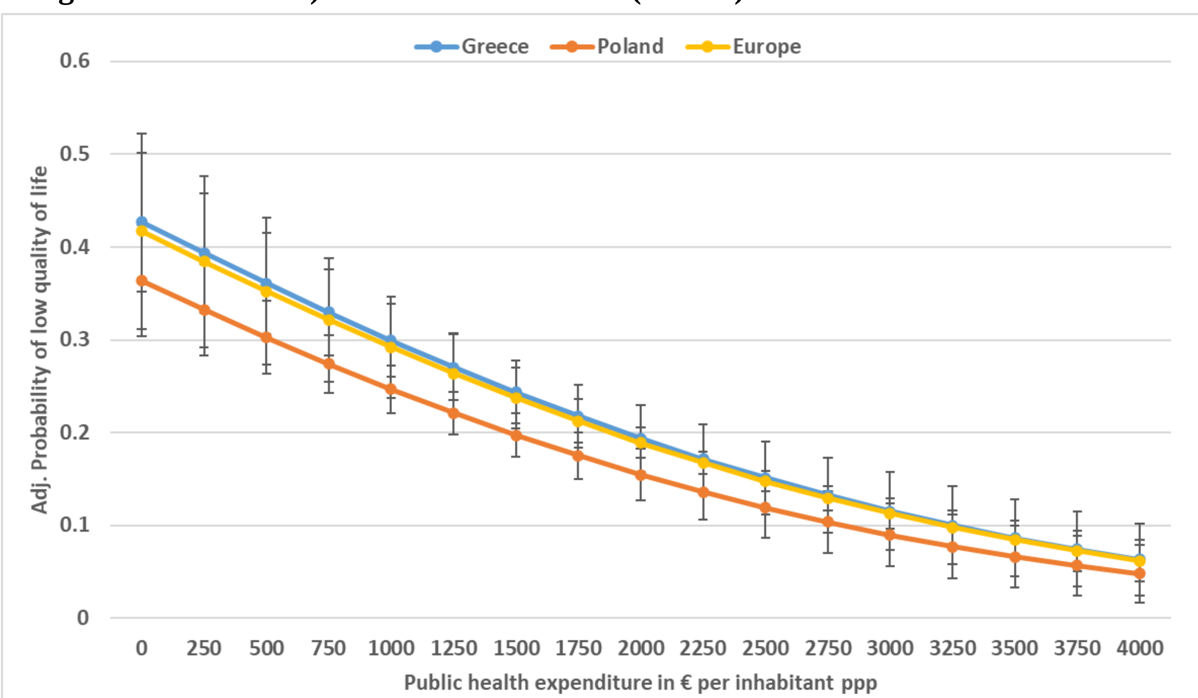
As public health expenditure was not a significant predictor of fair/poor self-reported health, we turn our attention to the relationship between public health investment and low quality of life. Increases in public health expenditure lead to decreases in the risk of low quality of life (Figure 298). The association between public health investment and the probability of low quality of life is non-linear, however, the returns are larger of women and those individuals afflicted with multimorbidity, which are also the higher-risk groups. Public health investment decreases the risk of low quality of life in Greece and Poland as well (Figure 299).

Figure 299 Impact of public health expenditure on the probability of low quality of life (predictive margins with 95% CIs) by gender and multimorbidity status (wave 6)



Note: CIs: confidence intervals.

Figure 300 Impact of public health expenditure on the probability of low quality of life (predictive margins with 95% CIs) in Greece and Poland (wave 6)



Note: CIs: confidence intervals, pps: purchasing power standard.

4.8.6. Satisfaction with the health system

Table 35 displays the average marginal effects of the determinants of the probability of being satisfied with the health system. Higher age, higher income level (although only the second quartile established statistical significance), a Mediterranean or Eastern welfare regime and higher public health expenditure were found to be increasing the probability of being satisfied with the health system, while marriage, multimorbidity, limitations in daily living and a Social Democratic welfare regime were decreasing it.

Table 36 Average marginal effects of independent predictors of the probability of being satisfied with health system following probit model estimation (wave 8)

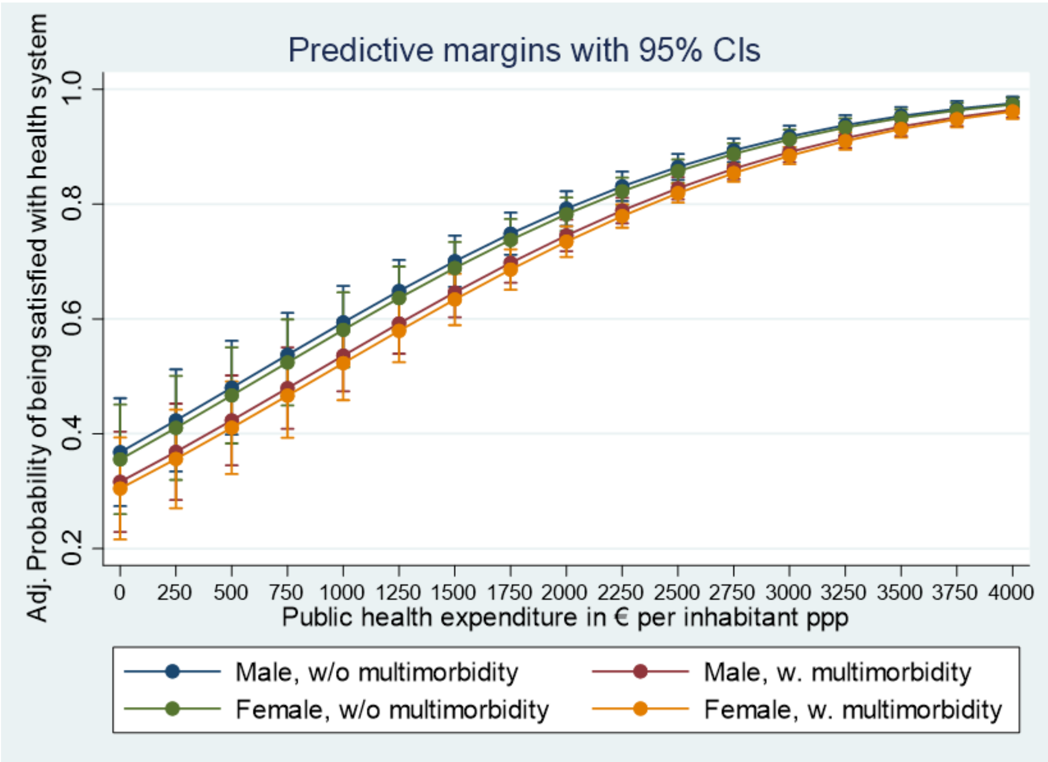
	Satisfaction with health system
Variables	**Prob. (Probit)**
Age	0.0019** (0.0009)
Gender (ref.: Male)	
Female	-0.0085 (0.0116)
Married (ref.: No)	
Yes	-0.0265** (0.0115)
Urban area (ref.: No)	
Yes	-0.0290* (0.0155)
Employment status (ref.: Not working)	
Working	-0.0127 (0.0200)
Education (ref.: None/primary)	
Secondary	-0.0223 (0.0149)
Tertiary	-0.0194 (0.0183)
Income (ref.: 1st quartile)	
2nd quartile	0.0333** (0.0154)
3rd quartile	0.0151 (0.0186)
4th quartile	0.0293 (0.0182)
Suppl. health insurance (ref.: No)	
Yes	0.0201 (0.0187)
Multimorbidity (ref.: No)	
Yes	-0.0382** (0.0154)
Cardiovascular diseases (ref.: No)	
Yes	0.0033 (0.0129)
Arthritis (ref.: No)	
Yes	-0.0006 (0.0122)
Neurodegenerative diseases (ref.: No)	
Yes	0.0289 (0.0232)
Chronic lung disease (ref.: No)	
Yes	-0.0184 (0.0192)

Cancer (ref.: No)	
Yes	0.0285 (0.0188)
Hypertension (ref.: No)	
Yes	-0.0025 (0.0134)
Diabetes (ref.: No)	
Yes	0.0112 (0.0136)
Hyperlipidemia (ref.: No)	
Yes	0.0114 (0.0115)
Emotional disorders (ref.: No)	
Yes	-0.0175 (0.0201)
Cataracts (ref.: No)	
Yes	-0.0111 (0.0154)
Polypharmacy (ref.: No)	
Yes	-0.0206* (0.0122)
ADL/IADL (ref.: None)	
1+	-0.0257** (0.0131)
Welfare regime (ref.: Soc. Democratic)	
Bismarckian	-0.0279 (0.0198)
Mediterranean	0.0734** (0.0285)
Eastern	0.1208*** (0.0252)
Public total HE	0.0146*** (0.0013)

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*
ADL/IADL: limitations in Activities of Daily Living or in Instrumental Activities in Daily Living, HE: health expenditure, Prob.: probability

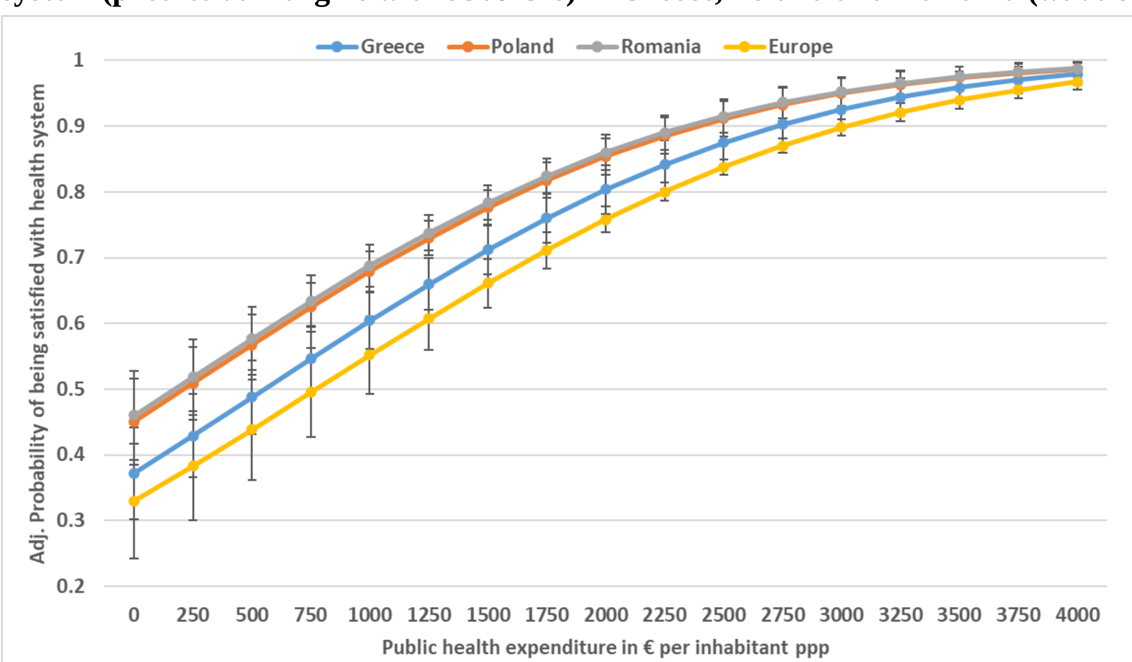
Figure 300 shows the relationship between public health expenditure and the probability of being satisfied with the health system. Higher public health investment is associated with higher probability of being satisfied with the health system, with the relationship being non-linear. This impact of public health investment is also observed in the case of Greece, Poland and Romania (Figure 301). Moreover, the adjusted probability is found higher in Poland and Romania than in Greece and Europe.

Figure 301 Impact of public health expenditure on the probability of being satisfied with health system (predictive margins with 95% CIs) by gender and multimorbidity status (wave 8)



Note: CIs: confidence intervals, OOPP: out-of-pocket payments.

Figure 302 Impact of public health expenditure on the probability of being satisfied with health system (predictive margins with 95% CIs) in Greece, Poland and Romania (wave 8)



Note: CIs: confidence intervals, pps: purchasing power standard.

Table 36 summarizes the main results of the econometric modelling analyses.

Table 37 Synopsis of the results of the econometric modelling analyses

	Total OOPP		Pharma OOPP		Total OOPP burden		Pharma OOPP burden		Catastr. total OOPP	Catastr. pharma OOPP	Unmet needs	Unmet pharma needs	Fair/poor SRH	Low QoL	Satisfied with HS
	Prob. of incurring	Exp. value (OOPP>0)	Prob. of incurring	Exp. value (OOPP>0)	Prob. of incurring	Exp. value (OOPP>0)	Prob. of incurring	Exp. value (OOPP>0)	Prob.	Prob.	Prob.	Prob.	Prob.	Prob.	Prob.
Higher age		+				+		+	+	+	-	-			+
Female	+	+	+	+	+	+	+	+	+						
Marriage		+		+		+		+	+	+				-	-
Urban area				+		+		+			+				
Working	+	+	+		+	+	+	+				-	-		
Higher education	+	+	+	+	+	+	+	+					-	-	
Higher income	+	+	+	+	+	-	+	-	-	-	-	-	-	-	+
Suppl. health insurance	-	-		-	-	-	-	-	-				-	-	
Multimorbidity	+	+		+	+	+	+	+	+				+		-
Cardiovascular diseases		+		+		+		+		+			+	+	
Arthritis	+	+	+	+	+	+	+	+			+		+		
Neurodegenerative diseases													+	+	
Chronic lung disease		+		+		+		+	+	+			+		
Cancer		+		+									+		
Hypertension	+		+		+		+						-		
Diabetes	-	-	-	+	-	-			-	+			+		
Hyperlipidemia							+				-		-		
Emotional disorders	+	+	+	+	+	+	+	+		+	+		+	+	
Cataracts	+		+	+			+								
Polypharmacy	+	+	+	+	+	+	+	+	+	+			+	+	
ADL/IADL limitations	+	+	+	+	+			+			+	+	+	+	-
Obesity													+		
Drinking														+	
Smoking															

Sedentary life													+	+	
Social Democratic welfare regime	+	-	+	-	+	-	+	-	-	-	+	-	-	-	-
Bismarckian welfare regime	-		-	-	-	-	-	+	+	+	+	+	+	+	
Mediterranean welfare regime	-	+	-	+	-	+	-	+	+	+		+	+		+
Eastern welfare regime	-	+	-	+	-	+	-	+	+	+	-	+	+		+
Higher public total HE					+	-			-		-			-	+
Higher public pharma HE							+	-		-		-			

Note: A + sign indicates a significantly increasing effect and a – sign denotes a significantly decreasing effect. ADL/IADL: limitations in Activities of Daily Living or in Instrumental Activities in Daily Living, Catastr.: catastrophic, Exp.: expected, HE: health expenditure, HS: health system, OOPP: out-of-pocket payments, pharma: pharmaceutical, prob.: probability, QoL: quality of life, SRH: self-reported health, suppl.: supplementary.

5. Conclusions

In view of growing cost pressures, concerns about the sustainability of health systems have led to the dominance of the cost-containment policy perspective in the public debate. Policy-makers worldwide usually opt for a combination of measures on both the supply and the demand sides of health systems to curtail costs, often to the detriment of health outcomes for individuals, families and society as a whole. However, health systems should not be regarded as a drag on resources, but rather as an investment on population health and a means to achieve better economic growth (Figueras et al. 2012). The interdependency between health systems, health and wealth is complex, but there appears to be a scientific consensus.

This report sought to shed light specifically on the impact of underinvestment in health systems on health outcomes and pharmaceutical care, in particular, in Greece, Poland and Romania using macro and micro ‘big data’ sources. Following the literature, health expenditure constitutes an indicator of investment in health systems. This premise is in accordance with the work of Grossman (Grossman 1972), according to which an increase in investment in medical treatment, time, and human resources improves health outcomes.

At first, investment in the health systems of Greece, Poland and Romania was investigated. On the one hand, the Economic Adjustment Programmes led to a divergence between Greece and the rest of Europe in terms of total health expenditure; the overall adjustment between 2009 and 2019 was equal to -22.8%, while, on average, total health spending per inhabitant increased by 16.7% in Europe. On the other hand, despite the convergence with Europe during the last decade in terms of investment in the health system, total health expenditure per capita is well below the European average for both Poland and Romania, the latter in particular. A similar pattern is observed with respect to pharmaceutical health expenditure per capita. Despite the convergence with Europe, investment in pharmaceutical care is below the European average in Poland and Romania, whereas pharmaceutical expenditure per inhabitant in Greece is somewhat higher compared with the rest of Europe.

Moreover, it is important to investigate the mix of financing arrangements of health systems. Public investment in health is falling short of the European average for all three countries. Overall, there appears to be a tendency to privatize health care, pharmaceutical care in particular, in Europe, as it is used as a policy instrument to decrease the rising financial burden of the public sector. This is particularly evident in Poland, where the share of public funding in total pharmaceutical spending was just 35.9% in 2019, whereas the European average was 59.3%. Public investment in pharmaceutical care remains well below the European average in Greece and Romania as well.

Reliance on private spending and in OOPP, in particular to provide health care is putting significant financial pressures on households, leading to significant economic welfare losses or even preventing them from seeking appropriate healthcare treatment. Unmet healthcare needs are particularly high in Greece, Poland and Romania. Greece is ranked first (27,8%) and Romania (20.9%) second in terms of the prevalence of unmet healthcare needs in 2020, while Poland also has a high share of individuals reporting unmet needs (12.4%). It is also noteworthy that unmet needs are increasing in almost all European countries over time. Regarding pharmaceutical care in particular, Romania (11.6%), Greece (2.9%) and Poland (2.2%) were associated with the highest prevalence of unmet needs for medicines among all countries.

The vast majority of the population in Poland and Greece incurs OOPP. As a result, the burden of OOPP on households' budget, i.e. the share of OOPP in equivalised household net income, is quite large in both Poland and Greece. Compared with the other countries, the average pharmaceutical OOPP burden is even larger in Poland and Greece, since. Poland has the second highest pharmaceutical OOPP burden among all countries, while Greece is ranked fifth. If OOPP exceed a predetermined share of the household budget, it is considered as a significant financial risk or, to put it differently, a catastrophe. A high incidence of catastrophic OOPP reveals the inefficiencies and the inadequacy of a health system to financially protect households from wellbeing disruptions caused by ill-health (Chantzaras and Yfantopoulos 2018a). The incidence of catastrophic OOPP was found to be large in both Poland and Greece, in Poland in particular. Furthermore, relative to the estimates in the other countries, the risk of catastrophe was even larger when pharmaceutical OOPP were considered.

An important proxy of the overall performance of the health system as well as a critical policy objective concerns satisfaction with the health system. It was found that the rate of satisfaction with the health system is rather low in Greece (lowest rate among all countries), Poland (second lowest rate) and Romania (fourth lowest). Just 45.4% of individuals in Greece stated that they are satisfied with their health system, while the corresponding estimates for Poland and Romania were 64.3% and 73.6%. M

Besides the average estimates of health outcomes, which were established to be suboptimal in the three countries of interest. substantial socioeconomic inequalities were also found in Greece, Poland and Romania in terms of various health outcomes. Socioeconomic inequalities in health outcomes can be tackled by acting across a range of public policy areas, namely, investing in the health of the more disadvantaged groups (Chantzaras and Yfantopoulos 2018b).

Econometric modelling was subsequently used to assess the impact of investment on health outcomes after adjusting for several other independent factors. Investment in health outcomes was defined as public (total and pharmaceutical) health expenditure. Investment in health outcomes in the form of public health expenditure was found to significantly decrease total OOPP burden and the risk of catastrophic total OOPP, overall unmet needs and low quality of life, whereas it also significantly increased the probability of being satisfied with the health system. Investment in health outcomes in the form of public pharmaceutical expenditure was found to significantly decrease pharmaceutical OOPP burden and the risk of catastrophic pharmaceutical OOPP and unmet pharmaceutical needs. Moreover, further analyses revealed that these effects were consistent in the subpopulations of Greece, Poland and Romania.

Overall, investment in health systems is not only a prerequisite for the improvement of health outcomes, but also a driver for economic growth. This report found that investment in health, public total and pharmaceutical health expenditure, is not adequate in Greece, Poland and Romania. Moreover, it established that private spending is a regressive way to fund health care, and it leads to increased unmet needs for health services and medicines and significant risk of economic catastrophe for households. Since it was demonstrated that public total and pharmaceutical expenditure can significantly improve health outcomes, policy-makers should consider public funding of their health systems not as waste of public resources, but as an opportunity to invest in the health of the population, namely, the human capital of their economy.

References

Andersen, R., and J. F. Newman. *Societal and Individual Determinants of Medical Care Utilization in the United States* (Milbank Q. 2005 Dec;83(4):10.1111/j.1468-0009.2005.00428.x. doi: 10.1111/j.1468-0009.2005.00428.x.).

Başar, D., F. H. Dikmen, and S. Öztürk. 2021. 'The prevalence and determinants of unmet health care needs in Turkey', *Health Policy*, 125: 786-92.

Belotti, Federico, Partha Deb, Willard G. Manning, and Edward C. Norton. 2015. 'Twopm: Two-Part Models', *The Stata journal*, 15: 3-20.

Chantzaras, Athanasios E., and John N. Yfantopoulos. 2018a. 'Financial protection of households against health shocks in Greece during the economic crisis', *Social Science & Medicine*, 211: 338-51.

———. 2018b. 'Income-related health inequalities among the migrant and native-born populations in Greece during the economic crisis: a decomposition analysis', *European Journal of Public Health*, 28: 24-31.

Clegg, L. X., B. F. Hankey, R. Tiwari, E. J. Feuer, and B. K. Edwards. 2009. 'Estimating average annual per cent change in trend analysis', *Stat Med*, 28: 3670-82.

Commission on the Social Determinants of Health. 2008. *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health* (World Health Organization: Geneva).

Deb, P., and E. C. Norton. 2018. 'Modeling Health Care Expenditures and Use', *Annu Rev Public Health*, 39: 489-505.

Figueras, Josep, Suszy Lessof, Martin McKee, Antonio Durán, and Nata Menabde. 2012. 'Health systems, health, wealth and societal wellbeing: an introduction.' in Josep Figueras and Martin McKee (eds.), *Health Systems, Health, Wealth and Societal Well-being. Assessing the case for investing in health systems* (Open University Press: New York).

Gannon, B., and B. Davin. 2010. 'Use of formal and informal care services among older people in Ireland and France', *Eur J Health Econ*, 11: 499-511.

Grossman, Michael. 1972. 'On the Concept of Health Capital and the Demand for Health', *Journal of Political Economy*, 80: 223-55.

Jürges, Hendrik. 2015. 'Health insurance coverage and access to care among European elders: crossnational differences and social gradients.' in Börsch-Supan Axel, Kneip Thorsten, Litwin Howard, Myck Michal and Weber Guglielmo (eds.), *Ageing in Europe - Supporting Policies for an Inclusive Society* (De Gruyter).

Jürges, Hendrik, and Luca Stella. 2019. 'Health and socio-economic status over the life course: First results from SHARE Waves 6 and 7.' in Börsch-Supan Axel, Bristle Johanna, Andersen-Ranberg Karen, Brugiavini Agar, Jusot Florence, Litwin Howard and Weber Guglielmo (eds.), *The social dynamics of unmet need, catastrophic healthcare expenses and satisfaction with health insurance coverage* (De Gruyter Oldenbourg).

Kim, S. Y., and G. S. Hong. 2015. 'Catastrophic Health Expenditures and Life Satisfaction: A Case in South Korea', *Journal of Family and Economic Issues*, 36: 369-82.

Kočiš Krůtilová, V. 2021. 'The out-of-pocket medication burden: Which health problems impact the Czech population aged 50+?', *International Journal of Health Planning and Management*.

Kočiš Krůtilová, V., L. Bahnsen, and D. De Graeve. 2021. 'The out-of-pocket burden of chronic diseases: the cases of Belgian, Czech and German older adults', *BMC Health Services Research*, 21.

Lyberaki, Antigone, Platon Tinios, George Papadoudis, and Thomas Georgiadis. 2019. '20. The economic crisis, fiscal austerity and long-term care: Responses of the care mix in three adjustment countries.' in Börsch-Supan Axel, Bristle Johanna, Andersen-Ranberg Karen, Brugiavini Agar, Jusot Florence, Litwin Howard and Weber Guglielmo (eds.), *Health and socio-economic status over the life course: First results from SHARE Waves 6 and 7* (De Gruyter Oldenbourg).

McKee, M., M. Suhrcke, E. Nolte, S. Lessof, J. Figueras, A. Duran, and N. Menabde. 2009. 'Health systems, health, and wealth: a European perspective', *Lancet*, 373: 349-51.

O'Donnell, Owen, Eddy van Doorslaer, Adam Wagstaff, and Magnus Lindelow. 2008. *Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation* (The World Bank: Washington, DC).

Souza, D. L. B., A. Oliveras-Fabregas, E. Minobes-Molina, M. de Camargo Cancela, P. Galbany-Estragués, and J. Jerez-Roig. 2021. 'Trends of multimorbidity in 15 European countries: a population-based study in community-dwelling adults aged 50 and over', *BMC Public Health*, 21.

Statistical Methodology and Applications Branch - Surveillance Research Program, National Cancer Institute. 2022. "Joinpoint Regression Program, Version 4.9.1.0 - April 2022." In.

Van Doorslaer, E., O. O'Donnell, R. P. Rannan-Eliya, A. Somanathan, S. R. Adhikari, C. C. Garg, D. Harbianto, A. N. Herrin, M. N. Huq, S. Ibragimova, A. Karan, T. J. Lee, G. M. Leung, J. F. R. Lu, C. W. Ng, B. R. Pande, R. Racelis, S. Tao, K. Tin, K. Tisayaticom, L. Trisnantoro, C. Vasavid, and Y. Zhao. 2007. 'Catastrophic payments for health care in Asia', *Health economics*, 16: 1159-84.

Wagstaff, Adam. 2007. 'The economic consequences of health shocks: evidence from Vietnam', *Journal of Health Economics*, 26: 82-100.

———. 2008. 'Measuring financial protection in health', *World bank policy research working paper*.

Wagstaff, Adam, and Eddy van Doorslaer. 2003. 'Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993–1998', *Health economics*, 12: 921-33.

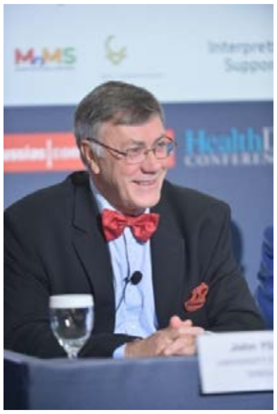
WHO. 2013. *The World Health Report 2013* (World Health Organization: Luxembourg).

———. 2019. 'Can people afford to pay for health care? New evidence on financial protection in Europe'.

Xu, K., D. B. Evans, K. Kawabata, R. Zeramdini, J. Klavus, and C. J. L. Murray. 2003. 'Household catastrophic health expenditure: A multicountry analysis', *Lancet*, 362: 111-17.

Yfantopoulos, John N., and Athanasios Chantzaras. 2018. 'Drug Policy in Greece', *Value in Health Regional Issues*, 16: 66-73.

Appendix Project Leader



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He has been working and advising the European Commission, (Eurostat), the World Health Organization, the International Labor Office, and the World Bank. He was the elected Rapporteur of the 23rd WHO Regional Office for Europe and the elected Chair of the 11th European Congress of ISPOR. In November 2008, he was awarded the ISPOR Distinguished Service Award. He has extensive experience with the Eurostat data sources (HBS, LFS, ECHP, SILC, EHIS) as well as with the EU Research Projects like SHARE and the (European Social Survey, (ESS)). In Greece he was an elected Member of the Senate of the University of Athens, Director of the Red Cross Hospital, Vice President of the National Organization for Social Care, Board Member of the National Medicines Agency (EOF), the Organization Against Drugs (OKANA) and a Member of the Research Committee for Social Science.

In 2005 in the evaluation of the Greek research centers from an international peer review committee, he received the highest grade (excellent (5)) for his scientific work, commitment to international collaboration and research networking.

Recent activities in a number of Eastern European countries, Russia, Bulgaria, Romania, Moldova, Albania include studies in the evaluation of economic efficiency, health technology assessment, Pharmaco-economics, and implementing effective health reforms. Professor Yfantopoulos has acted as co-author in the 'Social Situation Reports' published by the European Commission and the Eurostat. He has published 35 books, as well as more than 280 articles in international journals like: *Social Science and Medicine*, *The European Journal of Population Economics, European Journal of Health Economics, Value in Health*, *European Journal of Social Sciences, Journal of Economic and Social Measurement, Quality of Life Research, Health and Quality of Life Outcomes, Journal of Health Management*, *Socio-Economic Planning Sciences, Public Health Nutrition, International Journal of Dentistry, European Archives of Pediatric Dentistry*, *Journal of Nursing Management*, *Journal of Health*, *International Journal of Technology Assessment in Health Care, and others.*

Among his recent book include: "Health Economics Theory and Policy" (2006), "The Economics of Health Reforms"(2007), "Health Economics Management and Policy" (2008), "Health Inequalities: from Mortality to Quality of Life indicators (EQ-5D) (2008)", "The Welfare State in Theory and Practice (2009)" "Tackling Social Inequalities in Health" (2009). "The EQ-5D Plenary Meeting in Athens" (Editor) (2010), "Access to New Pharmaceutical Therapies" (2010). His work has been translated in English, French, German, Spanish, Russian, and Romanian,

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