

**A comparative analysis of Hospital Pharmaceutical Expenditure
trends in the EU: *how does Greece compare?***

Deliverable

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Contents

Executive summary	5
Introduction.....	5
The present study: A brief methodology note	6
Results: a selection from the study outcomes	7
Take-away points	17
Detailed Research Findings: Main Text	20
Introduction	21
Purpose of the study – Methods	22
Results	25
Discussion	47
Conclusions	49
References.....	50

Graphs

Graph 1 Average per capita Hospital Pharmaceutical Expenditure: change from 2013 to 2019	11
Graph 2 Average annual per capita Hospital Pharmaceutical Expenditure in 2019.....	12
Graph 3 Average per capita public Outpatient Pharmaceutical Expenditure from 2013 to 2019.....	13
Graph 4 Average per capita public Outpatient Pharmaceutical Expenditure in 2019	14
Graph 5 Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) from 2013 to 2019 (public sources/compulsory schemes).....	15
Graph 6 Average annual per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) in 2019 (public sources/compulsory schemes).....	16
Graph 7: Hospital Pharmaceutical Expenditure per country: change between 2013-2019	32
Graph 8: Outpatient Pharmaceutical Expenditure per country 2013-2019	34
Graph 9: Total Pharmaceutical Expenditure (Hospital & Outpatient) 2013-2019.....	36
Graph 10: Average per capita Hospital Pharmaceutical Expenditure from 2013 to 2019	43
Graph 11: Average per capita Hospital Pharmaceutical Expenditure in 2019	43
Graph 12: Average per capita Outpatient Pharmaceutical Expenditure from 2013 to 2019 ..	44
Graph 13: Average per capita Outpatient Pharmaceutical Expenditure in 2019	45
Graph 14: Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient): changes from 2013 to 2019.....	45
Graph 15: Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) in 2019.....	46
Graph 16 Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) in 2019.....	46

Tables

Table 1 Percentage of Hospital pharmaceutical expenditure (paid by compulsory health insurance third-party payer) to Total pharmaceutical expenditure (paid by compulsory health insurance third-party payer)	7
Table 2 Trends in hospital pharmaceutical exp. (paid by compulsory health insurance third-party payer).....	8
Table 3 Trends in Outpatient pharmaceutical expenditure (paid by compulsory health insurance third-party payer) and Total pharmaceutical expenditure (paid by compulsory health insurance third-party payer)	9
Table 4 Proportion of hospital pharmaceutical expenditure to total pharmaceutical expenditure in European countries.....	26
Table 5 Percentage change of hospital pharmaceutical expenditure in European countries.	27
Table 6 Percentage change of outpatient pharmaceutical expenditure and total pharmaceutical expenditure in European countries.....	29
Table 7: Hospital Pharmaceutical Expenditure (paid by compulsory health insurance systems or third-party payer) per country in million €	31

Hospital Pharmaceutical expenditure in Europe

Table 8: Outpatient Pharmaceutical Expenditure per country (in million €)	33
Table 9: Total Pharmaceutical Expenditure per country (Hospital & Outpatient - in million €)	35
Table 10: Ratio of Hospital Pharmaceutical Expenditure (paid by compulsory health insurance systems or third-party payer) to Total Pharmaceutical Expenditure (paid by compulsory health insurance systems or third-party payer)	37
Table 11: Ratio of Outpatient Pharmaceutical Expenditure (paid by health insurance systems or third-party payer) to Total Pharmaceutical Expenditure (paid by health insurance systems or third-party payer).....	38
Table 12: Percentage of Hospital Pharmaceutical Expenditure (paid by health insurance systems or third-party payer) to Outpatient Pharmaceutical Expenditure (paid by health insurance systems or third-party payer)	39
Table 13: Hospital Pharmaceutical Expenditure per capita (paid by health insurance systems or third-party payer) - in million €.....	40
Table 14: Outpatient Pharmaceutical Expenditure per capita (paid by health insurance systems or third-party payer) - in million €.....	41
Table 15: Total Pharmaceutical Expenditure per capita (Hospital & Outpatient Pharmaceutical Expenditure paid by health insurance systems or third-party payer) - in million €.....	42

Executive summary

Introduction

Pharmaceutical expenditure is an important component of the total health expenditure, accounting for around one-sixth of the latter and representing the third largest spending component in EU countries after inpatient and outpatient care. The trend of the outpatient (or retail) pharmaceutical expenditure has been increasing over time in most OECD countries (Health at a glance, 2021).

While outpatient pharmaceutical expenditure is systematically captured and reported by international organization databases (e.g., OECD – System of Health Accounts, Eurostat Database, WHO), on the contrary, expenditure on pharmaceuticals that are administered through the hospital setting (henceforth “hospital pharmaceutical expenditure”) remains a rather “obscure” and quite less developed part of international healthcare statistics. This omission can be partially attributed to the fact that during the last decades (also, the period of development of the major systems of health accounts) in-hospital pharmaceuticals were considered as an input, along with capital and labor (WHO, 2017), to the production function of hospital services, and, thus, metrics usually focused on the final product (services) rather than systematically disaggregating expenditure for partial inputs of the production process. This, however, constitutes a rather outdated approach to the measurement of in-hospital expenditure, since, in the last years, hospitals internationally have evolved to become a major channel for the distribution of innovative (and high cost) drugs, for a variety of reasons. In this sense, a re-focus on hospital pharmaceutical expenditure is imperative.

Over the last decade, hospital pharmaceutical expenditure has increased substantially, partly due to the advent of new high-cost treatments, particularly in therapeutic areas such as oncology and immunology. According to preliminary data analysis, pharmaceuticals used within the hospital setting can typically add another >20% to a country’s pharmaceutical bill, with an increasing average annual growth, that outpaces that of the retail pharmaceutical market.

In light of the above, a re-focus on adequate financing mechanisms for pharmaceutical innovation that is delivered through the hospital setting remains a major prerequisite of a sustainable pharmaceutical market and a key aspect of an evidence-based pharmaceutical policy that ensures patients' access to optimal treatment choices.

The present study: A brief methodology note

The objective of this study was to review and report the relative magnitude and trends of hospital pharmaceutical expenditure in EU countries during the last years and compare them, on the basis of ad-hoc developed indicators, with the status quo in Greece.

To perform the task, the study used a dual analytical approach, basing its outcomes on an *exploratory analysis*, as a first step, followed by a *confirmatory descriptive analysis* of cross-country expenditure data, for the final calculations.

For the first part of the study, i.e., the exploratory analysis, a literature review was implemented. Items were located with a structured (term- and criteria-based) search strategy in PubMed and Cochrane Library, and was complemented by reports or other grey literature located through Google Scholar or national organizations. A series of indices were calculated and selected results are presented in the section that follows

The second part of the study uses primary data on pharmaceutical expenditure across European countries provided by the European Federation of Pharmaceutical Industries and Associations (EFPIA). The primary data were used on a descriptive statistic analytical approach, in order to highlight trends and perform international comparisons. Again, a series of indices were calculated and a selection of outcomes is presented in the following sections. The granularity of the EFPIA data has made feasible a variety of comparisons and, thus, those data are utilized for the final calculations of the study, as they were deemed superior, in terms of statistical handling, compared to the literature search data.

Results: a selection from the study outcomes

Part 1: Exploratory analysis for the identification of the key trends, as derived by the literature

After the review of the literature, data for a total of 15 countries were extracted. A degree of heterogeneity in data reporting was observed, mainly with respect to the reference year as well as for reporting items. Nevertheless, **comparisons highlight a clear trend of increases in hospital pharmaceutical expenditure across all countries in the sample with the exception of Greece**

Table 1 Percentage of Hospital pharmaceutical expenditure (paid by compulsory health insurance third-party payer) to Total pharmaceutical expenditure (paid by compulsory health insurance third-party payer)

Country	Year ¹	Ratio ²
Greece	2019	23,5%
Belgium	2019	49,3%
Finland	2018	22,2%
Ireland	2016	21,2%
Spain	2016	38,3%
Sweden	2016	23,5%
Ukraine	2013	18,7%
Denmark	2020	47,5%
Italy	2018	38,0%
Germany	2014	21,4%

¹ Most recent available data

² The ratio reflects the Percentage of Hospital pharmaceutical expenditure (paid by compulsory health insurance third-party payer) to Total pharmaceutical expenditure (paid by compulsory health insurance third-party payer)

Hospital Pharmaceutical expenditure in Europe

Netherlands	2014	28,4%
France	2014	20,0%
Poland	2014	33,5%
UK	2014	43,0%
Portugal	2011	30,6%

- Hospital pharmaceutical expenditure accounts for **approximately 30.6% of total pharmaceutical expenditures** paid by compulsory schemes (social insurance)
- In **Greece**, this ratio is estimated at 23,5%, **significantly lower** than the sample average.

Table 2 Trends in hospital pharmaceutical exp. (paid by compulsory health insurance third-party payer)

Country	Time period	% Change between years
Greece	2012-2019	-21,6%
Belgium	2013-2019	+88,2%
Finland	2012-2108	+56,9%
Ireland	2012-2016	+38,5%
Spain	2014-2016	+18,3%
Sweden	2012-2016	+14,3%
Denmark	2012-2020	+51%
Italy	2011-2018	+81%
Germany	2010-2014	-2,3%
Netherlands	2010-2014	+41,7%
France	2010-2014	+6,8%
Poland	2010-2014	+31%
UK	2010-2014	+63,4%

Hospital Pharmaceutical expenditure in Europe

- **Hospital pharmaceutical expenditure increased** in all countries in the sample for the years where data was available, with the **exception of Germany** (where it remained almost **stable**) and **Greece**
- Hospital pharmaceutical expenditure **in Greece declined by 21.6%** during the period 2012-2019.
- **This places the country at odds to the European trend**; the average growth within the years where data is available is estimated at 40.7%, in the sample countries (excluding Greece)
- Although the transformation of the hospital distribution channel is a more or less common policy practice which, in turn, shapes the expenditure trend, **Greece remains a notable exception (follows the trend of policy, takes an opposite direction in terms of expenditure trends)**

Table 3 Trends in Outpatient pharmaceutical expenditure (paid by compulsory health insurance third-party payer) and Total pharmaceutical expenditure (paid by compulsory health insurance third-party payer)

Country	Time period	% change of Outpatient PE	% change of Total PE
Greece	2012-2019	-32,5%	-30,2%
Belgium	2013-2019	+1,1%	+31,0%
Finland	2012-2108	12,6%	19,3%
Ireland	2012-2016	-2,8%	+3,8%
Spain	2014-2016	+5,9%	+10,3%
Sweden	2012-2016	+11,8%	+12,4%
Denmark	2012-2020	+6,0%	+23,5%
Italy	2011-2018	+2,4%	+19,85
Germany	2010-2014	+2,3%	+1,0%

Hospital Pharmaceutical expenditure in Europe

Netherlands	2010-2014	-5,6%	+1,9%
France	2010-2014	-3,0%	-1,5%
Poland	2010-2014	-0,7%	+5,7%
UK	2010-2014	+20,2%	+30,5%

- *There is a mix of trends regarding the evolution of outpatient pharmaceutical expenditure. 8/13 of countries with available comparable evidence present increases, whereas 5/13 decrease outpatient spending. **None, however, at the depth of Greece** (-32.5% compared to an average of +4.2%)*
- ***Greece** is the **only** country in the analysis where total pharmaceutical expenditure **decreased** during the examined period (-30,2%).*
- *Trends in total pharmaceutical expenditure reveal that **hospital pharmaceutical expenditure grow at a higher rate** in Europe, compared to **outpatient** pharmaceutical spending*

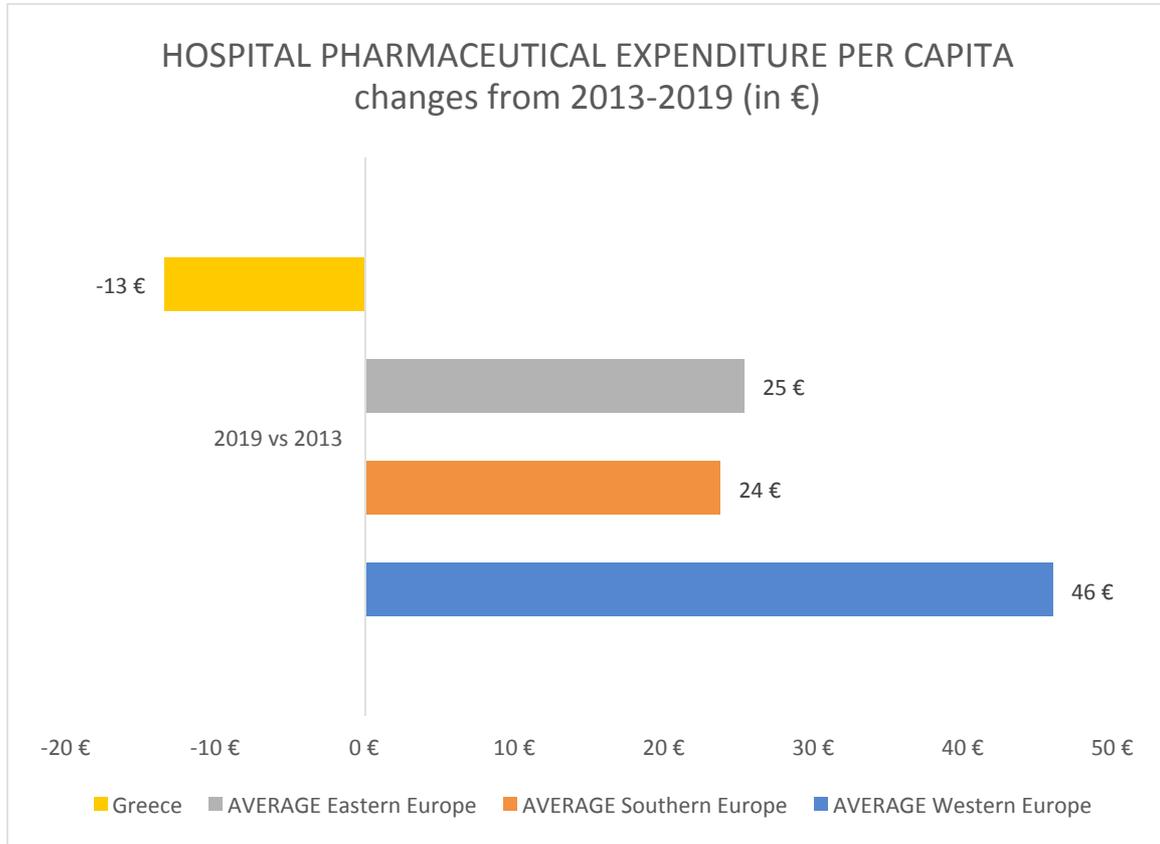
Part 2: Confirmatory analysis (based on EFPIA data) – trends in hospital pharmaceutical expenditure in European countries

The country level data enabled detailed comparisons and the production of descriptive statistics. For benchmarking purposes, the countries for which data was available, were classified in three categories:

- **Western Europe:** Belgium, Denmark, Ireland, Netherlands, Sweden, UK, Norway, Switzerland
- **Southern Europe:** Greece, Italy, Spain, France, Portugal
- **Eastern Europe:** Bulgaria, Croatia, Poland, Romania, Slovenia

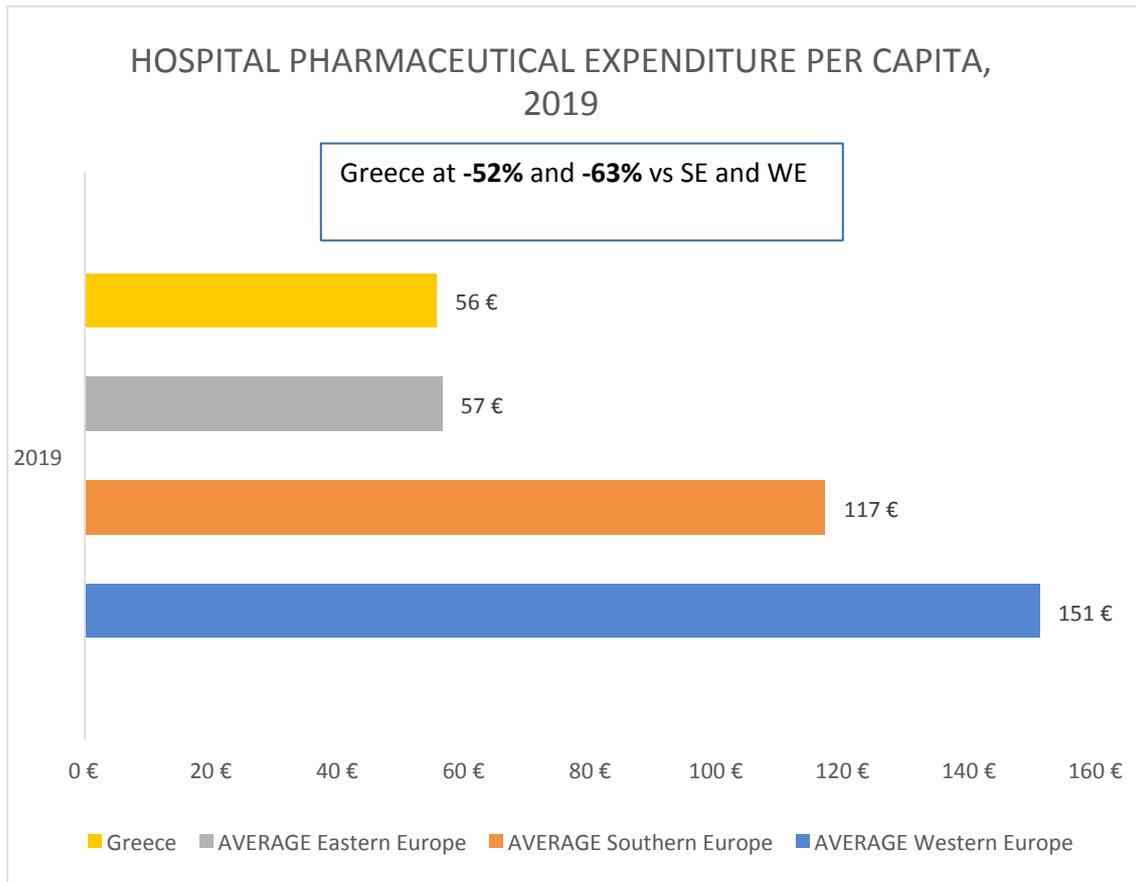
Greece is compared against the average estimates on a given indicator for each of the three categories (country groups). A selection of indicators is presented in Figures 1 – 6 that follow

Graph 1 Average per capita Hospital Pharmaceutical Expenditure: change from 2013 to 2019



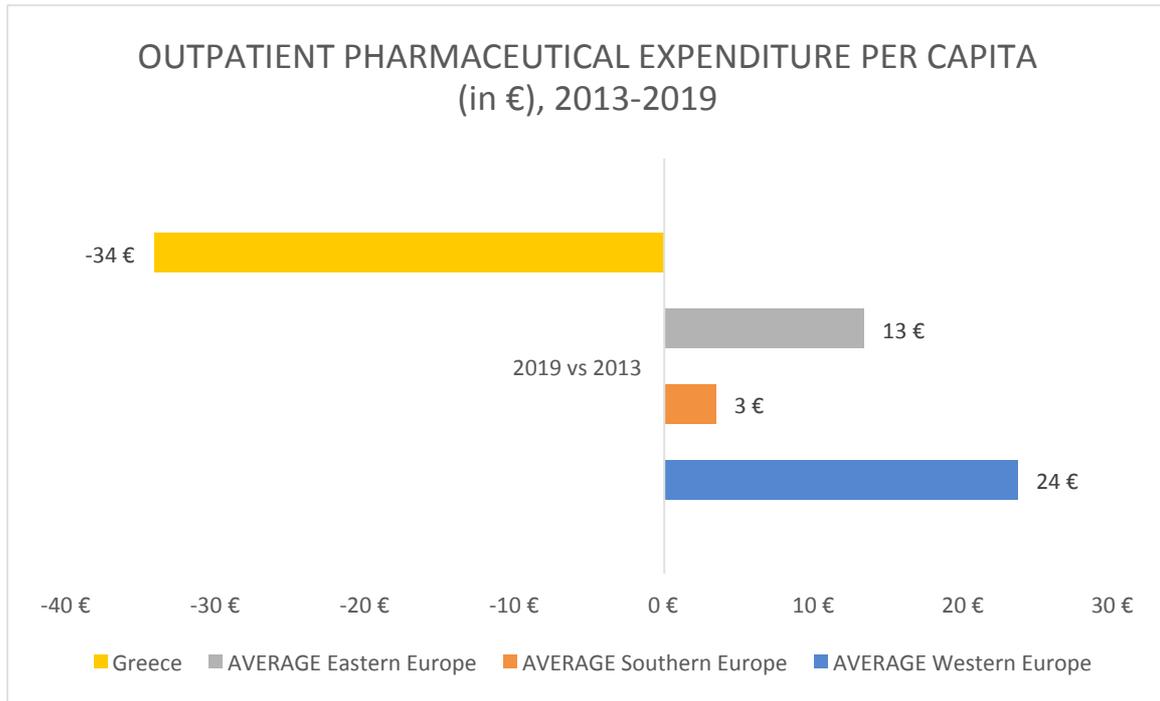
- Average per capita hospital pharmaceutical expenditure **increased by 46€** in Western European countries from 2013 to 2019
- A **similar, albeit lower, trend** is observed for Eastern European and Southern European countries (increase of 25€ and 24€ respectively)
- Greece **moves towards the opposite direction of the European trend**, showing **a reduction of 13€** in per capita hospital pharmaceutical expenditure during 2013-2019
- Of note, this reduction is not a result of changes in the basic elements that influence pharmaceutical spending (prices, volumes, product mix, all of which move rather towards the opposite direction), but **due to changes in the budget caps, resulting to increases in the total clawback and rebate amount**

Graph 2 Average annual per capita Hospital Pharmaceutical Expenditure in 2019



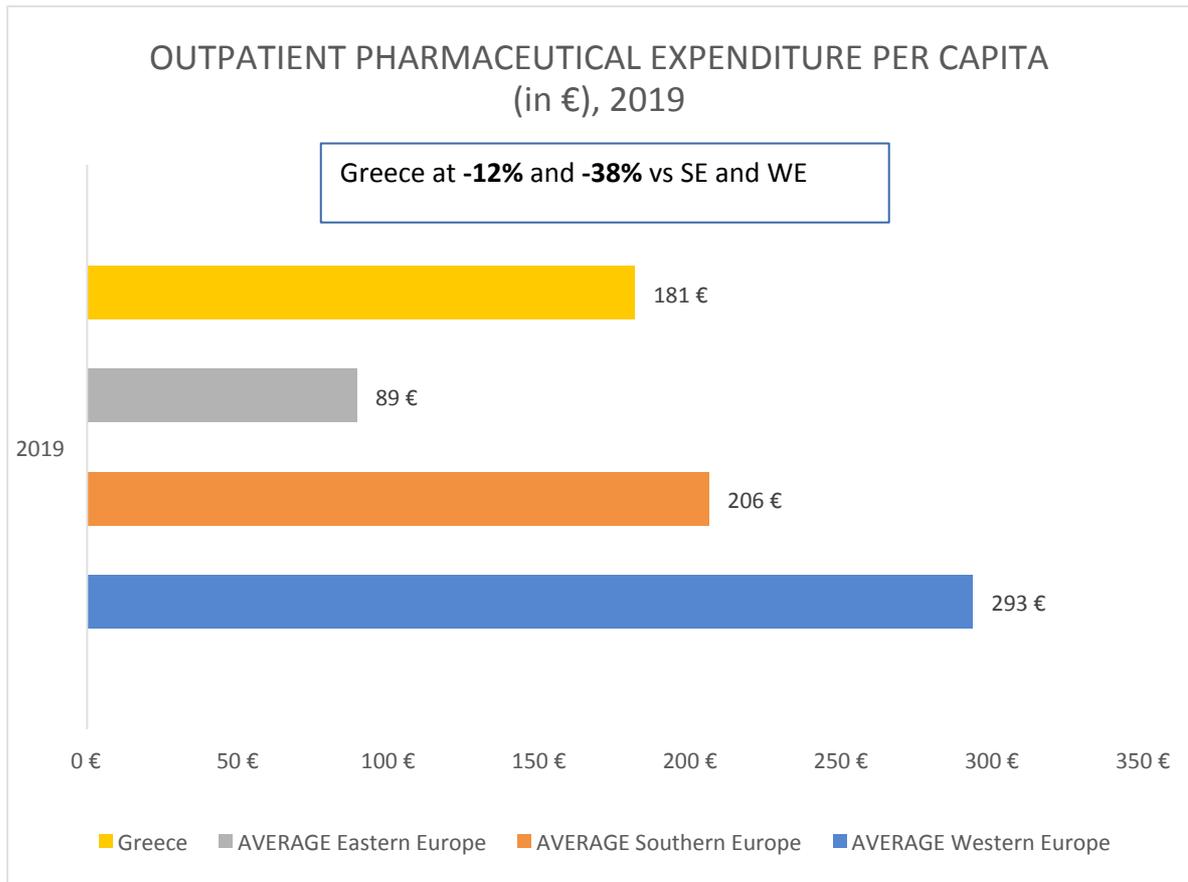
- The diagram presents the Average per capita Hospital Pharmaceutical Expenditure according to the latest cross-country available estimate (2019)
- The average per capita hospital pharmaceutical expenditure in **Greece** for was estimated at **56€**
- The estimate is **significantly lower** in Greece compared to its Southern and Western European peers (**-52% and -63% respectively**)
- The average per capita annual hospital pharmaceutical expenditure in **Greece** for 2019 is about at par with the respective estimate for Eastern Europe countries (57€ in the same year). Nevertheless, in terms of Gross Domestic Product per capita (a proxy of economic development) Greece is significantly higher (16,170 Euros) compared to the Eastern European Countries of the sample (11,870 Euros)

Graph 3 Average per capita public Outpatient Pharmaceutical Expenditure from 2013 to 2019



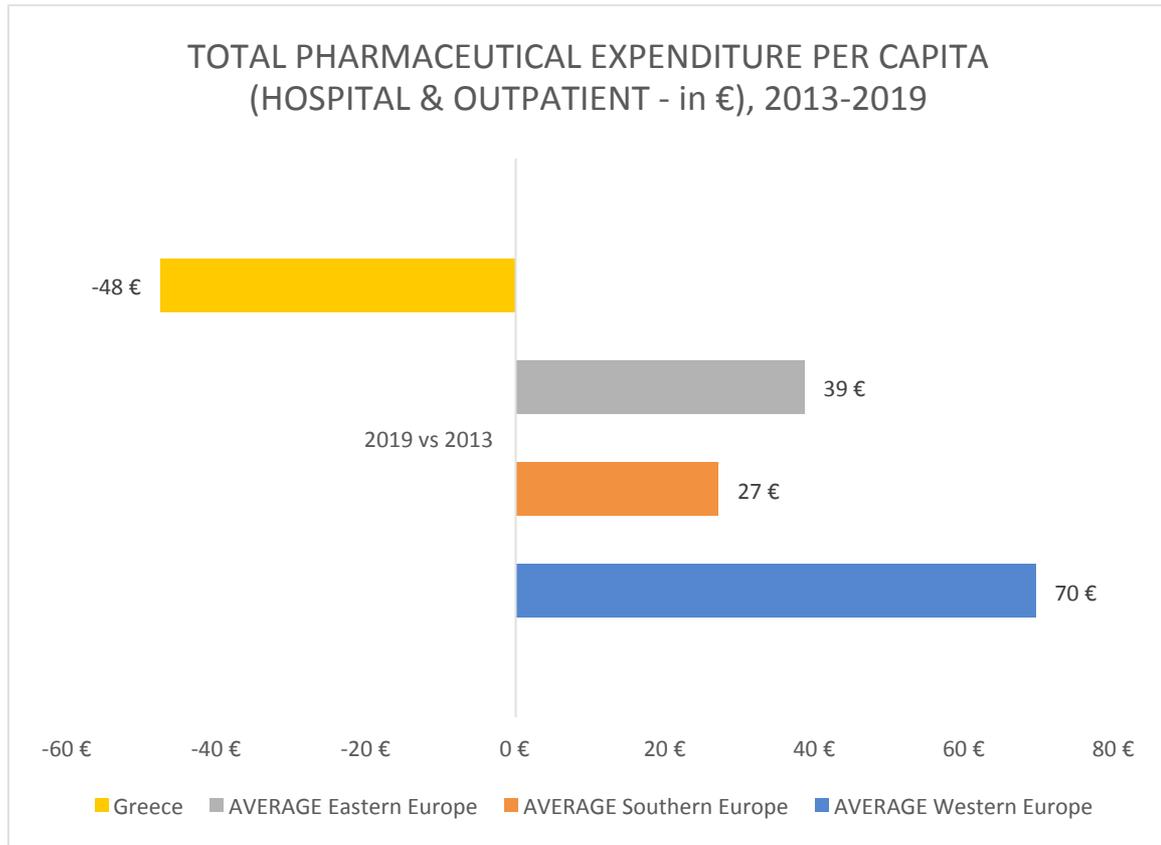
- For the purpose of comparing trends between the two major pharmaceutical market segments, descriptive statistics were also calculated for the outpatient setting
- Public per capita expenditure on outpatient pharmaceuticals **increased by 24€** in Western European countries from 2013 to 2019
- Increases in the average per capita outpatient pharmaceutical spending can be identified also for Eastern Europe (+13€) and Southern Europe (+3€).
- In Greece the **average per capita outpatient pharmaceutical expenditure, paid by compulsory schemes (i.e. by social insurance) declined by 34€ from 2013 to 2019 (-15,83%)**.
- For the case of Greece, **this decline is not based on market dynamics** (as explained above) but on budgetary measures (the setting of budget caps) as well as on changes in the policies for patient copayments, where a significant increase was observed, during the period under study
- Relative comparisons indicate that the **changes in hospital expenditure for pharmaceutical outpace** the spending trends in the outpatient setting

Graph 4 Average per capita public Outpatient Pharmaceutical Expenditure in 2019



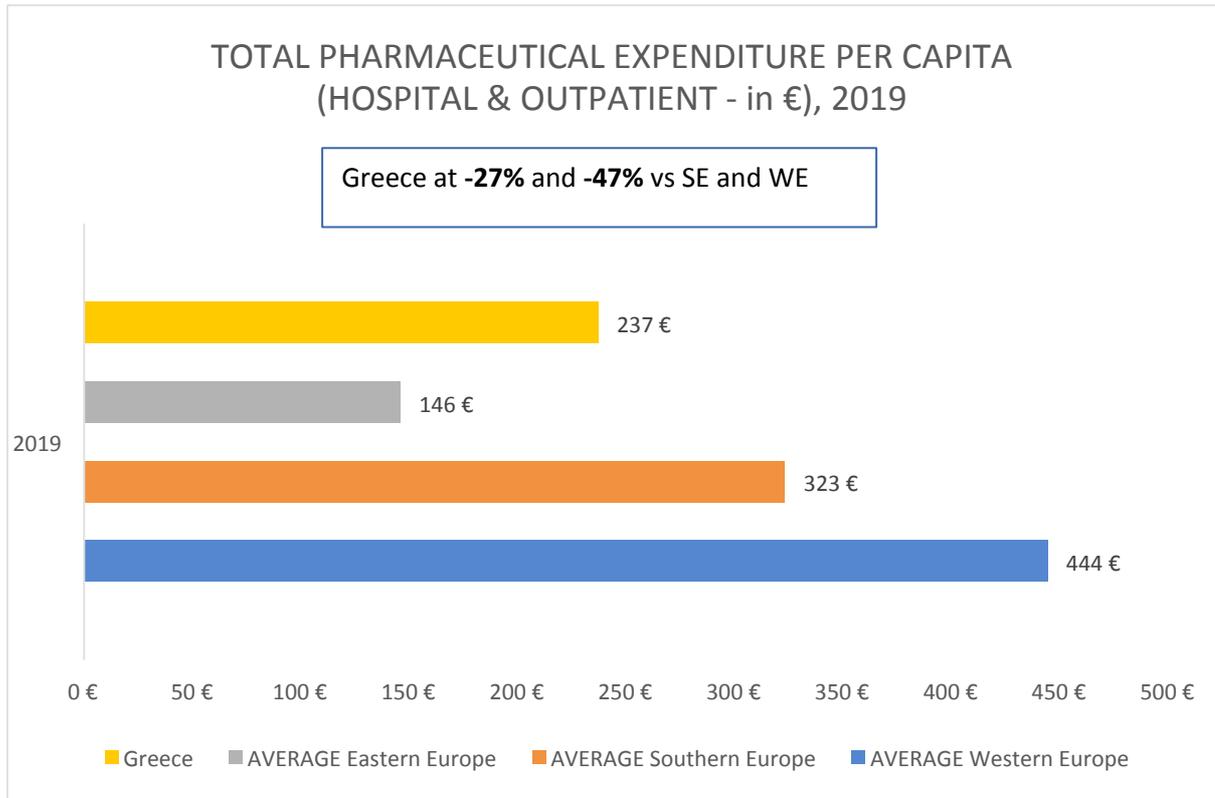
- *The diagram presents the Average per capita Outpatient Pharmaceutical Expenditure paid by compulsory schemes according to the latest cross-country available estimate (2019)*
- *The average per capita outpatient pharmaceutical expenditure in **Greece** for was estimated at **181€***
- *The estimate is **significantly lower** in Greece compared to its Southern and Western European peers (**-12% and -38% respectively**)*
- *The estimate for Greece is **higher** Greece compared to Eastern European countries (181€ vs 83€)*
- *The latter, combined with the hospital expenditure estimates, shows that in Greece funding for pharmaceutical expenditure is more extended in the outpatient setting compared to the hospital setting, vis-à-vis other European countries*

Graph 5 Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) from 2013 to 2019 (public sources/compulsory schemes)



- The diagram shows the evolution of total pharmaceutical expenditure (hospital and outpatient) paid by compulsory schemes in Europe from 2013 to 2019
- The average annual per capita total pharmaceutical expenditure (hospital & outpatient) **increased by 70€, on average, in Western European countries** in the period under investigation.
- Increasing trends in this period are also observed in **Eastern European (+39€)** and **Southern European (+27€)** countries.
- In Greece though the average per capita **total pharmaceutical expenditure (hospital & outpatient) declined by 48€ from 2013 to 2019.**
- Again, this is not an issue of market dynamics in Greece, since the net trend (i.e. public + private expenditure on pharmaceuticals) is positive during this period, showing a mis-alignment between policy measures and expressed demand for pharmaceuticals.

Graph 6 Average annual per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) in 2019 (public sources/compulsory schemes)



- The diagram focuses on a point estimate (for 2019) of the average annual per capita Total Pharmaceutical Expenditure (hospital + outpatient), that are sourced from public sector payers
- The average per capita total pharmaceutical expenditure (hospital & outpatient) in 2019 for Greece is estimated at **237€**.
- Compared to Southern and Western European countries, **per capita total pharmaceutical expenditure in Greece is lower by -27% and -47% respectively.**
- Compared its Eastern European peers, **per capita total pharmaceutical expenditure in Greece is higher by 38%.**
- The data imply a **tendency of under-funding** of hospital pharmaceutical expenditure, compared to the outpatient trend, in Greece

Take-away points

The global economic crisis that burst out in 2008 severely affected the overall social, economic and political life of Greece. Economic Adjustment Programmes that were imposed as part of the Memorandums of Understanding (MoUs) of 2010, 2012 and 2015, aimed in cutting waste and enhancing the efficiency of the healthcare system (Yfantopoulos & Chantzaras, 2018).

In the pharmaceutical field the austerity measures that had been taken led to a cost shifting of the pharmaceutical expenditure from the public to patients and to manufacturers. More specifically, public outpatient expenditure declined over 60%, from 5,1 billion € in 2009 to 2,0 billion € in 2020. In parallel, pharmaceutical industry's contribution, expressed through rebates (discounts) and clawbacks (mandatory returns) skyrocketed from 272 million € in 2012 to 1,304 billion € in 2020 (increase of 379%). Accordingly, patients' participation (co-payments) marked a significant increase of 54% from 416 million € in 2012 to 639 million € in 2020 (IOBE & SFEE, 2020).

Austerity measures of the past decade didn't refer solely to outpatient pharmaceutical expenditure but also included inpatient pharmaceutical expenditure. The public hospital pharmaceutical expenditure has declined from 761 million € in 2012 to 605 million € in 2020 (including the "1A products" and a hospital of a special status). A key question remains as to the actual criteria that were used in order to define the aforementioned spending caps. The reduction of public hospital pharmaceutical expenditure led to an increase of the industry participation, expressed through rebates and clawbacks, from zero levels in 2015 (year of implementation of fixed budget) to 569 million € for 2020 (IOBE & SFEE, 2020).

This regressive approach in the case of Greece is also depicted by the available evidence, both from the literature as well as from the country-level data that became available from EFPIA and facilitated, for a first time, a detailed set of cross-country comparisons in terms of outpatient *AND* hospital pharmaceutical expenditure.

Among other findings, a key trend that stems from the data is that Greece is the only country where both the inpatient and outpatient pharmaceutical spending paid by compulsory schemes was reduced over the period 2013-2019, whereas in all the other country-cases that were examined there was an increase in at least one of the two key segments of the pharmaceutical market. The latter probably highlights an effort, by the European countries, to meet the increasing demand for access to medications, channeling it through either the hospital (most notably) or the outpatient setting (or both).

Given the prevalent market distortions regarding the hospital pharmaceutical setting, a series of reforms are necessary for the stability of the system and the securing of access. Among a multitude of potential choices, the research team highlights the following thoughts:

- **Re-evaluate the budget caps** for pharmaceuticals, especially in the hospital setting, taking into account the European norm and trend, as evidenced by the available data
- Introduce **forecasting** systems that will take into account the evolutions in disease burden and the advances in pharmaceutical technology
- **Separate** the hospital pharmaceutical budget in **two components**, i.e. (a) **medicines that are used for the treatment of inpatients**, for which the hospital will be reimbursed through DRGs³ - and not through the current budget allocation - and (b) **medicines that meet the new role of the hospital as a high-tech supply channel**, which could have a separate budget (for example, the allocated budget could refer only to those products, excluding those that are funded through the DRG/KEN system).
- Examine and **re-evaluate the composition of the list of products** that are administered through the hospital

³ As done in most countries and according to the currently existing DRG schemes internationally. The DRG system in Greece already contains such a provision and drugs for inpatient care are already included in the DRG fee (apart from listed exceptions)

- Operationalize risk-sharing agreements and explore whether public hospitals could serve as **centers for the monitoring and evaluation (thus reimbursement)** of the RSAs that are implemented in the country
- Implement the total coverage of **e-prescribing** in hospitals
- Make use of negotiation-based **purchasing agreements**

Detailed Research Findings: Main Text

Introduction

Pharmaceutical expenditure is an important component of the total health expenditure, accounting for around one-sixth of the latter and representing the third largest spending component in EU countries after inpatient and outpatient care. The trend of the outpatient (or retail) pharmaceutical expenditure has been increasing over time in most OECD countries (Health at a glance, 2021).

While outpatient pharmaceutical expenditure is captured by international organization databases (e.g. OECD, WHO), on the contrary hospital pharmaceutical expenditure has not been examined thoroughly. This can be attributed to the fact that the hospital pharmaceutical expenditure constitutes an integral part of the total hospital expenditure, resulting into difficulties in extracting and isolating it. Medicines are considered a key input in the hospital production function in the production process of the hospital care, along with capital and labour (WHO, 2017).

Over the last decade, hospital pharmaceutical expenditure has increased substantially, partly due to the advent of new high-cost treatments, particularly in therapeutic areas such as oncology and immunology (Health at a glance, 2021). According to available data pharmaceuticals used during hospital care can typically add another 20% to a country's pharmaceutical bill. The importance of estimating hospital pharmaceutical expenditure is enforced by the findings that the annual average growth of hospital pharmaceutical spending has frequently outpaced that of retail pharmaceutical spending during the period 2010-2019 in several OECD countries (Canada, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Iceland, Israel, Korea, Mexico, Portugal, Spain) (Health at a glance, 2021). This fact may reflect though deliberate policy decisions to transfer high-cost medicines to hospital dispensing (Health at a glance, 2020). These decisions either taken due to reasons related to monitoring the distribution process or due to the nature of these drugs, have highlighted hospital dispensing as a new distribution channel of high-technology medicines.

Under the light of the above assessing, monitoring and controlling inpatient pharmaceutical expenditure should be a part of evidence-based pharmaceutical policies developed by policy makers, in order to ensure the optimal allocation of resources and the sustainability of the healthcare systems.

Purpose of the study – Methods

The purpose of this study was to assess the magnitude of the hospital pharmaceutical expenditure in Greece, identify trends and develop indicators that will facilitate international comparisons with other European countries. In this direction, the current study used a combination of approaches. To perform the task, the study used a dual analytical approach, basing its outcomes on an *exploratory analysis*, as a first step, followed by a *confirmatory descriptive analysis* of cross-country expenditure data, for the final calculations. Common element of the approaches is to include in the analysis the pharmaceutical expenditures paid by compulsory health insurance systems or third-party payers as a joint basis of comparison.

As noted above, **the first part of the study** constitutes an exploratory analysis that aimed to retrieve publicly available data on pharmaceutical spending for European countries. This was achieved by reviewing the literature for published evidence in the form of peer-reviewed papers, “grey” publications, official reports, or country-specific available data from official web-based sources (e.g., organization websites), from 2010 onwards. After the extraction of the data, a series of benchmarking calculations were performed by the production of a set of indicators, which comprise the following:

- Hospital Pharmaceutical Expenditure (paid by compulsory health insurance systems) trends - % changes between years - compound annual growth rate
- Outpatient Pharmaceutical Expenditure (paid by compulsory health insurance systems) trends - % changes between years

- Total Pharmaceutical Expenditure (Hospital and Outpatient Pharmaceutical Expenditure paid by compulsory health insurance systems) trends - % changes between years
- Composition of Total Pharmaceutical Expenditure (Hospital and Outpatient Pharmaceutical Expenditure paid by compulsory health insurance systems) – ratios

For each country the study aimed to (a) calculate the share of hospital pharmaceutical expenditure as part of total spending for pharmaceuticals – inpatient and outpatient – by third-party payers and (b) identify trends in hospital pharmaceutical expenditure (namely the proportional change between years and compound annual growth rate) by comparing point estimates of expenditure referring to distinct years, where available. For reasons of comparability, the respective country-specific trend in outpatient pharmaceutical expenditure, in the corresponding years, is also reported. The data refer to both outpatient and inpatient pharmaceutical expenditure, when the respective indice requires it.

The second part of the study uses primary data on pharmaceutical expenditure across European countries provided by the European Federation of Pharmaceutical Industries and Associations (EFPIA), in order to highlight trends and perform international comparisons. The set of indices that were produced on the basis of the EFPIA database include the following:

- Hospital Pharmaceutical Expenditure (paid by compulsory health insurance systems) for selected countries
- Hospital Pharmaceutical Expenditure (paid by compulsory health insurance systems) trends - % changes between years
- Outpatient Pharmaceutical Expenditure (paid by compulsory health insurance systems) for selected countries
- Outpatient Pharmaceutical Expenditure (paid by compulsory health insurance systems) trends - % changes between years

Hospital Pharmaceutical expenditure in Europe

- Total Pharmaceutical Expenditure (Hospital and Outpatient Pharmaceutical Expenditure paid by compulsory health insurance systems) for selected countries
- Total Pharmaceutical Expenditure (Hospital and Outpatient Pharmaceutical Expenditure paid by compulsory health insurance systems) trends - % changes between years
- Composition of Total Pharmaceutical Expenditure (Hospital and Outpatient Pharmaceutical Expenditure paid by compulsory health insurance systems) – ratios
- Percentage of Hospital pharmaceutical expenditure (paid by compulsory health insurance) to Outpatient pharmaceutical expenditure (paid by compulsory health insurance)
- Hospital Pharmaceutical expenditure (paid by compulsory health insurance systems) per capita for selected countries
- Outpatient Pharmaceutical expenditure (paid by compulsory health insurance systems) per capita for selected countries
- Total pharmaceutical expenditure (Hospital and Outpatient pharmaceutical expenditure paid by compulsory health insurance systems) per capita for selected countries
- Average per capita Hospital Pharmaceutical Expenditure from 2013 to 2019
- Average per capita Hospital Pharmaceutical Expenditure in 2019
- Average per capita Outpatient Pharmaceutical Expenditure from 2013 to 2019
- Average per capita Outpatient Pharmaceutical Expenditure in 2019
- Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) from 2013 to 2019
- Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) in 2019

Results

Method 1: Exploratory analysis

The review of the literature retrieved data for 15 European countries. For two of the countries the data were point estimates, i.e. they only referred to one year. A degree of heterogeneity in data reporting was observed, mainly with respect to the reference year(s). Albeit the available data are not in the same systematic and detailed form that outpatient pharmaceutical expenditure have been reported during the years (which, in its own highlights both an issue and a need, in the case of hospital pharmaceutical expenditure) some important conclusions can be drawn.

Table 4 presents the proportion of hospital pharmaceutical expenditure (HPE) to total pharmaceutical expenditure (TPE) in the 15 countries for which data were available in the published literature. Based on the reported data, the lowest proportion of HPE to TPE was in Ukraine (18.7%). On the contrary, the highest proportion of HPE to TPE was in Belgium (49.3%), followed by Denmark (47.5%) and UK (43.0%). **The average hospital pharmaceutical expenditure accounts for approximately 30.6% of total pharmaceutical expenditures** paid by compulsory schemes (social insurance or third-party payer). **In Greece, this ratio is estimated at 23,5%, significantly lower than the sample average.**

Hospital Pharmaceutical expenditure in Europe

Table 4 Proportion of hospital pharmaceutical expenditure to total pharmaceutical expenditure in European countries

Country	Year ⁴	Ratio ⁵	Source
Belgium	2019	49.3%	INAMI (2020)
Denmark	2020	47.5%	MEDSTAT.DK (2021)
Finland	2018	22.2%	THL (2020)
France	2014	20.0%	MS Report (2016)
Germany	2014	21.4%	MS Report (2016)
Greece	2019	23.5%	IOBE (2020)
Ukraine	2013	18.7%	IBERGLOBAL (2014)
Ireland	2016	21.2%	IGEES (2017)
Italy	2018	38.0%	AIFA (2019)
Netherlands	2014	28.4%	MS Report (2016)
Poland	2014	33.5%	MS Report (2016)
Portugal	2011	30.6%	Belloni et al. (2016)
Spain	2016	38.3%	LSE (2017)
Sweden	2016	23.5%	PPRI (2017)
UK	2014	43.0%	MS Report (2016)
Average		30.6%	calculation

Table 5 shows the percentage change in HPE over the years that reporting was available. As shown in Table 5, in Greece, the public hospital pharmaceutical expenditure, during the period 2012-2019, decreased by 21.6%. In contrast, in almost all European countries for which data were available, hospital pharmaceutical expenditure has increased significantly, by a percentage that in many cases exceeds 50%. The only exception is Germany, where the HPE decrease between 2010 and 2014 by 2.3%. In addition, the table presents the compound annual growth rate

⁴ Most recent available data

⁵ The ratio reflects the Percentage of Hospital pharmaceutical expenditure (paid by compulsory health insurance or third-party payer) to Total pharmaceutical expenditure (paid by compulsory health insurance third-party payer)

Hospital Pharmaceutical expenditure in Europe

(CAGR), which shows the annual changes of the HPE. Greece is the country with the lowest CAGR (negative; -3.4%), when in all other countries, apart from Germany, a CAGR of up to 13.1% is observed, supporting a clear increasing trend in public hospital pharmaceutical spending over time.

Although the transformation of the hospital distribution channel is a more or less common policy practice which, in turn, shapes the expenditure trend, Greece remains a notable exception (follows the trend of policy, takes an opposite direction in terms of expenditure trends)

Table 5 Percentage change of hospital pharmaceutical expenditure in European countries

Country	Time period	Change of HPE (%)	CAGR of HPE	Source
Belgium	2013-2019	+88,2%	9.5%	INAMI (2020)
Denmark	2012-2020	+51%	4.9%	MEDSTAT.DK (2021)
Finland	2012-2108	+56,9%	6.7%	THL (2020)
France	2010-2014	+6,8%	1.6%	MS Report (2016)
Germany	2010-2014	-2,3%	-1.1%	MS Report (2016)
Greece	2012-2019	-21,6%	-3.4%	IOBE (2020)
Ireland	2012-2016	+38,5%	8.5%	IGEES (2017)
Italy	2011-2018	+81%	8.2%	AIFA (2019)
Netherlands	2010-2014	+41,7%	9.2%	MS Report (2016)
Poland	2010-2014	+31%	7.0%	MS Report (2016)
Spain	2014-2016	+18,3%	8.8%	LSE (2017)
Sweden	2012-2016	+14,3%	2.5%	PPRI (2017)
UK	2010-2014	+63,4%	13.1%	MS Report (2016)

HPE; Hospital Pharmaceutical Expenditure, CAGR; Compound Annual Growth Rate

Table 6 presents the percentage change of outpatient pharmaceutical expenditure (OPE) and of total pharmaceutical expenditure (which, as noted above, is the sum of the inpatient and outpatient pharmaceutical expenditure paid by third-party payers). With regards to OPE, 5 countries in the sample experienced a decrease of the relevant expenditure during the last decade, for the years that data became available. Among them, Greece presents a notable decrease (-32.5%), whereas the remaining four countries experienced a decrease of less than 6%. The eight remaining countries in the sample had either an almost stable OPE or an increase of up to 12.6%. Total pharmaceutical expenditure increased in 11 out of 13 countries, with the highest increases recorded for Belgium and followed by the UK. Only two countries had a decrease in TPE, i.e. Greece (by 30.2%) and France (1.5%). Greece is the only country that presented a decrease in both inpatient and outpatient pharmaceutical expenditure of the 13 countries that were included in the analysis, based on data availability for >1 years. In conclusion, trends in total pharmaceutical expenditure reveal that hospital pharmaceutical expenditure grow at a higher rate in Europe, compared to outpatient pharmaceutical spending.

Hospital Pharmaceutical expenditure in Europe

Table 6 Percentage change of outpatient pharmaceutical expenditure and total pharmaceutical expenditure in European countries

Country	Time period	Change of OPE (%)	Change of TPE	Source
Belgium	2013-2019	+1.1%	+31.0%	INAMI (2020)
Denmark	2012-2020	+6.0%	+23.5%	MEDSTAT.DK (2021)
Finland	2012-2108	+12.6%	19.3%	THL (2020)
France	2010-2014	-3.0%	-1.5%	MS Report (2016)
Germany	2010-2014	+2.3%	+1.0%	MS Report (2016)
Greece	2012-2019	-32.5%	-30.2%	IOBE (2020)
Ireland	2012-2016	-2.8%	+3.8%	IGEES (2017)
Italy	2011-2018	+2.4%	+19.85	AIFA (2019)
Netherlands	2010-2014	-5.6%	+1.9%	MS Report (2016)
Poland	2010-2014	-0.7%	+5.7%	MS Report (2016)
Spain	2014-2016	+5.9%	+10.3%	LSE (2017)
Sweden	2012-2016	+11.8%	+12.4%	PPRI (2017)
UK	2010-2014	+20.2%	+30.5%	MS Report (2016)

HPE; Hospital Pharmaceutical Expenditure, TPE; Total Pharmaceutical Expenditure

Method 2: Confirmatory analysis (EFPIA data)

In the confirmatory analysis, the available data that were provided by the European Federation of Pharmaceutical Industries and Associations were utilized. The analysis focuses on the data that refer to hospital pharmaceutical expenditure (paid by compulsory health insurance systems or third-party payer). From the dataset, countries for which there was either incomplete data or there were inaccuracies about the documentation of the expenditure, were excluded from the analysis.

Table 7 and Graph 7 present the nominal hospital pharmaceutical expenditure per country per year and the percentage change between 2013-2019 respectively.

Hospital Pharmaceutical expenditure in Europe

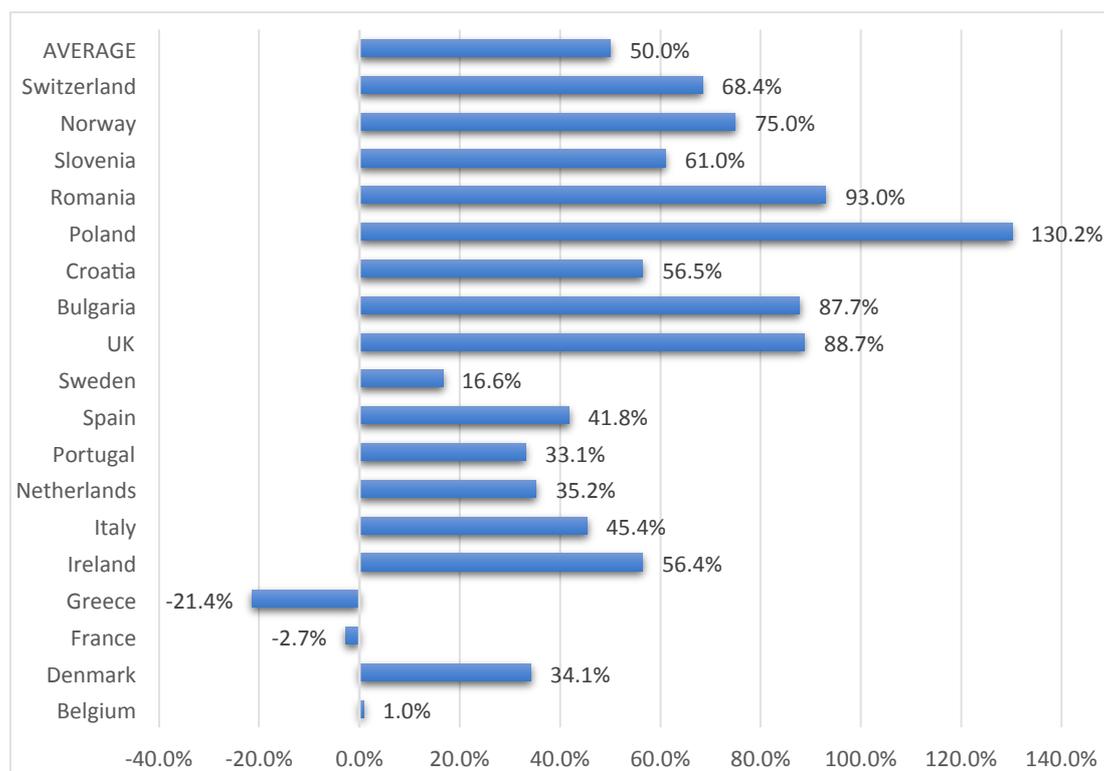
Table 7: Hospital Pharmaceutical Expenditure (paid by compulsory health insurance systems or third-party payer) per country in million €

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	411	398	410	405	415	411	415
Denmark	1160	1287	1324	1356	1482	1565	1556
France	4524	4540	4622	5218	5049	4877	4400
Greece	760	750	764	590	580	550	597
Ireland	326	336	338	426	437	494	510
Italy	7665	7693	9579	9723	9907	10878	11148
Netherlands	1774	1910	2054	2275	2420	2268	2399
Portugal	975	990	1034	1088	1141	1207	1298
Spain	5022	5254	6668	6234	6448	6619	7123
Sweden	782	829	807	809	842	847	912
UK	7775	8223	11355	11109	11639	12885	14675
Bulgaria	187	178	253	296	314	320	351
Croatia	177	193	238	277	277	277	277
Poland	852	937	999	1175	1378	1700	1961
Romania	357	324	333	336	494	558	689
Slovenia	100	119	130	134	136	151	161
Norway	615	683	680	680	752	845	1076
Switzerland	759	784	962	1021	1084	1113	1278
TOTAL	34221	35428	42550	43152	44795	47565	50826

Source: EFPIA

Hospital Pharmaceutical expenditure in Europe

Graph 7: Hospital Pharmaceutical Expenditure per country: change between 2013-2019



Source: EFPIA

Greece and France are the only two countries between the 18 countries with available data where hospital pharmaceutical expenditure declined from 2013 to 2019 (by -21,4% and -2,7% respectively). Poland is by far the country with the highest growth in the hospital pharmaceutical spending between 2013-2019, followed by Romania, UK and Bulgaria. The average hospital pharmaceutical expenditure of the 18 selected countries marked a significant increase of 50% between the period under survey.

Table 8 and Graph 8 present the outpatient pharmaceutical expenditure paid by compulsory health insurance systems or third-party payers and the percentage changes between the years 2013-2019 respectively.

Hospital Pharmaceutical expenditure in Europe

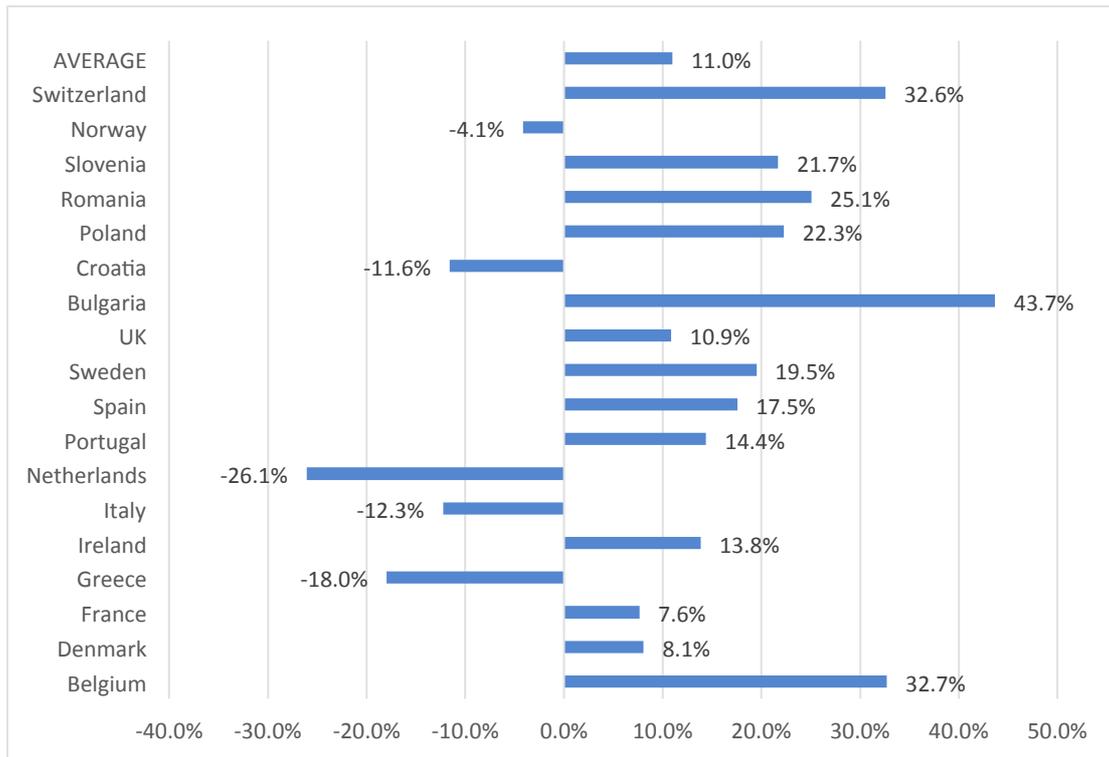
Table 8: Outpatient Pharmaceutical Expenditure per country (in million €)

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	3653	3637	3867	3973	4180	4481	4848
Denmark	743	759	772	773	758	758	803
France	22501	23561	23341	23456	23865	23967	24220
Greece	2371	2000	2000	1945	1945	1945	1945
Ireland	1437	1463	1501	1558	1579	1700	1636
Italy	8765	8507	8370	8147	7936	7691	7690
Netherlands	4324	4368	2941	3010	3070	3104	3196
Portugal	1160	1170	1182	1190	1213	1255	1327
Spain	9183	9360	9535	9913	10171	10482	10794
Sweden	2030	1962	2013	2168	2252	2286	2426
UK	10760	10655	14217	12633	11723	11445	11929
Bulgaria	293	327	330	354	408	420	421
Croatia	432	391	373	382	382	382	382
Poland	1711	1805	1909	1852	1969	2057	2092
Romania	1137	1486	1486	1471	1446	1438	1422
Slovenia	281	269	278	294	307	327	342
Norway	1207	1230	1289	1286	1269	1216	1157
Switzerland	4082	4146	4985	6564	6150	6084	5411
TOTAL	76070	77096	80389	80969	80623	81038	82041

Source: EFPIA

Hospital Pharmaceutical expenditure in Europe

Graph 8: Outpatient Pharmaceutical Expenditure per country 2013-2019



Source: EFPIA

Greece, Italy, Netherlands, Croatia, Iceland and Norway represent the five countries, between the 18 countries in the sample where outpatient pharmaceutical expenditure declined from 2013 to 2019. Bulgaria is leading the increase of the outpatient pharmaceutical expenditure between the abovementioned period, followed by Belgium and Switzerland. The average outpatient pharmaceutical expenditure of the 18 selected countries increased by 11% between the years 2013-2019.

Table 9 and Graph 9 present the total pharmaceutical expenditure (Hospital & Outpatient pharmaceutical expenditure paid by compulsory health insurance systems or third-party payer) and the percentage changes between years 2013-2019 respectively.

Hospital Pharmaceutical expenditure in Europe

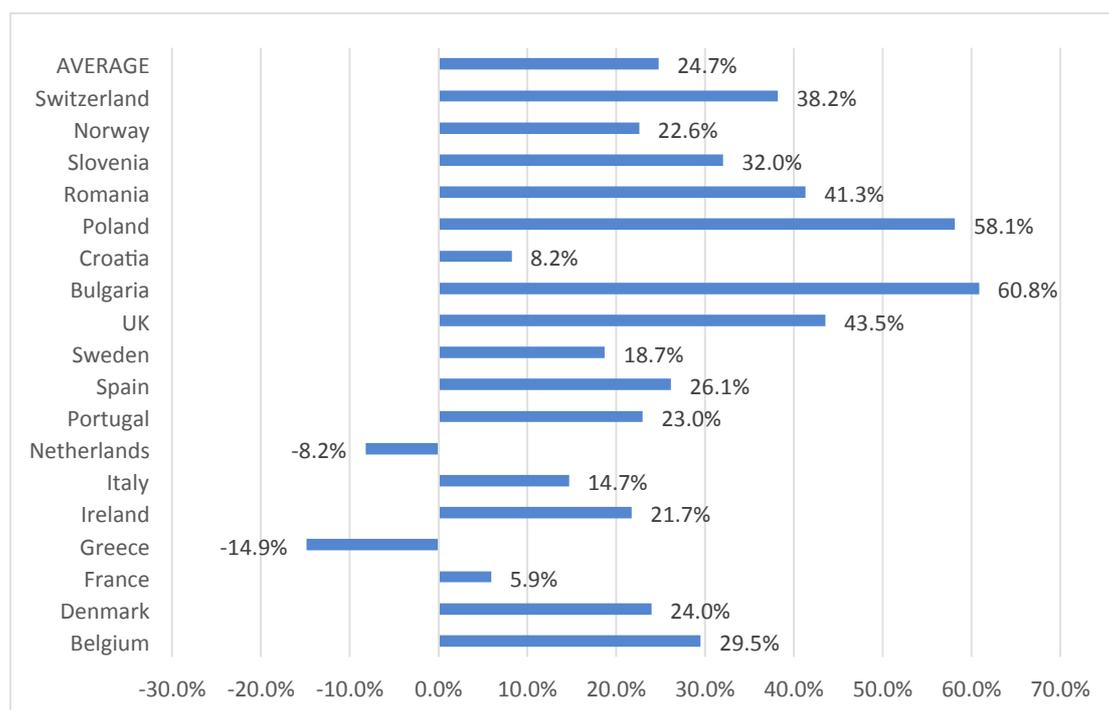
Table 9: Total Pharmaceutical Expenditure per country (Hospital & Outpatient - in million €)

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	4064	4035	4277	4378	4595	4892	5263
Denmark	1903	2046	2096	2129	2240	2323	2359
France	27025	28101	27963	28674	28914	28844	28620
Greece	3131	2750	2764	2535	2525	2495	2542
Ireland	1763	1799	1839	1984	2016	2194	2146
Italy	16430	16200	17949	17870	17843	18569	18838
Netherlands	6098	6278	4995	5285	5490	5372	5595
Portugal	2135	2160	2216	2278	2354	2462	2625
Spain	14205	14614	16203	16147	16619	17101	17917
Sweden	2812	2791	2820	2977	3094	3133	3338
UK	18535	18878	25572	23742	23362	24330	26604
Bulgaria	480	505	583	650	722	740	772
Croatia	609	584	611	659	659	659	659
Poland	2563	2742	2908	3027	3347	3757	4053
Romania	1494	1810	1819	1807	1940	1996	2111
Slovenia	381	388	408	428	443	478	503
Norway	1822	1913	1969	1966	2021	2061	2233
Switzerland	4841	4930	5947	7585	7234	7197	6689
TOTAL	110291	112524	122939	124121	125418	128603	132867

Source: EFPIA

Hospital Pharmaceutical expenditure in Europe

Graph 9: Total Pharmaceutical Expenditure (Hospital & Outpatient) 2013-2019



Source: EFPIA

Greece and the Netherlands are the two countries in the sample (N=18) where total pharmaceutical expenditure (hospital and outpatient) paid by third-party payers declined from 2013 to 2019 (-14,9% and -8,2% respectively). On the contrary, Bulgaria and Poland are the countries with the highest increase in the total pharmaceutical expenditure between 2013-2019 followed by UK and Romania. The average total pharmaceutical expenditure of the 18 selected countries increased by 24,7% between the years 2013-2019.

The Total pharmaceutical expenditure paid by compulsory health insurance systems or third-party payer is composed by: a) the Hospital expenditure paid by compulsory health insurance systems and b) the Outpatient expenditure paid by compulsory health insurance systems in different ratios across countries and years. The relevant ratios are presented in Tables 10 and 11:

Hospital Pharmaceutical expenditure in Europe

Table 10: Ratio of Hospital Pharmaceutical Expenditure (paid by compulsory health insurance systems or third-party payer) to Total Pharmaceutical Expenditure (paid by compulsory health insurance systems or third-party payer)

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	10,1%	9,9%	9,6%	9,3%	9,0%	8,4%	7,9%
Denmark	61,0%	62,9%	63,2%	63,7%	66,2%	67,4%	66,0%
France	16,7%	16,2%	16,5%	18,2%	17,5%	16,9%	15,4%
Greece	24,3%	27,3%	27,6%	23,3%	23,0%	22,0%	23,5%
Ireland	18,5%	18,7%	18,4%	21,5%	21,7%	22,5%	23,8%
Italy	46,7%	47,5%	53,4%	54,4%	55,5%	58,6%	59,2%
Netherlands	29,1%	30,4%	41,1%	43,0%	44,1%	42,2%	42,9%
Portugal	45,7%	45,8%	46,7%	47,8%	48,5%	49,0%	49,4%
Spain	35,4%	36,0%	41,2%	38,6%	38,8%	38,7%	39,8%
Sweden	27,8%	29,7%	28,6%	27,2%	27,2%	27,0%	27,3%
UK	41,9%	43,6%	44,4%	46,8%	49,8%	53,0%	55,2%
Bulgaria	39,0%	35,2%	43,4%	45,5%	43,5%	43,2%	45,5%
Croatia	29,1%	33,0%	39,0%	42,0%	42,0%	42,0%	42,0%
Poland	33,2%	34,2%	34,4%	38,8%	41,2%	45,2%	48,4%
Romania	23,9%	17,9%	18,3%	18,6%	25,5%	28,0%	32,6%
Slovenia	26,2%	30,7%	31,9%	31,3%	30,7%	31,6%	32,0%
Norway	33,8%	35,7%	34,5%	34,6%	37,2%	41,0%	48,2%
Switzerland	15,7%	15,9%	16,2%	13,5%	15,0%	15,5%	19,1%
AVERAGE	31,0%	31,7%	33,8%	34,3%	35,3%	36,2%	37,7%

Source: EFPIA

The ratio of the Hospital pharmaceutical expenditure (paid by compulsory health insurance systems or third-party payer) to the Total pharmaceutical expenditure (paid by compulsory health insurance systems or third-party payer) varies across countries and years. In Greece hospital pharmaceutical expenditure represents a ratio of around 23% to the total (hospital and outpatient) pharmaceuticals paid by the health insurance funds. The average ratio between the selected European countries indicates that hospital pharmaceutical spending represents approximately

Hospital Pharmaceutical expenditure in Europe

1/3 of the total pharmaceutical spending paid by the health insurance systems, while the rest 2/3 refer to outpatient pharmaceutical spending. For the period examined though (2013-2019) we can identify an increasing trend of substitution of outpatient pharmaceutical expenditure with hospital pharmaceutical expenditure. This could be attributed to deliberate policy decisions to transfer high-cost medicines to hospital dispensing.

Table 11: Ratio of Outpatient Pharmaceutical Expenditure (paid by health insurance systems or third-party payer) to Total Pharmaceutical Expenditure (paid by health insurance systems or third-party payer)

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	89,9%	90,1%	90,4%	90,7%	91,0%	91,6%	92,1%
Denmark	39,0%	37,1%	36,8%	36,3%	33,8%	32,6%	34,0%
France	83,3%	83,8%	83,5%	81,8%	82,5%	83,1%	84,6%
Greece	75,7%	72,7%	72,4%	76,7%	77,0%	78,0%	76,5%
Ireland	81,5%	81,3%	81,6%	78,5%	78,3%	77,5%	76,2%
Italy	53,3%	52,5%	46,6%	45,6%	44,5%	41,4%	40,8%
Netherlands	70,9%	69,6%	58,9%	57,0%	55,9%	57,8%	57,1%
Portugal	54,3%	54,2%	53,3%	52,2%	51,5%	51,0%	50,6%
Spain	64,6%	64,0%	58,8%	61,4%	61,2%	61,3%	60,2%
Sweden	72,2%	70,3%	71,4%	72,8%	72,8%	73,0%	72,7%
UK	58,1%	56,4%	55,6%	53,2%	50,2%	47,0%	44,8%
Bulgaria	61,0%	64,8%	56,6%	54,5%	56,5%	56,8%	54,5%
Croatia	70,9%	67,0%	61,0%	58,0%	58,0%	58,0%	58,0%
Poland	66,8%	65,8%	65,6%	61,2%	58,8%	54,8%	51,6%
Romania	76,1%	82,1%	81,7%	81,4%	74,5%	72,0%	67,4%
Slovenia	73,8%	69,3%	68,1%	68,7%	69,3%	68,4%	68,0%
Norway	66,2%	64,3%	65,5%	65,4%	62,8%	59,0%	51,8%
Switzerland	84,3%	84,1%	83,8%	86,5%	85,0%	84,5%	80,9%
AVERAGE	69,0%	68,3%	66,2%	65,7%	64,7%	63,8%	62,3%

Source: EFPIA

Hospital Pharmaceutical expenditure in Europe

The percentage of the Hospital expenditure (paid by health insurance systems) to Outpatient pharmaceutical expenditure (paid by health insurance systems) varies extensively across different countries and years, but the trends of the recent years reflect the increasing contribution of the hospital pharmaceutical spending in the total national pharmaceutical bill. Greece, Belgium, France and Sweden are the only exceptions of this trend, and for these countries this ratio marked a small decline between 2013 and 2019.

Table 12: Percentage of Hospital Pharmaceutical Expenditure (paid by health insurance systems or third-party payer) to Outpatient Pharmaceutical Expenditure (paid by health insurance systems or third-party payer)

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	11,3%	10,9%	10,6%	10,2%	9,9%	9,2%	8,6%
Denmark	156,1%	169,6%	171,5%	175,4%	195,5%	206,5%	193,8%
France	20,1%	19,3%	19,8%	22,2%	21,2%	20,3%	18,2%
Greece	32,1%	37,5%	38,2%	30,3%	29,8%	28,3%	30,7%
Ireland	22,7%	23,0%	22,5%	27,3%	27,7%	29,1%	31,2%
Italy	87,5%	90,4%	114,4%	119,3%	124,8%	141,4%	145,0%
Netherlands	41,0%	43,7%	69,8%	75,6%	78,8%	73,1%	75,1%
Portugal	84,1%	84,6%	87,5%	91,4%	94,1%	96,2%	97,8%
Spain	54,7%	56,1%	69,9%	62,9%	63,4%	63,1%	66,0%
Sweden	38,5%	42,3%	40,1%	37,3%	37,4%	37,1%	37,6%
UK	72,3%	77,2%	79,9%	87,9%	99,3%	112,6%	123,0%
Bulgaria	63,8%	54,4%	76,7%	83,6%	77,0%	76,2%	83,4%
Croatia	41,0%	49,4%	63,8%	72,5%	72,5%	72,5%	72,5%
Poland	49,8%	51,9%	52,3%	63,4%	70,0%	82,6%	93,7%
Romania	31,4%	21,8%	22,4%	22,8%	34,2%	38,8%	48,5%
Slovenia	35,6%	44,2%	46,8%	45,6%	44,3%	46,2%	47,1%
Norway	51,0%	55,5%	52,8%	52,9%	59,3%	69,5%	93,0%
Switzerland	18,6%	18,9%	19,3%	15,6%	17,6%	18,3%	23,6%

Source: EFPIA

Hospital Pharmaceutical expenditure in Europe

Per capita Hospital pharmaceutical expenditure (Table 13) clearly captures the trend across the selected European countries, as Greece, France and Belgium are the only exceptions of this increasing pace. Greece is the country with the highest decline of the per capita hospital pharmaceutical spending across the 18 selected with a decrease of 19,4%.

Table 13: Hospital Pharmaceutical Expenditure per capita (paid by health insurance systems or third-party payer) - in million €

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	37 €	36 €	36 €	36 €	37 €	36 €	36 €
Denmark	207 €	229 €	234 €	238 €	258 €	271 €	268 €
France	69 €	69 €	70 €	78 €	76 €	73 €	65 €
Greece	69 €	69 €	70 €	55 €	54 €	51 €	56 €
Ireland	71 €	72 €	72 €	90 €	91 €	102 €	104 €
Italy	128 €	127 €	158 €	160 €	164 €	180 €	186 €
Netherlands	106 €	113 €	122 €	134 €	142 €	132 €	139 €
Portugal	93 €	95 €	100 €	105 €	111 €	117 €	126 €
Spain	107 €	113 €	144 €	134 €	139 €	142 €	152 €
Sweden	82 €	86 €	83 €	82 €	84 €	84 €	89 €
UK	122 €	128 €	175 €	170 €	177 €	194 €	220 €
Bulgaria	26 €	25 €	35 €	41 €	44 €	45 €	50 €
Croatia	42 €	45 €	56 €	66 €	67 €	67 €	68 €
Poland	22 €	25 €	26 €	31 €	36 €	45 €	52 €
Romania	18 €	16 €	17 €	17 €	25 €	29 €	35 €
Slovenia	49 €	58 €	63 €	65 €	66 €	73 €	77 €
Norway	122 €	134 €	132 €	131 €	143 €	160 €	202 €
Switzerland	94 €	96 €	117 €	123 €	129 €	131 €	150 €

Source: EFPIA

Per capita Outpatient pharmaceutical expenditure (Table 14) marked an increase in most of the selected European countries between 2013 and 2019. The exceptions on this trend of the per capita outpatient pharmaceutical spending are the Netherlands, Greece, Italy, Norway and Croatia.

Hospital Pharmaceutical expenditure in Europe

Table 14: Outpatient Pharmaceutical Expenditure per capita (paid by health insurance systems or third-party payer) - in million €

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	328 €	325 €	344 €	351 €	368 €	393 €	423 €
Denmark	133 €	135 €	136 €	135 €	132 €	131 €	138 €
France	343 €	356 €	351 €	352 €	357 €	358 €	361 €
Greece	215 €	183 €	184 €	180 €	181 €	181 €	181 €
Ireland	312 €	315 €	321 €	330 €	330 €	352 €	334 €
Italy	147 €	140 €	138 €	134 €	131 €	127 €	129 €
Netherlands	258 €	260 €	174 €	177 €	180 €	181 €	185 €
Portugal	111 €	112 €	114 €	115 €	118 €	122 €	129 €
Spain	197 €	201 €	205 €	213 €	219 €	225 €	230 €
Sweden	212 €	203 €	207 €	220 €	225 €	226 €	237 €
UK	168 €	166 €	219 €	193 €	178 €	173 €	179 €
Bulgaria	40 €	45 €	46 €	49 €	57 €	60 €	60 €
Croatia	101 €	92 €	88 €	91 €	92 €	93 €	94 €
Poland	45 €	47 €	50 €	49 €	52 €	54 €	55 €
Romania	57 €	74 €	75 €	74 €	74 €	74 €	73 €
Slovenia	136 €	131 €	135 €	142 €	149 €	158 €	164 €
Norway	239 €	241 €	249 €	247 €	241 €	230 €	217 €
Switzerland	508 €	509 €	605 €	788 €	730 €	717 €	633 €

Source: EFPIA

Per capital total pharmaceutical expenditure (presented in Table 15) shows a significant increase across the 18 selected European countries, with the only exceptions in this trend Greece and the Netherlands.

Hospital Pharmaceutical expenditure in Europe

Table 15: Total Pharmaceutical Expenditure per capita (Hospital & Outpatient Pharmaceutical Expenditure paid by health insurance systems or third-party payer) - in million €

Country/Year	2013	2014	2015	2016	2017	2018	2019
Belgium	365 €	361 €	381 €	387 €	405 €	429 €	459 €
Denmark	340 €	364 €	370 €	373 €	390 €	402 €	406 €
France	412 €	425 €	421 €	430 €	433 €	430 €	426 €
Greece	285 €	252 €	255 €	235 €	234 €	232 €	237 €
Ireland	382 €	388 €	393 €	420 €	421 €	454 €	438 €
Italy	275 €	267 €	295 €	295 €	294 €	307 €	315 €
Netherlands	363 €	373 €	296 €	311 €	321 €	313 €	324 €
Portugal	204 €	207 €	214 €	220 €	228 €	239 €	255 €
Spain	304 €	314 €	349 €	348 €	357 €	367 €	382 €
Sweden	294 €	289 €	289 €	302 €	310 €	310 €	326 €
UK	290 €	293 €	394 €	363 €	355 €	367 €	399 €
Bulgaria	66 €	70 €	81 €	91 €	102 €	105 €	110 €
Croatia	143 €	138 €	145 €	157 €	159 €	161 €	162 €
Poland	67 €	72 €	77 €	80 €	88 €	99 €	107 €
Romania	75 €	91 €	92 €	91 €	99 €	102 €	109 €
Slovenia	185 €	188 €	198 €	207 €	214 €	231 €	242 €
Norway	361 €	375 €	381 €	377 €	384 €	389 €	419 €
Switzerland	602 €	606 €	722 €	911 €	859 €	848 €	783 €

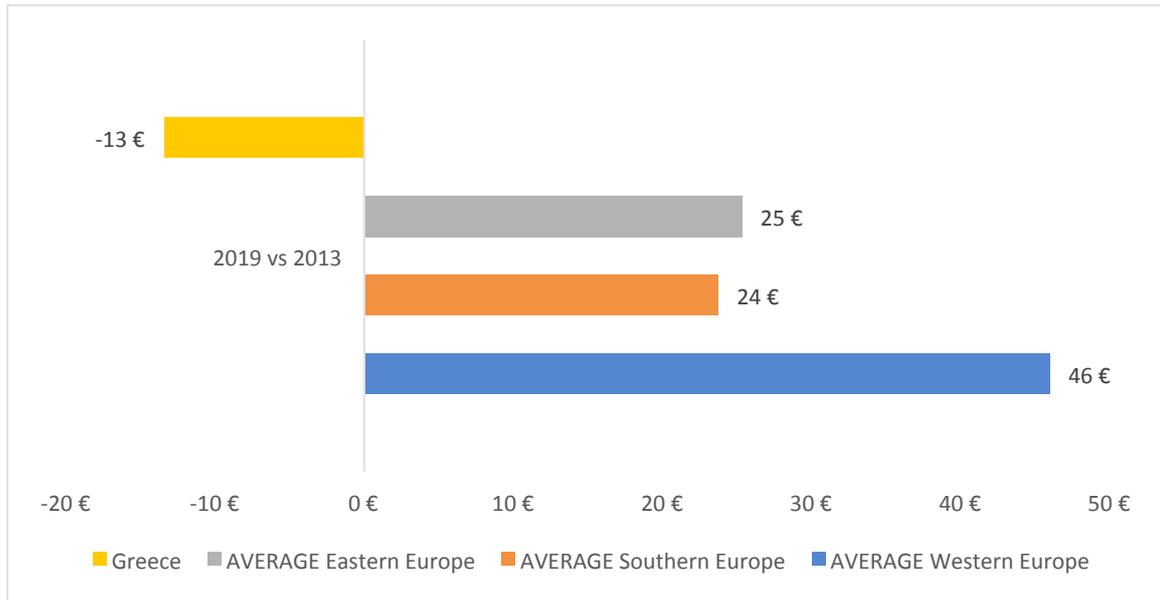
Source: EFPIA

Following the above analysis, the countries in the sample were clustered in groups countries (Western Europe, Southern Europe and Eastern Europe) in order to facilitate comparisons and benchmarking to Greece. The clusters contain the following countries:

- **Western Europe:** Belgium, Denmark, Ireland, Netherlands, Sweden, UK, Norway, Switzerland
- **Southern Europe:** Greece, Italy, Spain, France, Portugal
- **Eastern Europe:** Bulgaria, Croatia, Poland, Romania, Slovenia

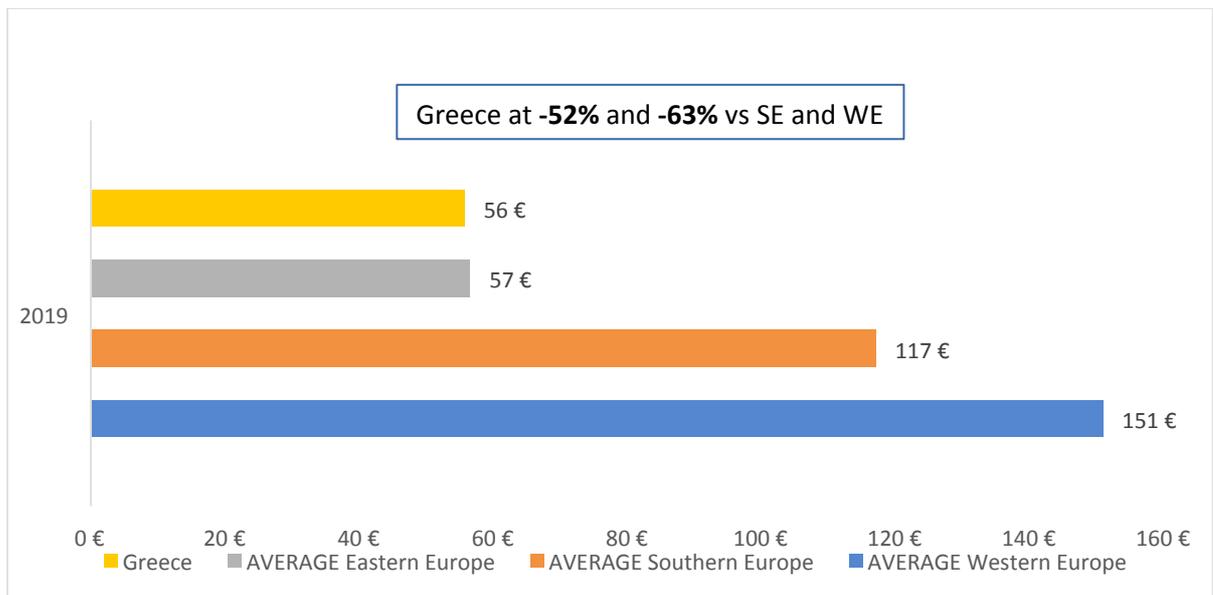
Hospital Pharmaceutical expenditure in Europe

Graph 10: Average per capita Hospital Pharmaceutical Expenditure from 2013 to 2019



The average per capita hospital pharmaceutical expenditure (Graph 10) increased by 46€ in Western European countries from 2013 to 2019, while in the countries of Eastern Europe and Southern Europe it marked an increase of 25€ and 24€ respectively. Greece was the country among the surveyed with the highest reduction of per capita hospital pharmaceutical expenditure (-13€ or -19,40% from 2013 to 2019).

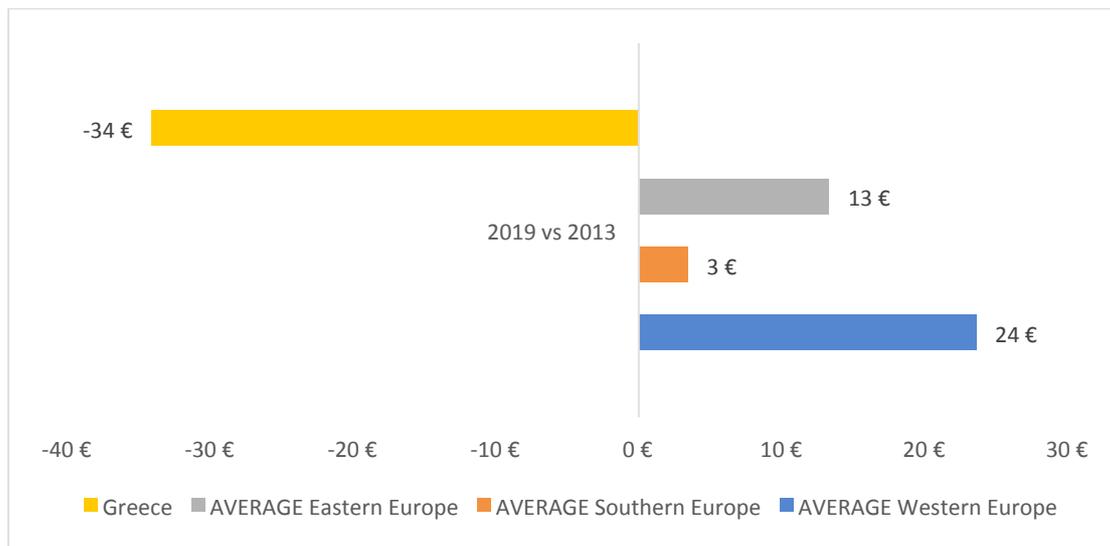
Graph 11: Average per capita Hospital Pharmaceutical Expenditure in 2019



Hospital Pharmaceutical expenditure in Europe

The average per capita hospital pharmaceutical expenditure in 2019 (Graph 11) accounts for 56€ in Greece, which can be compared with the level of Eastern Europe countries (57€ in the same year). The Greek average per capita hospital pharmaceutical spending in 2019 is less than a half compared to Southern Europe and Western Europe countries (-52% and -63% respectively).

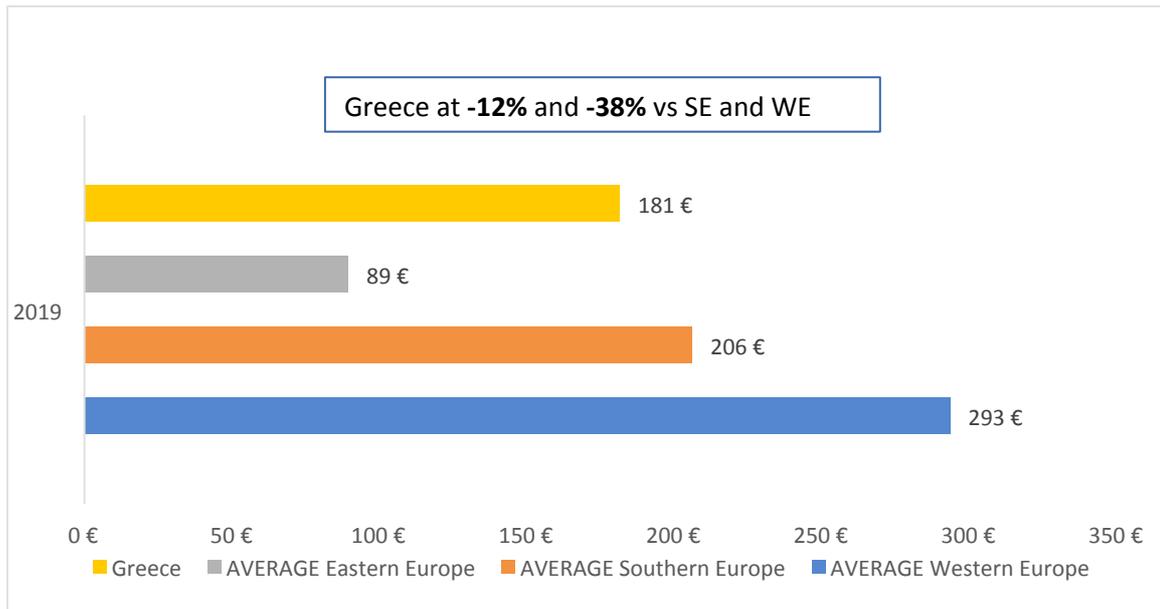
Graph 12: Average per capita Outpatient Pharmaceutical Expenditure from 2013 to 2019



On the side of the average per capita outpatient pharmaceutical expenditure (Graph 12), the analysis of the EFPIA data reveals an increase of 24€ in Western European countries from 2013 to 2019. Increases of the average per capita outpatient pharmaceutical spending can be identified also in Eastern European countries (+13€) and Southern Europe (+3€). In Greece the average per capita outpatient pharmaceutical expenditure declined by 34€ from 2013 to 2019 (-15,83%).

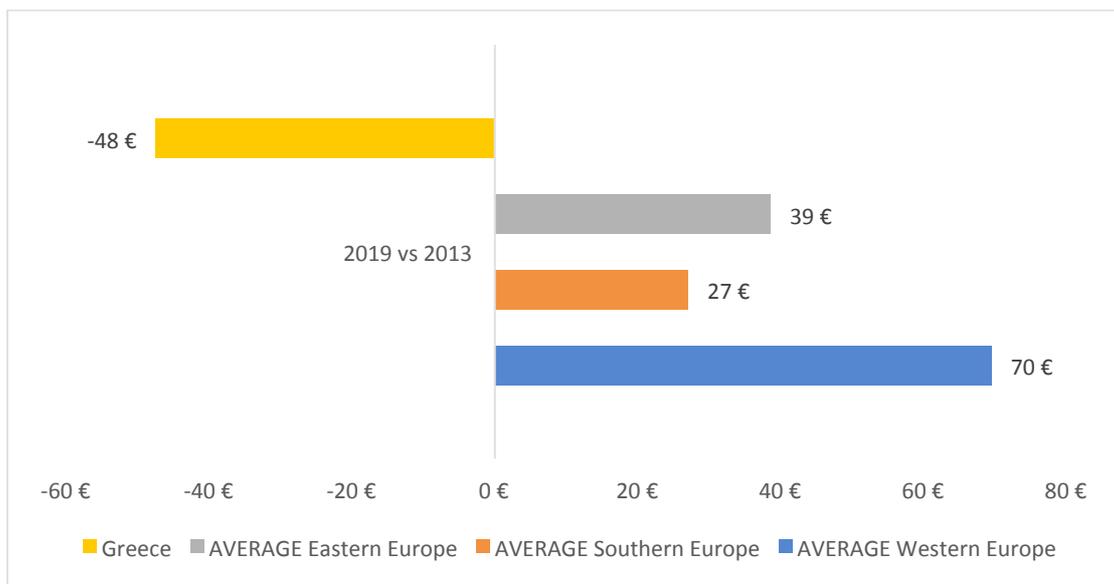
Hospital Pharmaceutical expenditure in Europe

Graph 13: Average per capita Outpatient Pharmaceutical Expenditure in 2019



The average per capita outpatient pharmaceutical expenditure in 2019 is estimated at 181€ for Greece (Graph 13), an estimate which is lower by 12% compared to its Southern European peers and by 38% compared to Western European countries.

Graph 14: Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient): changes from 2013 to 2019

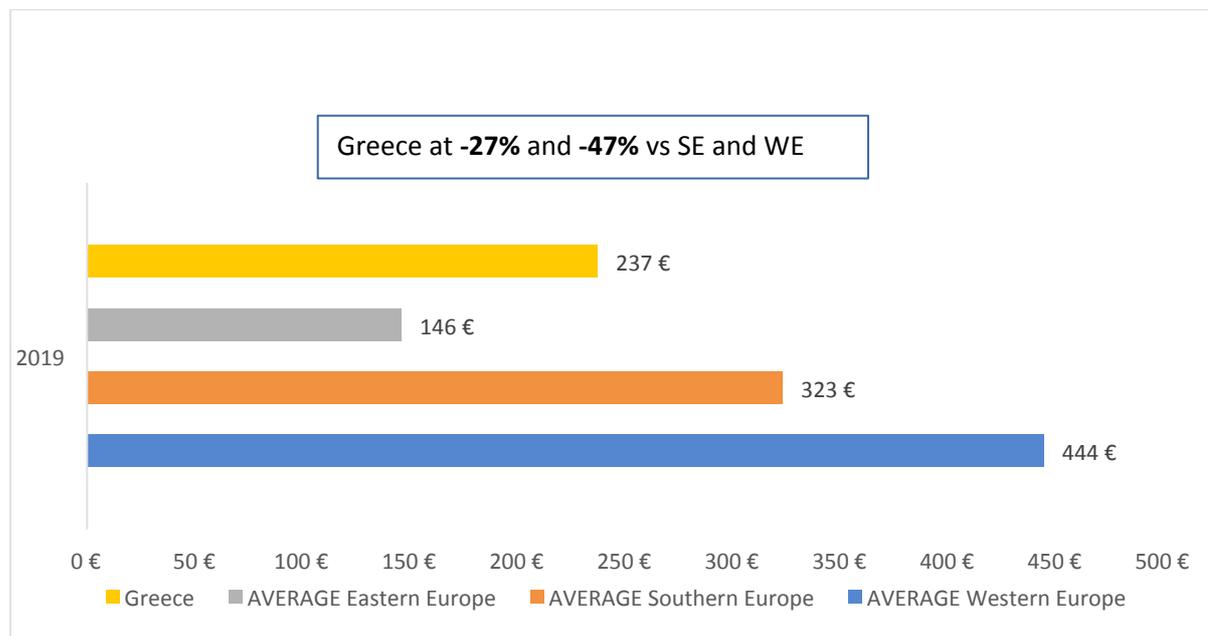


The average per capita total pharmaceutical expenditure (hospital & outpatient) increased by 70€ in Western Europe countries from 2013 to 2019 (Graph 14). The increasing trend for the period under survey applies also for the Eastern European

Hospital Pharmaceutical expenditure in Europe

countries (+39€) and for Southern European (+27€) countries. In the same period, Greece experienced a reduction in the average per capita total pharmaceutical expenditure (hospital & outpatient) by 48€ from 2013 to 2019.

Graph 15: Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) in 2019



Graph 16 Average per capita Total Pharmaceutical Expenditure (Hospital & Outpatient) in 2019

The average per capita total pharmaceutical expenditure (hospital & outpatient) in 2019 is estimated at 237€ in Greece (Graph 15). The country estimate is higher compared to countries of Eastern Europe (+38%), but it reveals a significant deviation of -27% and -47% respectively as compared to countries of Southern Europe and Western Europe.

Discussion

The global economic crisis that emerged in 2008 severely affected the overall social, economic and political life of Greece. The Economic Adjustment Programmes that were imposed as part of the Memorandums of Understanding (MoUs) of 2010, 2012 and 2015, aimed in cutting waste and enhancing the efficiency of the healthcare system (Yfantopoulos & Chantzaras, 2018).

In the pharmaceutical field, the austerity measures that had been taken led to a cost shifting of the pharmaceutical expenditure from the public to patients and to manufacturers. More specifically, public outpatient expenditure declined over 60%, from 5,1 billion € in 2009 to 2,0 billion € in 2020. In parallel, pharmaceutical industry's contribution, expressed through rebates (discounts) and clawbacks (mandatory returns) increased from 272 million € in 2012 to 1,304 billion € in 2020 (increase of 379%). Accordingly, patients' participation (co-payments) marked a significant increase of 54% from 416 million € in 2012 to 639 million € in 2020 (IOBE & SFEE, 2020).

Austerity measures of the past decade didn't refer solely to outpatient pharmaceutical expenditure but also included inpatient pharmaceutical expenditure. The public hospital pharmaceutical expenditure has declined from 761 million € in 2012 to 605 million € in 2020. The reduction of public hospital pharmaceutical expenditure led to an increase of the industry participation, expressed through rebates and clawbacks, from zero levels in 2015 (year of implementation of fixed budget) to 569 million € for 2020 (IOBE & SFEE, 2020).

This regressive approach in the case of Greece is also depicted by the available evidence, both from the literature as well as from the country-level data that became available from EFPIA and facilitated, for a first time, a detailed set of cross-country comparisons in terms of outpatient *AND* hospital pharmaceutical expenditure.

Among other findings, a key trend that stems from the data is that Greece is the only country where both the inpatient and outpatient pharmaceutical spending

paid by compulsory schemes was reduced over the period 2013-2019, whereas in all the other country-cases that were examined there was an increase in at least one of the two key segments of the pharmaceutical market. The latter probably highlights an effort, by the European countries, to meet the increasing demand for access to medications, channeling it through either the hospital (most notably) or the outpatient setting (or both).

Given the prevalent market distortions regarding the hospital pharmaceutical setting, a series of reforms are necessary for the stability of the system and the securing of access. Among a multitude of potential choices, the research team highlights the following thoughts:

- **Re-evaluate the budget caps** for pharmaceuticals, especially in the hospital setting, taking into account the European norm and trend, as evidenced by the available data
- Introduce **forecasting** systems that will take into account the evolutions in disease burden and the advances in pharmaceutical technology
- **Separate** the hospital pharmaceutical budget in **two components**, i.e. (a) **medicines that are used for the treatment of inpatients**, for which the hospital will be reimbursed through DRGs⁶ - and not through the current budget allocation - and (b) **medicines that meet the new role of the hospital as a high-tech supply channel**, which could have a separate budget (for example, the allocated budget could refer only to those products, excluding those that are funded through the DRG/KEN system).
- Examine and **re-evaluate the composition of the list of products** that are administered through the hospital
- Operationalize risk-sharing agreements and explore whether public hospitals could serve as **centers for the monitoring and evaluation (thus reimbursement)** of the RSAs that are implemented in the country
- Implement the total coverage of **e-prescribing** in hospitals

⁶ As done in most countries and according to the currently existing DRG schemes internationally. The DRG system in Greece already contains such a provision and drugs for inpatient care are already included in the DRG fee (apart from listed exceptions)

- Make use of negotiation-based **purchasing agreements**

Conclusions

Average hospital pharmaceutical expenditure in Europe has increased by 50%. However, Greece is one of the few countries where this expenditure has been decreased, representing the country with the highest rate of decrease (21.4%). In addition, outpatient and total pharmaceutical expenditure (as a sum of inpatient and outpatient pharmaceutical expenditure) during the period 2013-2019 increased in Europe by 11.0% and 24.7% respectively, whereas in Greece these expenditures were reduced by 18.0 and 14.9% respectively.

This situation reveals a clear mis-alignment between (a) Greece and the vast majority of its European peers and (b) the demand for pharmaceuticals, especially in the hospital setting, and the respective available budget. Policy initiatives are imperative in order to correct a significant and increasing market distortion, that could potentially place in peril the citizen's access to pharmaceutical technology, as well as the finance mechanisms of the healthcare system, in general

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