

## A Cross-Country Perspective On Health Spending In The OECD

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<b>Keywords:</b> Health Expenditure, Health Economics, Healthcare Financing, Public Health Policy, Economic Determinants of Health, Sustainable Healthcare.	<b>Abstract</b>  <p><b>Objective:</b> This study examines the determinants of health expenditures across 38 OECD countries with varying levels of development over the period 2000–2024.</p> <p><b>Methods:</b> Descriptive statistics, including means, standard deviations, medians, and ranges, were used to summarize the research parameters. The Kolmogorov-Smirnov test, along with skewness and kurtosis values, was employed to assess the normality of data distribution. As the variables were expressed in ratio form, unit root tests were deemed unnecessary. Parametric analytical methods were applied. Pearson’s product-moment correlation was conducted to examine relationships between variables, and a linear regression model was utilized to assess the effects of independent variables. All analyses were performed using SPSS version 25.0 for Windows, with a 95% confidence interval.</p> <p><b>Results:</b> Pearson correlation analysis showed that per capita health expenditure was strongly associated with several key variables, including the number of physicians (<math>r=0.928</math>), elderly population (<math>r=0.993</math>), and GDP (<math>r=0.939</math>), all at <math>p&lt;0.01</math>. Interestingly, negative correlations were observed with alcohol (<math>r=-0.962</math>) and tobacco use (<math>r=-0.972</math>), suggesting that increased health spending may contribute to reducing harmful behaviors, possibly through targeted public health initiatives and prevention programs. Furthermore, regression analysis indicated that life expectancy, elderly population ratio, and GDP were significant predictors of health expenditure per capita (<math>R^2=0.996</math>; <math>p&lt;0.01</math>), whereas for health expenditure as a share of GDP, hospital bed density, alcohol use, life expectancy, elderly population, and GDP were influential (<math>R^2=0.967</math>; <math>p&lt;0.01</math>). The negative coefficients for life expectancy and alcohol/tobacco use suggest that both the preventive impact of health spending and premature mortality may contribute to variations in health expenditure patterns across countries.</p> <p><b>Conclusion:</b> This study found that healthcare expenditures in OECD countries were driven by demographic, economic, and behavioral factors. Higher GDP and elderly population increased spending, while life expectancy and risky behaviors like alcohol and tobacco use showed inverse associations. The results highlight the need for investments in aging, prevention, and economic resilience.</p>
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### Introduction

An efficient and well-organized health system is crucial for public health, ensuring that patients receive fast and quality service while promoting the effective use of health resources. The OECD (Organisation for Economic Co-operation and Development) countries vary widely in income levels, business practices, and health strategies. Therefore, diversity should also be considered in comparative analysis. All countries are working to improve the functioning of healthcare, and as a result, administrators and relevant officials are striving to implement the best practices from other countries (Miszczyńska, 2018). Additionally, prolonged life expectancy, population growth, epidemics, and migration movements contribute to rising health expenditures, making the management of the healthcare system increasingly complex and essential.

The need to meet and manage the health needs of individuals forming the society has led states to establish systems. For this purpose, systems large enough to provide domestic and international services have been established, consisting of health service providers, health professionals and many curative/protective/preventive drugs, medical supplies, devices and holistic medical materials (Zerecan & Atakan, 2024). The World Health Organization (WHO) defines health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.” It is clear that the establishment and operation of the health system will have an economic dimension. Additionally, health economics focuses on making health services more equitable, accessible, and affordable for everyone.

The rising costs of healthcare worldwide are putting enormous pressure on providers, patients, governments, and insurers. In many countries, managing the increasing healthcare expenditures is a significant challenge due to their high costs. Questioning the extent to which healthcare expenditures constitute a necessity or a luxury may also present methodological challenges, as it involves assessing medical needs, societal priorities, and economic constraints while accounting for differences in healthcare systems and individual circumstances.

This study investigates the determinants of healthcare expenditures for a sample of thirty-eight countries in the Organization for Economic Cooperation and Development (OECD) from 2014 to 2024. Comparing healthcare expenditures in OECD countries with developed and developing economies is important for assessing the efficiency and sustainability of healthcare systems. Another debated issue in health economics is whether military expenditures significantly crowd out healthcare spending. As a result, this study highlights the need to understand the determinants of healthcare expenditures in order to develop sustainable healthcare systems and effectively manage costs.

The aim of this study is to provide insights into the factors that determine the efficiency of national health systems and to identify potential areas for reform to enhance health system efficiency. Understanding the factors influencing health expenditures enables policymakers to make informed decisions, design effective health reforms, and allocate resources efficiently.

### **The Concept of Health Expenditures**

Health expenditure refers to the allocation of resources aimed at promoting, improving, and maintaining health. National or total health expenditure represents the total monetary value of resources consumed within the health system during a specific year. Health expenditures have increased considerably in recent years due to factors such as technological developments, increased life expectancy, and the rise in aging populations and chronic diseases. While the average health expenditure of OECD countries was 8.7% of GDP in 2015, this rate increased to 9.22% in 2023. The factors driving this increase include technological advancements, rising social expectations, and the aging population. A country's per capita health expenditure is an important indicator of its level of development.

There are numerous health indicators and definitions developed by individuals, as well as national and international organizations, which encompass economic, social, and demographic factors. Economic factors include income levels, healthcare expenditure (both public and private), employment rates, health insurance coverage, the cost of healthcare services, and economic inequality, often measured by the Gini coefficient. These factors play a crucial role in shaping health disparities. Social factors encompass a wide range of determinants, such as education levels, lifestyle choices (including diet, physical activity, smoking, and alcohol consumption), social support networks, health literacy, housing conditions, environmental quality (such as air and water quality, as well as sanitation), and cultural attitudes toward health and well-being. Demographic factors include age distribution (the proportion of elderly, working-age, and youth populations), population growth rate, birth and death rates, urban versus rural population distribution, migration patterns, gender distribution, and life expectancy.

According to the World Health Organization (WHO), health expenditure includes all costs associated with the provision of health services, family planning activities, nutrition programs, and

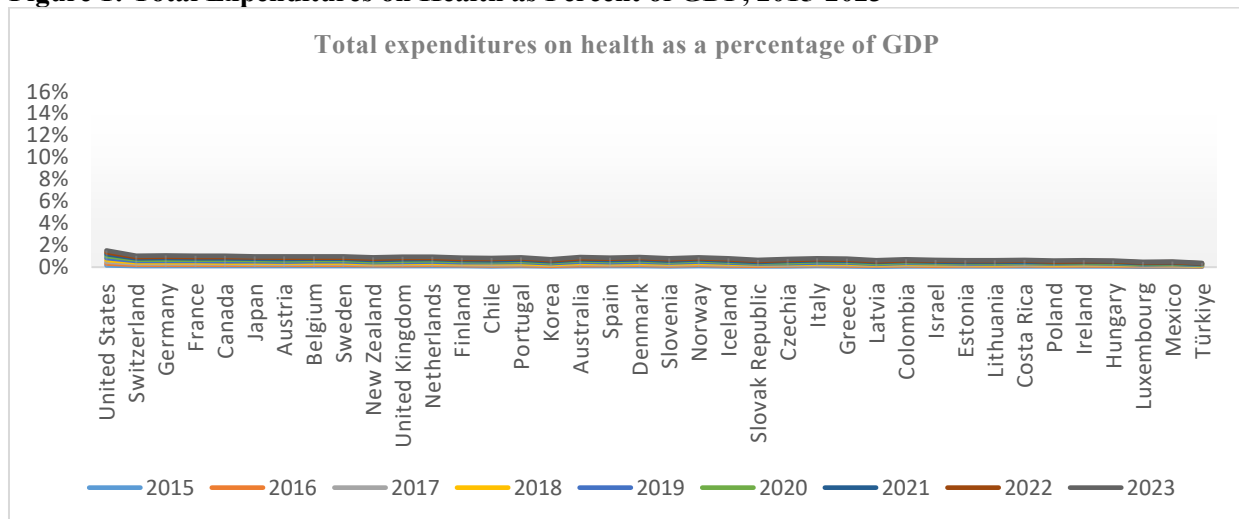
emergency health-related aid. Health financing is the most critical component of health systems. In the context of OECD countries, health expenditures refer to the “final consumption of health care goods and services (i.e., current health expenditure), including personal health care (such as curative care, rehabilitative care, long-term care, ancillary services, and medical goods) and collective services (such as prevention and public health services, as well as health administration).”

Different countries have different healthcare financing models. Healthcare is financed through a mix of funding sources, including government spending, compulsory health insurance, and private funds such as voluntary health insurance, Non-Governmental Organizations (NGOs), and private companies. Especially in developing economies, the state plays a central role in health spending and policy-making. When a government allocates a smaller proportion of its total expenditure to health, it may indicate that health, including nutrition, is not viewed as a priority. Difficult debates are ongoing over the best possible solutions for healthcare and its financing.

### Global Trends in Health Care Expenditures

Global trends in health care expenditures exhibit significant variations across countries, influenced by factors such as economic development, demographic shifts, technological advancements, and government policies. Figure 1 shows total health expenditures as a percentage of GDP from 2015 to 2023 across OECD countries. It has been observed that total health expenditures as a percentage of GDP have increased in OECD countries over the years. Additionally, the COVID-19 pandemic in 2020 led to a significant rise in health expenditures across nearly all countries. Following the pandemic, most countries experienced a slight decline in health spending; however, expenditure levels generally remain higher than pre-pandemic levels. Developed countries have consistently allocated a greater proportion of their GDP to health expenditures compared to emerging economies. The United States has persistently recorded the highest health expenditures relative to GDP, maintaining a substantial gap compared to other countries. On the other hand, Türkiye and Mexico have the lowest health expenditures as a percentage of GDP, remaining below 6% with only minor fluctuations.

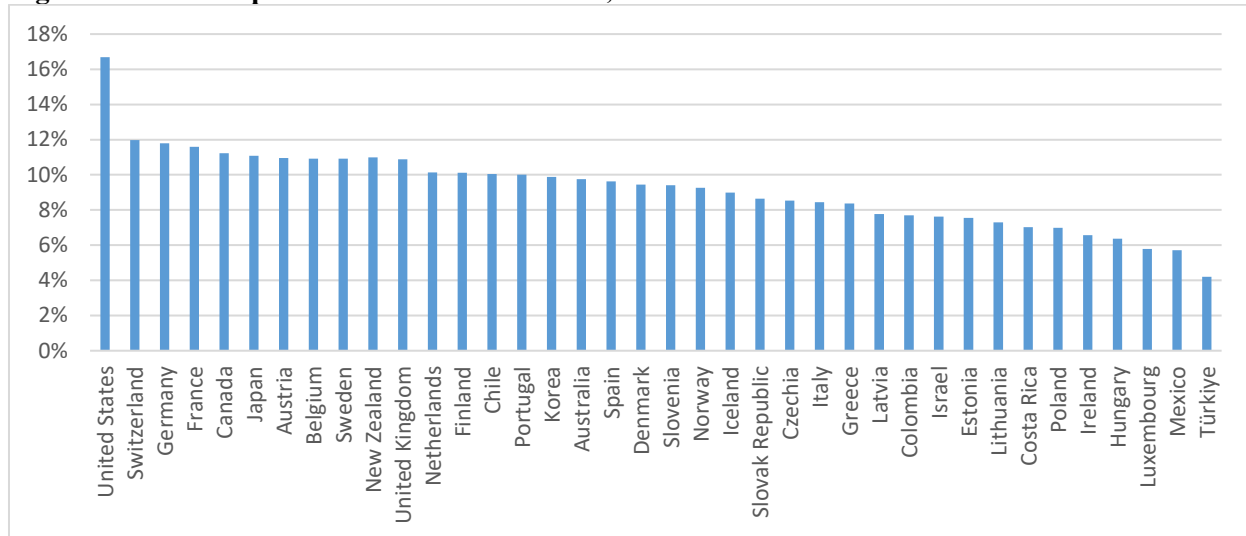
**Figure 1: Total Expenditures on Health as Percent of GDP, 2015-2023**



Source: OECD Health Statistics.

Western European countries (e.g., Switzerland, Germany, and France) have shown a steady increase in health expenditures, peaking in 2020 due to the COVID-19 pandemic, followed by slight declines while remaining above pre-pandemic levels. Canada, Japan, and Australia exhibit a similar trend, with spending rising in 2020 and experiencing slight declines thereafter. Nordic countries (e.g., Sweden, Norway, and Denmark) generally maintain stable health expenditures, with a temporary increase during the pandemic. In contrast, Eastern European and Latin American countries (e.g., Poland, Hungary, Chile, and Mexico) tend to have lower health expenditures as a percentage of GDP, though some nations, such as Latvia and Czechia, have shown noticeable increases over time.

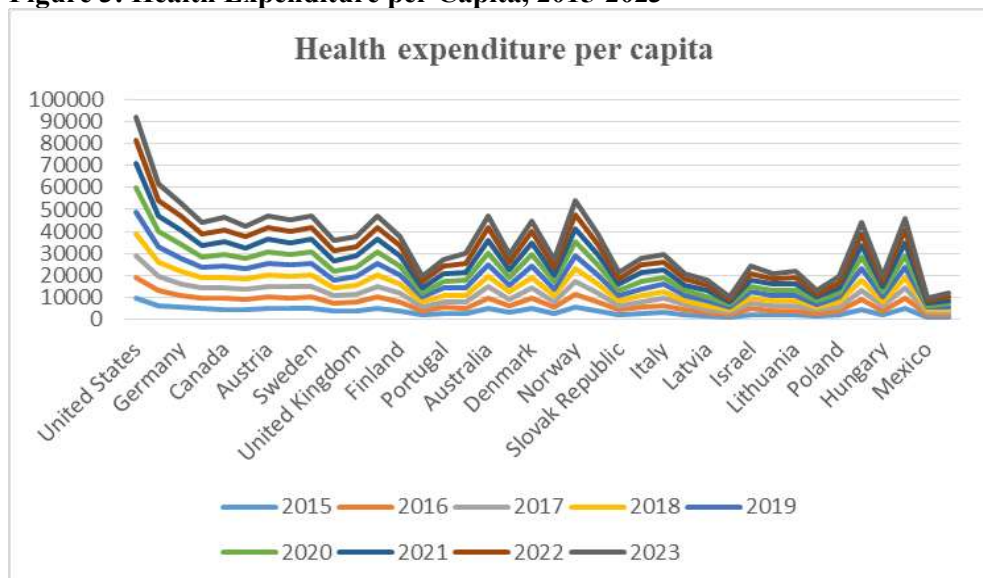
**Figure 2: Health expenditure as a share of GDP, 2023**



Source: OECD Health Statistics.

Figure 2 illustrates the share of health expenditures as a percentage of GDP in OECD countries for the year 2023. The United States (16.68%) ranks highest by a significant margin, followed by Switzerland (11.97%) and Germany (11.80%). In contrast, the countries with the lowest current health expenditures include Luxembourg, Mexico, and Türkiye, with Türkiye having the lowest share at 4.21%. Various economic challenges, including high inflation, political instability, exchange rate fluctuations, and broader macroeconomic constraints, hinder Türkiye's ability to invest adequately in healthcare.

**Figure 3: Health Expenditure per Capita, 2015-2023**



Source: OECD Health Statistics.

Health expenditure per capita refers to the average amount of money spent on healthcare services per person in a given country within a specific time period. It includes spending on hospitals, medical services, pharmaceuticals, preventive care, and other health-related expenses, funded by governments, private entities, or individuals. This metric helps assess a country's healthcare investment relative to its population size. Figure 3 shows total health expenditures per capita across OECD countries from 2015 to 2023. Healthcare spending has risen steadily from 2015 to 2023, with a sharp increase in 2020–2021 due to the pandemic, followed by stabilization in 2022–2023. The United States remains the highest spender, while Switzerland, Norway, and Luxembourg also maintain high per capita expenditures. Some countries (e.g., Korea, Türkiye, and Eastern European nations) have experienced

rapid growth in health spending, suggesting increased investments in healthcare infrastructure. Post-pandemic adjustments are evident, with spending normalizing in many countries after the emergency measures of 2020–2021.

### **Literature Review**

A literature review of 131 papers by Mbau et al. (2022) indicates that analyses in the health sector generally focus on the efficiency of healthcare facilities (such as hospitals and primary healthcare centers), while studies on system-level efficiency (national or sub-national) are more limited. Mbau et al.'s (2021) literature review also indicates that only 6% of studies utilized qualitative or mixed methods, while 94% relied on quantitative approaches. Health expenditures and their determinants have been extensively studied in OECD and EU countries, with research highlighting the role of economic, demographic, institutional, and environmental factors. Several studies also emphasize the impact of health expenditures on health outcomes and economic growth.

Access to healthcare varies significantly across and within countries due to regional and socioeconomic differences. Brezzi & Luongo (2016) analyzed 86 regions across five European countries (Czech Republic, France, Italy, Spain, and the United Kingdom) and found that both individual and regional factors influence access to health services, contributing to disparities in healthcare utilization. Similarly, Maisonneuve (2016) examined public health expenditures in OECD countries, finding that demographic and economic factors explain approximately 71% of cross-country differences, while policies and institutional factors account for an additional 23%. Moreover, Yetim et al. (2021) confirmed that income and education are significant determinants of health expenditures in OECD countries, whereas unemployment rates and dependency ratios do not have a statistically significant effect.

Scalamonti (2025) finds that in the MEDA region, long-term health care expenditure is influenced not only by per capita income but also by broader socioeconomic (development mortality rate, life expectancy, and ageing population) factors. Health care is identified as a necessity good, and causality tests show a bidirectional relationship between income and health spending.

Several studies have explored the macroeconomic and policy factors affecting health expenditures. Younsi et al. (2016) analyzed 167 countries and found that development assistance for health reduces government health expenditures but increases total health expenditures. Nghiem & Connelly (2017) examined health expenditure trends in OECD countries from 1975 to 2004, concluding that aging populations, technological advancements, and health insurance were the primary drivers of rising healthcare costs. More recently, Piscopo et al. (2024) and Malinowski (2024) studied factors influencing health care spending. Piscopo et al. (2024) analyzed public health expenditure determinants in 27 EU countries and identified GDP and out-of-pocket health spending as key drivers, while factors such as election years and public debt had modest effects. Malinowski's (2024) cross-national analysis encompassing 153 countries highlights the significant influence of GDP per capita, public health expenditure, physician density, and out-of-pocket healthcare costs on healthcare spending patterns.

The relationship between health expenditures and health outcomes has been widely analyzed. Karaman et al. (2020) investigated OECD countries and found that public health expenditures significantly reduce maternal and infant mortality while improving life expectancy at birth and at age 80. Private health expenditure per capita was also identified as a key determinant of self-reported health. Similarly, Anwar et al. (2023) used system GMM to study 38 OECD countries from 1996 to 2020 and confirmed that higher health expenditures are negatively associated with infant mortality and positively linked to life expectancy. Their findings also highlight that GDP, physician density, and air pollution significantly affect health outcomes. In line with this, Roffia et al. (2023) analyzed 36 OECD countries (1999–2018) using multiple regression and dynamic models, demonstrating that physician density, hospital bed density, and healthcare spending positively influence life expectancy.

The impact of health expenditures on economic growth has been a subject of ongoing debate. Beylik et al. (2022) analyzed 21 OECD countries using the Driscoll-Kraay standard error approach and found that a 1% increase in health spending raises GDP by up to 0.09%, while higher public health



expenditures enhance per capita income. However, greater out-of-pocket spending negatively affects economic growth. Hu & Wang (2024) further explored this relationship using a nonlinear dynamic panel threshold model for 33 OECD countries. Their results suggest that the positive effect of public health expenditures on economic growth strengthens in environments with higher household consumption, employee wages, and physical capital investment.

Recent studies have also examined the link between environmental factors and healthcare costs. Some studies found a long-term causal relationship between renewable energy consumption, CO<sub>2</sub> emissions, and health expenditures (Mujtaba & Shahzad, 2020; Akbar et al., 2020; Karaaslan & Çamkaya, 2022; Saleem et al., 2022; Yang et al., 2022). Most empirical findings suggest that investment in renewable energy improves healthcare outcomes by reducing air pollution and stimulating economic growth.

Another debated issue in health economics is whether military expenditures significantly crowd out healthcare spending. Ikegami & Wang's (2022) study, which examines data from 116 countries (including a subsample of 29 OECD and 87 non-OECD countries), finds that the crowding-out effect is statistically significant specifically in middle- and low-income countries within their sample. Gilani et al.'s (2019) study reveals that countries with low military expenditures tend to have higher life expectancy and lower infant mortality rates compared to those with high military expenditures. There is broad consensus that a reduction in military or defense expenditures positively impacts health expenditures or outcomes and contributes to higher economic growth (Desli & Gkoulgkoutsika, 2021; Wang et al, 2022; Grigorakis & Galyfianakis, 2022; Qehaja et al., 2023; Saeed, 2023; Ilzetzki, 2025).

The reviewed literature underscores the multifaceted nature of health expenditure dynamics, influenced by economic, demographic, institutional, and environmental factors. Health spending is shown to significantly affect health outcomes and economic growth, with public investment generally yielding positive impacts, while out-of-pocket expenses may hinder both equity and efficiency. Additionally, broader contextual elements such as environmental quality and military spending play an increasingly acknowledged role in shaping healthcare financing and outcomes. These findings highlight the need for integrated policy approaches that consider not only healthcare-specific variables but also macroeconomic and sociopolitical conditions to promote sustainable and equitable health systems.

## **DATA AND METHODOLOGY**

### **Data**

This study aims to investigate the determinants of health expenditures across 38 OECD countries with varying levels of development. The analysis is based on an annual dataset covering the period from 2000 to 2024. Data for the dependent and internal variables were obtained from the OECD Health Data Statistics database ([www.oecd.org](http://www.oecd.org)), while external variables were sourced from the World Bank database ([www.worldbank.org](http://www.worldbank.org)). The selected timeframe provides a sufficient period to analyze trends, fluctuations, and patterns in health expenditures, allowing for the assessment of both short-term dynamics and long-term developments. The extended time frame contributes to a more robust analysis of the underlying factors affecting health expenditures in OECD countries.

### **Methodology and Definition of the Variables**

Descriptive statistics, including means, standard deviations, medians, and ranges, were used to summarize the research parameters. The normality of the distribution was assessed using the Kolmogorov–Smirnov test, as well as skewness and kurtosis values. As the parameters were expressed as ratios, unit root testing was not deemed necessary. Accordingly, parametric analysis methods were employed. Pearson's product-moment correlation was utilized to assess the relationships between variables, while linear regression analysis was conducted to evaluate the effects. All statistical analyses were performed using SPSS version 25.0 for Windows, with a 95% confidence interval.

This study employs both internal and external variables to analyze the determinants of health expenditures across 38 OECD countries, which are widely used in the literature (Table 1). Two dependent variables are considered: health expenditures per capita (HEPC) and health expenditures as

a share of GDP per capita (HGDP). Accordingly, both types of explanatory variables are included in the regression model, which is specified as follows:

$$HEPC_{jt} = \delta_j + \alpha X_{ijt} + \beta X_{et} + \varepsilon_{jt}$$

$$HGDP_{jt} = \delta_j + \alpha X_{ijt} + \beta X_{et} + \varepsilon_{jt}$$

Where:

$HEPC_{jt}$  refers to health expenditures per capita for country  $j$  at time  $t$  (dependent variable)

$HGDP_{jt}$  refers to health expenditures as a share of GDP per capita for country  $j$  at time  $t$  (dependent variable)

$j$  refers to an individual country

$t$  refers to year,

$X_{ijt}$  refers to the internal (country-specific) variables

$X_{et}$  refers to the external (time-specific) variables

$\delta$  refers to the country fixed effect (captures country-specific unobserved heterogeneity)

$\alpha$  and  $\beta$  are coefficients while  $\varepsilon_{jt}$  is the error term.

Health outcomes are a function of economic factors (e.g., income levels, healthcare expenditure), social factors (e.g., education, lifestyle, healthcare access), and demographic factors (e.g., age distribution, population growth). Each of these factors plays a crucial role in shaping overall health at both individual and population levels.

Health outcome =  $f$ (economic factors, social factors, demographic factors)

In this analysis, a selection of economic, social, and demographic factors is utilized to examine their relationship with health expenditures (Table 1).

**Table 1. Summary information of the variables**

Variables	Notation	Description	Data Source
Dependent variables			OECD Health Data Statistics
Health expenditures per Capita (US\$)	HEPC	Per capita health care expenditures, constant prices, constant PPPs, OECD base year, in US\$	OECD Health Data Statistics
Health Expenditures as a share of GDP per capita	HGDP	Health Expenditures as a share of GDP per capita	OECD Health Data Statistics
Internal variables			OECD Health Data Statistics
Number of physicians	PHYS	Number of physicians per 1000 population	OECD Health Data Statistics
Number of hospital beds	HBED	Number of hospital beds per 1000 population	OECD Health Data Statistics
Alcohol consumption,	ALCH	Alcohol consumption, liters per capita (age 15+)	OECD Health Data Statistics
Tobacco consumption	TOBC	Tobacco consumption in grams per person (age 15+)	OECD Health Data Statistics
Life expectancy	LIFE	Life expectancy, years	OECD Health Data Statistics
Percentage of population	POPL	Percentage of population above 65 years old	OECD Health Data Statistics
External Variables			

Unemployment rate (%)	UNEMP	Unemployment rate (% of labor force actively seeking work)	World Bank
Inflation rate (%)	INF	Inflation rate (annual % change in general price level)	World Bank
GDP per capita	GDP	GDP per capita (economic output per person, in constant terms)	World Bank

Table 1 presents the definitions, notations, and data sources of the variables used in this study. The variables are categorized into dependent, internal, and external groups. The dependent variables -health expenditures per capita (HEPC) and health expenditures as a share of GDP per capita (HGDP)- capture the overall level and economic burden of health spending. Internal variables, such as the number of physicians (PHYS), hospital beds (HBED), alcohol and tobacco consumption (ALCH, TOBC), life expectancy (LIFE), and the proportion of the elderly population (POPL), reflect demographic and healthcare system characteristics. External variables, including unemployment (UNEMP), inflation (INF), and GDP per capita (GDP), represent broader macroeconomic conditions that may influence health spending patterns. These variables were selected based on their frequent use in the literature and their theoretical relevance to health economics. The data were primarily drawn from the OECD Health Data Statistics and the World Bank, ensuring consistency and comparability across the 38 OECD countries examined in this study.

### Empirical Findings

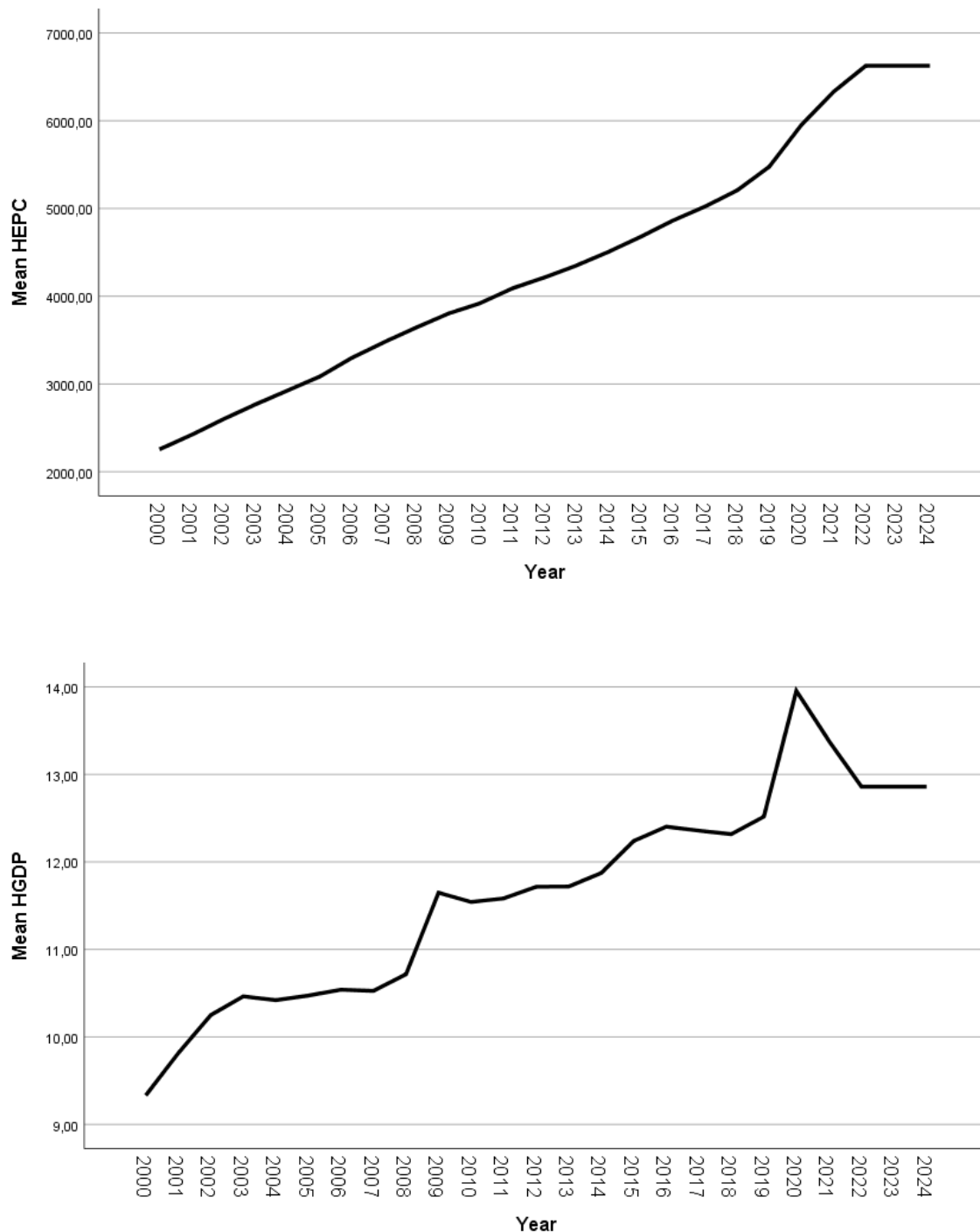
The mean health expenditure per capita across OECD countries for the period 2000–2024 was  $4,351.34 \pm 1,370.94$  USD, ranging from 2,255.23 USD to 6,625.55 USD. In terms of GDP share, health expenditures ranged between 9.33% and 13.95%, with a mean value of  $11.61 \pm 1.19\%$ . The average number of physicians per 1,000 population was  $2.73 \pm 0.36$ , while the mean number of hospital beds was  $4.93 \pm 0.31$  per 1,000 population. The average alcohol consumption was  $8.84 \pm 0.39$  liters per capita (age 15+), and the mean tobacco consumption was  $27.04 \pm 3.64$  grams per person (age 15+). Mean life expectancy was  $78.93 \pm 1.05$  years, and the average percentage of the population aged 65 and over was  $15.19 \pm 1.82\%$ . The average unemployment rate was  $6.67 \pm 1.08\%$ , and the mean inflation rate was  $2.61 \pm 1.80\%$ . Finally, the average GDP per capita was  $35,379.25 \pm 6,768.84$  USD (Table 2).

**Table 2. Descriptive characteristics of research parameters for 2000-2024 time period for OECD countries**

	Mean	Standard Deviation	Median	Minimum	Maximum
HEPC	4,351,34	1,370,94	4,216,03	2,255,23	6,625,55
HGDP	11,61	1,19	11,72	9,33	13,95
PHYS	2,73	0,36	2,73	2,40	3,37
HBED	4,93	0,31	4,83	4,61	5,55
ALCH	8,84	0,39	8,71	8,33	9,48
TOBC	27,04	3,64	26,91	21,98	32,56
LIFE	78,93	1,05	79,05	76,82	80,25
ELD	15,19	1,82	14,88	12,68	18,25
UNEMP	6,67	1,08	6,72	4,83	8,51
INF	2,61	1,80	2,47	0,34	8,24
GDP	35.379,25	6.768,84	36.287,74	22.648,14	46.724,02

During the period from 2000 to 2024, both health expenditure per capita and health expenditure as a share of GDP exhibited an overall increasing trend, with a temporary decline observed in 2021 (Figure 4).





**Figure 4. Health expenditure per capita and health expenditure as a share of GDP in OECD countries, 2000–2024**

Normality tests, including Kolmogorov–Smirnov Z values, indicated that all research parameters followed a normal distribution, with skewness and kurtosis values falling within the acceptable range of  $-2$  to  $+2$  (Table 3). Therefore, the assumption of normality was deemed satisfied for subsequent analyses. As the variables were expressed in ratio form, unit root testing was not required. Accordingly, parametric analysis methods were employed.

**Table 3. Normality distribution and Kolmogorov Smirnov Z results for research parameters**

	Skewness	Kurtosis	Kolmogorov Smirnov Z
HEPC	0,292	-0,955	0,086
HGDP	-0,051	-0,740	0,138
PHYS	0,935	-0,385	0,293
HBED	0,717	-0,693	0,167
ALCH	0,274	-1,224	0,152
TOBC	0,225	-1,056	0,146
LIFE	-0,554	-0,861	0,124
ELD	0,301	-1,252	0,117
UNEMP	-0,045	-0,790	0,088
INF	1,537	3,093	0,181
GDP	-0,386	-0,268	0,125

Pearson's product-moment correlation analysis revealed significant associations between health expenditures and the research parameters (Table 4). Health expenditure per capita was significantly positively correlated with the number of physicians ( $r = 0.928$ ,  $p < 0.01$ ), life expectancy ( $r = 0.795$ ,  $p < 0.01$ ), the proportion of the elderly population ( $r = 0.933$ ,  $p < 0.01$ ), and GDP per capita ( $r = 0.939$ ,  $p < 0.01$ ). It was significantly negatively correlated with the number of hospital beds ( $r = -0.927$ ,  $p < 0.01$ ), alcohol consumption ( $r = -0.962$ ,  $p < 0.01$ ), tobacco consumption ( $r = -0.972$ ,  $p < 0.01$ ), and unemployment rate ( $r = -0.527$ ,  $p < 0.01$ ).

Similarly, health expenditure as a share of GDP was significantly positively correlated with the number of physicians ( $r = 0.873$ ,  $p < 0.01$ ), life expectancy ( $r = 0.789$ ,  $p < 0.01$ ), the elderly population ( $r = 0.939$ ,  $p < 0.01$ ), and GDP per capita ( $r = 0.868$ ,  $p < 0.01$ ). It showed significant negative correlations with the number of hospital beds ( $r = -0.942$ ,  $p < 0.01$ ), alcohol consumption ( $r = -0.968$ ,  $p < 0.01$ ), and tobacco consumption ( $r = -0.944$ ,  $p < 0.01$ ).

**Table 4. Pearson's Moments Correlation analysis between health expenditures and research parameters**

	HEPC		HGDP	
	r	p	r	p
PHYS	0.928**	0.000	0.873**	0.000
HBED	-0.927**	0.000	-0.942**	0.000
ALCH	-0.962**	0.000	-0.968**	0.000
TOBC	-0.972**	0.000	-0.944**	0.000
LIFE	0.795**	0.000	0.789**	0.000
ELD	0.993**	0.000	0.939**	0.000
UNEMP	-0.527**	0.007	-0.295	0.152
INF	0.328	0.109	0.058	0.784
GDP	0.939**	0.000	0.868**	0.000

\*\* $p < 0.01$

These results suggest that as health expenditures increase, alcohol and tobacco use tend to decrease-possibly due to higher investments in preventive health programs and behavioral health interventions. Additionally, given that alcohol and tobacco use are linked to higher mortality and shorter life expectancy, these inverse relationships may also reflect their indirect effects on long-term healthcare costs.

A multiple linear regression model was applied to examine the effects of significantly correlated variables on health expenditure per capita (HEPC). The results showed that life expectancy ( $B = -199.507$ ,  $p < 0.01$ ), percentage of elderly population ( $B = 576.390$ ,  $p < 0.01$ ), and GDP per capita ( $B = 0.047$ ,  $p < 0.01$ ) had statistically significant effects on HEPC. The model explained 99.6% of the variance in HEPC ( $R^2 = 0.996$ ,  $F(8, 16) = 853.008$ ,  $p < 0.01$ ). These findings suggest that an aging

population and higher national income levels are strongly associated with increased health spending per capita, while higher life expectancy may contribute to efficiency or longer-term healthcare planning, leading to lower per capita costs. Based on the analysis results, the final model is presented as follows:

$$\text{HEPC} = 12665.646 - 199.507(\text{LIFE}) + 576.390(\text{ELD}) + 0.047(\text{GDP})$$

**Table 5. Linear regression model for effects of significantly correlated parameters on health expenditure per capita**

	Unstandardized Coefficients		Standardized Coefficients	t	p	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	12665.646	8879.964		1.426	0.173	-6159.037	31490.330
PHYS	12.841	223.063	0.003	0.058	0.955	-460.032	485.714
HBED	-141.932	274.826	-0.032	-0.516	0.613	-724.537	440.673
ALCH	-213.083	586.929	-0.061	-0.363	0.721	-1457.316	1031.150
TOBC	-21.554	26.358	-0.057	-0.818	0.426	-77.431	34.323
LIFE	-199.507	62.430	-0.153	-3.196	0.006	-331.853	-67.161
ELD	576.390	102.358	0.766	5.631	0.000	359.401	793.379
UNEMP	18.903	62.125	0.015	0.304	0.765	-112.796	150.603
GDP	0.047	0.011	0.234	4.476	0.000	0.025	0.070
R <sup>2</sup> : 0.996; F <sub>(8-16)</sub> : 853.008; p<0.01							

The regression analysis results indicated that the number of hospital beds (B = -0.761; p < 0.05), alcohol consumption (B = -3.265; p < 0.01), life expectancy (B = -0.490; p < 0.01), the percentage of the elderly population (B = 0.304; p < 0.05), and GDP (B = -6.418; p < 0.05) had statistically significant effects on the share of health expenditure in GDP. The model demonstrated a high explanatory power, accounting for 96.7% of the variance (p < 0.01) (Table 6). Based on the analysis results, the final model is presented as follows:

$$\text{HGDP} = 89.433 - 1.761(\text{HBED}) - 3.265(\text{ALCH}) - 0.490(\text{LIFE}) + 0.304(\text{ELD}) - 6.418(\text{GDP})$$

**Table 6. Linear regression model for effects of significantly correlated parameters on health expenditure in GDP**

	Unstandardized Coefficients		Standardized Coefficients	t	p	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	89.433	17.548		5.096	0.000	52.410	126.456
PHYS	-1.230	0.589	-0.373	-2.090	0.052	-2.472	0.012
HBED	-1.761	0.724	-0.453	-2.434	0.026	-3.288	-0.235
ALCH	-3.265	0.776	-1.072	-4.207	0.001	-4.903	-1.628
TOBC	-0.021	0.063	-0.064	-0.330	0.746	-0.155	0.113
LIFE	-0.490	0.165	-0.435	-2.976	0.008	-0.838	-0.143
ELD	0.304	0.123	0.467	2.483	0.024	0.046	0.563
GDP	-6.418	0.000	-0.366	-2.888	0.010	0.000	0.000
R <sup>2</sup> : 0.967; F <sub>(7-17)</sub> : 101.707; p<0.01							

## 7. Conclusion

This study aimed to explore the determinants of health expenditures in 38 OECD countries between 2000 and 2024 using a quantitative, macro-level analytical framework. Drawing on annual panel data from OECD and World Bank sources, the research employed descriptive statistics, Pearson correlation, and multiple linear regression analyses to identify the internal and external factors influencing two key indicators: health expenditures per capita (HEPC) and health expenditures as a share of GDP (HGDP).

The variables included demographic, behavioral, and economic parameters widely used in the literature, enabling robust cross-country comparisons.

This study has several limitations. It is based on aggregate data from 38 OECD countries, which may not reflect within-country disparities or be generalizable to non-OECD contexts. The analysis excludes institutional and policy-related variables, such as healthcare system types or regulatory frameworks, due to data limitations. Additionally, while reliable, the data may contain inconsistencies across countries and time. The use of regression models also poses a risk of endogeneity, and emerging future trends beyond 2024 are not captured such as the impact of pandemics or technological change.

The empirical results confirm that health expenditures are shaped by a complex interplay of demographic, economic, and behavioral factors. In particular, GDP per capita and the elderly population share emerged as strong positive determinants of health expenditures per capita, while life expectancy showed a significant negative effect, possibly indicating more efficient long-term health investment. On the other hand, health expenditures as a share of GDP were negatively associated with hospital bed density, alcohol consumption, and life expectancy, while positively affected by aging and, to a lesser extent, GDP. These findings reflect the dual pressures of rising demand for healthcare in aging societies and the influence of broader economic capacity.

The study also confirms insights from prior literature suggesting that behavioral risk factors- particularly alcohol and tobacco consumption- are inversely related to health spending, potentially due to preventive policy effects or long-term cost burdens associated with non-communicable diseases. Moreover, the high explanatory power of the regression models underscores the predictive relevance of the selected variables.

While the study contributes valuable cross-national evidence, it has limitations. It relies on country-level aggregates and omits institutional and policy-specific variables, such as healthcare system types or funding models, which may also influence spending patterns. Additionally, data consistency over time and across countries, along with potential endogeneity issues, may affect the robustness of causal interpretations. Future research could integrate mixed methods, system-level analyses, or institutional dimensions to provide a more nuanced understanding of healthcare financing dynamics.

Overall, the findings offer operational insights for policymakers aiming to design sustainable health systems in OECD countries. Strategic investments in aging care, public health, and economic resilience -combined with behavioral risk reduction- may help contain costs while improving population health outcomes.

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