# UNDERFUNDING OF THE HEALTH SYSTEM IN ROMANIA

**Sebastian MEZEI[1], Alma PENTESCU[2]**

[1]*Lucian Blaga University of Sibiu, 0000-0002-3138-871X*
[2]*Lucian Blaga University of Sibiu, 0000-0001-7963-0790*

*Abstract: Although health spending has increased in Romania, the budget allocation for health, compared to the gross domestic product, is among the lowest in Europe, specifically, in 2019, lower on average by 4.69% compared to the European average and by 6.08% compared to Germany, the country with the highest budget allocation for health. Every year, Romania's mortality rate is among the highest in the European Union, each time above the EU average and in last place in terms of treatable causes of mortality, which does show that the national health system fails to provide the necessary services, among the main causes being underfunding and inefficient use of allocated financial resources. The effects of the underfunding of the health system in Romania are highlighted in the statistics of the European Union level, the life expectancy at birth as well as the unsatisfied needs regarding the medical services ranked far worse than the European average. As part of this paper, a qualitative and quantitative research has been done which highlights the existence of direct relationships between the underfunding of the Romanian health system and the ability to provide citizens with adequate medical services. A comparative analysis of the level of funding in EU countries is conducted in regards to the best performing health systems, which have a direct impact on the health of the population and the situation in Romania.*

*Keywords: health systems, health underfinancing, health services*

*JEL classification: A12, H51, I15, P43*

## 1. Introduction

Health systems around the world are subject to countless challenges, related both to the delivery of medical services to the population, which meet their needs, and to the financial resources necessary for its operation.

Healthcare costs worldwide are increasing, being directly influenced by the development of new technologies and innovative medicines, as well as the pressure of an aging population that leads to an increase in cases of chronic diseases and generates a greater demand for health services.

Health systems cannot face these challenges without adequate funding, which supports both the costs necessary to provide medical services and the investments necessary to increase the quality of the medical act.

The healthcare system in Romania has made some significant progress, but it is far from being an efficient one, keeping countless features of the old system, including the over-dimensioning of units with beds or the lack of programs dedicated to prevention and promoting a healthy lifestyle.

With one of the lowest budget allocations from GDP for the health system, at the level of the European Union, the lack of prevention programs and the promotion of a healthy medical education among citizens, Romania occupies the last places in the EU in terms of the state of health of population, with the highest mortality rates and decreased life expectancy.

## 2. Literature review

---

[1] *sebastian.mezei@ulbsibiu.ro*

[2] *alma.pentescu@ulbsibiu.ro*

Over time there have been countless authors, (Hansen & King, 1998), (Nixon & Ulmann, 2006) who have carried out research on the financing of health services and their importance to achieve a health status of the population at a as high a level as possible.

(Newhouse, 1977) studied the relationship between medical expenditure and population income, (Hitiris & Posnett, 1992) showed the existence of a relationship between public health expenditure and the health status of the population, and (Parkin, McGuire, & Yule, 1987) researched the relationship between a state's income and health expenditures.

## 3. Research methodology

Our study carries out a qualitative and quantitative research on the importance of the financing of health systems in the countries of the European Union and highlighting the effects of its underfunding at the level of Romania.

The qualitative research was ensured by analyzing the specialized literature relevant to this research, and the quantitative research was carried out by econometric analyzes on a set of panel data for 24 member states of the European Union, collected from official sources (www.ec.europa. me, www.insse.ro)

Our research examines the correlation between health expenditures, as a percentage of GDP, at the level of the analyzed states and their impact on some indicators that show us the performance of a health system at the population level: life expectancy and preventable deaths.

The findings of this research represent an empirical study that reveals a positive correlation between budgetary allocations for health (percentage of GDP) and life expectancy or the number of preventable deaths, specifying the fact that health systems are very complex, health expenditures being one of the multitude of factors that can contribute to improving the health of the population.
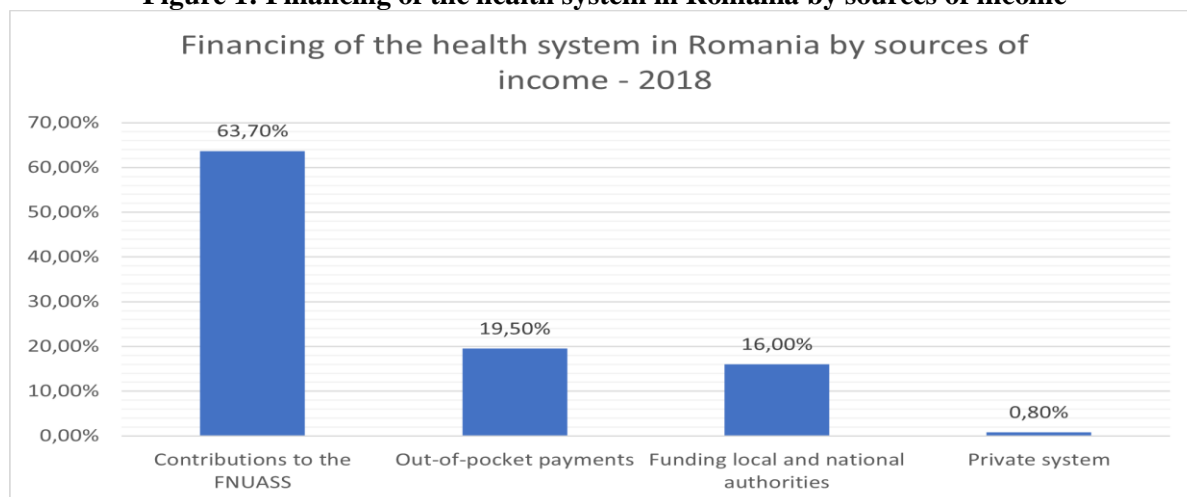
## 4. Health expenditures in Romania

Health expenses in Romania, similar to other countries in the European Union, are carried out mainly from public funds, in 2018, representing almost 80% of total expenses.
According to Eurostat, the highest percentage is found in Norway, 85.70% and the lowest in Cyprus, 42.03%, the differences being found in the funds spent by the private sector, which include both private health insurance and out-of-pocket payments or other funds. (Eurostat, 2022)

The most important source of funding for the health system in Romania is represented by the mandatory health insurance contributions, in 2018, being 63.7% of total expenses, in second place being the direct payments made by the population for some medical services , medicines and other medical products.

In third place, with a percentage close to direct payments (19.5%), is financing from central or local public administration budgets (16%).

An insignificant percentage, compared to the total expenses, is carried out by private insurance companies granted in the form of allowances paid to the insured (0.8%). (INSSE, 2018)

**Figure 1: Financing of the health system in Romania by sources of income**



Source: Authors' processing based on INSSE data, Health Accounts System, 2018

Analyzing the allocated health expenditures as a percentage of GDP, it is found that in the period 2014-2019, Romania ranks last, with an average of 5.24%, which shows us a very high level of underfunding of the health system.

At the level of the European Union, seven states (Germany, France, Sweden, Belgium, Austria, the Netherlands and Denmark) recorded values, regarding the percentage of GDP allocated to health, above the European average, and nine states have below seven percent of GDP. (Eurostat, 2022)

**Table 1: The situation regarding health expenditure in relation to GDP, at EU level (%):**

|  | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| **European Union** | 10,00 | 9,95 | 9,94 | 9,88 | 9,86 | 9,90 |
| **Germany** | 11,02 | 11,18 | 11,24 | 11,33 | 11,45 | 11,70 |
| **France** | 11,54 | 11,45 | 11,47 | 11,33 | 11,19 | 11,06 |
| **Sweden** | 10,95 | 10,80 | 10,85 | 10,79 | 10,94 | 10,83 |
| **Belgium** | 10,58 | 10,77 | 10,76 | 10,75 | 10,79 | 10,66 |
| **Austria** | 10,37 | 10,37 | 10,35 | 10,38 | 10,34 | 10,48 |
| **Netherlands** | 10,57 | 10,32 | 10,29 | 10,11 | 10,03 | 10,17 |
| **Denmark** | 10,31 | 10,34 | 10,25 | 10,10 | 10,10 | 10,12 |
| **Portugal** | 9,34 | 9,32 | 9,39 | 9,31 | 9,41 | 9,51 |
| **Finland** | 9,78 | 9,65 | 9,38 | 9,13 | 9,03 | 9,15 |
| **Spain** | 9,09 | 9,13 | 8,95 | 8,95 | 9,00 | 9,14 |
| **Italy** | 8,87 | 8,86 | 8,73 | 8,68 | 8,68 | 8,66 |
| **Slovenia** | 8,50 | 8,52 | 8,48 | 8,19 | 8,28 | 8,52 |
| **Greece** | 7,89 | 8,22 | 8,45 | 8,14 | 8,12 | 8,20 |
| **Czech Republic** | 7,60 | 7,20 | 7,11 | 7,38 | 7,47 | 7,78 |
| **Bulgaria** | 7,68 | 7,39 | 7,46 | 7,49 | 7,33 | 7,09 |
| **Lithuania** | 6,19 | 6,49 | 6,64 | 6,46 | 6,53 | 7,00 |
| **Slovakia** | 6,89 | 6,79 | 6,99 | 6,77 | 6,71 | 6,96 |
| **Cyprus** | 6,95 | 6,82 | 6,68 | 6,64 | 6,85 | 6,95 |
| **Croatia** | 6,62 | 6,70 | 6,74 | 6,67 | 6,76 | 6,81 |
| **Estonia** | 6,08 | 6,35 | 6,43 | 6,59 | 6,69 | 6,73 |
| **Ireland** | 9,55 | 7,32 | 7,45 | 7,15 | 6,88 | 6,67 |
| **Latvia** | 5,47 | 5,65 | 6,14 | 5,97 | 6,19 | 6,58 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Poland** | 6,28 | 6,34 | 6,50 | 6,56 | 6,33 | 6,45 |
| **Hungary** | 7,04 | 6,85 | 6,99 | 6,74 | 6,58 | 6,30 |
| **Romania** | 5,02 | 4,95 | 5,00 | 5,15 | 5,56 | 5,74 |

Source: Eurostat, https://ec.europa.eu/eurostat/databrowser/view/hlth_sha11_hc

The efficiency of a state's health system is reflected through a series of statistical indicators, an extremely important one being life expectancy, which shows us the average life span of the population. (World Health Organization, 2017)

In this indicator, Romania also ranks last, or penultimate, ahead of Bulgaria, with an average of 74.78 years for the period 2014 – 2021.

Although, in Romania, for the period 2016 - 2019, there was an increase in life expectancy, the situation worsened in the period 2020 - 2021, reaching 72.9 years, the lowest value in the analyzed period, this being influenced in particular from the effects of the SARS-CoV-2 pandemic, with our country registering over 66,000 deaths. (Eurostat, 2022)

**Table 2: Situation regarding life expectancy at EU level (years):**

| | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** |
|---|---|---|---|---|---|---|---|---|
| **European Union** | 80,8 | 80,5 | 80,9 | 80,9 | 81,0 | 81,3 | 80,4 | 80,1 |
| **Spain** | 83,3 | 83,0 | 83,5 | 83,4 | 83,5 | 84,0 | 82,4 | 83,3 |
| **Sweden** | 82,3 | 82,2 | 82,4 | 82,5 | 82,6 | 83,2 | 82,4 | 83,2 |
| **Iceland** | 82,9 | 82,5 | 82,2 | 82,6 | 82,9 | 83,2 | 83,1 | 83,2 |
| **Norway** | 82,2 | 82,4 | 82,5 | 82,7 | 82,8 | 83,0 | 83,3 | 83,2 |
| **Italy** | 83,2 | 82,7 | 83,4 | 83,1 | 83,4 | 83,6 | 82,3 | 82,9 |
| **Malta** | 82,1 | 82,0 | 82,6 | 82,4 | 82,5 | 82,9 | 82,3 | 82,9 |
| **Luxembourg** | 82,3 | 82,4 | 82,7 | 82,1 | 82,3 | 82,7 | 82,2 | 82,8 |
| **France** | 82,9 | 82,4 | 82,7 | 82,7 | 82,8 | 83,0 | 82,3 | 82,5 |
| **Finland** | 81,3 | 81,6 | 81,5 | 81,7 | 81,8 | 82,1 | 82,0 | 82,0 |
| **Belgium** | 81,4 | 81,1 | 81,5 | 81,6 | 81,7 | 82,1 | 80,8 | 81,9 |
| **Cyprus** | 82,3 | 81,8 | 82,7 | 82,2 | 82,9 | 82,3 | 82,4 | 81,8 |
| **Netherlands** | 81,8 | 81,6 | 81,7 | 81,8 | 81,9 | 82,2 | 81,4 | 81,5 |
| **Denmark** | 80,7 | 80,8 | 80,9 | 81,1 | 81,0 | 81,5 | 81,6 | 81,4 |
| **Austria** | 81,6 | 81,3 | 81,8 | 81,7 | 81,8 | 82,0 | 81,3 | 81,3 |
| **Portugal** | 81,3 | 81,3 | 81,3 | 81,6 | 81,5 | 81,9 | 81,1 | 81,2 |
| **Germany** | 81,2 | 80,7 | 81,0 | 81,1 | 81,0 | 81,3 | 81,1 | 80,9 |
| **Slovenia** | 81,2 | 80,9 | 81,2 | 81,2 | 81,5 | 81,6 | 80,6 | 80,9 |
| **Greece** | 81,5 | 81,1 | 81,5 | 81,4 | 81,9 | 81,7 | 81,4 | 80,3 |
| **Czech Republic** | 78,9 | 78,7 | 79,1 | 79,1 | 79,1 | 79,3 | 78,3 | 77,4 |
| **Estonia** | 77,4 | 78,0 | 78,0 | 78,4 | 78,5 | 79,0 | 78,9 | 76,9 |
| **Croatia** | 77,9 | 77,5 | 78,2 | 78,0 | 78,2 | 78,6 | 77,8 | 76,8 |
| **Poland** | 77,8 | 77,5 | 78,0 | 77,8 | 77,7 | 78,0 | 76,5 | 75,6 |
| **Slovakia** | 77,0 | 76,7 | 77,3 | 77,3 | 77,4 | 77,8 | 77,0 | 74,8 |
| **Lithuania** | 74,7 | 74,6 | 74,9 | 75,8 | 76,0 | 76,5 | 75,1 | 74,5 |
| **Hungary** | 76,0 | 75,7 | 76,2 | 76,0 | 76,2 | 76,5 | 75,7 | 74,5 |
| **Latvia** | 74,5 | 74,8 | 74,9 | 74,9 | 75,1 | 75,7 | 75,5 | 73,4 |
| **Romania** | 75,0 | 74,9 | 75,2 | 75,2 | 75,3 | 75,6 | 74,2 | 72,9 |
| **Bulgaria** | 74,5 | 74,7 | 74,9 | 74,8 | 75,0 | 75,1 | 73,6 | 71,4 |

Source: Eurostat, https://ec.europa.eu/eurostat/databrowser/view/demo_mlexpec

The average life expectancy at the level of the European Union is around 80 years, with 18 states recording values above this average.

In 2021, Romania registered 7.2 years less than the European average and 10.4 years less than Spain, the first ranked, in this indicator.

In the last places, in 2021, there are six countries (Slovakia, Lithuania, Hungary, Latvia, Romania and Bulgaria), with life expectancy values below 75 years. (Eurostat, 2022)

**Figure 2: Comparison of life expectancy, Romania – EU average**
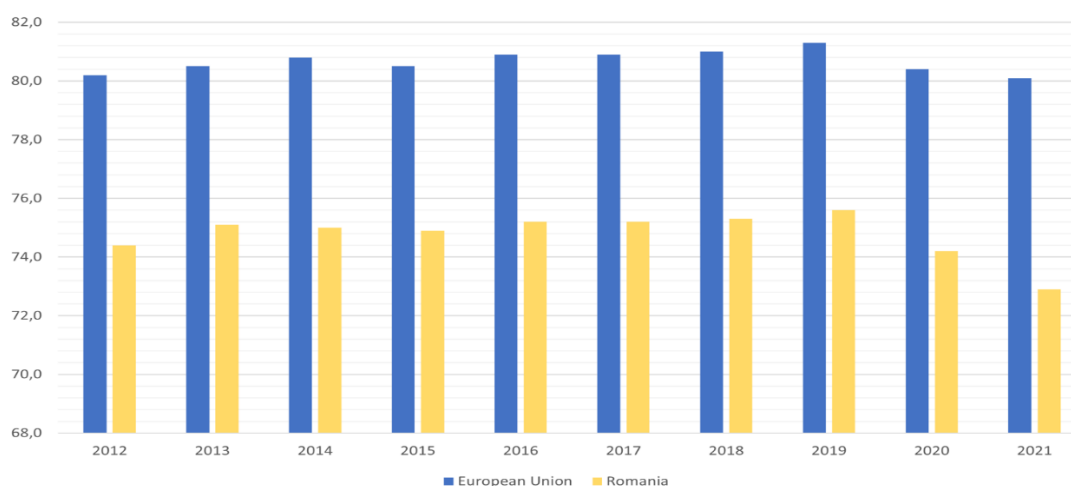


Source: Processing authors from the Eurostat database

The preventable death situation aggregates both preventable deaths and treatable deaths that could be avoided through health care actions related to prevention, screening, or appropriate treatment. The European average of this indicator amounts to 250 deaths per 100,000 inhabitants, of which 159 cases are preventable deaths and 91 are considered treatable deaths.

In this chapter, Romania occupies a dismal place, registering, in 2017, almost 513 cases per 100,000 inhabitants, the trend being increasing for the period 2018-2019.
Of these, 306 cases are considered preventable deaths and 206 cases are deaths that could have been avoided with appropriate treatment.

Thus, it is found that Romania registers twice as many preventable deaths compared to the European Union average and almost three times more than the number of cases registered by Italy, the country with the lowest number per 100,000 inhabitants.

**Table 3: The situation regarding preventable deaths at EU level (number per 100,000 inhabitants):**

|  | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|
| **European Union** | 278 | 273,39 | 266,66 | 258,25 | 259,85 | 254,32 | 250,75 |
| **Italy** | 200,23 | 197,18 | 187,83 | 181,87 | 184,92 | 176,65 | 175,07 |
| **Spain** | 202,44 | 198,27 | 193,81 | 188,6 | 187,73 | 184,65 | 181,38 |
| **Sweden** | 205,11 | 201,45 | 201,33 | 194,46 | 193,24 | 188,91 | 184,68 |
| **Cyprus** | 187,9 | 196,93 | 182,29 | 182 | 189,74 | 171,15 | 185,41 |
| **France** | 214,83 | 208,84 | 205,16 | 198,33 | 199,34 | 196,06 | 191,95 |
| **Netherlands** | 220,45 | 218,25 | 210,35 | 200,87 | 205,98 | 202,84 | 193,19 |
| **Ireland** | 251,71 | 242,57 | 236,64 | 230,95 | 220,73 | 218,24 | 202,72 |
| **Malta** | 240,98 | 239,33 | 209,74 | 215,6 | 200,85 | 202,5 | 203,13 |
| **Luxembourg** | 233,01 | 228,08 | 231,21 | 213,29 | 205,48 | 211,19 | 203,31 |
| **Belgium** | 254,69 | 252,95 | 249,36 | 236,33 | 234,68 | 226,38 | 220,71 |
| **Portugal** | 244,04 | 236,26 | 231,22 | 233,11 | 228,64 | 229,33 | 222,28 |
| **Denmark** | 274,59 | 269,53 | 252,94 | 251,22 | 242,02 | 236,78 | 229,93 |
| **Austria** | 250,05 | 250,84 | 245,13 | 240,9 | 245,81 | 238,86 | 233,26 |
| **Greece** | 242,84 | 247,36 | 240,91 | 236,86 | 241,8 | 236,31 | 235,6 |
| **Finland** | 274,53 | 267,92 | 259,75 | 246,23 | 238,15 | 242,82 | 236,59 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Germany** | 257,93 | 252,8 | 253,78 | 243,34 | 249,22 | 244,56 | 241,05 |
| **Slovenia** | 309,25 | 297,41 | 294,53 | 277,59 | 284,88 | 263,62 | 265,47 |
| **Czech Republic** | 373,46 | 364,9 | 362,66 | 336,57 | 341,89 | 323,26 | 324,18 |
| **Poland** | 395,4 | 389,06 | 377,51 | 355,18 | 352,57 | 348,26 | 351,47 |
| **Croatia** | 414,76 | 404,92 | 384,47 | 383,23 | 393,71 | 371,26 | 370,95 |
| **Estonia** | 462,64 | 466,27 | 436 | 432,35 | 418,95 | 405,36 | 383,86 |
| **Slovakia** | 462,01 | 458,45 | 444,41 | 423,71 | 435,2 | 412,2 | 412,46 |
| **Bulgaria** | 417,95 | 442,59 | 431,63 | 444,78 | 442,26 | 426,5 | 422,07 |
| **Lithuania** | 602,34 | 591,03 | 579,86 | 546,46 | 556,71 | 541,71 | 492,78 |
| **Hungary** | 556,06 | 542,36 | 516,64 | 512,73 | 518,21 | 501,24 | 506,76 |
| **Romania** | 563,26 | 552,27 | 529,09 | 526,28 | 522,99 | 518,22 | 512,89 |
| **Latvia** | 606,08 | 591,8 | 581,64 | 558,07 | 547,82 | 535,05 | 525,32 |

Source: Eurostat, https://ec.europa.eu/eurostat/databrowser/view/hlth_cd_apr$defaultview/

Analyzing the data (Eurostat, 2022) it is observed that the countries that allocate the most funds from the GDP to health are the best performers, and the results can be seen in the indicators regarding life expectancy or preventable death rates.

States that allocated amounts of GDP above the European average (France, Germany, Sweden, Belgium, Austria, the Netherlands and Denmark) also have life expectancy above the EU average and preventable deaths below the European average.

**Figure 3: Life expectancy and preventable deaths, allocation of GDP above the EU average**



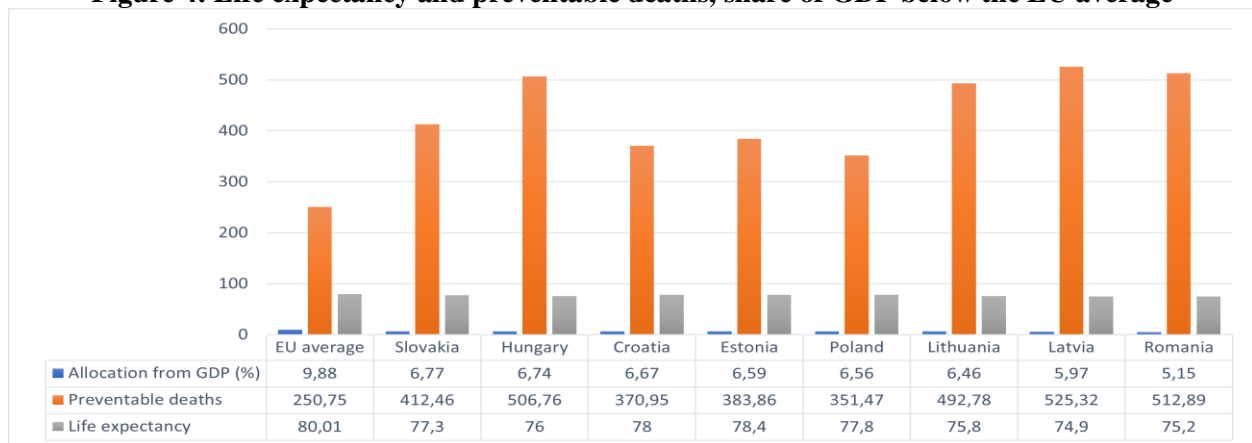| | EU average | France | Germany | Sweden | Belgium | Austria | Netherlands | Denmark |
|---|---|---|---|---|---|---|---|---|
| ■ Allocation from GDP (%) | 9,88 | 11,33 | 11,33 | 10,79 | 10,75 | 10,38 | 10,11 | 10,1 |
| ■ Preventable deaths | 250,75 | 191,95 | 241,05 | 184,68 | 220,71 | 233,26 | 193,19 | 229,93 |
| ■ Life expectancy | 80,01 | 82,7 | 81,1 | 82,5 | 81,6 | 81,7 | 81,8 | 81,1 |
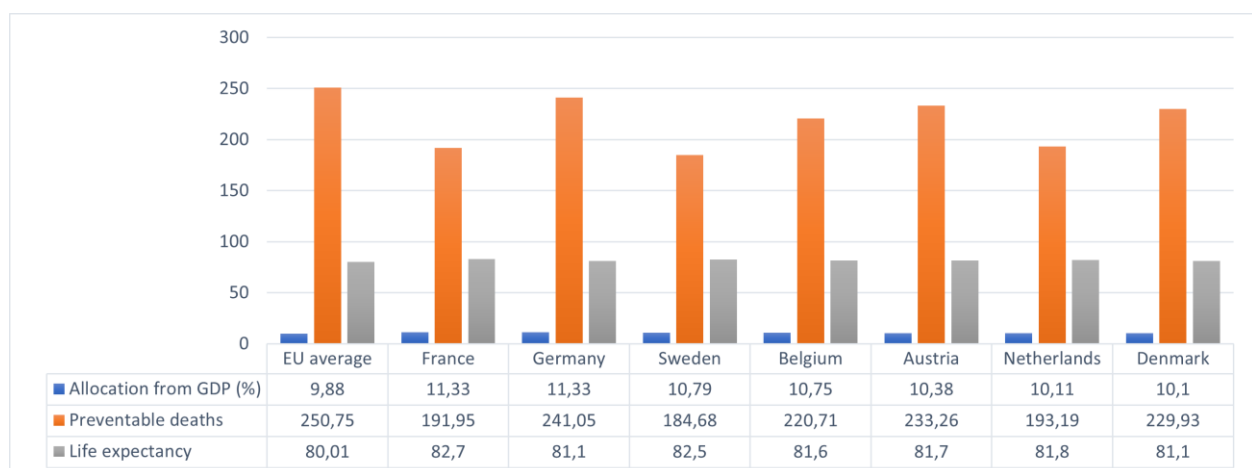
Source: Authors processing from the Eurostat database, for 2017

At the opposite pole, we observe the effect of the underfunding of health systems, with an impact on the presented indicators, which show us how effective a health system is at the population level.

The states that allocated amounts of GDP below the European average (Slovakia, Hungary, Croatia, Estonia, Poland, Lithuania, Latvia and Romania) recorded the lowest life expectancies, below the EU average, and preventable deaths recorded values of up to double European average.

**Figure 4: Life expectancy and preventable deaths, share of GDP below the EU average**



| | EU average | Slovakia | Hungary | Croatia | Estonia | Poland | Lithuania | Latvia | Romania |
|---|---|---|---|---|---|---|---|---|---|
| ■ Allocation from GDP (%) | 9,88 | 6,77 | 6,74 | 6,67 | 6,59 | 6,56 | 6,46 | 5,97 | 5,15 |
| ■ Preventable deaths | 250,75 | 412,46 | 506,76 | 370,95 | 383,86 | 351,47 | 492,78 | 525,32 | 512,89 |
| ■ Life expectancy | 80,01 | 77,3 | 76 | 78 | 78,4 | 77,8 | 75,8 | 74,9 | 75,2 |

Source: Authors processing from the Eurostat database, for 2017

## 5. Correlation between health expenditure of GDP and life expectancy

Table 1 includes GDP expenditures for 24 member states of the European Union, for 2019 an average of 9.90% is recorded at the level of the union, the maximum percentage being allocated by Germany (11.70%), Romania having the lowest allocation budgetary (5.74%).

Table 3 includes the situation regarding life expectancy at the EU level (number of years) for the same member states of the European Union, for the year 2019 an average of 81.3 years is recorded, the highest value being recorded by Spain (84.0 years), and Romania 75.6 years.

In the graphic representation (Figure 5) a correlation can be seen between the percentage of GDP allocated to health expenditure and life expectancy.

**Figure 5: Correlation of GDP expenditure and life expectancy (2019)**
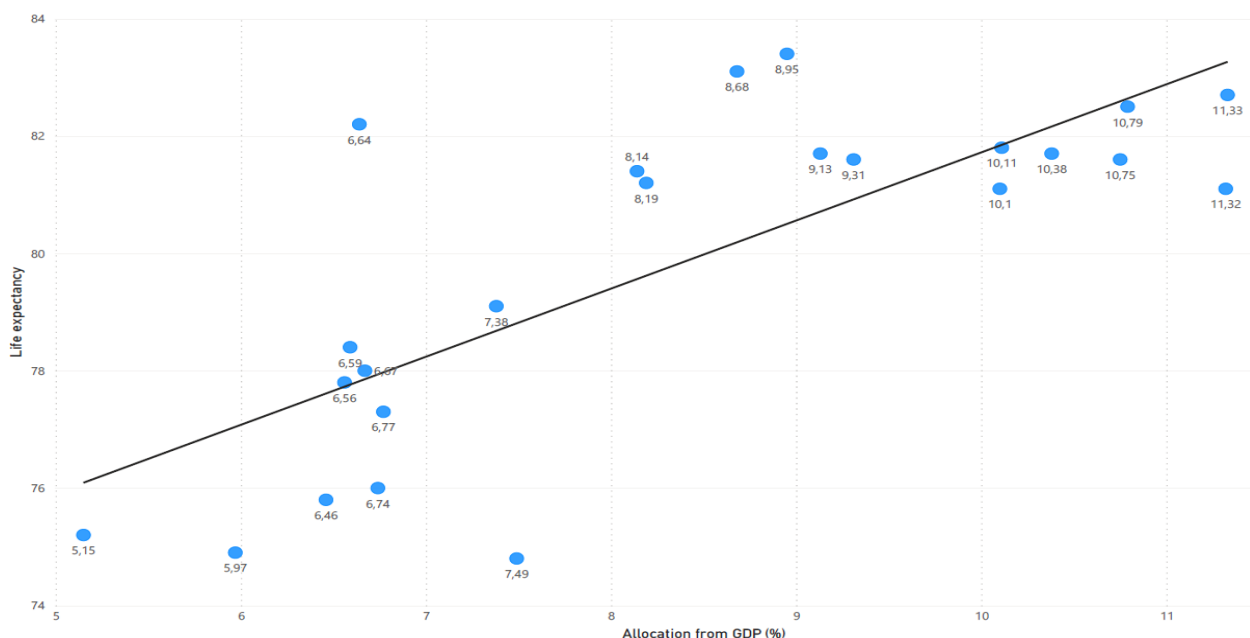


Source: Authors' processing from the Eurostat database, for 2019

The present research analyzes the hypothesis regarding the existence of a correlation between the percentage of GDP allocated to health, for the analyzed countries, on the life expectancy indicator. The results in Figure 5 show us the existence of a relationship between the high percentages allocated from GDP (Table 1) and the increase in life expectancy (Table 2).

Spearman's correlation coefficient was used to assess the link between (Table 1) the situation regarding health expenditure in relation to GDP, at EU level (%), for the analyzed countries and (Table 2) The situation regarding life expectancy at EU level (years). Spearman's correlation coefficient is 0.683 (Table 4)

**Table 4: Correlation matrix – Allocation from GDP, Life expectancy:**

| | | | Allocation from GDP (%) | Life expectancy |
|---|---|---|---|---|
| Spearman's rho | Allocation from GDP (%) | Correlation Coefficient | 1,000 | ,683** |
| | | Sig. (2-tailed) | . | <,001 |
| | | N | 24 | 24 |
| | Life expectancy | Correlation Coefficient | ,683** | 1,000 |
| | | Sig. (2-tailed) | <,001 | . |
| | | N | 24 | 24 |

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Data processing by the authors using SPSS 29.00 software

The level of connection between the chosen indicators (GDP Allocation and Life Expectancy) is shown in Table 5 and shows a strong correlation between them.

**Table 5: Correlation matrix – Allocation from GDP, Life expectancy:**

| | | Allocation from GDP (%) | Life expectancy |
|---|---|---|---|
| Allocation from GDP (%) | Pearson Correlation | 1 | ,767** |
| | Sig. (2-tailed) | | <,001 |
| | N | 24 | 24 |
| Life expectancy | Pearson Correlation | ,767** | 1 |
| | Sig. (2-tailed) | <,001 | |
| | N | 24 | 24 |

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Data processing by the authors using SPSS 29.00 software

Descriptive statistics are used to validate/invalidate the hypothesis (Table 6): Allocation from GDP registers values between 5.74% and 11.70%, Life expectancy (years) varies from 75.1 years to 84 years at the level of the analyzed countries .

**Table 6: Descriptive statistics – Allocation from GDP, Life expectancy:**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Allocation from GDP (%) | 24 | 5,74 | 11,70 | 8,4413 | 1,79338 |
| Life expectancy | 24 | 75,1 | 84,0 | 80,192 | 2,8124 |
| Valid N (listwise) | 24 | | | | |

Source: Data processing by the authors using SPSS 29.00 software

## 6. Correlation between health expenditure of GDP and preventable mortality

Table 1 includes GDP expenditures for 24 member states of the European Union, for the year 2017 an average of 9.88% is recorded at the level of the union, the maximum percentage being allocated by Germany and France (11.33%), Romania having the most small budget allocation (5.15%).

Table 2 includes the situation regarding preventable deaths at the EU level (no. per 100,000 inhabitants) for the same member states of the European Union, for the year 2017 an average of 304.14 deaths per 100,000 inhabitants is recorded, the highest value being recorded by Latvia (525.32 deaths), and Romania 512.89 deaths per 100,000 inhabitants.

In the graphic representation (Figure 6) a correlation is observed between the percentage of GDP allocated to health expenditure and preventable mortality.

**Figure 6. Correlation of expenditure in GDP and preventable deaths (2017)**
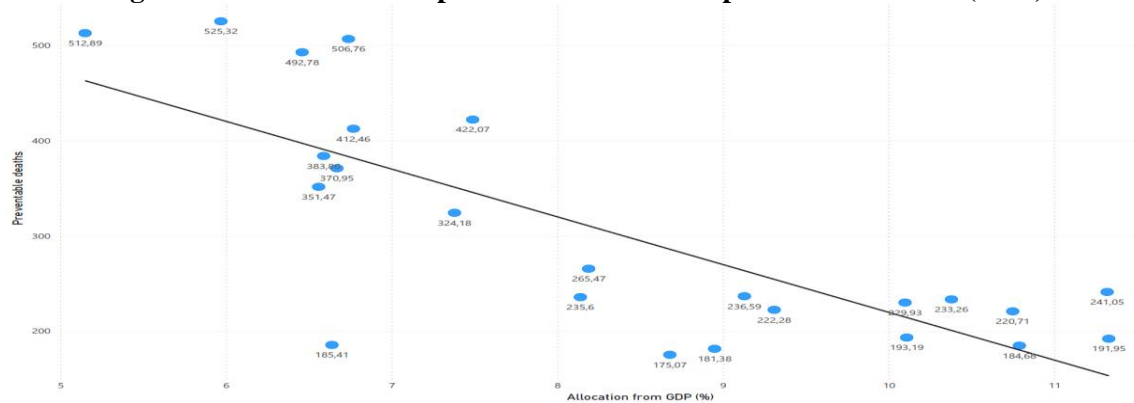


Source: Authors processing from the Eurostat database, for 2017

The present research analyzes the hypothesis regarding the existence of a correlation between the percentage of GDP allocated to health, for the analyzed countries, on the indicator of preventable mortality.

The results in Figure 6 show us the existence of a relationship between the high percentages allocated from GDP (Table 1) and the decrease in the value of preventable deaths (Table 3).
Spearman's correlation coefficient shows us whether the relationship between two variables can be expressed by a monotonic function, i.e. whether by increasing health expenditures relative to GDP, the life expectancy indicator also increases and vice versa.

Spearman's correlation coefficient was used to assess the link between (Table 1) The situation regarding health expenditure in relation to GDP, at EU level (%), for the analyzed countries and (Table 2) The situation regarding life expectancy at EU level (years). Spearman's correlation coefficient is 0.699 (Table 5).

**Table 7: Correlation matrix – Allocation from GDP, Preventable deaths:**

|  |  |  | Alocare din PIB (%) | Decese prevenibile |
|---|---|---|---|---|
| Spearman's rho | Allocation from GDP (%) | Correlation Coefficient | 1,000 | -,699** |
|  |  | Sig. (2-tailed) | . | <,001 |
|  |  | N | 24 | 24 |
|  | Preventable deaths | Correlation Coefficient | -,699** | 1,000 |
|  |  | Sig. (2-tailed) | <,001 | . |
|  |  | N | 24 | 24 |

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Data processing by the authors using SPSS 29.00 software

The level of connection between the chosen indicators (GDP Allocation and Preventable Deaths) is shown in Table 8 and shows a strong correlation between them.

**Table 8: Correlation matrix – Allocation from GDP, Preventable deaths:**

|  |  | Alocare din PIB (%) | Decese prevenibile |
|---|---|---|---|
| **Allocation from GDP (%)** | Pearson Correlation | 1 | -,778** |
|  | Sig. (2-tailed) |  | <,001 |
|  | N | 24 | 24 |
| **Preventable deaths** | Pearson Correlation | -,778** | 1 |
|  | Sig. (2-tailed) | <,001 |  |
|  | N | 24 | 24 |

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Data processing by the authors using SPSS 29.00 software

Descriptive statistics are used to validate/invalidate the hypothesis (Table 9): Allocation from GDP registers values between 5.74% and 11.70%, Preventable deaths (no. per 100,000 inhabitants) vary from 175.01 to 525.32, at the level of the analyzed countries.

**Table 9. Descriptive statistics – Allocation from GDP, Preventable deaths:**

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| **Allocation from GDP (%)** | 24 | 5,15 | 11,33 | 8,3171 | 1,86608 |
| **Preventable deaths** | 24 | 175,07 | 525,32 | 304,1379 | 120,17390 |
| **Valid N (listwise)** | 24 |  |  |  |  |

Source: Data processing by the authors using SPSS 29.00 software

## 7. Conclusions

Health systems are extremely complex, their performance depends on countless factors, direct or indirect, there is a constant pressure mainly of a financial nature, generated by the increase in administration costs, investments in new technologies and innovative medication.

In order to maintain a health system at a performance level that ensures high-level medical services, with an impact on the health status of citizens, budgetary allocations and financing of the health system at an appropriate level are necessary.

In the case of Romania, we can talk about a chronic underfunding of the health system, and in this paper we have shown that the budgetary allocation from GDP, at the level of the analyzed states, has an impact on the main health indicators of a population: life expectancy and preventable deaths.

The result of the research shows us the existence of a correlation between health expenditures allocated from GDP and life expectancy, respectively preventable deaths, the higher the financial allocations for health, the higher the life expectancy, and the indicator on preventable deaths is lower .

The limitations of the research are given by the complexity of the health systems and the numerous factors that influence the health status of the population, and the financing of the system does not necessarily show a direct causal relationship, a high level of financing can create the necessary premises to increase the quality of medical services with a direct impact on analyzed indicators.

An extension of the research, in the sense of including in the analysis the structure of health expenditures, especially regarding preventive and screening medical services or the promotion of a healthy lifestyle, can show us a much clearer picture of the performance of financial allocations with impact directly on the analyzed indicators.

# References

- Eurostat. (2022, 09 25). Retrieved from https://ec.europa.eu/eurostat/databrowser/view/hlth_sha11_hc
- Eurostat. (2022, 09 25). Retrieved from https://ec.europa.eu/eurostat/databrowser/view/demo_mlexpec
- Eurostat. (2022, 09 25). Retrieved from https://ec.europa.eu/eurostat/databrowser/view/demo_mlexpec
- Eurostat. (2022, 09 30). Retrieved 09 30, 2022, from https://ec.europa.eu/eurostat/databrowser/view/hlth_sha11_hf
- Eurostat. (2022, 09 25). Retrieved from https://ec.europa.eu/eurostat/databrowser/view/hlth_cd_apr$defaultview/
- Hansen, P., & King, A. (1998). Health care expenditure and GDP. *Journal of Health Economics*, *Vol* 17, 377–381.
- Hitiris, T., & Posnett, J. (1992). The determinants and efects of health expenditure in developed countries. *Journal of Health Economics*, *Vol.* 11(2), pp. 173 – 181.
- INSSE. (2018). Retrieved 09 15, 2022, from https://insse.ro/cms/files/publicatii/publicatii%20statistice%20operative/sistemul_conturilor_de_sanatate_in_romania_in_anul_2018_editia_2020_0.pdf
- Newhouse, J. P. (1977). Medical-care expenditure: a cross national survey. *The Journal of Human Resources*, *Vol.* 12(1), pp. 115 – 125.
- Nixon, J., & Ulmann, P. (2006). The relationship between health care expenditure and health outcomes. *The European Journal of Health Economics*, *Vol.* 7, pp 7–18.
- Parkin, D., McGuire, A., & Yule, B. (1987). Aggregate health care expenditures and national. *Journal of Health Economics, Vol. 6(2)*, 109 - 127.
- *World Health Organization*. (2017). Retrieved 10 15, 2022, from https://apps.who.int/iris/bitstream/handle/10665/255336/9789241565486-eng.pdf