

Macroeconomic Impact of Investment in Prevention and Health Infrastructure

Aspen Healthcare & Quality of Life
Program Research Paper

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About the Aspen Healthcare & Quality of Life

Aspen Institute Romania's Healthcare & Quality of Life Program was created to broaden the scope of the debate on health policy and support sustainable reforms in the health sector. It has developed a program community involving all relevant stakeholders (public officials and decision-makers, private stakeholders and representatives of the non-governmental and academic sectors and patients' associations). It provides a neutral and balanced venue, not just for discussing, but also for acting on critical issues affecting the Romanian and regional healthcare systems.

Executive Summary

The recent Draghi Report on European Competitiveness underscores the urgent need for structural reforms to strengthen the EU's economic model in response to global challenges. The report highlights that Europe must transition from its existing fragmented framework toward a more integrated and innovative-driven economic system. A key aspect of this transformation is enhancing human capital through improved governance, healthcare, education, and environmental sustainability—areas where the EU has historically delivered strong outcomes. The EU has also positioned itself as a leader in environmental protection, implementing policies that balance economic growth with sustainability. However, as the Draghi Report outlines, maintaining Europe's competitive edge requires greater investment in these foundational pillars, particularly in regions where disparities persist.

For Romania, aligning with this EU-driven model of competitiveness necessitates a strategic shift in healthcare investment, particularly in preventive care and health infrastructure. Increasing public health spending to European standards would not only improve workforce productivity and long-term economic potential but also ensure more equitable access to quality healthcare services.

The Romanian healthcare system is facing multiple structural and financial challenges that significantly affect access to and quality of healthcare services. With per capita spending on health among the lowest in the European Union, Romania has a system excessively focused on hospital care, to the detriment of prevention and outpatient medical care. In 2021, almost half of the funds allocated to health were directed to hospitals, while primary health care and prevention received insufficient funding (including primary prevention measures such as vaccination to prevent infectious diseases, or lifestyle improvement; and other types of secondary and tertiary prevention actions).

A key factor affecting the health status of the Romanian population is the high prevalence of behavioral risk factors, such as smoking, excessive alcohol consumption, and unhealthy eating, amplified by limited access to healthy foods. These factors, along with a lack of physical activity, have contributed to an increase in the incidence of non-communicable diseases, such as cardiovascular disease and type 2 diabetes, all of which have a significant impact on life expectancy and healthy life expectancy, in a context of aging population that will accelerate in the ten years and already lower birth rates. In both Romania and EU, Old-Age Dependency Ratios¹ will increase in the future, putting more and more pressure on social security,

¹ Old age dependency ratio is a demographic indicator that measures the proportion of elderly individuals (typically aged 65 and over) relative to the working-age population (usually defined as 15 to 64 years old). It is used to assess the economic burden on the workforce, as a higher ratio indicates a greater proportion of retirees who depend on a shrinking base of economically active individuals.

pensions, and healthcare systems due to a rising elderly population and fewer contributors to public funds. According to Eurostat data, in 2024 the old age dependency ratios were estimated at 33,8% in EU (average) and 31,2% in Romania². Until 2035 the old age dependency ratio in Romania will increase to 37.2% in Romania, reaching more than 55% in 2085 (Baseline scenario³).

Avoidable mortality, a key indicator of the good functioning of a health system, is almost double the European average, with about 695 deaths per 100,000 inhabitants, compared to a rate of 294, the EU average in 2021⁴. It is caused by treatable and preventable conditions such as cardiovascular disease, pneumonia and stroke, highlighting the need to improve access to rapid and effective healthcare.

This research investigates the macroeconomic impact of increased investment in the healthcare sector, focusing on prevention and improving access to healthcare services in Romania. The study highlights the pressing structural and financial challenges within the healthcare system and the significant benefits of prioritizing prevention-oriented spending. It examines the economic, health, and social implications of such investments through an extensive analysis of current conditions economic impact (productivity, fiscal revenues) and future scenarios of intervention.

The economic implications are profound. From 2015 to 2021, avoidable mortality cost the Romanian economy 6.5% of GDP—approximately €11 billion in lost productivity and €2.2 billion in uncollected tax revenues. Without intervention, the trend will worsen, with annual economic losses projected to exceed €5,77 billion over the next decade as the premature mortality rate is expected to increase.

However, there is significant potential for improvement. Two key scenarios illustrate the benefits of strategic action. The first scenario, emphasizing improved prevention measures, could reduce premature mortality by 44% within 10 years, resulting in €25,7 billion in cumulative economic gains, and €713,5 million in annual additional fiscal revenues (current

² <https://ec.europa.eu/eurostat/databrowser/view/tps00198/default/table?lang=en> (February 2025)

³ Demographic balances and indicators by type of projection [[proj_23ndbi](#)]

⁴ Eurostat database, Standardised preventable and treatable mortality [[sdg_03_42](#)]

prices values). The second, more ambitious scenario, targeting EU-average mortality rates, could decrease premature deaths by 58%, yielding €30.6 billion in cumulative economic gains, and €858 million in annual fiscal revenues.

To achieve these outcomes, targeted investments are critical. Constructing 8-9 new hospitals in underserved regions would address immediate disparities, requiring an estimated €600-675 million—a cost that could be recouped within 6-7 years through increased economic productivity and tax revenues. Moreover, aligning healthcare spending with EU average levels would necessitate at least 40%-45% increase in preventive care expenditure per capita. It is important to implement early detection programs and health checks at the level of primary assistance, focused on early treatment approaches to improve disease management, prevent complications and save for the health systems the costs determined by the co-morbidities and the aggravation of the disease, especially for individuals at risk.

In conclusion, Romania must increase healthcare expenditure, reallocating resources toward preventive care especially. Comprehensive public health education and early detection programs are crucial to addressing behavioral risk factors. Building healthcare infrastructure in underserved areas will enhance equity and access. Finally, improving governance and administrative efficiency will maximize the impact of these investments.

The Economic Context of Health Investments

Investment in healthcare is a fundamental driver of economic growth, influencing productivity, fiscal stability, and long-term development. A robust health system enhances human capital by ensuring a healthier, more active workforce, which in turn contributes to sustained economic output. In Romania, however, chronic underfunding of healthcare—particularly in preventive care—has led to high rates of avoidable mortality and morbidity, directly impacting labor market participation, productivity, and individual life satisfaction.

The decline in human capital contribution not only reduces current economic output but also lowers the long-term growth potential of the economy, as the shrinking and aging workforce struggles to sustain elevated levels of productivity. The Romanian labor force is already facing demographic challenges, with an aging population and declining birth rates putting pressure on future economic growth. Without targeted healthcare investments, particularly in preventive care and early intervention, the active workforce will continue to shrink due to increasing health-related issues, early retirements, and reduced work capacity.

Currently, Romania spends four times less per capita on preventive healthcare than the EU average, leading to higher rates of chronic illnesses and lower healthy life expectancy. This underinvestment not only increases healthcare costs but also weakens Romania's ability to maintain a competitive labor force in the future. Furthermore, regional disparities in healthcare infrastructure exacerbate labor market inefficiencies, as limited access to medical services in rural and economically disadvantaged regions restricts workforce mobility and productivity.

Where we stand compared to the EU and Member States

The Romanian health system is centered around hospitals, with a large capacity of beds compared to the European Union average. Reports from the European Commission and the OECD show that, in general, patients who seek timely care often bypass primary care facilities and go directly to hospitals.

As a result, almost half of the health funding in Romania goes to hospital care. Bypassing primary care is partly the result of patient preferences, but also due to the limited availability of general practitioners, especially in rural areas. At the same time, the lack of primary health care has very important implications for reducing avoidable mortality rates, which are the highest in the EU.

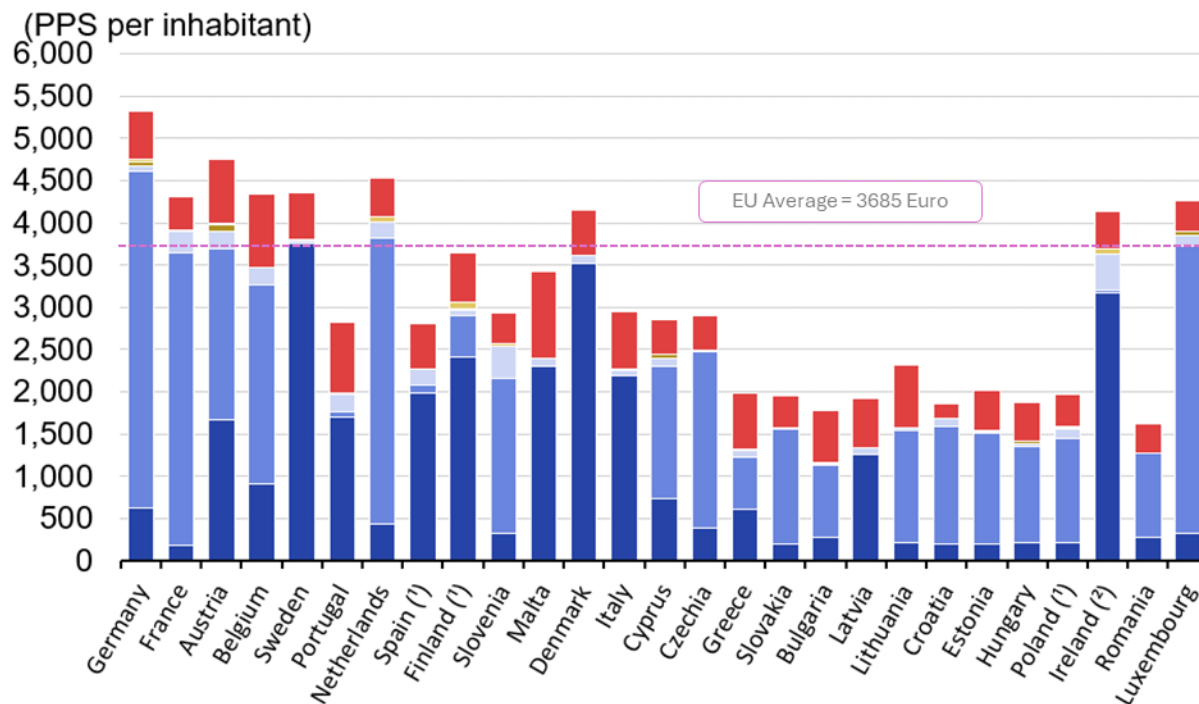
Even though coverage is compulsory, around 12% of the population is not insured⁵ (estimated for 2022). Uninsured people include people who work and live abroad, those who work informally, the unemployed who are not registered for social assistance, and those who do not have personal identity cards.

Per capita expenditure on health in Romania was the lowest in the EU in 2022. The social health insurance system that finances healthcare offers a comprehensive package of benefits. Compared to other EU countries, coverage is less generous in terms of outpatient pharmaceuticals and dental care.

Romania spent 1,627 PPS per capita on health in 2022 – less than half the EU average (around 3685 PPS per capita) and the lowest rate in the EU. This is 5.8% of GDP. The high expenditure on hospital healthcare is detrimental to other functions – especially outpatient healthcare. Hospital healthcare accounted for the largest share of health expenditure in Romania in 2021 (44%); this is the highest proportion among EU countries, and the EU average was 28%.

⁵ <https://www.who.int/europe/news-room/29-08-2022-out-of-pocket-payments-for-health-care-in-romania-undermine-progress-towards-universal-health-coverage>

Figure 1. Health expenditure per capita in EU countries (2022)



Note: ranked on current healthcare expenditure as a percentage of GDP.

(¹) Provisional.

(²) Enterprise financing schemes also includes financing schemes of non-profit institutions serving households.

Source: Eurostat (online data code: hlth_sha11_hf)

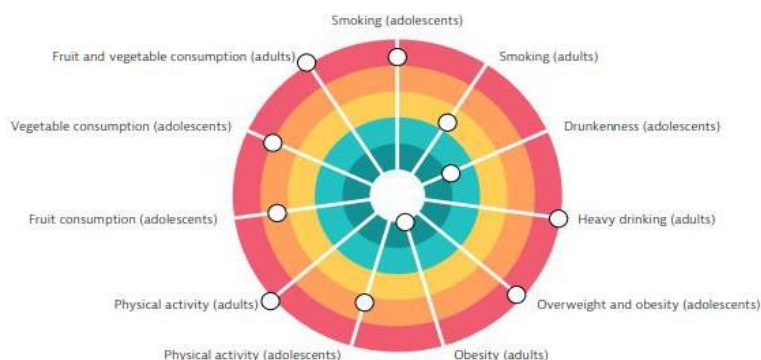
- Household out-of-pocket payments
- Enterprise financing schemes
- Financing schemes of non-profit institutions serving households
- Voluntary health insurance schemes
- Compulsory contributory health insurance schemes and compulsory medical saving accounts
- Government schemes

Source: European Commission and OECD, State of Health in the EU, Eurostat, 2024

Risk factors or what the public health system must fight against

Before assessing the performance of a health system, it is essential to look at the risk factors that put significant pressure on public health. These risk factors not only determine the frequency of diseases among the population but also increase the need for resources allocated to treatment and prevention, directly influencing the efficiency and sustainability of a health system.

Figure 2. Risk factors (2021)



Notes: The closer the dot is to the centre, the better the country performs compared to other EU countries. No country is in the white "target area" as there is room for progress in all countries in all areas.

Sources: OECD calculations based on HBSC survey 2022 for adolescents indicators; and EHIS 2019 for adults indicators.

Source: European Commission and OECD, *State of Health in the EU, 2023*

One of the most significant factors influencing population health is nutrition. In Romania, where the gross disposable household income at PPS was only 73% of the EU average in 2023, a larger share of income is allocated to essential needs. This is also reflected in Romania's negative household saving rate—the highest in the EU⁶—indicating that households are spending more than their gross disposable income, relying on past savings or borrowing to cover expenses. Consequently, the consumption pattern is heavily skewed towards basic necessities.

The latest Eurostat data show that Romanians allocate about 25% of a household's budget to food and non-alcoholic beverages, **double the EU average**, which stands at 14.3%. This does not mean that higher quality food is consumed, but on the contrary, people with lower income tend to allocate a higher percentage of their disposable income to food. However, due to financial constraints, they opt for cheap, high-calorie foods with low nutritional value, such as ultra - processed products and food high in sugars and fats.

According to the OECD report⁷, in lower-income countries, access to fresh and healthy food is limited, and prices for quality fruits, vegetables and proteins are relatively higher than in more developed countries, the consequence is the same, households opt for processed products that are cheap but less healthy.

⁶ https://ec.europa.eu/eurostat/databrowser/view/nasa_10_ki_custom_15697093/default/table?lang=en

⁷ https://read.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2021_ae3016b9-en#page1

Romania has one of the highest rates of smoking and excessive alcohol consumption in Europe⁸, to which is added the lack of physical activity and unhealthy diet described above. All these unhealthy habits are associated with several serious chronic diseases. These include cardiovascular diseases (hypertension, heart failure), type 2 diabetes, obesity, but also serious conditions such as lung and hepatocellular cancer. According to **the World Health Organization (WHO)**⁹, these chronic diseases are among the leading causes of preventable mortality.

⁸ <https://globalactiontoendsmoking.org/research/tobacco-around-the-world/romania/>

⁹ <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>

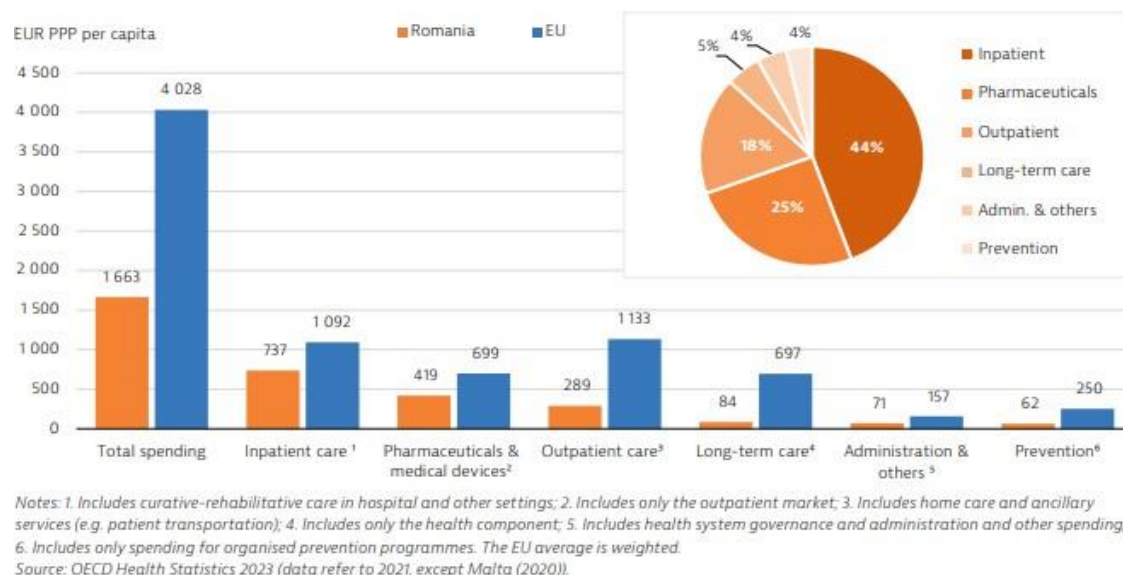
Structure of health expenses according to practice areas

In order to fully understand the complexity and challenges faced by the healthcare system in Romania, a detailed analysis of the expenditure structure is essential. It provides a clear picture of how resources are distributed and how efficiently funds are used in different practice areas. Without such an analysis, identifying the root causes of health problems becomes difficult, and the proposed solutions risk being incomplete or ineffective.

A first step in this analysis is to assess budget allocations for various segments of the health system, such as short-term care, prevention, long-term care, and outpatient healthcare. Each of these areas plays a crucial role in ensuring the health of the population, and **underfunding in one of these areas can have domino effects**, creating additional pressures on the other areas. For example, **insufficient funding for prevention** leads to an increase in the incidence of chronic diseases, which unnecessarily burdens the healthcare sector and increases the need for resources for expensive treatments and long-term care.

Romania faces a significant funding gap in the health sector, compared to the European Union average. These discrepancies in budget allocations affect all segments of the health system, but become more pronounced in certain practice areas, such as long-term care and prevention. In these areas, per capita expenditure in Romania is considerably lower, which contributes to a low quality of services and limited accessibility for a large part of the population.

Figure 3. Areas of health expenditure (Romania and the EU)



Source: European Commission and OECD, *State of Health in the EU*, 2023

Spending on **prevention** is four times lower per capita compared to the EU average. This reflects systemic **underfunding** in programs to prevent chronic diseases, such as diabetes, cardiovascular, respiratory diseases and cancer. Reduced investment in prevention leads to additional pressure on the health system, which subsequently faces much higher costs in treating advanced diseases. Prevention also plays a crucial role in educating the population and reducing risk factors that contribute to the increase in the incidence of non-communicable diseases (NCDs), such as tobacco and alcohol consumption, unhealthy diet and lack of physical activity.

In addition, expenditure on **outpatient healthcare in Romania** is significantly lower than the EU average (around 4 times lower). These include routine examinations and treatments for conditions that do not require hospitalization. In the context of deficient funding, many of these services are inaccessible, for the reason that they do not exist at the local level, and in some cases not even at the county level, as we will see below. **The lack of access to these services increases the pressure on the emergency system and hospitalization, sectors that are already overburdened.**

In terms of **long-term care**, Romania allocates eight times less per capita than the EU average. This lack of resources affects the care of the elderly and those with chronic diseases who require permanent assistance. **The Romanian health system is not adequately equipped to manage the demographic shift towards elderly population**, and the lack of funding in this area of practice leads to a considerable burden, both financial and emotional, on the families who must take responsibility for the care of these people. Additionally, a shortage of resources for long-term care means that many people do not receive the necessary treatments to maintain their quality of life, which can lead to additional medical complications.

In 2022, **4.9% of Romanians** reported unmet healthcare needs due to costs, distance to treatment centers or waiting times, a percentage that is more than double the EU average of 2.2%. This statistic highlights the negative impact that underfunding in health has on the population, especially those in rural or low-income areas. Most respondents (about 75%) identified **costs** as the main obstacle to accessing healthcare, which underlines the importance of adequate health system funding to ensure accessibility and equity of healthcare services.

Also, direct out-of-pocket health expenditure – which includes the payment of medicines, private consultations and other medical services– accounted for **21% of current health expenditure** in 2021 (final prices), well above the EU average of 15%¹⁰.

¹⁰ According to European Commission [country report](#) from 2023, the main driver of out-of-pocket spending is outpatient pharmaceuticals, but dental care costs are also significant.

The importance of prevention expenses

Public health frameworks¹¹ conceptualize prevention through three distinct levels, each playing a crucial role in mitigating adverse health outcomes¹².

Primary prevention encompasses proactive measures aimed at averting the emergence of health issues before they occur. This level of prevention operates either by implementing population-wide strategies to reduce risk factors or by directly addressing the underlying causes of potential health problems. By intervening at this stage, primary prevention seeks to eliminate the conditions that give rise to disease or adverse health events. Most important three categories of primary prevention measures are: (i) vaccination programs, such as immunization against measles, polio, or flu, which prevent infectious diseases from occurring; (ii) public health campaigns that promote healthy lifestyles, such as anti-smoking initiatives or awareness campaigns on the importance of physical activity and balanced nutrition; and also (iii) the environmental policies, such as regulations to reduce air pollution or bans on harmful chemicals in consumer products, which reduce exposure to health hazards.

Secondary prevention involves the early detection of health concerns to facilitate timely intervention and treatment. The primary objectives of secondary prevention are to enable prompt medical or behavioral responses, limit the progression of disease, and ultimately reduce the severity of associated harm. Screening programs, routine health check-ups, and early diagnostic efforts exemplify this approach by identifying health issues at an incipient stage, thereby improving outcomes.

Tertiary prevention is concerned with managing existing health conditions to minimize their impact on individuals' well-being. This level of prevention focuses on mitigating complications, improving quality of life, and preventing further deterioration through structured care and rehabilitation efforts.

While the last two preventative measures concentrate on identifying individuals who have already developed health issues and providing interventions to prevent their escalation, such approaches do not eliminate the root causes of disease. In contrast, only primary prevention endeavors to preemptively halt the emergence of health problems, making it a foundational strategy for long-term public health improvement.

Figure 4 illustrates the negative relationship between per capita preventive care expenditure (adjusted for purchasing power parity, PPP) and the DALY (Disability-Adjusted Life Years) rate for

¹¹ Kisling, L. A., & Das, J. M. (2023). Prevention Strategies. In StatPearls. StatPearls Publishing.
<https://www.ncbi.nlm.nih.gov/books/NBK537222/>

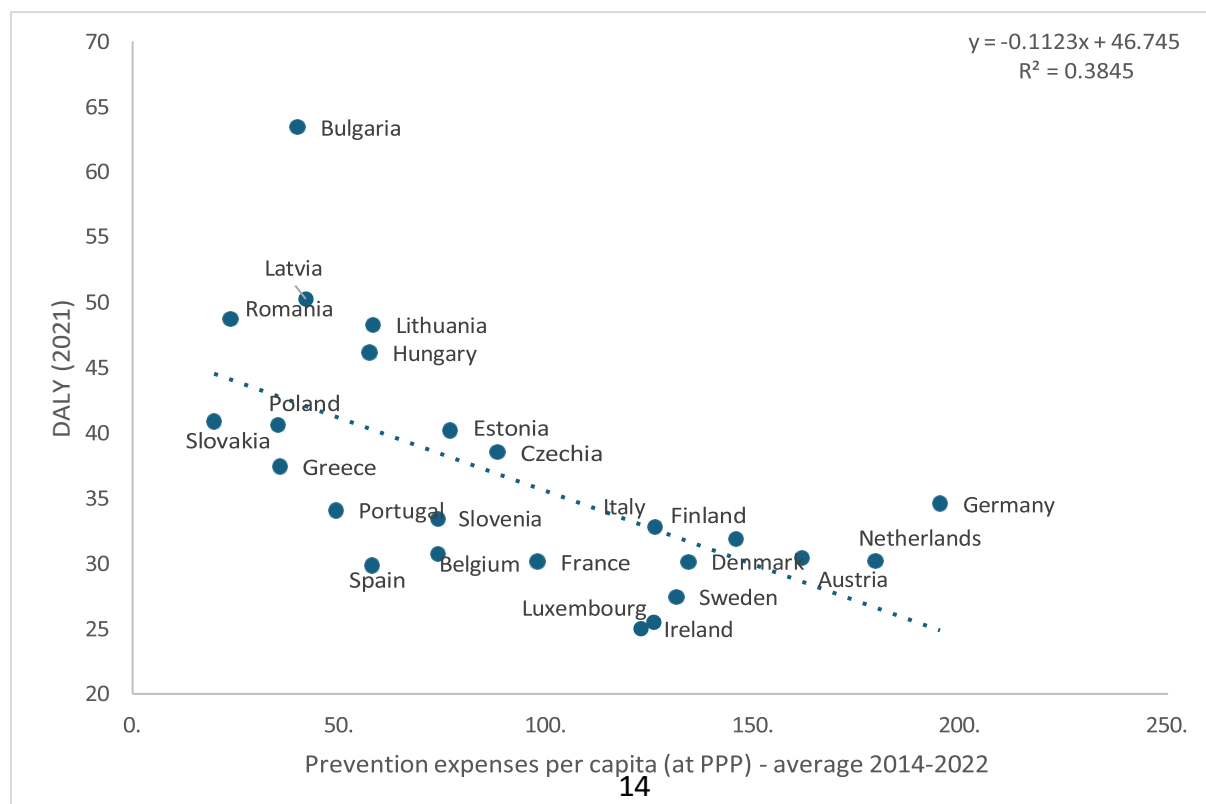
¹² Public health Scotland, Public health approach to prevention, 2024 <https://publichealthscotland.scot/about-us/what-we-do-and-how-we-work/public-health-approach-to-prevention/the-three-levels-of-prevention/>

European Union countries. In short, the DALY index represents disability-adjusted life years, an important indicator of the burden of disease on a population and with significant economic implications. A higher DALY index indicates a greater loss of health in terms of individual quality of life as well.

This negative correlation means that, in general, countries that invest more in preventive care (horizontal axis) have a lower rate of DALY (vertical axis), therefore a lower burden of disease. States that allocate considerable resources to prevention succeed in reducing the incidence and severity of diseases, thus improving the health of the population and reducing the burden of chronic diseases and premature deaths.

The data show that Bulgaria, Latvia and Romania are states that have low spending on prevention (below 50 PPP units) and that face very high rates of DALY (over 45). On the other hand, countries such as Luxembourg, Sweden, Ireland and Denmark have significantly higher spending on prevention (over 150 PPP units) and, at the same time, enjoy lower DALY rates (below 30), which indicates better health of the population. Germany is an interesting case because, although it invests considerably in prevention (over 200 PPC), the DALY rate is relatively high compared to other countries with similar investments. This may suggest that in Germany there are other factors that contribute to the burden of disease, such as the incidence of chronic diseases or lifestyle.

Figure 4. Relationship between prevention spending and the DALY index in the EU



Source: Eurostat and WHO

This negative correlation underscores the importance of preventive health policies. Investments in disease prevention – through vaccinations, screenings, medical education, awareness campaigns and lifestyle improvements – can significantly reduce the incidence of chronic diseases and conditions that seriously affect quality of life.

Benefits of investing in prevention:

- Chronic diseases such as diabetes, hypertension, cardiovascular and respiratory diseases are responsible for a large part of DALY.
- Prevention helps in the early diagnosis and effective management of these diseases.
- Although investments in prevention require upfront resources, they can reduce the overall costs of the healthcare system by preventing hospitalizations, costly treatments, and lost productivity.
- Primary prevention endeavors to preemptively halt the emergence of health problems, making it a foundational strategy for long-term public health improvement
- States that invest in prevention offer their population the chance to live longer and healthier, reducing the years lost due to diseases.

Results of the current health system

To understand the performance and efficiency of a health system, healthy life expectancy and avoidable mortality could be considered the most relevant indicators at the societal level. These two parameters provide an overview not only of lifespan, but of its quality and the ability of the health system to prevent and treat manageable conditions.

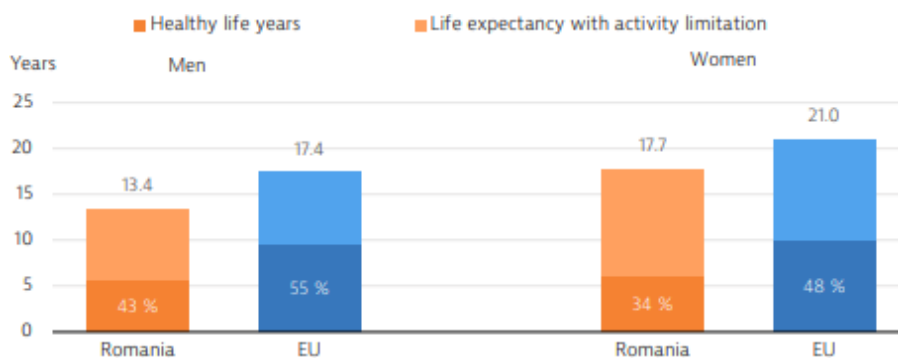
In 2022, in Romania, life expectancy at birth was 71.5 years for men and 79.3 years for women. This gender gap is explained by differences in tobacco and alcohol consumption patterns. In 2019, 30.6% of Romanian men smoked daily and 53.1% reported excessive alcohol consumption; among women in Romania, 7.5% smoked daily, and 18.0% reported excessive alcohol consumption.

In 2020, women in Romania aged 65 could expect to live another 17.7 years (more than 3 years below the EU average), and men, another 13.4 years (4 years below the EU average), data from the European Commission and OECD show.

A concept that becomes more relevant in literature than life expectancy is that of **healthy life expectancy**. Healthy life expectancy represents the years of life lived without major disabilities or chronic diseases that significantly affect the quality of life. This indicator is particularly important because it refers not only to the longevity of the population, but also to the number of years in which the individual can enjoy an active life, without significant limitations.

As can be seen from the figure below, beyond the fact that the life expectancy of a man reaching the age of 65 in Romania is only 13.4 years compared to 17.4 in the case of the EU, this man in Romania expects only 6 years of healthy life compared to 9 years in the case of the EU. The situation is similar among women, where healthy life expectancy at the age of 65 is another 6 years in Romania, while in the EU it is about 10 years.

Figure 5. Life expectancy and healthy life expectancy at age 65 (2021)

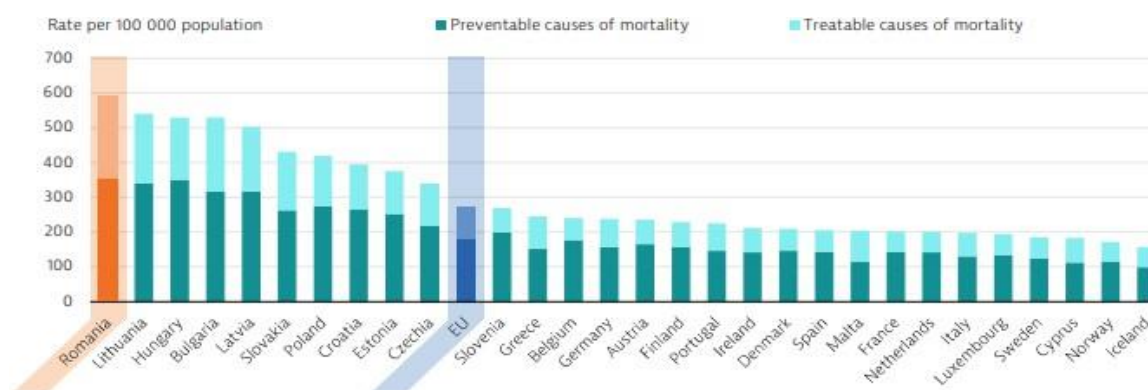


Source: European Commission and OECD, State of Health in the EU

Avoidable mortality is one of the most important indicators of public health, providing a clear measure of the impact that health policies and medical interventions have on the population. This indicator refers to deaths that could have been prevented, either by effective prevention measures (**preventable mortality**) or by appropriate treatments and medical interventions (**treatable mortality**). The analysis of these two categories of mortality provides an overview of the functioning of the health system in a country.

Avoidable mortality is a clear marker of the overall functioning of the health system, highlighting gaps in prevention and treatment. In Romania, preventable mortality is **almost double the European Union average, with a rate of 358 deaths per 100,000 inhabitants in 2020 and 440 in 2021**¹³. It is mainly caused by cardiovascular diseases, conditions associated with alcohol and tobacco consumption, but also by limited access to fast and quality medical care.

Figure 6. Mortality from preventable causes and treatable causes



Source: European Commission and OECD, State of Health in the EU, 2023

Preventable mortality reflects the ability of a health system to implement effective public health measures aimed at reducing the incidence of preventable diseases and conditions. Among the main causes of preventable mortality are diseases associated with the consumption of tobacco, alcohol, and unhealthy diet, but also infectious diseases preventable by vaccination or public health measures. For example, cardiovascular disease, which is often associated with an unhealthy lifestyle, is one of the leading causes of preventable mortality. Ischemic heart disease is among the most common conditions in Romania, reflecting both the lack of preventive measures and the elevated level of behavioral risk factors. In addition, liver diseases related to excessive alcohol consumption are also an important cause of preventable mortality in Romania, significantly affecting the working-age population.

¹³ Standardized preventable and treatable mortality [\[sdg_03_42\]](#)

Treatable mortality is an indicator of the efficiency of the healthcare system in providing adequate treatments and medical interventions for diseases and conditions that can be treated if diagnosed and managed in a timely manner. A high rate of treatable mortality indicates deficiencies in access to medical care, in the endowment of the health system and in its ability to respond promptly to patients' needs. In Romania, the main causes of treatable mortality include **strokes** and **pneumonia**, diseases that can be treated effectively if patients receive timely medical care.

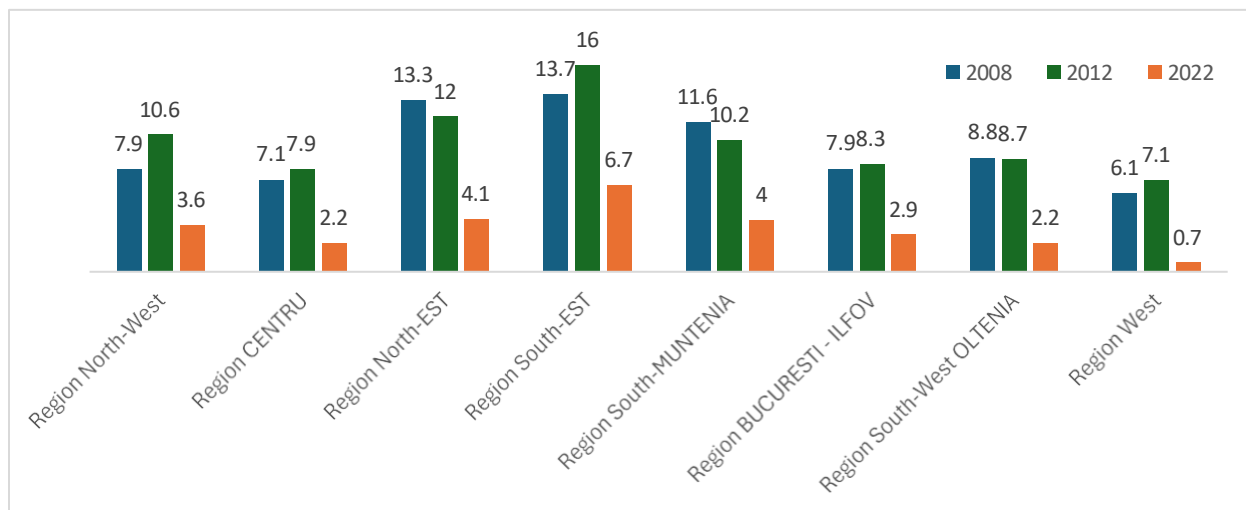
Romania had in 2020 a **treatable mortality rate of 235 deaths per 100,000 inhabitants**, increasing at 255 in 2021, a number almost three times higher than the European Union average. This is a significant problem as it reflects not only limitations in access to treatments, but also shortcomings in the proper management of chronic diseases such as cardiovascular disease and diabetes. Also, this high rate of treatable mortality indicates **a latency in diagnosis and the lack of effective early intervention protocols**.

An important aspect of avoidable mortality is regional **discrepancies**. In Romania, access to quality medical services varies significantly between regions and between urban and rural areas but also depending on the income level of patients. Populations in rural areas have limited access to prevention and treatment services, which increases the risk of avoidable mortality.

People with low income are also more likely to lack access to effective treatments, which amplifies health inequalities and leads to a higher rate of preventable and treatable mortality in these vulnerable groups.

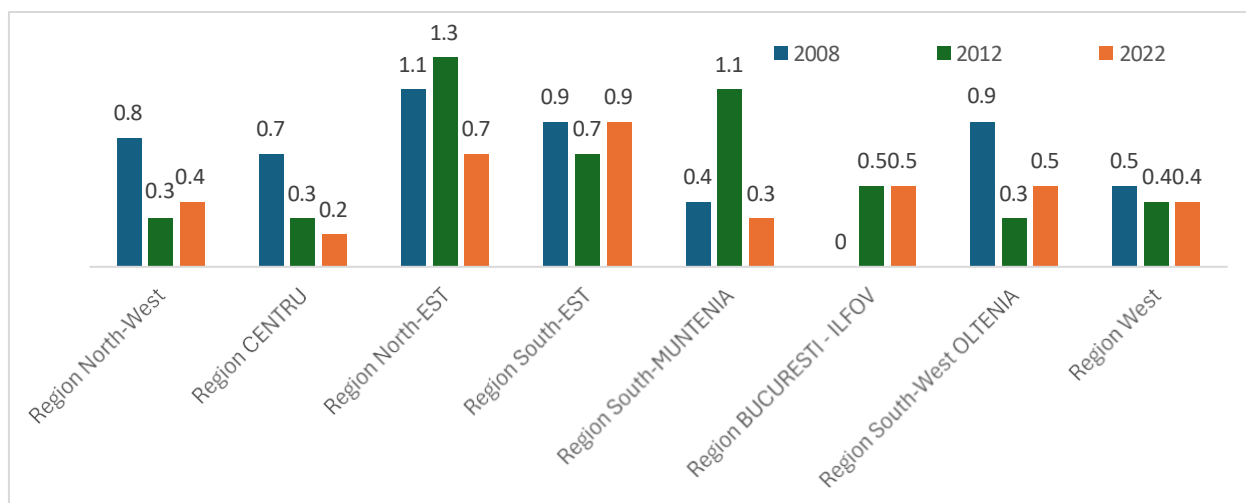
National Institute of Statistics data show that, although the situation of access to health services has improved in the last decade, there are different barriers, and these have an important effect in certain regions. For example, in the South-East region, 6.7% of the population does not have access to doctors because of the expenses that should be made, while in the North-East region the percentage of the population is 4.1%. These counties also have the highest share of the population that cannot reach a doctor due to a too long a distance or lack of means of transport (Figure 7 and Figure 8).

Figure 7. The share of the population that cannot afford (is too expensive or is not covered by medical insurance) to see a doctor



Source: authors calculations based on NIS data

Figure 8. The share of the population that considers that too much distance or lack of means of transport prevents access to the doctor



Source: authors calculations based on NIS data

Current hospital infrastructure

In the analysis and estimation of the need for investments in health infrastructure, several variables were pursued, which have the role of building a picture of the demand, supply and existing situation in terms of the provision of health services at the territorial level (data at the county or locality level – where available).

Thus, in terms of supply, we analyzed the number of hospital beds for continuous hospitalization, the number of medical units and the way they are currently allocated in Romania at the county level. The demand was approximated based on the resident population, both total and over 50 years old, the latter generally having a higher need for hospital medical services. Also, another variable considered refers to the median age of the resident population, approximating how the needs for healthcare services will evolve in the future.

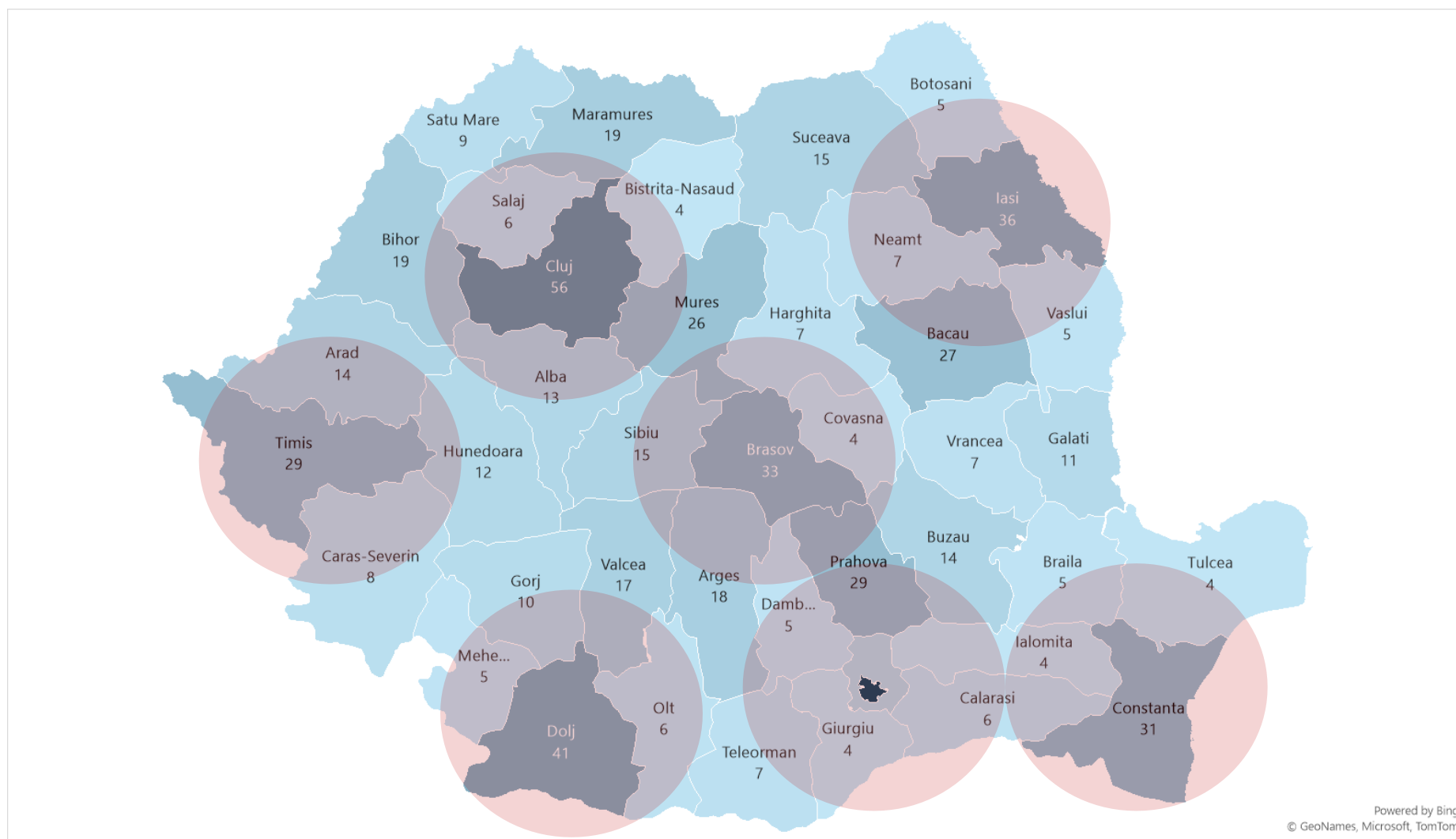
These are the first two dimensions of analysis that highlight the way in which the current supply of health services manages to cover the population's demand at the level of each county.

A third dimension refers to the identification of areas where the supply (medical units, hospital beds and medical staff) fails to cover parts of the demand, which signals additional investment needs in health infrastructure (buildings, equipment) and additional medical and auxiliary staff.

From the perspective of hospital and outpatient infrastructure, the heterogeneity at the county level is very high according to INS data, in general hospitals and outpatient clinics being found in cities with important university centers such as Bucharest, Iasi, Timisoara, Craiova, Cluj-Napoca, Brasov and Constanta. If we add Prahova County to these, these 8 counties account for over 50% of the total hospitals and outpatient clinics in Romania (710 in 2023) – see Figure 9.

On the other hand, there are also counties where the number of hospitals is very low while outpatient clinics are completely absent: Bistrița-Năsăud, Călărași, Brăila, Covasna, Giurgiu, Ialomița, Mehedinți, Tulcea, Vaslui (Figure 10).

Figure 9. Number of hospitals and specialty outpatient clinics at county level (2023)

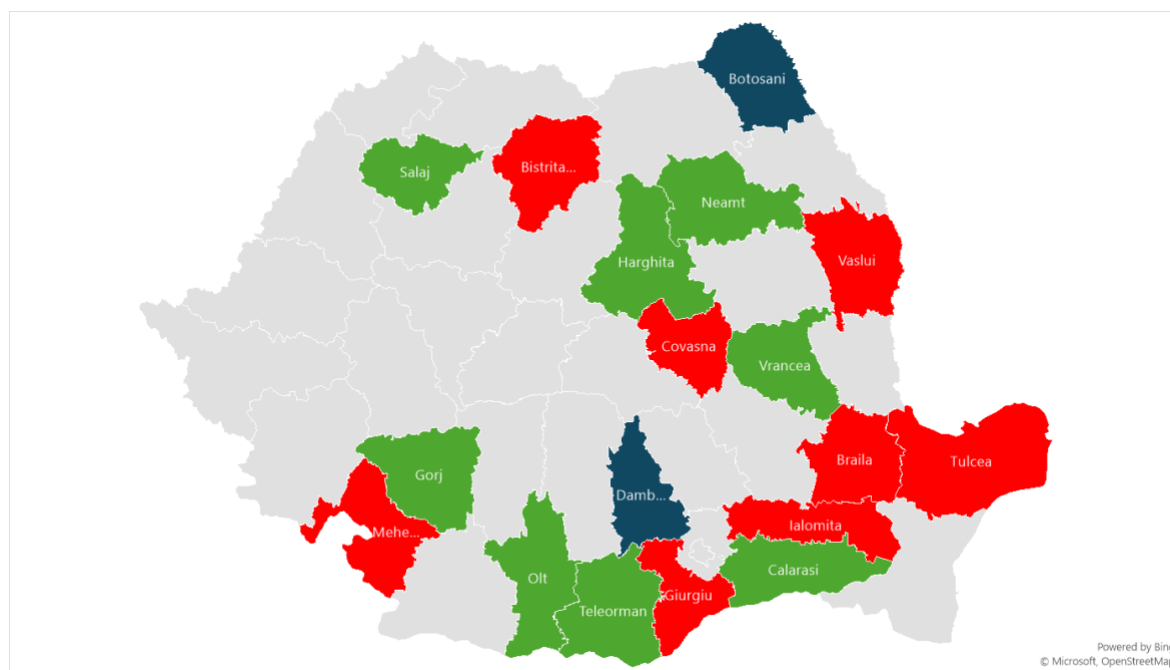


Source: authors' processing based on INS data (September 2024). For Bucharest there were 105 units, and for Ilfov County 12 units in 2023.

The distribution of human resources in the medical field in Romania reflects a significant trend of concentration around large university centers, a phenomenon determined both by the professional attractiveness of these centers and by the socio-cultural opportunities they offer. Cities such as Cluj-Napoca, Iasi, Bucharest, Craiova, Timisoara, Constanta, and Brasov, recognized for their prestigious universities, exert a strong influence on medical graduates. After completing their studies, doctors show a clear preference to stay in these urban centers, due to both the developed medical infrastructure and the professional networks and quality of life.

This phenomenon has profound implications for the ability of smaller cities, including county capital cities, to compete for attracting these specialists. Even in situations where smaller cities offer substantial financial benefit packages, the lack of a professional ecosystem of a level comparable to that of large university centers, together with the absence of similar cultural and social opportunities, limits the ability of these cities to attract and retain medical personnel.

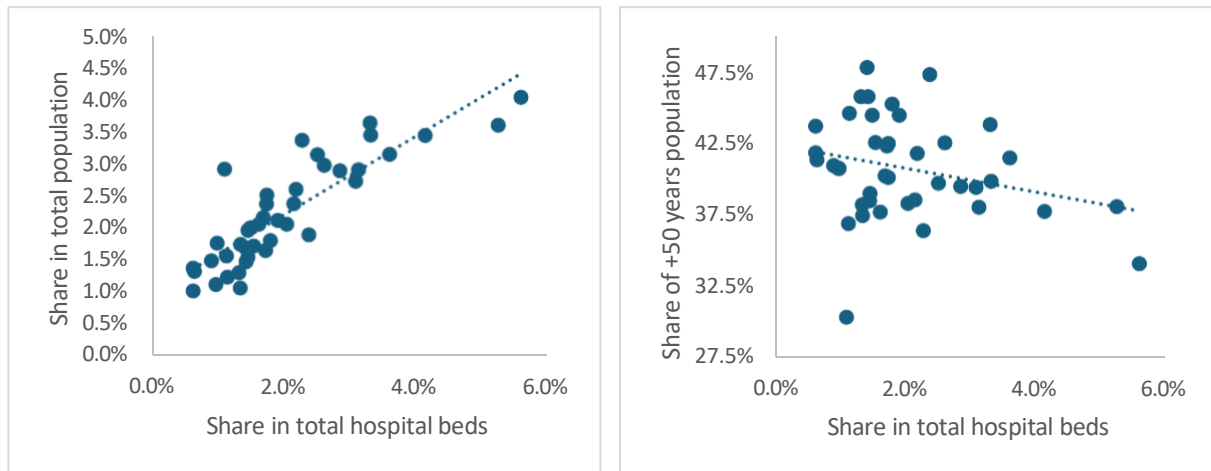
Figure 10. Counties with a shortage of specialized hospitals/outpatient clinics (2023)



Source: authors' processing based on INS data (September 2024). Note: red color shows counties with 0 specialty outpatient clinics and less than 5 hospitals, blue color shows counties with 1 specialty outpatient clinic and 4 hospitals, green color shows counties with 0 outpatient clinics and more than 5 hospitals

Figure 11 below shows that, although the distribution of beds per county according to the total population is a reasonable one, and the relationship between the number of beds and the total population at county level is a strongly positive one (large population, large no. of beds), the introduction of the criterion regarding the population over 50 years of age shows, in fact, an inverse situation. A rather negative correlation being illustrated, namely many counties with a dominant aging population (50+ years) have a low share of hospital beds at the county level (data from 2023). The introduction of this demographic criterion is relevant, because medical needs increase with age. We can thus understand one of the main causes underlying the unmet need for access to medical services, namely the distribution of beds according to the population's needs.

Figure 11. Relationship between the share of beds and the share of population - total and over 50 years (2023)



Source: authors' processing based on INS data (September 2024). To facilitate the graphic illustration from the figure, the capital Bucharest was eliminated, which concentrates approximately 17% of the hospital beds in Romania, 9% of the resident population, and 38% of the county's population is over 50 years old

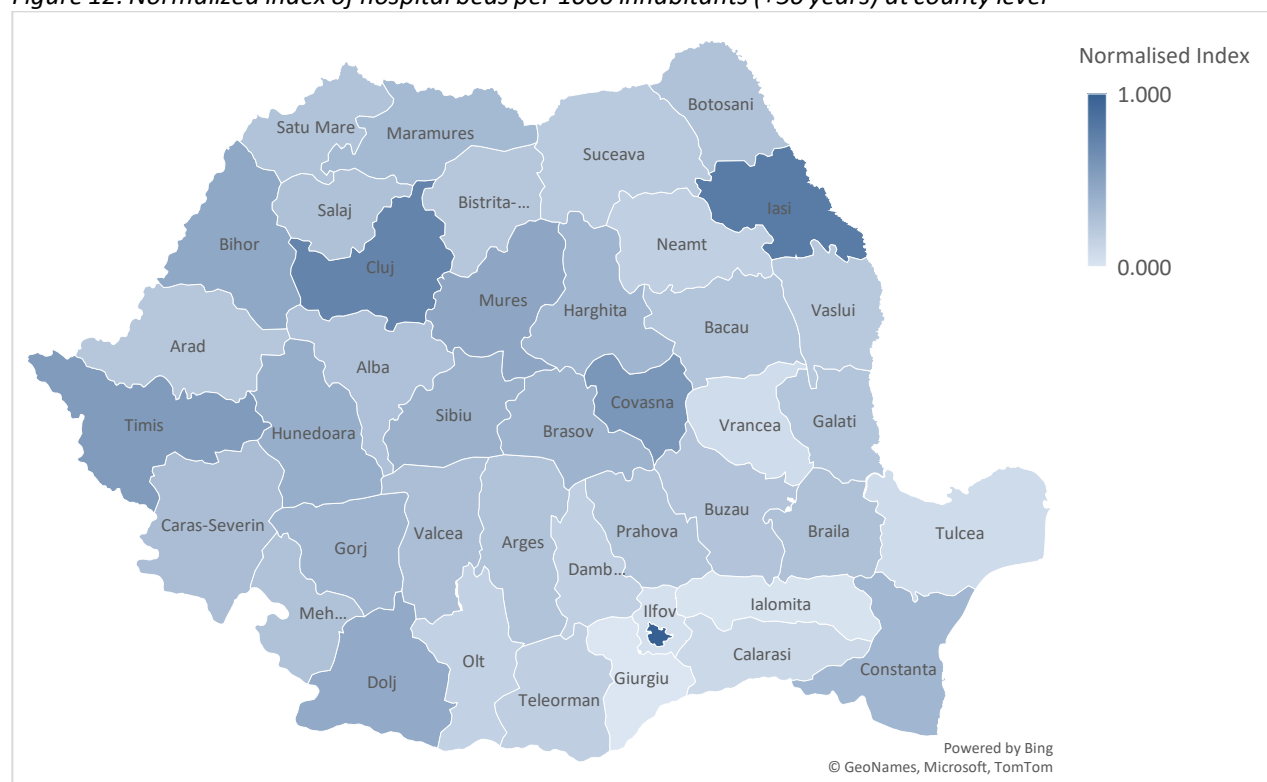
From the perspective of the adequacy to the number of people over 50 years of age, which reflects the level of access to health services among counties in Romania, Figure 12 illustrates several important elements. The normalized index for Romania is 0.38, which indicates a relatively low national average, with significant variations between counties, especially between the capital Bucharest, the important county seat municipalities and the other counties. These disparities highlight inequalities in access to medical resources in various regions of the country. Thus, the counties with a very low index (<0.2) are Giurgiu (0.00), Ialomița (0.02), Ilfov (0.04), Tulcea (0.08), Vrancea (0.08), and at the opposite pole, the counties with a high index (>0.6) are: Cluj (0.73), Iasi (0.79) and Bucharest (1.00).

The discrepancy between the average maturity of counties and care centers in providing treatment can lead to delays in providing necessary care, especially for chronic conditions or exacerbations that require hospitalization. People over 50 years are at an increased risk of

developing chronic diseases such as diabetes, cardiovascular disease, respiratory diseases, and cancer, while the lack of available hospital beds can complicate managing these conditions.

Moreover, in regions with few beds, hospitals can become overburdened, leading to a decrease in the quality of medical care provided. Patients may experience longer waiting times for admission and for access to necessary medical treatments or procedures. **In the absence of an adequate number of hospital beds, people from counties with a low index may be forced to travel to other counties with better resources (e.g. Bucharest, Cluj, Iasi), which generates additional pressure on hospitals in these counties and creates an imbalance in access to medical care.** This phenomenon can lead to congestion in large urban centers, where hospitals are already overcrowded. Counties with a very low index, such as Giurgiu, Ialomița, Ilfov and Vrancea, are the most exposed to risks related to insufficient access to medical care. This can have serious consequences both for public health and for the social and economic stability of the affected regions, for example by increasing mortality treatable or avoidable through prevention policies.

Figure 12. Normalized index of hospital beds per 1000 inhabitants (+50 years) at county level

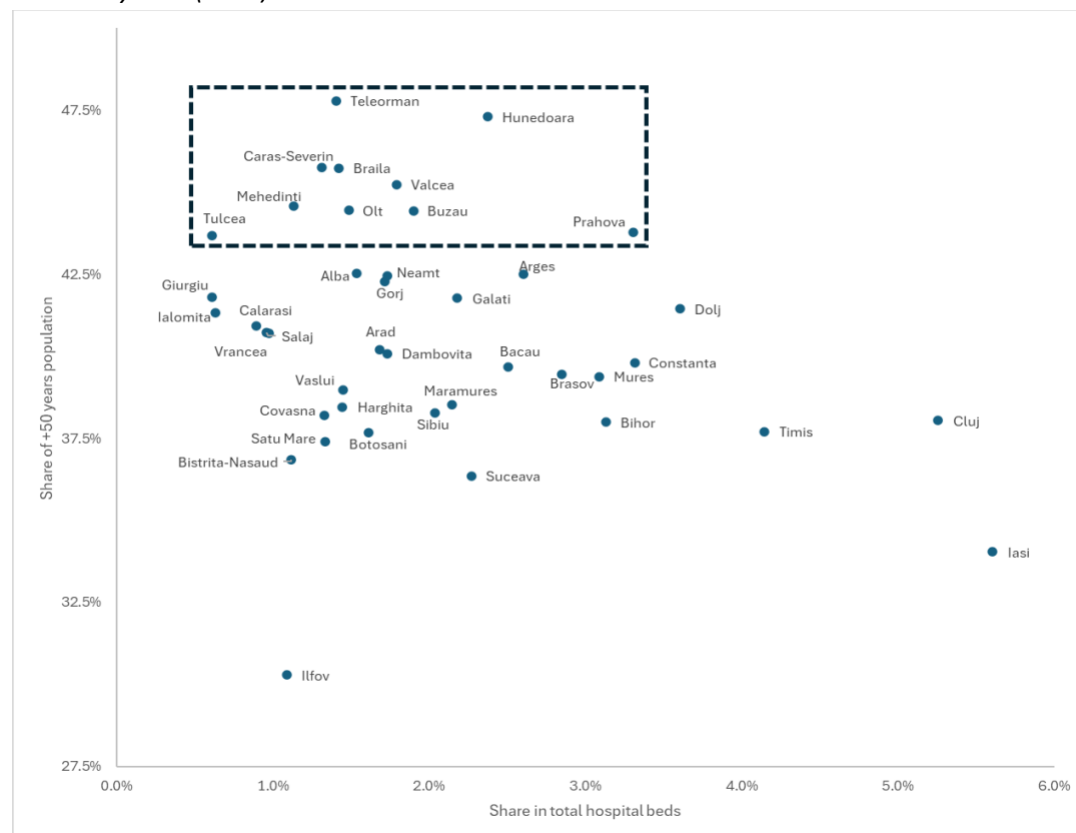


Source: authors' processing based on INS data (September 2024)

In Figure 13 we presented the distribution of counties in Romania according to two key variables regarding the need for medical services, namely the percentage of the population over 50 years old, which reflects the aging of the population in each county (vertical axis), and the percentage of hospital beds in the total population of the county, indicating the medical care capacity in relation to the number of inhabitants (50+ years) (horizontal axis). The area in the border (delimited by the dotted line) highlights the counties that have a relatively high proportion of the elderly population (between 42.5% and 47.5% of the population over 50 years old) and a moderate proportion of hospital beds (between 1.5% and 3%). It suggests that these counties may have a greater need for health resources for the elderly population, given the significant percentage of elderly people but with limited hospital capacity compared to other counties.

These data are also reinforced by the NIS survey on access to health services (People aged 16 and over who could not consult a specialist doctor in the last 12 months), which shows that the greatest unmet needs are in three regions: South-East, North-East and South-Muntenia (2022 data) previously presented in figures 7 and 8.

Figure 13. Relationship between the share of hospital beds and the share of the population over 50 years of age at the county level (2023)



Source: authors' processing based on INS data (September 2024). To facilitate the graphic illustration in the figure, the capital Bucharest was eliminated

As previously mentioned, a relatively small proportion of hospital beds in these counties compared to the needs of the aging population suggests that current hospital units may become overcrowded and waiting times for treatment are very long – which can worsen the health status of patients, especially in the case of emergencies, but also transfers to other counties – which, in addition to logistical difficulties, they put pressure on the health infrastructure in neighboring regions, especially large university centers (Timisoara, Craiova, Cluj-Napoca, Bucharest or Iasi).

The counties included in this area are 10 in number: Teleorman, Mehedinți, Caraș-Severin, Brăila, Olt, Buzău, Vâlcea, Hunedoara, Tulcea, Prahova. These counties have an aging population, and they can expect potentially greater pressure on the health system in the long term, given their inadequate health care capacity.

However, it can also be seen that among these counties with lower values of the number of beds reported to people over 50 years old, Prahova, Giurgiu, Ilfov and Calarasi can be rather associated with the hospitalization capacity in Bucharest, while Tulcea can be associated with Constanta. Due to the proximity, the hospital infrastructure needs in these counties need to be analyzed in more depth, to see the flows and intensity of use of hospitals in the capital area of Bucharest or Constanta. Vâlcea, Olt, Buzău and Hunedoara counties are areas where it is necessary to expand hospital capacity and increase investments.

The population in these counties is disproportionately aged, leading to an increase in demand for specialized healthcare services for chronic, geriatric and long-term treatments to meet the needs of older people.

Greater attention in these cases can also be paid to recovery after surgeries and treatments associated with old age (e.g. fractures, cardiovascular diseases) which involve both investments in physical infrastructure, equipment, but also investments in specialized personnel – increasing the number of geriatric doctors, nurses, physiotherapists and other specialists for the care of the elderly.

Accessibility and health infrastructure among counties in Romania

Figure 14 provides insight into the correlation between the number of hospital beds available for people over 50 years of age (normalized index of hospital beds per person over 50 years of age on the horizontal axis) and the accessibility index (vertical axis), which reflects how accessible the medical infrastructure based on transport infrastructure is in each county. The source of this index is the World Bank.

The processed data highlight major disparities between Romanian counties in terms of access to medical care for the elderly. The counties with the highest risk are highlighted in the box. They face significant challenges both in terms of hospital capacity (small number of beds) and access to hospitals (high index value). On the other hand, counties such as Iasi, Cluj, Covasna and Timis demonstrate a better performance, having both a large number of available beds and a relatively adequate transport infrastructure. Strategic investments in improving transport infrastructure, together with expanding hospitalization capacity in disadvantaged counties, are essential to ensure equitable access to health services.

Figure 14. Correlation between the number of beds and the accessibility index at county level

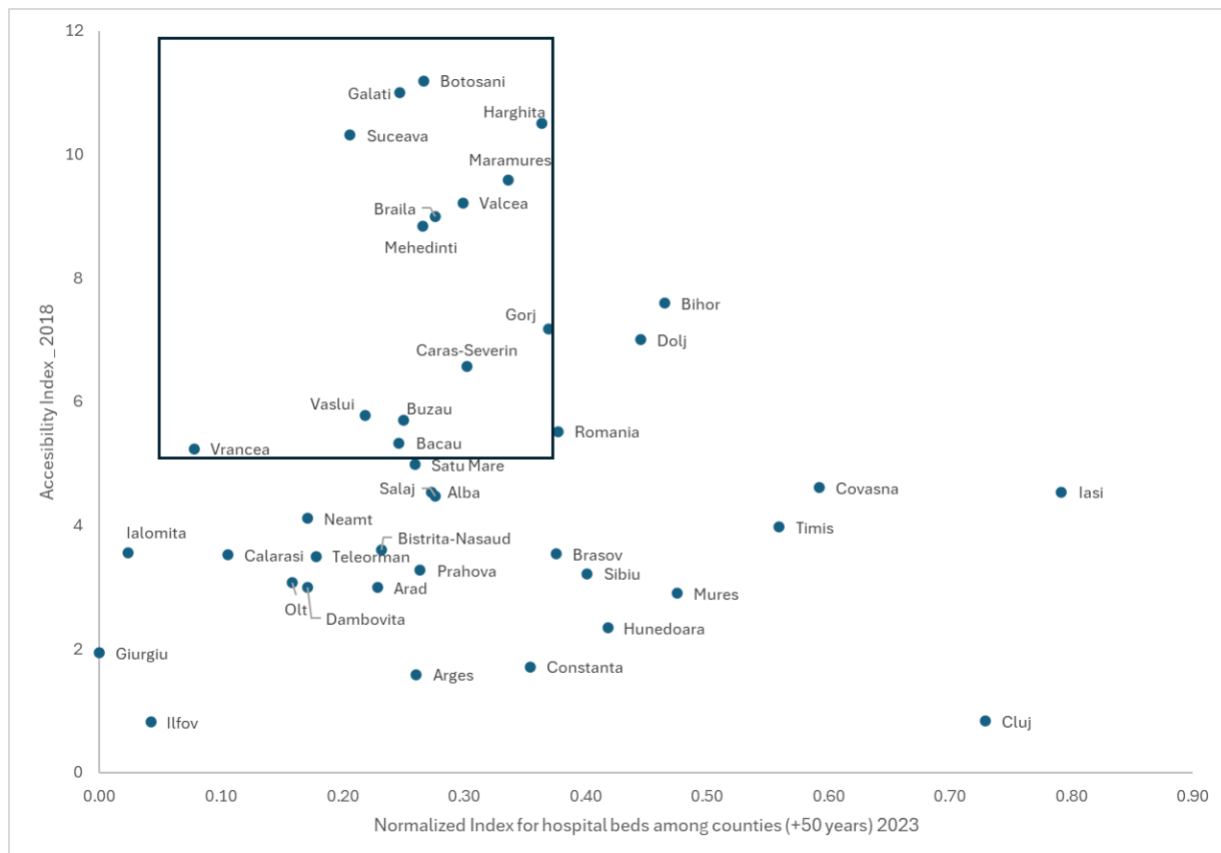
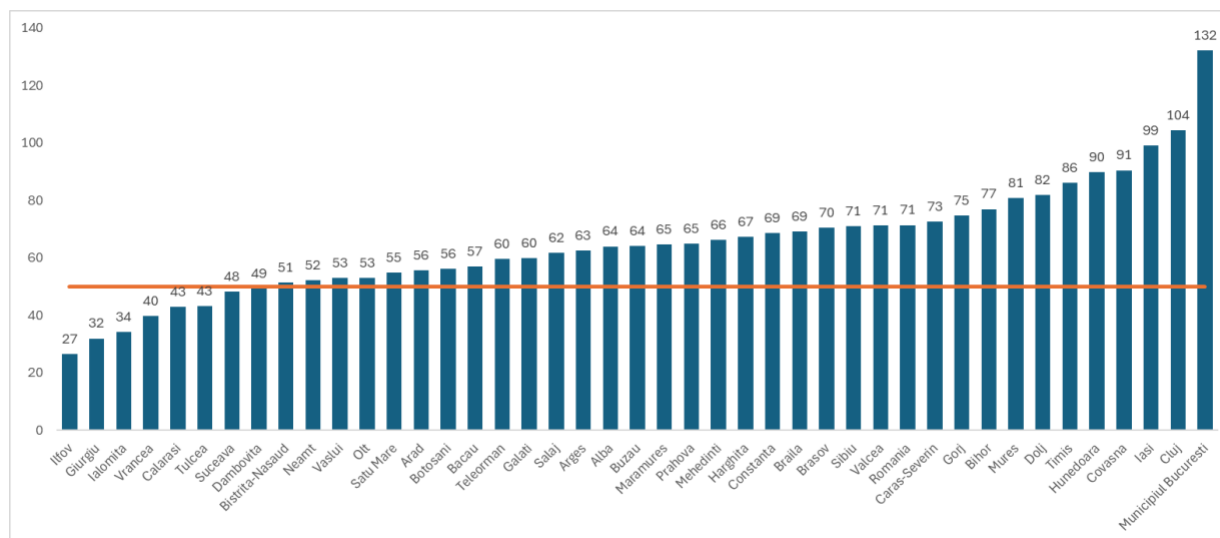


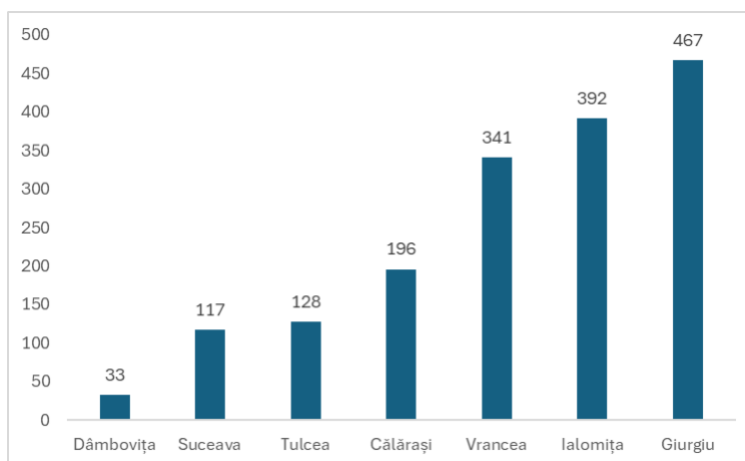
Figure 15 shows the rate of hospital beds per 10,000 inhabitants for counties in Romania, compared to the European Union average (orange horizontal line). Several counties have a hospital bed rate below the EU average, of 50 beds per 10,000 inhabitants. In the case of Romania, Ilfov (27), Giurgiu (32), Ialomița (34), and Vrancea (40) have the lowest values, even if Ilfov county can rather be considered to be included in the operational area of Bucharest. These counties face extremely limited hospital capacity, which may indicate reduced access to medical services for residents. Also, Tulcea (43), Călărași (43), Suceava (48) and others also have rates below the EU average but are closer to this threshold.

Figure 15. Rate of hospital beds per 10,000 inhabitants compared to the EU average



Source: Authors' calculations based on INS, European Commission and OECD data

Figure 16. Number of beds needed in deficit counties to reach the EU average



Source: Authors' calculations based on INS, European Commission and OECD data

Estimates of potential economic gains from increasing prevention and investments in the health sector

Investing in health infrastructure is a critical factor in driving economic growth, both in the short and long term. Studies demonstrate a positive link between improving health infrastructure and GDP growth, and investments in the health sector not only improve the health status of the population, life expectancy of healthy years, but also increase labor productivity, contributing sustainably to long-term economic growth (potential GDP) (Yamey et al., 2017).¹⁴

At the same time, a high level of public health also generates additional tax revenues (lack of sick leave or early retirement from working life), increased tax revenues from CAS, income tax and VAT, maintaining a healthy and productive population that can contribute to the economy and consumption.

To estimate the losses caused by premature mortality from preventable causes, **the human capital model** was used. This model quantifies both the lost labor productivity, i.e. the gross value added (GVA) in GDP - which was no longer generated - and the tax revenues that were no longer collected (income tax, VAT and social contributions) due to premature mortality. The formula for estimating the impact on GDP is:

$$GVA_t = L_t * H_t * W_t$$

Where:

L= number of patients/people

H = number of hours worked annually W = average hourly productivity

t = period

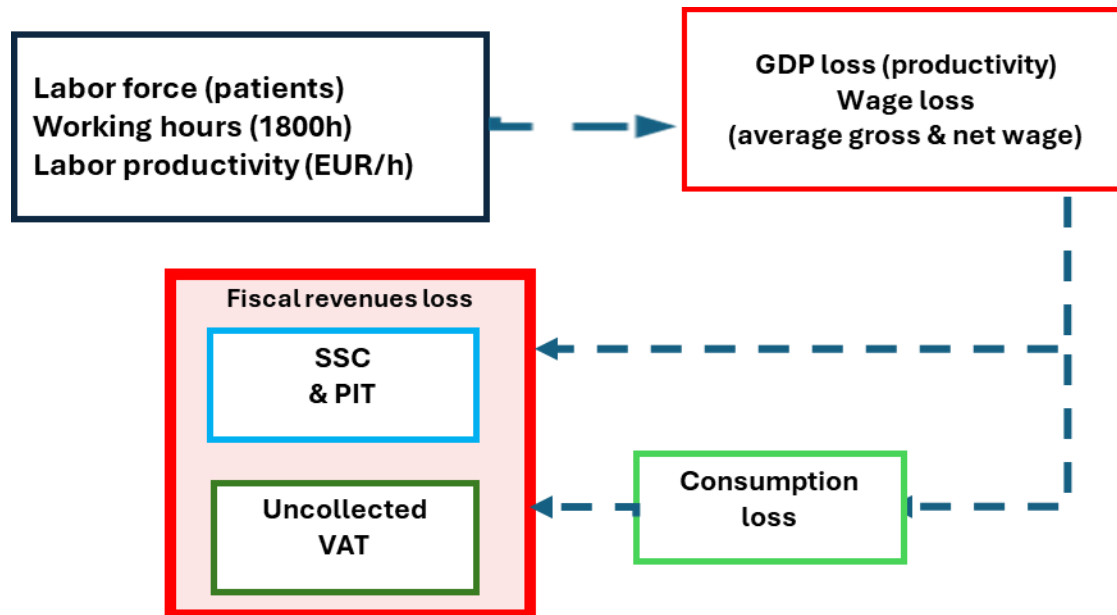
Total annual number of hours (T) = Average number of working hours per week (H)* Average number of working weeks per year (W)

Average hourly labor productivity (i.e. GVA - gross value added obtained in one hour) per employee in EUR

¹⁴ Yamey, G., Beyeler, N., Wadge, H., & Jamison, D., 2017. [Investing in health: the economic case. Report of the WISH Investing in Health Forum 2016].. Salud pública de México, 59 3, pp. 321-342 . <https://doi.org/10.21149/8675>.

Productivity losses = GVA per employee * Total annual number of hours (T) * Total number of people/premature deaths (P)

Figure 17. The Human Capital Model



To estimate the losses of GVA and tax revenues for the period 2015-2021, the following data were used:

- *hourly labor productivity calculated for each year*
- *the number of hours worked annually,*
- *the premature mortality rate from treatable and preventable causes for Romania and the EU,*
- *average net annual salary and average gross annual salary, gross-net difference*
- *average propensity to consume at household level of 86.5% of total income*
- *the implicit VAT rate of 14.2% according to the Fiscal Council*
- *Average annual exchange rate EUR/LEU*
- *Annual nominal GDP*

At the same time, the active population (i.e. those aged between 18 and 65 years) was considered according to NIS data as 67% of the total population. Thus, for premature mortality from treatable and preventable causes, considering only the active population, we have the situation presented in *Table 1*.

Table 1 – Premature mortality among the active population RO – EU (2015-2021)

Indicator / Year	2015	2016	2017	2018	2019	2020	2021
Total population, of which:	19875542	19760585	19643949	19533481	19425873	19354339	19229519
Active population (67% of the total population)	13316613	13239592	13161446	13087432	13015335	12967407	12883778
Premature deaths per 100,000 inhabitants (RO)	523	518	513	518	505	593	695
Premature deaths per 100,000 inhabitants (EU)	262	256	252	250	243	272	294
Difference in premature deaths between RO and EU per 100,000 inhabitants	261	263	261	268	262	322	401
Premature deaths in total working population, of which:	69645	68610	67504	67744	65703	76923	89516
Treatable mortality:	27826	27538	27110	27566	27155	30481	32818
Preventable mortality:	41818	41072	40394	40177	38548	46441	56699

Source: INS, European Commission, Eurostat and OECD, authors' calculations

It is very important to note that the data on premature mortality, which were extracted from the OECD and Eurostat reports, do not consider premature mortality caused by COVID-19.

However, a considerable increase is observed in Romania since 2020, namely, from an average of about 67800 premature deaths from treatable causes in 2015-2019 to more than 89,500 at the end of 2021 (+21700 new cases), the main cause being the overcrowding of hospitals with COVID cases, and the failure to treat other conditions that required urgent attention.

Further, the analysis considers two perspectives:

1. A historical one on the economic effects of premature mortality in the period 2015- 2021, when the latest data on mortality indicators in the Eurostat and OECD databases are available.
2. A forthcoming one, which considers three scenarios regarding the evolution of premature mortality from treatable and preventable causes:
 - the scenario in which **No measures** are applied, and current trends continue (maintaining the CAGR of 1.7% per year for treatable causes and 2.9% per year for preventable causes)
 - the scenario in which Romania improves prevention and reduces the premature mortality rate (a CAGR of 5.1% decrease per year in the next 10 years) – **Scenario 1 - Better prevention**
 - the scenario in which Romania reaches the level of the EU average in a period of 10

years (a CAGR of 7.7% decrease per year in the next 10 years to reach the overall EU average) - **Scenario 2 - Filling the gap with the EU average**

In the case of the latter two scenarios, we estimated both the benefits generated by public intervention in terms of prevention and the costs generated by such a measure, taking into account the situation in the European Union and the existing relationships between prevention expenditure made by Member States and premature mortality rates among EU Member States.

In terms of expenditures (investment) dynamic and to calculate the proper elasticities, a panel model with weighted effects was developed whose result showed that an increase in different categories of health expenditures¹⁵ per capita by 1 p.p. will generate a reduction in the premature mortality rate by 0.36 p.p. This quantitative estimate was based on the panel model developed for the period 2012-2021 and the coefficient of elasticity resulted from the model was statistically significant (p=0.0016).

Estimation Command:

```
=====
LS(?,CX=F) LOG(D(MORTALITYRATE)) C LOG(D(EXPENDITURES))
```

Estimation Equation:

```
=====
LOG(D(MORTALITYRATE)) = C(1) + C(2)*LOG(D(EXPENDITURES)) + [CX=F]
```

Substituted Coefficients:

```
=====
LOG(D(MORTALITYRATE)) = 1.21186795675 + 0.362944826834*LOG(D(EXPENDITURES)) + [CX=F]
```

¹⁵ Here the health expenditures considered were based on the Eurostat Classification of health care functions - SHA 2011 - Health care expenditure by function [hlth_sha11_hc custom_13887164]. The sums were expressed in EURO per capita for the period 2012-202, annual frequency, and included:

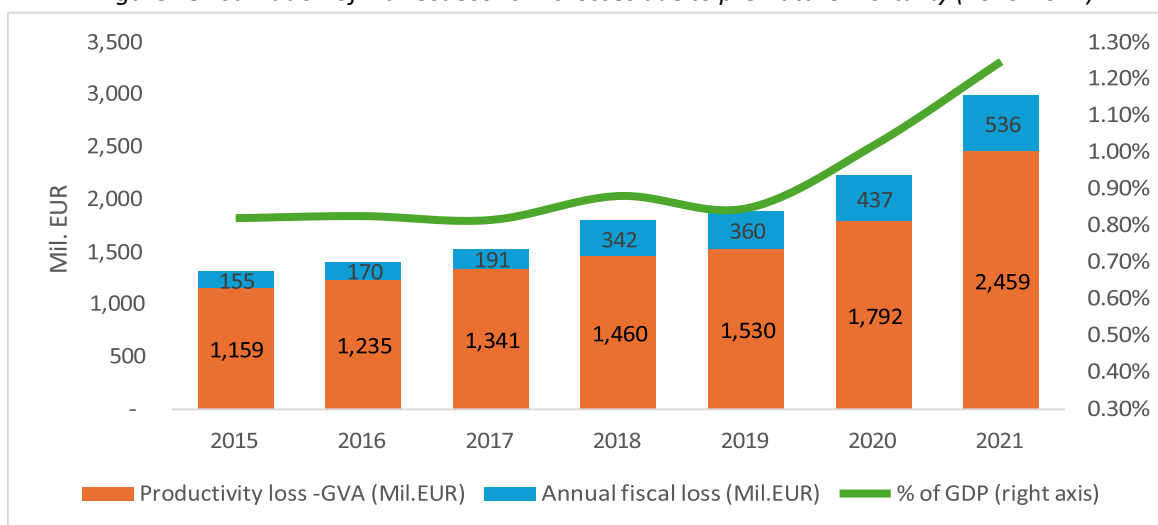
- (i) Preventive care
- (ii) Governance and health system and financing administration
- (iii) Other health care services unknown
- (iv) Long-term care (social)

The historical perspective. The economic losses due to the lack of prevention and access to healthcare services

The fiscal revenues that were no longer obtained because of deficiencies in prevention and access to health services (reflected by mortality from treatable and preventable causes) show an adverse evolution. Our estimates show that the fiscal losses increased significantly after 2019, while the gap with the EU average widened. At the same time, the estimation of the total indirect costs - which include both productivity (gross labor productivity) losses and tax revenues not collected to the state budget - also expanded.

Thus, the estimated values for the uncollected fiscal revenues due to inactivity (VAT, social security contributions, health insurance and personal income tax) increased steadily between 2015 and 2021, cumulating almost **2.2 billion EUR** over the entire period, while in the case of the GDP loss the amount was approximately **11 billion EUR**. The cumulative value of the indirect economic losses (fiscal losses and productivity) for the entire period 2015-2021 was close to **6.5% of GDP**. However, eliminating the impact of COVID-19, the losses in 2020 and 2021 are smaller with 1.2 billion EUR (with 346 million EUR in 2020 and 850 million EUR in 2021). This difference post-2020 suggests that while long-term economic losses due to preventable mortality were already a pressing concern, the pandemic exacerbated these vulnerabilities and there is an urgent need for healthcare investments, particularly in preventive measures and system resilience, to mitigate future shocks and sustain economic stability.

Figure 18 Estimation of indirect economic losses due to premature mortality (2015-2021)

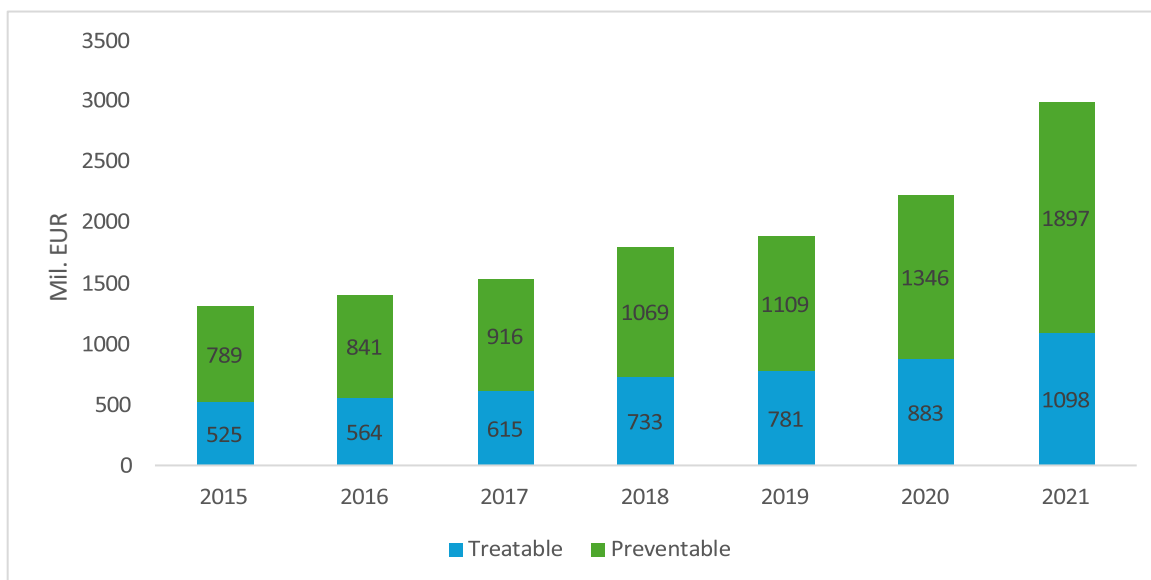


Sources: author's calculation, Eurostat, European Commission, INS

By cause, the largest contribution to the economic losses in 2015-2021 are derived from the

preventable causes of the premature mortality, 7.97 billion EUR for the entire period (including COVID-19 effect). It increased especially after the COVID-19 period, reaching almost 1.9 billion EUR in 2021.

Figure 19 Estimation of indirect economic losses by causes of premature mortality (2015-2021)



Sources: author's calculation, Eurostat, European Commission, INS

The theoretical model of the forecast regarding investment in prevention

Regarding the hypotheses considered in the model to forecast the effects and implications of investment in prevention and health access, we illustrate in Figure 20 below the theoretical development of benefits and costs (represented by the B/C ratio) of prevention expenditures in the healthcare sector over time with an effect on the premature mortality rate. Since prevention programs reduce costs by minimizing future burdens (e.g., disease treatment), ensuring a strong medium-term focus is key to long-term cost control.

Due to the data consideration and the difficulty to split the expenditures in prevention measures, we considered all three types of prevention categories as an aggregate approach in order to generate a comprehensive investment health strategy that not only reduces healthcare costs and mortality rates on the medium-long term, but also empowers individuals to lead healthier lives by preventing, detecting, and managing diseases at different stages. The timeline is divided into four periods, each with distinct characteristics regarding the ration between benefits and costs associated with preventive expenditures per capita.

For the **Initial Period (1–3 years)**, Benefits < Costs (B/C ratio is below 1). This is a period with high expenditures due to capital investments necessary to improve access to healthcare infrastructure and allocating resources to prevention strategies. This phase represents the startup cost of prevention programs. Since investments take time to yield results, initial costs outweigh the benefits, and the focus will be on building infrastructure, training, and implementing programs.

In the **Medium Term I (4–6 years)** the economic Benefits are higher than Costs (B/C ratio exceeds 1). In this phase, the ratio is increasing, showing significant returns on prevention investments. More resources are directed toward prevention, leading to measurable improvements, such as reductions in premature mortality. This is the growth phase, where investments in prevention start paying off. The compounding effects of earlier expenditures lead to greater health improvements and economic returns.

Thus, the prevention measures become more efficient, and their impact is clearly observable in premature mortality rates and economic indirect effects (GDP contribution, fiscal revenues).

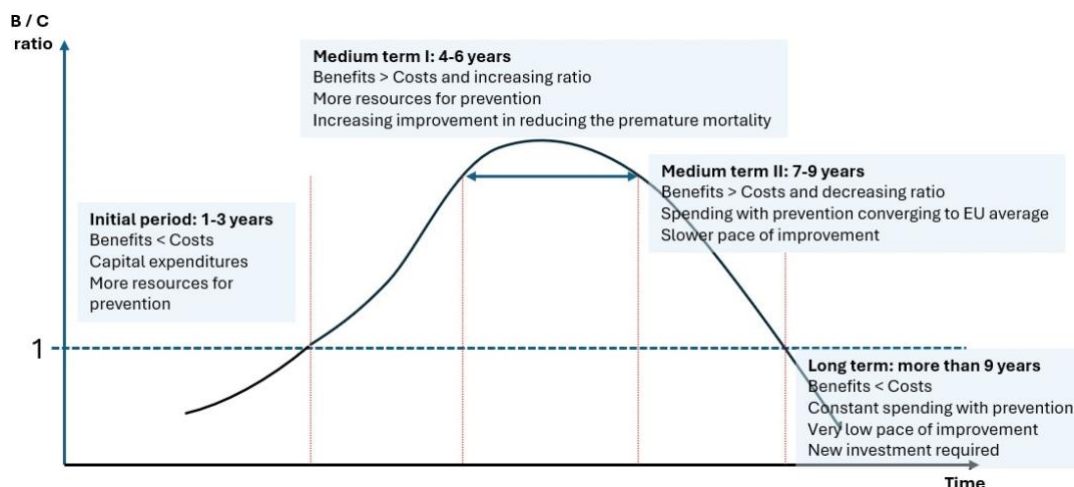
The third phase, **Medium Term II (7–9 years)**, the Benefits are larger than Costs (B/C ratio remains >1, but it starts decreasing. There will be a convergence process of spending on healthcare prevention per capita with the EU average, but the marginal improvement slows down amid the diminishing returns of prevention investments. While benefits still outweigh costs, the marginal benefit of additional spending decreases. In other words, this slowdown reflects that many "easy wins" have already been achieved, and additional gains require more effort or resources.

Lastly, the **Long Term (more than 9 years)** is characterized by Benefits below the Costs (B/C ratio falls below 1 again), constant spending on prevention, but the pace of improvement is very slow. Also, new investments are required to continue achieving meaningful benefits. This phase reflects stagnation in the effectiveness of current prevention strategies. The healthcare system reaches a point where additional improvements are difficult to achieve without innovation or substantial new investments. Maintenance costs and diminishing returns may outweigh the benefits, but also it will be needed a technological advancement.

Moreover, providing preventive healthcare to remote or underserved areas may involve higher transportation, logistical, and personnel costs. Also, as the prevalence of a disease or risk factor decreases due to successful prevention, the scope for further risk reduction narrows. The remaining risks may be harder to address or beyond the reach of prevention efforts. For example, if a community achieves a low obesity rate, further reductions may require intensive individual-level interventions, which are less cost-effective than earlier population-wide strategies. In this regard, the healthcare prevention system may require innovation, policy

adjustments, or reinvestment to maintain effectiveness and to overcome diminishing returns.

Figure 20 The theoretical evolution of benefits and costs ratio during time



Source: authors

Subsequently, as we mention above, we carried out three scenarios (**0-No measures**, **1-Better prevention** and **2-Filling the gap compared to the EU average**, as well as the economic impact on the reduction of indirect costs (productivity and tax revenues from the SSC, income tax and VAT) as a result of encouraging prevention to varying degrees for each of the three proposed scenarios.

In the first scenario (**0-No measures**), we considered maintaining the current situation in which no interventions are made to support prevention, the treatable and preventable mortality rate increasing from year to year at a rate determined by the average annual growth rate in the period 2015-2021, respectively 1.7% and 2.9% per year.

In the second scenario (**1-Better prevention**), the impact was calculated based on the assumption that there will be a gradual improvement of the primary and secondary prevention system over a period of 10 years, and the number of active people who fall under the incidence of premature mortality from treatable and preventable causes is reduced annually by 5.1% per year, to 392 people per 100,000 inhabitants.

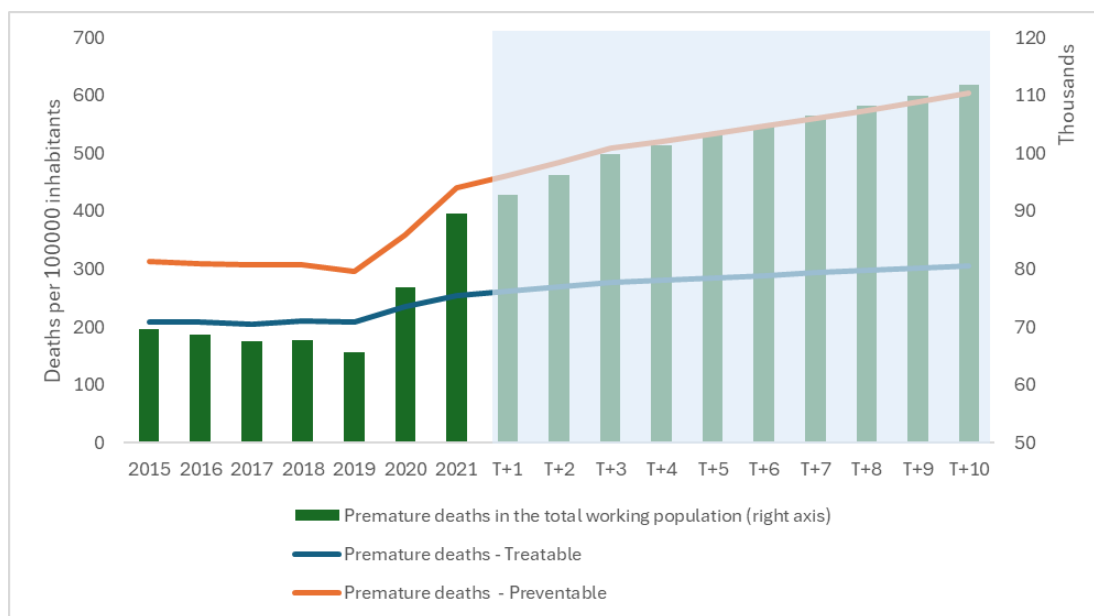
In the last scenario (**2-Filling the gap compared to the EU average**) we assumed a convergence of the premature mortality rate with the EU average in 5 years, respectively an average annual decrease in the number of people by 7.7%, up to a rate of 289 people per 100000 inhabitants.

No measures scenario – maintaining the current situation

The baseline scenario supports maintaining the current situation with **no measures** applied to improve the healthcare system. If nothing happens in terms of investments in prevention and increasing access to health services, the upward trend of the preventable and treatable premature mortality rate will generate increasing economic costs, both in terms of GDP and in terms of tax revenues not collected to the state budget.

To be noted that the COVID-19 period (2020-2021) was retained in the baseline scenario despite being an extraordinary event because it has had long-term structural effects on public health, mortality trends, and healthcare system resilience. Excluding this period might underestimate the real trajectory of premature mortality, as the pandemic has revealed critical weaknesses in healthcare systems, exacerbated existing health disparities, and created lasting impacts on population health. Here we have in mind that the pandemic contributed to excess mortality, worsened chronic conditions due to delayed treatments for other diseases. The systemic disruptions caused by COVID-19—such as overwhelmed hospitals, deferred preventive care, and delayed diagnoses—may have set a new baseline for mortality trends, making it unrealistic to ignore these effects at least on a short-medium term. However, starting with the T+4 period from the model the increase rate in premature mortality was halved to better calibrate the specifications of the model in a more realistic manner. By incorporating this adjusted trajectory, the model balances realism with caution, allowing for a more accurate projection of premature mortality under the baseline scenario (avoiding an overestimating problems).

Figure 21 Forecasting premature mortality rates maintaining the current conditions



Sources: author's calculation, Eurostat, European Commission, INS

In this context, for the next 10 years, the estimated costs based on the model expressed in current prices are on average 2 billion per year for treatable cases, and more than €3.79 billion per year for preventable cases. See below (Table 2) the detailed indirect economic effects of the two sources of premature mortality for each year.

Table 2 Estimation of the indirect economic costs in **No measure** scenario

Total ACTIVE persons		T0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10
Treatable		32818	33600	34402	35222	35559	35899	36243	36590	36940	37293	37650
Preventable		56699	59219	61851	64601	65884	67193	68528	69890	71279	72695	74139
Total		89516	92819	96253	99822	101443	103093	104771	106480	108218	109988	111790

Indirect costs		T0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10
Treatable	Fiscal costs (mil.EUR)	196	232	274	324	378	441	514	600	701	819	956
	GDP costs (mil.EUR)	902	992	992	1200	1200	1411	1530	1659	1800	1871	1946
	Total	1098	1224	1266	1524	1578	1852	2044	2260	2501	2690	2902

Indirect costs		T0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10
Preventable	Fiscal costs (mil.EUR)	339	409	493	594	700	825	973	1147	1353	1596	1883
	GDP costs (mil.EUR)	1558	1748	1961	2200	2410	2641	2893	3170	3472	3647	3831
	Total	1897	2157	2454	2795	3111	3466	3866	4316	4825	5243	5714

Overall losses		T0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10
Treatable & preventable	Fiscal costs (mil.EUR)	536	641	767	919	1078	1266	1487	1747	2054	2414	2839
	GDP costs (mil.EUR)	2459	2739	2953	3400	3610	4052	4423	4829	5272	5519	5777
	Total	2995	3380	3720	4318	4688	5318	5910	6576	7326	7933	8615

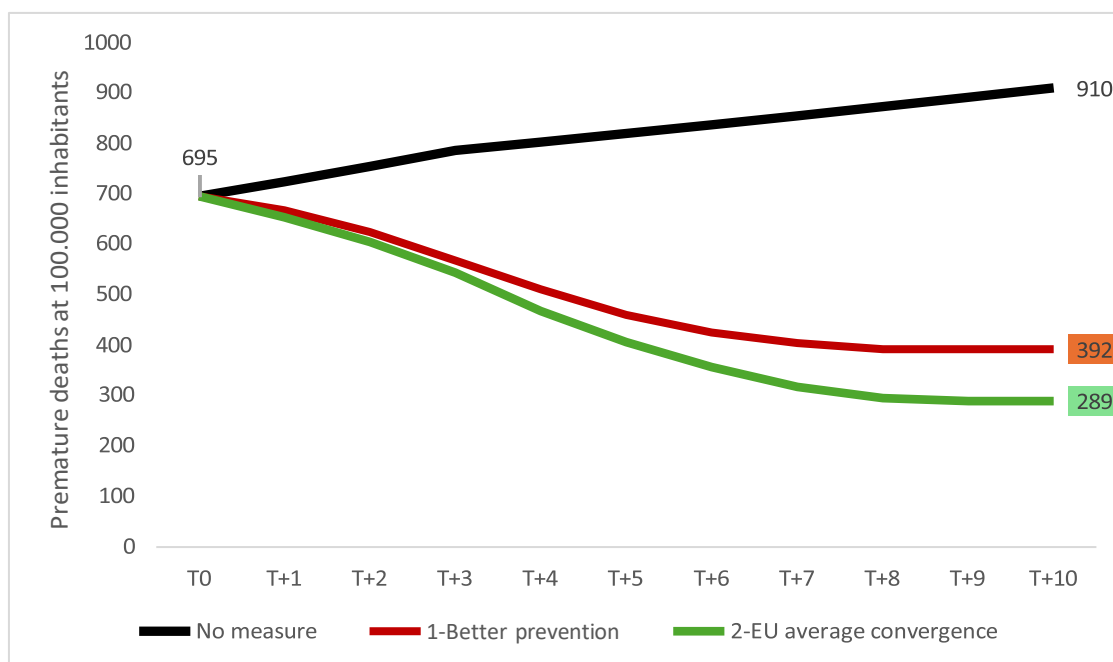
Sources: author's calculation, Eurostat, European Commission, INS

Intervention scenarios – improving the prevention

As we mentioned above, we considered two scenarios regarding the prevention policies and better access to medical services, depending on their impact on the premature deaths rate. In the first scenario, we consider a gradual improvement in the prevention policies with a decrease in the premature mortality rate from the current value of 695 premature deaths per 100.000 inhabitants to 392, representing a 44% decrease (see Figure 22 below for the trajectory).

For the second scenario, the objective is more optimistic. The mortality rate is expected to reach the EU average rate. In this case, the target is to decrease the value of premature deaths per 100000 to 289, representing a decrease of more than 58% in the period T+10.

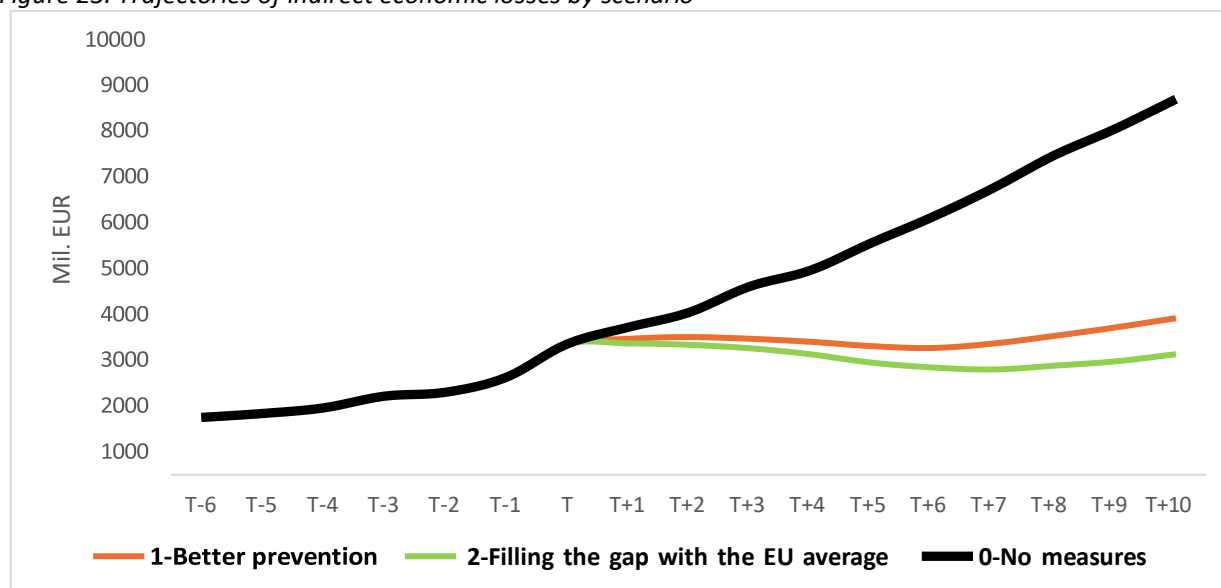
Figure 22 Premature mortality rate development by scenario



Sources: author's calculation, Eurostat, European Commission, INS

From the perspective of indirect costs at the level of the economy, there is a considerable impact in the case of all scenarios, but prevention interventions make a big difference, regardless of the scenarios in which we find ourselves.

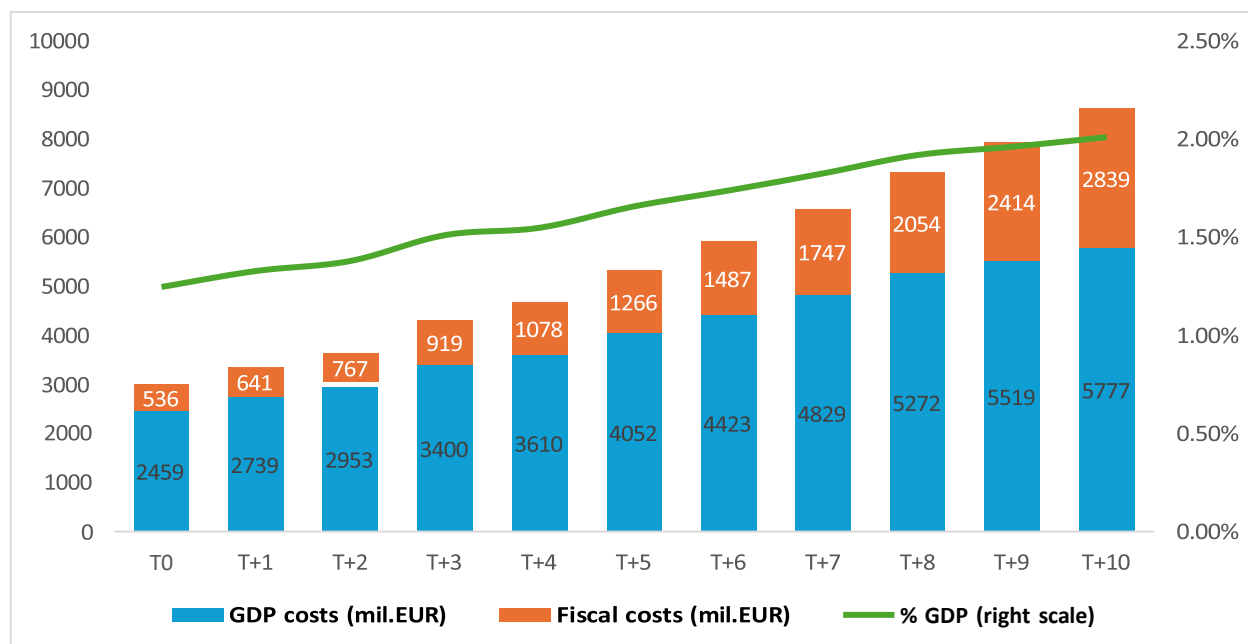
Figure 23. Trajectories of indirect economic losses by scenario



Sources: author's calculation, Eurostat, European Commission, INS

If no action is taken, the increase in indirect economic costs accelerates to an annual average of over 5.77 billion EUR in the next 10 years of the estimate (57.8 billion EUR cumulatively for the entire period). Of this value, most of it is represented by the loss of GDP, over 4.25 billion EUR annually, and approximately 1.52 billion EUR represents the average annual loss of revenues from VAT, CAS and PIT. All these values are expressed in current prices, without the application of a discount rate (Figure 23).

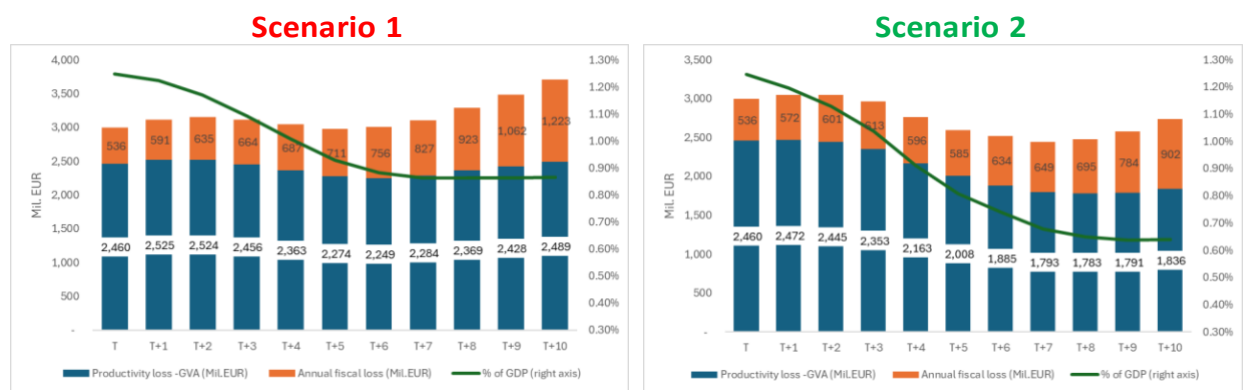
Figure 23 Indirect economic losses in No measure scenario



Sources: author's calculation, Eurostat, European Commission, INS

In the case of the other two scenarios, the losses end up being much lower amid prevention policies and the decrease in premature mortality rates per 100,000 inhabitants. In these scenarios, the cumulative economic losses in GDP and tax revenues reach 32 billion EUR in the scenario with improved prevention measures (or an annual average of 3.2 billion) and €19.9 billion in the scenario in which in Romania the evolution converges towards the premature mortality rate corresponding to the EU average (or an annual average of €2.7 billion) (see Figure 24).

Figure 24 Indirect economic losses by scenarios



Sources: author's calculation, Eurostat, European Commission, INS

The differences between the two scenarios are significant, highlighting the need for prevention policies to reduce premature mortality rates from both treatable and preventable causes, but also the economic benefits they can bring – beyond the socio-psychological impact they had on patients' individual life.

To ensure higher relevance in assessing the economic benefits of health investments, both nominal (current price) values and present values were calculated using a 5% discount rate, a standard approach recommended for healthcare economic evaluations¹⁶. The discount rate reflects the rate at which future benefits are adjusted to their present-day equivalent, allowing for a more accurate comparison of long-term investment impacts.

By applying the time value of money, the study accounts for the fact that a Euro earned in the future is worth less than a euro today due to inflation, opportunity costs, and risk factors (see

¹⁶ Hultkrantz L. Discounting in economic evaluation of healthcare interventions: what about the risk term? Eur J Health Econ. 2021 Apr;22(3):357-363. doi: 10.1007/s10198-020-01257-x. Epub 2021 Feb 22. PMID: 33616779; PMCID: PMC7954734.

Table 3).

This methodology provides a more precise estimate of the economic benefits of investing in healthcare, ensuring that long-term fiscal and economic gains are realistically assessed in today's financial terms. This approach allows policymakers to make more informed decisions, prioritizing investments that offer the highest net present value (NPV) and greatest return on public spending overtime.

In other words, the present value estimates refer to the application of the time value of money that discounts the future cashflow to arrive at its present-day value. It is obtained based on the following formula:

$$PV = FV \frac{1}{(1 + r)^n}$$

PV = present value

FV = future value

R = rate of return

N = number of periods

Then, the total sum of discounted cash flows is the sum of the annual cash flows adjusted with the discount factor in every year. The discount factor increases as the number of periods is larger, while the annual value of the cash flow decreases as the terminal value is more distant in time from the initial year.

$$DCF = \frac{CF_1}{(1 + r)^1} + \frac{CF_2}{(1 + r)^2} + \dots + \frac{CF_n}{(1 + r)^n}$$

Terminal Value

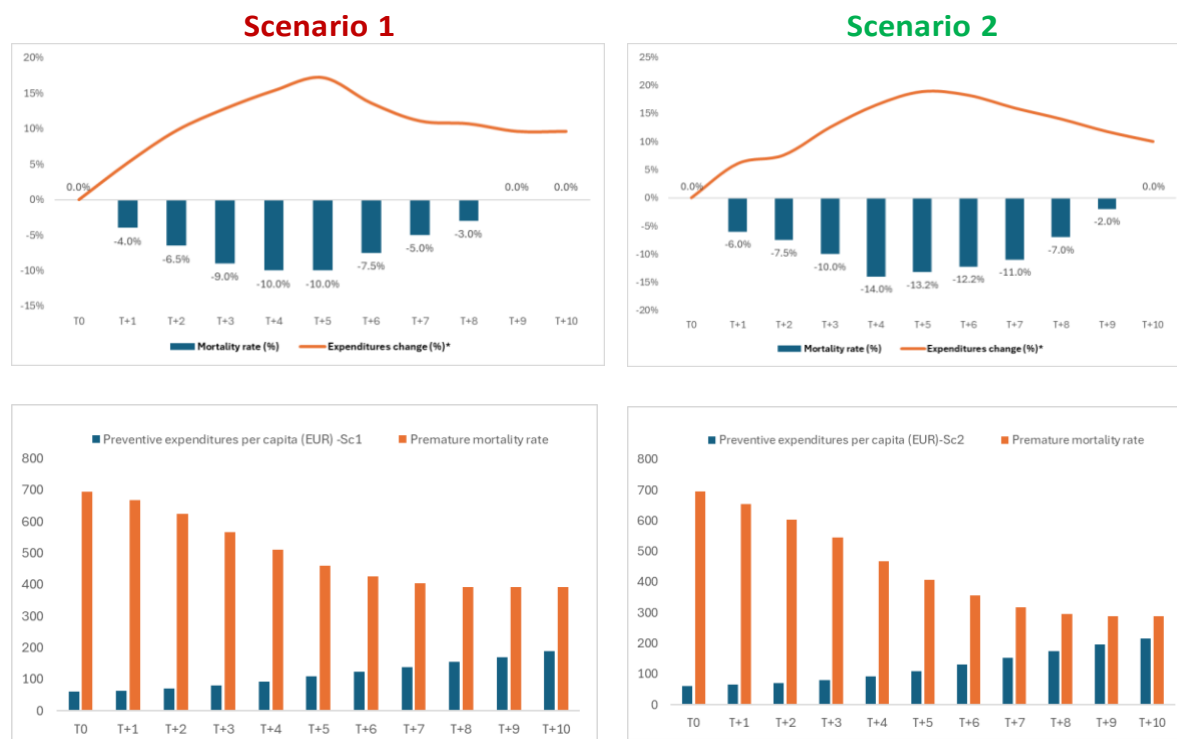
CF = Cash Flow

r = Discount Rate (WACC)

The investment needs and economic gains

The economic model also analyzed the dynamic of public expenditures, in particular the value of investments necessary to generate a reduction in the premature mortality towards the reference rate in every scenario (to 392 at 100.000 inhabitants for **Scenario 1** and to 289 at 100000 inhabitants for **Scenario 2**).

Figure 25 Expenditures and mortality rate annual changes

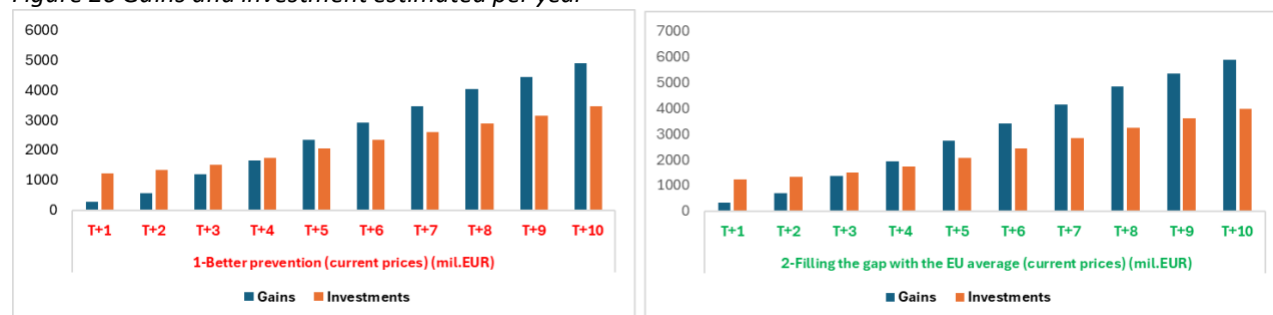


Sources: author's calculation, Eurostat, European Commission, INS

The estimated values for economic gains (productivity and fiscal revenues) in current prices have a cumulative value over the horizon of the 10 years of analysis of 25,7 billion EUR in the **1-Better prevention** scenario compared to the **0-No measure** scenario, respectively 2,57 billion EUR annually.

In scenario **2-Filling the gap compared to the EU average**, cumulative value of economic gains compared to scenario **0-No measures** are of 30,6 billion EUR for the entire period in current prices, or more than 3 billion EUR annually (see Figure 26 and Table 3 for details).

Figure 26 Gains and investment estimated per year

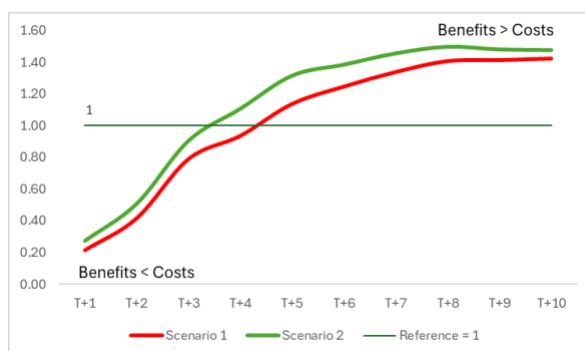


Sources: author's calculation, Eurostat, European Commission, INS

The ratio between benefits and costs (investments) explains how the expected economic impact will develop and is strongly related to the theoretical model described in Figure 20, with the most important economic effects on the medium term. For the first 3-4 years the investment is expected to increase more than the economic benefits, as more resources are allocated to preventive healthcare measures, but the ratio is expected to remain above 1 (benefits > costs) after year 4, with a more abrupt increase in the second scenario, as the efforts involved to reduce the premature mortality rate are higher. However, after the year 8 the marginal impact of increasing expenditure with prevention is expected to decrease as more structural changes are needed in order to reduce the mortality rate as we explained in the theoretical framework section.

Figure 27 Benefits / cost ratio for every intervention scenario (current prices)

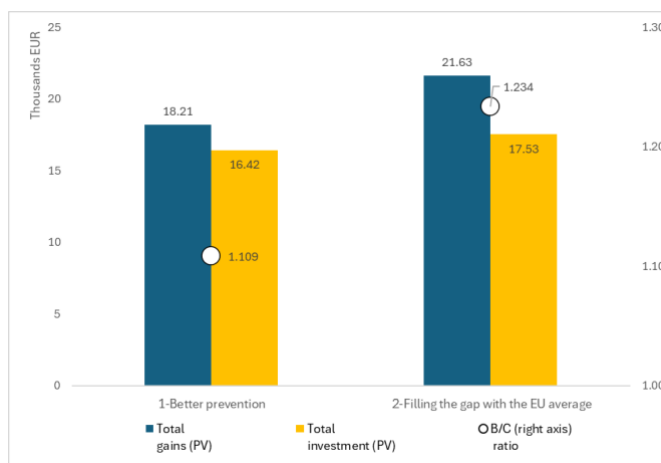




Sources: author's calculation, Eurostat, European Commission, INS

In terms of present values (with an annual 5% discount rate on the future cash flow), the report between the indirect economic gains and the investment needs (costs) is considerably above 1 regardless of the scenario. In the first scenario, the return rate is close to 11%, while in the second scenario the gains are larger, with a net return rate of 23.4% in the T+10 period (see Figure 28 for the entire period and Table 3 for detailed information by year).

Figure 28 Gains and investment needs by scenario compared with No intervention situation (Present Values)



Sources: author's calculation, Eurostat, European Commission, INS; B-Benefits, C-Costs (investments)

To obtain better performance significant investment is needed and the current expenditure per capita should converge with the EU average. According to our estimation based on the capacity of Romania to allocate more resources from healthcare spending overall to preventive policies, the increase should be at least close to 40%-45% of the European Union average, including better administrative and governance (expenditures regarding preventive care, governance and health system and financing administration, long-term care (social) and other health care services¹⁷), from the current level of 12-13% of the EU average (see Table 3 below).

¹⁷ Based on the Eurostat statistics regarding the health care expenditure by function, code: hlth_sha11_hc custom_13887164

Table 3. Gains and investment needs by scenario compared with No intervention situation (T+10 period)

Period	1	2	3	4	5	6	7	8	9	10			
Total GDP & fiscal Gains (mil.EUR) - current prices	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	Total gains	Total investment	B/C ratio
1-Better prevention	265	561	1199	1638	2333	2905	3465	4034	4442	4903	25746	22290	1.155
2-Filling the gap with the EU average	335	674	1353	1929	2725	3392	4134	4848	5358	5877	30624	23982	1.277
Discount rate for PV: 5.0%													
Total GDP & fiscal Gains (mil.EUR - present values)	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	Total gains	Total investment	B/C ratio
1-Better prevention	252	509	1036	1348	1828	2168	2463	2730	2863	3010	18207	16424	1.109
2-Filling the gap with the EU average	319	611	1168	1587	2135	2531	2938	3281	3454	3608	21632	17532	1.234

Sources: author's calculation, Eurostat, European Commission, INS

In terms of fiscal losses (gains) during the analyzed period, the fiscal losses decrease significantly in both **Scenario 1** and **Scenario 2**. At the end of the period T+10 the fiscal losses are lower with almost 50% in **Scenario 1** with better prevention comparative with **No measure** scenario, while in **Scenario 2**, when the premature mortality rate decreases toward the EU average, the losses are 2.3 times lower than **No measure** scenario.

Also, Table 4 presents the fiscal gains estimated for **Scenario 1** and **Scenario 2** from consumption (VAT), social security contributions, health fund contribution and personal income tax. Compared with the **No measure** scenario, for the entire period of 10 years, the cumulative gains are estimated at 7.1 billion EUR and, respectively, 8.5 billion EUR.

Table 4 Fiscal losses and gains estimated against No measure scenario (current prices) – by period

Mil. EUR - current prices	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	Total
Fiscal losses in No measure scenario	641	767	919	1078	1266	1487	1747	2054	2414	2839	15212
Fiscal losses in S1 scenario	591	635	664	687	711	756	827	923	1062	1223	8077
Fiscal losses in S2 scenario	572	601	613	596	585	634	649	695	784	902	6630
Differences (Gains)											
Fiscal gains in scenario 1	50	133	255	392	556	731	921	1131	1352	1616	7135
Fiscal gains in scenario 2	68	166	306	482	681	853	1098	1359	1631	1936	8582

Sources: author's calculation, Eurostat, European Commission, INS

Box 1. Investment effort

In a minimal investment scenario, which would cover only the necessary investment effort in the problematic counties below the EU average in terms of hospital beds per 10,000 inhabitants presented in Figure 16 (Dâmbovița, Suceava, Tulcea, Călărași, Vrancea, Ialomița, Giurgiu), we estimate a need for 8 hospitals to cover a number of 200-210 beds per hospital. **At an average cost of €75 million per hospital, the total amount that would be required to make the initial investment and equipment would be around €600 million.**

From a strict financial point of view and considering the uncollected tax revenues, estimated for the period 2015-2021, this investment effort would be recovered in a period of 5 years after the commissioning of the hospitals, by reducing the mortality rate from treatable and preventable causes and keeping longer these people in the active workforce.

Conclusions

1. The annual health expenditure per capita in Romania is the lowest in the European Union, 1627 PPS per inhabitant in 2022 compared to 3685 PPS in EU Member States, and only 5.8% of GDP compared to 10.4% EU average (latest available data from [Eurostat database](#)). At the same time, the structure of expenses by practice areas, where 44% of the total expenses represent hospital services, shows an excessive centralization on the hospital and deficient in prevention and outpatient care.
2. The risk factors for public health in Romania are more pronounced than the EU average, starting from an unhealthy diet to a higher consumption of tobacco and alcohol and lack of physical activity. All these factors put additional pressure on the health system because they contribute to the increase in the number of chronically ill people suffering from cardiovascular diseases, diabetes, respiratory diseases, obesity, and various types of cancer.
3. Romania has a much lower rate of healthy life expectancy compared to the EU and the third highest DALY (Disability – adjusted life years) coefficient, after Bulgaria and Latvia. This coefficient is correlated with investments in prevention.
4. The hospital infrastructure (number of hospitals and number of beds) is concentrated in a few large university centers, which attract and retain most of the medical staff. Because of this, although at national level we have a higher average number of beds than the EU, the rate of people who declare that they have unmet medical needs is almost double that of the EU, which denotes an inefficient geographical distribution of health infrastructure and areas with limited access to medical services.
5. There are seven counties, excluding Ilfov County, which have a number of hospital beds below the European Union average and where patients are forced to travel longer distances to benefit from medical services. In order to improve this situation and bring the counties to the level of the European average, a total of about 1700 more beds are needed in these seven counties.
6. Moreover, the challenge of insufficient hospital bed capacity in certain regions – due to either low infrastructure capacity or overcrowding - necessitates a paradigm shift in healthcare delivery, emphasizing ambulatory and primary care services. Rather than relying solely on the expanding inpatient hospital infrastructure, a strategic approach that strengthens outpatient and primary care services can provide a sustainable, cost-effective solution while improving patient outcomes.
7. Studies show that investment in primary and ambulatory care settings reduces the financial burden on healthcare systems. Thus, redirecting resources to preventative and early-stage interventions through general practitioners, community health centers, and ambulatory clinics can alleviate pressures on tertiary hospitals (Kringos et al., 2015). Also, countries with strong primary healthcare systems report lower overall healthcare costs and improved patient satisfaction (OECD,

2021). A study by Atun et al. (2016) demonstrated that nations prioritizing primary care experience better management of chronic diseases such as diabetes and hypertension, leading to reduced hospital admissions.

8. The avoidable mortality rate (both from treatable and preventable causes) is approximately double in Romania compared to the EU. This situation has a direct impact on the labor force and therefore on the Gross Value Added in GDP as well as on tax revenues.

9. The estimated uncollected fiscal revenues due to premature mortality (VAT, social security contributions, health insurance and personal income tax) increased steadily between 2015 and 2021, cumulating almost **2.2 billion EUR** over the entire period, while in the case of the GDP loss the amount was approximately **10.3 billion EUR**. The cumulative value of the indirect economic losses (fiscal losses and productivity) for 2015-2021 was close to **6.5% of GDP**.

10. We considered two scenarios regarding the prevention policies and better access to medical services, depending on their impact on the premature deaths rate in the following 10 years. If no action is taken, the increase in indirect economic costs accelerates to an annual average of over 5.8 billion EUR (current prices) in the next 10 years of the forecast (and 57.8 billion EUR cumulatively for the entire period). The annual average of losses is closed to a half of the Ministry of Education and Research budget (12 billion EUR in 2024¹⁸), a quarter of the Ministry of Health budget (20 billion EUR in 2025¹⁹) or the equivalent of Romanian government expenditures with European non-reimbursable funds in 2024²⁰ (5.9 billion EUR).

11. In the first scenario, **with improved prevention measures** comparative with no intervention scenario, the cumulative economic gains in terms of GDP and tax revenues reach 25.7 billion EUR (or an annual average of 2.57 billion EUR in the next ten years).

12. In second scenario, in which in Romania **the evolution converges towards the premature mortality rate corresponding to the EU average**, the economic indirect gains (productivity and fiscal revenues) relative to no measures implemented scenario are about 30 billion EUR (or 3 billion EUR per year).

13. In terms of fiscal gains depending on the scenario, the average additional fiscal revenues at the state budget are around 713 million EUR per year in the first scenario and 858 million EUR in the second scenario.

14. Based on the capacity of Romania to allocate more expenditures from healthcare spending overall to preventive policies, the increase should be at least close to 40%- 45% of the European Union average, including better administration and governance.

¹⁸ https://www.edu.ro/comunicat_presa_04_2025_buget_educatie_cercetare

¹⁹ <https://www.zf.ro/eveniment/bugetul-pentru-sanatate-trece-de-100-de-miliarde-de-lei-in-2025-bani-22678683>

²⁰ https://mfinante.gov.ro/static/10/Mfp/buletin/executii/Anexa2_bgc31122024.pdf

Recommendations

1. **Increase Prevention Funding as a Strategic Priority** - Boost healthcare spending on prevention to at least 40%-45% of the EU average over the next decade. This targeted investment can reduce premature mortality rates significantly, leading to cumulative economic gains (productivity and fiscal) of over €30 billion in 10 years, while spending approximately €24 billion. Even more important than financial gains, this investment will save over the course of 10 years more than 750.000 lives.
2. One of the most effective prevention areas is **Early Detection and Screening Programs**. For an effective allocation of funds (most value for money) the priority should be for accessible screening for major non-communicable diseases (e.g., diabetes, cardiovascular diseases, and cancer) to ensure early diagnosis and enrolment into treatment programs. Timely interventions can prevent disease progression, reduce treatment costs, and save lives.
3. **Leverage Economic Gains from Prevention** - The macroeconomic benefits of prevention, such as a healthier workforce contributing to increased productivity and reduced absenteeism, **will generate fiscal gains of approximately €700-850 million annually**. These funds should be reinvested into scaling up preventive healthcare infrastructure.
4. **Ensure Equitable Access to Preventive Services** - Address disparities by providing mobile health units and telemedicine in underserved regions. Enhance transport infrastructure and digital connectivity to ensure all populations benefit equally from preventive healthcare.
5. **Integrate Prevention into Health and Economic Policies** - Align health prevention goals with broader economic policies to maximize impact, including tax incentives for companies promoting workplace health programs.
6. **Address Key Behavioral Risk Factors** - Taxation Policies: Increase taxes on tobacco, alcohol, and ultra-processed foods, channeling revenue into preventive health campaigns. Subsidies for Healthy Choices: Reduce VAT on fresh fruits, vegetables, and whole grains to encourage healthier eating habits.
7. **Expand and modernize health infrastructure**. Construct new hospitals in the seven counties with critical infrastructure deficits, ensuring equitable access to healthcare services across regions. Such investments should be paired with modern equipment and digital health solutions to enhance service quality and efficiency.

- 8. Focus on human resources in the healthcare sector.** Implement incentives to attract and retain medical professionals in underserved regions, including competitive financial packages, housing support, and professional development opportunities. It is imperative to strength and increase the capacity of primary care physicians and ambulatory care. Additionally, it is important to prioritize training programs to increase the number of specialists, particularly in geriatrics, preventive medicine, and long-term care.
- 9. Enhance governance and administrative efficiency.** Streamline healthcare management systems to ensure efficient allocation and use of resources. Improve data collection and monitoring to support evidence-based policymaking and accountability. At the same time, a solution can be the public-private partnerships to supplement public healthcare investments and introduce innovative care models.
- 10. Monitor and evaluate impact of health investments.** Establish robust mechanisms for tracking the outcomes of increased healthcare investments and to assess the long-term economic and social gains, ensuring that resources are directed toward the most impactful, viable initiatives.

References

1. Atun, R., Gurol-Urganci, I., Hone, T., Pell, L., Stokes, J., Habicht, T., Lukka, K., Raaper, E., & Habicht, J. (2016). Shifting chronic disease management from hospitals to primary care in Estonian health system: analysis of national panel data. *Journal of global health*, 6(2), 020701. <https://doi.org/10.7189/jogh.06.020701>
2. Boerma W, Kringos D. Introduction. In: Kringos DS, Boerma WGW, Hutchinson A, et al., editors. *Building primary care in a changing Europe*. Copenhagen (Denmark): European Observatory on Health Systems and Policies; 2015. (Observatory Studies Series, No. 38.)
3. Draghi Report on European Competitiveness, 2024
4. European Commission and OECD - "State of Health in the EU", 2023
5. Global action to end smoking, State of Smoking and Health in Romania, 2022
6. Hultkrantz L. Discounting in economic evaluation of healthcare interventions: what about the risk term? *Eur J Health Econ*. 2021 Apr;22(3):357-363.
7. Kisling, L. A., & Das, J. M. (2023). *Prevention Strategies*. In StatPearls. StatPearls Publishing
8. OECD, *Health at a Glance*, 2021
9. Public health Scotland, *Public health approach to prevention*, 2024
10. World Health Organization, *Noncommunicable diseases*, 2024
11. World Health Organization, *Out-of-pocket payments for health care in Romania undermine progress towards universal health coverage*, 2022
12. Yamey, G., Beyeler, N., Wadge, H., & Jamison, D., 2017. [Investing in health: the economic case. Report of the WISH Investing in Health Forum 2016].. *Salud pública de México*, 59 3, pp. 321-342

Databases

1. Eurostat – Data on GDP, healthcare expenditures, mortality rates, demographic changes.
2. European Commission – Reports and statistics on healthcare and fiscal policies.
3. OECD Database – Health and economic indicators related to Romania and the EU.
4. Romanian National Institute of Statistics (INS) – National demographic and economic statistics.
5. World Health Organization (WHO) Database – Data on global and regional health risks, mortality, and disease prevalence.