DETERMINANTS OF UNMET HEALTHCARE NEEDS IN THE EUROPEAN UNION COUNTRIES

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ABSTRACT

The population's access to quality medical services is one of the indicators that reflects the country's level of development from a social perspective. The quality of life of citizens largely depends on their health status. No matter how wealthy a person may be, if they are ill, they cannot fully enjoy life. The rate of population aging in EU countries is high; with age, chronic diseases emerge, and the need for medical care increases. Therefore, the object of study, "unmet need for medical examination and care," remains relevant. The main objective of the study is to verify the hypothesis that the number of practicing doctors, dentists, and hospital beds influences the "unmet need for medical examination and care." By applying software EViews 9.5, the type of correlation between the endogenous variable "unmet need for medical examination and care" and the exogenous variables—the number of practicing doctors, dentists, and hospital beds—was established. Regression analysis was conducted to achieve the proposed goal.

The indicator "unmet need for medical examination and care" suggests that dissatisfaction with medical services has increased in every second member state of the European Union over the past five years. However, in other EU countries, the number of satisfied individuals with the availability and quality of health services is increasing. In most EU countries, except for four, the number of hospital beds per hundred thousand inhabitants and hospitals has decreased in the last twelve years. Despite the surge in diseases during the COVID-19 pandemic, the downward trend persists. Thus, in some EU countries, there is a consistent downward trend in patient satisfaction with the accessibility and quality of medical care.

The results obtained in this study support the hypothesis that the number of practicing doctors, dentists, and hospital beds influences the "unmet need for medical examination and care." It was also found that, compared to other countries, in the case of France, the regression coefficient between the number of doctors and the "unmet need for medical examination and care" is the largest (in absolute value).

Keywords: *unmet need for medical examination and care, access to health services, quality of healthcare services, inequality, healthy life years at birth (HALE), population well-being*

INTRODUCTION

In 2021, more than half of the world's population (4.5 billion people) lacked full access to essential medical services. One in four individuals could not afford medical services, and one in six individuals, even if they could pay for medical services, risked losing their livelihood (WHO, 2023). Older people are often faced with the dilemma of choosing between buying food and paying for medical services. Therefore, the availability of medical services, as the subject of this study, remains relevant in modern realities. Timely diagnosis and the prompt provision of medical care are crucial as they contribute to the improvement of health status, reduce the duration of illness and rehabilitation, and prevent premature disability and mortality. The availability of medical assistance is the focus of research in this article. The main objective of the study is to verify the hypothesis that the number of practicing doctors, dentists, and hospital beds influences the "unmet need for medical examination and care" (UNMEC).

The introduction of a private health system has resulted in the migration of experienced doctors from state hospitals and clinics to private medical facilities. The energy crisis and high inflation have led to a decline in the standard of living for a portion of the European population. Consequently, the number of citizens unable to afford paid medical services has increased. Consequently, there is a consistent trend of decreasing population access to medical care and quality medical services in some EU countries. The public health level is contingent upon the performance of the healthcare system. An examination of the socio-economic policies of European Union countries reveals that nations with robust economies are implementing a wide range of healthcare reforms to enhance the efficiency of medical services.

For the first time, this work evaluates the availability of medical services by approaching the issue from a different angle and utilizing the UNMEC indicator as an endogenous variable. The novelty of this study lies in its identification of the main factors contributing to an increase in the UNMEC.

LITERATURE REVIEW

Researchers use various methods and concepts in assessing the availability of medical services. Vasilios Raftopoulos believes patient satisfaction is dominant in providing and improving health care quality. In developing grounded theory, he assumed that older patients are the primary users of health care services. The main research method was triangulation (in-depth interviews, focus groups, and direct observation) (Raftopoulos, 2005). Abbas Al-Refaie used a structural model to study the factors influencing patient satisfaction with the quality of hospital services (Al-Refaie, 2013).

Another commonly used method is multivariate logistic regression. Tamara Chambers-Richards, Batholomew Chireh, and Carl D'Arcy used this method to analyze multivariate predictors of patient satisfaction (Chambers-Richards et al., 2022). The number of predictors varies across studies. However, not all are statistically significant, even when a relatively large number of predictors are examined. Alina Abidova, Pedro Alcântara da Silva, and Sérgio Moreira analyzed 18 predictors of patient satisfaction in emergency care. According to the results, only three of these eighteen predictors have a statistically significant relationship with patient satisfaction: overall satisfaction with doctors, qualitative perceived waiting time for triage, and meeting expectations. These scientists also showed that only two of these eighteen predictors have a statistically significant relationship with the perceived quality of healthcare: overall satisfaction with doctors and meeting expectations (Abidova et al., 2020).

The population's quality of life (QL) directly depends on the availability of medical services and their quality. The correlation between quality of care (QC) and QL is positive. However, it may be either weak (Alonazi & Thomas, 2014) or significant depending on the country, the welfare of the patients, and the historical period. German researchers Linda Baumbach and her colleagues consider that patients who are more satisfied with their medical care, compared with less confident patients, rate their quality of life as higher. The self-rated health of these patients is also comparatively higher. The main conclusion reached by the researchers is that patient satisfaction with medical care reflects both the quality of medical services and the quality of life (Baumbach et al., 2023).

Most studies on this topic are based on survey results. Few works use regression analysis and economic-mathematical modeling of statistical data. Of the models listed in Table 1, all but the first are based on survey data. There is insufficient data to build a model of patient satisfaction with the healthcare system.

Table 1.
Variables of some models of patient satisfaction with the healthcare system

Endogenous variable	Exogenous variables	Data	Scientific sources
Degree of patient satisfaction	Gross domestic product (GDP) per capita, expenditures on health (% GDP), unemployment rate, people above the age of 65 years old (% total population), number of physicians per 100,000 habitants, number of nurses per 100,000 habitants, and number of hospital beds per 100,000 habitants (Xesfingi & Vozikis, 2016).	Four years, 2007, 2008, 2009, and 2012. 22 European countries (88 observations divided by four years)	S. Xesfingi and A.Vozikis (2016)
Overall Patient Satisfaction	Service Quality Dimensions: assurance, reliability, tangibles, responsiveness, and empathy (Al-Damen, 2017).	August 2016 to January 2017. Four hundred forty-eight outpatient participants.	Rula Al-Damen (2017)
Patient Satisfaction	Access to care, costs of medical care, quality of care received, sociodemographic characteristics of patients (age, residency, income, etc.), and health service features (Zhang et al., 2020).	2007-2010 years. 5774 responses.	Hao Zhang, Wenhua Wang, Jeannie Haggerty and Tibor Schuster (2020)
Patient Satisfaction, Patient Loyalty	Perceived healthcare service quality: reliability, assurance, tangibles, empathy, responsiveness (Aladwan et al., 2021).	Four hundred patients of Jordan Mafraq Hospital.	Mohammad Abdallah Aladwan, Hayatul Safrah Salleh, Marhana Mohamed Anuar, Hosaam ALhwadi and Islam Almomani (2021)
Level of outpatient satisfaction	Socio-demographic factors (age, gender, education, nationality, etc.), speed of service, clinical and laboratory tests, and impressions of medical services (nursing care, administrative, and general service) (Theofilou, 2022).	May - June 2019. Thirty-six men and twenty-seven women.	Paraskevi Theofilou (2022)

Endogenous variable	Exogenous variables	Data	Scientific sources
Patient Satisfaction	Age categories, sex, marital status, educational level, income status, unmet health care needs, general life satisfaction, availability of provincial care, quality of care received, most recent patient, and physician type.	2010 year. Six thousand three hundred thirty-five respondents with neurological conditions.	Tamara Chambers-Richards, Batholomew Chireh and Carl D'Arcy (2022)
Patients' satisfaction with nursing care	Age, marital status, region, department, income, type of medical insurance, caring, trust, and professional ethics (Guo et al., 2022).	Twenty-nine thousand one hundred eight patients from 107 hospitals in China.	Shujie Guo, Yulan Chang, Hongwei Chang, Xiaoxiao He, Qiuxue Zhang, Baoyun Song and Yilan Liu (2022)

Source: Systematization by authors

Many researchers argue that increased healthcare spending leads to increased patient satisfaction (Kringos et al., 2013), and healthcare expenditure, in turn, is related to GDP per capita. Not only real GDP per capita directly impacts "Patient Satisfaction with accessibility and quality of medical care," but also social exclusion, poverty, and material and social deprivation impact the endogenous variable (Gutium et al., 2023). Medical deprivation is an integral part of social deprivation.

DATA SOURCES AND USED METHODS

The availability of databases limits research. "Long-term spatial samples, where each object (individuals, firms, households) is observed many times over some time, are called panel data" (Ratnicova, 2006, p. 267). Any experienced researcher knows that Eurostat only provides time series; therefore, the panel data method cannot be applied.

Regression analysis is the primary method used to test the hypothesis that the number of practicing doctors, dentists, and hospital beds influence the UNMEC. The comparative analysis method was used to compare the dynamics of several indicators reflecting UNMEC, NALE, healthcare expenditure, etc., in EU countries to identify common characteristics and differences. Using software EViews 9.5, regression equations for UNMEC were constructed, and influencing factors were identified. The study's subject is the European Union countries. Data from Eurostat for 2010-2021 were used to build the models since not all indicators and countries have data for 2022. The definition, calculation methodology, and data on "self-reported unmet need for medical examination and care" are presented by Eurostat at https://ec.europa.eu/eurostat/web/health/database. The endogenous and exogenous variables of regression equations for EU countries are presented in Table 2. The significance level was 5% and 10% when testing the developed regression equations.

Table 2.
Endogenous and exogenous variables

Designation	Endogenous variable	Unit of measure
unmet	Unmet need for medical examination and care (UNMEC)	Percentage
Designation	**Exogenous variable**	**Unit of measure**
doc	Practicing physicians	Per hundred thousand inhabitants
dentist	Practicing dentists	Per hundred thousand inhabitants
bed	Hospital beds	Per hundred thousand inhabitants
d1x	Dummy variables	It takes value 1 in 201x; it takes value 0 in the rest years

Source: Systematization by authors

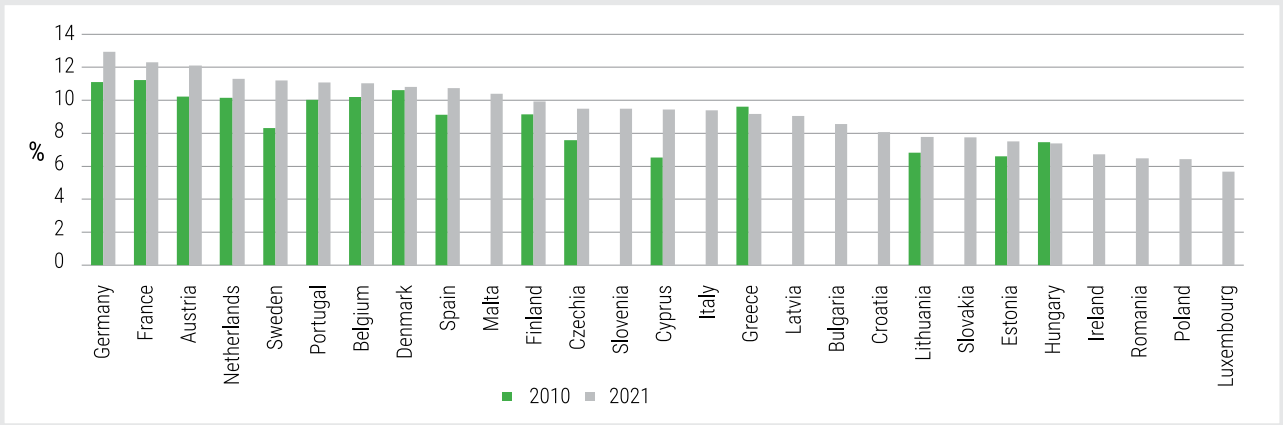
Although regression analysis was applied to all EU countries, the article presents only part of the results. The main selection criterion was relevance for developing measures to increase satisfaction with the need for medical examination and care. For example, the choice fell on Bulgaria, Latvia, and Romania since, in these countries, the indicator UNMEC dropped significantly over the analyzed period. The results of a study of some countries with a high level of healthy life years at birth are also presented since healthcare is more developed in these countries.

SELECTION OF THE EUROPEAN UNION COUNTRIES TO IDENTIFY FACTORS INFLUENCING THE AVAILABILITY AND QUALITY OF MEDICAL SERVICES

In most countries that promote policies to improve and strengthen public health, the goals of increasing the birth rate, reducing mortality, and increasing the life expectancy of citizens are established. Unfortunately, the issue of accessibility and quality of medical services is often either ignored or not given sufficient attention. When formulating strategies and programs to develop the healthcare system, it is crucial to recognize that an increase in healthcare expenditure only occasionally guarantees an improvement in the quality of medical services, although investment is indispensable for achieving tangible results. One of the criteria we use for selecting the European Union countries to be analyzed is the share of healthcare expenditures in Gross Domestic Product (GDP) and the growth of this indicator.

The top five countries with the highest share of healthcare expenditures in GDP (in 2021) are Germany (12.93%), France (12.30%), Austria (12.10%), Netherlands (11.29%), and Sweden (11.20%). The most significant increase for 2010-2021 was recorded in Cyprus (2.91 percentage points), Sweden (2.88 p.p.), Czechia (1.90 p.p.), Austria (1.88 p.p.), and Germany (1.83 p.p.) (Figure 1).

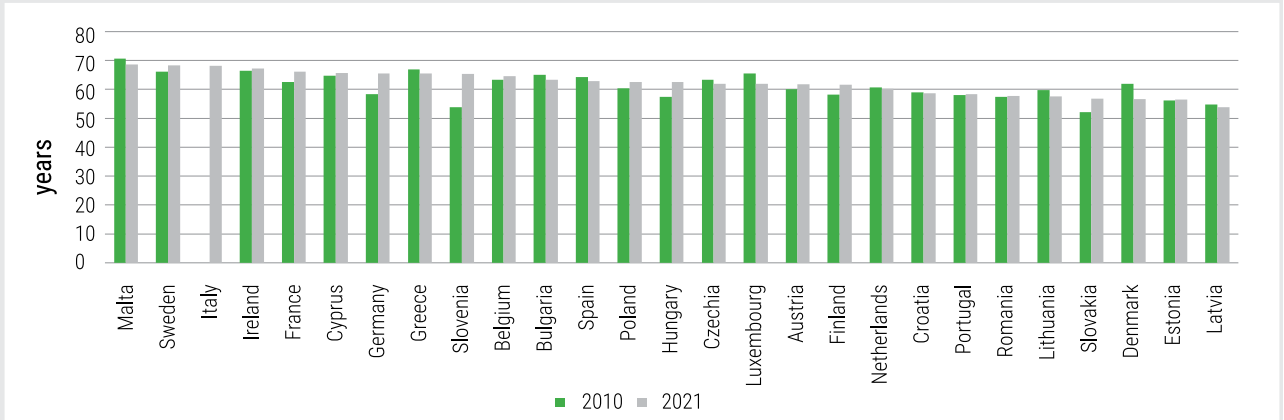
Figure 1.
Share of total healthcare expenditure in GDP in the European Union countries



Source: Eurostat (Eurostat, 2023)
Note: Data for 2010 are missing for the following countries: Malta, Slovenia, Italy, Latvia, Bulgaria, Croatia, Slovakia, Ireland, Romania, Poland, and Luxembourg.

Other criteria for selecting the European Union countries are healthy life years at birth and the growth of this indicator. Among the countries noted when applying the first criterion, two countries were in the top five countries with the highest healthy life years at birth in 2010: Sweden (68.4) and France (66.2), and the highest increase during 2010-2021 was recorded in Germany (7.3) and France (3.6) (Figure 2).

Figure 2.
Healthy life years at birth in the European Union countries



Source: Eurostat (Eurostat, 2023)
Note: Data for 2010 are missing for Italy

Healthy life years at birth in the Czech Republic fell by 1.3 years in 2010-2021 and in the Netherlands by 0.4 years. The results of applying all the listed criteria are shown in Table 3. Germany, Sweden, Austria, and France are the first four selected countries that meet most of the requirements and will be used to identify the main factors influencing UNMEC.

Table 3.

Top the European Union countries by criteria

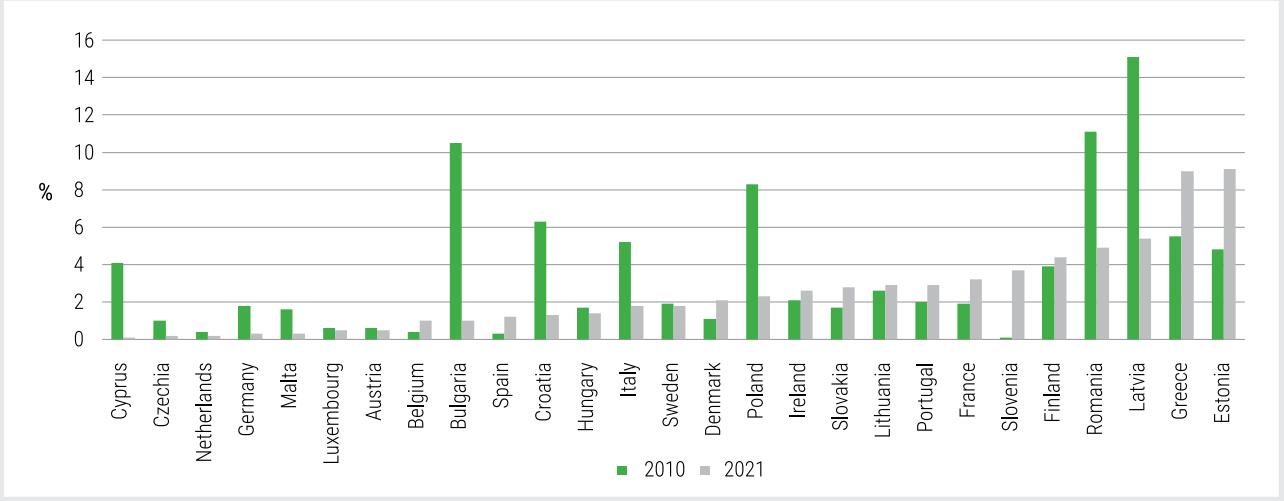
Country	The highest share of healthcare expenditures in GDP (2021)	The highest growth of the share of healthcare expenditures in GDP (2010-2021)	The highest healthy life years at birth (2021)	The highest growth of healthy life years at birth (2010-2021)
Germany	+	+	–	+
France	+	–	+	+
Austria	+	+	–	–
Netherlands	+	–	–	–
Sweden	+	+	+	–
Cyprus	–	+	–	–
Czechia	–	+	–	–
Malta	–	–	+	–
Italy	–	–	+	–
Ireland	–	–	+	–
Slovenia	–	–	–	+
Hungary	–	–	–	+
Slovakia	–	–	–	+

Source: Systematization by authors

Although Austria meets only two of the four criteria, since it, together with Germany, is among the top European Union countries with the lowest level of UNMEC (Figure 3), it was included in the list of countries studied to identify the main factors influencing the availability and quality of medical services.

Figure 3.

Unmet need for medical examination and care in the European Union countries



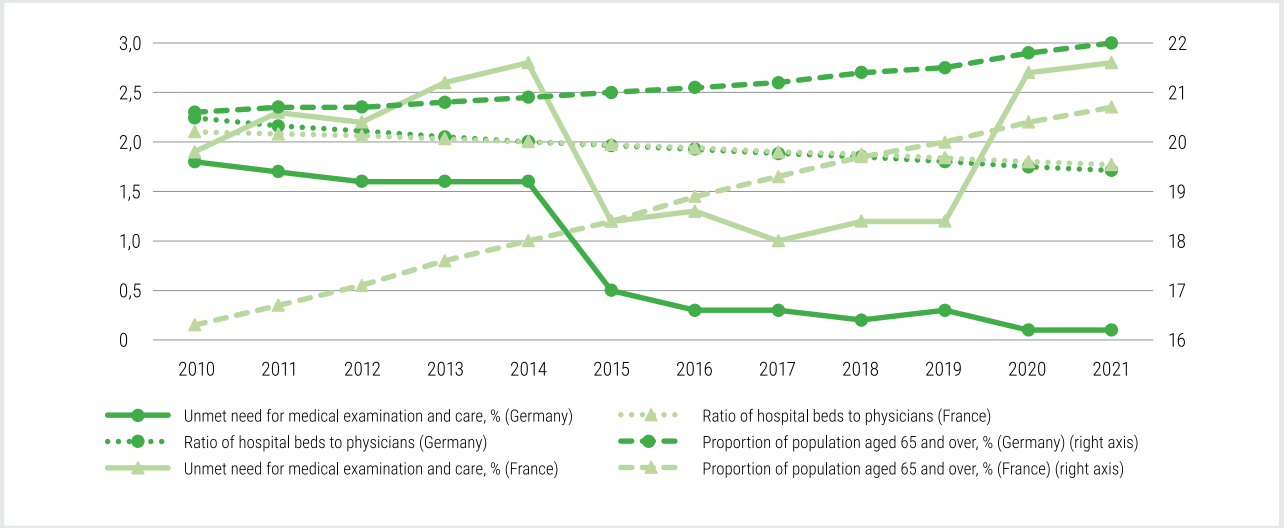
Source: Eurostat (Eurostat,2023)

The criterion of decreasing the UNMEC was used to identify the other three countries. During 2010-2022, UNMEC dropped in Latvia by 9.7 percentage points, Bulgaria by 9.5 p.p., and Romania by 6.2 p.p. So, the selection of European Union countries to identify factors influencing the availability and quality of medical services are Germany, Sweden, Austria, France, Latvia, Bulgaria, and Romania.

IDENTIFYING FACTORS INFLUENCING UNMET NEEDS FOR MEDICAL EXAMINATION AND CARE IN THE EUROPEAN UNION COUNTRIES

The proportion of the population aged 65 and over is increasing in Germany and France, and the ratio of hospital beds to physicians is decreasing. However, the evolution of UNMEC differs (Figure 4). The value of this indicator in 2021 compared to 2010 fell in Germany by 1.7 percentage points and increased in France by almost one p.p.

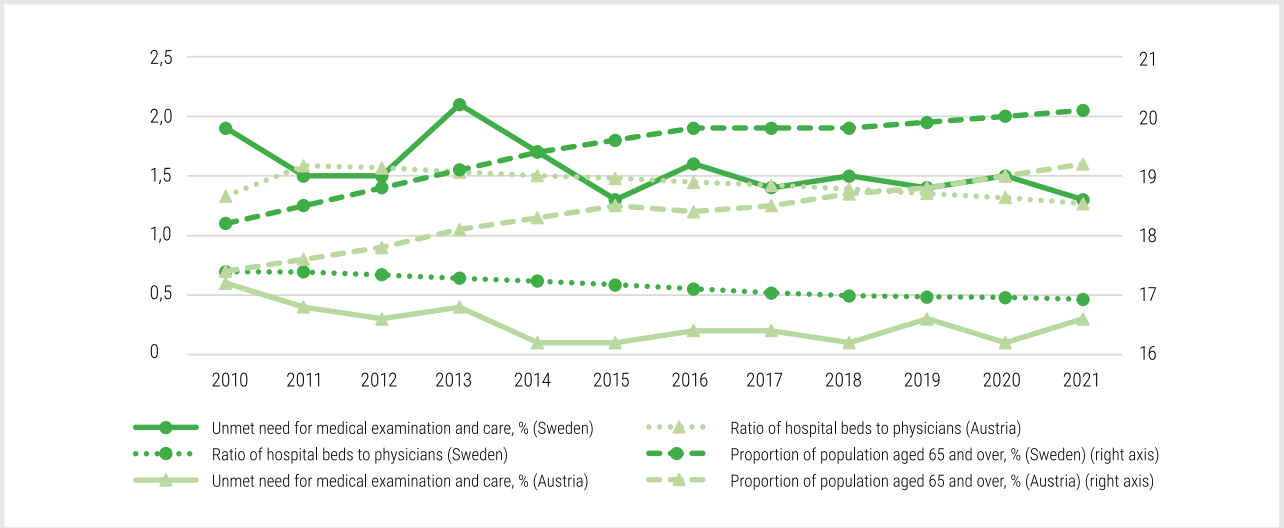
Figure 4.
Evolution of "unmet need for medical examination and care" and other indicators in Germany and France



Source: eelaborated by authors using Eurostat's database (Eurostat,2023)

The trends in the studied indicators are identical in Austria and Sweden: the population aged 65 and over has increased, the UNMEC has fallen, and the ratio of hospital beds to physicians has fallen (Figure 5).

Figure 5.
Evolution of "unmet need for medical examination and care" and other indicators in Sweden and Austria

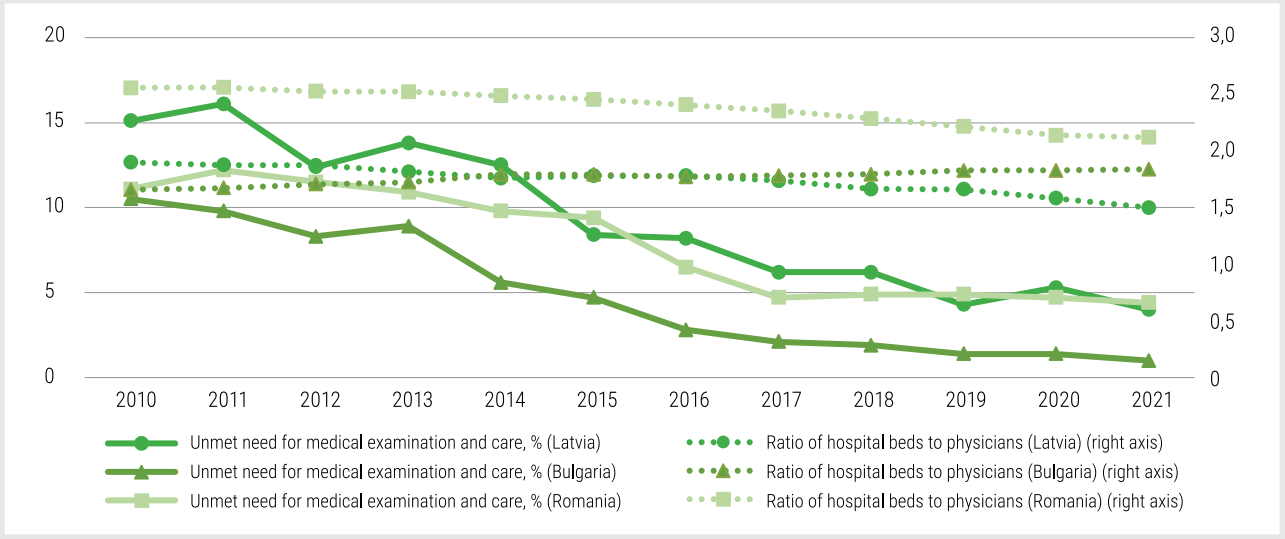


Source: eelaborated by authors using Eurostat's database (Eurostat, 2023)

Identical trends were recorded in Latvia, Bulgaria, and Romania, except for an increase in the ratio of hospital beds to physicians in Bulgaria (Figure 6). Thus, the comparative analysis of the dynamics of the UNMEC and the ratio of hospital beds to physicians does not answer whether there is a correlation between these indicators.

Figure 6.

Evolution of "unmet need for medical examination and care" and the ratio of hospital beds to physicians in Latvia, Bulgaria, and Romania



Source: eelaborated by authors using Eurostat's database (Eurostat,2023)

The following regression equations were developed to test the hypothesis that the number of practicing doctors, dentists, and hospital beds influence the UNMEC (Table 4).

Table 4.

Regression equations

Country	Regression equations		R-squared
Germany	$unmet = -80.432+0.076\times doc-0.364\times dentist+0.099\times bed$	(1)	0.966
Austria	$unmet = -0.008\times doc+0.107\times dentist-0.002\times bed$	(2)	0.760
France	$unmet = -0.403\times doc+2.175\times dentist-0.014\times bed+1.740\times d14$	(3)	0.767
Latvia	$unmet = -1.052\times dentist+0.150\times bed$	(4)	0.777
Bulgaria	$unmet = 68.856-0.081\times doc-0.310\times dentist+2.323\times d13 =$	(5)	0.989
Romania	$\ln(unmet) = -5.403\times\ln(doc) + 4.990\times\ln(bed)$	(6)	0.851

Source: authors' computations using EViews 9.5

In the case of Sweden, neither the number of practicing physicians nor the number of hospital beds influence patient satisfaction with accessibility and quality of medical care (Table 5).

Table 5.

Testing the null hypothesis H0 that the regression parameters are equal to zero (case Sweden)

	Variables	$unmet=b_1\times doc+b_2\times dentist+b_3\times bed$			
		Coefficient (bi)	Standard error	t-value	p-value
1	*doc*	0.000972	0.009013	0.107825	0.9165
2	*dentist*	-0.003173	0.076301	-0.041590	0.9677
3	*bed*	0.005965	0.010433	0.571758	0.5815

Source: authors' computations using EViews 9.5

Table 6 represents the results of testing Ho for regression equations (1-6) for which the regression parameters are equal to zero.

Table 6.

Testing the null hypothesis that the regression parameters are equal to zero

Variables	Germany: *unmet* = −80.432+0.076×*doc*−0.364×*dentist*+0.099×*bed*		
	Standard error	t-value	p-value
c	15.70548	-5.121297	0.0009
doc	0.016398	4.652000	0.0016
dentist	0.085407	-4.259686	0.0028
bed	0.015612	6.351283	0.0002
	Austria: *unmet* = −0.008×*doc*+0.107×*dentist*−0.002×*bed*		
doc	0.002103	-3.949467	0.0034
dentist	0.024358	4.405025	0.0017
bed	0.000797	-2.800237	0.0207
	France: *unmet* = −0.403×*doc*+2.175×*dentist*−0.014×*bed*+1.740×*d*14		
doc	0.101390	-3.971755	0.0041
dentist	0.541254	4.018768	0.0038
bed	0.005421	-2.563651	0.0335
d14	0.512371	3.395690	0.0094
	Latvia: *unmet*= −1.052×*dentist*+0.150×*bed*		
dentist	0.199483	-5.272739	0.0004
bed	0.025281	5.936750	0.0001
	Bulgaria: *unmet* = 68.856−0.081×*doc*−0.310×*dentist*+2.323×*d*13		
c	4.307022	15.98691	0.0000
doc	0.027721	-2.929911	0.0190
dentist	0.078269	-3.965466	0.0041
d13	0.482255	4.816495	0.0013
	Romania: ln(*unmet*) = −5.403×ln(*doc*) + 4.990×ln(*bed*)		
ln(doc)	0.695422	-7.769409	0.0000
ln(bed)	0.603034	8.274353	0.0000

Source: authors' computations using EViews 9.5

Using the Breusch-Godfrey Serial Correlation LM test, the null hypothesis, that there is no autocorrelation of errors, was verified for equations (1-6) up to lag 2 (Table 7). The results of this test allow us to accept the null hypothesis for regression equations (1-5) but not for equation (6).

Table 7.

Breusch-Godfrey Serial Correlation LM test results

Variables	Germany: *unmet* = −80.432+0.076×*doc*−0.364×*dentist*+0.099×*bed*		
	Standard error	t-value	p-value
resid(-1)	0.412012	-0.915363	0.3953
resid(-2)	0.442189	-1.572106	0.1670
	Austria: *unmet* = −0.008×doc+0.107×*dentist*−0.002×*bed*		
resid(-1)	0.384122	-1.435985	0.1941
resid(-2)	0.438113	-0.220251	0.8320

Variables	Standard error	t-value	p-value
	France: *unmet* = −0.403×doc+2.175×*dentist*−0.014×*bed*+1.740×*d*14		
resid(-1)	0.483662	-0.520821	0.6211
resid(-2)	0.521841	-0.609103	0.5648
	Latvia: *unmet*= −1.052×*dentist*+0.150×*bed*		
resid(-1)	0.374385	1.155732	0.2811
resid(-2)	0.439239	0.023852	0.9816
	Bulgaria: *unmet* = 68.856−0.081×*doc*−0.310×*dentist*+2.323×*d*13		
resid(-1)	0.495188	-0.372576	0.7223
resid(-2)	0.645567	-0.453706	0.6660
	Romania: ln(*unmet*) = −5.403×ln(*doc*) + 4.990×ln(*bed*)		
resid(-1)	0.266058	3.873535	0.0047
resid(-2)	0.392596	-2.061117	0.0849

Source: authors' computations using EViews 9.5

The regression equation was modified, considering the errors' autocorrelation. In the case of Romania, the ARMA Maximum Likelihood method was applied, and the following equation was obtained:

$$\ln(unmet) = -5.696 \times \ln(doc) + 5.241 \times \ln(bed) + [AR(1) = 0.95, AR(2) = -0.66, UNCOND] \quad (7)$$
$$R^2 = 0.948$$

The Breusch-Pagan-Godfrey test was applied to check whether heteroscedasticity or homoscedasticity of errors occurs. The test results showed that the null hypothesis is valid, and the regression errors in regression equations (1-6) are homoscedastic (Table 8).

Table 8.
Breusch-Pagan-Godfrey test results

Germany: *unmet* = −80.432+0.076×*doc*−0.364×*dentist*+0.099×*bed*			
F-statistic	0.619292	*Prob. F (3,8)*	0.6219
*Obs*R-squared*	2.261595	*Prob. Chi-Square (3)*	0.5199
Scaled explained SS	0.531006	*Prob. Chi-Square (3)*	0.9120
Austria: *unmet* = −0.008×*doc*+0.107×*dentist*−0.002×*bed*			
F-statistic	1.840254	*Prob. F (3,8)*	0.2180
*Obs*R-squared*	4.899808	*Prob. Chi-Square (3)*	0.1793
Scaled explained SS	1.563951	*Prob. Chi-Square (3)*	0.6676
France: *unmet* = −0.403×*doc*+2.175×*dentist*−0.014×*bed*+1.740×*d*14			
F-statistic	0.551682	*Prob. F (4,7)*	0.7047
*Obs*R-squared*	2.876239	*Prob. Chi-Square (4)*	0.5787
Scaled explained SS	0.873376	*Prob. Chi-Square (4)*	0.9283
Latvia: *unmet*= −1.052×*dentist*+0.150×*bed*			
F-statistic	1.015158	*Prob. F (2,9)*	0.4004
*Obs*R-squared*	2.208802	*Prob. Chi-Square (2)*	0.3314
Scaled explained SS	0.245171	*Prob. Chi-Square (2)*	0.8846
Bulgaria: *unmet* = 68.856−0.081×*doc*−0.310×*dentist*+2.323×*d*13			
F-statistic	0.561208	*Prob. F (3,8)*	0.6555
*Obs*R-squared*	2.086357	*Prob. Chi-Square (3)*	0.5547
Scaled explained SS	0.522978	*Prob. Chi-Square (3)*	0.9138

Romania: ln(*unmet*) = −5.403×ln(*doc*) + 4.990×ln(*bed*)			
F-statistic	0.418314	*Prob. F (2,9)*	0.6703
*Obs*R-squared*	1.020627	*Prob. Chi-Square (2)*	0.6003
Scaled explained SS	0.867863	*Prob. Chi-Square (2)*	0.6480

Source: authors' computations using EViews 9.5

The correlation coefficient between the exogenous variable "number of practicing physicians per hundred thousand inhabitants" and the endogenous variable UNMEC is negative in most of the analyzed countries, indicating the need to increase the number of doctors in France, Bulgaria, and Romania to improve the availability of medical services. In the case of Austria, this coefficient is insignificant (0.008).

From 2010 to 2021, in Germany, the number of doctors increased by 20.92%, reaching 453.22 doctors per hundred thousand inhabitants. According to equation 1, this led to a 5.96 percentage point increase in UNMEC. This is attributed to the fact that German citizens were surveyed, and doctors in German private clinics serve not only German citizens but also many wealthy clients from other countries. The developed regression equation reflects the specifics of the German healthcare system, which differs from countries such as Romania and Bulgaria.

The energy crisis severely impacted European countries, including the German economy, leading to the bankruptcy of enterprises. Some German entrepreneurs relocated their businesses to other countries, including the United States, to avoid bankruptcy. These circumstances, combined with inflation, have increased unemployment and impoverished the population, including the middle class, which cannot afford quality services from private clinics due to their high costs.

During the analyzed period, the number of hospital beds per hundred thousand inhabitants decreased in all EU countries except Bulgaria, Romania, Ireland, and Portugal. This reduction had varying effects on different EU countries. In Austria and France, a decrease in the exogenous variable "number of hospital beds per hundred thousand inhabitants" led to an increase in UNMEC. In the case of Germany and Latvia, the correlation coefficient is positive, indicating a direct relationship between these variables.

Medical tourism is common in Germany, with hospitals receiving over €1.2 billion annually from medical travelers and treating around a quarter of a million patients on average. Germany is preferred over the USA for medical tourism, mainly due to lower tariffs for medical services. In the US, tariffs are twice as high as in Germany (VisitWorld, 2022). In these countries, when choosing how to pay health care providers, the main criterion is ensuring the profitability of the bed, which has contributed to a decrease in days of hospitalization.

CONCLUSIONS AND RECOMMENDATIONS

The tested hypothesis was confirmed. A study of the relationship between UNMEC and healthcare indicators revealed that in most analyzed EU countries (with few exceptions), the endogenous variable is significantly influenced by the following independent variables: the number of practicing physicians per hundred thousand inhabitants, the number of practicing dentists per hundred thousand inhabitants, and the number of hospital beds per hundred thousand inhabitants.

When developing strategies and programs to enhance the accessibility and quality of medical services, it is crucial to draw insights from leading EU countries. Germany, Austria, Sweden, and France uphold high healthcare standards and employ innovative treatment methods. However, Germany attracts the main influx of medical tourism due to its high-quality medical services, skilled doctors, and shorter waiting times in clinics compared to many other countries. In France, Austria, and other European nations, the waiting time to schedule an appointment with a doctor is longer than in Germany. Germany could potentially decrease the UNMEC by reducing income inequality and increasing total healthcare expenditure per inhabitant.

The primary advantages of the Austrian healthcare system include the coverage of the state health insurance program for nearly the entire population and the high quality of medical services within the public sector. While doctors' professionalism is commendable, some highly qualified specialists exclusively provide medical services in private medical institutions. Other drawbacks of the healthcare system include long waiting times and high congestion in public healthcare facilities. To enhance the availability of medical services for the Austrian population, it is imperative to improve overall well-being so that most citizens can access both public and private clinic services. Additionally, measures should be taken to reduce the "at-risk-of-poverty rate" and income inequality.

Sweden, akin to Germany and Austria, boasts a high level of healthcare, contributing to one of the highest levels of healthy life expectancy in the European Union for its

citizens. Although the overall accessibility of medical care is high, it remains low in remote regions. Another issue is the lengthy waiting times for elective surgery, which does not guarantee timely surgical intervention.

The French healthcare system is characterized by highly qualified medical personnel, reasonable prices, and personalized care. French doctors are compelled to uphold their qualifications and minimize errors since even minor complaints can result in the revocation of their license.

Despite significant decreases in UNMEC during the analyzed period in Bulgaria, Latvia, and Romania, these countries must persist in enhancing their medical systems and implementing the advantageous practices observed in Germany, Austria, France, and Sweden.

REFERENCES

Abidova, A., Alcântara da Silva, Pedro & Moreira, S. (2020). Predictors of Patient Satisfaction and the Perceived Quality of Healthcare in an Emergency Department in Portugal. *The Western Journal of Emergency Medicine, 21*(2), 391–403. https://doi.org/10.5811/westjem.2019.9.44667

Aladwan, M.A., Salleh, H.S., Anuar, M.M., ALhwadi, H., & Almomani, I. (2021). The relationship among service quality, patient satisfaction and patient loyalty: case study in Jordan Mafraq hospital. *Linguistics and Culture Review, 5*(S3), 27–40. https://doi.org/10.21744/lingcure.v5nS3.1368

Al-Damen, R. (2017). Health Care Service Quality and Its Impact on Patient Satisfaction "Case of Al-Bashir Hospital." *International Journal of Business and Management, 12*(9), 136–152. https://doi.org/10.5539/ijbm.v12n9p136

Alonazi, W.B., & Thomas, S.A. (2014). Quality of Care and Quality of Life: Convergence or Divergence? *Health Services Insights, 7*, 1-12. https://doi.org/10.4137/HSI.S13283

Al-Refaie, A. (2013). A structural model to investigate factors that affect patient satisfaction and revisit intention in Jordanian hospitals. In: G.D. Magoulas (Ed.), *Investigations into Living Systems, Artificial Life, and Real-World Solutions* (pp. 136–147). Hershey, PA: IGI Global. https://doi.org/10.4018/jalr.2011100105

Baumbach, L., Frese, M., Härter, M., König, H.H., & Hajek, A. (2023). Patients Satisfied with Care Report Better Quality of Life and Self-Rated Health-Cross-Sectional Findings Based on Hospital Quality Data. *Healthcare (Basel), 11*(5), 775. https://doi.org/10.3390/healthcare11050775

Chambers-Richards, T., Chireh, B., & D'Arcy, C. (2022). Unmet health care needs: factors predicting satisfaction with health care services among community-dwelling Canadians living with neurological conditions. *BioMed Central Health Services Research, 22*, 1256. https://doi.org/10.1186/s12913-022-08611-0

Eurostat. (2023). *Health*. Eurostat Statistics Explained. https://ec.europa.eu/eurostat/web/health/database

Guo, S., Chang, Y., Chang, H., He, X., Zhang, Q., Song, B. and Liu, Y. (2022). Patient satisfaction with nurses' care is positively related to the nurse-patient relationship in Chinese hospitals: A multicentre study. *Frontiers in Public Health, 10*. https://doi.org/10.3389/fpubh.2022.1109313

Gutium, T., Gojaeva, E., & Huseynova, S. (2023). Social exclusion and poverty in the European Union and candidate countries. *Cogito Multidisciplinary Research Journal, XV* (2), 124-145.

Kringos, D., Boerma, W., Van der Zee, J., & Groenewegen, P. (2013). Europe's strong primary care systems are linked to better population health and higher health spending. *Health Affairs, 32*(4), 686-694. https://doi.org/10.1377/hlthaff.2012.1242

Raftopoulos, V. (2005). A grounded theory for patients' satisfaction with quality of hospital care. *ICUs & Nursing Web Journal, 22*, 1-15. https://hdl.handle.net/20.500.14279/1933

Ratnikova, T. (2006). Introduction to econometric analysis of panel data. *Economic Journal of Higher School of Economics, 2*, 267–316. (In Russ.). https://ej.hse.ru/data/2010/12/31/1208183686/10_02_06.pdf

Theofilou, P. (2022). Investigation of Outpatient Satisfaction in a General Hospital: The Effect of Socio-demographic Factors. *World Journal of Nursing Research, 2*(1), 11–20. https://doi.org/10.31586/wjnr.2022.435

VisitWorld.Today. (2022). Medical tourism in Germany: health insurance for foreigners and how to go for treatment. VisitWorld Today. https://visitworld.today/ru

WHO. (2023). *Billions left behind on the path to universal health coverage*. World Health Organization. https://www.who.int/news/item/18-09-2023-billions-left-behind-on-the-path-to-universal-health-coverage

Xesfingi, S., & Vozikis, A. (2016). Patient satisfaction with the healthcare system: Assessing the impact of socio-economic and healthcare provision factors. *BioMed Central Health Services Research, 16*(94). https://doi.org/10.1186/s12913-016-1327-4

Zhang, H., Wang, W., Haggerty, J., & Schuster, T. (2020). Predictors of patient satisfaction and outpatient health services in China: evidence from the WHO SAGE survey. (4), 465–472. https://doi.org/10.1093/fampra/cmaa011