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# ECONOMIC ASSESSMENT OF REGIONAL CHALLENGES OF THE HEALTHCARE SECTOR OF UKRAINE IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

## ABSTRACT

The article is devoted to determining the development directions of the healthcare sector of Ukraine at the regional level, taking into account the European integration vector and the challenges of modern times. The purpose of the article is to determine the priorities of health care development in Ukraine at the regional level by assessing the compliance of the health care system in the regions of Ukraine with the Sustainable Development Goals to improve the economic development of the regions. The methodological data for the calculations have been taken from the World Health Organization, the State Statistics Committee, the Ministry of Health, the National Health Service of Ukraine, the Center for Public Health, publications, and statistics of the European Commission, Statista. The economic indicators of the development of the regions of Ukraine were analyzed. An assessment of regional challenges in the sphere of health care of Ukraine in conditions of sustainable development was carried out (Vinnitsia, Odesa, Rivne, Lviv, and Kharkiv Oblasts, which have the highest indicators of achieving Goal 3 of the Sustainable Development Goals in Central, Southern, Northern, Western and Eastern Ukraine, respectively) with the Sustainable Development Goals has been analyzed. Following the results of the assessment of the regions using the petal diagram in the polar coordinate system, the priorities for the development of the regions under study and the general directions for the healthcare sector development in Ukraine at the regional level in the context of European integration have been identified.

**Keywords:** sustainable development, healthcare, pandemic, region, European integration

**JEL Classification:** Q01, I38, O18, R58

## INTRODUCTION

The high-priority task of the health care system of any government is to ensure an adequate level of public health, which is determined by strategic documents at national, European, and international levels. European integration is Ukraine's primary and constant foreign economic priority, which is reflected in almost all sectors of the economy, including healthcare. Further reinforcement of Ukraine and the EU relations will ensure economic transformation, attract innovative technologies, increase foreign investments and enhance the country's competitiveness.

Ukraine's healthcare sector is looking for ways to overcome the crisis and build a development model close to European standards. Nowadays the economic development of the country is impossible without taking into account the territorial features, in particular, the strengths and weaknesses of the functioning of regional economic systems, favorable and negative trends in the development of regions in the relevant sector of the economy. The effective implementation of European projects and European experience in the national healthcare practice of Ukraine is an essential factor in the efficient functioning of the industry, which makes it possible to ensure a capable public health system, increase the efficiency of interaction between institutions, accessibility, and quality of medical services, and achieve positive results in achieving the Sustainable Development Goals (SDGs).

## LITERATURE REVIEW

The theoretical coverage of the stages, features and regulatory support for the modern health care system reform in Ukraine has been studied by such scientists as V. Andriyash [1], A. Antonov [2], M. Bilyns'ka [3], O. Diegtiar [4], O. Kozyrieva [5], N. Orlova [4], Ya.Radysh [3], I.Rozhkova [3], whose papers focused on theoretical and practical approaches to the priorities and principles of healthcare development in the current reform framework, analysis of international and national experiences in establishing public mechanisms for healthcare development. Jan E. Blanpain [6], Hans Henri P. Kluge [7], Natasha Azzopardi Muscat [7], Satish Mishra [7], Susanne Nielsen [7], Florian Tille [7] have studied the tendencies of the European healthcare system dynamics and ways to counteract COVID-19 based on the use of digital technologies. Mariangela Bonasia [8] and Napolitano Oreste [8] assessed the performance of European healthcare systems. Practical aspects of financial and economic support of health care are covered in the works Diegtiar O. [9], Dlouhy M. [10], Filipova N. [11], Goranitis I. [12], Kinash I. [13], Kozureva O. [9], Krynychko L. [14], Liaropoulos L. [12], Motajlo O. [14], Orlova N. [9], Pikhots'ka O. [15], Prykazka S. [9], Savchuk L. [13], Shapovalova A. [9] etc. Recognizing the significant scope of scientific research of theoretical and practical nature on the health care system development, the undoubted achievements of the scientists mentioned above require further scientific research to define the directions of health care development in Ukraine at the regional level, taking into account the EU vector of growth and the challenges of modern times.

The purpose of the article is to determine the priorities for the development of health care in Ukraine at the regional level by assessing the compliance of the health care system in the regions of Ukraine with the goals of sustainable development to improve the economic development of the regions.

The methodological basis of the study is represented by general scientific and unique methods of understanding economic phenomena and mechanisms of public administration in the modern world and national economies: systematization and generalization - in the study of the peculiarities of European regional health policy, contemporary challenges of the medical industry; methods of analysis and synthesis - in determining the main directions and tools of public mechanisms for the health care sector development in a pandemic; comparative analysis - to assess the compliance of the health care system with the SDGs. The systematic approach made it possible to determine the healthcare development direction in Ukraine at the regional level in the context of European integration.

The scientific works of domestic and foreign scientists, data of the World Health Organization, the State Statistics Committee, orders and reports of the Ministry of Health, the National Health Service of Ukraine (NHSU), the Center for Public Health, applied research of the Department of Strategic Planning and Macroeconomic Forecasting, publications and statistics of the European Commission, Statista, reference and information publications of international professional organizations on the state of healthcare development are the research information source.

## RESULTS

The COVID-19 pandemic has been a profound crisis for health systems since 2020. Therefore, at a meeting in Brussels in 2020, the European Commission identified six priorities for action in 2021. The main priority is to continue working to safeguard the lives and well-being of citizens threatened by the coronavirus pandemic, to ensure Europeans have a future vaccine, and to help rebuild the economy through green and digital transformation. Furthermore, as part of promoting European welfare, taking into account the threats from COVID-19, the European Commission is working to strengthen the healthcare system and develop existing and create new research institutions in this area [16].

As of May 01, 2022, 5.09 billion cases of COVID-19 were registered worldwide. Most of the confirmed cases of COVID-19 are typical for Europe (42%), America (30%), and Asia (25%). In Europe, 1.89 billion confirmed cases of infection were recorded: France (28.3 million), Germany (24.14 million), and the United Kingdom (21.93 million) are leading.

European countries had to transform public mechanisms to overcome the multidimensional consequences of the COVID-19 crisis. The most common changes in the public mechanisms of the EU countries are the support for interagency coordination, involvement of stakeholders in coordination meetings, combating misinformation, risk management, and the creation of appropriate institutions.

Thus, the European healthcare system is implemented through a wide range of instruments and institutions at the national and regional levels. Even though European countries' healthcare systems differ, they have the following common objectives: to ensure universal access and high efficiency of healthcare, rational use of resources, improve the quality of services,

and respond to the patient's requests. In European countries, health care is financed mainly at the expense of the patient and from the state budget, including social health insurance.

The Pan-European Commission on Health and Sustainable Development encourages national governments, regional and global organizations, and other stakeholders with an impact on health and social protection systems to contribute to wide-ranging reforms, investment programs, and governance improvement measures that have become urgent in the current context.

The State Strategy regulates the regional state policy in Ukraine for Regional Development for 2021-2027, regional development programs and projects; regional development strategies and implementation action plans; state programs for the cross-border cooperation improvement, socio-economic development of certain territories, regional development agreements, etc. These regulatory and legal documents allow the effectiveness of the use of public resources in the region for the benefit of people, unity of the state, and sustainable development.

In 2021 there were positive trends in the regional dynamics of production in key areas of development: industry, agriculture, construction and development of capital investments, as evidenced by the dynamics of the main socio-economic indicators. Thus, the production of industrial products was increased in 16 regions and in Ukraine as a whole by 1.9%; volumes of agricultural production were increased in 20 regions and in Ukraine as a whole by 14.4%; volumes of construction products were increased in 17 regions and in Ukraine as a whole by 6.8%; capital investments were increased in 24 regions and in Ukraine as a whole – by 13.0%. Most of all, capital investments were increased in Zaporizhia (by 39.2%), Lviv (37.7%), Kyiv (by 35.1%), Vinnytsia (by 33.1%), Chernihiv (by 23.7%), Chernivtsi (by 23.6%), Ternopil (by 22.5%) and Cherkasy (by 22.4%) regions [17].

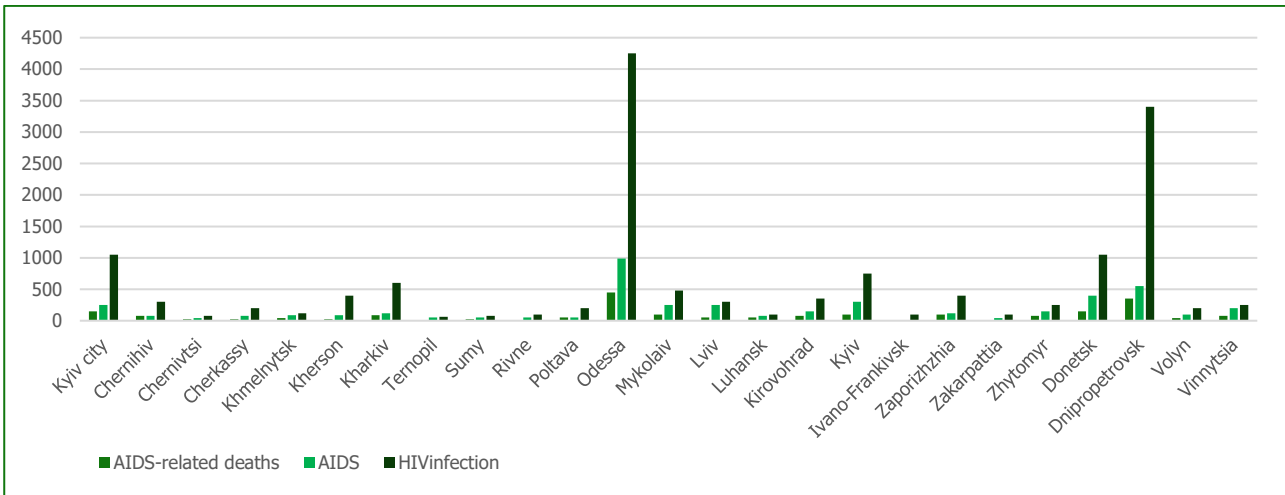
Local budget revenues increased in all regions, ranging from 14.8% in Vinnytsia to 28.5% in Dnipropetrovsk regions, and on average in Ukraine, the growth rate was 20.5% (for the corresponding period of 2020 – 5.4%), which indicates financial viability at the regional level. Real wages increased in all regions of the country: from 5.2% in Kirovohrad to 14.4% in Khmelnytsky regions and in Ukraine as a whole - by 10.5% (in 2020 - by 7.4%). The reduction in the amount of wage arrears in relation to the wage fund took place in 12 regions. The lowest values of this indicator were recorded in Chernivtsi, Kirovohrad (0.2%), Zakarpattia (0.3%), Zhytomyr, Khmelnytsky (0.6%), Rivne, Vinnytsia, Kyiv (0.8%) and Chernihiv (1.0%) regions. Donetsk, Sumy (11.4%), Kharkiv (6.1%), Dnipropetrovsk (4.3%), Kherson (3.5%) and Luhansk (3.2%) regions have the largest amount of debt in relation to the monthly wage fund.

The preservation of negative dynamics in 2021 is observed in the level of unemployment of the population, which compared to 2020 increased in all regions and in Ukraine as a whole (Sumy region - by 0.7%, Mykolaiv, Luhansk, Cherkasy - by 0.6%, Donetsk, Zakarpattia, Kirovograd, Kharkiv, Kherson and Chernihiv - by 0.5%, Zaporizhia, Poltava, Ternopil, Khmelnytsky, Chernivtsi - by 0.4%) [17].

The healthcare sector of Ukraine has sufficient resources to function effectively, using innovative tools, approaches, and practices. However, despite the positive developments in this direction, the level of public health in Ukraine today is qualified as unsatisfactory since, during the last decade, there has been an increase in the level of general mortality of the population within 4%, while in European countries there was a decrease - by 4%, and the average life expectancy is less (by 5-10 years) than in economically developed European countries.

The current state of public health in Ukraine, as in the global context, is affected by COVID-19, HIV, AIDS, and other infectious diseases. The most significant number of registered cases of COVID-19 is observed in Kharkiv, Odesa, Dnipro, and Lviv Oblasts. In total, 1.68 million vaccinations against coronavirus were carried out in Ukraine (May 25, 2022). The critical policy tools in decision-making at the state and regional levels of Ukraine in the context of the catastrophic consequences of the COVID-19 pandemic are routine immunization, preventive vaccination against poliovirus, measles, mumps, and rubella; vaccination; Medical Guarantee Program, expanded Affordable Medicines Program, increased requirements for cancer treatment, electronic services development, financial and legal levers [18].

According to WHO estimates, the highest rates of HIV/AIDS in Eastern Europe are characteristic of Ukraine, where almost 250 thousand people with HIV live. In Ukraine in 2021, 4.2 thousand cases of AIDS, 15.5 thousand cases of HIV infection and 1.9 thousand cases of AIDS-related deaths, and 38 cases of HIV infection among foreigners were officially registered (based on [11]). Regional analysis of HIV cases showed that the highest number of HIV infections in 2021 was recorded in Odesa (4210 cases), Dnipropetrovsk (3392 cases) Oblasts, and the city of Kyiv (1104 cases), the lowest number - in Zakarpattia (81), Ternopil (63), Chernivtsi (61) Oblasts (Figure 1).

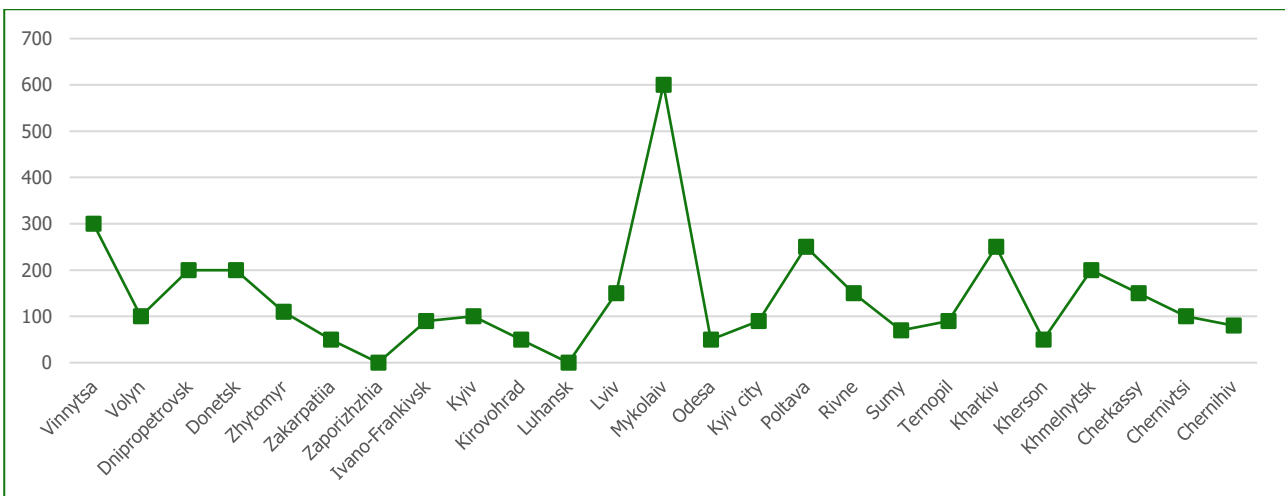


**Figure 1. Registered cases of HIV infection, AIDS, and AIDS-related deaths by regions in Ukraine, 2021. (Source: [18])**

Reforming the healthcare system is impossible without financial and economic restructuring at all levels, provided that healthcare institutions are financed, their efficiency and quality of medical services are taken into account, and the number of healthcare institutions in the regions is optimized. This will optimize the allocation of financial resources for healthcare at all levels.

Over the past ten years, the government has approved ten comprehensive measures and adopted 45 national programs aimed at prolonging and improving the average life expectancy of citizens, five integrated measures - on the treatment and prevention of AIDS, 5 - on the elimination of the consequences of the Chernobyl accident, 15 - on the healthy generation and stimulation of fertility, 3 - on the health of the elderly, 4 - on the fight against tuberculosis, 3 - to overcome drug addiction, 3 - on the disaster medicine. However, there was insufficient resource provision for the effective implementation of the declared programs: 26% of the programs were partially funded, 10% - almost half, 6% - one-third, and 4% were not funded at all, which indicates the low efficiency of the regional state target programs.

Due to the effective organization and optimization of procurement through international organizations, it was possible to release UAH 321 million, which made it possible to increase funding for adult hemophilia, oncology, multiple sclerosis, many children's programs (nanism, cystic fibrosis, hepatitis, cerebral palsy, etc.), procurement of medicines for citizens with orphan diseases (pulmonary arterial hypertension, Gaucher disease, etc.) by 10%. Furthermore, additional funding of UAH 73 million was allocated for the patients' treatment in pediatric oncology, UAH 415 million for adult oncology, and UAH 38 million for cardiovascular diseases. The new funding model envisages automation and centralization of administrative mechanisms, which will facilitate a prompt response to the lack of funding in the region (Figure 2).



**Figure 2. Expenditures to medical institutions that concluded an agreement with the NHSU in 2020, UAH million. (Source: [19])**

Changes in the mechanism of financing the healthcare system of Ukraine began in 2019 during the transformation period: the government reduced healthcare costs (from USD 100 in 2018 to USD 97 in 2019) to reduce the budget deficit. The largest increase in funds allocated from the state budget for healthcare management is observed at the end of 2019, this figure increased only by UAH 4824.80 thousand, which is 5.72% more than in 2018; as of the end of 2020, this figure increased by UAH 84.7 billion, which is 3.3 times higher than in 2020.

For epidemiological surveillance (observation), the activities of laboratory units of the Public Health Center and measures to combat epidemics in 2020, funds were allocated by UAH 3549.4 million more than in 2018, the amount of expenditures for epidemiological supervision decreased by UAH 3208.5 million compared to 2020, research, scientific and scientific-technical developments decreased by UAH 116.2 million, health care management decreased by UAH 166.6 million. In 2021 expenditures on training and advanced training of medical and pharmaceutical, scientific and scientific-pedagogical staff increased by UAH 126.3 million (Table 1).

**Table 1. State health care expenditures according to the departmental program classification of state budget expenditures in 2018-2021, UAH million. (Source: [20])**

Indicators	2018	2019	2020	2021
Healthcare leadership and management	107,8	124,5	194,2	27,6
Research, scientific and scientific-technical developments, etc.	140,3	146,7	153	36,8
Epidemiological surveillance	1583,4	1703,3	4215,5	1007
Training and advanced training of medical and pharmaceutical, scientific and scientific-pedagogical staff	419	464,6	437,8	564,1

Budget decentralization reforms have led to a reduction in centralized subsidies in some of the Ukrainian regions, which may exacerbate further inequality between them. In healthcare, subventions were provided from the general fund of the state budget to local budgets in the amount of UAH 22.4 billion (or 138.2% of budget allocations), of which a medical subvention is UAH 14.55 billion (or 99.8% of budget allocations). The expenditures for the functioning of the NHSU in 2019 were UAH 72289.3 million, in 2020 – UAH 89101.6 million, in 2021 – UAH 124193.8 million.

During 2020-2021, representatives of the interregional departments of the NHSU held meetings with the local authorities in the regions and provided consultations on the development of individual medical institutions and the effective network. Payment for services under the Medical Guarantee Program is the primary source of funds for a medical institution. The share of funding from the state budget is many times higher than hospitals need from local governments. However, the local government, as the owner of the institutions, still has an obligation to maintain the institutions, pay for utilities, and maintain the infrastructure. Equipped and powerful hospitals eventually begin to earn money on their own, but before that, the local community has to invest in the institution's development. After all, a hospital with specialists and equipment will be able to conclude an agreement with the NHSU for more service packages and, accordingly, receive more funding. The NHSU, in its turn, guarantees that payment for the services provided will be sustainable if the institution meets the requirements and has concluded an agreement with the NHSU. As a result, the institution receives ongoing funding and can spend money on the supply of medicines and additional payments to medical staff.

In 2021, 1654 specialized medical institutions and 1696 primary healthcare institutions concluded agreements with the NHSU. In total, as of February 1, 2021, 272,264 doctors and medical staff were registered in the electronic healthcare system (EHSS), including primary care doctors - 23,980, specialized medical care doctors - 97,668, specialists with basic and incomplete higher medical education - 153,251.

After the beginning of the full-scale military invasion of the Russian Federation on the territory of Ukraine, which is a violation of international law, millions of citizens are under threat, and the national healthcare system is functioning in conditions of increased risk. Today, in the conditions of war, the healthcare sector of Ukraine is looking for ways to overcome the crisis and build a model of development close to European standards. That is why, in the conditions of a full-scale invasion of the Russian Federation into the territory of Ukraine, the introduction of innovative telemedicine technologies, new methods of diagnosis and treatment of diseases into the practice of medical institutions will allow Ukraine to achieve positive results from the strategy for reforming the health care system to enter the unified world and European community.

The healthcare system in Ukraine is increasingly experiencing a shortage of qualified medical personnel. The share of healthcare professionals among the total workforce of Ukraine is relatively high (5.9%), but the number of personnel in the healthcare sector of Ukraine is unsatisfactory and has a steady downward trend.

There are 147.4 thousand doctors of all medical specialties and 1186 hospitals in Ukraine. The most significant number of doctors is in Kyiv (14.6 thousand), Lviv (11.9 thousand), and Dnipropetrovsk (11.5 thousand) Oblasts; the smallest is in Luhansk (1.9 thousand). In addition, there are 273.52 thousand nursing staff in Ukraine: the largest number is in Dnipropetrovsk and Lviv Oblasts (20 thousand each), Kyiv (18.2 thousand), and Kharkiv (16.3 thousand) Oblasts; the smallest number is in Luhansk Oblast (4.5 thousand) [21].

To ensure the integrity and coherence of regional development directions and to identify opportunities and prospects for achieving Goal 3 "Strong health and well-being" SDG, a scientific and methodological approach to assessing the relevance of the health care system in the region to the SDGs was applied using a petal chart in the polar coordinate system as one of the effective ways to display multidimensional observations with an arbitrary number of variables.

The assessment of health system alignment with SDG Goal 3 was conducted for the following Oblasts from each part of Ukraine: Vinnytsia, Odesa, Rivne, Lviv, and Kharkiv Oblasts, which have the best indicators of achieving SDG Goal 3 in Central, Southern, Northern, Western and Eastern Ukraine respectively. The following indicators were selected to assess the current situation for each indicator:

- public health: number of registered cases of HIV infection, the incidence of active tuberculosis.
- access to medicines: number of e-prescriptions issued, vaccinations against COVID-19.
- provision of health care services and financing: expenditures to medical institutions that have concluded an agreement with the NHSU, the amount of additional subsidies to local budgets.
- human resources of the health care system: the level of provision with practicing doctors per 10000 population, the average number of applications per doctor.
- initial data for the assessment according to the selected indicators are presented in Table 2.

**Table 2. Baseline data for assessment.** (Source: according to [20, 22-26])

Indicators to measure the achievement of SDG Goal 3	Region				
	Vinnytsia	Lviv	Kharkiv	Odesa	Rivne
The number of registered cases of HIV infection, pcs.	172	327	575	4210	149
Incidence of active tuberculosis, % compared to the previous year	26.50	50.00	36.20	105.90	38.90
The number of e-prescriptions issued, thousand pcs.	1658.73	2407.88	3066.10	1699.37	1003.69
The number of vaccinations against COVID-19, thousand pcs.	1220.81	2078.15	2306.84	1746.01	851844
The amount of additional subsidies to local budgets, UAH million	7.54	8.08	198.84	28.66	1.17
Expenditures to medical institutions that have concluded an agreement with the NHSU, UAH million	279.90	142.22	251.63	47.39	139.49
Level of provision of medical practitioners per 10000 population	24.73	24.71	24.30	24.40	24.30
The average number of concluded declarations per a practicing doctor	7100	6800	8100	6600	4500
The number of registered cases of HIV infection, pcs.	172	327	575	4210	149

Changes in the selected indicators of achieving Goal 3 of the Sustainable Development Goals are shown relative to one center in the range from -3 to 3. On the petal chart, data points appearing further from the center show better performance than those closer to the center.

According to the results of the regional assessment, it is proved that Vinnytsia Oblast has the most favorable performance results that correspond to the established SDGs and has the most effective prospects for future development (Figure 3).

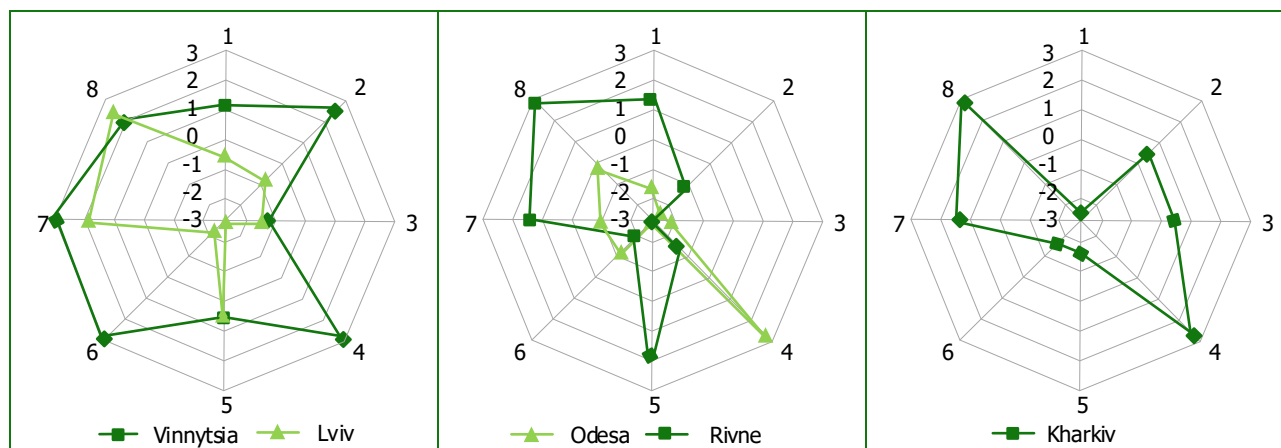


Figure 3. Relevance of health systems in the Oblasts of Ukraine to SDG Goal 3.

Kharkiv Oblast ranks second in terms of assessing the health system's compliance with SDG Goal 3 in the Oblasts. Among the studied regions, the lowest alignment of the healthcare system with the SDGs is observed in Odesa Oblast, where the healthcare sector development prospects are somewhat limited, given the problems of ensuring a robust public health system.

## DISCUSSION

The proposed study allows to economically assess the regional challenges of the healthcare sector of Ukraine in the context of sustainable development, and, unlike the current methods of assessing regions, the emphasis is on four key indicators (public health, access to medicines, provision of health care services and financing, human resources). They require discussion of the modernization of the regional economy by improving the efficiency and competitiveness of the regional economy and approaches to adjusting the priorities for the development of the industry in a particular region for a certain period. The issue of assessing the economic mechanism in the field of health care for an inclusive recovery of the industry after the systemic crisis, taking into account the highlighted indicators of sustainable development, remains debatable. We plan to reveal these problems in further research.

## CONCLUSIONS

Despite the significant achievements for further development of the healthcare sector in Vinnytsia Oblast, it is advisable to increase the availability of medicines and develop and improve the quality of healthcare services. Kharkiv Oblast's regional policy must be adjusted to ensure a capable public health system. Odesa and Rivne Oblasts need to focus on building the human resources potential of the region and improving the level of public health. In Lviv Oblast, given the sufficient number of medical personnel among the analyzed regions, it is advisable to implement measures to improve public health.

External and internal factors, under the influence of which the regions of Ukraine are developing today, determine the requirements for the economy of the regions and, accordingly, the rapid response to globalization changes. The economic assessment of regional development allowed us to identify the most capable regions (Vinnytsia, Odesa, Rivne, Lviv and Kharkiv regions), which also have the best indicators of achieving sustainable development goals in Central, Southern, Northern, Western and Eastern Ukraine, respectively. A key measure to improve the economic development of the regions is the transformation of the mechanism of financial support for health care. To increase the efficiency of the use of budgetary resources at different levels of management and ensure sustainable development of the healthcare sector, the key areas are the development of a comprehensive methodology for assessing the effectiveness of the financial support of the healthcare system; regulation of the procedure for the use of local budget resources, the introduction of innovative software products into the mechanism of strategic procurement of the NHSU.

Current factors (pandemic, infectious diseases, war, problems of financing the industry, lack of public funds, reduction of free medical care, lack of clear criteria for assessing the effectiveness of the use of budget resources at different levels of management) significantly slow down the reform of the healthcare system in Ukraine and the country's European integration. However, taking into account the best European practices of regional health policy implementation in order to achieve

the SDGs and European integration, the critical areas of Ukrainian healthcare development at the regional level may include health governance, universal health coverage, the flexibility of the healthcare system taking into account existing and possible risks, the people, strong human resources potential of the healthcare system.

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## **ЕКОНОМІЧНА ОЦІНКА РЕГІОНАЛЬНИХ ВИКЛИКІВ СФЕРИ ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ В УМОВАХ СТАЛОГО РОЗВИТКУ**

У статті обґрунтована необхідність визначення напрямів розвитку сфери охорони здоров'я України на регіональному рівні з урахуванням європейського вектору та викликів сучасності. Метою статті є визначення пріоритетів розвитку охорони здоров'я в Україні на регіональному рівні шляхом оцінки відповідності системи охорони здоров'я в регіонах України Цілям сталого розвитку для покращення економічного розвитку регіонів. Методичною базою для розрахунків є дані Всесвітньої організації охорони здоров'я, Державного комітету статистики, Міністерства охорони здоров'я, Національної служби здоров'я України, Центру громадського здоров'я, публікації та статистичні дані Європейської Комісії, Statista. Проаналізовано економічні показники розвитку регіонів України. Проведена оцінка регіональних викликів сфери охорони здоров'я України в умовах сталого розвитку (Вінницька, Одеська, Рівненська, Львівська та Харківська області, які мають найкращі індикатори досягнення Цілі 3 Цілей сталого розвитку в Центральній, Південній, Північній, Західній та Східній Україні, відповідно). За результатами оцінювання регіонів за допомогою пелюсткової діаграми в полярній системі координат визначено пріоритети розвитку регіонів, що досліджувались, та загальні напрями розвитку сфери охорони здоров'я України на регіональному рівні в умовах євроінтеграції.

**Ключові слова:** сталий розвиток, охорона здоров'я, пандемія, регіон, євроінтеграція

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