


Analysis of Economic Factors in the Context of Healthcare Reform in Ukraine



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Abstract: The study aimed to assess the impact of economic factors on the healthcare system renewal in Ukraine. The study analysed key regulatory documents that affect healthcare financing and management and compares the Ukrainian model with those of other European countries, such as Poland, Germany, the Czech Republic and Switzerland. To obtain the results, data for 2019-2025, including official statistics on sector financing and access to healthcare services, were used. The main findings of the study indicate significant regional disparities in access to healthcare services in Ukraine, which appear to be associated with the uneven distribution of financial resources. The available data suggest that healthcare reform based on the principle of “money follows the patient” has improved funding for healthcare facilities in large cities, while rural facilities tend to remain comparatively underfunded. In addition, the study determined that higher incomes provide better access to healthcare services, while people with lower incomes face financial barriers and informal payments, which worsen access to healthcare. Comparisons with healthcare models in Poland, Germany and the Czech Republic demonstrated that systems with compulsory health insurance provide greater financial stability and equal access to healthcare services. The Ukrainian system requires significant reforms to address regional disparities and improve the efficiency of financing. The findings highlight the need to improve the mechanisms for allocating financial resources, particularly for rural areas, and to attract additional private investment to modernise healthcare facilities.

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Introduction

The global economic challenges highlighted issues in many areas, including healthcare systems, which continue to face challenges related to limited financial resources and underdeveloped infrastructure. The healthcare system in Ukraine needs to be transformed, as the old model does not meet modern requirements, especially in the context of economic instability. One of the main tasks is to reform healthcare systems to increase their resilience and ability to respond effectively to future challenges. Changes in the economy have confirmed that the resilience of healthcare systems is a crucial factor in ensuring their effective operation in various crises. The research relevance is determined by the need to develop economic strategies that will help improve the efficiency of healthcare systems and their adaptation to new challenges. Investment in regional healthcare infrastructure and the introduction of innovative technologies were emphasised. This will not only improve the quality of medical services but also reduce regional inequalities in their provision, ensuring more equal access to medical resources across the country.

The World Health Organisation (WHO) (2024) synthesises post-2017 reform progress (single purchaser, explicit benefit package/Medical Guarantee Programme, and an increasingly mature eHealth backbone) while

documenting how these arrangements were stress-tested by the full-scale invasion and associated demographic, epidemiological, and fiscal shocks. The review argues that prior financing reforms materially supported continuity of service delivery, yet identifies persistent constraints, especially under wartime budget compression, around out-of-pocket burdens, equity of access across regions, and the need to further optimise purchasing and provider-payment design to improve allocative efficiency and protect vulnerable groups (Leshchenko and Leshchenko, 2023).

In peer-reviewed policy debate, Habicht *et al.* (2024) conceptualise Ukraine's progress toward universal health coverage as a function of institutional attributes that enabled rapid adaptation during wartime (including governance arrangements and financing instruments), but they also highlight that maintaining UHC trajectories during conflict requires deliberate fiscal and administrative choices, not merely emergency mobilisation. Complementing this, Murphy and Kovtoniuk (2025) present Ukraine as an illustrative case of health-system resilience after three years of full-scale invasion, emphasising the practical role of the Medical Guarantee Programme, primary-care financing, and service-package revision (including mental health and rehabilitation), while also underscoring the continuing pressures created by infrastructure damage, workforce disruption, and recurrent security risks.

Beztelesna *et al.* (2024) empirically associate provider behaviour and patient choice with increased competition and shifting utilisation patterns under reform – relevant to analyses of how incentives operate when resources are scarce and accountability requirements intensify. In parallel, Mudge *et al.* (2025) argue that Ukraine's reconstruction window makes digital health architecture a core enabling condition for recovery: the policy case for a future-facing digital system is advanced explicitly as a mechanism to scale access, sustain continuity amid displacement, and improve system-level coordination. Finally, recovery-oriented policy documentation, including the Government's health-care recovery planning and World Bank programme materials, situates health reform within broader reconstruction finance, emphasising targeted investments, strengthened purchasing capacity, and institutional performance improvements as prerequisites for equitable rebuilding (The National Council for the Recovery of Ukraine from the Consequences of the War, 2022).

Existing studies primarily address individual aspects such as governance adaptation, financing reforms, or system resilience under crisis, but lack an integrated economic and comparative perspective. In contrast, this study provides a comprehensive analysis that combines regulatory review, longitudinal financial data, regional equity assessment, and international comparison, thereby offering a more rigorous and policy-relevant understanding of how healthcare financing, incentives, and resource allocation shape access and sustainability under wartime conditions.

The novelty of this study lies in its comprehensive assessment of healthcare reform in Ukraine under concurrent pandemic and wartime conditions, integrating economic analysis, regulatory review, and international comparison. Unlike previous studies that examine individual aspects of healthcare financing or governance, this research focuses on the interaction between economic factors, regional disparities, behavioural incentives, and technological innovation. The significance of the study is determined by its policy-oriented approach, offering economically grounded recommendations to improve the efficiency, accessibility, and resilience of the healthcare system in conditions of prolonged economic and institutional instability.

The study aimed to analyse the impact of economic factors on the reform of the healthcare system in Ukraine in the context of current challenges. To achieve this goal, the existing problems of healthcare financing and management, which have become particularly evident during the COVID-19 pandemic, were analysed, and the possibilities of introducing innovative technologies and improving regional infrastructure to increase the efficiency of healthcare services were explored.

1. Materials and Methods

The study covered the period from 2019 to 2025, which is characterised by significant changes in the financing and functioning of the Ukrainian healthcare system under the influence of both internal economic factors and external challenges, including the COVID-19 pandemic and the war. For a comprehensive assessment of the reform processes, quantitative and qualitative data were used to analyse the dynamics and effectiveness of the implemented measures.

The first stage of the study was a detailed analysis of regulatory documents that affected the reform of the healthcare system in Ukraine. The Law of Ukraine No. 2168-VIII "On State Financial Guarantees of Medical Service to the Population" (2018) was central to this analysis. The Resolution of the Cabinet of Ministers of Ukraine No. 410 "On Approval of the Procedure for the Implementation of State Guarantees of Medical Care for the Population" (2018) was analysed. The Order of the Cabinet of Ministers of Ukraine No. 1013-p "On Approval of the Concept of

Reform of the Financing of the Healthcare System” (2016), which provides for significant changes in the mechanisms for financing medical institutions, was also examined. In addition, the National Strategy for Building a New Healthcare System in Ukraine for the Period 2015-2025 (2014) was analysed, which establishes the main strategic directions for the development of the sector, including the introduction of innovative technologies, telemedicine and infrastructure modernisation. The effect of these legal acts on the structure and functioning of medical services, access to medical care in different regions of the country, and the integration of new technologies such as telemedicine was emphasised. The stage aimed to identify the legal basis and main directions of reforms that had a direct impact on the financing and management of the healthcare system in Ukraine. The assessment of the impact of these documents determined how effectively they respond to current challenges, in particular, financial constraints and problems of medical resource management, identifying potential weaknesses that need to be further improved.

The second stage involved the use of statistical data provided by the Cabinet of Ministers of Ukraine, in particular: Ministry of Finance of Ukraine (2024) data on healthcare expenditures in 2023, data on state budget expenditures in 2021 (MinFin, 2025a), and information on healthcare expenditures in 2022 and 2019 (Ministry of Finance, 2023; MinFin, 2025b). This data included not only information on the dynamics of financing the sector, but also indicators on private investment in the healthcare sector and per capita expenditures. The statistical indicators were used to track trends in healthcare financing and assess their impact on the availability and quality of healthcare services, especially in remote regions.

The third stage of the study employed a structured international comparative analysis of healthcare governance models in Ukraine and selected European countries (Poland, Germany, the Czech Republic, and Switzerland). These countries were chosen based on the following criteria: (i) geographic and historical proximity to Ukraine (Poland and the Czech Republic), (ii) differing but well-established healthcare financing and insurance models (Germany and Switzerland), and (iii) availability of comparable and reliable statistical data from international databases (World Health Organisation (WHO) (2023), World Bank Group (2025a, 2025b)).

To ensure methodological comparability, the analysis was conducted using a uniform set of indicators grouped into four analytical dimensions: (1) healthcare financing structure, including public health expenditure as a percentage of GDP and per capita health expenditure; (2) insurance and governance model, distinguishing between tax-based, social health insurance, and mixed systems; (3) cost-containment and financial sustainability mechanisms, such as co-payments, pooled purchasing, and regulatory price controls; and (4) access and equity indicators, including population coverage, out-of-pocket expenditure share, and access to healthcare services across different socio-economic groups.

The comparative assessment focused on how each governance model responds to common systemic challenges, namely chronic underfunding, demographic ageing, and rising healthcare costs. Data were analysed using descriptive and comparative methods to identify structural advantages and limitations of each model. Particular attention was paid to policy instruments and governance practices that demonstrate effectiveness in maintaining financial sustainability while preserving equitable access to healthcare services. The results of this comparison were subsequently evaluated in terms of their potential adaptability to the institutional, economic, and social context of Ukraine.

2. Results

Given the internal economic problems and external threats such as war, the reorganisation of the healthcare system is one of the top priorities for Ukraine in the current environment. The healthcare system faces many challenges, including underfunding of the sector, outdated equipment, a shortage of qualified staff and insufficient access to healthcare services. Considering these circumstances, cost-effective reforms are of utmost importance.

As financing and optimisation of resources are fundamental to creating a sustainable and competitive healthcare system, economic factors are substantial in determining the feasibility and effectiveness of reforms. Innovative technologies are an important part of the reform as they can significantly improve the quality of healthcare services and reduce costs, but their implementation requires appropriate financial and economic plans (Panchenko *et al.* 2018; Ketners *et al.* 2024). In this situation, an analysis of economic factors is important to assess the success of current reforms and to develop plans.

The transformation of the healthcare system in Ukraine is based on several key regulatory documents that have significantly influenced the development of the sector. One of the central regulatory acts is the Law of Ukraine No. 2168-VIII “On State Financial Guarantees of Medical Service to the Population” (2018), which introduced a new model of financing medical institutions based on the principle of “money follows the patient” based on the 2018 Medical Reform (Zaporizhzhia City Council, 2025). This approach was designed to improve the efficiency of public

resource use and encourage medical institutions to improve the quality of services. According to the regulatory framework, patients are formally granted the right to choose their doctor and medical institution. There is evidence indicating that this mechanism may contribute to improvements in service quality, although its effects vary across regions.

Hospitals in large cities, where patient volumes are higher, tend to receive comparatively more funding, while healthcare facilities in remote regions face persistent resource constraints (Hasanov *et al.* 2025; Moskalenko *et al.* 2025). According to recent analyses by WHO/Europe and national recovery planning documents, these financial pressures have contributed to the consolidation and restructuring of healthcare networks, including the reduction or reorganisation of some rural facilities. Available evidence suggests that such changes may affect physical access to services in sparsely populated areas if compensatory measures (*e.g.*, strengthened primary care, mobile units, or telemedicine) are not adequately implemented (World Health Organisation (WHO), 2025; The National Council for the Recovery of Ukraine from the Consequences of the War, 2022). This distribution of resources has not only deepened regional disparities in the provision of healthcare services but also demonstrated the need for further improvements in the financing mechanism.

The next important stage of the reforms was the Order of the Cabinet of Ministers of Ukraine No. 1013-p “On Approval of the Concept of Reform of the Financing of the Healthcare System” (2016), which consolidated the transition to the state insurance model. This was intended to relieve the state budget by attracting additional insurance resources to finance healthcare services. In practice, the implementation of this model can optimise healthcare costs and use public funds more rationally. However, there were difficulties with the management of insurance funds, which led to insufficient financial support for some medical institutions. The lack of proper control over the use of funds in some regions has worsened the situation with access to quality healthcare services for socially vulnerable groups.

An additional impetus to healthcare reform was provided by the Resolution of the Cabinet of Ministers of Ukraine No. 410 “On Approval of the Procedure for the Implementation of State Guarantees of Medical Care for the Population” (2018), which defined the rules for implementing state guarantees for medical care for the population through the National Health Service of Ukraine. It introduced mechanisms for financing healthcare services, which contributed to increased transparency and predictability in the allocation of resources. It also improved the efficiency of planning of medical institutions and increased their financial stability. However, the problem of uneven distribution of financial resources between different types of institutions was also evident, which only contributes to the existing disparities.

“The National Strategy for Building a New Healthcare System in Ukraine for the Period 2015-2025” (2014) is one of the most important strategic documents. This document defines the main directions of the healthcare system’s development. These areas include the introduction of innovative technologies, the development of telemedicine and the implementation of the latest solutions to improve the efficiency of healthcare services. Although the strategy has had many benefits, including the creation of an electronic healthcare system and the attraction of foreign investment, the lack of funding for healthcare facilities in the regions remains a problem (Yaremko and Dumych, 2025). Currently, one of the challenges for Ukraine’s healthcare system is that the integration of new technologies requires not only financial resources, but also the training of personnel to operate them.

These reforms coincide with ongoing disparities between urban and rural healthcare facilities, underscoring the need for further improvements in healthcare financing and governance. Policy reviews by WHO/Europe emphasise that such disparities are influenced not only by reform design but also by wartime disruptions, demographic change, and fiscal constraints, which jointly shape access outcomes across regions (World Health Organisation (WHO), 2025; Murphy and Kovtoniuk, 2025).

An analysis of key economic indicators in the Ukrainian healthcare system assessed the dynamics of financing and identified the main trends in the development of the industry. The period from 2019 to 2025 has seen significant changes, in particular due to the impact of the COVID-19 pandemic and full-scale invasion, which have forced the government to increase healthcare spending. While public funding for healthcare has been steadily increasing, so needs to modernise infrastructure and ensure access to quality healthcare. At the same time, private investment remains insufficient to fully support the development of the system, especially in remote regions. Per capita healthcare expenditures show a downward trend in dollar terms, which likely reflects broader macroeconomic pressures and currency devaluation, limiting the state’s capacity to fully cover the cost of medicines and medical equipment. Table 1 shows the main economic indicators in the healthcare sector of Ukraine for 2019-2025.

Table 1. Analysis of key economic indicators in the healthcare system

Year	Healthcare expenditures (billion UAH)	Public expenditures (billion UAH)	Private investment (billion UAH)	Expenses per capita (USD)
2019	131.7	95.1	-	104
2020	131.3	114.6	8.2	159
2021	170.5	132.7	9.4	144
2022	215.3	187.2	10.6	136
2023	217.4	181.8	11.2	116
2024	238.7	204.2	11.8	110
2025	253.7	217.0	12.5	105

Source: compiled by the author based on MinFin (2025a, 2025b, 2025c, 2025d, 2025e).

The analysis of key economic indicators in the Ukrainian healthcare system for 2019-2025 shows a significant increase in state funding, which is a prerequisite for supporting the industry, especially in the context of the pandemic and military operations. Despite the overall increase in expenditures, the main challenges remain: a decline in per capita expenditures in dollar terms, which reflects growing economic instability and hryvnia devaluation, as well as insufficient private investment. Public funding is mainly allocated to current expenditures, including wages and medicines, while investments in the modernisation of medical infrastructure are insufficient. This highlights the need for additional measures to attract private capital and to use public funds more efficiently to ensure that healthcare services are accessible and of a quality that meets European standards.

To analyse the percentage by which the annualised growth rate of per capita healthcare spending falls short of the annualised growth rate of per capita gross domestic product (GDP), the following formulas are proposed (1-3):

$$\text{CAGR1} = (\text{EV1}/\text{BV1})^{(1/n)} - 1, \quad (1)$$

$$\text{CAGR2} = (\text{EV2}/\text{BV2})^{(1/n)} - 1, \quad (2)$$

$$\text{CAGR}\Delta = \text{CAGR1} - \text{CAGR2}, \quad (3)$$

where: CAGR1 – compound Annual Growth Rate of healthcare spending per capita; CAGR2 – compound Annual Growth Rate of GDP per capita; EV1 – ending value of healthcare spending per capita; EV2 – ending value of GDP per capita; BV1 – beginning value of healthcare spending per capita; BV2 – beginning value of GDP per capita; n – number of years.

The resulting -6% for Ukraine confirms the shortfall of Healthcare Spending CAGR during 2019-2025 relative to GDP CAGR for the same period (World Bank Group, 2025b).

In the process of changing the healthcare system, it is also necessary to account for elements of behavioural economics. Behavioural economics studies how psychological, social and emotional factors influence people's economic decisions (Shafa, 2021; Panteghini, 2000). Implementing reforms in the Ukrainian healthcare system can be more effective if it incorporates not only economic indicators and government strategies, but also the behaviour of healthcare professionals, patients and other system stakeholders. Behavioural economics can better influence healthcare decisions and programmes.

The use of incentives, or "nudges", to change behaviour is one of the core concepts of behavioural economics. In healthcare, this can include providing doctors and healthcare facilities with financial incentives to achieve certain outcomes or provide better medical services. Hospitals that improve patient survival rates or reduce infectious diseases may receive more funding (Leontyev and Ketners, 2023; Drobyazko *et al.* 2019). This improves efficiency and encourages healthcare professionals to adopt new treatments. Behavioural approaches can also motivate patients to adopt healthier lifestyles, which reduces the burden on the healthcare system in the long term. For example, offering discounts on health insurance to those who maintain a healthy lifestyle or undergo regular medical check-ups can have a positive impact on overall health (Peredalo *et al.* 2019).

The use of “nudges” for patients is an important tool. For instance, offering discounts on health insurance to patients who regularly undergo medical check-ups or follow a healthy lifestyle. This reduces the incidence of chronic diseases and, consequently, reduces the burden on the healthcare system in the future, as the number of expensive medical procedures and inpatient treatment is also reduced.

Another effective method is the creation of patient awareness platforms. E-reminder systems or personalised health plans can help patients control their health, which will facilitate timely visits to the doctor, reducing the number of serious illnesses and hospitalisations.

The literature and conceptual analysis suggest that the use of incentives for doctors and patients may have a broad economic impact, although the magnitude of this effect depends on institutional design and implementation conditions. Improving the health of the population by encouraging healthy habits reduces treatment costs, reducing the need for expensive medical procedures and hospitalisation. Investing in prevention is more effective in the long run, as it reduces the cost of treating diseases that could have been prevented (Aliyev, 2014; Vazova *et al.* 2025).

The integration of behavioural economics into the reform of the Ukrainian healthcare system will significantly improve the efficiency of healthcare services. The use of financial incentives for doctors and patients, as well as innovative approaches to health management, will reduce treatment costs, reduce morbidity and improve the quality of healthcare services in the country (Niyazbekova *et al.* 2023; Shtal *et al.* 2023).

Decision-making under uncertainty is another important element of behavioural economics. Medical decisions are often made under conditions of limited time and information, which can lead to erroneous or incomplete decisions by both doctors and patients. Behavioural economics approaches can help people make decisions by providing them with better tools to analyse treatment options, disease prognoses, or choose healthcare providers (Panteghini, 2006; Nitsenko *et al.* 2024). In particular, the quality of medical decisions can be significantly improved by introducing AI-based systems that offer the best treatment options based on the statistics and medical indicators of each patient.

Thus, in the process of reforming the healthcare system, the introduction of behavioural economics principles can contribute to a more rational use of resources, reduce costs and improve the quality of medical services. This can be used to develop a long-term healthcare model that considers not only technological and financial aspects, but also behavioural factors that influence medical decision-making and treatment outcomes. A comparison of economic models of healthcare management in different countries reveals several important examples that could be useful for reforming the Ukrainian system. In particular, Poland, which has a system of compulsory social health insurance, demonstrates both the advantages and disadvantages of this strategy. Despite the wide coverage of the population and access to basic healthcare services, the level of funding remains low compared to other countries. This limits the ability to modernise infrastructure, improve the quality of healthcare services and ensure a sufficient number of healthcare workers, especially in rural areas. In such circumstances, increased investment and improved financing are needed to ensure the sustainability of the healthcare system.

Accordingly, Germany and Switzerland have more stable healthcare financing models based on compulsory health insurance with high contribution rates, which improves the efficiency of management. Health insurance premiums in Germany account for a significant percentage of income, which guarantees stable funding for private and public healthcare systems. Switzerland has compulsory health insurance and a model where patients bear partial costs of medical services. This allocates resources more optimally. This guarantees a high level of medical services, access to modern technologies and continuous development of medical facilities (Durdykulyyeva, 2025).

The experience of these models provides evidence indicating that healthcare provision can be improved through mixed financing arrangements, private investment, and strengthened social insurance systems, subject to adaptation to national contexts such as Ukraine's. Germany and Switzerland show how well-developed insurance systems can ensure stable financing and high levels of healthcare services, while Poland's experience highlights the need to invest in infrastructure and expand access to healthcare services.

The Czech Republic is another country with which to compare, as its healthcare system is based on compulsory health insurance that covers all people and provides broad access to healthcare services. To maintain a high level of healthcare services, the Czech Republic has one of the highest shares of public funding for healthcare among European countries. Quality management systems are widely used in the Czech Republic, such as accreditation of healthcare facilities according to international standards (*e.g.*, International Organisation for Standardisation (ISO) 9000) (Czechia: Health..., 2023). This improves the structure and efficiency of healthcare facilities.

The Czech healthcare system is committed to maintaining high standards of care and continuously improving services. Increasing the number of accredited hospitals and implementing quality management systems in clinical practices are important components, as they improve patient safety and reduce medical errors. At the

same time, the Czech healthcare system still faces two challenges. These are rising healthcare costs due to the national economic difficulties and a shortage of medical staff, especially in rural areas.

Ukraine could employ the Czech model, in implementing accreditation standards and investing in improving the quality of healthcare services. The use of quality management and accreditation systems will help improve the efficiency of medical institutions and strengthen patients' trust in the services provided (Musayeva *et al.* 2025; Abbasova *et al.* 2023).

Another important example is Germany, which has the oldest health insurance system in the world, based on the Bismarck model. The system is based on compulsory insurance through numerous social insurance funds financed by contributions from employees and employers. The main goal of the German system is to ensure high-quality healthcare services while controlling costs. However, Germany has faced challenges related to changes in the demographic structure and an ageing population, which negatively affected the healthcare financing system (Breckenkamp *et al.* 2007).

Germany actively uses measures to manage the quality of healthcare services, such as external comparative hospital quality management. This ensures regular monitoring and evaluation of the quality of healthcare facilities, providing open data to assess their performance. The introduction of internal quality management systems in hospitals, which became mandatory in 2004, is also important. These steps improved the quality of healthcare services, but there have also been problems, including bureaucratic obstacles and problems with obtaining reliable data. Table 2 highlights a comparison of the healthcare models of the above countries.

Table 2. Comparison of healthcare models

Country	Healthcare model	Primary sources of funding	Issues
Poland	Compulsory health insurance through the National Health Fund		Low funding in rural areas, waiting lists for specialised care
Czech Republic	Universal health insurance, state funding	Social Contributions, government funding	Shortage of medical staff, rising costs of medical services
Germany	Multi-channel compulsory health insurance (Bismarck model)		Rising costs, ageing population
Switzerland	Mandatory health insurance with partial payment for services by patients	Contributions from the public, private insurance, and public funding	High costs of medical services, regional differences in access to services

Source: compiled by the author based on Smarżewska *et al.* (2022), Briš *et al.* (2018), Schusselé Filliettaz *et al.* (2021).

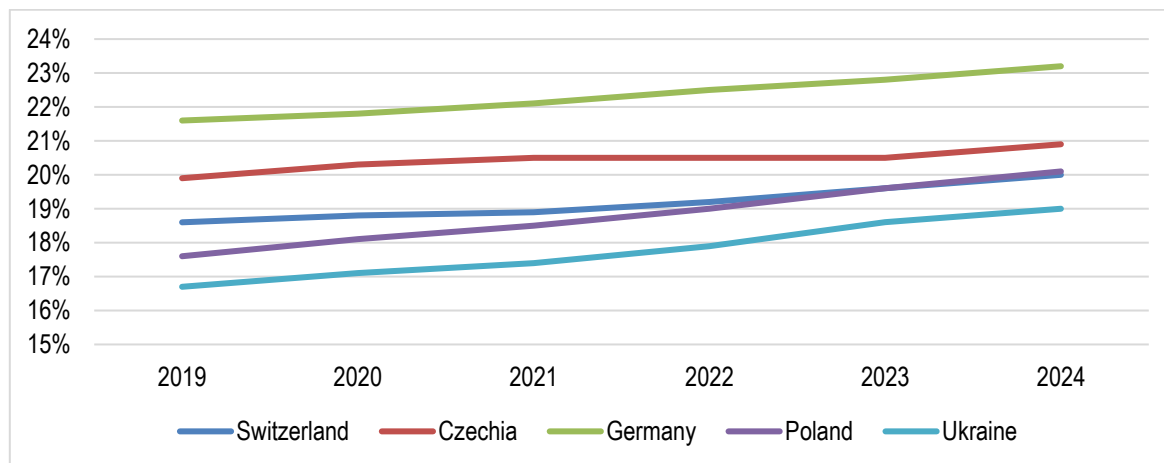
Although all four countries have compulsory health insurance systems, they face different challenges depending on the financing and structure of their systems. Poland, which relies on compulsory health insurance through the National Health Fund, needs additional funding to address problems with access to healthcare in rural areas and reduce waiting times for specialised treatment. This points to the need for infrastructure improvements and increased funding in certain regions. The Czech Republic, with a comprehensive compulsory health insurance system, continues to face a shortage of medical personnel and rising healthcare costs. To maintain an effective healthcare system, attention must be paid to attracting new staff and improving human resources, and strategies to optimise costs must be developed (Aliyeva *et al.* 2025; Fedotova *et al.* 2021). Germany, with its multi-channel insurance system, remains an example of a highly developed healthcare system, but rising healthcare costs and an ageing population pose challenges for long-term financial stability. This requires continuous monitoring and the development of new approaches to effective resource management.

Overall, these examples demonstrate that each system has advantages but also faces unique challenges that require adaptation and reform. Ukraine should incorporate the positive experience of these countries to improve the domestic healthcare system, especially in the areas of financing and optimising healthcare delivery.

Considering the overall trend of the ageing population in the world and in the mentioned countries, and as a result, higher demand for medical services, it is becoming more crucial to find new efficiencies in the Healthcare Systems financing (Figure 1).

The introduction of new technologies into the healthcare system is crucial for increasing cost-effectiveness and improving the quality of healthcare services. Each technology currently in widespread use has unique benefits that help optimise the operation of healthcare facilities and reduce healthcare costs. Modern healthcare has been transformed by the introduction of technologies such as electronic health records, telemedicine, robotic surgical systems and artificial intelligence (AI) (Hasanova and Najafova, 2025; Kovalchuk *et al.* 2024).

Figure 1. Aging populations in selected countries (2019-2024)



Note: percentage of population aged 65+.

Source: compiled by the author based on World Bank Group (2025a).

One of the most important technologies in the modern healthcare system is electronic health records (EHR), which provide a more efficient organisation of medical services. The old record-keeping system was inefficient and error prone. EHRs have greatly simplified access to medical information, providing quick results of examinations, treatment and patient history. This greatly reduces the likelihood of errors, such as incorrect prescriptions or repeated diagnostic procedures (Honavar, 2020). Electronic health records facilitate cooperation between medical institutions and ensure quick information exchange. Access to a single medical database guarantees continuity of care, for example, if a patient changes doctors or visits different doctors. Reduced administrative costs, shorter decision-making times, and reduced need for duplication of medical procedures are economic benefits of implementing EHRs (Dzhedzhula *et al.* 2024; Kussainova *et al.* 2018).

During the COVID-19 pandemic, telemedicine has become particularly relevant as it has become important to reduce physical contact between doctors and patients (Huriev, 2024; Nurusheva *et al.* 2024). Doctors can conduct remote consultations via video calls or special platforms. This greatly simplifies access to medical services for patients, especially those who live in remote areas or have limited mobility. Reduction of the burden on healthcare facilities and the cost of transporting patients can be achieved by reducing the need for personal visits to hospitals. Telemedicine can also provide professional advice, which contributes to faster diagnosis and treatment of diseases at early stages. Subsequently, this reduces the cost of treating chronic diseases, as regular health monitoring via telemedicine platforms provides timely intervention if necessary.

Robotic surgical systems, such as Da Vinci, have revolutionised surgery. Doctors can perform operations with greater precision than is possible with traditional surgery using these systems. The robot can perform complex surgical interventions with minimal incisions, which reduces the risk of complications, the length of time patients recovers and the length of hospital stays. Patients return to normal life faster after surgery, which reduces the cost of postoperative care for healthcare facilities. Robotic systems require significant initial investment, but their use significantly reduces the cost of treatment and rehabilitation after surgery. In addition, robots can perform surgeries with precision that is difficult to achieve with the human hand, which increases the probability of treatment success (Reddy *et al.* 2023).

AI is becoming increasingly important as an important tool in the medical field, especially in the management of large amounts of medical data and diagnostics (Lavrukhina *et al.* 2025; Andriushchenko and Panteghini, 2025). AI can help doctors diagnose diseases more accurately, detect previously unnoticed symptoms, and predict the development of diseases due to its ability to analyse large amounts of information. This provides for faster treatment and the avoidance of complex complications, which reduces the cost of lengthy and complex treatment. AI can also be used to optimise medication management, which can reduce the cost of procuring medicines and increase their effectiveness. AI algorithms can, for example, predict the need for specific medications and prevent overstocks or shortages.

Among other technologies, e-prescriptions are an important step towards automating procedures in the healthcare system. Doctors can issue prescriptions electronically through this technology, which facilitates processing and reduces the likelihood of prescription errors. Patients can get the medicines they need quickly thanks to e-prescriptions, which facilitate the work of pharmacies. To reduce logistics and procurement costs, the introduction of this technology improves control over the distribution and procurement of medicines.

Overall, the reviewed evidence suggests that the introduction of new technologies in the healthcare sector can increase economic efficiency, particularly through reductions in administrative costs and improved service coordination. Modern technologies not only improve the quality of medical services but also reduce overall healthcare costs by optimising medical and administrative processes and reducing treatment costs (Issayeva *et al.* 2024; Gulaliyev *et al.* 2023). Notably, the successful implementation of these technologies requires significant initial investments, but their long-term economic effect justifies these costs.

An analysis of environmental risks and obstacles that may affect the successful implementation of health system reforms is important to assess obstacles that may slow or even prevent the implementation of changes. Limited financial resources are the main risk. Compared to more developed countries, the healthcare system in Ukraine remains underfunded, as is the case in many transition countries such as Bulgaria, Romania and Moldova. Budgetary constraints are a major obstacle to introducing modern technologies, modernising infrastructure and ensuring access to high-quality healthcare services in all regions. In addition, due to problems with transparency and weak governance, resources are often allocated inefficiently, resulting in poor healthcare system performance.

Economic instability caused by conflicts and inflation, the devaluation of the hryvnia and the decline in the country's investment attractiveness are other significant obstacles. Opportunities for long-term planning and implementation of structural reforms in the healthcare sector are limited by constant economic fluctuations. For instance, due to unpredictable costs and the need to respond quickly to economic crises, the introduction of expensive technologies or infrastructure projects becomes problematic.

Inefficient resource management is another significant risk. The implementation of reforms is significantly hampered by weak planning, expenditure monitoring and insufficient coordination between different levels of government. In addition, corruption problems pose additional challenges, as funds may not be used for targeted programmes or may be misused.

In addition, the shortage of personnel and low salaries of healthcare workers are important obstacles that can lead to an outflow of healthcare workers from the country or their refusal to work in the public healthcare system. The shortage of doctors, nurses, and other staff reduces the overall efficiency of the system and makes it difficult to introduce new technologies and programmes. This problem is exacerbated by outdated equipment and a lack of modern technology in many healthcare facilities, as even qualified healthcare professionals cannot provide quality care without the right tools.

Economic risks also include the high costs associated with implementing reforms that require significant short-term investments. For instance, infrastructure upgrades, the transition to electronic medical records, and the purchase of modern medical equipment require significant financial investments that often exceed the capacity of the national budget. The upfront costs can pressure the national financial system, rendering it difficult to simultaneously address other pressing issues such as security and social support (Shahini and Shahini, 2025; Lakbaev *et al.* 2017).

Political instability and constant changes in legislation can also impede reforms. Frequent changes in governments or reform programmes can lead to a lack of public confidence and the cancellation or postponement of important initiatives. This, in turn, delays the process of change and reduces the effectiveness of what is already being done. The main risks that may impede the implementation of reforms are highlighted in Table 3.

Table 3. Key economic risks and their impact on the implementation of healthcare reforms

Economic risk	Impact on the implementation of reforms
Underfunding	Inability to modernise infrastructure, introduce new technologies and ensure access to quality services
Economic instability	High risks of unforeseen expenses, reduced opportunities for long-term planning
Resource management inefficiency	Non-transparent use of funds, loss of part of the budget due to corruption, and reduced productivity.
Staff shortage	Outflow of qualified healthcare workers, insufficient staff to implement reforms
High costs of implementation	The need for significant short-term investments, exceeding budget capacities
Political instability	Political instability can cause unpredictable changes in budgeting and the cancellation or postponement of important reforms, which can delay the implementation of systemic changes and reduce the efficiency of resource use.

Source: compiled by the author.

The successful implementation of healthcare reforms in Ukraine is largely dependent on overcoming numerous economic risks and barriers. Limited funding, economic and political instability, inefficient resource management, staff shortages and high costs of innovation remain key obstacles to modernising the system. To overcome them, strategic approaches are needed to attract investment, improve resource management and ensure stable financing, which will create a sustainable and efficient healthcare system. This will not only improve the quality of healthcare services but also reduce costs, contributing to a more sustainable, affordable and efficient healthcare system that meets European standards.

The establishment of mobile medical clinics and healthcare units is one of the key solutions in reforming the healthcare system in Ukraine, which will improve access to healthcare services in remote areas. Mobile clinics give patients living in rural or hard-to-reach areas the opportunity to receive medical care locally, without having to travel long distances, which is a new and original contribution to the reform. Such clinics will also improve overall access to healthcare services and reduce the burden on inpatient medical facilities.

In addition, an important aspect is the introduction of telemedicine in mobile clinics, which will provide remote consultation with doctors using electronic platforms, receive preliminary consultations and prescriptions using electronic prescriptions. The use of such technologies will significantly reduce administrative costs, increase the efficiency of healthcare services and improve their quality through the rapid exchange of information between healthcare professionals.

These changes will reduce the costs of medical care, transportation of patients and doctors, and administrative costs of record keeping. The introduction of such innovations in healthcare will reduce the cost of serving the population in remote areas, increase the efficiency of using medical resources and ensure more equitable access to healthcare services in the country. At the same time, the use of artificial intelligence to automate diagnostics, predict diseases and determine the best treatment methods is cost-effective, as it will significantly improve the accuracy and speed of decision-making by healthcare professionals.

However, the development of mobile clinics and technologies such as telemedicine and AI comes with certain obstacles. First, it requires significant investment in infrastructure and training for healthcare professionals on how to use the new technologies. Second, the rapid introduction of electronic prescriptions and telemedicine may be hindered by issues related to patient safety and data protection. In addition, there is a risk of uneven distribution of such clinics across regions, which could worsen access to services for part of the population, as well as difficulties in integrating new systems into existing healthcare systems. From an economic point of view, these innovations will help reduce healthcare costs, as most services will be provided directly at the patient's place of residence, reducing transportation and hospitalisation costs. At the same time, the use of electronic prescriptions and telemedicine will save healthcare workers time, increasing their productivity and efficiency. The implementation of such technologies will reduce the cost of manual record keeping, accelerate the process of providing medical services, and improve the accuracy of diagnoses using automated decision support systems. Solutions for improving medical services in Ukraine are presented in Table 4.

Table 4. Solutions to improve healthcare services in Ukraine through mobile clinics and innovative technologies

Problem	The proposed solution	Expected results
Unequal access to medical services between urban and rural areas	Establishment of mobile medical clinics and medical aid stations	Improvement of access to healthcare services in remote areas
Insufficient funding in rural areas	Implementation of public-private partnerships to finance mobile clinics	Attraction of additional financial resources, reducing the burden on the state budget
Lack of infrastructure in remote areas	Introduction of financial reserves to support healthcare facilities in rural areas	Modernisation of medical facilities, purchase of new technologies and equipment
Lack of medical staff in rural areas	Implementation of training and motivation programmes for healthcare professionals to work in rural areas	Increasing the skills and number of healthcare workers in remote regions
Insufficient efficiency in the management of healthcare services	Introduction of electronic prescriptions and telemedicine for remote consultations	Reduced administration costs and improved decision-making speed

Source: compiled by the author.

The proposed solutions, such as the creation of mobile medical clinics and the introduction of innovative technologies, can significantly improve the accessibility of healthcare services to the population, reduce healthcare

costs and ensure that all people in Ukraine, especially those in rural and remote areas, have equal access to healthcare services. They have great potential to improve the quality of healthcare services and the overall level of healthcare in the country.

3. Discussions

Fredriksson (2024) examined Sweden's healthcare policy and its impact on access to healthcare. The study demonstrated the importance of removing financial barriers to improve access. In Ukraine, reforms face challenges due to insufficient funding and a lack of governance coherence.

Biró and Prinz (2019) determined that healthcare expenditures are correlated with income, which is also the case in Ukraine, where higher incomes provide better access. However, due to economic difficulties, these barriers may be more significant.

Sparkes *et al.* (2022) noted that political and economic factors influence the implementation of reforms. Their findings are consistent with the results of this study on the impact of social and political realities on reforms in Ukraine.

Husereau *et al.* (2022) addressed the development of standards for economic evaluation in health care, which is important for decision-making and resource management. The study emphasised the importance of standardising valuation methods to ensure transparency and comparability across countries, which is relevant for healthcare reform in Ukraine. They also emphasised the need to incorporate socio-economic conditions when interpreting the results of economic evaluations, which is important for Ukraine due to challenges such as underfunding and inequalities in access to services. The main differences between the study by Husereau *et al.* (2022) and this study are related to the maturity of economic valuation mechanisms, which are still in their infancy in Ukraine.

Clements *et al.* (2012) examine the economic aspects of health care reforms, in particular the financing and cost-effectiveness issues associated with rising health care costs due to demographic factors and technological advances. The findings of this study are consistent with the findings of Clements *et al.* (2012) that rising healthcare costs are a major challenge. The study also emphasised the need for a balance between quality of service and cost control, which is consistent with the findings of this study on the efficient use of public resources and the attraction of private capital for infrastructure modernisation.

Sorum *et al.* (2023) analysed the use of automation to improve access to healthcare services and reduce administrative costs. The results are consistent with the findings of the current study, which also confirms the importance of reducing administrative barriers to improve system efficiency. The study by Sorum *et al.* (2023) emphasised behavioural aspects, while in the presented context, the economic challenges are addressed, due to limited resources.

Denis *et al.* (2023) analysed reforms in Canada and the political challenges faced by the healthcare system. In Ukraine, there are also political and economic obstacles to reforms, due to insufficient funding. The difference is that in Canada, the problems were with policy coordination between governments, while in Ukraine, they were associated with economic stability.

Guo *et al.* (2022) demonstrated how reforms in China have improved access to healthcare services, but inequalities between urban and rural areas persist. This is also the case in Ukraine, where unequal access to healthcare services is a substantial issue, particularly in rural areas due to a lack of staff and funding.

Jarvis *et al.* (2023) highlight the impact of centralisation of resources in Canada on improving coordination, but also on limiting local responsiveness to needs. This is in line with the findings of the current study, which also mentions that centralisation can negatively affect the distribution of resources between urban and rural areas. Ikegami (2024) analysed the economic feasibility of healthcare reforms in terms of access to healthcare services, efficiency of healthcare delivery, and use of pharmaceutical products. The study highlighted that, even in developed countries, willing-to-pay patients have better access to specialised care. In addition, the study underlined the importance of standardising clinical procedures to improve efficiency, as well as the importance of assessing the value of medicines based on cost-benefit analysis.

Discussing the results of the study is important for understanding the economic factors that influence healthcare reform. The data confirm the need to adapt economic models to ensure accessibility and improve the quality of healthcare services. This correlates with the findings of Jakovljevic *et al.* (2023), emphasising the importance of financial inputs to achieve sustainable health development in low- and middle-income countries. The study also demonstrated that investments in infrastructure and new technologies have a significant impact on the efficiency of healthcare services. As noted by Jakovljevic *et al.* (2023), public funding and private investment should be balanced to ensure access to healthcare for all segments of the population.

Overall, the results of the study point to the need to integrate economic models of healthcare management that have proven effective in other countries to improve the Ukrainian system. The use of similar approaches as described by Jakovljevic *et al.* (2023) could be a key factor in improving health outcomes in Ukraine.

Habicht *et al.* (2023) analysed the impact of national health system reforms on economic sustainability and equitable access to health services. The study emphasised the importance of effective financial management, including balancing public investment and private financing, to ensure equal access to healthcare for all segments of the population.

The results of this study are consistent with the findings of Habicht *et al.* (2023) that proper financial management is critical for the successful implementation of healthcare reforms. Both studies emphasise the importance of securing stable funding to support the sustainability of health services in times of economic instability. However, this study addressed the challenges faced by the Ukrainian healthcare system as a result of the military operations and the economic crisis, while Habicht *et al.* (2023) addressed general aspects of financial management in different countries. The World Health Organization (WHO) (2025) emphasizes the centrality of equitable access to essential health services (including in underserved and remote communities), together with robust health financing, transparent priority-setting, and effective governance as prerequisites for health-system sustainability and universal health coverage. In the context of Ukraine, WHO/Europe's recent analyses additionally foreground system resilience under wartime shocks and the need to align public and partner resources with strategic priorities, including stronger governance of capital investment and health-care network transformation (*e.g.*, consolidation and strengthened primary/community care) to improve efficiency and population-level outcomes. These emphases are consistent with the present study's conclusions regarding access constraints in resource-limited settings and the importance of management efficiency and investment mobilisation; however, the study places comparatively greater weight on the economic consequences of hostilities for service continuity and financial sustainability, thereby extending and specifying the war-related macro- and meso-level pressures highlighted in WHO/Europe's recent reviews of Ukraine's health financing reform and recovery trajectory.

The analysis of the implementation of new economic models of healthcare management in Ukraine and comparison with the studies of other authors demonstrates that, despite some convergence in conclusions, there are significant differences. Studies confirm the importance of removing financial barriers, increasing access to healthcare services and improving financing mechanisms. However, Ukraine faces unique challenges, including underfunding, inequalities in access to healthcare services, and political and economic instability due to the war.

Implementing reforms in Ukraine requires adapting international experience to local conditions, especially given the limited resources and geographical inequalities. Comparisons with other countries show that attracting investment, introducing innovations, and optimising management models are key to the successful modernisation of the Ukrainian healthcare system.

Conclusions and Further Research

This study demonstrates that the transformation of Ukraine's healthcare system is not merely a managerial or technological challenge but a matter of urgent public policy that directly affects social stability, regional cohesion, and long-term economic resilience. The findings indicate that chronic underfunding, combined with the uneven territorial distribution of financial and human resources, has become a structural weakness of the healthcare system. In policy terms, this necessitates a revision of intergovernmental fiscal allocation mechanisms, particularly those linked to the "money follows the patient" principle, to ensure that rural and conflict-affected regions receive compensatory financing that reflects higher service delivery costs and lower population density.

A key policy implication of the study is the need to institutionalise targeted equalisation instruments within national healthcare financing. This includes the introduction of adjustment coefficients for rural and frontline regions, earmarked subventions for essential healthcare services, and minimum service availability standards enforced by the National Health Service of Ukraine. Without such regulatory corrections, existing financing rules may risk further deepening regional inequalities, particularly in rural and conflict-affected areas.

The results also provide strong evidence that digitalisation and technological innovation should be treated as core elements of state healthcare policy, rather than auxiliary modernisation tools. The implementation of electronic medical records, telemedicine, e-prescriptions, and automated management systems has direct fiscal implications: reducing administrative expenditure, limiting informal payments, improving expenditure transparency, and enabling real-time monitoring of service provision. From a public policy perspective, this requires the adoption of a national digital health investment programme, supported by medium-term budget planning and clearly defined performance indicators, rather than fragmented pilot initiatives.

Another important conclusion concerns healthcare investment policy. Given the limited fiscal capacity of the state under conditions of war and economic instability, the study confirms that public–private partnerships (PPPs) and regulated private investment must become a formal component of healthcare governance. Policymakers should prioritise the development of a predictable regulatory framework for private participation, including guarantees for investors, transparent procurement procedures, and safeguards to ensure that private capital complements rather than replaces public responsibility for essential services. Such an approach would allow the state to focus public resources on universal coverage while leveraging private investment for infrastructure modernisation and technological upgrading.

The findings further highlight that healthcare reform cannot succeed without human resource policy interventions. Persistent staff shortages, especially in rural areas, indicate the need for targeted public programmes that combine financial incentives, housing support, and career development opportunities for medical professionals. These measures should be embedded in national and regional healthcare strategies rather than implemented as temporary or ad hoc solutions.

At the same time, this study has several limitations that are relevant for policy interpretation. Ongoing military operations and economic disruptions limited comprehensive regional coverage, which constrains the generalisability of some conclusions. In addition, the lack of fully harmonised post-pandemic data restricts long-term evaluation of COVID-19-related policy effects. These limitations underline the need for continuous data collection and adaptive policy monitoring mechanisms within the healthcare system.

Future research should therefore focus on policy evaluation and impact assessment, particularly the cost-effectiveness of digital health technologies, public-private partnership models, and behavioural incentives for providers and patients. Further comparative studies at the regional level are also needed to assess how differentiated financing instruments and governance models perform under conditions of economic instability and demographic change. Such research would provide an empirical basis for refining healthcare policy instruments and ensuring the long-term sustainability, equity, and resilience of Ukraine's healthcare system.

Declarations

Declaration of Competing Interest: The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of use of generative AI and AI-assisted technologies: The author declares that he has not used generative AI.

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