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Transformation of Inpatient Healthcare Under Financing Reform, Pandemic, and Martial Law: A Case Study of Hospitals in Zhytomyr Region (2014–2024)

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Трансформація стаціонарної медичної допомоги в умовах реформи фінансування, пандемії та воєнного стану на прикладі лікарень Житомирської області (2014–2024 рр.)

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Introduction

The healthcare system of Ukraine has undergone fundamental transformations in recent years, driven by both internal reforms and external challenges of unprecedented scale. The healthcare financing reform, initiated in 2017 and implemented at the hospital level in 2020, radically changed the principles of resource allocation – from funding based on the number of beds to payment for actually provided services within the framework of the Medical Guarantee Program [1]. This transformation coincided with the global COVID-19 pandemic and the full-scale military aggression of the Russian Federation against Ukraine, creating a unique combination of factors affecting hospital network functioning.

The historical context of the Ukrainian healthcare system development reveals a prolonged reform process. Turchina M.O. and Kazak R.A. (2023) analyzed the historical and legal experience of Ukraine's healthcare system development, including the evolution of approaches to hospital bed capacity organization [2]. These studies emphasize that current transformations represent a logical continuation of long-term attempts to optimize the healthcare sector.

The optimization of hospital bed capacity and staffing has been a persistent challenge for the Ukrainian healthcare system. In 2015, the government established standards for hospital bed provision per 10,000 population [3], intended to guide facility network planning.

Karol K. et al. (2021) investigated the importance of good governance in hospital payment reform in Ukraine, emphasizing the role of institutional factors in reform success [4]. International experience with diagnosis-related group payment systems, analyzed by Kalanj K. et al. (2021) using Croatia as an example, demonstrates the potential for improving resource utilization efficiency when transitioning to new financing models [5].

The medical and demographic situation in Ukraine, characterized by Slabkyi G.O. et al. (2019) as a global public health problem, creates additional challenges for the inpatient care system [6]. The authors note negative demographic trends, including population aging and the growing burden of chronic non-communicable diseases, affecting the need for hospital beds and the structure of hospitalizations.

The COVID-19 pandemic emerged as a global challenge for healthcare systems, fundamentally altering approaches to inpatient care organization. International research demonstrates significant pandemic impact on hospitalization rates and bed utilization. Kalanj et al. (2021) analyzed COVID-19's impact on hospitalizations in Croatia, revealing substantial changes in the structure and volume of inpatient care, including reduced elective admissions and bed repurposing for COVID-19 patients [7]. Similar trends were observed in Germany, where the pandemic affected neurological hospitalizations [8]. Reif S. and Schubert S. (2024) thoroughly analyzed hospital capacity reporting mechanisms in Germany during the pandemic, identifying the importance of transparent and timely information for effective resource management [9].

The Russian Federation's military aggression against Ukraine, initiated in February 2022, added new dimensions to healthcare system transformation. Zub V.O. and Kotuza A.S. (2022) analyzed the state of oncological care during wartime, revealing significant difficulties in ensuring continuity of specialized treatment [10].

WHO reports highlight the unique resilience of Ukraine's healthcare financing system under war

conditions. The report "Health financing in Ukraine: resilience in the context of war" (2022) emphasizes that despite military actions, Ukraine continued implementing reforms and ensured the functioning of the Medical Guarantee Program [11]. The updated report "Health financing in Ukraine: reform, resilience and recovery" (2024) demonstrates the system's adaptation to wartime conditions and outlines recovery prospects [12]. These documents underscore the importance of continuing reforms even under crisis conditions and the necessity of flexibility in healthcare system management.

The Ukrainian government continues developing the regulatory framework to ensure healthcare system functioning under new conditions. The Cabinet of Ministers Resolution of February 28, 2023, regarding the organization of a capable network of healthcare facilities [13] and the resolution of December 22, 2023, on implementing the state medical guarantee program for 2025 [1] demonstrate aspirations for further facility network optimization and financing mechanism improvement.

However, despite research on individual aspects of healthcare system transformation, there is a lack of comprehensive analysis of hospital performance indicator dynamics at the regional level, considering the cumulative impact of financing reform, the COVID-19 pandemic, and martial law. Particularly important is the study of long-term trends, enabling identification of both gradual changes associated with system reform and sharp fluctuations caused by crisis phenomena. Zhytomyr region, as a typical region of Central Ukraine, can serve as a representative example for analyzing transformation processes in regional healthcare systems.

The research relevance is underscored by the need for a scientifically grounded approach to planning inpatient care development under ongoing crises and limited resources. Understanding the dynamics of key indicators and their influencing factors is critically important for formulating effective healthcare policy at regional and national levels.

The aim of this study is to conduct a comprehensive analysis of hospital bed capacity dynamics, inpatient care volumes, and hospital staffing in Zhytomyr region during 2010–2024 to identify the impact of healthcare financing reform, the COVID-19 pandemic, and martial law on regional inpatient care system functioning. The research aims to identify key hospital network transformation trends and assess the regional healthcare system's adaptive capacity to systemic challenges, with the goal of formulating evidence-based recommendations for further inpatient care development under ongoing crisis conditions.

Object, materials and research methods

The object of this study is the inpatient healthcare system of Zhytomyr region, represented by the network of hospital facilities of all forms of ownership and subordination functioning within the region. The subject of the study comprises indicators of resource provision (human resources, bed capacity) and performance outcomes (number of treated patients, bed utilization indicators) of inpatient healthcare facilities.

The study utilized official statistical data from the Zhytomyr Regional Information and Analytical Center for Medical Statistics for the period 2014–2024. The information source consisted of annual reporting forms No. 20 "Report of a legal entity regardless of its organizational and legal form and individual entrepreneur conducting business activities in medical practice", approved by the Order of the Ministry of Health of Ukraine dated July 10, 2007, No. 378 (as amended by MoH orders dated 17.06.2013 No. 511 and 04.10.2018 No. 1802).

The following sections of reporting form No. 20 were analyzed: section I. Facility staffing at the end of the reporting year (Table 1100), providing data on the number of staff positions by personnel categories: physicians, nursing staff, junior medical personnel, and other personnel; section III. Hospital activity. Bed capacity and its utilization (Table 3100), providing data on the number of beds at year-end, number of discharged patients, and average length of stay.

A retrospective descriptive-analytical study was conducted using a continuous data collection method. The study period covers 11 years (2014–2024), enabling analysis of indicator dynamics before the implementation of hospital financing reform (2014–2019), during the COVID-19 pandemic (2020–2021), and under martial law conditions (2022–2024).

The study employed a comprehensive set of methods: 1) systems analysis – for comprehensive assessment of the regional inpatient care system functioning; 2) statistical method – for processing and analyzing quantitative data; 3) time series analysis – for studying trends in indicator changes over time; 4) comparative analysis – for assessing indicator changes across different periods; 5) structural analysis – for examining human resource composition; graphical method – for visualizing obtained results.

The study was conducted in accordance with the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects". As the research is based on analysis of aggregated statistical data without using personal information of patients or medical workers, informed consent was not required. The study did not involve intervention in the treatment process or experiments with human participants.

Statistical data processing was performed using Microsoft Excel 2019 (Microsoft Corporation) and STATISTICA 10.0 statistical package (StatSoft Inc.).

The following indicators were calculated for time series analysis: absolute increment (chain and base) – to assess absolute changes in indicators compared to the previous year and the base year 2014; growth rate and growth tempo (%) – to evaluate relative changes in indicators; average growth rate – to assess average annual changes over the study period.

The least squares method with linear trend construction was applied to identify trends in indicator changes over time. Trend reliability was assessed using the coefficient of determination (R^2). Structural analysis of human resources was conducted by calculating the proportion of each personnel category in the total number of staff positions.

The following derived indicators were calculated to evaluate bed capacity utilization efficiency: average length of stay = Total bed-days / (Number of discharged patients + Number of deaths); bed turnover = (Number of discharged + Number of deaths) / Number of beds; workload per physician position = Number of treated patients / Number of physician positions.

Piecewise linear regression was used to identify change points in time series associated with reform implementation, pandemic, and war. Results visualization was performed using line graphs to demonstrate indicator dynamics and bar charts to compare indicators during key periods. All graphical materials were created following scientific data visualization principles. The statistical significance level for all calculations was set at $p < 0.05$.

Research Results

Analysis of staffing in hospitals of Zhytomyr region for the period 2014–2024 revealed a persistent trend toward reduction in the total number of staff positions. The total number of personnel decreased from 25,071.75 staff positions in 2014 to 19,474 in 2024, representing a 22.3% reduction (Table 1).

The greatest reduction was observed among junior medical staff – 32.3% (from 4,782.25 to 3,235.5 staff positions). The number of nursing staff positions decreased by 23.5% (from 9,909.5 to 7,582), other personnel by 23.3% (from 5,311.5 to 4,071.5). The smallest reduction was recorded among physicians – 9.5% (from 5,068.5 to 4,585 staff positions).

The dynamics of human resource reduction showed an uneven pattern with three distinct periods (Fig. 1):

1) period of moderate reduction (2014–2017): total personnel decreased by only 2.6%, while the number of physicians remained practically stable;

2) period of intensive reduction (2018–2022): total personnel decreased by 17.7%. The highest reduction rates were observed in 2020 (–4.4% compared to 2019) and 2022 (–3.6% compared to 2021);

3) period of stabilization (2023–2024): reduction rates slowed, and in 2024 there was a slight increase in total personnel by 0.9% compared to 2023.

The structure of human resources also underwent changes during the study period (Table 2). The proportion of physicians in the overall personnel structure increased from 20.2% in 2014 to 23.5% in 2024. Conversely, the share of junior medical staff decreased from 19.1% to 16.6%.

The ratio of nursing staff to physicians decreased from 1.96:1 in 2014 to 1.65:1 in 2024, indicating disproportionate reduction of nursing staff compared to physicians. This may negatively impact the quality of medical care and increase the workload on existing personnel.

The average annual reduction rate for the entire study period was: physicians – 0.9%; nursing staff – 2.4%; junior medical staff – 3.7%; other personnel – 2.4%; total – 2.3%.

The most critical reduction in human resources was observed in 2020–2022, coinciding with the COVID-19 pandemic period and the beginning of full-scale military aggression. During this period, total personnel decreased by 7.0%, with junior medical staff (–11.8%) and nursing staff (–8.5%) categories being most affected.

Analysis of hospital bed capacity in Zhytomyr region revealed an overall downward trend from 9,180 beds in 2014 to 7,912 in 2024, representing a 13.8% decrease. The dynamics of bed capacity reduction were characterized by unevenness and several distinct phases coinciding with key reforms and crisis events (Table 3).

Linear regression for the 2014–2019 period showed stable bed capacity reduction ($R^2 = 0.91$, $p < 0.001$). Segmented regression analysis identified three critical trend change points: 2020 (onset of COVID-19 pandemic

Table 1

Dynamics of staff positions in hospitals of Zhytomyr region by personnel category, 2014–2024

Years	Personnel category				
	Physicians	Nursing staff	Junior medical staff	Other personnel	Total
2014	5068,5	9909,5	4782,25	5311,5	25071,75
2015	5078,5	9957	4737,75	5277,25	25050,5
2016	5054,25	9744	4575,5	5148,75	24522,5
2017	5067,5	9692,25	4510,5	5155,5	24425,75
2018	4850,25	9260,25	4308,5	4922	23341
2019	4719,5	8925	4169	4794,75	22608,25
2020	4649,5	8575	3952,25	4445,5	21622,25
2021	4616	8225	3711,5	4299,5	20852
2022	4578,25	7842,75	3485,25	4204	20110,25
2023	4617	7515,5	3188	3972,75	19293,25
2024	4585	7582	3235,5	4071,5	19474
Change 2024 to 2014, %	–9,5	–23,5	–32,3	–23,3	–22,3

Source: compiled by the author.

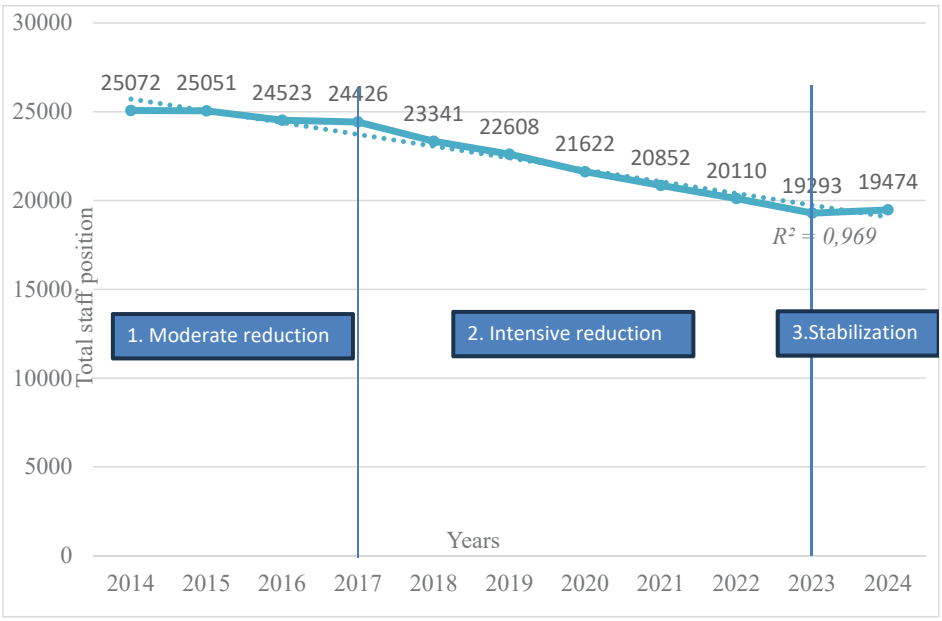

Fig. 1. Dynamics of total staff positions in hospitals of Zhytomyr region, 2014–2024

Source: compiled by the author.

Table 2

Structure of human resources in hospitals of Zhytomyr region, %

Personnel Category	2014	2019	2020	2022	2024
Physicians	20.2	20.9	21.5	22.8	23.5
Nursing staff	39.5	39.5	39.6	39.0	38.9
Junior medical staff	19.1	18.4	18.3	17.3	16.6
Other personnel	21.2	21.2	20.6	20.9	20.9

Source: compiled by the author.

Table 3

Dynamics of main hospital performance indicators in Zhytomyr region, 2014–2024

Year	Number of beds	Average length of stay, days	Bed turnover, patients per year	Physician workload, patients per year
2014	9180	10,3	31,8	58
2015	9207	10,1	32,1	58
2016	8268	9,8	35,4	58
2017	8117	9,6	34,9	56
2018	7749	9,3	36,1	58
2019	7646	9,1	35,4	57
2020	7326	8,7	24,0	38
2021	7146	8,5	29,0	45
2022	7131	7,9	30,9	48
2023	7725	8,0	36,6	61
2024	7912	7,6	40,4	70
Change 2024 to 2014, %	–13,8	–26,1	26,9	**20,9**

Source: compiled by the author.

and implementation of new financing model), 2022 (beginning of full-scale war), and 2023 (recovery period) (Fig. 2).

The number of treated patients during 2014–2019 showed a slight downward trend, but in 2020 it sharply decreased to 175,919 (–35.0% compared to 2019). This decline resulted from a combination of factors: quarantine restrictions, population fear of visiting hospitals, bed repurposing for COVID-19, and adaptation to the new per-patient financing model implemented from April 2020.

Despite the onset of full-scale war, the number of treated patients continued to grow in 2022 to 220,607 (+6.5% compared to 2021). In 2023–2024, rapid recovery occurred: treated patients reached 319,644, exceeding the pre-war 2019 level by 18.1%. For the first time during

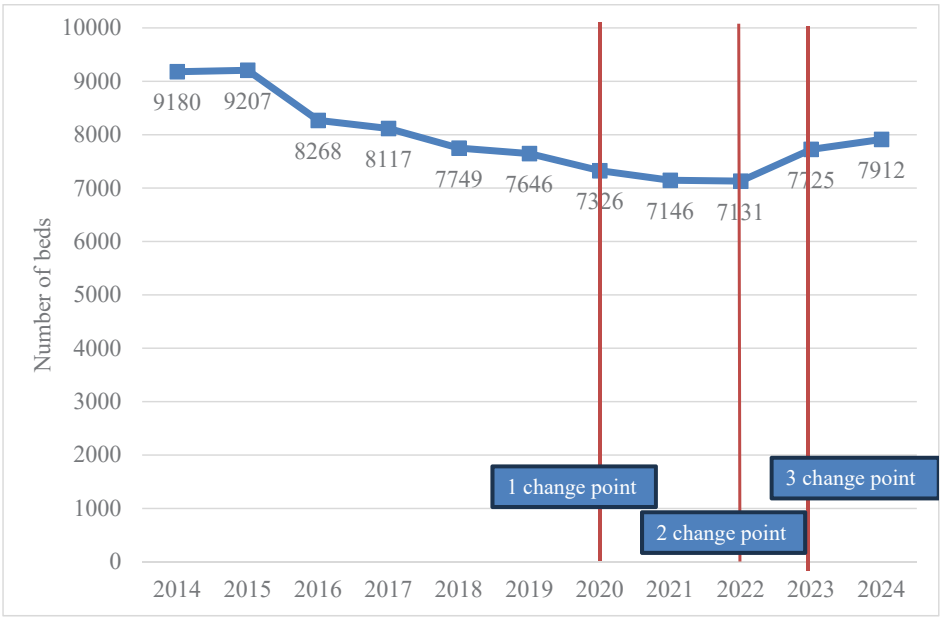

Fig. 2. Dynamics of hospital bed capacity in Zhytomyr region

Source: compiled by the author.

the study period, bed capacity increased in 2023–2024 (+10.9% compared to 2022), possibly related to the need for adaptation to wartime needs (Fig. 3).

Number of patients treated per bed per year (bed turnover) reached a record value of 40.4 in 2024 (+14.1% compared to 2019), indicating intensification of bed utilization under the influence of the new financing model. Physician workload (number of patients treated per physician position per year) increased by 21.4% compared to the pre-war period, reaching 69.7 treated patients per position (Fig. 4).

Meanwhile, average length of stay continued to decrease (from 10.3 to 7.6 days), which can be explained by economic incentives of the new financing model encouraging faster patient discharge (Fig. 5).

Multiple regression analysis showed that the COVID-19 pandemic had the greatest negative impact on the number of treated patients ($\beta = -94{,}764$, $p < 0.001$), while financing reform had a positive effect ($\beta = +28{,}450$, $p < 0.05$). The impact of demographic changes was statistically insignificant, indicating that population decrease was compensated by increased hospitalization intensity.

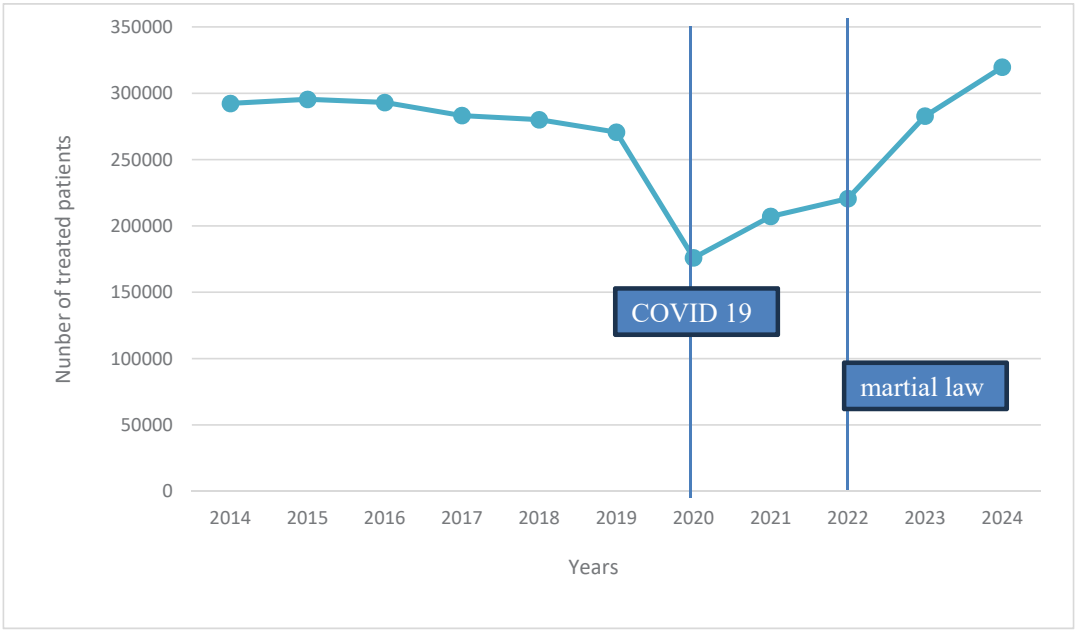

Fig. 3. Dynamics of treated patients with key events marked

Source: compiled by the author.

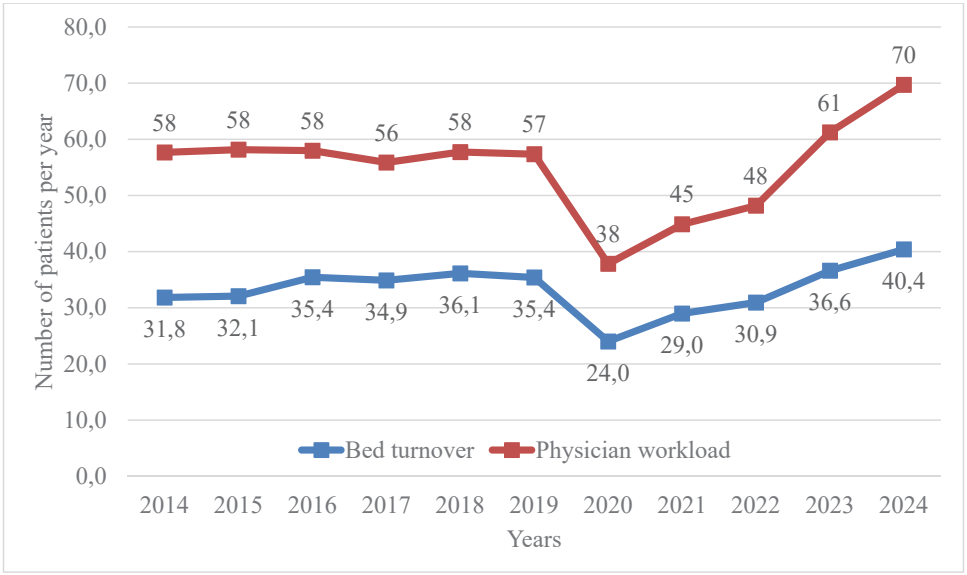

Fig. 4. Dynamics of bed turnover and physician workload, 2014–2024

Source: compiled by the author.

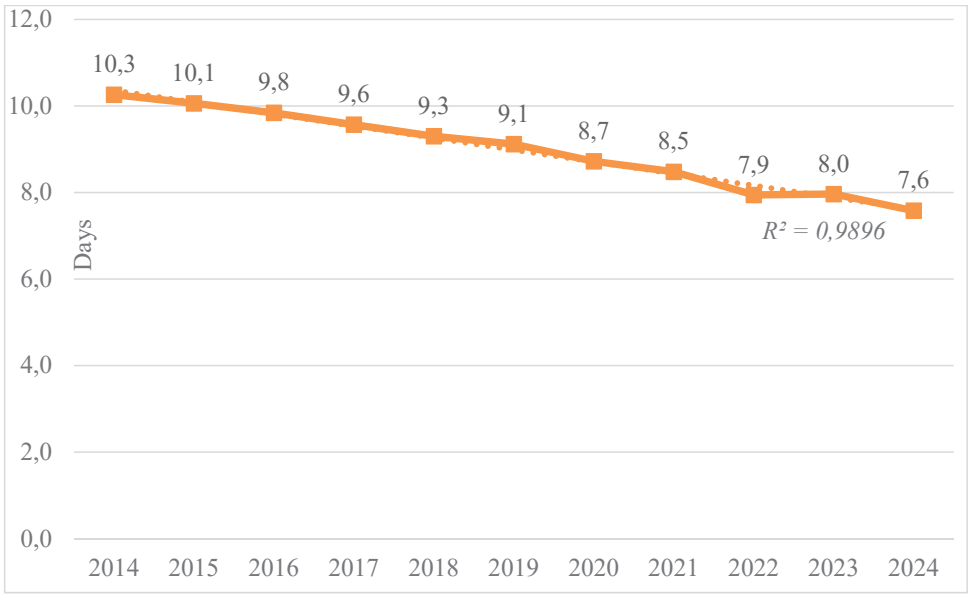

Fig. 5. Dynamics of average length of stay, 2014–2024

Source: compiled by the author.

Thus, the transformation of inpatient care in Zhytomyr region occurred under the influence of three key factors: financing reform (efficiency stimulation), COVID-19 pandemic (temporary accessibility reduction), and martial law (adaptation to new needs). Despite resource reduction and crisis events, the system demonstrated adaptability, achieving record productivity indicators in 2024.

Discussion of the Research Results

The results of our study demonstrate the unique trajectory of inpatient care transformation in hospitals in the Zhytomyr region under the simultaneous influence of three powerful factors: financing reforms, the COVID-19 pandemic, and full-scale war. The revealed capacity of the regional healthcare system not only to adapt to crisis conditions but also to achieve record productivity indicators in 2024 deserves detailed analysis.

The most unexpected finding of our study is the 18.1% increase in treated patients in 2024 compared to pre-war 2019, despite a 13.9% reduction in human resources and prolonged exposure to crisis factors. This paradox can be explained by the synergistic effect of financing reform and forced process optimization under resource constraints.

Our data align with Kalanj K. et al. (2021) conclusions about the importance of economic

incentives in improving hospital efficiency, but demonstrate a more pronounced effect under crisis conditions. While DRG system implementation in Croatia led to 8–12% efficiency improvement [5], our study shows bed turnover increased by 14.1% and physician workload by 21.4%.

Implementation of per-patient payment from April 2020 created powerful economic incentives for treatment process optimization. The reduction in average length of stay from 9.1 to 7.6 days (–16.5%) after reform implementation significantly exceeds the pre-reform reduction rate. Comparing our results with Aragón et al. (2022) 15-year analysis of DRG implementation in England [14], where length of stay decreased by only 2.5%, highlights the accelerating effect of crisis. This confirms the hypothesis that economic mechanisms in Ukraine can be more effective than administrative management methods.

The success of per-patient payment during multiple crises provides new insights into healthcare financing theory. Wang et al. (2025) concerns about DRG systems leading to patient selection and quality compromise [15] appear mitigated in crisis contexts where hospitals cannot afford to be selective. The existential need to maintain revenue streams while serving all patients may have prevented gaming behaviors typically associated with activity-based payment systems.

Notably, unlike other countries where similar reforms were implemented under stable conditions, Ukrainian hospitals adapted to the new financing model simultaneously with the pandemic. This may have accelerated transformation processes, as the crisis situation reduced resistance to change and stimulated the search for new approaches to work organization.

The COVID-19 pandemic had a dual impact on the inpatient care system. On one hand, the sharp drop in hospitalizations in 2020 (–35.0%) corresponds to international trends described by Kalanj et al. (2021) for Croatia and Reif & Schubert (2024) for Germany [7; 9]. Whereas Carvalho et al. (2024) documented consistent deterioration in acute care performance indicators across OECD member states during the COVID-19 pandemic [16], the present data elucidate a distinct mechanism of "crisis-induced efficiency enhancement". On the other hand, unlike the gradual recovery in European countries, Ukrainian hospitals demonstrated "super-recovery" exceeding pre-pandemic indicators.

The uniqueness of our study lies in analyzing healthcare system functioning under full-scale war conditions. The increase in bed capacity in 2023–2024 (+10.9%) after a prolonged reduction period indicates system flexibility and its ability to respond to new needs. The record indicators of 2024 can be explained by several factors: deferred demand for medical care from previous years; needs for treating wounded and war-affected individuals; influx of internally displaced persons with higher healthcare needs; improved logistics and work organization under crisis conditions.

International evidence suggests optimal physician-to-nurse ratios of 1:3–4 for quality care delivery. Our data show this ratio deteriorating from 1:1.96 to 1:1.65, approaching levels associated with increased adverse events. This finding aligns with Rozanova et al. (2024) concerns about human costs of maintaining services during crisis [17], though our aggregate data cannot capture individual-level burnout and stress.

The increase in staff workload to 69.7 treated patients per physician raises concerns about healthcare quality and professional burnout risks. The disproportionate reduction in nursing (–23.5%) and junior medical staff (–32.3%) compared to physicians (–9.5%) may lead to imbalances in healthcare delivery. This requires revision of staffing standards and implementation of personnel retention measures.

Our study has certain limitations. First, using aggregated data prevents assessment of variability between individual hospitals. Second, the absence of healthcare quality data limits the ability to evaluate intensification consequences. Third, the impact of migration processes on indicators may be underestimated due to inaccuracies in population estimates.

Prospects for further research

Further research will focus on studying the impact of identified transformation processes on healthcare quality and clinical treatment outcomes under conditions of intensified bed capacity utilization. Special attention should be paid to investigating the long-term consequences of increased workload on medical personnel and developing evidence-based approaches to optimizing staffing under crisis conditions.

Conclusions

1. The conducted analysis of hospital performance indicators dynamics in Zhytomyr region for 2014–2024 revealed a comprehensive transformation of the inpatient care system under the influence of three key factors: implementation of the new per-patient financing model (from April 2020), COVID-19 pandemic (2020–2021), and full-scale military aggression (from 2022).

2. It was established that despite a 13.8% reduction in bed capacity and 22.3% reduction in human resources, the number of treated patients in 2024 increased by 9.4% compared to 2014 and by 18.1% compared to pre-war 2019, indicating significant improvement in resource utilization efficiency.

3. The new financing model proved to be a powerful catalyst for treatment process optimization, manifested in the reduction of average length of stay from 9.1 to 7.6 days (–16.5%) and increase in bed turnover from 35.4 to 40.4 (+14.1%) during 2019–2024.

4. The COVID-19 pandemic had a short-term negative impact on inpatient care accessibility (35.0% drop in treated patients in 2020), but in the long term

accelerated hospital adaptation to new economic conditions and stimulated the search for efficiency improvement reserves.

5. Martial law did not lead to inpatient care system collapse (in Zhytomyr region); conversely, 2023–2024 witnessed recovery and expansion of bed capacity (+10.9%) with simultaneous achievement of record productivity indicators, demonstrating high adaptive capacity of the regional healthcare system.

The practical significance of the study lies in demonstrating the possibility of successful regional inpatient care system transformation under extreme conditions through properly chosen economic incentives. The research results substantiate the necessity of continuing healthcare financing reform even under martial law conditions, but with mandatory consideration of staffing needs and medical personnel support.

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Purpose: to analyze the dynamics of hospital bed capacity, inpatient care volumes, and staffing in Zhytomyr region hospitals during 2014–2024 to assess the impact of healthcare financing reform, COVID-19 pandemic, and martial law on the regional inpatient care system functioning.

Materials and methods. A retrospective descriptive-analytical study was conducted using official statistical data from Zhytomyr Regional Medical Statistics Center for 2014–2024. Annual reporting forms No. 20 data were analyzed regarding staff positions, bed capacity, discharged and deceased patients, and average length of stay. Systems analysis, time series analysis, comparative and structural analysis methods were applied. Statistical processing included growth rate calculations, linear and segmented regression.

Results. Total staff positions decreased by 22.3% (from 25,071.75 to 19,474), with the greatest reduction among junior medical staff (–32.3%). Bed capacity decreased by 13.8% (from 9,180 to 7,912), but increased by 10.9% in 2023–2024. After a 35.0% drop in 2020, treated patients reached a record 319,644 in 2024, exceeding pre-war 2019 levels by 18.1%. Average length of stay decreased from 10.3 to 7.6 days (–26.2%). Bed turnover increased from 31.8 to 40.4 (+27.0%), reaching maximum values. Physician workload increased from 57.7 to 69.7 patients (+20.8%).

Conclusions. The inpatient care transformation in Zhytomyr region demonstrated successful adaptation to multiple crises. Implementation of per-patient payment catalyzed resource utilization efficiency, compensating for pandemic and war impacts while achieving record productivity. Despite reduced resources, the system showed high adaptive capacity, ensuring increased healthcare accessibility. Critical challenges include increased staff workload requiring compensatory mechanisms for long-term sustainability.

Key words: financing, bed capacity, human resources, bed utilization efficiency, COVID-19 pandemic, martial law, bed turnover.

Мета дослідження – провести комплексний аналіз динаміки ліжкового фонду, обсягів наданої стаціонарної допомоги та кадрового забезпечення лікарень Житомирської області протягом 2014–2024 років для виявлення впливу реформи фінансування охорони здоров'я, пандемії COVID-19 та воєнного стану на функціонування регіональної системи стаціонарної медичної допомоги; оцінити адаптаційну спроможність системи до множинних кризових явищ та ідентифікувати ключові тренди трансформації лікарняної мережі.

Матеріали та методи. Проведено ретроспективне описово-аналітичне дослідження з використанням суцільного методу збору даних на основі офіційних статистичних матеріалів Житомирського обласного інформаційно-аналітичного центру медичної статистики за 2014–2024 роки. Джерелом інформації слугували щорічні звітні форми № 20 «Звіт юридичної особи незалежно від її організаційно-правової форми та фізичної особи – підприємця, які провадять господарську діяльність з

медичної практики», затверджені наказом МОЗ України від 10.07.2007 № 378. Аналізувалися дані розділу І «Штати закладу на кінець звітного року» щодо кількості штатних посад за категоріями персоналу (лікарі, середній медперсонал, молодший медперсонал, інший персонал) та розділу ІІІ «Діяльність стаціонару. Ліжковий фонд та його використання» щодо кількості ліжок, виписаних і померлих хворих, тривалості лікування. Застосовано комплекс методів: системний аналіз, статистичний метод, метод динамічних рядів, порівняльний і структурний аналіз. Статистична обробка передбачала розрахунок абсолютних та відносних показників, темпів приросту, середньорічних темпів змін. Для виявлення тенденцій застосовувався метод найменших квадратів із побудовою лінійних трендів, достовірність яких оцінювалася за коефіцієнтом детермінації (R^2). Проведено сегментований регресійний аналіз для визначення точок зламу трендів. Розраховано похідні показники ефективності: обіг ліжка, навантаження на персонал, середня тривалість лікування. Рівень статистичної значущості встановлено $p < 0,05$.

Результати дослідження. Загальна кількість штатних посад скоротилася на 22,3 % (з 25071,75 у 2014 році до 19 474 у 2024 році), при цьому найбільше скорочення спостерігалося серед молодшого медперсоналу (–32,3 %), середнього медперсоналу (–23,5 %) та іншого персоналу (–23,3 %), найменше – серед лікарів (–9,5 %). Ліжковий фонд зменшився з 9180 до 7912 ліжок (–13,8 %), однак у 2023–2024 роках уперше за досліджуваний період відбулося його збільшення на 10,9 % порівняно з мінімальним значенням 2022 року. Кількість пролікованих пацієнтів після різкого падіння на 35,0 % у 2020 році (до 175 919 осіб) унаслідок пандемії COVID-19 та початку нової моделі фінансування поступово відновлювалася й досягла у 2024 році максимального значення – 319 644, що на 18,1 % перевищує довоєнний рівень 2019 року. Середня тривалість перебування на ліжку скоротилася з 10,3 до 7,6 дня (–26,2 %), причому темпи скорочення прискорилися після впровадження оплати за пролікованого пацієнта. Обіг ліжка зріс з 31,8 у 2014 році до 40,4 у 2024 році (+27,0%), досягнувши максимального значення за весь період. Навантаження на одного лікаря збільшилося з 57,7 до 69,7 пролікованих пацієнтів (+20,8 %). Лінійна регресія підтвердила стійкість тренду скорочення персоналу ($R^2 = 0,97$, $p < 0,001$) та середнього ліжкодня ($R^2 = 0,99$, $p < 0,001$). Множинний регресійний аналіз показав найбільший негативний вплив пандемії COVID-19 ($\beta = –94,764$, $p < 0,001$) та позитивний ефект реформи фінансування лікарень ($\beta = +28,450$, $p < 0,05$) на кількість пролікованих.

Висновки. Дослідження виявило успішну трансформацію стаціонарної медичної допомоги Житомирської області під одночасним впливом реформи фінансування, пандемії COVID-19 та воєнного стану. Впровадження з квітня 2020 року оплати за пролікованого пацієнта в рамках Програми медичних гарантій стало каталізатором підвищення ефективності використання ресурсів, що проявилося в інтенсифікації використання ліжкового фонду та скороченні тривалості госпіталізації. Система продемонструвала високу адаптивну спроможність, забезпечивши не лише виживання в кризових умовах, але й досягнення рекордних показників продуктивності у 2024 році. Критичним викликом залишається значне зростання навантаження на медичний персонал, що потребує розробки компенсаторних механізмів для забезпечення стійкості системи та якості медичної допомоги в довгостроковій перспективі.

Ключові слова: фінансування, ліжковий фонд, кадрові ресурси, ефективність, COVID-19, воєнний стан, обіг ліжка.

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