

# The potential of the national healthcare system in a context of integration into the European medical space

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## Abstract

The conducted study of an analysis of a healthcare system in Ukraine demonstrates a long-term trend toward a reduction of human and infrastructural potential of the national healthcare system, which began in the 1990s and intensified amid military actions after 2014. In particular, the total number of doctors and mid-level medical personnel has decreased threefold, especially in frontline regions. A personnel crisis became most acute after 2020, coinciding with the pandemic and the war. A number of hospitals and hospital beds between 1990 and 2023 decreased almost threefold, reflecting a shift from the Soviet model to an outpatient-oriented system; however, this simultaneously threatens to create shortages in access to inpatient care. At the same time, the number of outpatient and polyclinic institutions has gradually increased, indicating an implementation of principles of primary healthcare reform. Healthcare financing has shown an overall increase, particularly through the Medical Guarantees Program, which in 2024 accounts for more than 50 % of a sectoral budget. However, emergency medical care and infrastructure in combat zones remain underfunded. The increase in expenditures for drug reimbursement indicates strengthening of a social component of healthcare policy aimed at supporting vulnerable population groups. Despite positive changes in a financial support of the sector, a situation with medical personnel and infrastructure requires urgent strategic decisions to preserve and restore resource potential, especially under wartime conditions and during post-war reconstruction.

*Keywords:* national healthcare system; healthcare reform; European integration; medical standards; health policy; public health management; medical education; quality of medical services; institutional capacity; healthcare modernization; European medical area; cross-border healthcare; patient mobility; healthcare governance; sustainable development in health sector.

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## 1. Introduction

Over the past three decades, the Ukrainian healthcare system has undergone profound transformations, driven by a number of factors: from post-Soviet economic shocks and demographic changes to large-scale structural reforms, the COVID-19 pandemic and full-scale war since 2022. Our study provides a comprehensive analysis of key quantitative and financial indicators of the healthcare industry based on a series of charts (fig. 1–10) covering the period 1990–2024.

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## 2. Literature review

Analysis of recent research. Issues related to the development of public administration in the healthcare sector are reflected in the scientific works of many Ukrainian scholars, including: Radysh Ya.F., Buhaitsov S.H., Yarosh N.P., Ryngach N.O., Banchuk M.V., Klymenko O.V., Nadyuk Z.O., Kurylo T.M., Rudyi V.M., Martyniuk O.I., Leshchenko V.V., Parashchych I.M., Buravliov L.O., Bedryk I.O., Liakhovchenko L.A., Torbas O.M., Vasiuk N.O., Korolchuk O.L., Vysotska T.Ye., Bilous I.V., Dudka V.V., Kuzminskyi P.Y., Zhilka K.I., Firsova O.D., Kryzyna N.P., Mokretsov S.Ye., Kovalenko T.Yu., Bilynska M.M., Dzhafarova D.M., Furtak I.I., Pitko Ya.M., Dub N.Ye., Filts Yu.O., Shtohryn O.P., Yurystovska N.Ya., Shehedyn Ya.Yu., Shevchuk V.V., Vovk S.M., Karlash V.V., Ustymchuk O.V., Halatsan O.V., Kotliarevskiy Yu.O., Kravchenko Zh.D., Lermontova Yu.O., Antonov A.V., Antonova L.V., Datsii N.V., Dombrovska S.M., Karamyshev D.V., Serhiienko L.V., Krykun O.D., Petryk S.M., Krynychko F.R., and others.

## 3. Results and discussions

To identify and define weaknesses and assess effectiveness of implemented policies in a field of healthcare, it is necessary to conduct a comprehensive analysis of dynamics of a number of doctors and paramedical personnel in the country as a whole and in a regional context, changes in a network of hospitals and outpatient clinics, the transformation of bed fund, as well as an evolution of a volume of budget financing of a medical sector in general and by areas (Medical Guarantees Program, primary, specialized and emergency care, drug reimbursement). The following figure 1 presents indicators of the total number of doctors of all specialties in Ukraine.

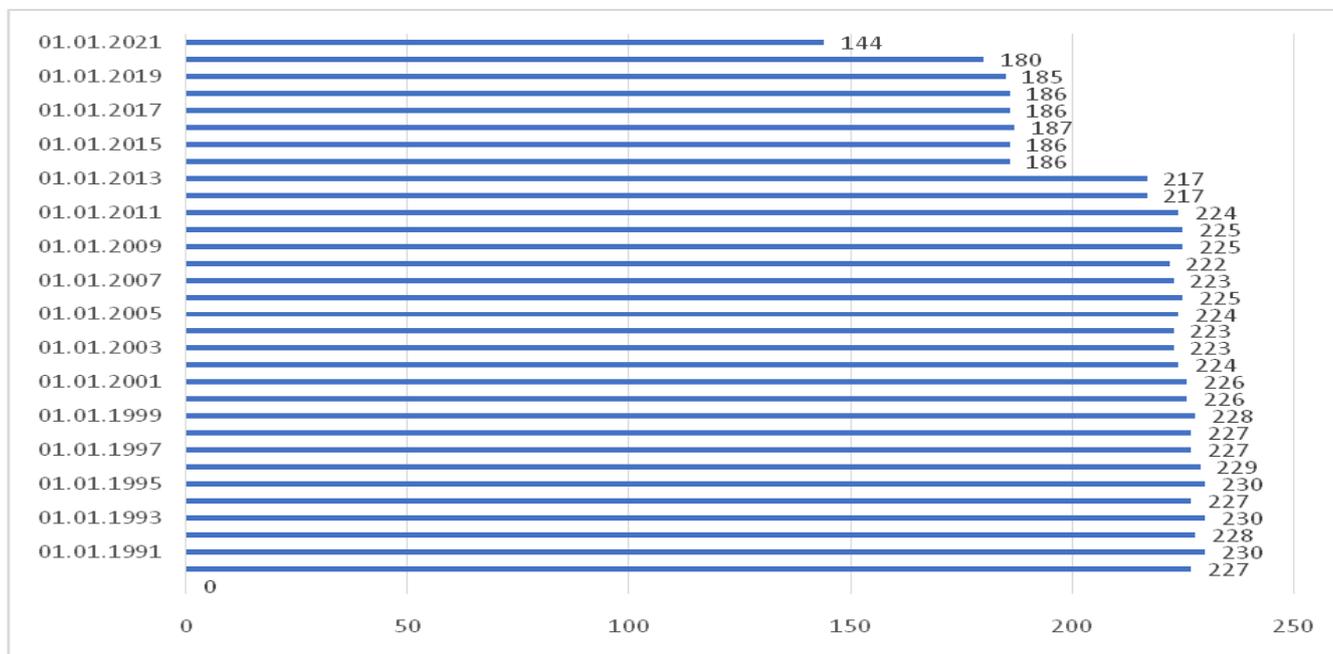


Fig. 1. Dynamics of a total number of doctors of all specialties in Ukraine for 1990-2021, thousand people

During 1991–2009, the number of doctors remained relatively stable, fluctuating within 227–230 thousand people. The highest figure was recorded in 1995, 1993 and 2001, over 230 thousand doctors. Minor fluctuations of 2–3 thousand did not affect an overall structure of medical personnel. Starting from 2010, a gradual decrease in the number of doctors has been observed. Thus, in 2013, a number of doctors was already 217 thousand, and in 2015 - 186 thousand, which indicates a loss of over 31 thousand doctors over 2 years. This may be due to demographic factors, personnel migration, structural reforms in the healthcare system, and a decrease in an attractiveness of the profession. The most critical decline was recorded in 2021 – 144 thousand doctors, which is 36 thousand people less than in 2019. Such a rapid decline may be associated with the COVID-19 pandemic and the increased burden on the healthcare system. The following figure 2 presents the total number of doctors of all specialties by region in Ukraine for 2000–2023.

A general decline in the number of physicians has been observed in a vast majority of regions, especially since 2020. The most significant reduction occurred in 2022–2023, caused by Russia’s full-scale invasion of Ukraine, large-scale evacuations, a destruction of medical facilities, and a migration of healthcare professionals.

The highest values in most regions were recorded between 2005 and 2010, followed by a gradual decline. The greatest concentration of physicians is found in large cities and major regional centers. Kyiv shows the highest figures in 2023 – 21.6 thousand physicians, which is the highest among all regions. In 2000, this figure was 12.6 thousand, indicating a steady increase contrary to the national downward trend. Kharkiv region maintained consistently high levels – from 14.6 thousand (in 2000) to 15.6 thousand (in 2021), but experienced a sharp drop to 10.9 thousand in 2022–2023 due to hostilities near the frontlines.

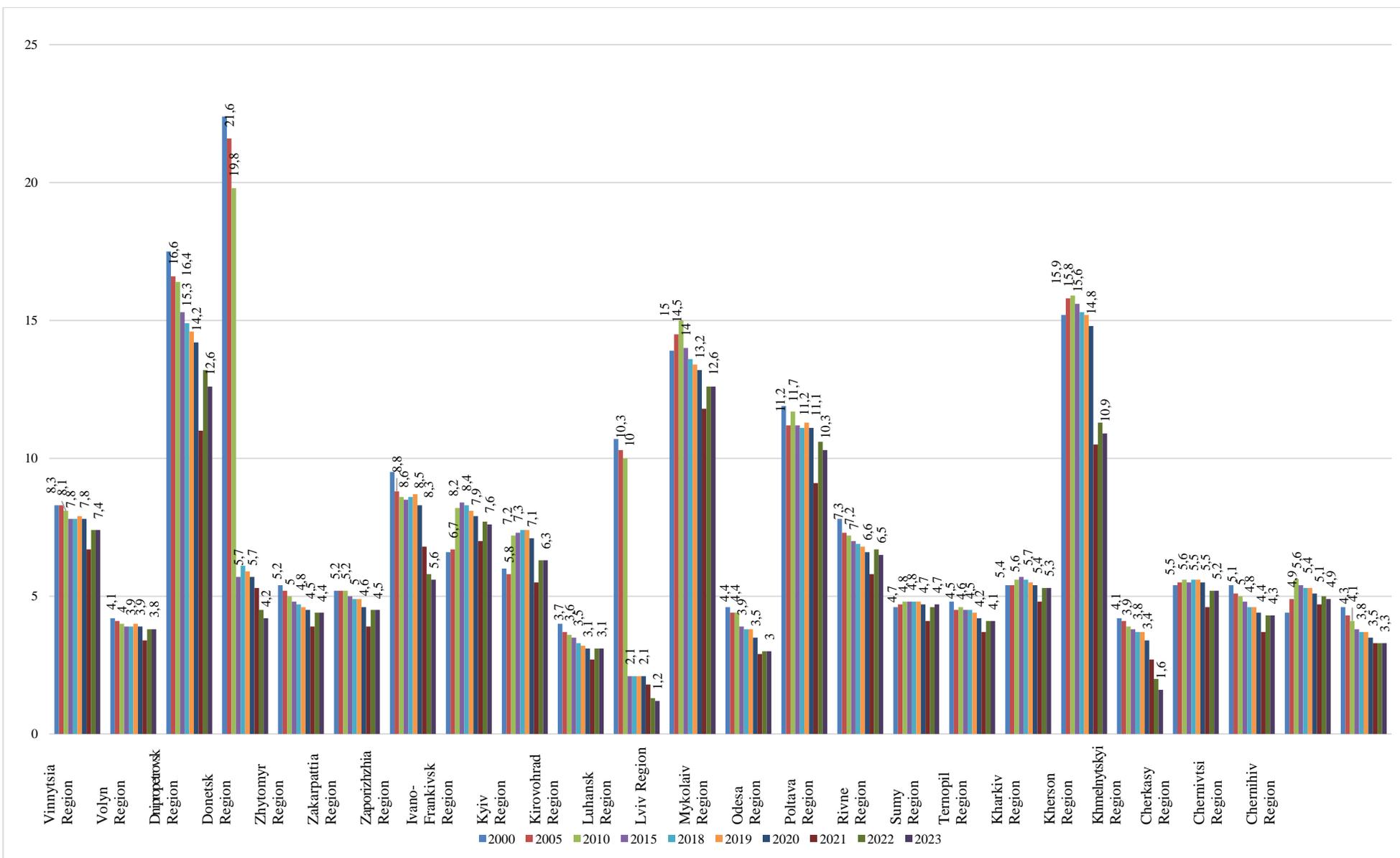


Fig. 2. Dynamics of the total number of doctors of all specialties by region in Ukraine for 2000–2023, thousand people

Regions with traditionally strong medical infrastructure include Dnipropetrovsk region, where a number of medical personnel was 16.6 thousand in 2000, decreasing to 13.3 thousand by the end of 2023. In Lviv region, the number of healthcare professionals increased from 10.3 thousand in 2000 to 12.6 thousand in 2021, though a moderate decline to 12.1 thousand was recorded in 2023.

In Odesa region, an amount of physicians was over 11.7 thousand in 2000, showing a gradual but steady decrease to 10.3 thousand by the end of 2023.

The lowest indicators are consistently recorded in Chernivtsi, Ternopil, Luhansk, and Kirovohrad regions, ranging from 2 to 4 thousand physicians. The most critical decline occurred in Luhansk region – from 3.5 thousand in 2000 to 1.2 thousand in 2023, nearly a threefold reduction due to occupation and ongoing hostilities. A significant decrease in the number of physicians was also observed in frontline regions such as Kharkiv, Mykolaiv, Zaporizhzhia, and Luhansk. Meanwhile, in regions such as Ternopil, Lviv, and Zakarpattia, the figures remain relatively stable, which may indicate internal migration and redistribution of medical personnel.

The following figure 3 presents indicators of a total number of mid-level medical personnel in Ukraine for the period 1990–2023 (in thousands).

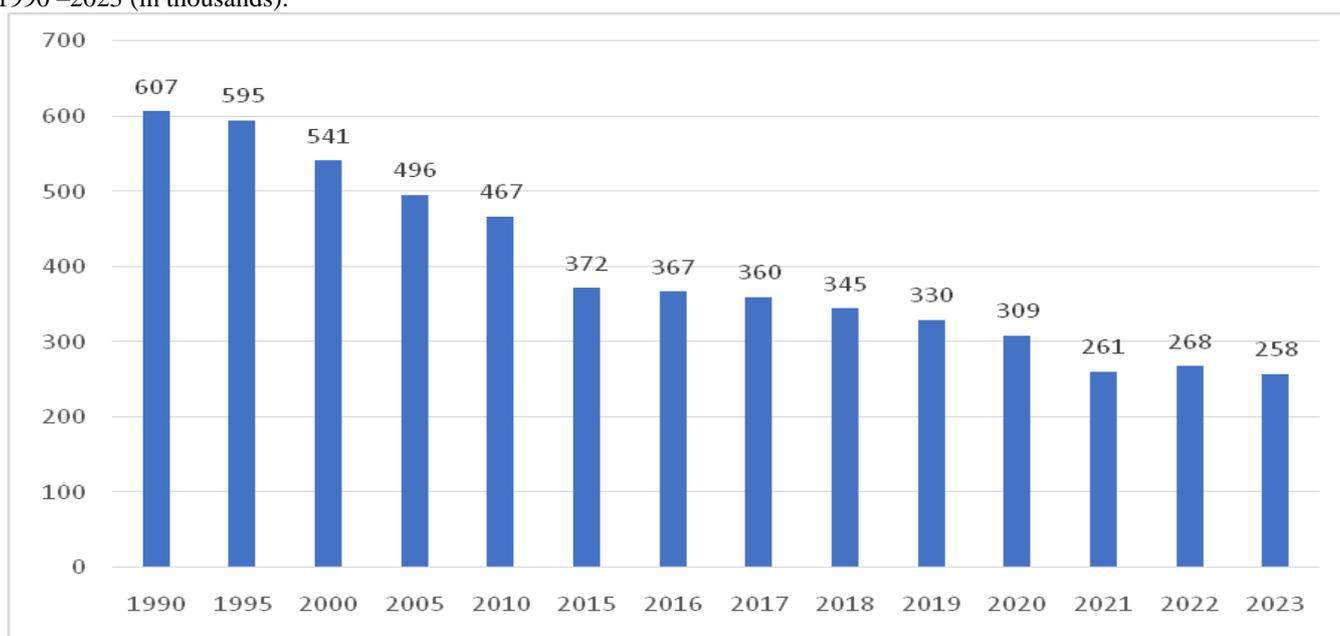


Fig. 3. Dynamics of a total number of medical personnel in Ukraine for 1990-2023, thousand people

Throughout 1990–2023, Ukraine experienced a steady decline in a number of mid-level medical personnel (nurses, feldshers, midwives, etc.). During the analyzed period, a number of workers in this category decreased by almost 2.5 times – from 607 thousand in 1990 to 258 thousand in 2023.

Between 1990 and 2005, the first stage of rapid decline was recorded: in 1990, an indicator stood at over 607 thousand people; in 1995 – 595 thousand; and by 2000 – 541 thousand, which is 54 thousand fewer. In 2005, a number of mid-level healthcare workers decreased by another 8.31 %, reaching 496 thousand. Overall, from 1990 to 2005, reduction amounted to more than 111 thousand people (about 18 %), which was linked to transformational economic processes following the collapse of the USSR, beginning of downsizing of a healthcare network, and outflow of personnel to a private sector or abroad.

During 2005-2015, a relatively stable trend persisted, though with a gradual decline from 467 thousand in 2010 to 372 thousand in 2015 – a decrease of 95 thousand. Between 2015 and 2019, a moderate reduction was recorded: in 2017, the number of mid-level medical staff was about 360 thousand, while in 2019 it dropped by 30 thousand to 330 thousand. Overall, from 2015 to 2019, the decrease totaled about 42 thousand employees, indicating some stabilization of the system before the COVID-19 pandemic.

The sharpest phase of reduction occurred during 2020–2023: in 2020, the number of mid-level healthcare workers was 309 thousand; in 2021 – 261 thousand; in 2022 – 268 thousand; and in 2023 – only 258 thousand, largely due to the ongoing war in Ukraine.

Thus, between 1990 and 2023, the country lost nearly 350 thousand mid-level medical workers. Particularly critical losses occurred after 2020 – a reduction of about 51 thousand within just three years. A slight increase in 2022 (from 261 to 268 thousand) was associated with the mobilization of resources during the first year of the war, but this proved unsustainable, as another decline to 258 thousand was recorded in 2023.

The following figure 4 presents indicators of mid-level medical personnel by region in Ukraine for the period 2000-2023.

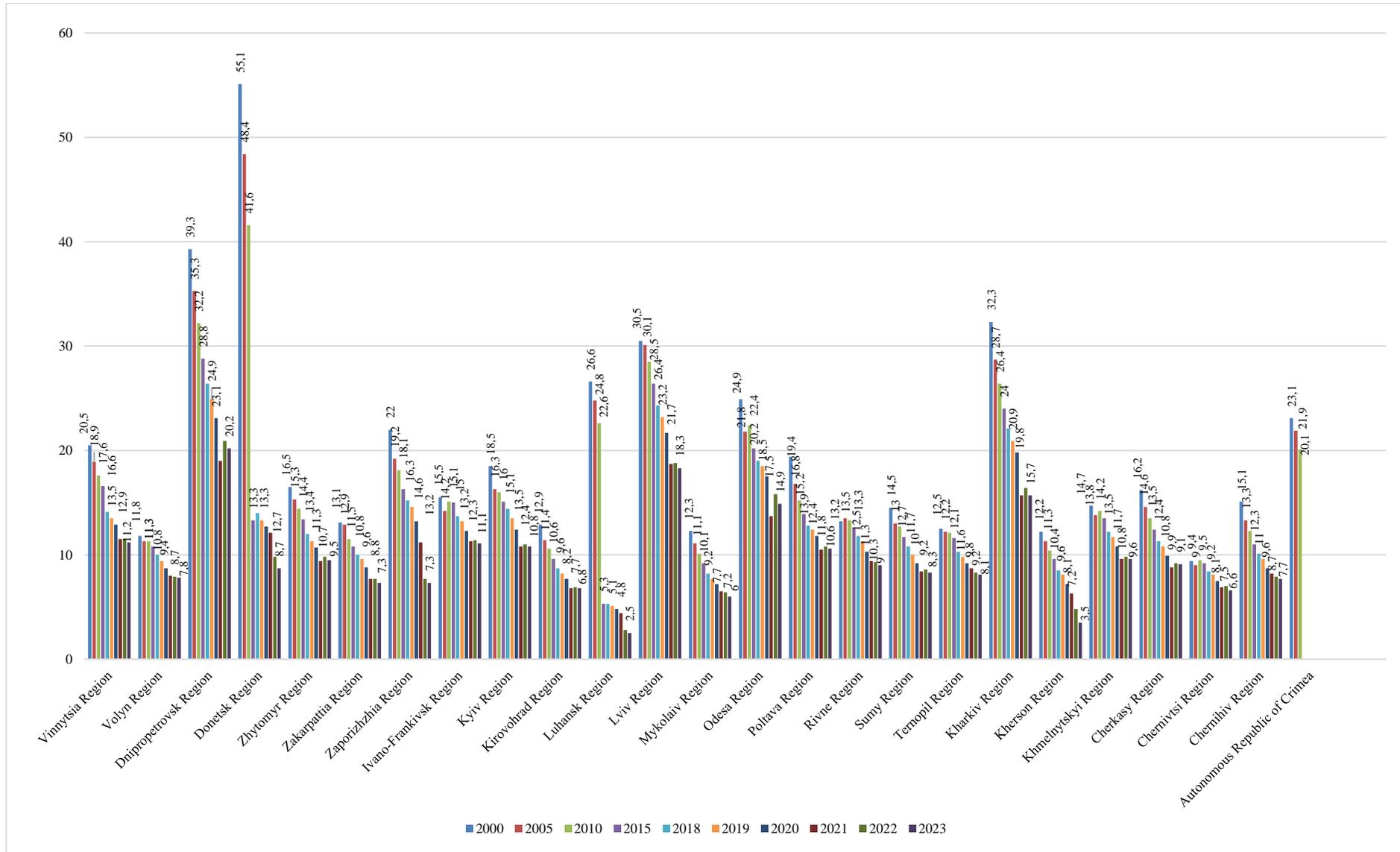


Fig. 4. Number of medical staff by region in Ukraine for 2000-2023, thousand people

Thus, based on figure 4 above, it can be stated that during the analyzed period there has been a long-term trend toward a reduction in a number of medical personnel across most regions of Ukraine.

The most significant decline was recorded between 2014 and 2023, coinciding with the occupation of Crimea, the Anti-Terrorist Operation (ATO) in eastern Ukraine, the COVID-19 pandemic, and the full-scale invasion of 2022. The regions with the sharpest decline are Donetsk and Luhansk, which experienced the most critical reduction in mid-level medical personnel (by -70 % to -80 %), primarily due to active hostilities, infrastructure destruction, and population displacement. Zhytomyr, Chernivtsi, and Ternopil regions also show a substantial decrease (by 40–55 %), despite absence of active combat, indicating a nationwide staffing crisis.

In western regions of Ukraine – Lviv, Ivano-Frankivsk, Ternopil, and Zakarpattia – a number of personnel has remained relatively stable, with a slight upward trend in 2020–2021, associated with an increased demand during the pandemic.

Kyiv region demonstrates the smallest decline – from 14.6 thousand to 12.1 thousand – reflecting better working conditions and higher staff retention. Kherson, Mykolaiv, and Zaporizhzhia regions show a steady reduction in medical personnel, which intensified after 2022 due to active hostilities and the occupation of parts of their territories.

The most critical situation is observed in the frontline regions – Donetsk, Luhansk, Zaporizhzhia, Kharkiv, Sumy, and Kherson – where the healthcare system urgently requires reinforcement of human resources.

The following figure 5 presents the indicators of the total number of hospital facilities in Ukraine for the period 1990–2021.

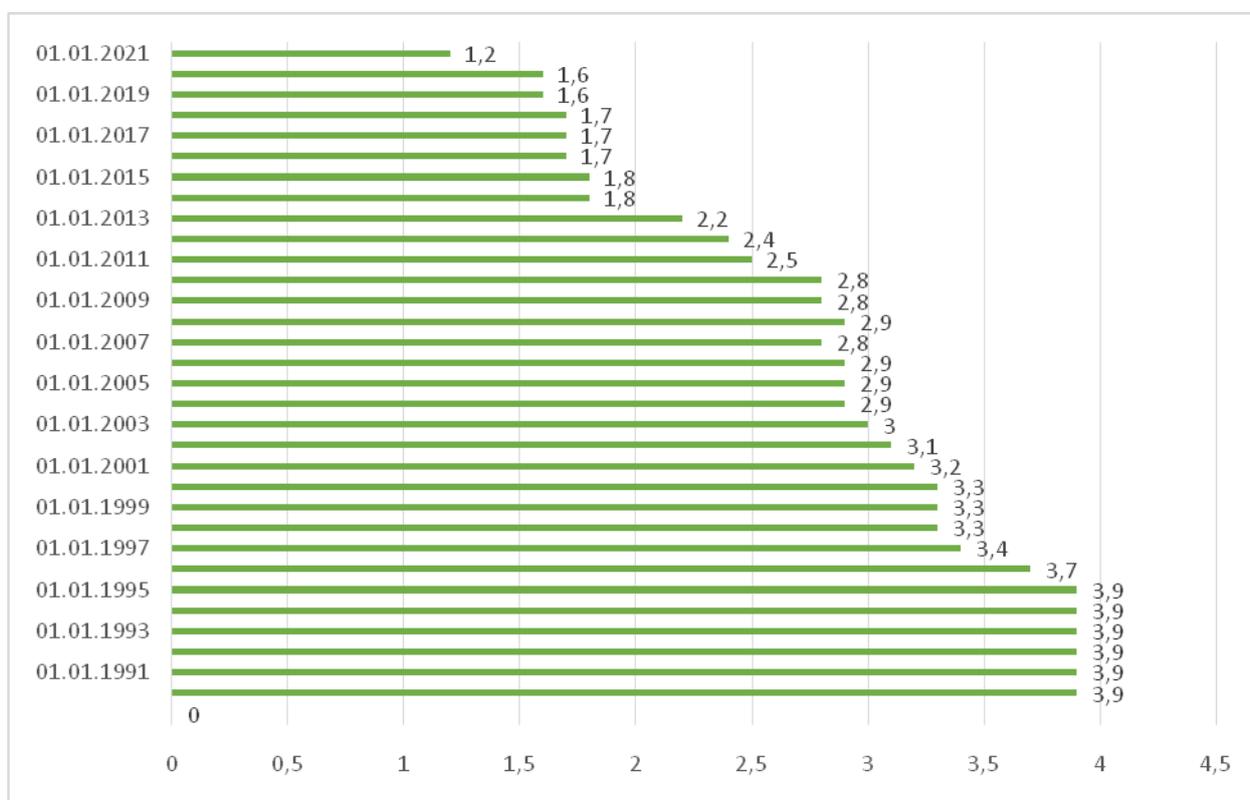


Fig. 5. Dynamics of the total number of hospitals in Ukraine for 1990-2021, thousand people

During 1991–2001, Ukraine experienced a relatively moderate reduction in the number of hospital facilities – from 3.9 thousand to 3.3 thousand institutions – reflecting initial waves of healthcare system transformation following the country’s independence.

Between 2001 and 2011, active healthcare reform took place, during which a number of hospitals decreased by 0.8 thousand, or about 24 %. This decline was driven by the closure of low-capacity hospitals, consolidation of medical institutions, and a shift toward outpatient and polyclinic care.

The period from 2011 to 2021 saw the most intensive reduction, as the number of hospitals was halved – from 2.5 thousand to 1.2 thousand units. This was a consequence of healthcare reform (2017–2020), an introduction of the «money follows the patient» financing principle, closure or reorganization of facilities, demographic decline, and urbanization.

Overall, the total number of hospital institutions in Ukraine decreased threefold during the study period – from 3.9 thousand in 1991 to 1.2 thousand in 2021.

The following figure 6 presents the indicators of the total number of outpatient and polyclinic institutions in Ukraine for the period 1991–2021.

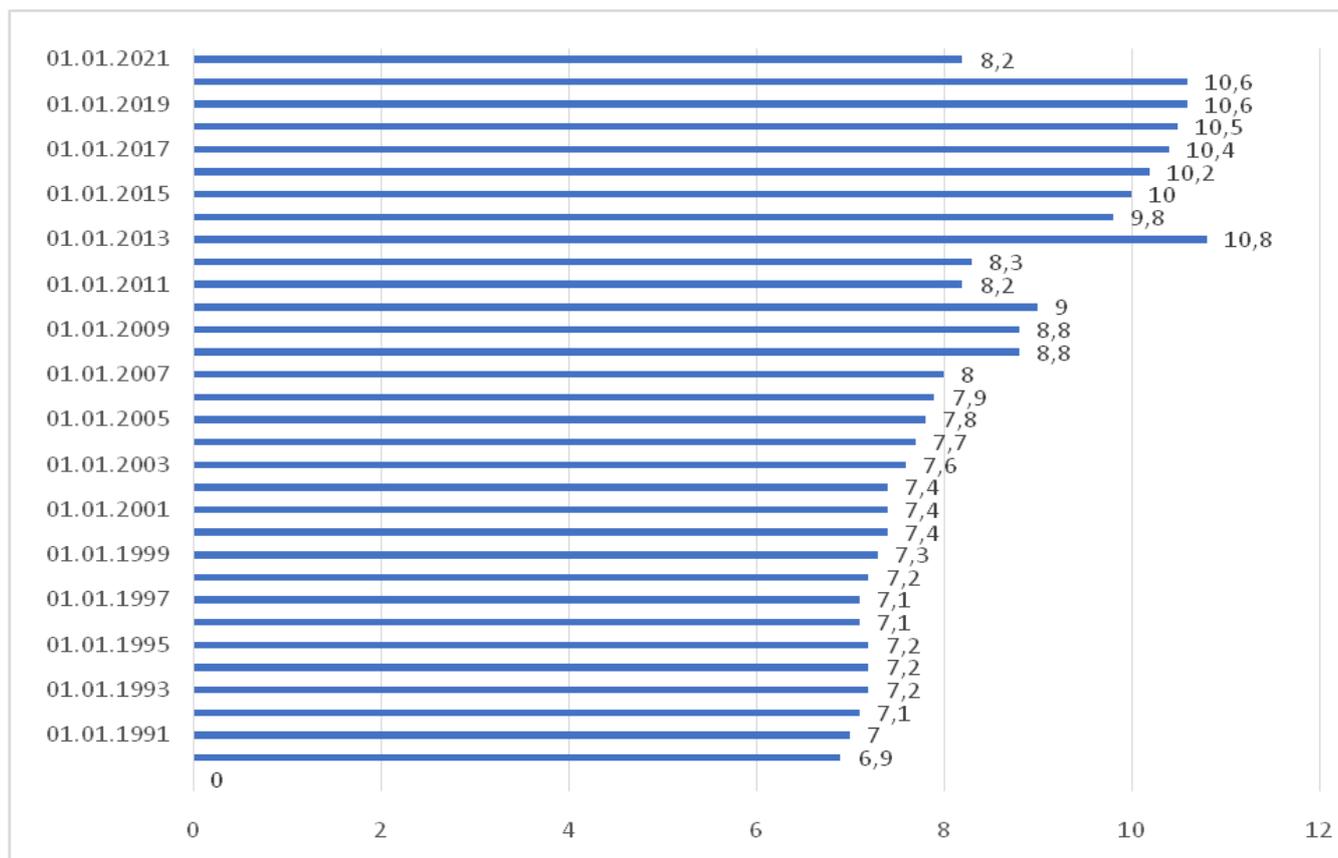


Fig. 6. Dynamics of the total number of medical outpatient clinics in Ukraine for 1991–2021, thousand people

In contrast to inpatient hospitals (see fig. 5), dynamics of outpatient and polyclinic institutions demonstrate a gradual increase in their number over the past three decades, reflecting a shift in Ukraine’s healthcare system toward primary medical care.

During 1991–2001, a number of outpatient and polyclinic facilities grew slowly – from 6.9 thousand to 7.6 thousand units – mainly due to adaptation to new economic conditions.

Between 2001 and 2011, there was a period of active expansion, with a number of institutions increasing by 1.2 thousand units. This growth was driven by the development of a family medicine network, improved accessibility of primary healthcare in rural areas, and redistribution of medical functions from hospitals to outpatient facilities.

In the period 2011–2021, another stage of growth was recorded, as a number of facilities rose from 8.8 thousand to 10.6 thousand units. This trend reflects outcomes of healthcare reforms – particularly medical transformation launched in 2017, when a primary care level became the main entry point to the healthcare system. Key factors included institutional separation of primary care, signing of patient–family doctor declarations, and establishment of new outpatient clinics and Primary Health Care Centers (PHCCs) supported by a state, local communities, and donor programs.

The following figure 7 presents data on the total number of hospital beds in Ukraine for the period 1990–2023.

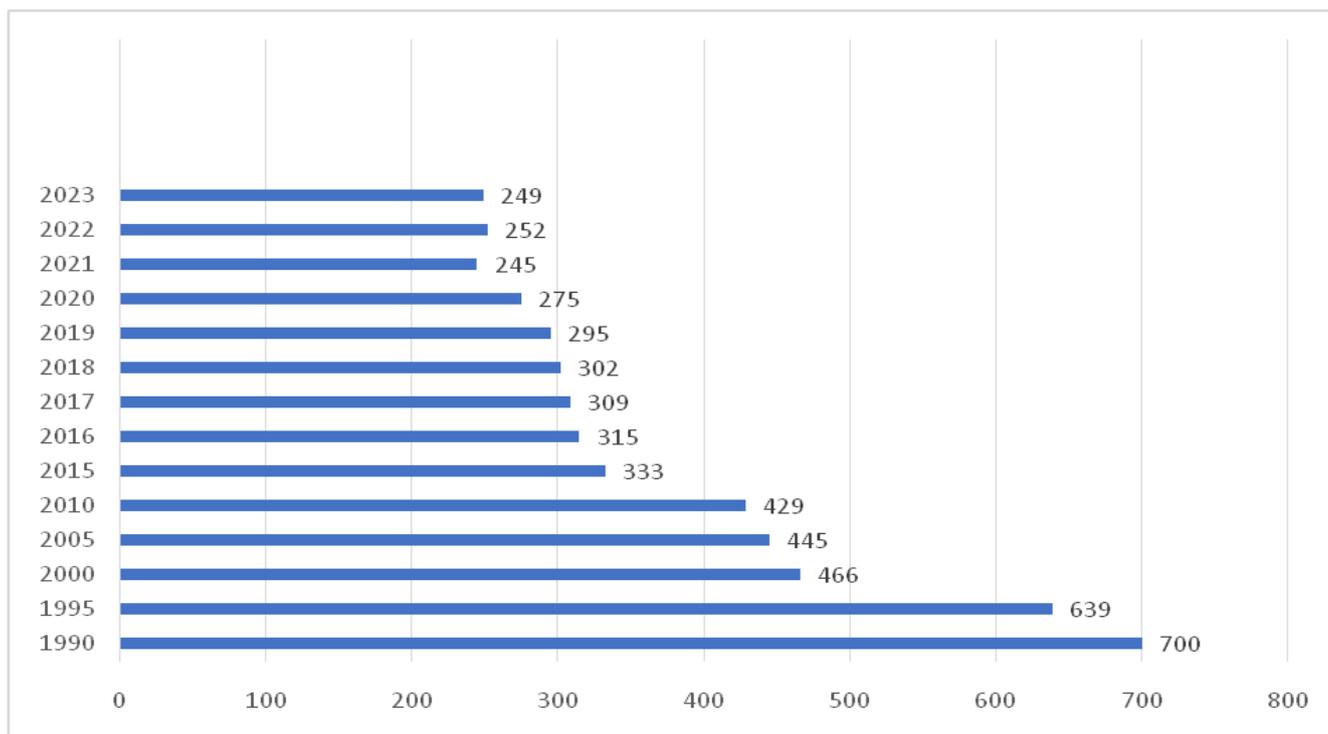


Fig. 7. Dynamics of a total number of hospital beds in Ukraine for 1990–2023, thousand

Thus, the analysis of a total number of hospital beds in Ukraine from 1990 to 2023 reveals a clear and long-term downward trend in the healthcare system, which has continued for over 30 years. Reduction in inpatient care capacity has been one of key directions of a healthcare reform, aimed at deinstitutionalization, cost optimization, and the development of an outpatient sector.

During 1990–2000, a significant decrease was recorded—from 700 thousand to 466 thousand beds, or by 33.4 % – mainly due to the economic crisis of the 1990s, a collapse of a planned healthcare system, and reduced public funding.

Between 2000 and 2010, a stable decline continued, as a number of hospital beds decreased from 466 thousand to 429 thousand (about 8 %).

The period 2010–2020 marked an accelerated reduction, particularly in the context of implementing the *Concept for Healthcare Reform* (2017), the establishment of the *National Health Service of Ukraine (NHSU)*, and the transition to a service-based payment model rather than financing based on a number of beds.

From 2020 to 2023, the indicator showed relative stabilization, though at a low level – about 250 thousand beds – due to wartime challenges, network reorganization, and adaptation to needs of military, internally displaced persons (IDPs), and wounded.

The dynamics of a total number of hospital beds by region during 2000–2023 are presented in figure 8.

Overall, during 2000–2023, a steady decline in a number of hospital beds was recorded across all regions of Ukraine. The regions with the most significant reductions include: Kyiv city – nearly a 47 % decrease; Zaporizhzhia region – from 18.3 to 10.2 thousand (–44 %); Kherson region – from 29 to 19 thousand (–34 %); Luhansk region – from 22.7 to 7.7 thousand (–66 %), largely due to the impact of military actions; Donetsk region – from 41.7 to 29 thousand (–30 %), also partly related to the war.

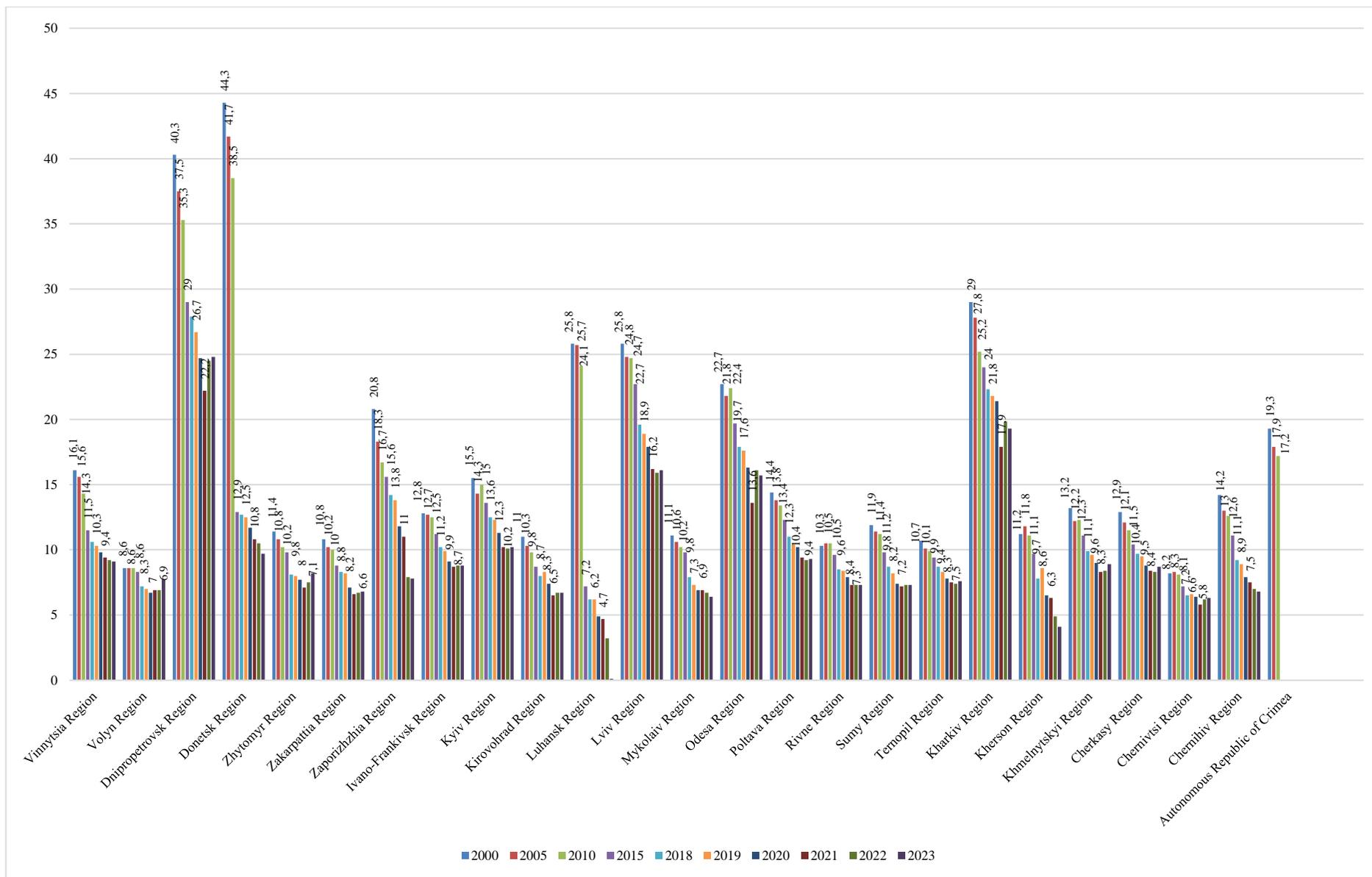


Fig. 8. Dynamics of the total number of hospital beds by region, 2000-2023, thousand

In the regions affected by military aggression (Donetsk, Luhansk, Kherson, Zaporizhzhia), a significant reduction in hospital bed capacity has been observed. This is primarily due to a partial or complete destruction of hospitals, evacuation of medical facilities, and loss of territorial control.

Regions with the lowest number of hospital beds in 2023 were Chernivtsi – 5.8 thousand, Ternopil – 6.3 thousand, Zakarpattia – 6.6 thousand, Volyn – 6.9 thousand, and Ivano-Frankivsk – 8.2 thousand. These regions have lower population density and a compact hospital network, which has facilitated a faster transition to outpatient and day-care treatment models.

The following figure 9 presents data on the total healthcare funding in Ukraine for 2020–2024.

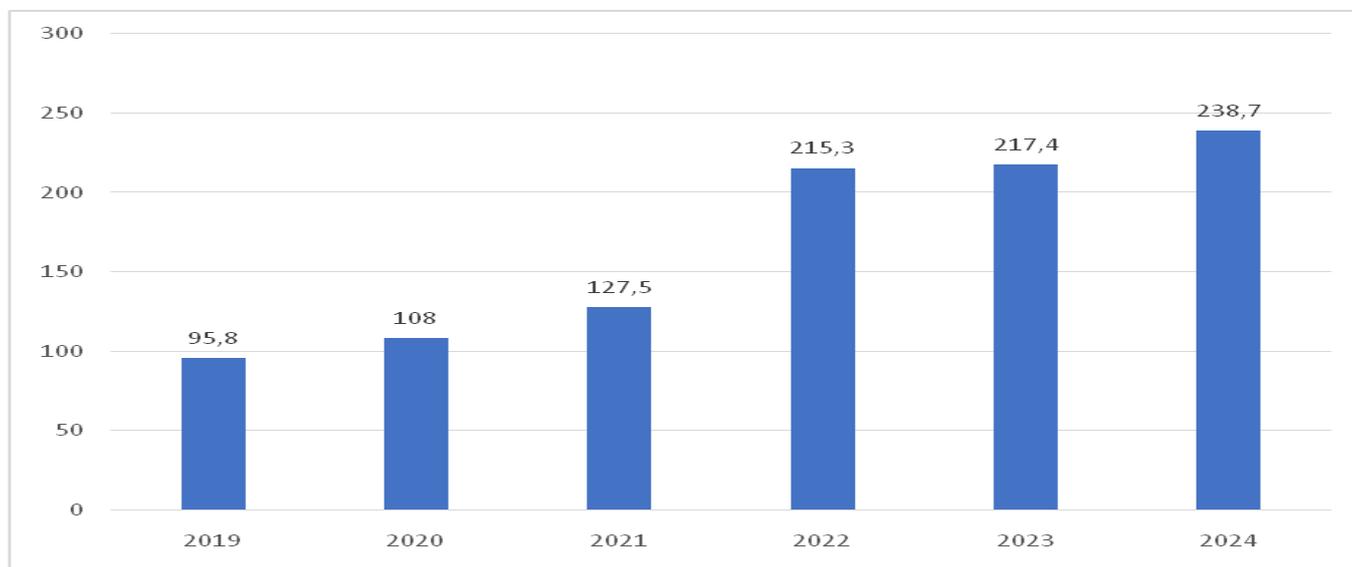


Fig. 9. Total funding for healthcare in Ukraine for 2020-2024

During 2019–2024, there was a steady increase in budget allocations for healthcare, rising from UAH 95.8 billion in 2019 to UAH 238.7 billion in 2024.

In 2022, a sharp surge in healthcare funding was recorded, reaching over UAH 87.8 billion. This increase was driven by several factors: higher expenditures due to the full-scale war, the need to provide medical guarantees for military personnel, internally displaced persons (IDPs), and affected civilians, as well as increased funding for emergency care, logistics, and humanitarian programs. In 2023, a modest increase of 1.0 % was observed, indicating a period of stabilization; however, in 2024, growth is expected to resume at 9.8 % compared to the previous year. The following figure 10 presents the data on state healthcare expenditures in Ukraine by type of medical allocation for 2018–2024.

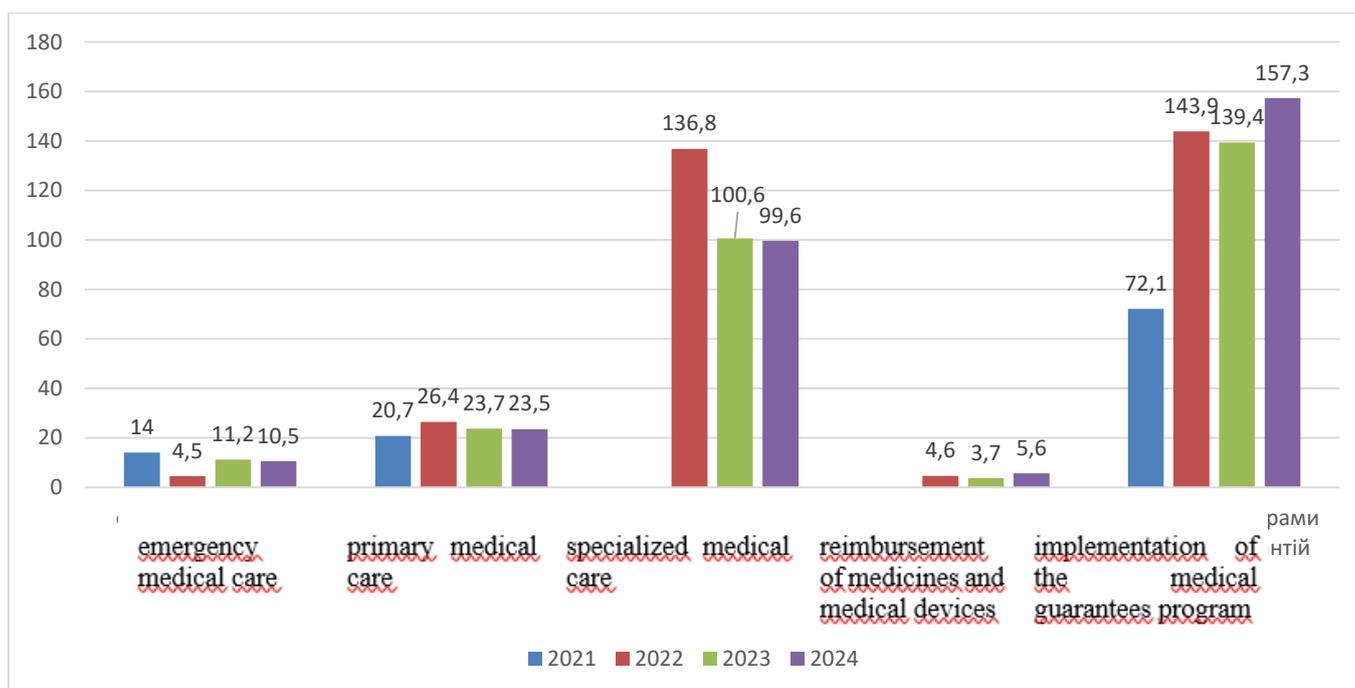


Fig. 10. Healthcare financing in Ukraine by type of medical direction, 2018–2024

Between 2018 and 2024, there was a steady increase in overall healthcare financing, particularly within a framework of the Medical Guarantees Program, which has become a primary mechanism for funding medical services following the 2017–2019 reforms.

The highest funding for the Medical Guarantees Program was recorded in 2024, totaling approximately UAH 157.3 billion, which is 10 % higher than in 2023 (UAH 143 billion). This underscores the priority given to the guaranteed package of medical services, including free diagnostics, childbirth, surgery, and oncology treatment.

Funding for specialized medical care was around UAH 136.8 billion in 2022, but decreased to UAH 89.6 billion in 2023–2024. This reduction may reflect a reallocation of funds toward primary and emergency care or adjustments due to wartime conditions, which necessitated shifting priorities.

For primary healthcare, approximately UAH 23.7 billion was allocated in 2024, reflecting stable growth compared to 2021 (UAH 20.7 billion). This aligns with the primary care reform and an emphasis on family medicine as the first point of contact in the healthcare system.

Emergency medical care remains the least funded sector during the study period, with only UAH 5 billion allocated in 2024—a decrease from UAH 14 billion in 2021. This may indicate system rationalization or limitations in transport and personnel amid wartime conditions.

Reimbursement of medicines shows gradual growth in state funding, rising from UAH 3.7 billion in 2022 to UAH 5.6 billion in 2024, highlighting the strengthening of the social aspect of healthcare and support for patients with chronic conditions (e.g., diabetes, hypertension).

Thus, the Medical Guarantees Program has become a dominant funding mechanism, accounting for over 50 % of the total healthcare budget. Resources have been redistributed in favor of primary and specialized care, reflecting a patient-centered model. However, decline in emergency care funding remains a challenge during wartime. The increase in spending on medicine reimbursement demonstrates a step toward improving access to treatment for low-income populations. Overall, despite wartime and economic challenges, there is a positive trend in investment in the healthcare system.

#### 4. Conclusions and prospects for further research in this area

The conducted study of Ukraine's healthcare system reveals a long-term trend of declining human and infrastructural capacity, which began in the 1990s and intensified during military conflicts after 2014. Specifically, a total number of physicians and mid-level medical personnel has decreased threefold, particularly in frontline regions. The most acute staffing crisis occurred after 2020, coinciding with the COVID-19 pandemic and the full-scale war.

The number of hospital facilities and beds from 1990 to 2023 declined nearly threefold, reflecting the transition from the Soviet model to an outpatient-oriented system, yet simultaneously creating a risk of reduced access to inpatient care. In contrast, a number of outpatient and polyclinic institutions gradually increased, demonstrating the implementation of primary healthcare reform principles.

Healthcare funding has shown overall growth, particularly through the Medical Guarantees Program, which in 2024 accounts for over 50 % of a sector's budget. However, emergency medical care and infrastructure in conflict-affected areas remain underfunded. An increase in expenditure on medicine reimbursement indicates a strengthening of a social component of healthcare policy, aimed at supporting vulnerable population groups.

Despite positive changes in financial provision, a situation with medical personnel and infrastructure requires urgent strategic measures to preserve and restore resource capacity, especially under conditions of war and during post-conflict reconstruction.

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