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Assessment of systemic problems and consequences of public administration of human resources in the healthcare system of Ukraine

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Abstract

The article provides a comprehensive analysis of systemic problems and the consequences of state management of human resources in the health care system of Ukraine. It is substantiated that human resources are a key resource for the functioning of the industry, determining its ability to provide the population with quality medical services, adapt to reforms and effectively respond to crisis challenges. It was found that in 2021–2024, the healthcare system will experience a steady decline in the number of doctors and paramedical staff, a deepening of regional disparities, and an increase in the share of employees of retirement age, which indicates the aging of the human resource potential.

Regional analysis showed the most critical losses in the eastern and southern regions of Ukraine, in particular in Donetsk, Luhansk, Kherson, and Zaporizhzhia, where the level of medical staffing has decreased by more than 30–50 %. In contrast, the western regions demonstrate relative stability and concentration of human resources, which form an asymmetric model of the functioning of the healthcare system. A significant decrease in the actual staffing of full-time positions by doctors and paramedical staff was identified, which is accompanied by an increase in vacancies and an increase in the load on existing employees.

The study of the structure of the human resource potential showed the dominance of the secondary level of medical care and the insufficient development of the primary link, which limits the effectiveness of the preventive model of health care. It was also established that the level of certification of medical workers in most professional groups is decreasing, which negatively affects the quality of medical services and the professional stability of the industry.

It was established that the current state of state management of human resource potential is characterized by systemic structural imbalances, regional unevenness and personnel shortage. The need to improve state personnel policy, introduce differentiated regional approaches and strengthen mechanisms for the reproduction of medical personnel to ensure the sustainability of the health care system of Ukraine is substantiated.

Keywords: human resource potential; health care; public administration; medical personnel; regional disparities; staffing; certification of doctors; medical personnel.

1. Introduction

Human resources are a determining factor in the functioning of the healthcare system and a key condition for the implementation of public policy in the field of providing the population with medical services. The availability, structure, and

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quality of medical personnel determine the capacity of the healthcare system to perform its basic functions, adapt to reform changes, and ensure resilience in crisis conditions.

According to the Annual Report on the Health Status of the Population of Ukraine and the Epidemiological Situation for 2024 [3], during 2021–2024, a steady trend toward an increase in the share of physicians of retirement age has been observed in the healthcare system of Ukraine, which is one of the key indicators of the aging of the sector's human resources.

In particular, in 2024, the share of physicians of retirement age reached 25.3 %, which in absolute terms amounts to 32,316 individuals, while in 2023 this figure was 24.7 %, and in 2021–2022 it was 23.7 %. This dynamic indicates a gradual but systemic increase in age-related imbalances within the medical workforce.

The most unfavorable situation is observed in certain regions of Ukraine, particularly in Mykolaiv, Luhansk, Donetsk, and Kherson regions, where the share of physicians of retirement age exceeds 30 %, that is, more than one-third of all medical personnel. Similar processes are also observed among junior medical specialists, whose share of retirement age in 2024 amounted to 12.1 % (26,037 individuals), which is higher compared to 10.7 % in 2021. The increase in the proportion of retirement-age personnel among mid-level medical staff indicates limited rates of workforce renewal and insufficient compensation for staff attrition through the inflow of young professionals [3].

2. Literature review

The issue of assessing systemic problems and the consequences of public administration of human resources in the healthcare system of Ukraine has been studied by both domestic and foreign scholars. Among Ukrainian researchers, significant contributions have been made by V.Lekhan, H.Slabkyi, V.Moskalenko, Yu.Voronenko, and O.Radysh, who analyzed workforce provision in the sector, the efficiency of managing medical resources, and the impact of reforms on the healthcare system. Certain aspects of personnel policy and its state regulation were examined by L.Zhalilo, I.Stefanyuk, and S.Shevchenko. Among foreign researchers, the works of WHO experts, in particular T.Evans, J.Frenk, and J.Kutzin, are noteworthy, as they developed approaches to assessing human resources in healthcare systems, their sustainability, and effective management.

3. The identification of previously unresolved issues and the formulation of research hypotheses

Despite the significant body of research on human resources in the healthcare system, a number of issues remain insufficiently explored. In particular, there is a lack of a comprehensive assessment of the systemic problems of public administration of healthcare personnel in Ukraine in the context of ongoing reforms and crisis conditions. Existing studies often focus on individual aspects – such as workforce shortages, migration, or aging – without considering their interconnection and cumulative impact on the sustainability of the healthcare system. Furthermore, insufficient attention has been paid to evaluating the consequences of managerial decisions in the field of personnel policy, especially in terms of long-term system resilience and the capacity to respond to external challenges. There is also a need to deepen the analysis of regional disparities in staffing and their implications for equitable access to healthcare services.

Based on this, it can be hypothesized that systemic shortcomings in public administration of human resources lead to structural imbalances in the healthcare workforce, ineffective personnel policy contributes to the aging and outflow of medical staff, and the lack of strategic planning in human resource management negatively affects the resilience and efficiency of the healthcare system of Ukraine.

4. Purpose, objectives and methods of the study

The purpose of the article is to assess systemic problems and the consequences of public administration of human resources in the healthcare system of Ukraine.

To achieve this purpose, the study sets the following objectives: to identify key systemic problems in the management of healthcare personnel; to analyze the current state and structure of human resources in the healthcare system; to evaluate the consequences of public administration decisions for the development and sustainability of the sector; and to determine the impact of personnel policy on the efficiency and resilience of the healthcare system under contemporary challenges.

The methodological basis of the study includes a set of general scientific and special methods, in particular: analysis and synthesis for generalizing theoretical approaches to human resource management; a comparative method for assessing trends and regional disparities; statistical analysis for evaluating quantitative indicators of staffing; and a системний підхід for identifying interconnections between management decisions and their consequences for the healthcare system.

5. Main results

For a comprehensive analysis of human resources in the healthcare system of Ukraine, an assessment was carried out in the following main areas: the dynamics of the number of physicians in a regional context; the structural distribution of physicians by sectoral blocks and levels of healthcare provision; the structure of pediatric physicians by specialty; the dynamics of the number of mid-level medical personnel; and the provision of the population with physicians and mid-level medical staff.

These indicators make it possible to comprehensively assess the current state of human resources in the healthcare system of Ukraine, identify the main trends in their transformation, and reveal key problems in staffing within the sector.

Figures 1–4 present the dynamics of the number of physicians in the regional context of Ukraine for the period 2015–2024.

According to the data in figure 1, the dynamics of the number of physicians in the western region of Ukraine during 2015–2024 indicate relative stability of human resources compared to other regions. Despite the nationwide trend of a reduction in medical personnel in 2021–2022, most regions demonstrate a gradual recovery of indicators in 2022–2024. The largest number of physicians is consistently concentrated in the Lviv region, amounting to more than 14.0 thousand individuals in 2015 and approximately 12.4 thousand by the end of the study period. Overall, the western region is characterized by minimal losses in human resources due to military actions, which allows it to be considered a zone of relative workforce stability within the healthcare system of Ukraine.

Regarding the northern region of Ukraine (fig. 2), a pronounced structural asymmetry is clearly observed, driven by the high concentration of medical personnel in the city of Kyiv. During 2015–2020, the capital of Ukraine recorded the largest number of physicians, ranging from 23.9 to 25.0 thousand individuals, which significantly exceeds the indicators of other regions within the area. However, in 2021, a sharp decline in the number of physicians is observed, correlating with pandemic-related factors.

In 2022–2024, there is a recovery in the indicators, reaching 22.8–22.4 thousand individuals; however, the overall trend indicates a gradual reduction of the personnel base in peripheral regions such as Chernihiv and Sumy oblasts. Thus, the northern region is characterized by a high level of intra-regional disparity in healthcare workforce distribution.

In the eastern region of Ukraine (fig. 3), the most significant reduction in the number of physicians over the study period has been recorded. In 2015, more than 15 thousand physicians were concentrated in both Kharkiv and Dnipropetrovsk regions, while by 2024 their numbers had decreased to 9.3 and 12.2 thousand, respectively. A particularly critical decline is observed in the Donetsk region, from 5.7 to 2.7 thousand individuals, and in the Luhansk region, from 2.1 to 0.9 thousand, which is directly related to military actions, occupation of territories, and the migration of both the population and healthcare professionals. As a result of these changes, there has been a profound transformation of the human resources potential and structural destabilization of the healthcare system.

In the southern region of Ukraine (fig. 4), a gradual decline in the number of physicians is observed in most regions, with a pronounced negative trend after 2021. The most significant personnel losses were recorded in the Kherson region, where the number decreased from 3.8 thousand individuals in 2015 to 1.4 thousand in 2024, reflecting the consequences of temporary occupation and infrastructure destruction. Despite partial recovery in 2022, the Odesa region did not reach its pre-war level by 2024, with the number of physicians amounting to 9.8 thousand. At the same time, central regions such as Poltava, Vinnytsia, and Cherkasy demonstrate relative stabilization of indicators in 2022–2024. Overall, the southern region is characterized by a moderate but steady decline in human resources, with high variability in intra-regional trends.

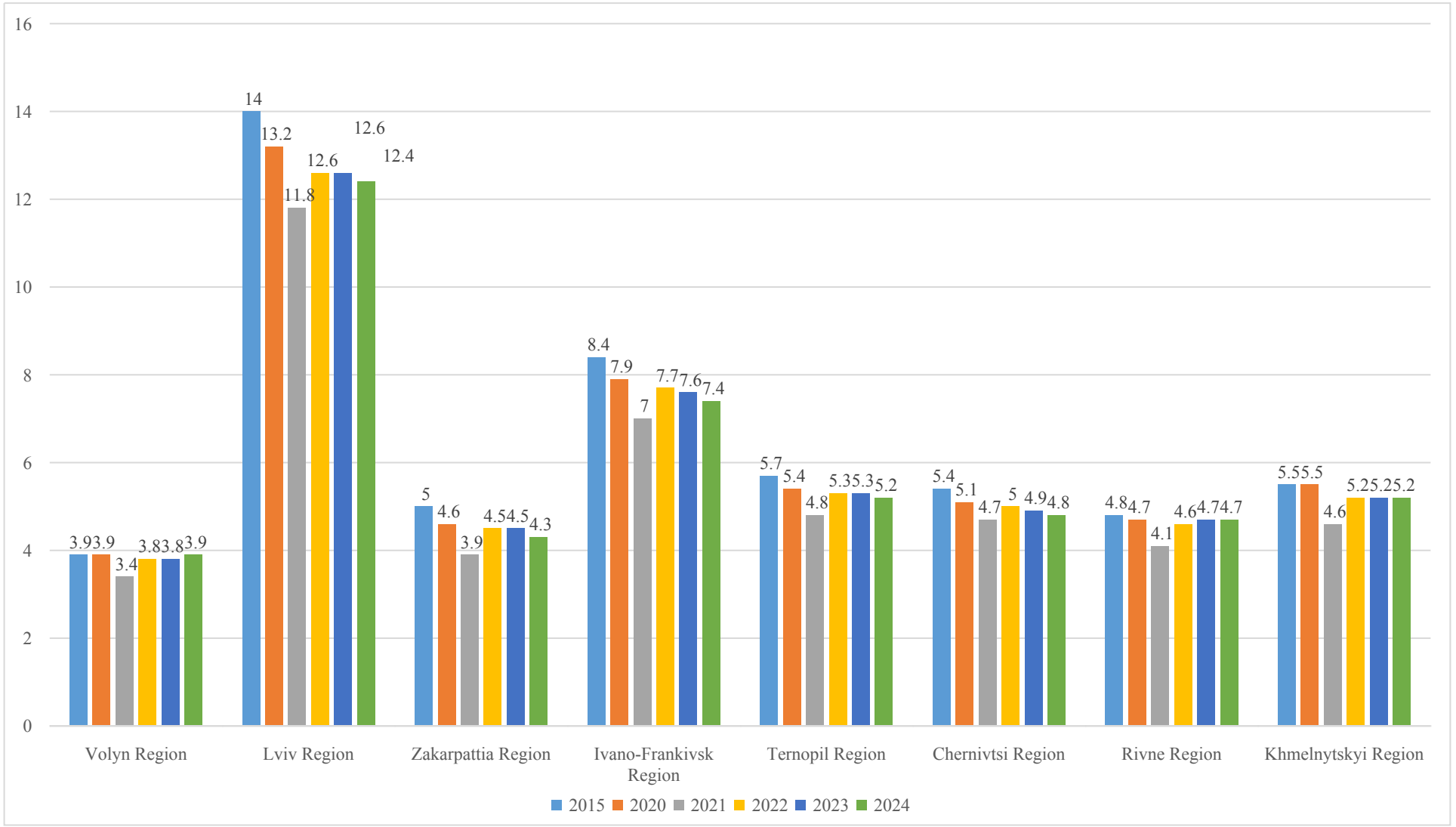

Fig. 1. Dynamics of the Number of Physicians in the Western Region of Ukraine, 2015–2024, thousand persons [1]

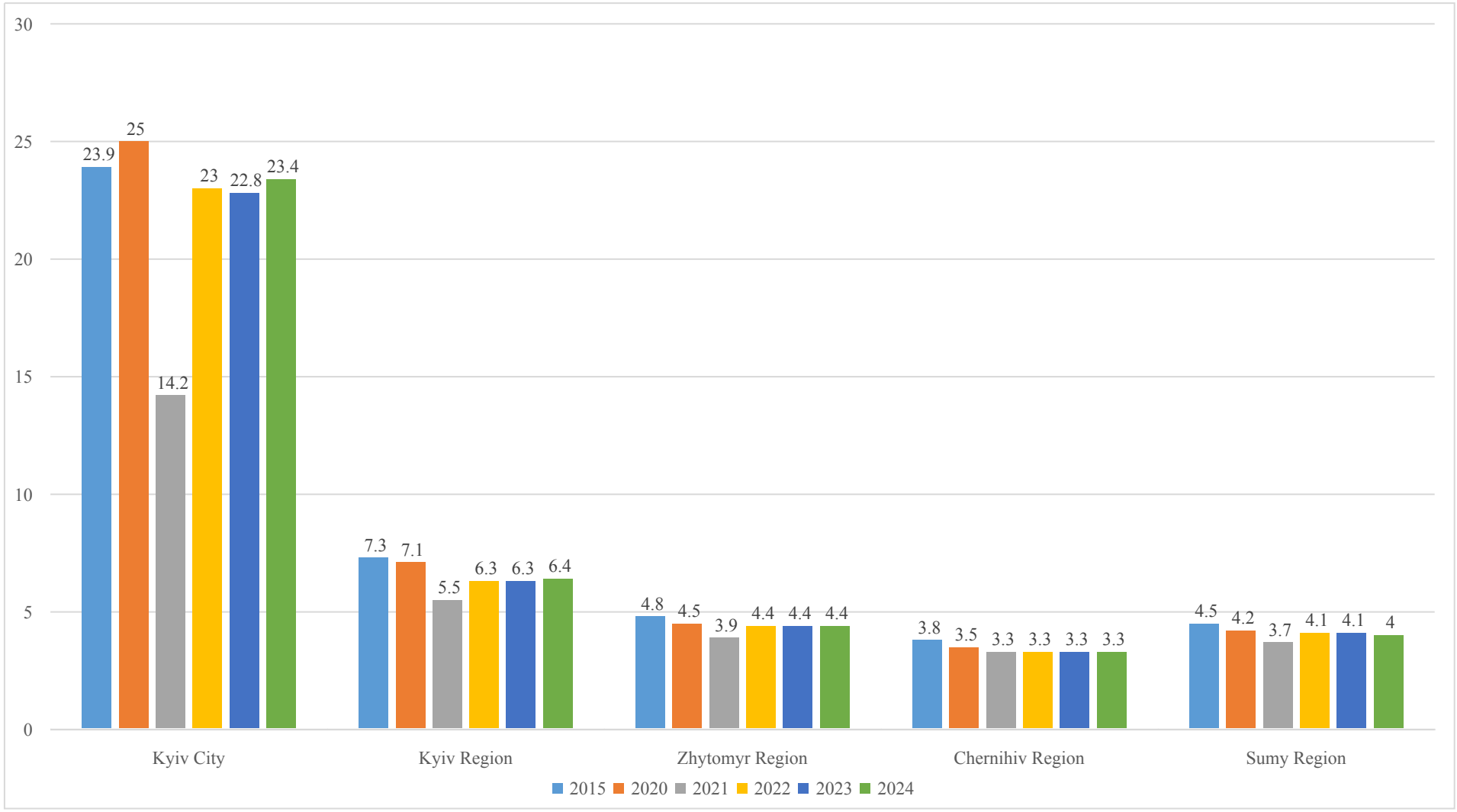

Fig. 2. Dynamics of the Number of Physicians in the Northern Region of Ukraine, 2015–2024, thousand persons [1]

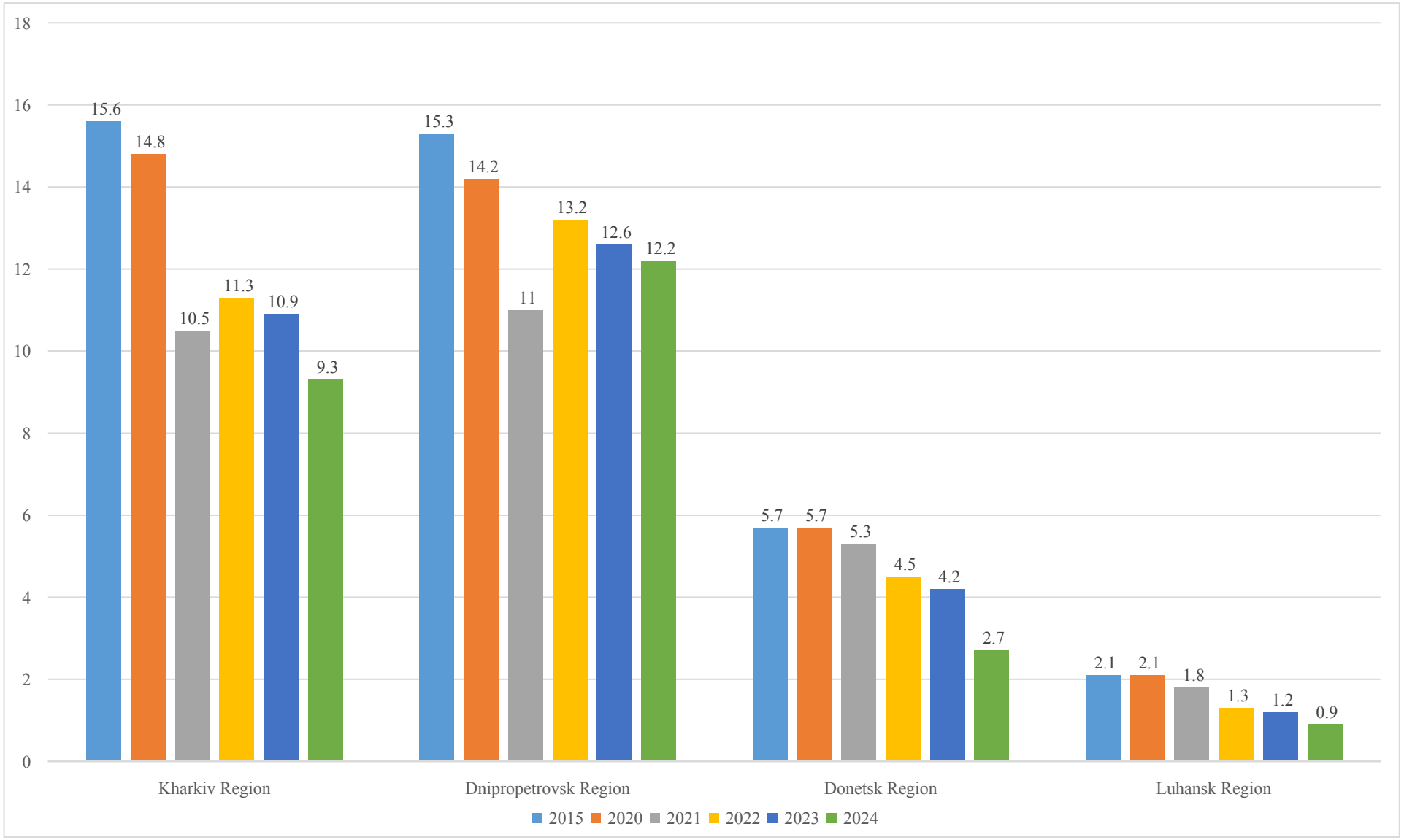

Fig. 3. Dynamics of the Number of Physicians in the Eastern Region of Ukraine, 2015–2024, thousand persons [1]

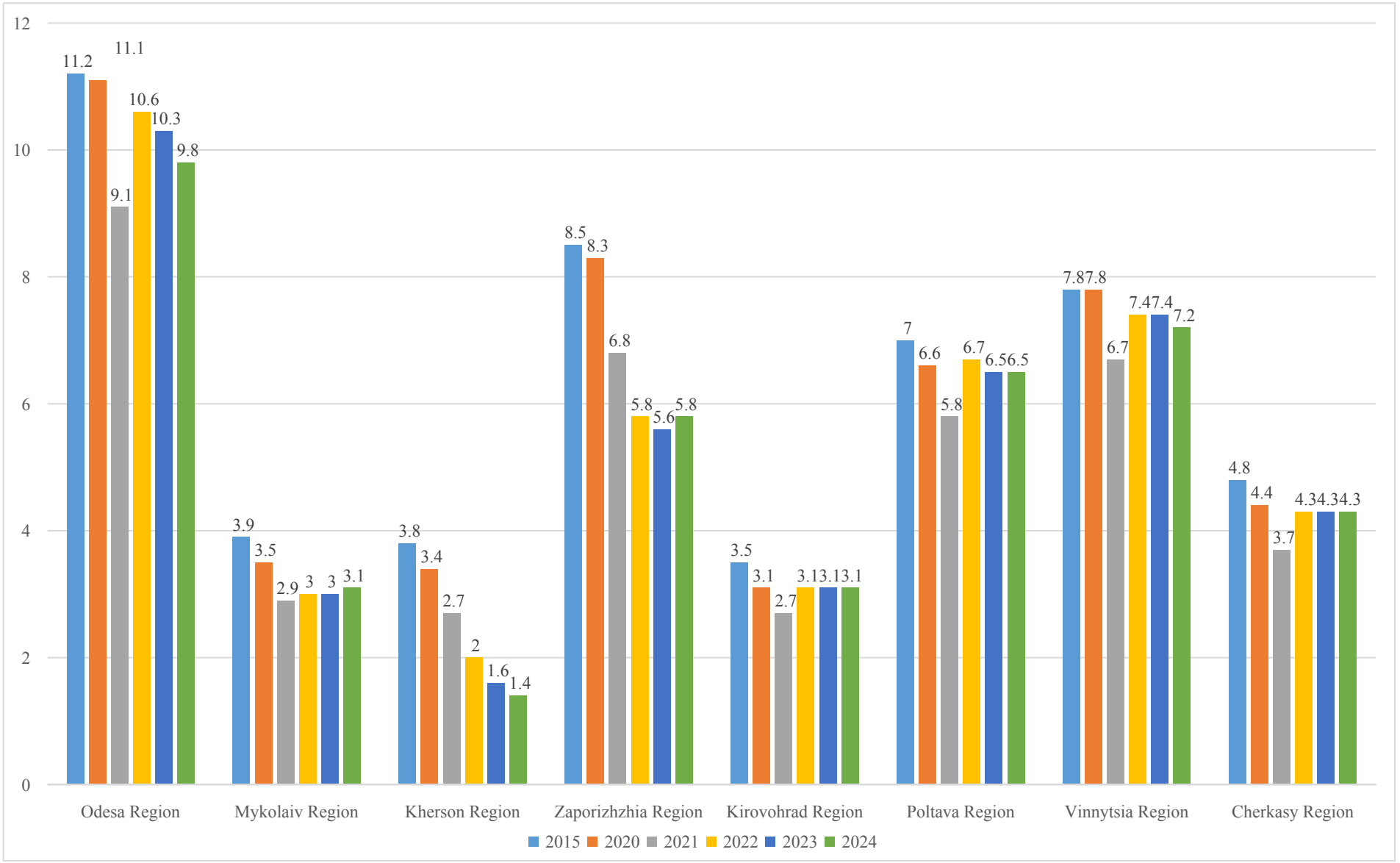

Fig. 4. Dynamics of the Number of Physicians in the Southern Region of Ukraine, 2015–2024, thousand persons [1]

Figure 5 below presents the structural distribution of physicians by major sectoral blocks in Ukraine in 2024.

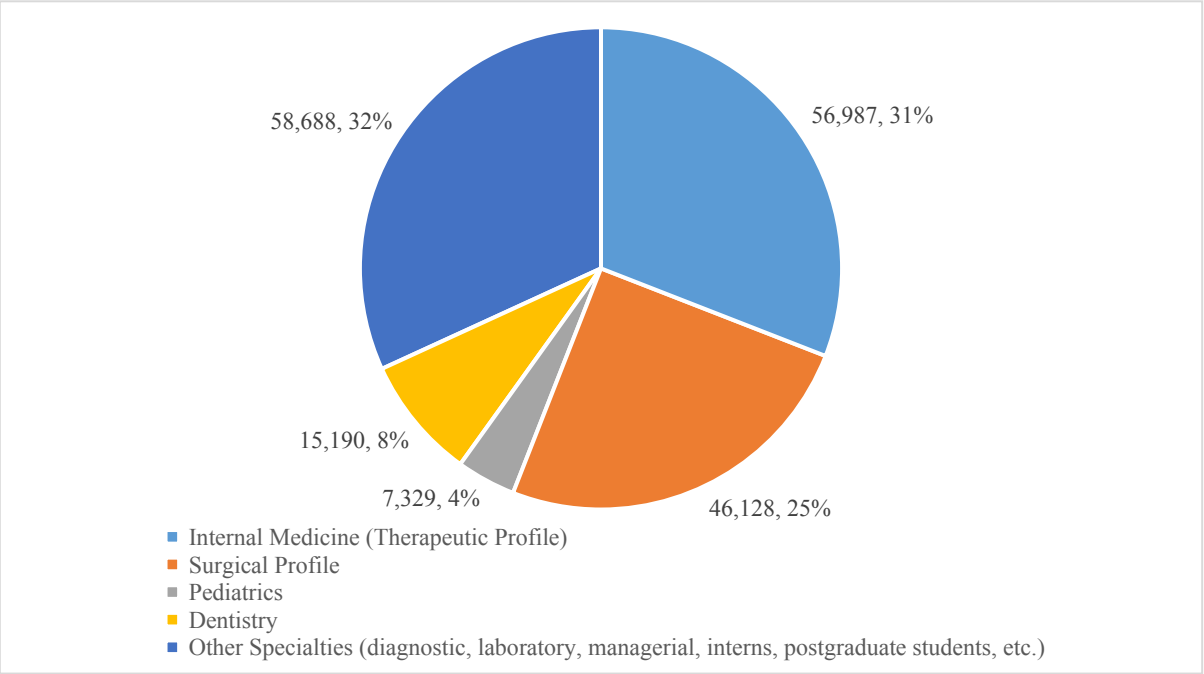

Fig. 5. Structural Distribution of Physicians by Major Sectoral Blocks in Ukraine, 2024 [2]

The analysis of the sectoral structure of human resources in the healthcare system of Ukraine as of December 31, 2024 (fig. 5) shows that the largest share is represented by physicians of the therapeutic profile – 56,987 individuals (30.9 % of the total). The surgical block includes 46,128 specialists (25.0 %), reflecting a significant concentration of resources in specialized care. The share of dentists amounts to 15,190 individuals (8.2 %), while the pediatric segment is relatively small, with only 7,329 individuals (4.0 %). At the same time, a substantial group consists of other specialties – approximately 58,688 individuals or 31.9 %, indicating a well-developed diagnostic, auxiliary, and managerial infrastructure within the sector. Figure 6 below presents the structural distribution of physicians by levels of healthcare provision in Ukraine in 2024.

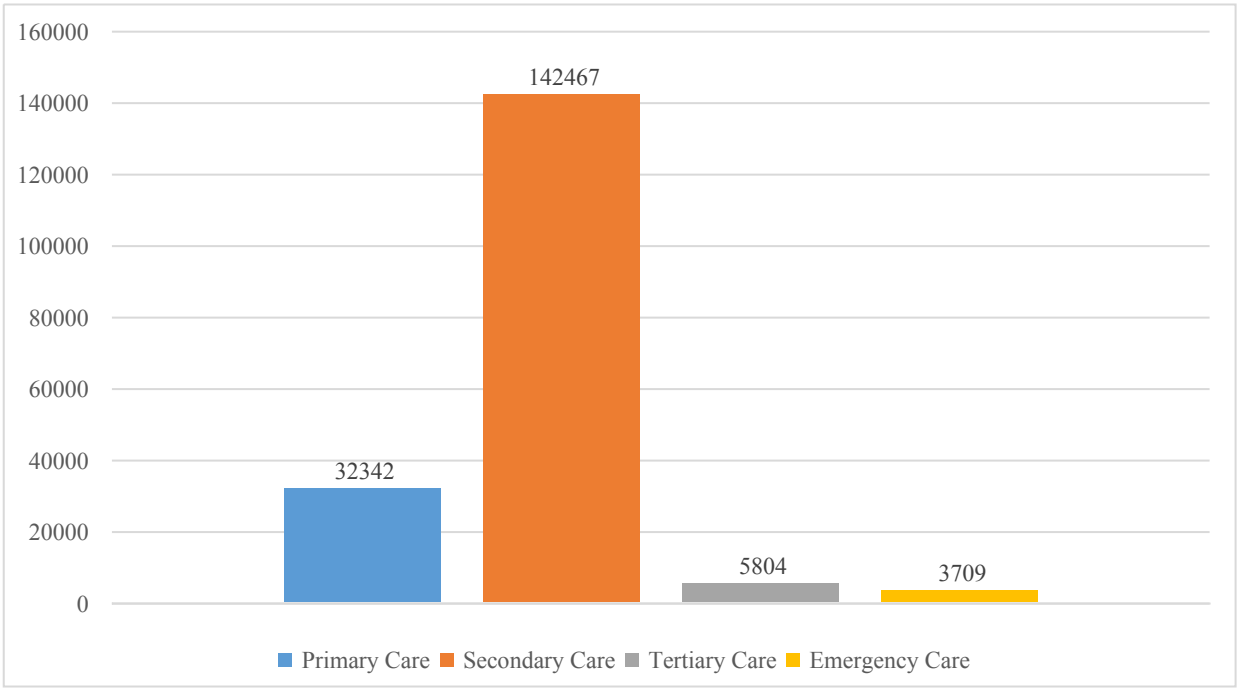

Fig. 6. Structure of Human Resources Provision by Levels of Healthcare Delivery in Ukraine as of December 31, 2024 [2]

The structural analysis of human resources by levels of healthcare delivery in Ukraine in 2024 (fig. 6) demonstrates the clear dominance of the specialized segment within the overall system. The secondary level accounts for 142,467 physicians (77.3 %),

while primary healthcare is represented by 32,342 specialists (17.5 %). The tertiary level includes 5,804 physicians (3.1 %), and emergency medical care comprises 3,709 physicians (2.0 %).

This distribution reflects the historically formed model of healthcare organization, in which the main emphasis is placed on specialized and hospital-based care. At the same time, such a structure indicates an insufficient development of primary healthcare, which plays a crucial role in prevention, early diagnosis, and reducing the burden on higher levels of medical care. The imbalance in the allocation of human resources may lead to inefficiencies in service delivery, increased pressure on secondary care institutions, and limited accessibility of basic medical services for the population. The resulting ratio of primary to specialized care of approximately 1:4.4 highlights a significant concentration of human resources at the secondary level of healthcare delivery. This disproportion suggests the need to optimize personnel policy and strengthen the role of primary care as a fundamental component of an effective and sustainable healthcare system.

Figure 7 below presents the distribution of pediatric physicians in Ukraine in 2024, which allows for a more detailed assessment of the structure of specialized medical personnel and the identification of potential imbalances within the pediatric segment.

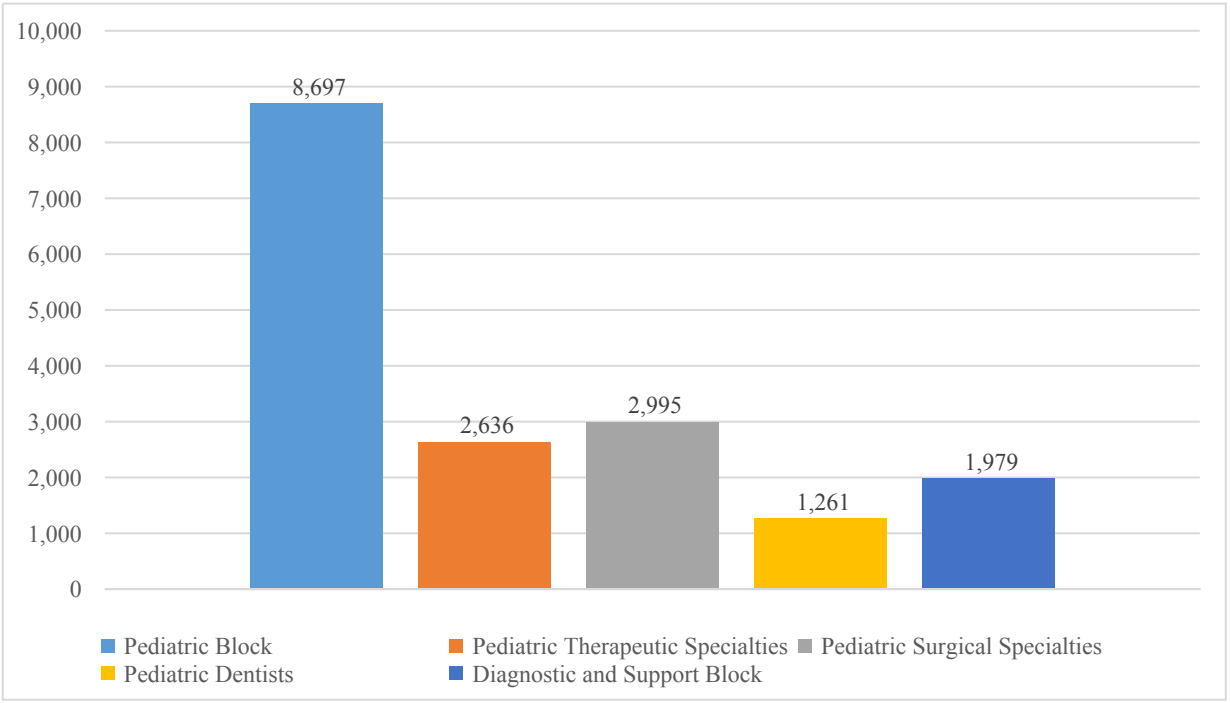

Fig. 7. Structure of Pediatric Physicians by Specialties in Ukraine, 2024, persons [2]

The quantitative analysis of the structure of pediatric physicians in Ukraine in 2024 (fig. 7) indicates a pronounced concentration of human resources within the core pediatric segment. Out of the total number of 17,568 physicians, nearly half are pediatricians and neonatologists – 8,697 individuals. This figure is 2.9 times higher than the number of pediatric surgical specialists (2,995 individuals) and 3.3 times higher than that of narrow therapeutic pediatric specialists (2,636 individuals). Pediatric surgical specialties exceed narrow therapeutic areas by 359 individuals, indicating a somewhat greater representation of the surgical segment within specialized care for children. At the same time, the number of pediatric dentists amounts to 1,261 individuals, which is more than twice that of the surgical block and nearly seven times that of the pediatric segment.

Figure 8 below presents the comparative number of mid-level medical personnel across regions of Ukraine for the period 2015–2024, measured in thousands of individuals. The comparative analysis of mid-level medical personnel across regions of Ukraine in 2015 and 2024 (fig. 8) demonstrates a steady trend toward a reduction in human resources in almost all regions of the country. The largest relative decline is observed in the Kherson region, where the number of mid-level medical personnel decreased from 9.6 thousand individuals in 2015 to 3.1 thousand in 2024, representing a loss of nearly 68 %. Similarly critical indicators are recorded in the Luhansk region, where the decline is approximately 66 %, and in the Donetsk region, where it exceeds 62 %. A significant reduction in human resources is also observed in the Zaporizhzhia region, exceeding 50 %, confirming the substantial impact of security factors on the workforce stability of the healthcare system.

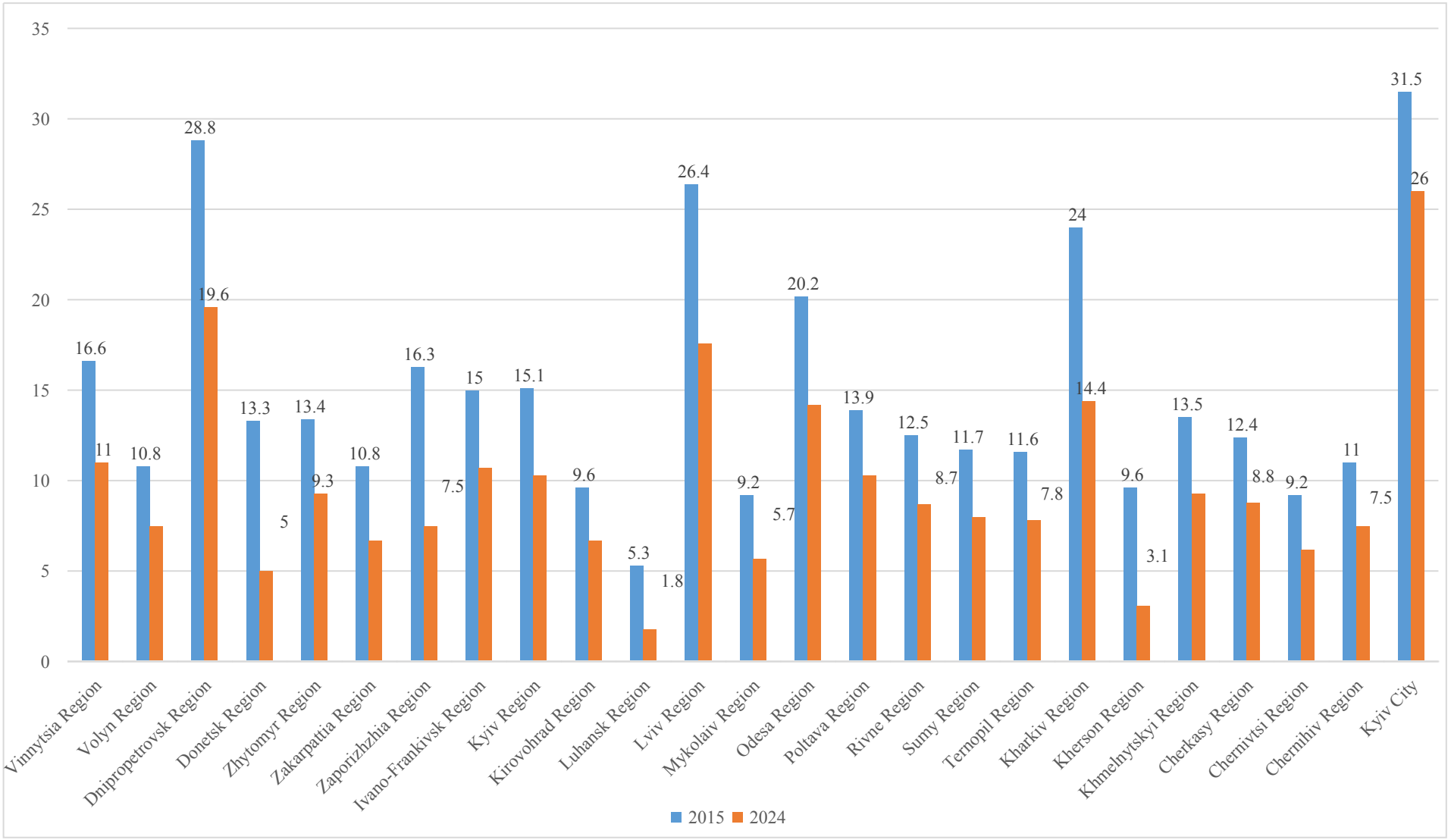

Fig. 8. Comparative Number of Mid-Level Medical Personnel by Regions of Ukraine in 2015 and 2024, thousand persons [1]

Among large industrial regions, a significant decline is observed in the Kharkiv region, where the number of mid-level medical personnel decreased from 24.0 to 14.4 thousand individuals, representing approximately a 40 % reduction and indicating substantial workforce losses. At the same time, in Dnipropetrovsk and Lviv regions, despite relatively high absolute figures, the number of mid-level medical personnel decreased by more than one-third.

The smallest decline was recorded in Kyiv City, where the number decreased from 31.5 to 26.0 thousand individuals, or approximately 18 %, indicating a relatively more stable personnel situation in the capital compared to other regions.

The obtained results of the regional analysis demonstrate significant territorial disparities in the number of mid-level medical personnel, as well as a general trend toward their reduction in 2015–2024. At the same time, for a more comprehensive understanding of the transformation of the healthcare workforce model, it is advisable to consider the long-term dynamics of healthcare staffing in Ukraine. For this purpose, indicators of the provision of physicians and mid-level medical personnel in 1990–2017 are analyzed, the results of which are presented in figure 9.

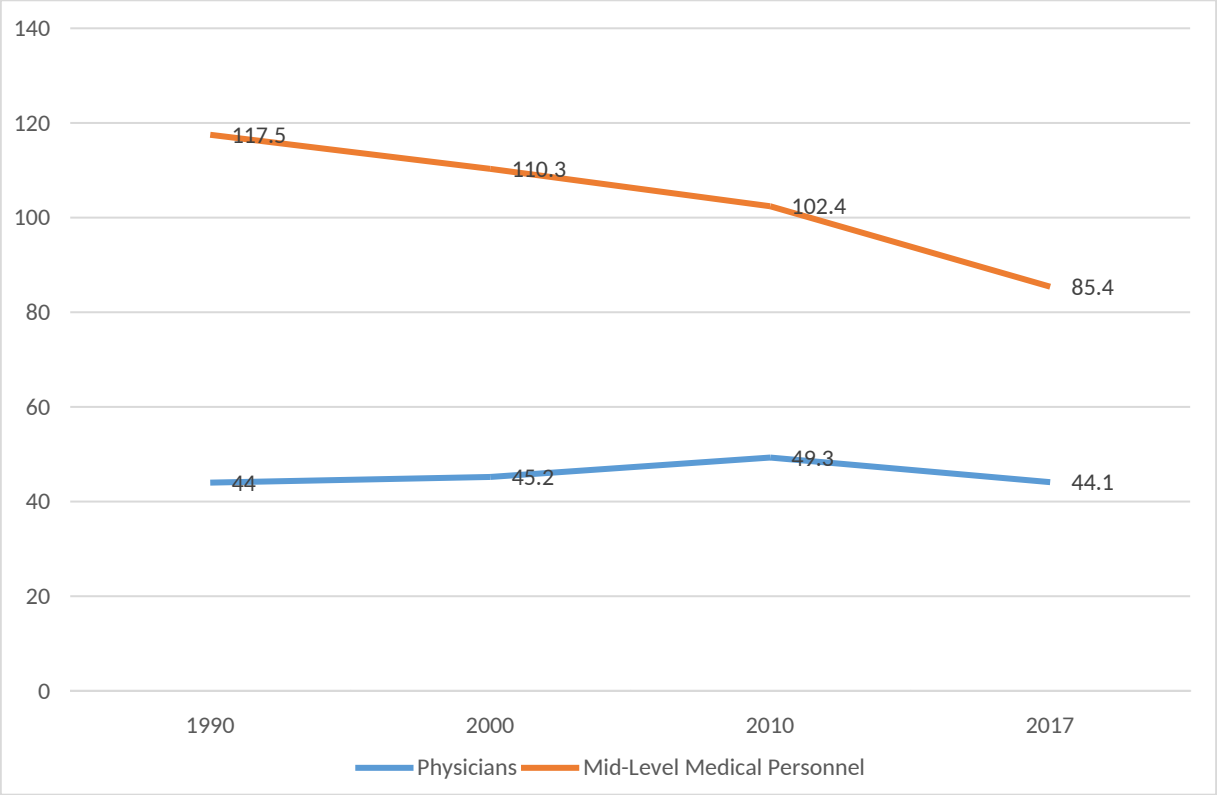

Fig. 9. Provision of Medical Personnel in Ukraine, 1990–2017, per 10,000 population [3]

During the study period, the indicator of provision with mid-level medical personnel decreased from 117.5 to 85.4 individuals per 10,000 population (fig. 9), representing a reduction of 27.3 %. At the same time, the provision of physicians remained relatively stable: 44.0 in 1990 and 44.1 in 2017 per 10,000 population, with a peak value of 49.3 recorded in 2010.

Particularly noteworthy is the transformation of the ratio between physicians and mid-level medical personnel. In 1990, there were approximately 2.7 mid-level medical workers per physician, whereas by 2017 this figure had decreased to 1.9. Thus, the workforce structure of the healthcare system has shifted toward a reduction in supporting personnel, which may indicate an increased workload on physicians and changes in the organizational model of healthcare service delivery.

Figure 10 below presents the indicators of physician provision (staff positions) across regions of Ukraine for the period 2021–2024.

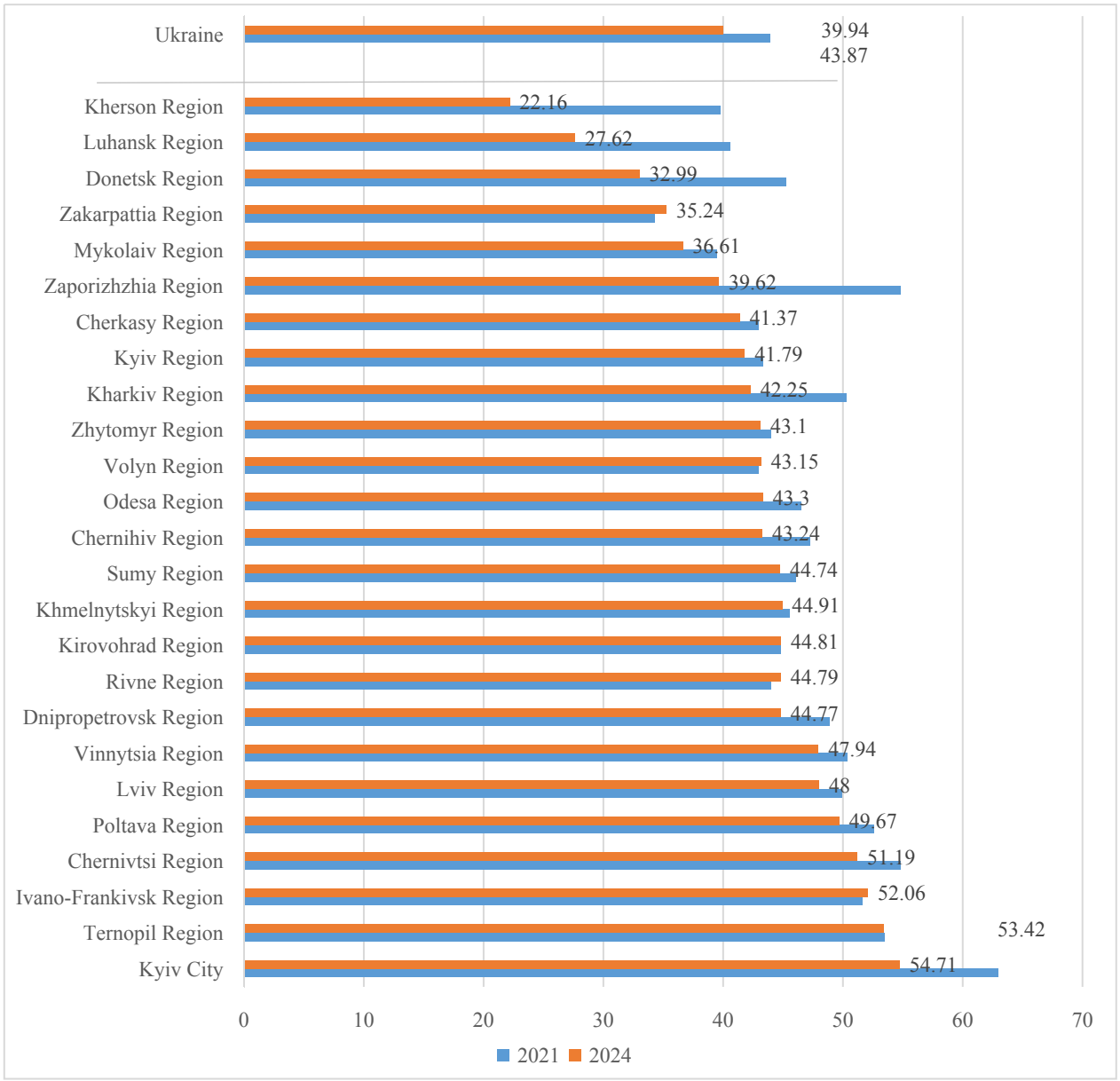

Fig. 10. Provision of Physicians (Staff Positions) by Regions of Ukraine in 2021–2024, per 10,000 population [3]

The comparative analysis of physician provision (staff positions) across regions of Ukraine in 2021–2024 (fig. 10) indicates a nationwide trend toward a reduction in human resources. In 2024, the provision rate amounts to 39.94 per 10,000 population compared to 43.87 in 2021, reflecting a decrease of 3.93 units or nearly 9 %.

The highest rates of decline are observed in Kherson region, where the indicator decreased from 39.78 to 22.16 (a drop of 17.62 points), in Luhansk region from 40.60 to 27.62 (12.98 points), in Donetsk region from 45.26 to 32.99 (12.27 points), in Zaporizhzhia region from 54.80 to 39.62 (15.18 points), and in Kharkiv region from 50.26 to 42.25 (8.01 points). A significant decrease is also recorded in Kyiv City, amounting to 8.23 points.

At the same time, in several western and central regions – such as Ivano-Frankivsk, Zakarpattia, Volyn, and Rivne regions— relative stabilization or slight growth of the indicator is observed, which indicates internal migration of human resources and regional concentration of medical personnel. Thus, despite the formal preservation of relatively high levels of provision in some regions, interregional disparities have significantly intensified.

Figure 11 below presents the indicators of physician provision (headcount) across regions of Ukraine in 2021–2024 per 10,000 population.

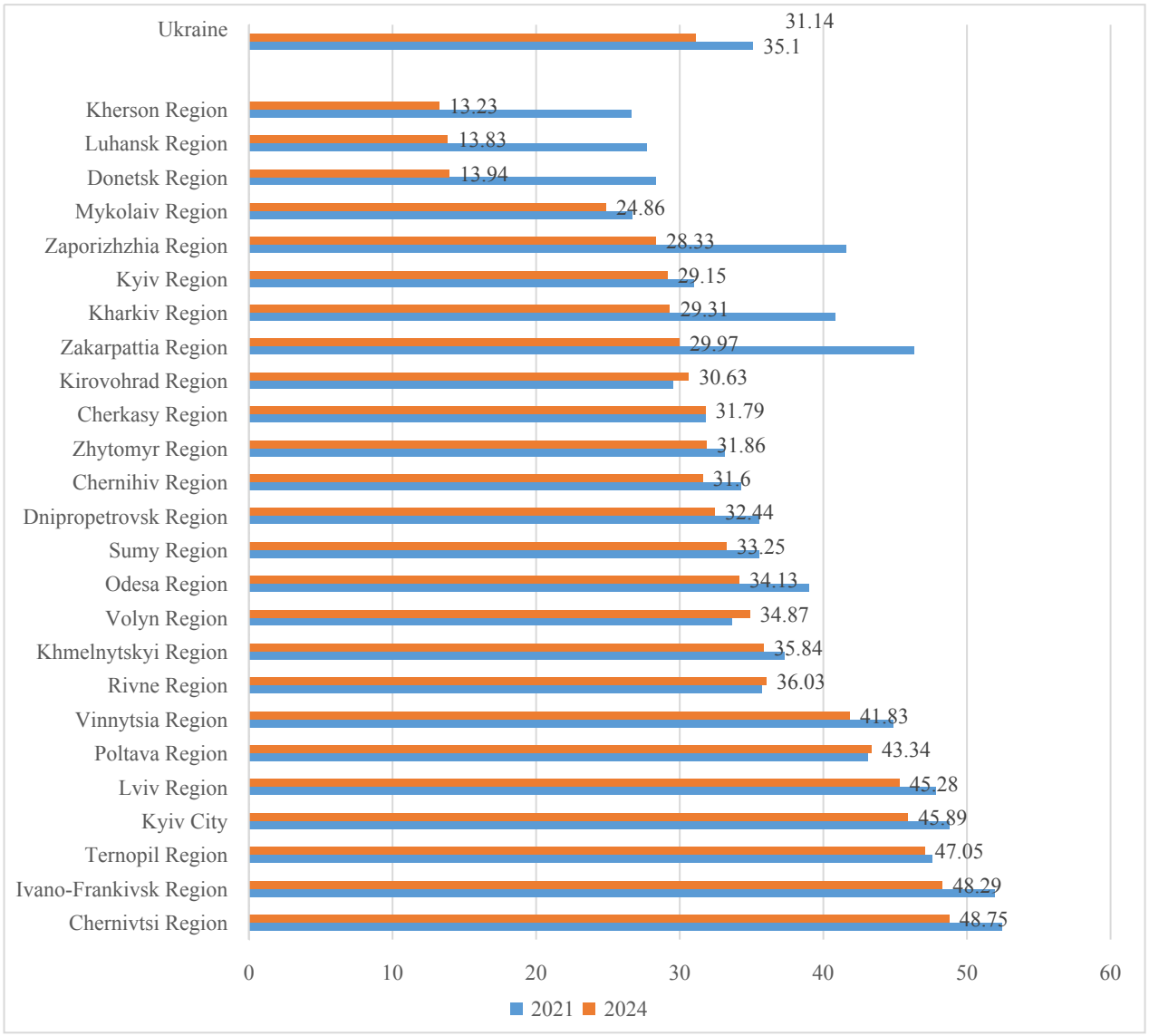

Fig. 11. Provision of Physicians (Headcount) by Regions of Ukraine in 2021–2024, per 10,000 population [3]

The comparative analysis of physician provision by headcount in 2021–2024 (fig. 11) demonstrates a deeper transformation of human resources than that reflected by staff position indicators. In 2024, the level of physician provision (headcount) amounts to 31.14 per 10,000 population compared to 35.1 in 2021, indicating a decrease of 3.96 units or more than 11 %. Thus, the actual number of practicing physicians is declining at a faster rate than suggested by the staffing structure.

The most significant decrease is observed in regions most affected by military actions and intensive migration processes. In particular, in the Donetsk region, provision decreased from 28.36 to 13.94 (a reduction of 50.8 %), in the Luhansk region from 27.7 to 13.83 (–50.1 %), and in the Kherson region from 26.66 to 13.23 (–50.4 %). Substantial declines are also recorded in the Zaporizhzhia region – from 41.57 to 28.33 (–31.8 %) – and in the Kharkiv region – from 40.8 to 29.31 (–28.2 %). This dynamic indicates a significant reduction in the number of actively practicing physicians and a loss of workforce stability in frontline regions. It should be noted that in several western and central regions – such as Volyn, Rivne, Kirovohrad, and Poltava regions – relative stabilization of the indicator is observed. This suggests a redistribution of medical personnel within the country and the formation of new regional centers of workforce concentration.

Thus, while indicators based on staff positions reflect the nominal structure of human resource provision, data based on headcount demonstrate the actual level of workforce presence. The growing gap between these two indicators highlights an increasing structural shortage of physicians and a rising workload on active medical personnel.

Figure 12 below presents the indicators of provision with mid-level medical personnel by staff positions in the regional context of Ukraine per 10,000 population for 2021–2024.

In 2021–2024, the human resource structure of the healthcare system of Ukraine (Fig. 12) underwent noticeable changes in the segment of mid-level medical personnel. In 2024, the provision indicator amounted to 62.25 per 10,000 population compared to 72.26 in 2021, corresponding to a decrease of 10.01 units or 13.8 %. This dynamic reflects not only quantitative losses but also a shift in the balance between the main categories of medical staff, as the rate of decline among mid-level personnel exceeds that of physicians.

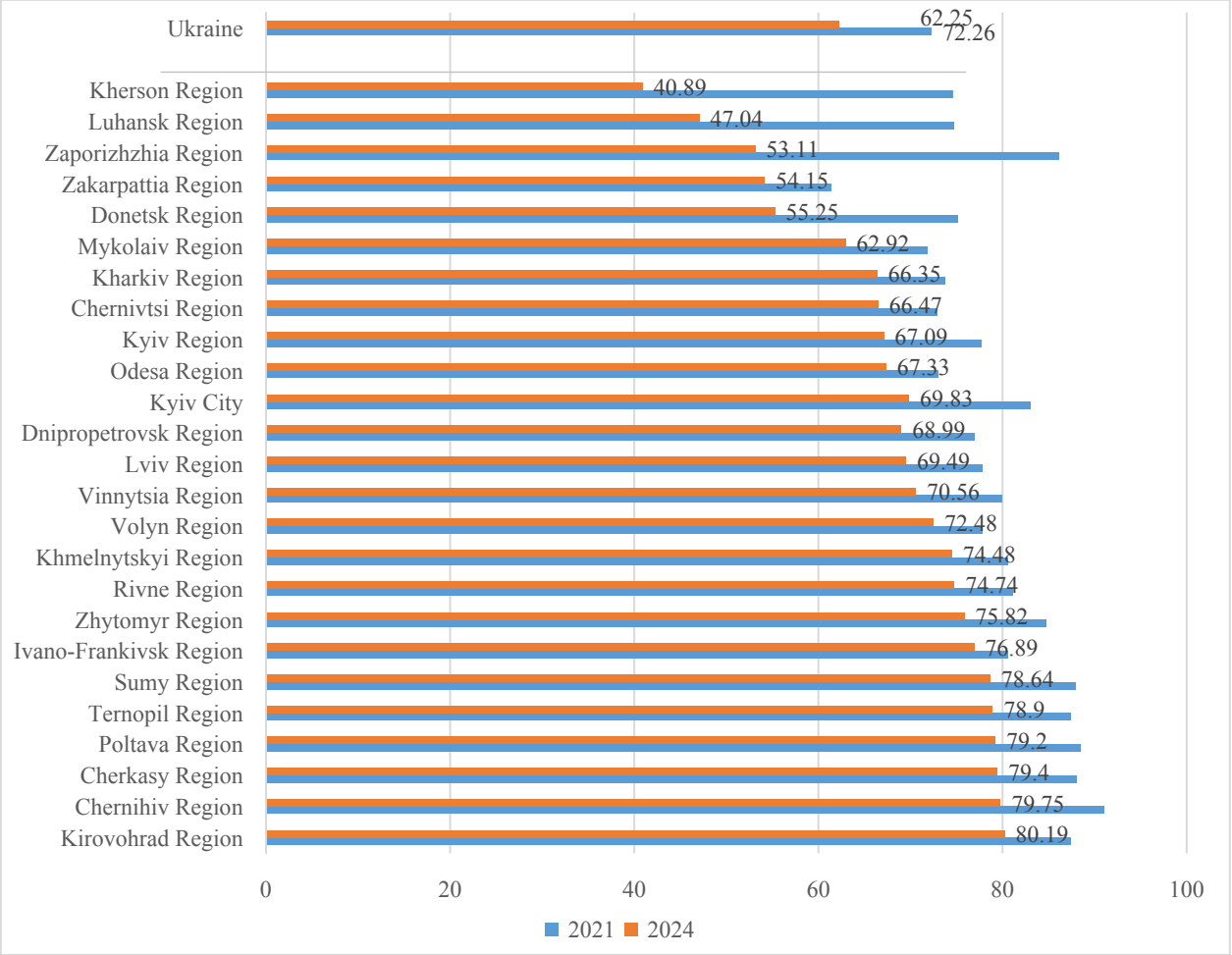

Fig. 12. Provision of Mid-Level Medical Personnel (Staff Positions) by Regions of Ukraine in 2021–2024, per 10,000 population [3]

The most pronounced decline is observed in regions affected by military actions and significant population outflows. In the Kherson region, the indicator decreased from 74.64 to 40.89 per 10,000 population (–45.2 %), in the Zaporizhzhia region from 86.10 to 53.11 (–38.3 %), in the Luhansk region from 74.73 to 47.04 (–37.1 %), and in the Donetsk region from 75.14 to 55.25 (–26.5 %). A decline is also observed in the capital and adjacent regions, indicating the nationwide nature of workforce changes. At the same time, in several western and central regions, the rate of decline is less pronounced, particularly in Ivano-Frankivsk (–4.5 %), Rivne (–7.8 %), and Khmelnytskyi (–7.6 %) regions. This may indicate partial compensation of workforce losses through internal migration and redistribution of labor resources within the country.

Figure 13 below presents the indicators of provision with mid-level medical personnel (headcount) by regions of Ukraine in 2021–2024 per 10,000 population. Unlike staffing-based indicators, these data reflect the actual human resource capacity of the healthcare system and the degree of real staffing of positions.

In 2024, the nationwide indicator of provision with mid-level medical personnel (headcount) (Fig. 13) amounts to 52.56 per 10,000 population compared to 63.72 in 2021, corresponding to a decrease of 11.16 units or 17.5 %. The rate of decline exceeds that of staffing-based indicators, indicating an increase in vacancies and a growing shortage of mid-level medical personnel. Significant changes are recorded in Donetsk region, where the indicator decreased from 64 to 26.2 (–59.1 %), in the Luhansk region from 66.5 to 27.58 (–58.5 %), in the Kherson region from 63.12 to 30.22 (–52.1 %), and in the Zaporizhzhia region from 68.3 to 39.68 (–41.9 %). This dynamic indicates a profound loss of actively working mid-level medical personnel.

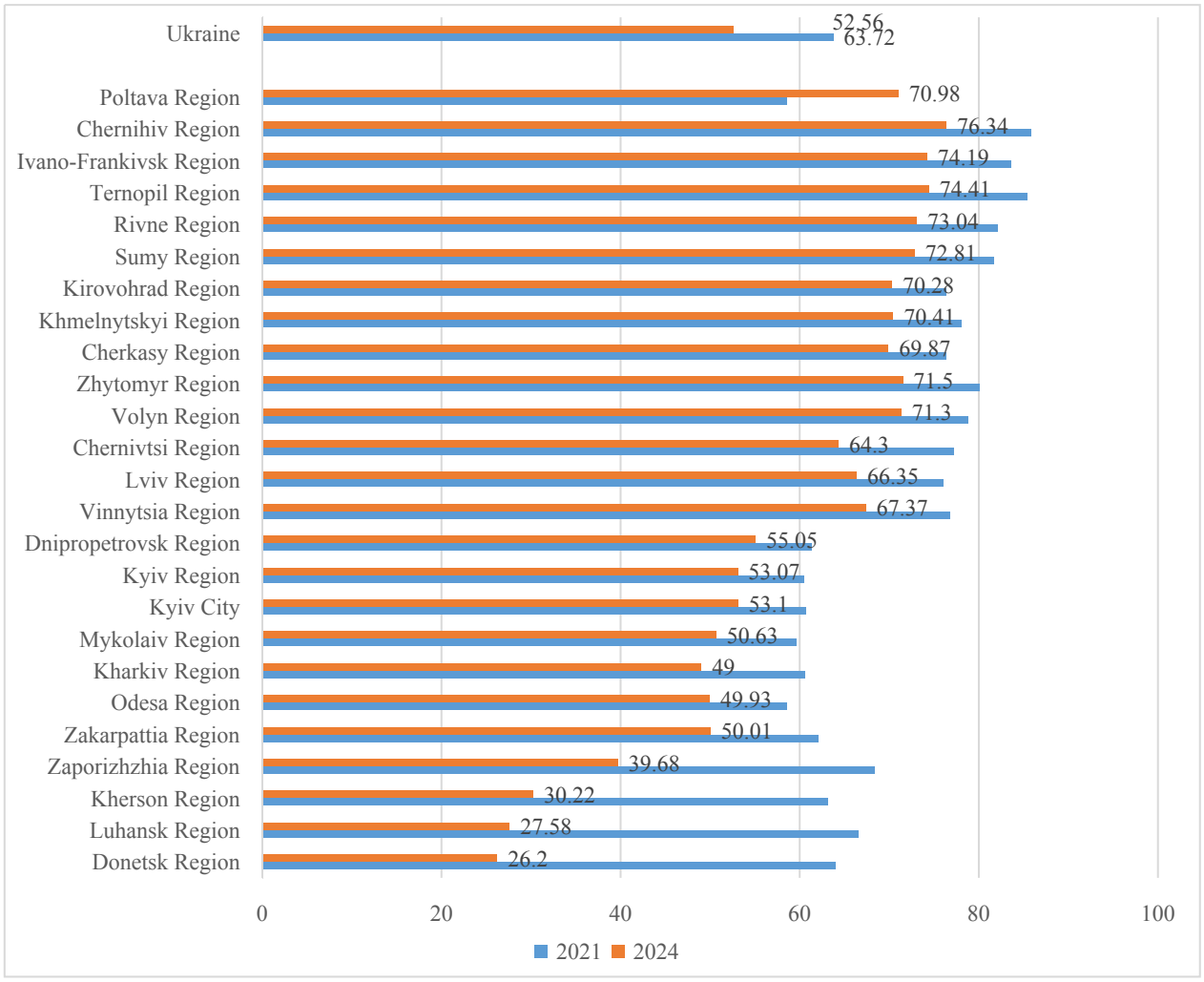

Fig. 13. Provision of Mid-Level Medical Personnel (Headcount) by Regions of Ukraine in 2021–2024, per 10,000 population [3]

Thus, the dynamics of headcount indicators demonstrate a deepening of the actual workforce shortage, which is more pronounced than reflected by staffing indicators. This increases the workload on existing personnel and creates risks of reduced quality and accessibility of medical services.

Figure 14 below presents the indicators of staffing completeness of physician positions by headcount in Ukraine for 2021–2024. The indicators of staffing completeness of physician positions by headcount during 2021–2024 reflect not only changes in the number of medical personnel but also the level of institutional capacity of the healthcare system to ensure continuity in the provision of medical services.

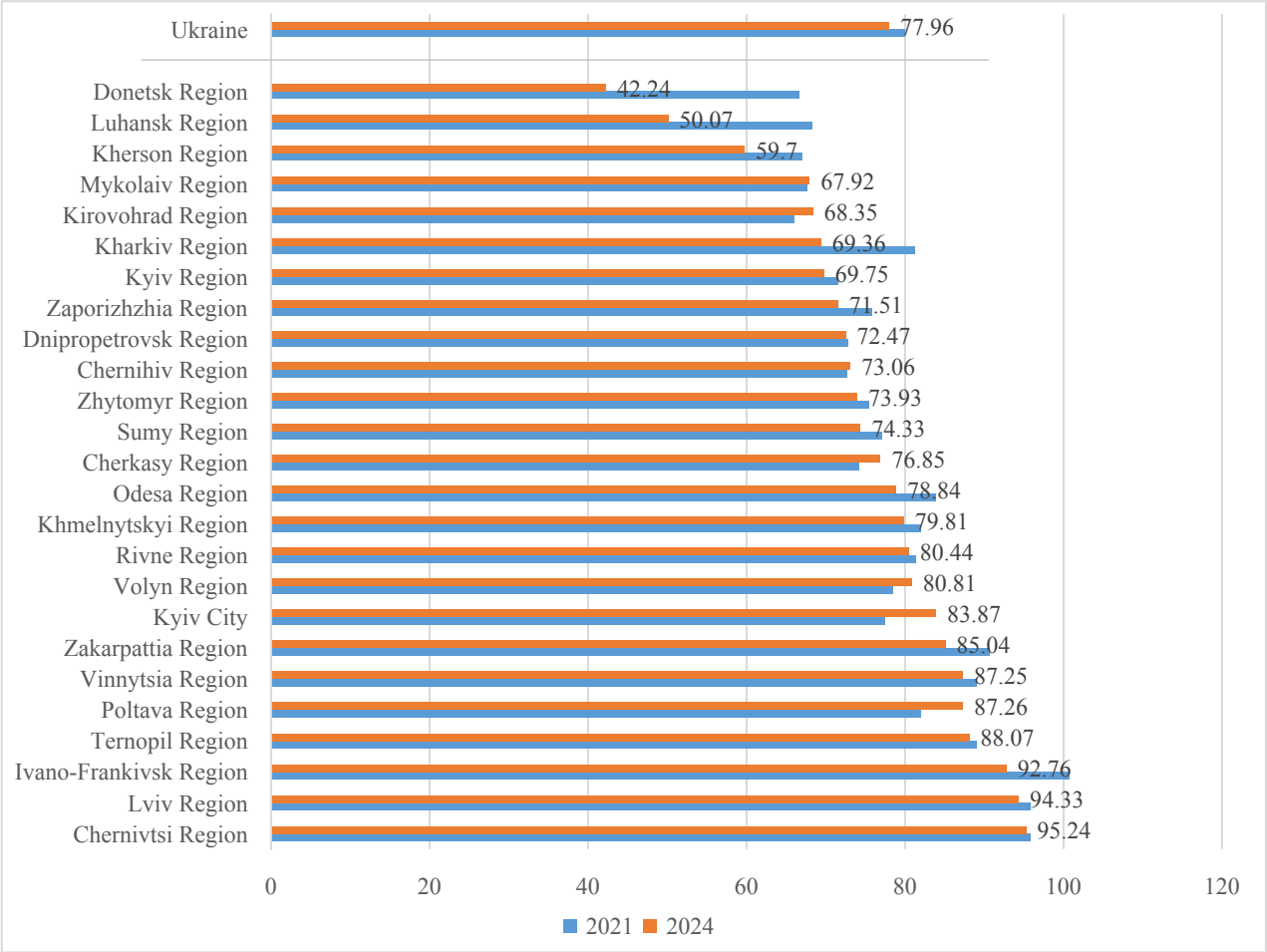

Fig. 14. Staffing Completeness of Physician Positions by Headcount in Ukraine, 2021–2024, % [3]

The nationwide indicator of staffing completeness of physician positions by headcount (fig. 14) decreased from 80 % in 2021 to 77.96 % in 2024, indicating a gradual increase in the share of vacant positions and a decline in the actual staffing level of healthcare institutions.

Particular attention should be paid to regions where staffing levels have declined to near-critical thresholds. In the Donetsk region, only 42.24 % of positions are filled, in the Luhansk region—50.07 %, and in the Kherson region – 59.7 %. Under such conditions, the healthcare system operates in a state of chronic workforce shortage, increasing the risk of staff overload, limiting access to specialized care, and complicating compliance with medical quality standards.

At the same time, in several regions of the western part of the country, the staffing level exceeds 90 %, demonstrating the uneven nature of workforce processes and the growing territorial concentration of medical personnel. This differentiation forms an asymmetric model of sector functioning, where workforce stability in some regions is ensured against the backdrop of significant weakening in others.

To deepen the analysis of staffing completeness, it is advisable to further detail the results by professional groups of physicians (table 1). The analysis shows that the total number of physicians decreased by 16,212 individuals (–11.3 %), confirming a stable trend of declining human resources in the sector. At the same time, there is a parallel decrease in the level of certification from 67.1 % to 58.0 % (–9.1 percentage points), indicating a weakening of professional stability and a reduction in the share of physicians with confirmed qualification categories.

The most significant losses are observed in specialties that form the basis of secondary and specialized medical care. In particular, the number of dentists decreased by 25.2 %, pediatricians by 18.8 %, obstetricians-gynecologists by 14.1 %, and therapists by 13.5 %. Such dynamics create risks of reduced accessibility of specialized care and increased workload on related specialties. Alongside the quantitative decline, there is also a decrease in the share of certified physicians across almost all professional groups. The largest decline in certification levels is recorded among psychiatrists (–14.7 percentage points), surgeons (–12.3), emergency physicians (–12.1), and anesthesiologists (–11.5). This may indicate both the outflow of experienced professionals and disruptions in continuous professional development under conditions of systemic turbulence. At the same time, the lowest rates of decline are observed among oncologists (–2.9 %) and emergency medicine physicians (–5.1 %).

The combination of workforce reduction and declining certification levels creates long-term risks of reduced quality of medical services, complicates the process of reproducing a qualified medical workforce, and necessitates a revision of personnel

policy mechanisms in the healthcare sector. In addition, the reduction in highly qualified specialists may lead to a decline in the overall effectiveness of clinical decision-making and patient outcomes. The imbalance between different professional groups of physicians can further distort the structure of healthcare service provision and limit the capacity of the system to respond to complex medical needs. Moreover, the weakening of certification processes may reduce motivation for continuous professional development and negatively affect the institutional culture within healthcare organizations. This situation also increases the dependency of the system on a limited number of experienced professionals, thereby raising the risk of burnout and professional exhaustion. Furthermore, the observed trends may hinder the implementation of healthcare reforms aimed at improving quality and efficiency. In the long term, without targeted policy interventions, these processes may lead to irreversible losses in human capital and undermine the sustainability of the healthcare system.

Additionally, the decline in staffing levels and professional certification may negatively affect the integration of innovative medical technologies and modern treatment approaches, as their implementation requires a sufficiently qualified workforce. The shortage of specialists in key areas may also lead to longer waiting times for patients and reduced timeliness of medical interventions. Another important consequence is the growing inequality in access to healthcare services, particularly between urban and rural areas, where personnel deficit is often more acute. The cumulative effect of these factors may contribute to a deterioration in public health indicators and a decrease in overall life expectancy. Moreover, the erosion of personnel potential may weaken the system’s ability to respond effectively to future crisis challenges, including epidemics or other large-scale emergencies. Therefore, strengthening human resource capacity should become a strategic priority of public administration in the healthcare sector. This requires the development of a comprehensive personnel policy aimed not only at quantitative replenishment but also at improving the quality and professional competence of medical personnel.

Table 1
Dynamics of Physician Certification by Specialties in Ukraine, 2021–2024 [3]

Specialists	2021, persons	2024, persons	Absolute change, persons	Relative change, %	Certified physicians, 2021, %	Certified physicians, 2024, %	Absolute change, percentage points	Relative change, %
Therapists	9637	8340	-1297	-13,5	68,8	57,3	-11,5	-16,7
Surgeons	7045	6582	-463	-6,6	79,5	67,2	-12,3	-15,5
Oncologists	752	730	-22	-2,9	60,9	50,8	-10,1	-16,6
Dentists	7943	5944	-1999	-25,2	74,0	66,0	-8,0	-10,8
Obstetricians-Gynecologists	8938	7675	-1263	-14,1	84,1	73,7	-10,4	-12,4
Pediatricians	7780	6315	-1465	-18,8	73,4	68,8	-4,6	-6,3
Psychiatrists	2766	2587	-179	-6,5	75,0	60,3	-14,7	-19,6
Emergency Medicine Physicians	3756	3565	-191	-5,1	74,0	61,9	-12,1	-16,4
Anesthesiologists	7950	7483	-467	-5,9	72,6	61,1	-11,5	-15,8
General Practitioners – Family Doctors	14367	13262	-1105	-7,7	72,4	65,2	-7,2	-9,9
Total for the Sector	143887	127675	-16212	-11,3	67,1	58,0	-9,1	-13,6

Thus, a comprehensive analysis of the human resources of the healthcare system of Ukraine in both the long-term (1990–2017) and contemporary dynamics (2015–2024) demonstrates a systemic reduction of workforce capacity and a deepening of regional disparities.

In 2021–2024, a decrease in physician provision was recorded from 43.87 to 39.94 per 10,000 population (staff positions) and from 35.1 to 31.14 (headcount). The provision of mid-level medical personnel declined even more intensively – from 72.26 to 62.25 (staff positions) and from 63.72 to 52.56 (headcount). This indicates a growing actual workforce shortage and an increase in vacancy rates.

The most critical workforce losses are observed in Donetsk, Luhansk, Kherson, and Zaporizhzhia regions, where the level of physician provision by headcount decreased by more than 30–50 %, while staffing completeness in 2024 amounted to 42.24 % in Donetsk, 50.07% in Luhansk, and 59.7 % in Kherson. A significant reduction in workforce capacity is also recorded in the Kharkiv region.

At the same time, relative stability or lower rates of decline are characteristic of Ivano-Frankivsk, Ternopil, Rivne, Volyn, Khmelnytskyi, and Lviv regions, where staffing levels exceed 80–90 %, indicating a concentration of human resources in the western region. An additional factor of workforce vulnerability is the decline in certification levels across almost all key specialties, particularly among psychiatrists, surgeons, anesthesiologists, and emergency physicians.

6. Concluding remarks

Thus, the regional analysis confirms the formation of an asymmetric model of human resource provision, in which eastern and southern regions are characterized by a deep shortage of medical personnel, while the western region demonstrates relative workforce stability. This asymmetry reflects not only the consequences of external challenges, particularly military actions and migration processes, but also long-standing structural imbalances in the distribution and management of healthcare personnel.

The identified trends indicate that the current system of public administration of human resources is insufficiently adaptive to crisis conditions and does not ensure a balanced distribution of medical staff across the country. The concentration of personnel in relatively safe regions is accompanied by a critical depletion of personnel potential in frontline and affected areas, which significantly limits access to healthcare services and increases the burden on the remaining workforce.

In this context, there is a need to implement a differentiated and region-oriented public personnel policy that would take into account the specific characteristics of each region, the level of its personnel capacity, and the intensity of external challenges. Such a policy should include targeted mechanisms for retaining and attracting medical personnel to deficit regions, strengthening incentives for professional activity, and ensuring continuous professional development.

In addition, it is important to improve strategic planning in the field of human resources, enhance monitoring systems, and introduce flexible management tools capable of responding promptly to dynamic changes in the healthcare environment. Without systematic modernization of public administration approaches, the existing disparities may deepen further, posing risks to the sustainability, accessibility, and overall effectiveness of the healthcare system of Ukraine.

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