

TRENDS AND PROSPECTS FOR THE DEVELOPMENT OF HUMAN RESOURCES POTENTIAL IN REGIONAL HEALTHCARE: BASED ON THE MATERIALS OF THE SUBJECTS OF THE NCFD

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Abstract

This study provides a comparative analysis of the dynamics of human resource provision in the healthcare system of the constituent entities of the North Caucasus Federal District for 2020–2024. A decrease in the provision of outpatient medical personnel and emergency medical care specialists was found in most regions, with positive local trends in some constituent entities. An increase in the proportion of specialists who successfully passed professional accreditation was noted, indicating an increase in the level of professional training. Based on the data obtained, a conclusion was made about the need for an integrated strategic approach to human resource management with an emphasis on the development of professional education, social support for young specialists and improvement of regional human resource policy.

Keywords: human resources, mid-level medical personnel, doctors, regional healthcare, North Caucasus Federal District, healthcare development trends.

I. Introduction

Human resources are a key element in ensuring the effectiveness of the healthcare system. Qualified health workers determine the level of accessibility, quality and safety of medical services provided, as well as the sustainability of the entire healthcare system in the context of changing socio-economic factors and demographic trends (Medvedeva , Soshkin & Liferov , 2022; Safonov , Ragozin & Glazunova , 2022).

The North Caucasian Federal District occupies about 1% of the total area of the Russian Federation, its population is 7% of the total population of the country and includes 7 subjects, united in 2010 by separating part of them from the Southern Federal District. In terms of population, in the post-Soviet space, the North Caucasian Federal District is considered an object of demographic well-being, which may cause problems in the staffing of the regional healthcare system.

Modern healthcare faces numerous challenges, among which the issue of staffing is particularly acute. The shortage of doctors and nursing staff, their uneven territorial distribution, the outflow of qualified specialists from the public healthcare system to the private one, as well as low motivation of health workers significantly reduce the effectiveness of medical care (Dubovik , Kazarinova & Savinova , 2024; Shapovalov ,

2014). It is important to note that the human resources potential of healthcare is not only a resource, but also a strategic asset that determines the sustainability and development of the industry. Optimization of human resources policy in healthcare requires a systematic approach, including the modernization of educational programs, the introduction of effective mechanisms for continuous professional development, as well as the creation of favorable working conditions and social support for health workers (Gryaznova & Chuzhnikov , 2015; Aksenova & Shkrumyak , 2021).

In his address to the Federal Assembly on 29.02.2024, the President of the Russian Federation V.V. Putin particularly emphasized the importance of the country's personnel provision, announcing the launch of the national project "Personnel" (Message of the President of the Russian Federation). This step confirms the severity of the problem of personnel shortage and the need for a comprehensive approach to its solution, including improving the system of training specialists, improving qualifications and creating comfortable working conditions.

An important area of human resources policy is the balanced distribution of medical personnel. Currently, there is an obvious imbalance between primary care physicians and specialists, which creates additional burdens on the outpatient care system. Solving this problem requires not only changing the structure of medical personnel training, but also creating attractive conditions for working in primary health care, including competitive wages, providing social guarantees and creating a comfortable professional environment (Zadornaya , Alekseev , & Ershov , 2016). In addition, it is necessary to take into account the age structure of the medical personnel. Increasing the proportion of doctors of retirement and pre-retirement age requires the development of strategies to attract and retain young specialists, create conditions for career growth and professional development (Karpova & Zagoruychenko , 2022; Sarkhadov , 2024; Muslimov , Mingazov & Mingazova , 2024). In this regard, the study of the state of staffing of the medical care system in the subjects of the North Caucasus Federal District is of great interest.

II. Methods

The purpose of the study is a comparative analysis of development trends and regional differences in the staffing of the subjects of the North Caucasus Federal District in the period 2020-2024.

To achieve this goal, the data of the open register of the Federal State Statistics Service EMISS were analyzed, which are of interest in the context of the state of the healthcare system in the Republic of Dagestan (RD), the Republic of Ingushetia (RI), the Kabardino-Balkarian Republic (KBR), the Karachay-Cherkess Republic (KCR), the Republic of North Ossetia-Alania (RSO-A), Stavropol Krai (SK) and the North Caucasian Federal District (NCFD) as a whole for 2020-2024. Based on the studied data, using MS Excel 2016 and SPSS " Statistics " software, relative deviations in percentages were calculated, graphs and histograms were constructed.

The authors acknowledge and declare the possible limitations of the study:

- Rosstat data may contain collection or reproduction errors;

- the analysis is based on quantitative indicators; qualitative aspects (reasons for attrition, motivation, working conditions) were not studied;
- the period 2020-2024 included the COVID-19 pandemic, which may have distorted some trends.

III. Results

As a result of the comparative analytical study of key indicators of staffing of medical organizations in the subjects of the North Caucasus Federal District for the period 2020-2024 (Table 1), a stable negative trend was identified, consisting in a decrease in the level of staffing of outpatient care with doctors. An exception to this trend is the Republic of Dagestan, where in 2021 and 2023 a moderate increase in the share of staffing of outpatient medical institutions with doctors was recorded, which may indicate targeted personnel interventions and an effective regional health policy.

Regarding the staffing of emergency medical care institutions operating in outpatient settings, in all subjects of the district, with the exception of the SK, a regressive trend is observed in the reduction of the number of specialized specialists. At the same time, by 2024, this indicator has stabilized, reaching maximum values, which is probably due to resource capacity limitations and saturation of human resources in these organizations.

Table 1. The state of human resources in the subjects of the North Caucasus Federal District in the period 2020-2024.

Name subject	2020 G., %	2021		2022 G., %	2023		2024	
		%	Relative deviation by 2020, %		%	Relative deviation by 2022, %	%	Relative deviation by 2023, %
<i>Staffing of medical organizations providing medical care in outpatient settings, by doctors (N5)</i>								
RD	92.4	92.6	100.21	92.5	97	100.21	100	92.30
RI	88.1	87.2	98.97	88.5	97.3	98,98	99	89.41
CBD	85.7	82.8	96.61	92.5	99.1	96.61	100	95.73
KCR	87.1	85	97.58	84.2	95.4	97.58	97	86.28
RSO-A	90.6	89.7	99,0	96.9	100	99.0	100	97.87
CR	89	87.3	98.08	96	98	98,1	97	97.86
SK	77.5	76.6	98.84	84.7	84.1	98.84	95	85.69
<i>Staffing of feldsher stations, feldsher-midwife stations, medical outpatient clinics with medical workers (N5)</i>								
RD	98.13	97.12	97.12	97.9	99.2	99.2	100	100
RI	94.81	86.41	86.41	88.7	99.8	99.8	100	100
CBD	88,84	90.4	90.4	98.3	99.7	99.7	100	100
KCR	93.46	92.22	92.22	88.6	98.4	98.4	98	98
RSO-A	90.95	95.52	95.52	96	100	100	100	100
CR	89.22	87.95	87.95	95.6	99.4	99.4	99	99
SK	88.47	90.13	90.13	90	85.5	85.5	97	97
<i>The cumulative staffing of medical organizations providing medical care to children with pediatricians</i>								
RD	-	92.57	-	92.3	92.5	99.71	91.5	98.92
RI	-	87.17	-	93.4	98.4	107.15	99.6	101.22

CBD	-	82.79	-	94.6	98.7	114.27	98.4	99.7
KCR	-	85.01	-	89.8	90	105.63	98.5	109.44
RSO-A	-	91,12	-	98.7	100	108.32	100	100
CR	-	87.32	-	93.1	94.9	106.62	95.7	100.84
SK	-	76.62	-	87.8	85.4	114.59	92.6	108.43
Name of the subject	2020, people	2021		2022 g., people	2022		2023	
		person	Relative deviation by 2020, %		person	Relative deviation by 2022, %	person	Relative deviation by 2023, %
<i>Provision of medical workers providing emergency medical care (persons per 10 thousand population)</i>								
RD	-	5.89	-	5.9	6.3	106.78	6	95.24
RI	-	7.74	-	7.7	3.3	42.86	8	242.42
CBD	-	7.35	-	8.2	7.8	95.12	8	102.56
KCR	-	7.31	-	6.8	7.2	105.88	7	97.22
RSO-A	-	10.42	-	10.2	10.2	100	10	98.04
CR	-	7.13	-	7.5	7.9	105.33	8	101.27
SK	-	5.76	-	6	5.6	93.33	5	89.29

Source: compiled based on data from EMISS FS Rosstat (EMISS state statistics , n.d.)

Another significant indicator reflecting the progress of the federal project "Provision of medical organizations of the healthcare system with qualified personnel", implemented within the framework of the national project "Healthcare", demonstrates a systemic decrease in the level of staffing of feldsher-obstetric stations with mid-level medical personnel. Negative dynamics can be observed in all subjects of the North Caucasus Federal District without exception, which indicates the presence of persistent shortages in the primary health care sector, including in terms of attracting and retaining mid-level specialists in rural areas. At the same time, an analysis of the indicator of provision of medical organizations with pediatricians in the district as a whole indicates a positive cumulative trend, reflecting an increase in the staffing of this category of specialists in most subjects of the region. However, against the background of the general positive trend, the Republic of Dagestan and the Kabardino-Balkarian Republic stand out, where a decrease in this indicator was recorded in 2024. This may indicate both interregional migration of personnel and uneven distribution of pediatric resources at the level of the subjects of the Russian Federation.

A special contribution to the formation and development of the human resources potential of the Russian healthcare system is made by mid-level medical personnel, who represent the most numerous category of medical workers. This professional group plays a key role in ensuring the availability, continuity and effectiveness of medical care to the population, as well as in the implementation of preventive measures and dispensary observation. According to statistical data presented in the form of a histogram (Fig. 1), in the period from 2021 to 2023, in the subjects of the North Caucasus Federal District, with the exception of the Republic of Ingushetia, there is a positive trend in the level of provision of the population with mid-level specialists.

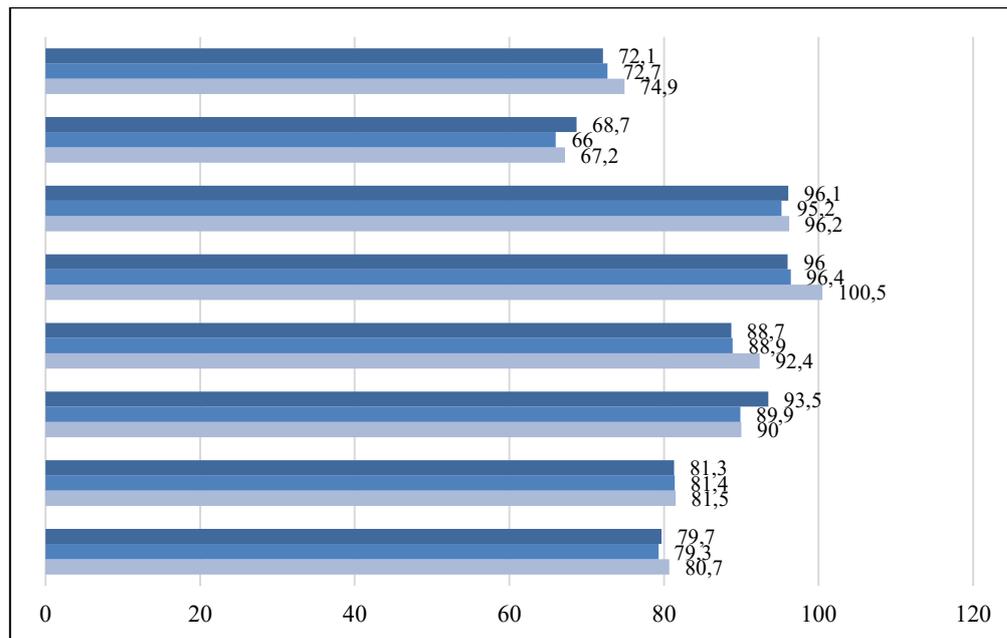


Fig. 1. Provision of the population with mid-level medical workers in the subjects of the North

Caucasus Federal District 2021-2023 (people per 10 thousand population). *Source:* compiled based on data from the Unified Medical Information System of the Federal Service of Rosstat (EMISS state statistics, n.d.). At the same time, in 2022, a number of federal subjects, such as the Chechen Republic, the Republic of North Ossetia-Alania and the Republic of Ingushetia, recorded a decrease in the number of mid-level medical personnel per 10 thousand people, compared to the same indicator in the previous year. This regression, in turn, may be due to the migration of medical personnel, age-related attrition of workers, insufficient attractiveness of the profession and other socio-economic factors. The noted trend of decreasing provision with mid-level medical workers is characteristic not only of the specified territories, but is also generally observed at the level of the entire federal district, which requires a systemic analysis and the development of effective personnel policy measures. At the same time, in other regions of the North Caucasus Federal District: the Karachay-Cherkess, Kabardino-Balkarian Republics and the Republic of Dagestan, there is either stability in provision indicators or their slight increase, which may indicate a more sustainable functioning of regional healthcare systems and the presence of effective mechanisms for retaining mid-level personnel.

When analyzing the staffing of healthcare institutions with mid-level specialists, it seems appropriate to consider the level of staffing of the healthcare system with individual categories of medical workers, which is reflected in the statistical data (Table 2). In particular, as of 2022, a decrease in the provision of nurses is recorded in such subjects of the North Caucasus Federal District as the Republic of Dagestan, the Kabardino-Balkarian Republic, the Karachay-Cherkess Republic and the Republic of North Ossetia-Alania. This may indicate increasing difficulties in staffing the nursing sector, including professional emigration, a shortage of new graduates, as well as age-related attrition of specialists. At the same time, in other subjects of the district, positive dynamics are observed, expressed in an increase in the indicator of provision with this category of personnel. In 2023, the downward trend in the number of nurses in most regions of the district continues, but in certain regions, such as the Republic of Dagestan, the Republic of Ingushetia (growth of 3.9%) and the Republic of North Ossetia-Alania (growth of 6.6%), positive dynamics are observed, which may be due to the strengthening of regional programs to attract and retain mid-level medical personnel, as well as an increase in the social attractiveness of the profession.

Table 2. Indicators of the staffing status of mid-level medical personnel in the subjects of the North Caucasus Federal District from 2021 to 2023.

Name of the subject	2020, people	2021		2022, people	2023	
		person	Relative deviation by 2020, %		person	Relative deviation by 2022, %
<i>Obstetricians</i>						
North Caucasus Federal District	4959	4785	96.49	4820	4838	100.37
RD	2085	1999	95.88	2021	2010	99.46
RI	221	233	105.43	259	259	100
CBD	345	335	97.1	323	320	99.07
KCR	209	197	94.26	188	184	97.87
RSO-A	334	326	97.6	314	320	101.91
CR	741	724	97.71	753	787	104.52
SK	1024	971	94.82	962	958	99.58
<i>Lab assistants</i>						
North Caucasus Federal District	1778	1772	99.66	1632	1543	94.55
RD	620	573	92.42	579	554	95.68
RI	108	106	98.15	100	95	95
CBD	67	68	101.49	66	51	77.27
KCR	190	184	96.84	170	147	86.47
RSO-A	280	267	95.36	256	281	109.77
CR	192	219	114.06	186	165	88.71
SK	321	355	110.59	275	250	90,91
<i>Nurses</i>						
North Caucasus Federal District	71097	71123	100.04	70477	70280	99.72
RD	20194	20049	99.28	20289	20311	100.11
RI	3402	3441	101.15	3455	3593	103.99
CBD	7151	7037	98.41	6626	6523	98.45
KCR	3681	3633	98.7	3501	3486	99.57
RSO-A	5527	5143	93.05	5258	5605	106.6
CR	9243	10039	108.61	9840	9567	97.23
SK	21899	21781	99.46	21508	21195	98.54
<i>Paramedics</i>						
North Caucasus Federal District	5864	6603	112.6	7031	7607	108.19
RD	1528	1590	104.06	1725	2614	151.54
RI	295	301	102.03	291	349	119.93
CBD	622	645	103.7	697	695	99.71
KCR	458	450	98.25	435	536	123.22
RSO-A	460	511	111.09	518	590	113.9
CR	570	1152	202.11	1440	884	61.39
SK	1931	1954	101.19	1925	1939	100.73

Source: compiled by the authors based on data from the EMISS FS Rosstat (EMISS state statistics , n.d.) .

In terms of obstetric personnel in 2022, in all subjects of the North Caucasus Federal District, with the exception of the Republic of Ingushetia, where there is an increase in provision by 5.43%, negative dynamics were recorded, which indicates a system-wide personnel shortage in this professional group. By 2023, some improvement in the situation is observed: an increase in the number of obstetricians was registered in the Republic of North Ossetia-Alania (1.91%) and the Chechen Republic (4.52%), as well as in the federal district as a whole, which can be interpreted as a result of targeted measures to increase personnel sustainability in the obstetric and gynecological service. In terms of provision with medical laboratories, according to data for 2022, positive dynamics are noted in the Kabardino-Balkarian Republic, the Chechen Republic and the North Caucasus Federal District, where there was an increase in the number of laboratory technicians. However, in other subjects of the district, there is a tendency to reduce this contingent. As of 2023, the provision of laboratory technicians in most regions shows a steady decline, with the exception of the Republic of North Ossetia-Alania, where an increase of 9.77% was recorded, which may indicate an effective regional personnel policy in the field of laboratory diagnostics.

Similarly, the analysis of the dynamics of the number of paramedics shows that in 2022, positive dynamics are observed in all regions of the district, with the exception of the Karachay-Cherkess Republic. In 2023, this trend generally continues, but in the Kabardino-Balkarian Republic and the Chechen Republic, a decrease in the number of paramedic personnel was noted, which may indicate local problems in the organization of primary health care and an insufficient influx of young specialists into the paramedic link. In general, the identified trends emphasize the need for an integrated approach to managing mid-level human resources in healthcare, taking into account regional characteristics, demographic burden and priorities of the public health system.

Analysis of the data presented in the diagram (Fig. 2) allows us to state the presence of variability in the indicators of the number of doctors of various specialties in the territory of the subjects of the North Caucasus Federal District. Thus, since 2016, in the Karachay-Cherkess Republic and the Chechen Republic, a stable positive trend has been observed, reflecting a systematic increase in the number of medical personnel. At the same time, in other regions of the district, fluctuations in this indicator are revealed, indicating instability in the processes of personnel reproduction and attraction of doctors.

However, as of 2023, in such subjects as the Republic of Ingushetia, the Kabardino-Balkarian Republic, the Karachay-Cherkess Republic, the Republic of North Ossetia-Alania and the Chechen Republic, there is an increase in the number of doctors, which can be interpreted as a result of the implementation of regional personnel support programs aimed at increasing the staffing of medical organizations with senior specialists. Despite this, in general, a decrease in the general indicator of the number of doctors is recorded in the North Caucasus Federal District, which indicates a persistent structural shortage of personnel and the need to strengthen strategic planning in the field of personnel provision of the healthcare system.

The level of professional competence and readiness of healthcare specialists to carry out medical activities in the context of modern standards is largely determined by the completion of the professional accreditation procedure, which is a key tool for assessing the compliance of the level of training of medical workers with established qualification requirements. According to data for 2023 (Fig. 3), the largest number of specialists who successfully passed accreditation were recorded in the Republic of North Ossetia-Alania and the Republic of Karelia.

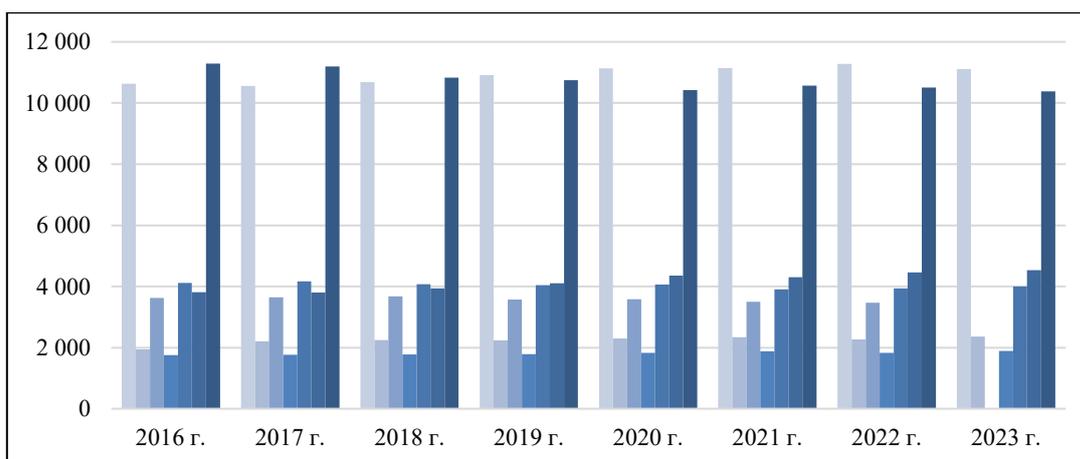


Fig. 2. The number of doctors of all specialties in organizations providing medical services to the population in the subjects of the North Caucasus Federal District 2016-2023 (people). *Source:* compiled according to data from the Unified Medical Information System of the Federal Service of Rosstat (EMISS state statistics, n.d.).

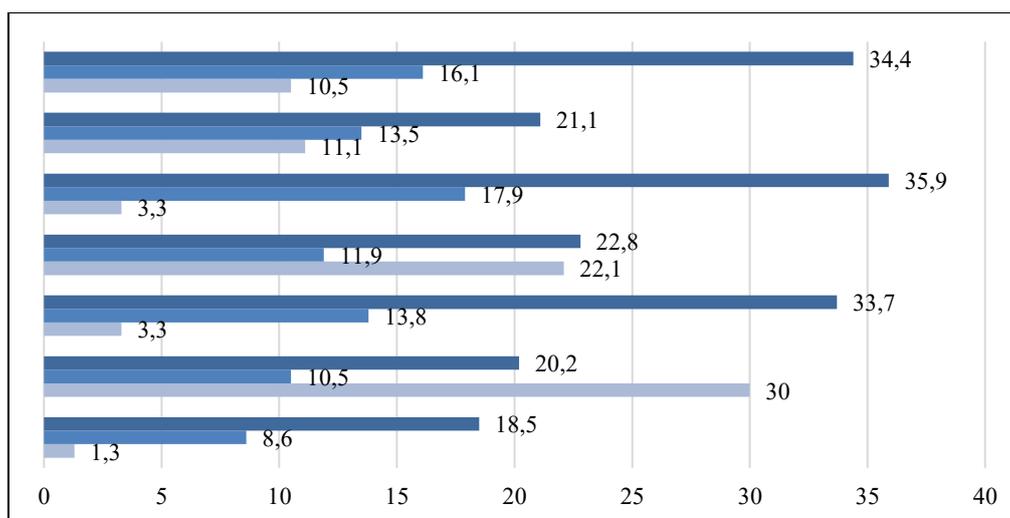


Fig. 3. The share of specialists admitted to professional activities through the accreditation procedure in the subjects of the North Caucasus Federal District in 2021-2023 (%). *Source:* compiled based on data from the Unified International Scientific and Information System of the Federal Service of Rosstat (EMISS state statistics, n.d.).

Such positive dynamics can be explained by a high degree of organizational and methodological efficiency of the functioning of accreditation centers located in the territory of the specified subjects, as well as the availability of the appropriate material and technical base and human resources for carrying out this procedure in accordance with regulatory and legal regulations. In other regions of the North Caucasus Federal District, with the exception of the Republic of Ingushetia, there is also a steady increase in the number of specialists who have successfully passed the accreditation stage and received permission to carry out professional activities, which indicates a general increase in the level of professional training of medical personnel and the effectiveness of the postgraduate education system in the region's healthcare.

IV. Discussion

I. Subsection One.

A comparison of the results of a retrospective analysis conducted in the subjects of the North Caucasus Federal District with the data presented in a number of domestic studies reveals a number of significant patterns. According to the findings of Russian experts, there is a steady downward trend in the provision of medical organizations with pediatricians throughout the country as a whole. However, in most subjects of the North Caucasus Federal District, this indicator demonstrates positive dynamics, which may indicate regional specifics of staffing processes (Khodakova , Senotrusova , Deev & Kobayakova , 2023; Esaulenko , Petrova , Sychev & Petrov , 2024). At the same time, the persistent negative dynamics in certain regions may be due to both the migration of medical personnel between subjects of the Russian Federation and the uneven distribution of pediatric resources within the regions.

Special attention should be paid to the steady decline in the number of specialists working in feldsher-midwife stations, which, according to researchers, is largely due to a lack of motivation among health workers, especially among graduates of medical universities. The key demotivating factors are low wages and limited socio-economic prospects for living in rural areas. In this context, government support measures implemented within the framework of regional personnel policy, as well as the development of mechanisms for targeted training and subsequent mandatory employment of graduates of medical educational institutions, are of particular importance (Fominykh , 2018).

In order to increase the staffing of outpatient healthcare with medical personnel, modern researchers focus on the need to adjust the volume of educational services within the framework of residency programs, including by increasing the number of extra-budgetary places. It is also noted that it is advisable to increase the share of graduates in the specialty "general medical practice" as an important human resource for primary healthcare (Sheiman & Sazhina , 2018; Kantemirova , Arsakhanova & Chiviev , 2024). At the same time, the priority direction of personnel policy should be the formation of favorable conditions for the professional activity and residence of medical specialists, which can contribute to both improving the quality of primary health care and attracting qualified personnel to the regional healthcare system.

II. Subsection Two.

The analysis of the human resources potential of the healthcare system in the subjects of the North Caucasus Federal District demonstrates a number of stable imbalances caused by both the internal structural features of the regions and the impact of macroeconomic and demographic factors. The efficiency of the healthcare system directly correlates with the level of staffing of various professional groups with medical personnel, including primary care physicians, specialists, and mid-level and junior medical personnel. In the context of modern healthcare, the problem of personnel shortage

remains one of the most acute. Stable trends in the reduction of the provision of medical personnel in the outpatient and polyclinic sector have been recorded in almost all subjects of the district. The exception is certain regions that demonstrate short-term positive shifts, which indicates the effectiveness of local incentive programs. Along with this, the decrease in the number of emergency medical care specialists, especially in rural areas, indicates the need to develop long-term strategies for personnel reproduction and retention of specialists in this area. Special attention in the analysis is paid to the mid-level medical personnel, which plays a key role in the conditions of primary health care and preventive medicine. Despite the positive dynamics in a number of subjects, the indicators of provision with nurses, midwives, laboratory technicians and paramedics remain unstable in the district as a whole. This situation is largely due to the demographic aging of personnel, limited influx of young specialists, professional emigration and insufficient social attractiveness of the profession.

A positive trend should be recognized as the growth in the number of specialists successfully passing professional accreditation, which indicates an increase in the quality of training and the level of professional competence of personnel. This indicator directly reflects the effectiveness of the system of postgraduate education and training of specialists, as well as the organizational and methodological readiness of regional accreditation centers.

To ensure sustainable development of the healthcare workforce, it is necessary to provide state support for professional training and advanced training programs, develop continuous medical education, expand social support measures for young professionals through preferential mortgage lending and social guarantees, and develop regional workforce planning strategies taking into account the demographic burden, migration flows, and urbanization levels. At the same time, it is necessary to improve the professional accreditation system with uniform accessibility throughout the district and adapt international experience to Russian realities, which together will allow for the creation of a sustainable and effective healthcare workforce infrastructure capable of meeting modern challenges.

CONFLICT OF INTEREST.

Authors declare that they do not have any conflict of interest.

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