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# МЕДИЦИНА И ОРГАНИЗАЦИЯ ЗДРАВООХРАНЕНИЯ

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2023, ТОМ 8, № 2 НАУЧНО-ПРАКТИЧЕСКИЙ ЖУРНАЛ ДЛЯ ВРАЧЕЙ

# МЕДИЦИНА И ОРГАНИЗАЦИЯ ЗДРАВООХРАНЕНИЯ

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# CHARACTERISTICS OF HOSPITALIZATIONS OF CHILDREN IN THE FIRST MONTH OF LIFE TO A MULTIDISCIPLINARY CHILDREN'S HOSPITAL

*© Dmitry O. Ivanov, Karina E. Moiseeva, Vadim K. Yuriev, Marina Yu. Komissarova, Victoria V. Danilova, Anna V. Alekseeva, Viktor G. Puzyrev*

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**ABSTRACT.** Taking into account the peculiarities of the incidence of newborns' morbidity in St. Petersburg, the assessment of hospitalizations of children in the first month of life into a multidisciplinary children's hospital in a metropolis is an urgent issue for research. For this purpose, data of 267 children who were treated in a multidisciplinary children's hospital in 2020–2022 were taken from MIS "Ariadna". Statistical data processing was carried out using MS Office 2016 and STATISTICA 10.0 StatSoft Inc. software. The analysis of the data obtained revealed that the majority of patients in the first month of life were admitted through an in-hospital transfer and their treatment was financed by compulsory medical insurance funds. During the COVID-19 pandemic, most children in the first month of life were hospitalized by emergency aid (66.7%), but since 2021, hospitalization of two-thirds of patients started to be planned. The share of children rehospitalized in 2022 was 2.3%, and the highest rate of rehospitalization was observed in 2021, when its level reached 11.7%. An assessment of the distribution of hospitalized children by birth weight showed an increase in the proportion of newborns born prematurely. The largest proportion of patients in the first month of life was hospitalized in the departments of pathology beds for newborns and premature babies, intensive care beds for newborns and surgical beds for children, which had the highest average length of stay for patients. The proportion of patients hospitalized at pathology beds for newborns and premature babies, surgical beds for children, ophthalmological and pediatric beds' departments has decreased, while it has increased at the departments of intensive care beds for newborns and other beds. During the study period, the average length of stay of patients in a hospital decreased in intensive care beds for newborns, as well as surgical beds for children, and simultaneously increased in pathology beds for newborns and premature babies, ophthalmic, pediatric beds. In the structure of patients number of children with certain conditions originating from the perinatal period on and congenital malformations, deformations and chromosomal abnormalities prevailed, the proportion of them decreased during the study period. The vast majority of patients in the first month of life were discharged from the hospital, but there was a decrease in the proportion of children transferred to other hospitals and an increase in the proportion of patients who died in the hospital in the neonatal period.

**KEY WORDS:** children of the first month of life; hospitalization; children's multidisciplinary hospital; metropolis; structure of patients; average duration of inpatient treatment.

# ХАРАКТЕРИСТИКА ГОСПИТАЛИЗАЦИЙ ДЕТЕЙ ПЕРВОГО МЕСЯЦА ЖИЗНИ В МНОГОПРОФИЛЬНОМ ДЕТСКОМ СТАЦИОНАРЕ

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**РЕЗЮМЕ.** Учитывая особенности заболеваемости новорожденных в Санкт-Петербурге, оценка госпитализаций детей первого месяца жизни в многопрофильном детском стационаре мегаполиса является актуальной темой для исследования. С этой целью была проведена выкопировка данных из МИС «Ариадна» 267 детей, проходивших лечение в многопрофильном детском стационаре в 2020–2022 гг. Статистическая обработка данных осуществлялась с использованием программного обеспечения MS Office 2016 и STATISTICA 10.0 (StatSoft Inc.). Анализ полученных данных выявил, что большинство пациентов первого месяца жизни поступали по внутрибольничному переводу и их лечение оплачивалось из средств ОМС. Во время пандемии COVID-19 большая часть детей на первом месяце жизни были госпитализированы экстренно (66,7%), однако начиная с 2021 г. две трети пациентов стали поступать планово. Доля детей, госпитализированных повторно в 2022 г., составила 2,3%, а наиболее высокая регоспитализация отмечалась в 2021 г., когда ее уровень достиг 11,7%. Оценка распределения госпитализированных детей по массе тела при рождении показала рост удельного веса новорожденных, родившихся недоношенными. Наибольший удельный вес пациентов первого месяца жизни были госпитализированы на койки патологии новорожденных и недоношенных детей, реанимационные для новорожденных и хирургические для детей, на которых была наиболее высокая средняя длительность пребывания пациентов. Доля больных, госпитализированных на койки патологии новорожденных и недоношенных детей, хирургические койки для детей, офтальмологические и педиатрические койки, снизилась, а на реанимационные койки для новорожденных и прочие койки — выросла. За изучаемый период средняя длительность стационарного лечения пациентов снизилась на реанимационных койках для новорожденных, а также хирургических койках для детей и одновременно выросла на койках патологии новорожденных и недоношенных детей, офтальмологических, педиатрических койках. В структуре больных преобладали дети с отдельными состояниями, возникающими в перинатальном периоде, и врожденными аномалиями (пороками развития), деформациями и хромосомными нарушениями, доля которых в изучаемый период снижалась. Преобладающее большинство пациентов первого месяца жизни были выписаны из стационара, однако наблюдалось снижение доли детей, переведенных в другие стационары, и рост удельного веса пациентов, умерших в стационаре в неонатальном периоде.

**КЛЮЧЕВЫЕ СЛОВА:** дети первого месяца жизни; госпитализация; детский многопрофильный стационар; мегаполис; структура больных; средняя длительность стационарного лечения.

## INTRODUCTION

Currently, the demographic situation in Russia is characterized by a decrease in birth rate and an increase in mortality [2, 5]. Under these conditions, the task of paramount importance is to reduce infant morbidity and mortality [4]. Morbidity rate of newborns is equally, or even more important from the medical, social, and economic points of view, since it remains high in Russia [8]. An assessment of the dynamics of morbidity in infants of the first month of life has shown that over the last 5 years the indicators have slightly decreased in the Russian Federation (Fig. 1); nevertheless, deviations in physical and neuropsychiatric development are detected in more than 25% of infants of the first year of life [7]. Every third infant in our country is born healthy, and in some regions, including St. Petersburg, this indicator is even lower [9].

Such a high incidence of morbidity in children of the first month of life necessitates further development of specialized medical care for children of this age group [6]. According to Federal Law No. 323-FZ of 21.11.2011. "On the Basics of Health Protection of Citizens in the Russian Federation", specialized medical care is provided by specialist doctors and includes prevention, diagnosis and treatment of diseases and conditions (including periods of pregnancy, childbirth and the postpartum period). It requires the use of special methods and complex medical technologies, as well as medical rehabilitation, being provided in inpatient hospitals as well as in day care hospital departments [11]. This type of care is considered the most resource-intensive sector of health care. In modern conditions it should meet a high level of quality and accessibility, while taking into account the basic needs of patients [14]. Specialized care for infants of the first month of life is provided in neonatology inpatient units of perinatal centers and children's hospitals [10]. It has its own distinctive features, since a significant number of infants come from obstetric organizations, and the main department where this category of patients is treated is the department of pathology of newborns and premature infants [1, 3, 12, 13]. Thus, considering the peculiarities of neonatal morbidity in St. Petersburg, the assessment of newborns' hospitalizations in a multidisciplinary pediatric hospital of the metropolis is a relevant topic for research.

## AIM

To assess hospitalizations of infants in the first month of life in a multidisciplinary pediatric hospital in 2020–2022.

## MATERIALS AND METHODS

The site of the present research was a multidisciplinary pediatric hospital of the Federal

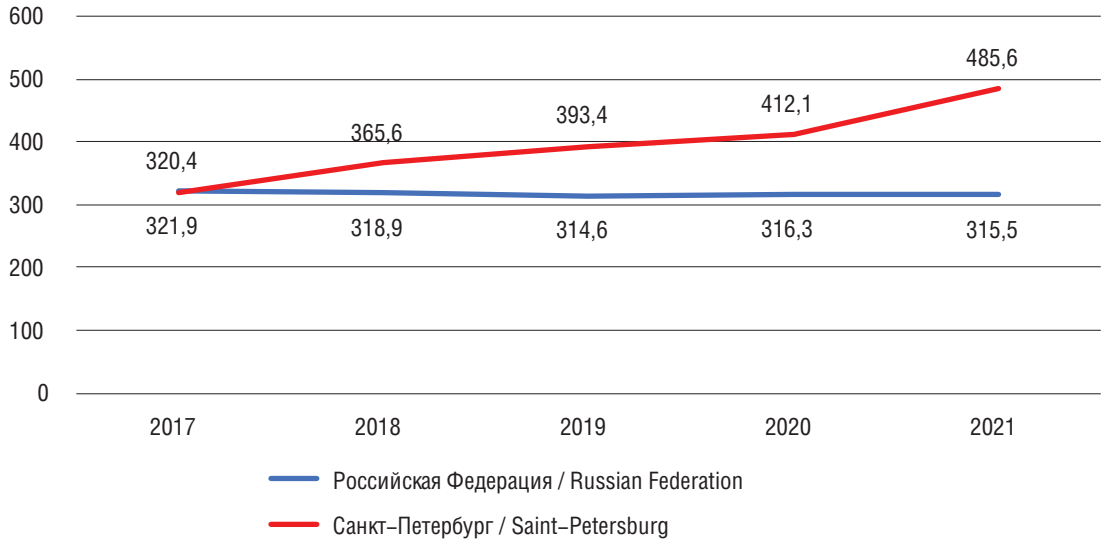


Fig. 1. The incidence of newborns in the Russian Federation and St. Petersburg in 2017–2021 (per 1000 children born alive)

Рис. 1. Заболеваемость новорожденных в Российской Федерации и Санкт-Петербурге в 2017–2021 гг. (на 1000 детей, родившихся живыми)

State Budgetary Educational Institution of Higher Professional Education "St. Petersburg State Pediatric Medical University" of the Ministry of Health of Russia, belonging to the third-level hospitals. Data obtained from the Ariadna medical information system was used for further data analysis by sampling infants who were hospitalized during the first 28 days of life, in 2020–2022. Inclusion criterion: residence of the infant's family in St. Petersburg. Thus, data from 267 children were selected for the study, including 69 newborns in 2020, 103 newborns in 2021, and 95 newborns in 2022.

Extensive and intensive indicators, arithmetic weighted mean and its error were calculated. The reliability of differences in indicators was assessed using Student's criterion. Differences were considered significant at $p < 0.05$. Statistical processing of data was performed using MS Office 2016 and STATISTICA 10.0 software (StatSoft Inc).

## RESULTS AND DISCUSSION

Assessment of the distribution of patients of the first month of life by sex showed that girls predominated in 2020, and from 2021, the specific gravity of boys increased to 52.6% (Figure 2).

The majority of patients of the first month of life were admitted by intrahospital transfer from the obstetric hospital of the perinatal center, which is a structural subdivision of the multidisciplinary pediatric hospital of St. Petersburg State Pediatric Medical University (Table 1). The proportion of such infants increased by the level of 2020 and amounted to 84.2% in 2022. It was established that during the research period, the specific gravity of infants admitted by referral from the outpatient clinic and without referral decreased to 4.2%. At the same time, the specific gravity of patients transferred from other hospitals and hospitalized by ambulance increased.

The research demonstrated that the specific gravity of patients whose treatment was paid for from the compulsory medical insurance (CMI) system in 2020–2022 amounted to 89.5–93.2% (Fig. 3). The second largest source of funding was high-tech medical care, the share of which was the highest in 2022 and amounted to 10.5%. There were no children of this age who received medical care from parents' personal funds or through voluntary health insurance (VHI) in 2020 and 2022.

In 2020, during the COVID-19 pandemic, most patients were admitted as emergencies (66.7%). From 2021 onwards, the proportion decreased, and in 2022, 67.4% of infants in the first month of life were admitted in a planned basis. The majority of infants were primary patients, and their proportion in 2022 was 93.7%, while the proportion of infants admitted repeatedly was 2.3%. Rehospitalization was at its

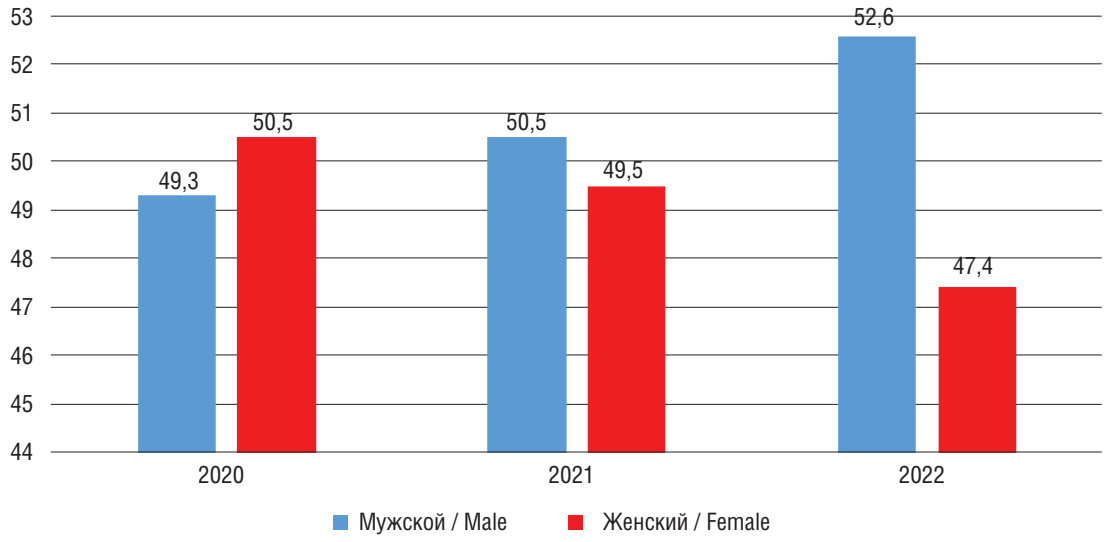


Fig. 2. Distribution of patients in the first month of life by gender in 2020–2022 (in %)

Рис. 2. Распределение пациентов первого месяца жизни по полу в 2020–2022 гг. (в %)

*Table 1*

Distribution of patients in the first month of life depending on the type of referral in 2020–2022 (in % and abs.)

*Таблица 1*

Распределение пациентов первого месяца жизни в зависимости от вида направления в 2020–2022 гг. (в % и абс.)

| Вид направления / Direction type | 2020 год / 2020 year | | 2021 год / 2021 year | | 2022 год / 2022 year | | Динамика / Dynamics (%) |
|---|---|---|---|---|---|---|---|
| | % | абс. / abs. | % | абс. / abs. | % | абс. / abs. | |
| Внутрибольничный перевод / Intrahospital transfer | 79,7 | 55 | 85,4 | 88 | 84,2 | 80 | +5,3 |
| Поликлиники / Polyclinics | 8,7 | 6 | 5,8 | 6 | 4,2 | 4 | –51,7 |
| Без направления / No direction | 11,6 | 8 | 3,9 | 4 | 4,2 | 4 | –6,4 |
| КДЦ / CDC | 0,0 | 0 | 1,0 | 1 | 1,1 | 1 | +100,0 |
| Перевод из других стационаров / Transfer from other hospitals | 0,0 | 0 | 1,9 | 2 | 2,1 | 2 | +100,0 |
| Скорая помощь / Ambulance | 0,0 | 0 | 1,9 | 2 | 4,2 | 4 | +100,0 |
| Итого / Total | 100,0 | 69 | 100,0 | 103 | 100,0 | 95 | – |

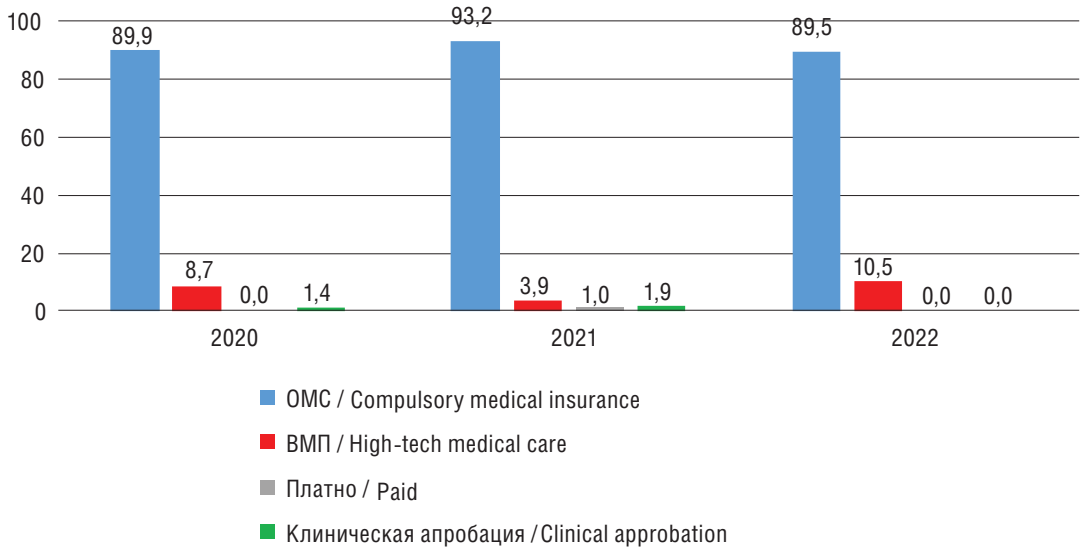


Fig. 3. Distribution of patients in the first month of life by source of funding in 2020–2022 (in %)

Рис. 3. Распределение пациентов первого месяца жизни по источнику финансирования в 2020–2022 гг. (в %)

highest in 2021, when its rate reached 11.7%. The distribution of patients by order of referral for hospitalization and their ratio of primary and repeated hospitalizations are shown in Figures 4 and 5.

Assessment of the distribution of newborns hospitalized in a multidisciplinary children's hospital by birth weight showed that the proportion of premature babies by birth weight was 17.4% in 2020, and in 2021 and 2022 it increased to 24.3 and 21.1%, respectively (Table 2). Whereas, the proportion of infants born with very low and extremely low birth weight increased annually in 2020–2022, reaching 11.6 and 6.3% by 2022, respectively. Among those hospitalized, the proportion of infants born with a birth weight of 4000 g or more in 2022 was 3.2%, and it decreased in 2022 to both 2020 and 2021 levels.

Assessment of the structure of patients depending on the profile of beds showed (Table 3) that in 2020–2022 the largest share of children

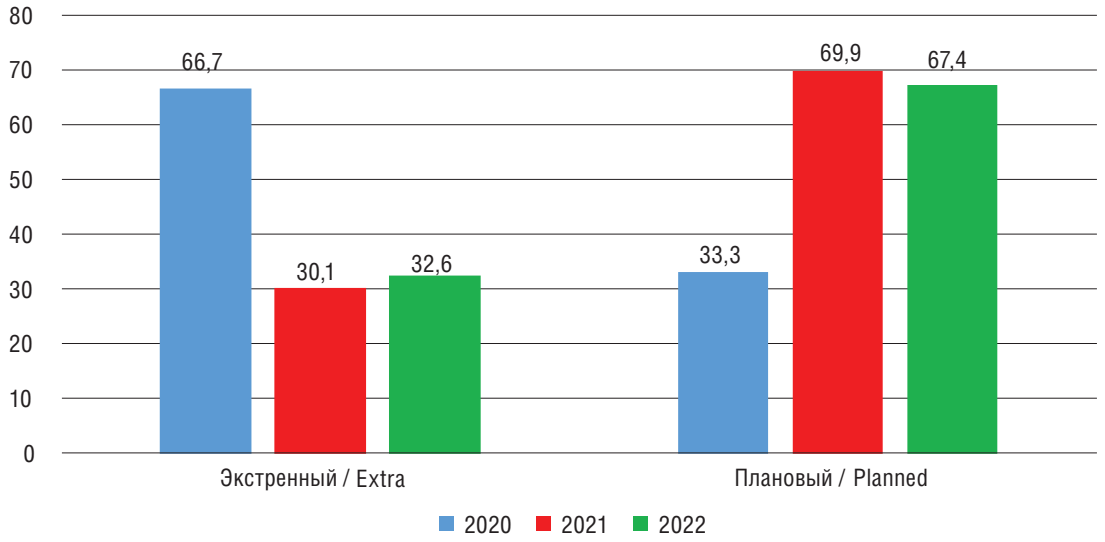


Fig. 4. Distribution of patients by order of referral to hospitalization in 2020–2022 (in %)

Рис. 4. Распределение пациентов по порядку направления на госпитализацию в 2020–2022 гг. (в %)

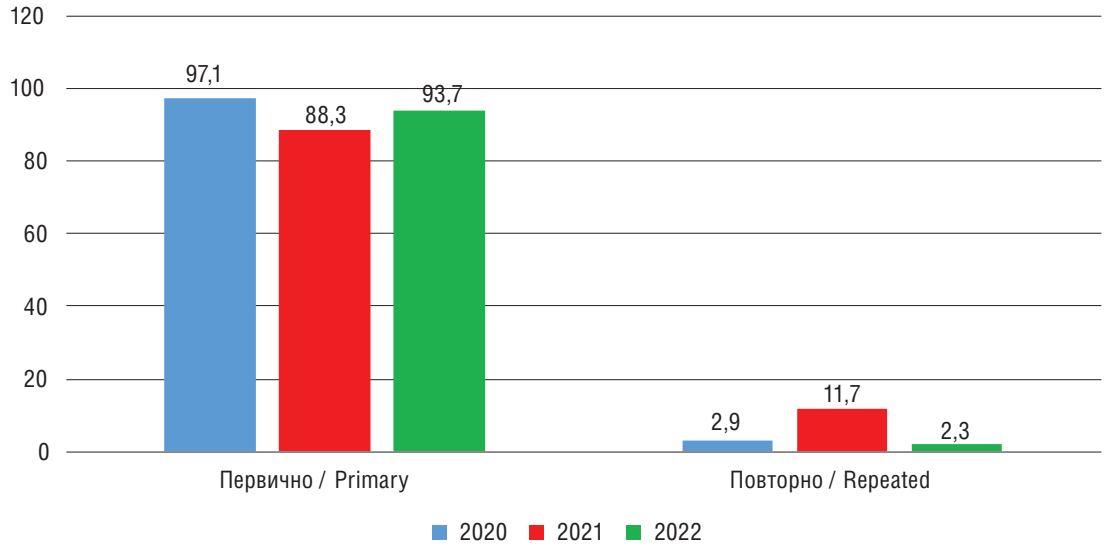


Fig. 5 The ratio of patients in the first month of life by primary and repeated hospitalizations in 2020–2022 (in %)

Рис. 5. Соотношение пациентов первого месяца жизни по первичным и повторным госпитализациям в 2020–2022 гг. (в %)

was hospitalized in the beds of pathology of newborns and premature babies, resuscitation beds for newborns and surgical beds for newborns. Evaluation of the dynamics of indicators revealed that the share of patients hospitalized in newborn and premature babies' pathology beds, surgical beds for children, ophthalmology and pediatric beds in 2022 decreased to the level of 2020. At the same time, the number of resuscitation beds for newborns and other beds increased.

According to Table 3, the highest average duration of inpatient treatment in 2020–2022 was for patients hospitalized in neonatal intensive care, surgical, pathology of newborns and premature infants' beds. The assessment of the average duration dynamics of inpatient treatment showed a decrease in the stay of patients in neonatal intensive care beds and surgical beds, and an increase in the stay of patients in neonatal and premature babies' pathology, ophthalmology, pediatric and other beds.

The assessment of the structure of the treated patients admitted in the neonatal period indicated (Table 4) that during the research period the majority of children were treated for individual

*Table 2*

Birth weight of children in the first month of life hospitalized in a multidisciplinary children's hospital in 2020–2022 (in % and abs.)

*Таблица 2*

Масса тела при рождении детей первого месяца жизни, госпитализированных в многопрофильный детский стационар в 2020–2022 гг. (в % и абс.)

| Масса тела, г / Body weight, g | 2020 год / 2020 year | | 2021 год / 2021 year | | 2022 год / 2022 year | | Динамика / Dynamics (%) |
|---|---|---|---|---|---|---|---|
| | % | абс. / abs. | % | абс. / abs. | % | абс. / abs. | |
| До 2500 / Up to 2500 | 17,4 | 12 | 24,3 | 25 | 21,1 | 20 | +17,5 |
| До 1000 / Up to 1000 | 0,0 | 0 | 3,9 | 4 | 6,3 | 6 | +100,0 |
| До 1500 / Up to 1500 | 1,4 | 1 | 11,7 | 12 | 11,6 | 11 | +87,9 |
| 2500–3999 | 76,8 | 53 | 51,4 | 53 | 57,8 | 55 | –24,7 |
| 4000 и более / 4000 or more | 4,3 | 3 | 8,7 | 9 | 3,2 | 3 | –25,6 |
| Итого / Total | 100,0 | 69 | 100,0 | 103 | 100,0 | 95 | – |

conditions arising in the perinatal period (P00–P96) and congenital anomalies (malformations), deformations and chromosomal abnormalities (Q00-Q99), the share of which decreased by 5.2 and 27.3% in 2022 compared to 2020, respectively.

The current research established that the predominant majority of infants in the first month of life were discharged from hospital in 2020–2022 (Figure 6). The highest specific gravity of those discharged was in 2022, when it amounted to 94.7%. During the studied period, there was a decrease in the share of patients transferred to other hospitals and an increase in the specific gravity of infants who died in the neonatal period in the hospital.

## CONCLUSION

1. The majority of patients in the first month of life are admitted by intrahospital transfer and their treatment is funded by the CMI. During the COVID-19 pandemic, the majority of patients were hospitalized as emergencies (66.7%), however, starting from 2021, two-thirds of first-month-of-life infants began to be admitted on a planned basis. The repeated hospitalization rate in 2022 was 2.3%, and the highest values were observed in 2021, when the re-hospitalization rate reached 11.7%.

2. Assessment of the distribution of patients hospitalized in a multidisciplinary children's hospital in the first month of life by birth weight showed an increase in the specific gravity of infants born prematurely, with low, very low and extremely low birth weight. The proportion of infants born with a birth weight of 4000 g and more decreased during the reported period.

3. In 2020–2022, the largest specific gravity of patients were treated in the beds of pathology of newborns and premature babies, resuscitation for newborns beds and surgical beds. The share of children hospitalized in newborn and premature babies' pathology beds, surgical beds for children, ophthalmology and pediatric beds decreased, while the share of children hospitalized in resuscitation beds for newborns and other beds increased.

4. The longest average duration of hospital treatment is observed in patients hospitalized in resuscitation for newborns beds, surgical beds for children, and newborn and premature infant pathology beds. During the studied period, the average length of stay of children decreased in neonatal intensive care beds and surgical beds for children, while it increased in newborn and premature babies' pathology, ophthalmology, pediatric and other beds.

5. The majority of children were treated for individual conditions arising in the perinatal period as well as for congenital anomalies (malformations), deformations and chromosomal abnormalities, the share of which decreased by 2022.

6. During the studied period, the predominant majority of children of the first month of life were discharged from the hospital. There was a

*Table 3*

The structure of patients and the average duration of inpatient treatment of children in the first month of life, depending on the profile of beds in 2020–2022 (in % and M±m)

*Таблица 3*

Структура больных и средняя длительность стационарного лечения детей первого месяца жизни в зависимости от профиля коек в 2020–2022 гг. (в % и M±m)

| Профиль коек / Bed profile | 2020 год / 2020 year | | 2021 год / 2021 year | | 2022 год / 2022 year | | Динамика удельного веса / Specific gravity dynamics (%) | Динамика средней длительности / Average duration dynamics (%) |
|---|---|---|---|---|---|---|---|---|
| | Удельный вес / Specific gravity (%) | Средняя длительность (в днях) / Average duration (in days) | Удельный вес / Specific gravity (%) | Средняя длительность (в днях) / Average duration (in days) | Удельный вес / Specific gravity (%) | Средняя длительность (в днях) / Average duration (in days) | | |
| Реанимационные для новорожденных / Resuscitation for newborns | 7,3 (5) | 26,0±16,83* | 12,6 (13) | 9,7±2,27 | 15,8 (15) | 18,2±3,75* | +54,4 | –30,0 |
| Хирургические для детей (в т.ч. кардиохирургические, нейрохирургические) / Surgical for children (including cardiac surgery, neurosurgery) | 26,1 (18) | 18,3±6,31* | 10,7 (11) | 13,8±2,75 | 20,0 (19) | 15,2±6,58* | –23,4 | –16,9 |
| Патологии новорожденных и недоношенных детей / Pathologies of newborns and premature babies | 58,0 (40) | 14,6±1,67* | 63,1 (65) | 15,6±1,47 | 49,5 (47) | 18,3±2,72* | –14,7 | +20,2 |
| Офтальмологические / Ophthalmic | 0,0 (0) | 0,0±0,00 | 1,9 (2) | 4,5±0,50 | 3,2 (3) | 8,7±6,22 | +100,0 | +100,0 |
| Педиатрические (в т.ч. пульмонологические, кардиологические) / Pediatric (including pulmonological, cardiological) | 7,2 (5) | 2,0±1,00* | 6,8 (7) | 14,1±7,53 | 5,3 (5) | 5,6±4,60* | –24,4 | +64,3 |
| Прочие / Other | 1,4 (1) | 20,0±3,25* | 4,9 (5) | 12,7±2,37 | 6,2 (6) | 9,8±1,03* | +77,8 | –51,0 |
| Итого / Total | 100,0 (69) | 13,5±4, 84 | 100,0 (103) | 11,7±2,82 | 100,0 (95) | 12,6±4,15 | – | – |

* Статистически значимая разница между показателями 2020 и 2022 гг. (p <0,05).
* Statistically significant difference between 2020 and 2022 figures (p<0.05).

decrease in the specific gravity of patients transferred to other hospitals and an increase in the proportion of children who died in the hospital in the neonatal period.

Thus, the research demonstrated that patients hospitalized in the neonatal period, in most cases, are admitted by intra-hospital transfer in a planned manner to the beds of pathology of newborns and premature babies, resuscitation beds for newborns and surgical beds for children, where the average duration of inpatient treatment is the longest, which is mainly paid for with CMI

*Table 4*

Structure of patients in the first month of life by ICD-10 classes in 2020–2022 (in %)

*Таблица 4*

Структура пациентов первого месяца жизни по классам МКБ-10 в 2020–2022 гг. (в %)

| **Класс заболеваний по МКБ-10 / Class of diseases according to ICD-10** | **2020 год / 2020 year** | | **2021 год / 2021 year** | | **2022 год / 2022 year** | | **Динамика / Dynamics (%)** |
|---|---|---|---|---|---|---|---|
| | **%** | **абс. / abs.** | **%** | **абс. / abs.** | **%** | **абс. / abs.** | |
| Болезни крови, кроветворных органов и отдельные нарушения, вовлекающие иммунный механизм / Diseases of blood and blood-forming organs and certain disorders involving the immune mechanism | 1,4 | 1 | 3,9 | 4 | 4,2 | 4 | +66,7 |
| Болезни органов дыхания / Diseases of the respiratory system | 0,0 | 0 | 3,9 | 4 | 3,2 | 3 | +100,0 |
| Болезни мочеполовой системы / Diseases of the genitourinary system | 0,0 | 0 | 2,9 | 3 | 5,3 | 5 | +100,0 |
| Отдельные состояния, возникающие в перинатальном периоде / Certain conditions originating in the perinatal period | 47,8 | 33 | 57,3 | 59 | 45,3 | 43 | –5,2 |
| Врожденные аномалии (пороки развития), деформации и хромосомные нарушения / Congenital malformations, deformations and chromosomal abnormalities | 33,4 | 23 | 23,3 | 24 | 24,2 | 23 | –27,3 |
| Факторы, влияющие на состояние здоровья / Health affecting factors | 1,4 | 1 | 2,9 | 3 | 2,1 | 2 | +33,3 |
| Прочие / Other | 16,0 | 11 | 5,8 | 6 | 15,7 | 15 | –1,9 |
| Итого / Total | 100,0 | 69 | 100,0 | 103 | 100,0 | 95 | – |

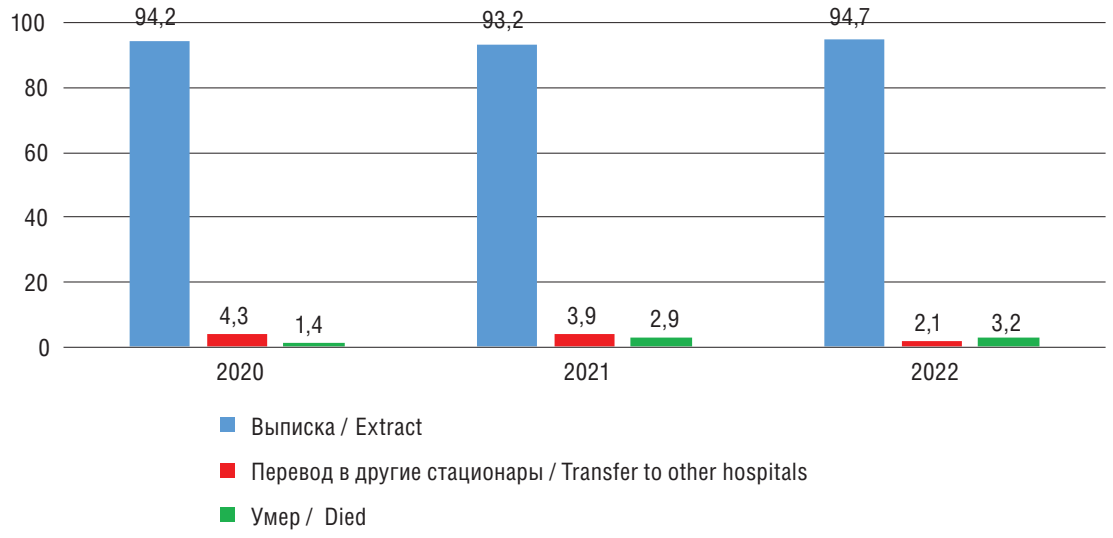


Fig. 6. Distribution of patients in the first month of life by type of dropout in 2020–2022 (in %)

Рис. 6. Распределение пациентов первого месяца жизни по типу выбывания в 2020–2022 гг. (в %)

funds, and in the majority of cases children are discharged after treatment.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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# ASSESSMENT OF LIFE LIMITATIONS IN THE PROCESS OF MEDICAL AND SOCIAL EXAMINATION FOR CITIZENS AGED 18 YEARS AND OLDER WITH HIV-INFECTION — AIDS

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**ABSTRACT.** When a person with HIV-infection — AIDS is identified as a disabled person, it is necessary to conduct examination, which is carried out in the Federal State Institutions of Medical and Social Expertise (ITU). The criteria for establishing disability set out in the Order of the Ministry of Labor of Russia dated August 27, 2019 No. 585n are currently applied. The conditions for recognizing a citizen as a disabled person are persistent violations of the functions of the body, which lead to restrictions of vital activity, as well as the need for social support of the citizen. The notion of disability implies partial or complete loss of the ability or capacity to carry out self-care, independent movement, to navigate, communicate and be engaged in work activities. To determing the category and severity of disability is necessary not only for establishing the fact and group of disability, but also for planning the type and scope of social protection measures, including rehabilitation. The crucial point for specialists of a medical organization is filling in the "Referral for medical and social examination by a medical organization" (form No. 088/u), since when making a decision to establish disability, ITU doctors rely largely on the information recorded in this document, including major categories of disability. The definition of restrictions in the main categories of life activity is also extremely necessary for the formation of an individual program for the rehabilitation or habilitation of a disabled person (IPRA) and planning a complex of necessary rehabilitation measures. A professional analysis of the medical history and a competent, thorough registration of a referral to the ITU (form No. 088 / u) contributes to the qualitative conduct of a medical and social examination and availability for the person of the entire range of social protection measures.

**KEY WORDS:** medical and social expertise; HIV-infection; AIDS; disability; disabled; limitation of life; Referral for medical and social examination by a medical organization; form No. 088/u; individual program for the rehabilitation or habilitation of a disabled person.

# ОЦЕНКА ОГРАНИЧЕНИЙ ЖИЗНЕДЕЯТЕЛЬНОСТИ В ПРОЦЕССЕ МЕДИКО-СОЦИАЛЬНОЙ ЭКСПЕРТИЗЫ ГРАЖДАНАМ 18 ЛЕТ И СТАРШЕ С ВИЧ-ИНФЕКЦИЕЙ — СПИДом

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**РЕЗЮМЕ.** При признании лица с ВИЧ-инфекцией — СПИДом инвалидом необходимо проведение процедуры освидетельствования граждан, которое осуществляется в федеральных государственных учреждениях медико-социальной экспертизы (МСЭ). При проведении МСЭ в настоящее время применяют критерии для установления инвалидности, изложенные в Приказе Минтруда России от 27.08.2019 г. № 585н. Условиями признания гражданина инвалидом являются стойкие нарушения функций организма, которые приводят к ограничению в различных категориях жизнедеятельности, а также необходимость в социальной поддержке гражданина. Ограничение жизнедеятельности подразумевает частичную или полную утрату способности или возможности осуществлять самообслуживание, самостоятельно передвигаться, ориентироваться, общаться и заниматься трудовой деятельностью. Определение категории и степени выраженности ограничений жизнедеятельности необходимо не только для установления факта и группы инвалидности, но и для планирования вида и объема социальных мер защиты, включая реабилитацию. Ответственным моментом для специалистов медицинской организации является заполнение «Направления на медико-социальную экспертизу медицинской организацией» (форма № 088/у), так как при решении вопроса об установлении инвалидности врачи МСЭ во многом полагаются на зафиксированные в данном документе сведения, в том числе и по основным категориям ограничения жизнедеятельности. Определение ограничений в основных категориях жизнедеятельности также крайне необходимо для формирования индивидуальной программы реабилитации или абилитации инвалида (ИПРА) и планирования комплекса необходимых реабилитационных мероприятий. Профессиональный анализ истории болезни и грамотное, тщательное оформление направления на МСЭ (форма № 088/у) способствует качественному проведению медико-социальной экспертизы и получению гражданином всего комплекса мер социальной защиты.

**КЛЮЧЕВЫЕ СЛОВА:** медико-социальная экспертиза; ВИЧ-инфекция; СПИД; инвалид; инвалидность; ограничение жизнедеятельности; направление на медико-социальную экспертизу медицинской организацией; форма № 088/у; индивидуальная программа реабилитации или абилитации инвалида.

## INTRODUCTION

The spread of HIV-infection — AIDS continues. By December 31, 2021, 137,596 citizens of the Russian Federation (RF) have been living with a laboratory-confirmed diagnosis of HIV-infection. 71,019 new cases of HIV-infection detected in the immune blot. During the entire period of studying the incidence in Russia, namely since 1987, when the first HIV-infected patient was identified, HIV was detected in 1,562,570 people, 424,974 of whom died (27.2%). The HIV morbidity rate for 2021 was 48.7 per 100,000 population. Considering that HIV-infection is an incurable disease and the number of new HIV-infections exceeds the number of deaths, there is an increase in the total number of people living with HIV in the Russian Federation. In recent years, HIV-infection in Russia has been detected among the population of the most active working age [1].

At the stage of secondary lesions, HIV-infection is characterized by persistent disorders of functions of various organs and systems, which reduce the quality of life, lead to difficulty or complete inability to self-care, labor activity, which requires medical, psychological, and financial assistance. The system of economic, legal and social support measures in Russia is guaranteed by the state if a person is recognized as a disabled person [10].

## AIM

To formulate the basic requirements for the development of life activity limitations (LAL) in patients with HIV-infection referred for medical and social expert assessment (MSEA) on the basis of the analysis of current normative-legal documents. A medical organization must refer a patient to the MSEA office in case there are per-

sistent impairments of body functions, which remain despite adequate and full complex of treatment and rehabilitation measures, as well as there are signs of life activity limitations in order to provide the most complete and comprehensive medical and social expert assessment (MSEA) of patients with HIV-infection.

## MATERIALS AND METHODS

The authors have analyzed the actual normative-legal documents, which most fully reflect the whole range of dysfunctions in patients with HIV-infection — AIDS. The research analyzes the practical use of actual normative acts and careful observance of their requirements when the documents for referring citizens to MSEA are prepared on the basis of an expert example.

## RESULTS AND DISCUSSION

A disabled individual is a person who has a health disorder with an enduring impairment of body functions, caused by diseases, consequences of injuries or defects, leading to a limitation of life activity and resulting in the need for social protection [8]. Federal organizations of MSEA are responsibile for establishing disability, its causes, term, time of onset, and the need of a disabled person for various types of social assistance [5]. The Order of the Russian Ministry of Labor of 27.08.2019 No. 585n (p. 9) states that the criterion for establishing disability is a health disorder with II and more pronounced degree of persistent impairment of body functions (in the range from 40 to 100%), caused by diseases, consequences of injuries or defects, leading to a limitation of a person's life activity, determining the need for social protection [4].

Quantitative assessment of persistent impairment of body functions (in the range from 10 to 100%) for citizens over 18 years old is given in Appendix No. 1 of the normative document. When a persistent impairment of body functions is established within the quantitative expression of not less than 40%, expert physicians of the MSEA bureau assess the impact of the impaired functions on a citizen's vital activity. Determination of the structure and degree of life activity limitation (LAL) is one of the main tasks of federal state MSEA institutions [5]. Determination of the category and degree of disability is necessary not only to ascertain disability, but also to plan the type and scope of social protection measures, including rehabilitation. The Federal Law "On Social Protection of Disabled Persons in the Russian Federation" of 24.11.1995, No. 181-FZ, defines disability as "a complete or partial loss of a person's ability or opportunity to perform self-care, to move independently, to orient, to communicate, to control his or her behavior, to study and to engage in labor activity" [10].

Order of the Russian Ministry of Labor of 27.08.2019 No. 585n identifies 7 categories of human life activity: a) ability to self-care; b) ability to move independently; c) ability to orientate; d) ability to communicate; e) ability to control one's behavior; f) ability to learn; g) ability to work. There are 3 degrees of life activity limitations (LAL): 1st, 2nd and 3rd degree [4]. LAL is defined as a complete (3rd degree) or partial (1st, 2nd degree) loss of a person's ability to carry out life activities in these main categories.

LAL is caused by persistent disorders of functions of body systems as a result of chronic disease. The severe course of HIV-infection is manifested by dystrophic and autoimmune processes, opportunistic diseases, malignant neoplasms, which is a clinical reflection of the failure of immune defense [2].

Stage 4A is characterized by bacterial, fungal and viral pathological changes in mucous membranes and skin, inflammatory diseases of the upper respiratory tract. 4B stage is accompanied by lesions of internal organs, peripheral nervous system, localized Kaposi's sarcoma. Stage 4B is characterized by severe generalized opportunistic diseases, pneumocystis pneumonia, lymphomas, including brain lymphomas with further involvement of the central nervous system [2]. In addition, liver damage, acute necrosis of skeletal muscles, myopathy, pathologic fractures due to decreased bone mineral density and other adverse reactions of antiretroviral therapy are registered against the background of treatment. Multi-organ character of HIV-infection is caused by the lesion of vascular endothelium and connective tissue, involvement of all organs and systems with autoimmune reactions, immune complex diseases and metabolic disorders, which is manifested by cardiovascular, neurological, endocrine and bone and joint pathology. All pathological pro-

cesses associated with HIV-AIDS lead to persistent disruption of the functions of various body systems: peripheral and central nervous, digestive, urinary, cardiovascular, respiratory, immune and blood, endocrine and metabolic, neuromuscular and skeletal systems, as well as movement-related (statodynamic) and mental functions.

Each of the LAL categories is determined by the peculiarities of organism function disorders. Certain persistent violations lead to certain limitations of vital activity.

For instance, disorders of movement-related (statodynamic) functions caused by lesions of the nervous system, diseases of muscles, joints and bones, contribute to limitation of such categories of life activity as self-care, independent movement, ability to work. Persistent disorders of cardiovascular, respiratory, digestive, endocrine and urinary systems are polyetiologic, however, they are mainly manifested by shortness of breath, weakness, dizziness. Ultimately, the violation of these functions limits the ability to self-care, independent movement, labor activity. The degree of restriction may vary. Disorders of mental functions such as consciousness, intelligence, memory, emotion, perception, thinking, and others result in limitations in the following categories: self-care, orientation, communication, control of one's behavior, learning, and ability to work.

The same category of LAL may be related to a few permanent impairments. For example, limitation of independent movement is caused both by statodynamic problems, and by shortness of breath, weakness, and dizziness, which appear in case of damaged respiratory, cardiovascular and nervous systems.

The greatest significance in the development of social insufficiency are such limitations as the ability to self-care, independent movement, labor activity.

*The ability to perform self-care* is a person's ability to independently fulfill basic physiological needs and perform daily household activities: observing personal hygiene (washing the face, washing hair and the whole body, brushing teeth, cutting nails on hands and feet), putting on and taking off outer clothing, underwear, hosiery, hats, shoes, using fasteners (buttons, hooks, zippers), cooking and eating, using bedding, cleaning, washing, ironing and repairing linen, cleaning the room, using household appliances, door locks, buying food, clothing and household items, medicines, etc., as well as other activities.

In the 1st degree of self-care limitation, the patient is independent and can do the same amount of housework, but it takes more time than before due to interruptions and (or) slower pace of performance; sometimes auxiliary technical means are required (for cooking, washing dishes, laundry, household cleaning, etc.). Self-care limitation of the 2nd degree is manifested by regular partial assistance of others with the use of auxiliary technical means if necessary, as the patient has difficulties in buying and bringing home groceries, cooking, bathing, etc. Self-care ability limitation of the 3rd degree is characterized by the need for constant assistance and care, complete dependence on other people [4].

*The ability to move independently* is the ability to move independently in space (walk, run, move on flat and rough surfaces, on stairs, within an apartment, room, bed), use a private car and public transport (getting in and out of it), bend over, pick up objects from the floor, etc.

The 1st degree of limitation of the ability to move independently is established when the patient spends more time to overcome a certain distance, which is caused by slow walking or forced stops for rest. If necessary, the patient uses auxiliary technical means (e.g., a cane) to facilitate movement. The 2nd degree limitation of the ability to move independently is manifested in regular partial assistance of other people, using auxiliary technical means if necessary. In the 3rd degree of this category, the patient is unable to move independently and needs constant assistance from others.

*Ability to work* — the ability to perform labor activity in accordance with the requirements to the content, volume, quality and conditions of work performance.

The 1st degree of limitation is the ability to perform labor activity under normal working conditions with reduced qualification, severity, tension and (or) reduction of the workload, inability to continue working in the main profession (position, specialty) while retaining the ability to perform labor activity of lower qualification under normal conditions. At the 2nd degree of limitation of the ability to work, patients can work in specially created

conditions with the use of auxiliary technical means. The 3rd degree of limitation of the ability to labor activity implies preservation of the ability to perform elementary labor activity with significant assistance of other people, or the impossibility of its implementation is ascertained.

When examining patients with HIV-infection — AIDS in the stage of secondary lesions, most often there is *a limitation of the ability to self-care, the ability to move independently, the ability to work.* This is explained by increased fatigue, weakness, shortness of breath due to anemia, significant loss of body weight up to the development of cachexia, asthenic state, respiratory failure, which reduces tolerance to physical and mental workload.

HIV-associated dementia up to severe dementia and loss of speech develops in some examinees when the nervous system is involved (vascular lesions, brain abscesses and neoplasms, aseptic meningitis, etc.). Inadequacy of behavior, disorientation in space and time lead to limitation of *self-care, independent movement* and labor activity, up to limitation of the *ability to communicate, orientation, control of one's behavior, learning.*

Vision acuity reduction arising from demyelination and degeneration of optic nerve fibers reflects a persistent impairment of sensory functions, which leads to *limited ability for self-care, independent movement, orientation, communication, education, and labor activity*.

It is necessary to assess the somatic, neurological and mental status and analyze the impact of the existing disorders of body functions on one or another sphere of life activity during the examination process. Identification of disability, clarification of its category and degree makes it possible to determine the need of a disabled person for specific measures of social protection, including rehabilitation. The necessary list of needs for social protection measures during the MSEA is specified in the Individual Program of Rehabilitation or Habilitation of a Disabled Person (IPRA) [6].

**Expert example** (examination on 28.02.2020). Male, 35 years old.

The man graduated from a mechanical-technological college with a specialty "Mechanic for repair of radio equipment", had no permanent place of work. Currently he does not work. He was resented for examination for the first time.

The diagnosis was confirmed in October 2018, when he was urgently hospitalized in the intensive care unit of the city hospital for fever, headache, the condition was determined as serious. Generalized cryptococcosis (cryptococcal meningitis and pulmonary cryptococcosis), pneumocystis pneumonia was diagnosed against the background of low immune status and high viral load (CD4+ 115 cells/μL (14%), HIV viral load (VL) — 7,008,407 copies/mL). Antiretroviral therapy (ART) was started, which was further adjusted due to the development of anemia. The patient is registered at the "Center for Prevention and Control of AIDS and Infectious Diseases" since 2018. At present, the treatment regimen (darunavir 800 mg/day, ritonavir 100 mg/day, raltegravir 400 mg 2 times a day) is applied, which resulted in the increase of CD4+ cells to 528 cells/μL (amounted to 15%), HIV viral load — 301 copies/ml, and the patient has been in clinical remission for more than 6 months.

The patient addressed to the MSEA bureau and complained on dizziness, constant weakness, rapid fatigability, constant sleepiness, decreased appetite, shortness of breath at minor physical activity and at rest, unsteadiness, uncertainty in walking.

He lives with his wife, who does housework, including shopping. The patient requires assistance when bathing, washing his body as he has physical difficulties. Due to constant weakness, dizziness, and shortness of breath he rarely goes outdoors. He came for examination with his wife (waiting in the corridor).

*Objective status.* He entered the room on his own, without an escort. The man walks very slowly; after taking off his clothes, shortness of breath appears when he talks. He sits on the couch, changes body position and stands up slowly, supporting on his arms. Conscious, the mood is lowered, quickly becomes fatigued. Sharply reduced nutrition, body mass index (BMI) — 13. The skin is pale with grayish plaque, dry. No peripheral edema. Peripheral lymph nodes are not enlarged. The sclera is subicteric. The tongue is crimson in color, with teeth impressions on the lateral surface. The chest is of asthenic type. The intercostal spaces are retracted. Respiratory rate is 21 per minute. Respiration over the lungs is vesicular, sharply

weakened in the lower parts with no rales. Pulse 96 per minute, rhythmic. Heart tones muffled. The abdomen is retracted, soft, painless. The liver protrudes from under the edge of the rib arch by 2 cm. Stroking on the lumbar region is painless.

*Psychologist.* He makes contact, understands instructions, performs tasks with shortness of breath, with a slight decrease in the pace of activity. Research on Schulte tables (52 sec, 47 sec, 1 min 10 sec, 1 min 15 sec, 1 min 06 sec) — a slight decrease in the volume of arbitrary attention. Memory 7/10, 8/10, 9/10, 9/10, delayed reproduction — 9 words. Short-term visual memory — from the first presentation 9 out of 9 pictures. In the study of thinking he performed tasks on generalizations and selection of phrases to proverbs and sayings (according to the received education). Emotional-personal sphere was investigated by the HADS method: anxiety scale — 7 points, depression scale — 15 points (clinically expressed depression). As a result of the experimental-psychological examination during the MSEA examination, changes in mental processes were revealed in a mild degree (due to a slight decrease in the function of arbitrary attention).

*Principal diagnosis.* HIV-infection, stage 4B, incomplete remission on ARVT. *Complications:* Molluscum contagiosum. Erosive pyoderma. Oropharyngeal candidiasis. Leukoplakia of the tongue. Left-sided lower lobe pneumonia in 2019. Pneumocystis pneumonia in 2018. Generalized cryptococcosis (cryptococcal meningitis, pulmonary cryptococcosis) in 2018. Consequences of cryptococcal meningitis in 2018, cryptococcal meningoencephalitis with the development of mild changes in mental processes (due to a slight decrease in the function of arbitrary attention). Encephalopathy (mixed genesis) of the 2nd degree. Anemia of mild severity. Severe hypotrophy of the 3rd degree (BMI 13). Chronic hepatitis C virus, antibodies to *Hepatitis C Virus*, HCV Ab+ positive, with minimal biochemical activity.

The MSEA examination was guided by following data: stage 4B of HIV-infection with phenomena of incomplete remission on ART, with the presence of multiple complications, opportunistic infections, including meningitis and pneumonia twice. In accordance with item 1.4.3 of Appendix No. 1 to the Order of the Ministry of Labor of Russia from 27.08.2019, No. 585n, which states that the quantitative assessment of persistent impairment of functions corresponds to 70–80% in the presence of "HIV-infection: stage 4B (secondary diseases), progression phase on the background of ART. Expressed disorders of body functions on the background of ART and CD4+ level from 100 to 200 cells/μL", the condition was considered as manifestation of persistent expressed disorders of blood and immune system function in quantitative expression of 70%, as there is stage 4B, signs of incomplete remission and CD4+ level of 115 cells/μL before treatment and 528 cells/μL against the background of ART and HIV — 301 copies/mL [4].

Hypotrophy with BMI 13, according to modern concepts, can be considered as a sign of severe malnutrition, reflecting persistent pronounced impairment of the digestive system function [3].

In addition, persistent minor disorders of mental functions with anxiety-depressive symptomatology and cognitive disorders in the form of a slight decrease in attention were observed.

Thus, the revealed persistent pronounced disorders of different systems, manifested by dyspnea, dizziness, weakness, rapid fatigability, lead to limitation of such vital spheres as self-care, independent movement and ability to work. Minor impairments of mental functions do not have a significant impact on life activity.

Determining the degree of severity of LAL, it is necessary to find out how the patient performs a particular life function. The answer to one of the questions about the performance of daily living activities and mobility will help to decide the degree of severity of the limitation in self-care and independent mobility: 1) always independently in full (previous) volume; 2) independently with a longer expenditure of time and (or) with a reduction in volume, using technical means if necessary; 3) limited independence, requires regular partial assistance from others (1–3 times a month, 1–3 times a week, etc.) with the use of technical means if necessary; 3) limited independence, requires regular partial assistance from others (1–3 times a month, 1–3 times a week, etc.) 4) fully dependent on others, needs constant assistance and care from others.

The examined citizen can move independently, however there are limitations due to

shortness of breath, unsteadiness, uncertainty in walking. He moves only within his apartment or room. He goes outdoors only in case of extreme necessity accompanied by his wife. This limitation of *independent movement* corresponds to the 2nd degree, as it is characterized by a pronounced decrease in the speed and pace of walking, its fractional performance, reduction of the distance of movement (mainly within the apartment), limited independence, requires regular partial assistance of other persons.

In the sphere of *self-care*, the patient requires regular partial assistance of others in buying groceries, medicines, bathing. "Partial" assistance implies that there is no complete dependence on other people — the examined independently performs hygiene procedures, uses household appliances, eats food, he can open and close the door lock, etc. The ability to self-care with regular partial assistance of other people corresponds to limitation of the 2nd degree of severity [4].

The *ability to work* is considered as professional capacity to work — namely to perform work of a certain qualification, volume and quality in specific conditions. The main occupation of the examined person (since he received special education) is a mechanic for radio equipment repair. It is assumed that during the working day the radio equipment repair mechanic performs disassembling, cleaning, assembling of radio receivers, tape recorders, electric playback devices with replacement of fuses, repairs control knobs, power cords with plugs, cleans the workplace, etc.

Persistent pronounced disorders of immune, digestive and blood system functions, manifested by dizziness, weakness, rapid fatigue, drowsiness, exclude the ability to meet the requirements for labor complexity, working environment conditions, which are necessary in the course of professional activity. The examinee is incapable of reproducing special professional knowledge, skills and abilities at the usual workplace due to his physical and psychophysiological characteristics, but he will be able to work in lightened conditions. This corresponds to the 2nd degree of LAL — the ability to perform labor activity in specially created conditions with the use of auxiliary technical means. Specially created working conditions imply a number of measures to be taken by the employer with regard to the disabled person: an individual schedule with the establishment of the beginning of work and the duration of the shift, free pace of work, reduction of the workload (0.25–0.5 rate), individual performance standards, the possibility of partial performance of work at home and other forms as agreed upon by both parties (the administration of the enterprise and the disabled person).

Thus, according to the submitted medical and expert documents, the data of objective examination, complex evaluation of indicators, the condition of the examined person with HIV-infection was assessed as the 3rd degree of severity of persistent disorders of the blood and immune system function, corresponding to 70%. This degree of persistent functional impairment was determined on the basis of a range of features. The patient has been diagnosed with stage 4B HIV-infection with incomplete remission of the disease — clinical remission has been lasting for 6 months. Moreover, the patient suffered from opportunistic infections — passed pneumocystis pneumonia, generalized cryptococcosis, oropharyngeal candidiasis; there are multiple complications of the disease — consequences of cryptococcal meningitis and cryptococcal meningoencephalitis in the form of mild changes in mental processes. The 3rd degree of severity of the digestive system dysfunction was also determined, since there is pronounced hypotrophy of the 3rd degree (BMI — 13, significant body weight deficiency), which can be characterized as a slim disease in HIV-infection.

The examined person had persistent impairments of body functions resulting in life activity limitations in the following categories:

- self-care abilities of the 2nd degree, as the patient requires regular partial assistance of other people to buy groceries, medicines, bathing;
- moving ability of the 2nd degree — can move independently, but with walking pace limitations due to shortness of breath; the patient can move only within the apartment or room, on the street — only accompanied by other people due to shakiness and uncertainty in walking;
- ability to work of the 2nd degree — can work in facilitated conditions, but the patient is not able to reproduce special professional knowledge, skills and abilities at a regular workplace,

- the above-mentioned limitations require social protection, including rehabilitation and habilitation, which provides grounds for establishing a disability.

The second disability group was established, as persistent organ dysfunction corresponds to the 3rd degree (70%), there are limitations of vital activity of the 2nd degree in three categories, and the patient needs social protection measures.

Previousiously, before the RF Government Decree No. 339 of 29.03.2018 "On Amending the Rules for Recognizing a Person as Disabled" came into effect, the examined person would have been assessed as having the second group of disability, for a period of one year, the cause of disability — "general disease" [7].

In accordance with p. 37 of Resolution No. 339, in case of HIV-infection at the stage of secondary diseases (stage 4B, 4B) and terminal stage 5, the disability group is established *without a period of re-examination* at *the initial* examination. Thus, according to the results of the examination, the examined person will be recognized as a disabled person of the second group for an indefinite period of time.

Despite the fact that the RF Government Resolution No. 339 issued on 29.03.2018 became invalid on 01.07.2022, the enacted RF Government Resolution No. 588 of 05.04.2022 "On recognizing a person as a disabled person" [8], namely the section IV of the Appendix "Diseases, defects, irreversible morphological changes, dysfunctions of organs and body systems, in which the disability group (the category "disabled child") is established without a period of re-examination (until the age of 18 years) during the initial examination" includes a corresponding paragraph which regulates the establishment of disability for an indefinite period of time, during the initial examination: paragraph 39. HIV-infection, secondary disease stage (stages 4B, 4C), terminal stage 5.

The representatives of the Federal State Budgetary Institution of Additional Professional Education "St. Petersburg Institute for Advanced Training of Medical Examiners" of the Ministry of Labor and Social Protection of the Russian Federation [9] conducted a research, studying the peculiarities of MSEA of individuals with HIV-infection — AIDS. The results showed that disability for the indefinite period of re-examination was established more often during the initial re-examination in the main group compared to the control group, before the RF Government Decree No. 339 of 29.03.2018 entered into force (48.6 vs. 19.0%; $\chi^2$=0.491 at the level of significance p <0,01). This trend is currently fixed in the Resolution of the Government of the Russian Federation from 05.04.2022 № 588 "On recognizing a person as a disabled person" [8], which makes it possible to predict an increase in the rates of establishing "indefinite" disability groups during the initial examination of patients with HIV-infection and, accordingly, a decrease in the rates of establishing disability without the term of examination during the repeated examination of disabled people. This fact provides a more efficient and cost-effective use of resources of medical organizations and MSEA institutions, determining the disability group "indefinitely" at the initial examination and developing the individual program for rehabilitation and habilitation (IPRH) for the entire period of examination.

## CONCLUSION

Undoubtedly, the assessment of LAL is an important stage in establishing the fact of disability in the MSEA bureau. Correct and comprehensive determination of the category/categories of LALs and the degree of LALs allows to determine the disability of a citizen during the examination, as well as to formulate rehabilitation measures for a particular patient, taking into account the category and degree of LALs. The plan of rehabilitation measures is reflected in the IPRA. Correct and adequate preparation of IPRH is impossible without a professional assessment of the patient's disability. Taking into account the current trend of conducting MSEA in absentia, which is preferable for many citizens, it is extremely important for the medical commission of a medical organization to reflect the LALs even more attentively forming a "Referral for medical and social expert evaluation by a medical organization" (form No. 088/u) when referring a patient with HIV-infection — AIDS to MSEA. In this regard, it is necessary to give a detailed description of every categories of disability in Form No. 088/u and record the identified limitations in detail, which will allow the MSEA to

correctly assess and determine the disability, as well as to form an individualized list of rehabilitation measures. Furthermore, when referring a citizen to the MSEA, form No. 088/u should indicate the entire recommended list of necessary rehabilitation measures for the examined person including all rehabilitation areas (not only medical rehabilitation), which is impossible without an adequate assessment of the LALs.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisi-tion, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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# HEALTHCARE IN CHINA AND RUSSIA. SIMILARITY, DIFFERENCES AND COOPERATION

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**ABSTRACT.** The article presents a comparative analysis of the healthcare systems of the Russian Federation and the People's Republic of China. The comparative method and content analysis of world health indices (Health Efficiency; Global Health Safety Index; Health Index), demographic indicators, health financing, public health insurance, medical services market and classification of medical organizations were used. China is ahead of the Russian Federation in the ranking of world health indices. Russia surpasses China in terms of health spending as a percentage of GDP and per capita financing, is more prepared to work in the face of epidemics, the maternal mortality rate in the Russian Federation is below the average prevailing level in the world. The advantage of the Russian healthcare system is free medicine. The main problem of China's healthcare system is the inequality in the availability of public medical care for various societies of the population, the limited list of diseases and operations provided free of charge, and the high cost of private medical services. The deficit of state support is compensated by traditional Chinese medicine, which is fixed and funded by the state as an official method of medical care.

**KEY WORDS:** healthcare system of the Russian Federation; healthcare system of the People's Republic of China; demographic situation; world health indices; healthcare financing; public health insurance system; classification of medical organizations; traditional medicine.

# ЗДРАВООХРАНЕНИЕ КИТАЯ И РОССИИ. ОБЩНОСТЬ, РАЗЛИЧИЯ И СОТРУДНИЧЕСТВО

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**РЕЗЮМЕ.** В статье приведен сравнительный анализ систем здравоохранения Российской Федерации и Китайской Народной Республики. Использован компаративный метод и контент-анализ мировых индексов здравоохранения (Эффективность здравоохранения; Глобальный индекс безопасности здоровья; Индекс здравоохранения), демографических показателей, финансирования здравоохранения, государственного медицинского страхования, рынка медицинских услуг и классификации медицинских организаций. Установлено опережение Китаем Российской Федерации в рейтинге мировых индексов здравоохранения. Россия превосходит Китай по уровню расходов на здравоохранение в процентах от ВВП и на душу населения, более подготовлена к работе в условиях эпидемий, уровень коэффициента материнской смертности в Российской Федерации ниже среднего сложившегося в мире. Преимуществом российской системы здравоохранения является бесплатная медицина для всех граждан. Главной проблемой системы здравоохранения Китая является неравенство доступности государственной медицинской помощи для различных социумов населения, ограниченность списка заболеваний и операций, предоставляемых бесплатно. Дефицит государственной поддержки компенсируется традиционной китайской медициной, закрепленной и финансируемой государством как официальный метод медицинской помощи.

**КЛЮЧЕВЫЕ СЛОВА:** система здравоохранения Российской Федерации; система здравоохранения Китайской Народной Республики; демографическая ситуация; мировые индексы здравоохранения; финансирование здравоохранения; система государственного медицинского страхования; классификация медицинских организаций; народная медицина.

## BACKGROUND

In the current context of cooperation between the Russian Federation (RF) and the countries of the Asia-Pacific region, the sphere of healthcare is used as a mechanism for solving political, economic and humanitarian state tasks. In this regard, the role of health protection in Russia's interstate relations with such a mighty country as the People's Republic of China (PRC) is increasing.

The history of Russian-Chinese relations has been developing for several centuries. Official relations between Russia and China were established back in 1689 with the signing of the Treaty of Nerchinsk. An important element of interaction between Russia and China in the XVIII–XIX centuries was the distribution of natural science, including medical knowledge [4]. During this period, Russian doctors the first being O.P. Wojciechowski arrived at the Russian Spiritual Mission in Beijin. The practical and scientific activities of doctors from the Russian Empire made a significant contribution to improving the image of Russian doctors for the Chinese population. Russian scientists became interested in Chinese medicine, and the inhabitants of the Celestial Empire got acquainted with European methods of treatment [6]. The role of the Soviet Union in the formation of the Chinese national health system is difficult to overestimate. The USSR contributed to the training of national medical personnel of the People's Republic of China, the construction of hospitals and medical educational institutions for the training of Chinese specialists in the territory of the People's Republic of China. Soviet doctors and teachers were sent to China, and advanced Soviet medical literature translated into Chinese was published. At the All-China Meeting of Higher Medical Education Specialists (1954), a unified curriculum for all medical

educational institutions in China was adopted in accordance with that of medical institutes of the USSR [4].

The roots of Chinese medicine go back to the III–II centuries BC. The knowledge accumulated over many centuries about human health and the medicinal properties of food products, including tea and wine [12], medicinal plants, the influence of acupuncture and moxibustion formed the basis of ancient treatises and more than 1800 works of folk healers, which are still the most valuable sources of world medicine and key stones of Chinese scientific thought [2]. Research scientific works of doctors of the Russian mission of the XVIII–XIX centuries on Chinese medicine have not lost their relevance to the present time [6].

Over the past decades, the Russian Federation and the People's Republic of China preserve close relations, seeking for an opportunity for mutual integration, including healthcare systems. The meeting between the Minister of Health of the Russian Federation Mikhail A. Murashko and the Ambassador Extraordinary and Plenipotentiary of the People's Republic of China Zhang Hanhui held in December 2022 indicated mutual interest in cooperation between our countries in such areas as training of medical specialists, import and export of medical products, safety and telemedicine [5].

Over the past decades, the healthcare systems of both States have been reformed. Their analysis will help to identify the advantages of systems that should be supported for further development. However, at present, in the presence of literature on trade, economic, cultural and humanitarian ties between the Russian Federation and the PRC, the field of healthcare is either not described at all, or rarely mentioned.

## PURPOSE AND TASKS

Based on a comparative analysis of the healthcare systems of the Russian Federation and the People's Republic of China, to establish adjusted data on the benefits of healthcare systems for the further prosperity of both countries.

## MATERIALS AND METHODS

The comparison of the healthcare systems of the Russian Federation and the People's Republic of China based on the comparative analysis method, content analysis of official and operational reports of Rosstat, statistical data on the demographic situation of the People's Republic of China, the Knoema World Atlas of Data, the ranking of countries on the international health indices Bloomberg Health Care Efficiency, GHS Index, Numbeo, basic health laws in the Russian Federation and the People's Republic of China.

## RESULTS

According to Bloomberg Health Care Efficiency, in the ranking of countries in the world, *The Effectiveness of Healthcare* is assessed by three indicators: average life expectancy at birth, public health expenditures as a percentage of GDP per capita, and the cost of medical services per capita. The rating is based on data from the World Health Organization, the United Nations and the World Bank (The Most Efficient Health Care). According to this rating, in 2018, Russia ranked 53$^{rd}$ out of 60 countries, China — 20$^{th}$. At the same time, China was ahead of Russia in terms of average life expectancy at birth (76.1 years and 71.2 years, respectively), and the Russian Federation was leading compared to China in health care costs of GDP (5.6% and 5.3%, respectively) and per capita ($524 and $426, respectively) [7]. *The Global*

*Health Safety Index (GHS Index)* evaluates the effectiveness of health systems in all countries of the world, based on an analysis of the state's preparedness for cases of a pandemic or epidemic in the following six categories. **Prevention**: Less than 7% of countries scored highest for their ability to prevent the emergence or release of pathogens. **Detection and reporting**: Only 19% of countries received top marks for detection and reporting. **Rapid response**: Less than 5% of countries received the highest score for their ability to respond quickly to the spread of the epidemic and mitigate its consequences. **Healthcare system**: The average score for the indicators of the healthcare system was 26.4 points out of 100, which makes medicine the lowest paid category. **Compliance with international norms**: Less than half of the countries have submitted confidence-building measures in accordance with the Biological Weapons Convention (BWC) over the past three years, which indicates their ability to adhere to important international norms and obligations related to biological threats. **Risk environment**: Only 23% of countries scored the highest on indicators related to their political system and government effectiveness [20]. In this context, the PRC and the Russian Federation in 2019 had the same values in all six categories and were ranked at the average level. However, China is ranked 51st in the GHS Index, and Russia is 63rd out of 195 countries, which may be due to some subjectivity of the assessment.

The Russian Federation is not only coping with the pandemic of a new coronavirus infection with dignity, but has also provided assistance to countries in need of the world, thereby making a significant contribution to strengthening the global healthcare architecture. The coordinated joint work of the Russian Federation and the People's Republic of China in accordance with the intergovernmental agreement on cooperation in the field of emergency prevention and response during the pandemic helped to cope with a common problem [5].

In the ranking of the Numbeo *Health Index* in the dynamics of mid-2021 — mid-2022, China rose from 41 to 40$^{th}$ place, and Russia — from 62 to 59$^{th}$ place out of 195 countries [21]. The positive dynamics of the health index in both countries is due to the implementation of programs to improve medical care for the population and an increase in health care costs.

*Classification of medical organizations.* In the nomenclature of medical organizations (MO) of the Russian Federation, there are the following divisions: medical and preventive outpatient type (outpatient clinics, clinics, consultations, dispensaries, centers, medical and sanitary units and ambulance stations) and stationary/inpatient type (hospitals, clinics, hospitals, maternity hospitals, sanatoriums, hospices); special type and MO supervision in the field of consumer protection and human well-being. In addition, the division of MO is carried out on a territorial level: Federal; Regional, republican, regional, district; Municipal; Interdistrict; District, including central; City, including central. Medical institutions are divided according to the volume of care provided, the availability of specialized care [8]. In China, hospitals are divided into three levels (I–III). The highest, level III, are academic medical centers with 1,000 or more beds in major cities of China, providing high-tech care. Level II hospitals are located in regional and district centers, level I — in provinces. In addition, there are three sublevels of MO: A, B and C, where A is the highest and C is the lowest. Sublevels differ

in the availability of diagnostic equipment, laboratories, and doctors of narrow specialization. Public hospitals of class IIIA are whole towns from several departments. They conduct accurate research in their own laboratory, carry out diagnostics, hospitalization and operations. Public hospitals of class IIIA have a good reputation, but long queues. Since 2012, medical care has been provided to foreign citizens in military hospitals of subclass A. In private medical centers of class B, treatment is much more comfortable than in public hospitals: there are no queues, comfortable waiting conditions. Of the minuses — they do not have sufficient equipment. Class C traditional medicine cabinets are represented by outdoor cabinets with the absence of expensive equipment, but they have their own pharmacy with traditional Chinese medicine (TCM) preparations [3]. Therefore, level III public hospitals are usually overcrowded, and level I–II are insufficiently filled. This division is conventionally similar to the three-tier healthcare system in the Russian Federation, but without a clear system of routing (distribution) of patients. In general, the hospital system in China is very diverse, and increases the availability of medical care for people with different income levels.

*Demographic situation* of the Russian Federation and China. The average life expectancy in Russia in 2020 was 73.2 years and ranked 96th in the world (men — 68.2 years, women — 78.0 years) [23]. In China — 77.4 years and 48th place in the world (men — 74.7, women — 80.5) [22]. *The birth rate* in 2020 in the Russian Federation was 12.1 per 1000 population [24]. In China, this indicator is lower and amounted to 11.3 per 1000 population, which, along with a decrease in the birth rate in the birth rate reflects the state's policy to combat overpopulation [13]. The dynamics of *the mortality rate* in the Russian Federation in 1971–2020 is negative (9 per 1000 population and 12.8 per 1000 population, respectively). The average annual increase was 0.73% [25]. In China, in the same period, there was a decrease in the mortality rate from 9.9 per 1,000 people to 7.4 per 1,000 people in 2020 [14]. High mortality of the population is the most acute demographic problem of the Russian Federation and is caused by the consequences of social cataclysms. In the statistics of *maternal mortality* in 2020, both in the Russian Federation and in the PRC, there was a decrease in this indicator compared to 2003: in the Russian Federation by 1.9 times (from 49 to 17 deaths per 100 thousand live births) [29] and by 1.7 times — in the PRC (from 48 to 29 deaths per 100 thousand. live births) [18]. In China, this indicator exceeds the average established world level. *The infant mortality* rate in the Russian Federation decreased from 28.9 per 1,000 live births in 1971 to 4.5 in 2020 [28]. In China, this ratio in 2020 was 5.5 per 1,000 live births, which is 13.8 times less than in 1971 (76 per 1,000 live births) [17]. In the world ranking for this indicator, Russia ranks 40th, China — 68$^{th}$ out of 236 countries. *The neonatal mortality* rate in 2001–2020 in the Russian Federation decreased from 8.6 to 2.3 per 1,000 live births, respectively [30]. In China, since 2001, neonatal mortality has decreased moderately from 19.9 per 1,000 live births to 3.5 in 2020 [19].

*Financing of healthcare.* In 2019, healthcare financing in the Russian Federation amounted to 5.6% of GDP [26], in China — 5.4% (an average annual increase of 1%) [15]. Health expenditure per capita of Russian Federation increased from 95 US dollars in 2000 to 653 US dollars in 2019 growing at an average annual rate of

12.18% [27]. In China, the annual increase in healthcare financing peaked at 35.86% in 2008, then decreased to 6.8% in 2019 and amounted to $535 [16]. In the Russian Federation, free medicine is available to every citizen [11]. The basic program of compulsory medical insurance (CHI) covers the expenses of the population for primary health care, prevention, medical examination, emergency and emergency medical care, palliative and specialized care in a number of cases. Employers deduct 5.1% of wages to the MHI fund. About 5% of Russian citizens use the services of private insurance companies under voluntary health insurance programs, at the expense of a certain budget, personal contributions of citizens, contributions from employers [10]. In China, most of the costs of providing medical care are covered by medical insurance at the expense of social health insurance, but part of the costs always have to be paid by the population. State medical services in China are provided on an insurance basis, as in the Russian Federation, and include three programs.

1. Insurance of working residents of cities (Urban employee basic medical insurance — UEBMI, 1998), which does not provide access to private hospitals. Health insurance cards can only be used to reimburse medical expenses of patients and do not cover the costs of transporting patients in emergency cases. The UEBMI insurance fund is formed by deductions from the payroll (6% is paid by the employer and 2% by the employee). In general, the annual insurance premium for each insured is $ 100–250.

2. Insurance of students and pensioners living in cities (Urban resident basic medical insurance — URBMI, 2007), provides medical care to children, primary and secondary school students and unemployed residents not covered by the UEBMI system, allocates additional subsidies to low-income citizens, as well as young children, students with disabilities. It is financed by the state and at the expense of annual contributions of citizens from $ 20 to $ 100.

3. The new cooperative medical insurance scheme for rural residents (New cooperative medical scheme — NRCM, 2003) covers more than 90% of rural population. It is financed by the state and insurance premiums of this category of the population in the amount of $ 20–50. Partially covers medical expenses, outpatient treatment and hospitalization costs of the insured person due to illness or accident or surgical intervention with a certain disease [9].

The Chinese government supports the development of private health insurance (PHI). Critical disease insurance (CDI) has become one of the new types in China's insurance system for patients insured by NCMS or URBMI and subject to high costs in the event of critical illnesses according to the approved list [31].

*Attitude to traditional medicine in China and Russia.* In the Russian Federation, the use of methods and means of traditional medicine is not funded by the state and refers to alternative methods that are not funded for under the CHI program. The folk methods of treatment licensed in the Russian Federation include homeopathy, acupuncture, herbal medicine, manual therapy [11]. In China, much attention is paid to both the development of TCM and the active use of modern technologies. On July 1, 2017, the Law on Traditional Chinese Medicine came into force in China. According to this Law, the state should develop activities in the field of TCM and pay equal attention to TCM and Western medicine, finance the construction of TCM institutions, the

development and production of TCM drugs. TCM is one of the dominant positions in the prevention and treatment of chronic diseases. The total number of TCM institutions in China at the end of 2019 reached 65,809, which is 41.4% more than in 2015. TCM institutions across the country served 1.16 billion in 2019. patient visits compared to 910 million in 2015. The main directions of TCM are zhen — acupuncture and chiu — moxibustion, phytotherapy, therapeutic gymnastics, diet therapy, massage [1].

## CONCLUSION

The analysis of the healthcare systems of the Russian Federation and the People's Republic of China has established both similarity and their differences. High life expectancy, low mortality rate in China, despite the low birth rate relative to the Russian Federation, allowed the country to take higher places in the ranking of world health indices. At the same time, the improvement of the maternity care system in the Russian Federation contributed to a fixed decrease in the maternal mortality rate, which in China still remains above the established world level. Both states are at the average level of international health indexation. Russia surpasses China in terms of healthcare spending as a percentage of GDP and per capita, and is more prepared to work in conditions of epidemics. The advantage of the Russian healthcare system is free medicine for all citizens of the country. The main problem of China's healthcare system is the inequality of access to state medical care. The levels of medical care are different for rural and urban population, between different cities and even within the same city and depend on the place of residence and employment of the patient. The selectivity of the state health insurance system for the Chinese population is compensated by folk medicine. The popularization of traditional medicine, fixed and funded by the state as an official method of treatment, is a distinctive feature of the Chinese healthcare system. In Russia, traditional medicine is fixed by law, but funds are not allocated for its promotion. The recognition of traditional Chinese medicine at the state level increases the availability of medical care with minimal costs for it. To strengthen and develop the healthcare system of the Russian Federation and China, further cooperation and exchange of experience are necessary. The revival of a network of medical and paramedic-obstetric stations in sparsely populated areas of the country, mobile medical teams within the framework of the reform of primary health care contribute to increasing the availability of medical care to the population of the Russian Federation. It should be noted that modern trends of reforming the healthcare system to expand TCM in China cannot be extrapolated with the reforms in the Russian healthcare system. Any foreign experience should be adapted to national conditions.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisi-tion, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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# INCIDENCE OF ADOLESCENTS MORBIDITY IN THE NORTH-EASTERN CAUCASUS

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**ABSTRACT.** Each region of Russia has its own natural-climatic and socio-economic features, unique peculiarities of the lifestyle of the population, certain social problems and social advantages, and therefore the study of the incidence of adolescents in concrete regions of the Russian Federation is of great medical and social importance. In order to assess the characteristics of the primary incidence of adolescents living in the region of the North-East Caucasus, official statistical reports and publications of the Federal State Statistics Service and the Ministry of Health of the Russian Federation for the Republic of Dagestan, the Republic of Ingushetia and the Chechen Republic for 2017–2021 were analyzed. It was established that the primary incidence of adolescents during the entire observation period in all three republics was below the national average, the lowest rates were noted in the Chechen Republic. In the structure of primary morbidity in the studied regions, as well as in the country as a whole, respiratory diseases prevailed, however, further distribution of disease classes by ranking places in each republic had its own characteristics. Lower, compared to the average for the Russian Federation, indicators of primary morbidity in 2021 were observed in the Republic of Dagestan for 7 classes of diseases, in the Republic of Ingushetia for 8 classes, in the Chechen Republic for 11 out of 13 identified classes. At the same time, the incidence of COVID-19 in adolescents was one of the lowest in the country. The dynamics of the primary incidence of adolescents in the Republic of Dagestan and the Chechen Republic corresponded to that in Russia as a whole — a stable level of the indicator in 2017–2018, a slight decrease in 2019, a sharp decrease in 2020 and a significant increase in 2021, while The Republic of Ingushetia did not show a decrease in the indicator in 2020, but the decrease was revealed a year later — in 2021. In the period from 2017 to 2021, the dynamics of primary morbidity rates for certain classes of diseases had multidirectional dynamics for most classes of diseases — against the background of an increase in the indicator in one region, a decrease in another and vice versa was noted.

**KEY WORDS:** teenagers; Northeast Caucasus; primary morbidity; incidence structure; dynamics.

# ЗАБОЛЕВАЕМОСТЬ ПОДРОСТКОВ СЕВЕРО-ВОСТОЧНОГО КАВКАЗА

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**РЕЗЮМЕ.** Каждый регион России имеет свои природно-климатические и социально-экономические особенности, особенности образа жизни населения, свои социальные проблемы и социальные преимущества, в связи с чем изучение особенностей заболеваемости подростков в отдельных субъектах РФ имеет важное медико-социальное значение. С целью оценки особенностей первичной заболеваемости подростков, проживающих в регионе Северо-Восточного Кавказа, были проанализированы официальные статистические отчеты и публикации Федеральной службы государственной статистики и Министерства здравоохранения РФ по Республике Дагестан, Республике Ингушетия и Чеченской Республике за 2017–2021 гг. Установлено, что первичная заболеваемость подростков в течение всего периода наблюдения во всех трех республиках была ниже средних показателей по стране, наиболее низкие показатели отмечались в Чеченской Республике. В структуре первичной заболеваемости в изучаемых регионах, как и в стране в целом, преобладали болезни органов дыхания, однако дальнейшее распределение классов болезней по ранговым местам в каждой республике имело свои особенности. Более низкие, по сравнению со средними по РФ, показатели первичной заболеваемости в 2021 г. наблюдались в Республике Дагестан по 7 классам заболеваний, в Республике Ингушетия — по 8 классам, в Чеченской Республике — по 11 из 13 выделенных классов. При этом заболеваемость подростков COVID-19 была одной из наиболее низких по стране. Динамика первичной заболеваемости подростков в Республике Дагестан и Чеченской Республике соответствовала таковой по России в целом: стабильный уровень показателя в 2017–2018 гг., небольшое снижение в 2019 г., резкое снижение в 2020 г. и значительный подъем в 2021 г., в то время как в Республике Ингушетия не наблюдалось снижения показателя в 2020 г., оно произошло на год позже — в 2021 г. В период с 2017 по 2021 г. показатели первичной заболеваемости отдельными классами болезней имели разнонаправленную динамику по большинству классов заболеваний: на фоне роста показателя в одном регионе отмечалось снижение в другом и наоборот.

**КЛЮЧЕВЫЕ СЛОВА:** подростки; Северо-Восточный Кавказ; первичная заболеваемость; структура заболеваемости; динамика.

## INTRODUCTION

Each region of Russia has its own natural-climatic and socio-economic features, unique peculiarities of the lifestyle of the population, certain social problems and social advantages [2]. The region of the North-Eastern Caucasus, which includes the Chechen Republic, the Republic of Ingushetia and the Republic of Dagestan, is no exception. The identification of the North-East Caucasus as a special region is due to both its geographical location and the closeness of culture, type of behavior, mentality, a single religion (mainly Islam), similar demographic characteristics [9].

Adolescence is one of the most difficult periods in the life of every person and requires special attention from the state, since during this period the formation intellectual, labor, and reproductive potential of the country is completed, and cardinal physiological and psychological changes in the child occur [1]. At the same time, against the background of an incompletely formed attitude towards a conscious relation to one's own health, and often noted low medical activity, adolescents frequently develop chronic pathology, and there is a rapid transition from acute forms of diseases to recurrent and chronic forms [8]. In this regard, studying the features of adolescent incidence in individual regions of the country contributes to the adoption of management decisions necessary for a given area, the development of treatment, preventive and social measures aimed at improving the health of young people.

## AIM

The aim of the study is to establish the characteristics of primary morbidity of adolescents living in the region of the North-Eastern Caucasus.

## MATERIALS AND METHODS

In the course of this study, official statistical reports and publications of the Federal State Statistics Service were analyzed, as well as the collections "Morbidity of the Russian child population (15–17 years old) with a diagnosis established for the first time in life" (Part IX) of the federal state budgetary institution "Russian Research Institute of Health" of the Ministry of Health of the Russian Federation for 2017–2021 [3–7]. Statistical processing of results and data analysis were carried out using the computer program Microsoft Office Excel and a software package for statistical analysis developed by StatSoft, STATISTICA10.0.

## RESULTS AND DISCUSSION

In 2021, primary morbidity rate among adolescents in the studied regions was: in the Republic of Dagestan — 1042,9, in the Republic of Ingushetia — 930,4 and in the Chechen Republic — 538,7 per 1000 children of the corresponding age. In the structure of primary morbidity, the first place in all three republics was occupied by diseases of the respiratory system, which accounted for 31,5% in the Republic of Dagestan, 46,7% in the Republic of Ingushetia, and 44,6% in the Chechen Republic (Table 1). In second place, but with a significantly lower share, in the Republic of Dagestan and the Republic of Ingushetia were injury, poisoning and certain other consequences of external causes, and in the Chechen Republic — diseases of the ear and mastoid process. The third place in the structure of primary incidence in the Republic of Ingushetia and the Chechen Republic was occupied by diseases of the eye and adnexa, and in the Republic of Dagestan — diseases of digestive system, while diseases of the eye and adnexa occupied fourth place.

Next in terms of share in the Republic of Dagestan were diseases of the genitourinary system, diseases of the skin and subcutaneous tissue, diseases of the ear and mastoid process, blood and blood-forming organs diseases and certain disorders involving the immune mechanism, endocrine, nutritional and metabolic diseases. The share of other classes of diseases in the morbidity structure accounted for less than 3%.

In the Republic of Ingushetia, fourth place belonged to diseases of the musculoskeletal system and connective tissue, fifth place went to diseases of the skin and subcutaneous tissue, followed by diseases of the digestive system, diseases of the ear and mastoid process, diseases of the genitourinary system, ninth-tenth place was shared by diseases of the nervous system and certain infectious and parasitic diseases.

In the structure of primary morbidity among adolescents of the Chechen Republic, fourth place was occupied by diseases of the genitourinary system, fifth place was taken by injury, poisoning and certain other consequences of external causes, followed by some infectious and parasitic diseases, diseases of the musculoskeletal system and connective tissue, blood and blood-forming organs diseases and certain disorders involving the immune mechanism, and diseases of the skin and subcutaneous tissue. Other classes of diseases had a share of less than 3%.

During the entire observation period (2017–2021), the level of primary morbidity among adolescents in all three republics of the North-Eastern Caucasus was below the national average (Fig. 1). At the same time, the lowest indicators of primary incidence were observed in the Chechen Republic, where the primary morbidity was 2,6–3,2 times lower than the Russian average.

The lower rates of primary incidence of adolescents in the Chechen Republic compared to the country as a whole in 2021 were largely due (Table 2) to diseases of the digestive system, the morbidity of which was 4,3 times lower, injury, poisoning and certain other consequences of external causes (–4,2 times), diseases of the skin and subcutaneous tissue (–3,6 times), respiratory diseases (–3,1 times), endocrine, nutritional and metabolic diseases (–2,5 times ), diseases of the musculoskeletal system and connective tissue (–2,4 times) and diseases of the nervous system (–2,3 times).

The most significant difference in the levels of primary incidence among adolescents in the Russian Federation as a whole and the Republic

*Table 1*

The structure of primary morbidity among adolescents in the republics of the North-Eastern Caucasus in 2021 (in %)

*Таблица 1*

Структура первичной заболеваемости подростков в республиках Северо-Восточного Кавказа в 2021 г. (в %)

| **Класс болезней по МКБ-10 / Class of diseases according to ICD-10** | **Республика Дагестан / The Republic of Dagestan** | | **Республика Ингушетия / The Republic of Ingushetia** | | **Чеченская Республика / Chechen Republic** | |
|---|---|---|---|---|---|---|
| | **удельный вес / specific gravity** | **ранговое место / rank place** | **удельный вес / specific gravity** | **ранговое место / rank place** | **удельный вес / specific gravity** | **ранговое место / rank place** |
| Болезни органов дыхания / Diseases of respiratory system | 31,5 | 1 | 46,7 | 1 | 44,6 | 1 |
| Травмы, отравления и некоторые другие последствия воздействия внешних причин / Injury, poisoning and certain other consequences of external causes | 12,8 | 2 | 6,7 | 2 | 6,5 | 5 |
| Болезни органов пищеварения / Diseases of digestive system | 9,0 | 3 | 5,9 | 6 | 2,4 | 11 |
| Болезни глаза и его придаточного аппарата / Diseases of the eye and adnexa | 8,2 | 4 | 6,6 | 3 | 8,2 | 3 |
| Болезни мочеполовой системы / Diseases of genitourinary system | 7,4 | 5 | 4,7 | 8 | 7,4 | 4 |
| Болезни кожи и подкожной клетчатки / Diseases of the skin and subcutaneous tissue | 6,8 | 6 | 6,1 | 5 | 3,2 | 9 |
| Болезни уха и сосцевидного отростка / Diseases of the ear and mastoid process | 5,6 | 7 | 5,1 | 7 | 8,5 | 2 |
| Болезни крови, кроветворных органов и отдельные нарушения, вовлекающие иммунный механизм / Blood and blood-forming organs diseases and certain disorders involving immune mechanism | 4,0 | 8 | 0,7 | 12–13 | 3,5 | 8 |
| Болезни эндокринной системы, расстройства питания и нарушения обмена веществ / Endocrine, nutritional and metabolic diseases | 3,9 | 9 | 0,7 | 12–13 | 2,1 | 12 |
| Болезни нервной системы / Diseases of the nervous system | 2,5 | 10–11 | 3,5 | 9–10 | 2,9 | 10 |
| Некоторые инфекционные и паразитарные болезни / Certain infectious and parasitic diseases | 2,5 | 10–11 | 3,5 | 9–10 | 4,7 | 6 |
| Болезни костно-мышечной системы и соединительной ткани / Diseases of the musculoskeletal system and connective tissue | 2,4 | 12 | 6,5 | 4 | 3,9 | 7 |
| COVID-19 | 1,2 | 13 | 1,7 | 11 | 0,4 | 13 |
| Прочие / Other | 2,2 | – | 1,6 | – | 1,7 | – |
| Итого / Total | 100,0 | – | 100,0 | – | 100,0 | – |

*Table 2*

Primary incidence of certain classes of diseases in adolescents (15–17 years old) of the Russian Federation as a whole and the republics of the North-Eastern Caucasus (per 1000 children aged 15–17) in 2021 and the difference in indicators (times)

*Таблица 2*

Первичная заболеваемость отдельными классами болезней подростков (15–17 лет) РФ в целом и республик Северо-Восточного Кавказа (на 1000 детей 15–17 лет) в 2021 г. и разница показателей (разы)

| Класс болезней по МКБ-10 / Class of diseases according to ICD-10 | Республика Дагестан (РД) / The Republic of Dagestan (RD) | Российская Федерация (РФ) / Russian Federation (RF) | РД/РФ / RD/RF | Республика Ингушетия (РИ) / The Republic of Ingushetia (RI) | Российская Федерация (РФ) / Russian Federation (RF) | РИ/РФ / RI/RF | Чеченская Республика (ЧР) / Chechen Republic (ChR) | Российская Федерация (РФ) / Russian Federation (RF) | ЧР/РФ / ChR/RF |
|---|---|---|---|---|---|---|---|---|---|
| Некоторые инфекционные и паразитарные болезни / Certain infectious and parasitic diseases | 26,0 | 27,5 | –1,1 | 32,3 | 27,5 | +1,2 | 25,2 | 27,5 | –1,1 |
| Болезни крови, кроветворных органов и отдельные нарушения, вовлекающие иммунный механизм / Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism | 41,9 | 7,6 | +5,5 | 6,6 | 7,6 | –1,2 | 19,1 | 7,6 | +2,5 |
| Болезни эндокринной системы, расстройства питания и нарушения обмена веществ / Endocrine, nutritional and metabolic diseases | 41,2 | 27,8 | +1,5 | 6,8 | 27,8 | –4,1 | 11,1 | 27,8 | –2,5 |
| Болезни нервной системы / Diseases of the nervous system | 25,5 | 35,5 | –1,4 | 32,0 | 35,5 | –1,1 | 15,8 | 35,5 | –2,3 |
| Болезни глаза и его придаточного аппарата / Diseases of the eye and adnexa | 85,0 | 54,3 | +1,6 | 60,9 | 54,3 | +1,1 | 44,1 | 54,3 | –1,2 |
| Болезни уха и сосцевидного отростка / Diseases of the ear and mastoid process | 58,3 | 31,2 | +1,9 | 47,4 | 31,2 | +1,5 | 45,8 | 31,2 | +1,5 |
| Болезни органов дыхания / Diseases of the respiratory system | 328,8 | 734,7 | –2,2 | 434,3 | 734,7 | –1,7 | 240,0 | 734,7 | –3,1 |
| Болезни органов пищеварения / Diseases of the digestive system | 94,2 | 55,0 | –1,7 | 54,8 | 55,0 | – | 12,8 | 55,0 | –4,3 |
| Болезни кожи и подкожной клетчатки / Diseases of the skin and subcutaneous tissue | 70,3 | 61,2 | +1,2 | 56,8 | 61,2 | –1,1 | 16,9 | 61,2 | –3,6 |
| Болезни костно-мышечной системы и соединительной ткани / Diseases of the musculoskeletal system and connective tissue | 25,3 | 49,1 | –1,9 | 60,8 | 49,1 | +1,2 | 20,9 | 49,1 | –2,4 |
| Болезни мочеполовой системы / Diseases of the genitourinary system | 77,3 | 50,9 | +1,5 | 44,0 | 50,9 | –1,2 | 40,0 | 50,9 | –1,3 |
| Травмы, отравления и некоторые др. последствия воздействия внешних причин / Injury, poisoning and certain other consequences of external causes | 133,2 | 147,1 | –1,1 | 60,9 | 147,1 | –2,4 | 34,8 | 147,1 | –4,2 |
| COVID-19 | 12,1 | 55,9 | ,4,6 | 15,8 | 55,9 | –3,5 | 2,2 | 55,9 | –25,4 |

*Table 3*

Dynamics of growth/decrease in the primary incidence of certain classes of diseases in adolescents (15–17 years old) in the republics of the North-Eastern Caucasus (per 1000 children aged 15–17) in the period from 2017 to 2021 (in %)

*Таблица 3*

Динамика роста/снижения первичной заболеваемости отдельными классами болезней подростков (15–17 лет) в республиках Северо-Восточного Кавказа (на 1000 детей 15–17 лет) в период с 2017 по 2021 гг. (в %)

| **Класс болезней по МКБ-10 / Class of diseases according to ICD-10** | **Республика Дагестан / The Republic of Dagestan** | | **Динамика в % / Dynamics in %** | **Республика Ингушетия / The Republic of Ingushetia** | | **Динамика в % / Dynamics in %** | **Чеченская Республика / Chechen Republic** | | **Динамика в % / Dynamics in %** |
|---|---|---|---|---|---|---|---|---|---|
| | **2017** | **2021** | | **2017** | **2021** | | **2017** | **2021** | |
| Некоторые инфекционные и паразитарные болезни / Certain infectious and parasitic diseases | 23,4 | 26,0 | +11,1 | 35,9 | 32,3 | –10,0 | 31,0 | 25,2 | –18,7 |
| Болезни крови, кроветворных органов и отдельные нарушения, вовлекающие иммунный механизм / Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism | 57,3 | 41,9 | –26,9 | 9,0 | 6,6 | –26,7 | 43,9 | 19,1 | –56,5 |
| Болезни эндокринной системы, расстройства питания и нарушения обмена веществ / Endocrine, nutritional and metabolic diseases | 53,3 | 41,2 | –22,7 | 10,8 | 6,8 | –37,0 | 8,3 | 11,1 | +33,7 |
| Болезни нервной системы / Diseases of the nervous system | 43,0 | 25,5 | –40,7 | 42,6 | 32,0 | –24,9 | 13,6 | 15,8 | +16,2 |
| Болезни глаза и его придаточного аппарата / Diseases of the eye and adnexa | 69,8 | 85,0 | +21,8 | 69,8 | 60,9 | –12,8 | 30,1 | 44,1 | +46,5 |
| Болезни уха и сосцевидного отростка / Diseases of the ear and mastoid process | 57,0 | 58,3 | +2,3 | 59,2 | 47,4 | –19,9 | 46,2 | 45,8 | –0,9 |
| Болезни органов дыхания / Diseases of the digestive system | 352,3 | 328,8 | –6,7 | 427,0 | 434,3 | +1,7 | 254,3 | 240,0 | –5,6 |
| Болезни органов пищеварения / Diseases of the digestive system | 118,3 | 94,2 | –20,4 | 75,8 | 54,8 | –27,7 | 17,8 | 12,8 | –28,1 |
| Болезни кожи и подкожной клетчатки / Diseases of the skin and subcutaneous tissue | 81,2 | 70,3 | –13,4 | 69,5 | 56,8 | –18,3 | 9,2 | 16,9 | +83,7 |
| Болезни костно-мышечной системы и соединительной ткани / Diseases of the musculoskeletal system and connective tissue | 32,6 | 25,3 | –22,4 | 74,9 | 60,8 | –18,8 | 4,3 | 20,9 | +386,1 |
| Болезни мочеполовой системы / Diseases of the genitourinary system | 82,8 | 77,3 | –6,4 | 61,8 | 44,0 | –28,8 | 18,5 | 40,0 | +116,2 |
| Травмы, отравления и некоторые др. последствия воздействия внешних причин / Injury, poisoning and certain other consequences of external causes | 153,4 | 133,2 | –13,2 | 69,6 | 60,9 | –12,5 | 30,1 | 34,8 | +15,6 |

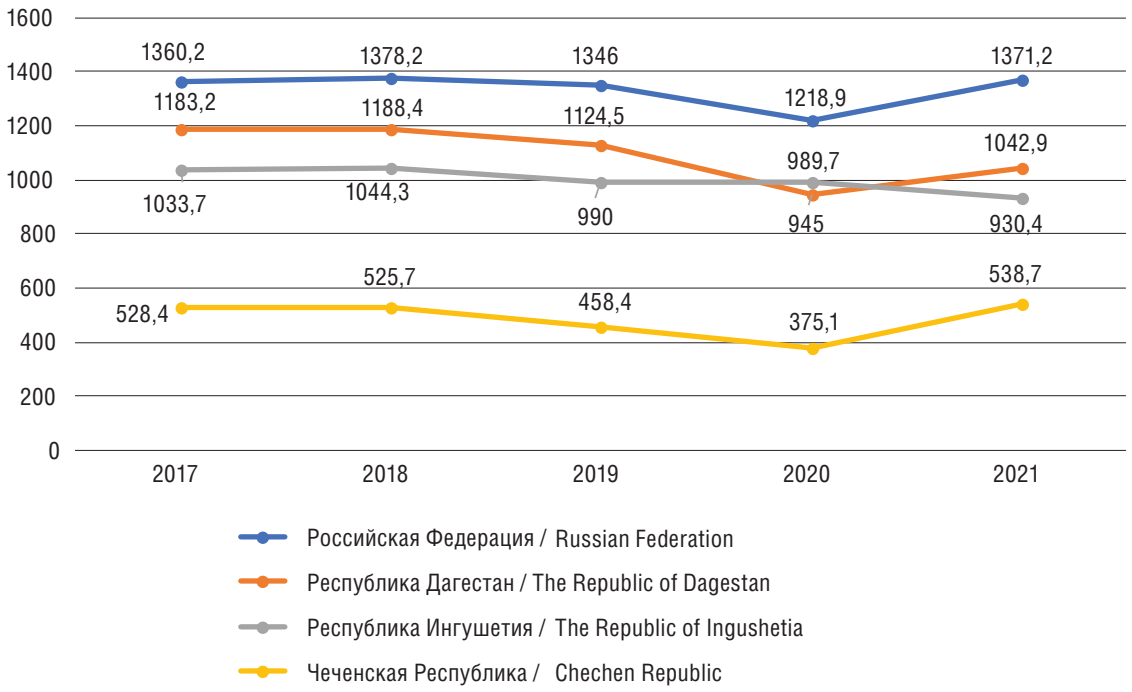


Fig.1. Dynamics of primary morbidity among adolescents in the Russian Federation as a whole and the republics of the North-Eastern Caucasus (per 1000 children aged 15–17)

Рис. 1. Динамика первичной заболеваемости подростков Российской Федерации в целом и республик Северо-Восточного Кавказа (на 1000 детей 15–17 лет)

of Dagestan was observed by classes: diseases of the respiratory system (–2,2 times), diseases of the musculoskeletal system and connective tissue (–1,9 times), diseases of the digestive system (–1,7 times) and diseases of the nervous system (–1,4 times).

In the Republic of Ingushetia, much lower indicators of primary morbidity in adolescents compared to the national average were recorded in the classes of endocrine, nutritional and metabolic diseases (–4,1 times), injury, poisoning and certain other consequences of external causes (–2,4 times), respiratory diseases (–1,7 times), diseases of the genitourinary system (–1,2 times).

At the same time, attention is drawn to the significantly higher primary incidence in adolescents of diseases of the blood and haemopoietic organs and certain disorders involving the immune mechanism in the Republic of Dagestan (+5,5 times) and the Chechen Republic (+2,5 times). In addition, it should be noted that all three republics of the North-Eastern Caucasus successfully coped with COVID-19 morbidity in adolescents in 2021, which made it possible to achieve one of the lowest rates in the country.

An analysis of the dynamics of primary incidence of adolescents showed (Fig. 1) that in the Republic of Dagestan and the Chechen Republic the dynamics of the indicator corresponded to that in Russia as a whole — a stable level of the indicator in 2017–2018, a slight decrease in 2019, a sharp decrease in 2020 and a significant increase in 2021 to the level of 2017. Unlike the Republic of Dagestan, the Chechen Republic and the country as a whole, the Republic of Ingushetia did not show a decrease in the indicator in 2020, but the decrease was revealed a year later — in 2021.

There is no doubt that the sharp decrease in morbidity in 2020 was due to the COVID-19 pandemic outbreak, which led to the introduction of a number of quarantine restrictions, a reduction in social contacts and the risk of the spread of infectious diseases, a decline in the volume of planned medical care, and a decrease in visits to medical organizations. The increase in incidence in 2021, obviously, was of a compensatory nature, when the first reaction to the emerging pandemic subsided somewhat and a number of measures taken allowed primary health and social care for children to be made

more accessible, and for the population to increase their access to medical organizations.

Comparative analysis of the dynamics of primary morbidity rates for certain classes of diseases in the period from 2017 to 2021 showed multidirectional dynamics for most classes of diseases (Table 3).

Thus, if over the past 5 years the primary incidence of endocrine, nutritional and metabolic diseases, diseases of the nervous system, diseases of the skin and subcutaneous tissue, diseases of the musculoskeletal system and connective tissue, diseases of the genitourinary system, injury, poisoning and certain other consequences of external causes in the Republic of Dagestan and the Republic of Ingushetia decreased, while in the Chechen Republic, on the contrary, it increased. The morbidity of certain infectious and parasitic diseases, diseases of the ear and mastoid process in the Republic of Ingushetia and the Chechen Republic decreased during this period, while in the Republic of Dagestan it increased. The incidence of diseases of the eye and adnexa increased in the Chechen Republic and the Republic of Dagestan, and decreased in the Republic of Ingushetia. The incidence of diseases of the respiratory system decreased in the Republic of Dagestan and the Chechen Republic, but increased in the Republic of Ingushetia. At the same time, in all three republics there was a decrease in the primary morbidity of blood and haemopoietic organs diseases and certain disorders involving the immune mechanism, and diseases of the digestive system.

The most significant changes in the period 2017–2021 occurred in the Chechen Republic: an increase in the primary incidence of adolescents with diseases of the musculoskeletal system and connective tissue by 386.1%, diseases of the genitourinary system — by 116.2%, diseases of the skin and subcutaneous tissue — by 83.7%, diseases of the eye and adnexa — by 46.5%, endocrine, nutritional and metabolic diseases — by 33.7% and a reduction in the morbidity of diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism, by 56.5%. In addition, the primary incidence of diseases of the nervous system in the Republic of Dagestan and endocrine, nutritional and metabolic diseases in the Republic of Ingushetia (37.0%) decreased very significantly (by 40.7%).

## CONCLUSION

1. The level of primary incidence among adolescents living in the republics of the North-Eastern Caucasus during 2017–2021 was below the national average, the lowest rates were noted in the Chechen Republic.

2. Each republic has its own characteristics of the morbidity structure, lower, compared to the average for the Russian Federation, indicators of primary incidence for most classes of diseases.

3. The republics of the North-Eastern Caucasus successfully coped with COVID-19 morbidity in adolescents and achieved some of the lowest rates in the country.

4. In 2017–2018 in all three republics there was a stable level of primary incidence of adolescents; in 2019 there was a slight decrease in the rate, and then in the Republic of Dagestan and the Chechen Republic there was a sharp decrease in 2020 and a significant increase in 2021, which corresponded to the dynamics in the country as a whole. At the same time, in the Republic of Ingushetia there was no decrease in the indicator in 2020; it occurred a year later — in 2021.

5. During the period under study, the dynamics of primary morbidity rates for certain classes of diseases had multidirectional dynamics for most classes of diseases — against the background of an increase in the indicator in one region, a decrease in another and vice versa was noted.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

**Competing interests.** The authors declare that they have no competing interests.

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## ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

**Вклад авторов.** Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку ста-

тьи, прочли и одобрили финальную версию перед публикацией.

**Конфликт интересов.** Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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# NARCOLOGISTS ABOUT THE PROBLEMS OF NARCOLOGICAL CARE SERVICES

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**ABSTRACT.** The article presents the results of a questionnaire of psychiatrists-narcologists aimed at revealing the main problems in the activities of narcological service. Based on an anonymous survey of 258 narcologists who work in state medical organizations providing narcological treatment in the subjects of the Russian Federation that are part of the North-Western, Southern, North Caucasian and Volga federal districts, analysis of problems in the sphere of organization of provision of appropriate medical care was made. Extensive and intensive coefficients were used to describe the results. In addition, Fisher's one-sided exact test was used to compare the obtained relative values. The results of the survey made it possible to single out five main groups of problems. The most significant turned out to be connected with that of organization of the provision of drug treatment and issues associated with low level of funding the service. Doctors note a wide range of issues, including those related to the operation of the medical information system, staff shortages, insufficient drug provision, functioning of "medical sobering-up stations" and others. More frequently respondents noted that the solution of the above mentioned problems is undoubted responsibility of the administration of various levels — starting with the administration of medical organizations up to executive authorities in the field of healthcare. The presented results indicate the urgent necessity to make managerial decisions that correspond to the content of these problems. An important aspect is to increase the amount of staffing of the service, as well as the necessity to draw attention to the problems of the narcological service both from the society and authorities.

**KEY WORDS:** survey of doctors; organization of drug treatment; survey of medical workers; problems of the narcological service; drug disorders; psychiatrists, narcologists.

# ВРАЧИ — ПСИХИАТРЫ-НАРКОЛОГИ О ПРОБЛЕМАХ НАРКОЛОГИЧЕСКОЙ СЛУЖБЫ

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**РЕЗЮМЕ.** В статье представлены результаты опроса врачей — психиатров-наркологов об основных проблемах в деятельности наркологической службы. На основании анонимного опроса 258 врачей — психиатров-наркологов, работающих в государственных медицинских организациях, оказывающих помощь по профилю «психиатрия-наркология», субъектов Российской Федерации, входящих в состав Северо-Западного, Южного, Северо-Кавказского и Приволжского федеральных округов, был проведен анализ проблем в организации оказания соответствующей медицинской помощи. Для описания результатов использовались экстенсивные и интенсивные коэффициенты. Кроме того, для сравнения полученных относительных величин использовался односторонний точный критерий Фишера. Результаты опроса позволили выделить пять основных групп проблем. Наиболее значимыми оказались организация оказания наркологической помощи и проблемы, связанные с низким уровнем финансирования службы. Врачи отмечают большой спектр проблем, в том числе связанных с работой медицинской информационной системы, дефицитом кадров, недостаточным лекарственным обеспечением, с организацией «медицинских вытрезвителей» и прочих. С большей частотой респонденты отмечали, что решение данных проблем лежит на администрации различного уровня — от администрации медицинских организаций до органов исполнительной власти в сфере здравоохранения. Представленные результаты указывают на необходимость принятия управленческих решений, соответствующих содержанию указанных проблем. Важным аспектом является увеличение кадрового обеспечения службы, а также необходимость привлечения внимания к проблемам наркологической службы как со стороны общественности, так и со стороны ведомств.

**КЛЮЧЕВЫЕ СЛОВА:** опрос врачей; организация наркологической помощи; опрос медицинских работников; проблемы наркологической службы; наркологические расстройства; врачи — психиатры-наркологи.

## INTRODUCTION

An important task today is to increase the attention and interest of employers in optimizing the quality of health care for the population, which cannot be realized without improving the working conditions of medical personnel [1]. One of the main mechanisms for assessing the satisfaction of doctors is receiving feedback from them on various aspects of medical care.

The need to study the opinions of specialists is primarily due to the growing staff shortage. Thus, during the period from 2018 to 2021, the number of psychiatrists-narcologists have a clear downward trend; during this period, their number decreased by 199 people [4].

As one of the tools for improving the quality of health care, medical-sociological monitoring is of particular importance in modern times. The survey of patients and medical workers is regulated by current legislation in the field of quality control of medical care. In particular, the Order of the Ministry of Health of Russia No. 785n dated July 31, 2020 “On the approval of the Requirements for the organization and conduct of internal quality control and safety of medical activities” mentions the possibility of the administration of a medical organization to get acquainted with the results of questionnaires and oral surveys of patients and (or) their legal representatives, family members of the patient, employees of a medical organization, as well as the

results of the analysis of complaints and appeals from citizens within the framework of scheduled and targeted inspections [3]. In addition, leading health care organizers, medical sociologists and researchers, such as academician of the Russian Academy of Sciences A.V. Reshetnikov, note the importance of feedback from all participants in the process of providing medical care in effective making appropriate management decisions [6]. This approach is carried out through medical and social study [5].

Despite this, the administration of healthcare organizations most often focuses on questionnaires of the patients, without conducting surveys of employees. In turn, patients' assessment of the medical care provided to them is often more subjective and based on the perception of ethical and deontological standards. In general, the results of surveys of healthcare personnel on their satisfaction with the system in which they work are presented less frequently than questionnaires of the patients [2, 7]. As a rule, surveys of medical specialists of various fields are aimed at using diagnostic and therapeutic measures in their practice.

Thus, the main aim of this study is to present an analysis of the results of a survey of psychiatrists-narcologists about the main problems in the system of organizing the provision of drug treatment.

## MATERIALS AND METHODS

The study the technology for diagnosing problems of the organization was applied, in accordance with which a "Problem Diagnostic Map" was developed. Respondents were asked to formulate the three most important, in their opinion, organizational problems, ranking them in order of importance to the provision of medical care. Next, it was necessary to analyze the state of the problems indicated by respondents according to the parameters proposed in the map: "What and how does this problem manifest itself?"; "Causes of the problem"; "What needs to be done to solve it (what actions to take)?"; "Who should do this?"; "What (who) hinders it?".

258 psychiatrists-narcologists were anonymously surveyed. All doctors work in state medical organizations providing health care in the profile of "psychiatry-narcology", located on the territory of the constituent entities of the Russian Federation (hereinafter referred to as RF), which are part of the North-Western (29,5%; n=76), Volga (37,5%; n=97), North Caucasus (17,1%; n=44) and Southern (15,9%; n=41) federal districts (hereinafter referred to as NWFD, VFD, NCFD, SFD, respectively). In total, specialists from 32 constituent entities of the Russian Federation took part in the questionnaire. The distribution of interviewed psychiatrists-narcologists by federal districts is shown in Figure 1. The doctors' work experience ranged from 2 months to 40 years.

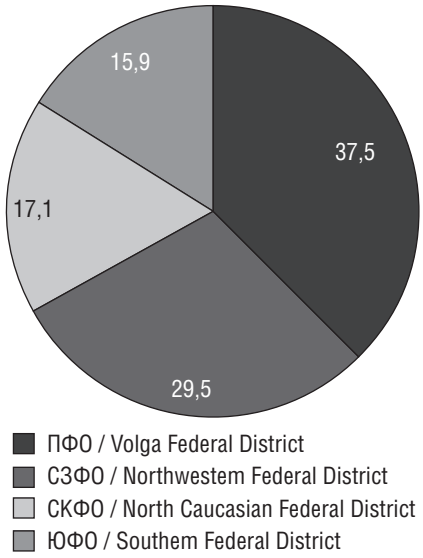


Fig. 1. Distribution of interviewed psychiatrists-narcologists by federal districts, %

Рис. 1. Распределение опрошенных врачей — психиатров-наркологов по федеральным округам, %

After processing and systematizing the collected information, a data array was obtained, which is described in this article using absolute and relative (extensive and intensive coefficients) values. One-sided Fisher's exact test was used to compare relative values.

## RESULTS

In general, respondents identified 498 problems of three levels of significance. Thus, all of the listed problems can be divided into 5 groups. The problems, as well as a description of their components, are presented in Table 1.

More than half of the surveyed respondents pointed to the organizational problems of the service (50,8%; n=131), the second place in the frequency of answers was the financing of the

*Table 1*

The main problems of the narcological service from the point of view of psychiatrists-narcologists

*Таблица 1*

Основные проблемы наркологической службы с точки зрения врачей — психиатров-наркологов

| Наименование проблемы / Name of the problem | Основные составляющие, входящие в данную категорию проблем / The main components of this group of problems |
|---|---|
| Кадровые проблемы / Personnel problems | Дефицит кадров, уровень подготовки кадров, условия труда (нагрузка, заработная плата, бумажная работа) / Shortage of personnel, level of training of personnel, working conditions (load, wages, paperwork) |
| Организационные проблемы / Organizational problems | Структура службы, вопросы организации деятельности службы, маршрутизация пациентов, преемственность в лечении, соблюдения требований действующих санитарных правил, наличие и удобство использования медицинской информационной системы (далее — МИС) / The structure of the service, issues of organizing the activities of the service, patient routing, continuity in treatment, compliance with the requirements of the current sanitary rules, the availability and ease of use of the medical information system |
| Проблемы, связанные с нормативно-правовыми аспектами / Regulatory Issues | Стандарты и порядки оказания помощи, межведомственное взаимодействие, юридические вопросы оказания медицинской помощи / Standards and procedures for providing assistance, interdepartmental interaction, legal issues of medical care |
| Финансовые проблемы службы / Financial problems of the service | Условия содержания больных, лекарственное обеспечение пациентов, условия работы врачей, оборудование для диагностики и лечения / Conditions for the upkeep of patients, their drug provision, working conditions for doctors, equipment for diagnostics and treatment |
| Стигматизация больных наркологического профиля и наркологической службы / Stigmatization of patients with narcological profile and narcological services | Отношение общества к больным с психическими расстройствами и расстройствами поведения, связанными с употреблением психоактивных веществ (далее — ПАВ) / The attitude of society towards patients with mental disorders and behavioral disorders associated with the consumption of psychoactive substances |

service (47,7%; n=123), the third place — personnel problems (41,1%; n=106). The smallest, but significant number of interviewed doctors pointed out problems associated with regulatory documentation and stigmatization by society of narcological patients and narcological care services in general — 35,7% (n=92) and 17.8% (n=46), respectively.

It is also important what significance the surveyed doctors attach to the problems they named. Thus, the most common of the issues identified by psychiatrists-narcologists is a problem in organizing the activities of the service. 26% (n=67) of respondents indicate it as a priority, 14,3% (n=37) — as a problem of moderately significant, and 10,5% (n=27) rated the problem as of little importance, but still affecting the quality of medical care (Fig. 2).

Financial problems of the service are the second most common response. At the same time, 20.9% (n=54) of respondents speak of it as a primary problem, 16,7% (n=43) a problem of medium significant, 10,1% (n=26) — of little importance, but still influential on the quality of health care.

Personnel problems were indicated by 41,1% of respondents (n=106), with 15,1% of respondents (n=39) highlighting it as a priority problem, 16,7% (n=43) marking this problem as of moderately significant, and 9,3% (n=24) noted it as the least important.

More than a third of doctors (35,5%; n=92) pointed out the regulatory issues of the activities of the narcological care service. At the same time, 16.3% (n=42) of respondents rated it as significant, 11,2% (n=29) as a problem as of moderate importance, and 8.1% (n=21) indicate this group as insignificant, but still affecting the quality of medical care.

Finally, problems related to stigmatization of patients with mental disorders and behavioral disorders associated with the consumption of psychoactive substances ranked fifth in frequency of responses. The structure of respondents'

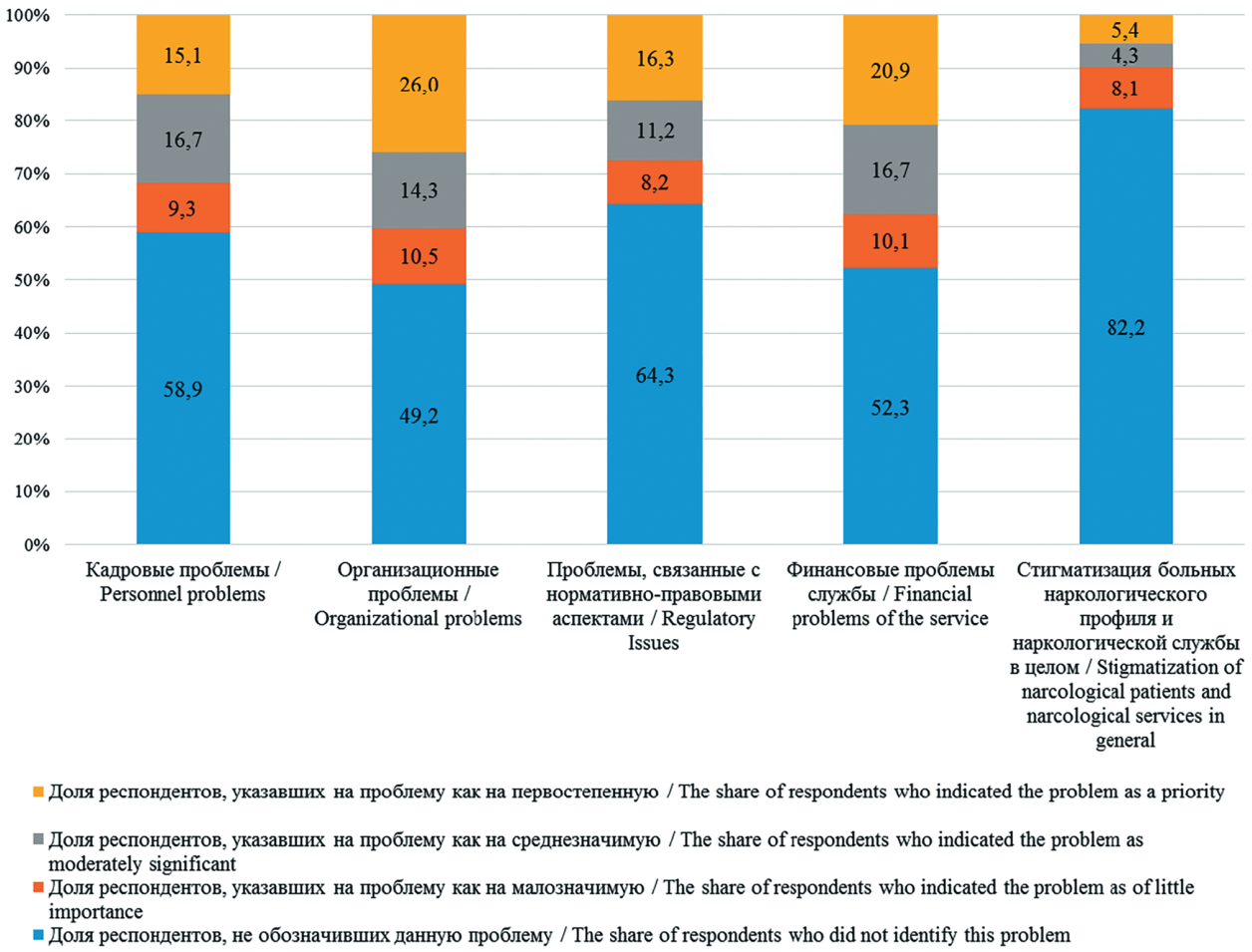


Fig. 2. Structural problems noted by psychiatrists-narcologists, by level of significance, %

Рис. 2. Структура проблем, отмеченных врачами — психиатрами-наркологами, по уровню значимости, %

answers according to the level of significance of these problems turned out to be as follows: 5.4% (n=14) of respondents talk about it as significant, 4,3% (n=11) as a problem of medium significance, and 8,1% (n=21) as of little importance, but influencing the quality of health care.

The distribution of problems stated by respondents, taking into account their level of significance, is presented in the diagram (Fig. 2).

## DISCUSSION

The most extensive group of problems are ***problems related to the organizational aspects of the activities of the narcological care service.***

The doctors surveyed point out difficulties in organizing the providing narcological assistance and meeting the standards of medical care in the «psychiatry-narcology» profile in conditions of insufficient space for the full deployment of all departments (8,5%; n=22). In addition, respondents highlight the following problems: lack of conditions for the development of a comprehensive rehabilitation system as the final stage of the treatment and rehabilitation process (3,1%; n=8); absence of labor workshops (2,3%; n=6); physicians note that during the period of remission, the patient cannot receive maintenance treatment due to preferential medication provision (5,4%; n=14), and also that after discharge from the hospital, patients cannot get a job and many patients have no housing (4,7%; n=12). Doctors also note that most drug rehabilitation centers are paid (1.2%; n=3). Psychiatrists-narcologists point to insufficient continuity and interaction with district physicians and social services (7%; n=18). 9% of respondents indicate the difficulties of organizing consultations with profile specialists, and transferring to other

medical facilities upon admission of patients with comorbidities (decompensated diabetes mellitus, traumatic brain injury, etc.) (8,9%; n=23). The problem of imperfection of the medical information system, which was pointed out by 15 surveyed doctors (5,8%), is due to the lack of options necessary for work, unstable operation and an overly complex interface (especially for older physicians and nurses). Thus, a number of doctors note that at the present stage, the medical information system *does not make work easier, but rather complicates it.* In addition, remoteness and inconvenient transport connections (n=10, 3,9%) are another problem, which was indicated by 3,9% of respondents (n=10), which is often the reason for the difficulty of providing narcological assistance.

The reasons for these problems, according to the respondents, are **often insufficient funding of services and lack of space and staff.**

Doctors also point to the problems of insufficient medication supply, especially modern drugs ("shortage of necessary medicines, forced to use alternative treatments"), and their untimely delivery (20,9%; n=54). 15,9% of respondents say that the facilities are underequipped with diagnostic equipment and consumables (n=41). Physicians also noted the lack of financial resources to expand the number of rehabilitated and insufficiency of improving the conditions for the upkeep of patients (lack of repair, absence of split systems, etc.), 22 doctors (8,5%) answered this way. Another cost item that is often underfunded, according to respondents, is the maintenance of high-tech diagnostic laboratory equipment (2,3%; n=6).

The next most frequently answered problem is personnel. There is a shortage of psychiatrists-narcologists, especially in district medical offices (14,3%; n=37); high level of workload on doctors (8,1%; n=21), which is expressed in large service areas, working for more than 1 rate and maintaining a large volume of documentation (duplication of electronic and paper documentation, annual increase in requests from the prosecutor's office, the Federal Penitentiary Service, courts, all levels of the Ministry of Internal Affairs) (865%; n=22). In addition, 13 narcologists indicated work-related emotional burnout (5%). Doctors often mentioned the lack of young professionals in the service, which may be due to the low prestige of the specialty and often the fact that these specialists, after working for several years, go to *private medical organizations* (5%; n=13).

According to respondents, the reasons for this block of problems are the following: low wages, changes in the educational system and the increasing complexity of training specialists, insufficient funding of the service, as well as the lack of prestige of the profession and the high emotional load in work.

The fourth group of problems is related to the **current regulatory and legal documentation that ensures the work of the narcological care service.** The interviewed specialists associate difficulties in implementing clinical recommendations and standards of medical care with excessive workload (9,7%; n=25), insufficient material and technical base (7,8%; n=20), as well as with imperfect regulatory framework (9,7%; n=25). On the one hand, doctors talk about the possibility of patients refusing to be placed in a dispensary observation (which is equivalent to refusing treatment in state medical organizations in the profile of "psychiatry-narcology"), since this entails difficulties in finding employment, determining professional suitability for certain categories, and on the other hand, they complain about the lack of possibility of organizing treatment if indicated without the consent of patients if relatives wish.

Another frequently mentioned problem, indicated by 5,4% of respondents (n=14), is the organization of "medical sobering-up stations". Hospitalization to the emergency department of intoxicate persons who have lost the ability to move or navigate their environment, in most cases, according to respondents, is not justified, because these persons do not require specialized medical care, but only outside observation is sufficient. *The organization of such of "sobering-up stations"* on the territory of narcological dispensaries is also, according to doctors, not rational, for the same reason. The same group also mentions the problem of the complexity of interaction with law enforcement agencies: unreasonable requests, non-legal requirements for information about patients (3,1%; n=8).

The last, smallest group of problems is the problem associated with the **stigmatization by society of narcological patients and narcological care services in general.** In this group, doctors noted the following problematic issues: denial of the disease by both patients and patients' relatives (3,1%; n=8), fear of social con-

sequences (loss of rights, work, etc.), refusal of health care in state institutions due to social consequences after the establishment of dispensary observation (10,5%; n=27), low level of public confidence when first visiting a psychiatrist-narcologist (1,2%; n=3), insufficient education of the population (0,8%; n=2), delayed seeking medical help, ignoring doctor's appointments, late start of treatment, low motivation to start and continue therapy (especially at the outpatient stage) (0,8%; n=2). Problems of deontology deserve special attention—the relationship between doctor and patient, doctor and the patient's relatives (1.6%; n=4). Physicians note that assessing to medical workers sometimes begins with threats, complaints and statements. Patients and their relatives in some cases interfere with the treatment process and communicate in a rude manner. The reasons for this group of problems may be a low level of public awareness about the peculiarities of the provision of medical care, the rights and responsibilities of patients, stereotypes of public opinion about substance use disorder, imperfections in the regulatory framework, as well as the hushing up difficulties.

In addition to analyzing the problems pointed out by doctors, special attention should be given to assessing the opinions of specialists regarding who is able to solve these problems, as well as the reasons why these problems have not yet been solved.

Statistical analysis using one-sided Fisher's exact test showed with significance p=0,001 that, from the point of view of doctors, most of the problems of the narcological care service should be resolved by chief physicians (n=66) and executive authorities of different levels (n=299). Thus, in 73,3% (n=365) of cases, the solution to all problems, according to respondents, lies *with the administration of various levels.* And if in the case of problems associated with the structure of the service (21,5%; n=107), the regulatory framework (13,7%; n=68) and the workload (16.7%; n=83) this is justified, then when it comes to the reluctance of doctors themselves to make efforts for self-development (3,8%; n=19), this looks like a desire to shift responsibility to others.

It is important that 92 psychiatrists-narcologists (18,5%) indicated that they did not know who should solve these problems (most of them could not formulate the cause of the problem (10,2%; n=51)).

15,3% (n=38) of respondents indicate that the difficulties of narcological care services are ignored, both in society as a whole and at the level of executive and legislative authorities at various levels. Thus, 13,3% (n=33) of surveyed physicians talk about the need to adjust the legislative framework. Only 7,3% (n=18) say that there are no obstacles to solving these problems.

## CONCLUSION

1. With the highest frequency, psychiatrists-narcologists noted problems in organizing the provision of medical care in the "psychiatry-narcology" profile, as well as those related to the financing of the service.
2. Most often, doctors noted that solving problems lies with the administration at various levels.
3. According to the experts interviewed, the difficulties of organizing "medical sobering-up stations" are relevant.
4. Personnel shortage is the main reason for the increasing load on specialists working in the narcological care services, according to respondents' answers. In addition, doctors note that young specialists prefer to work in private medical organizations, and therefore the service is not replenished by personnel.
5. An important aspect is that, according to a significant number of doctors, medical information system currently complicates ongoing work.
6. The priority problem is insufficient funding of the service. Increased funding may be the key to solving many of the identified challenges.
7. It is important that the problems indicated by psychiatrists-narcologists may not be specific to the profile of "psychiatry-narcology", and the results of this study can be applied to most branches of medicine.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisi-tion, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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# SOME ASPECTS OF METHODOLOGICAL SOLUTIONS IN ASSESSING THE LEVEL OF MATERNAL MORTALITY AT THE REGIONAL LEVEL

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**ABSTRACT.** The purpose of the work is to consider some aspects of the application of the methodology for calculating and comparative analysis of maternal mortality in Smolensk region in comparison with that at the federal level. Statistical and analytical methods were applied, two methods were used to "align" the dynamic series in the study of maternal mortality rates for 25 years, from 1995 to 2019. Sufficiency of calculating a moving average over 3 points to equalize maternal mortality rates at the federal level is demonstrated. For indicators at the regional level, where the absolute values of maternal deaths vary from 1 to 7 per year, alignment over at least 5 years is required using an informed moving average calculation. Specific examples to approve efficiency of application of the ICD-10 recommendations for the publication of maternal mortality rates in order to improve their analysis are applied.

**KEY WORDS:** maternal mortality; the method of «leveling the dynamic series».

# НЕКОТОРЫЕ АСПЕКТЫ МЕТОДОЛОГИЧЕСКИХ РЕШЕНИЙ ПРИ ОЦЕНКЕ УРОВНЯ МАТЕРИНСКОЙ СМЕРТНОСТИ НА РЕГИОНАЛЬНОМ УРОВНЕ

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**РЕЗЮМЕ.** Цель работы — рассмотреть некоторые аспекты применения методологии расчета и сравнительного анализа показателей материнской смертности в Смоленской области в сопоставлении с федеральным уровнем. Применены статистический и аналитический методы, две методики «выравнивания» динамического ряда при изучении показателей материнской смертности за 25 лет, с 1995 по 2019 гг. Показана достаточность расчета скользящей средней по трем точкам для выравнивания показателей материнской смертности на федеральном уровне. Для показателей регионального уровня, когда абсолютные значения случаев материнской смерти варьируют от 1 до 7 за год, требуется выравнивание не менее чем за 5 лет с помощью расчета взвешенной скользящей средней. На конкретных примерах рассмотрено применение рекомендаций МКБ-10 по опубликованию показателей материнской смертности с целью улучшения их анализа.

**КЛЮЧЕВЫЕ СЛОВА:** материнская смертность; методика «выравнивания» динамического ряда.

## INTRODUCTION

The merger of the maternity hospital and antenatal clinic in the Soviet Union in 1949 made it possible to ensure continuity in the provision of obstetric and gynecological care for pregnant women, women in labor and postpartum women. The obligatory nature of work for the working-age population that existed in the Soviet period (criminal liability was provided for parasitism), the need for pregnant women to obtain a certificate of incapacity for work at the antenatal clinic in a timely manner, patronage health care of pregnant women and a number of other features made it possible to provide almost complete coverage of pregnant women, women in labor and postpartum with medical supervision and provision of medical care. In this established system, the demographic of maternal mortality (MM) ratio largely served as a criterion for the quality of obstetric services. It was calculated based on summary reports of medical institutions of administrative territories and the country as a whole [3]. At the same time, the MM indicator was included in the section of the main ones characterizing the work of the obstetric and gynecologic services. There was no annual open publication of statistical information on the state of health care and population health. Until the mid-80s of the 20th century, MM was calculated as the ratio of maternal deaths per 1000 births [3]. With the formation of the Federal State Statistics Service (Rosstat) in 1991, changes were adopted in the methodology for calculating the indicator per 100,000 live births. Information has become publicly available, traditionally describing the work of the obstetric and gynecologic services. In the Smolensk region, MM rates have been published annually in the statistical collections “State of healthcare and health of the population of the Smolensk region” in the section “obstetric and gynecologic services” since 1995, and since 2000 the information has been presented on the website of the Smolensk Regional Medical Information and Analytical Center (SOMIAC). In 1999, “International Statistical Classification of Diseases and Related Health Problems, 10th Revision” (ICD-10) was introduced into healthcare practice throughout the country by order of the Ministry of Health of the Russian Federation dated May 27, 1997 No. 170. The second volume of ICD-10 provides not only a definition of maternal mortality, but also recommendations on the methodology for calculating MM indicators, presenting statistical data, and analyzing rates. As for the definition and methodology for calculating the MM indicator, they began to be used in Russia before the introduction of ICD-10, ensuring data comparability starting in 1991. At the same time, by 2019, in more than a third of Russian regions (32), no cases of MM were registered, and in a number of regions the rate was several times higher than the Russian level ($9{,}0^0/_{0000}$), including in the Smolensk Region ($28{,}2^0/_{0000}$) — 3 times [10].

## AIM

The aim of the work is to consider some aspects of the application of the methodology for calculating and comparative analysis of maternal mortality rates in the Smolensk Region in comparison with that at the federal level.

## MATERIALS AND METHODS

MM indicators in the Smolensk Region were analyzed in comparison with the federal

level for 25 years: from 1995 (the appearance of annual open regional reporting) to 2019 (before the start of the COVID-19 pandemic). The source of statistical information is Rosstat (https://rosstat.gov.ru), SOMIAC (https://somiac.ru/s_medstat.htm) and printed and electronic publications of statistical collections "State of healthcare and health of the population of the Smolensk Region" [4–8, 11–17].

Two methods of "leveling" ("smoothing") the time series were used: calculating a moving average over three points and calculating a weighted moving average (over five points) [9]. Counting a three-point moving average ($\tilde{y}_i$) allows you to replace each level ($y_i$) with the average value of this level and two adjacent ones ($y_{i-1}$ и $y_{i+1}$), i.e. the system 123 234 345 is used, etc.:

$$\tilde{y}_i\,(3) = (y_{i-1} + y_i + y_{i+1}) : 3 \quad \text{(formula 1)}.$$

Using formula 1, a moving average of the MM indicator in Russia for 1996 was calculated $\tilde{y}_2 = (y_1 + y_2 + y_3) : 3 = (53{,}3 + 48{,}9 + 50{,}2) : 3 = 50{,}8$. By the same formula, rates for subsequent years up to and including 2018 were computed. Formula 1 is not suitable for calculating the aligned values of the first ($\tilde{y}_1$) and last levels ($\tilde{y}_{25}$). To count them, another formula was used:

$$\tilde{y}_1 = (7 \cdot y_1 + 4 \cdot y_2 - 2 \cdot y_3) : 9 \quad \text{(formula 2)}.$$

When computing the first level (1995), we received:

$$\tilde{y}_1 = (7 \cdot y_1 + 4 \cdot y_2 - 2 \cdot y_3) : 9 = (7 \cdot 53{,}3 + 4 \cdot 48{,}9 - 2 \cdot 50{,}2) : 9 = 52{,}0^*.$$

Using formula 2, the last level is also calculated (in our study, 2019 is $\tilde{y}_{25}$), while the points of the series are counted from the end:

$$\tilde{y}_{25} = (7 \cdot y_{25} + 4 \cdot y_{24} - 2 \cdot y_{23}) : 9 = (7 \cdot 9{,}0 + 4 \cdot 9{,}1 - 2 \cdot 8{,}8) : 9 = 9{,}1^*.$$

The method of calculating a weighted moving average using five points is recommended with strong fluctuations of indicators. It includes three formulas: for calculating a five-point moving average, the first and last levels of the indicator ($y_1$, $y_{25}$), the second and penultimate levels ($y_2$, $y_{24}$).

The formula used to calculate the moving average is:

$$\tilde{y}_i = (y_{i-2} + 2 \cdot y_{i-1} + 4 \cdot y_i + 2 \cdot y_{i+1} + y_{i+2}) : 10 \quad \text{(formula 3)}.$$

Using formula 3, we compute the MM in the Smolensk Region for 1997 ($\tilde{y}_3$):

$$\tilde{y}_3 = (y_1 + 2 \cdot y_2 + 4 \cdot y_3 + 2 \cdot y_4 + y_5) : 10 = (63{,}7 + 2 \cdot 56{,}2 + 4 \cdot 24{,}3 + 2 \cdot 24{,}7 + 67{,}3) : 10 = 39{,}0.$$

According to the same formula, indicators in the Smolensk Region were calculated for subsequent years up to 2017 inclusive.

To calculate the first and last levels, the formula is used:

$$\tilde{y}_1 = (7 \cdot y_1 + 5 \cdot y_2 - y_3 - y_4) : 10 \quad \text{(formula 4)}.$$

In our study, the first level is 1995 ($\tilde{y}_1$), the last level is 2019 ($\tilde{y}_{25}$). Using formula 4, we compute:

$$\tilde{y}_1 = (7 \cdot y_1 + 5 \cdot y_2 - y_3 - y_4) : 10 = (7 \cdot 63{,}7 + 5 \cdot 56{,}2 - 24{,}3 - 24{,}7) : 10 = 67{,}8^{**};$$

$$\tilde{y}_{25} = (7 \cdot y_{25} + 5 \cdot y_{24} - y_{23} - y_{22}) : 10 = (7 \cdot 28{,}2 + 5 \cdot 12{,}9 - 11{,}6 - 10{,}3) : 10 = 24{,}0^{**}.$$

To calculate the second and penultimate levels we use the formula:

$$\tilde{y}_2 = (3 \cdot y_1 + 5 \cdot y_2 + y_3 + y_4) : 10 \quad \text{(formula 5)}.$$

In our work, the second level is 1996 ($\tilde{y}_2$), the penultimate level is 2018 ($\tilde{y}_{24}$). Using formula 5, we compute:

$$\tilde{y}_2 = (3 \cdot y_1 + 5 \cdot y_2 + y_3 + y_4) : 10 = (3 \cdot 63{,}7 + 5 \cdot 56{,}2 + 24{,}3 + 24{,}7) : 10 = 52{,}1^{***};$$

$$\tilde{y}_{24} = (3 \cdot y_{25} + 5 \cdot y_{24} + y_{23} + y_{22}) : 10 = (3 \cdot 28{,}2 + 5 \cdot 12{,}9 + 11{,}6 + 10{,}3) : 10 = 17{,}1^{***}.$$

To assess the reliability of the difference between the compared indicators, the Student's t-test was calculated.

*Table 1*

Maternal mortality in the Russian Federation for 1995–2019 (per 100,000 live births, in $^{0}/_{0000}$)

*Таблица 1*

Материнская смертность в Российской Федерации за 1995–2019 годы (на 100 000 живорожденных, в $^{0}/_{0000}$)

| Год / Year | Материнская смертность / Maternal mortality | | Скользящая средняя (3 точки) — $\tilde{y}_i$ (3) / Moving average (3 points) — $\tilde{y}_i$ (3) | Год / Year | Материнская смертность / Maternal mortality | | Скользящая средняя (3 точки) — $\tilde{y}_i$ (3) / Moving average (3 points) — $\tilde{y}_i$ (3) |
|---|---|---|---|---|---|---|---|
| | $^{0}/_{0000}$ | порядковый уровень (y) / ordinal level (y) | | | $^{0}/_{0000}$ | порядковый уровень (y) / ordinal level (y) | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1995 | 53,3 | $У_1$ | ***52,0**** | 2008 | 20,7 | $У_{14}$ | 21,6 |
| 1996 | 48,9 | $У_2$ | 50,8 | 2009 | 22,0 | $У_{15}$ | 19,7 |
| 1997 | 50,2 | $У_3$ | 47,7 | 2010 | 16,5 | $У_{16}$ | 18,2 |
| 1998 | 44,0 | $У_4$ | 46,1 | 2011 | 16,2 | $У_{17}$ | 14,7 |
| 1999 | 44,2 | $У_5$ | 42,6 | 2012 | 11,5 | $У_{18}$ | 13,0 |
| 2000 | 39,7 | $У_6$ | 40,1 | 2013 | 11,3 | $У_{19}$ | 11,2 |
| 2001 | 36,5 | $У_7$ | 36,6 | 2014 | 10,8 | $У_{20}$ | 10,7 |
| 2002 | 33,5 | $У_8$ | 34,0 | 2015 | 10,1 | $У_{21}$ | 10,3 |
| 2003 | 31,9 | $У_9$ | 29,6 | 2016 | 10,0 | $У_{22}$ | 9,6 |
| 2004 | 23,4 | $У_{10}$ | 26,9 | 2017 | 8,8 | $У_{23}$ | 9,3 |
| 2005 | 25,4 | $У_{11}$ | 24,3 | 2018 | 9,1 | $У_{24}$ | 9,0 |
| 2006 | 23,7 | $У_{12}$ | 23,7 | 2019 | 9,0 | $У_{25}$ | ***9,1**** |
| 2007 | 22,0 | $У_{13}$ | 22,1 | | | | |

## RESULTS

Table 1 presents MM rates in the Russian Federation for the period from 1995 to 2019.

Columns 2 and 6 of this table contain indicators from official sources of statistical information [10]. It should be noted that MM levels fluctuated both upward and downward over 25 years. Thus, in 1995, the MM indicator was $53,3^{0}/_{0000}$, in 1996 it decreased to $48,9^{0}/_{0000}$, in 1997 it increased to $50,2^{0}/_{0000}$, etc. To determine the general trend in the dynamics of maternal mortality rates in Russia, a simple method of "smoothing" the dynamic series was used through a moving average over three numbers (points) [9]. The equalized maternal mortality indicators are recorded in columns 4 and 8 of Table 1.

As data in these columns show, the use of a simple method of "leveling" the dynamic series made it possible to identify a clear annual downward trend in MM indicators in Russia, almost 6 times from 1995 ($52,0^{0}/_{0000}$) to 2019 ($9,1^{0}/_{0000}$).

To establish the trend in maternal mortality in the Smolensk Region, 2 methods of "smoothing" the dynamic series were used: calculating a moving average using three points and calculating a weighted moving average (using five points). Column 4 of Table 2 presents the results obtained by computing the moving average over three points, i.e. for 1996–2018 according to formula 1, for 1995 and 2019 — according to formula 2.

However, when using the "smoothing" technique over three points, a significant variation in maternal mortality remains — the indicator either increases or decreases by 2 times or more. That is why the second method was used — calculating a weighted moving average over five points.

The equalized values of MM rates in the Smolensk Region are recorded in column 5 of Table 2. Thus, when averaging over a five-year period, we obtain fluctuations in the MM indicator within smaller limits. And since 2000, there has been a tendency for the MM rate in the Smolensk Region to decrease almost 3 times, from 68,8 to $24,0^{0}/_{0000}$ by 2019. However, in general, regional indicator levels exceed federal levels.

When assessing the reliability of the actual levels of maternal mortality in Russia by year,

*Table 2*

Maternal mortality in the Smolensk region for 1995–2019 (per 100,000 live births in $^{0}/_{0000}$)

*Таблица 2*

Материнская смертность в Смоленской области за 1995–2019 годы (на 100 000 живорожденных в $^{0}/_{0000}$)

| Год / Year | Материнская смертность / Maternal mortality | | Скользящая средняя (3 точки) — $\tilde{y}_i$ (3) / Moving average (3 points) — $\tilde{y}_i$ (3) | Взвешенная скользящая средняя — $\tilde{y}_i$ / Weighted moving average — $\tilde{y}_i$ |
|---|---|---|---|---|
| | $^{0}/_{0000}$ | порядковый уровень (y) / ordinal level | | |
| 1 | 2 | 3 | 4 | 5 |
| 1995 | 63,7 | $У_1$ | ***69,1**** | ***67,8***** |
| 1996 | 56,2 | $У_2$ | 48,1 | ***52,1***** |
| 1997 | 24,3 | $У_3$ | 35,1 | 39,0 |
| 1998 | 24,7 | $У_4$ | 38,8 | 43,1 |
| 1999 | 67,3 | $У_5$ | 61.5 | 60,1 |
| 2000 | 92,5 | $У_6$ | 77,7 | 68,8 |
| 2001 | 73,4 | $У_7$ | 59,4 | 59,3 |
| 2002 | 12,1 | $У_8$ | 36,2 | 35,7 |
| 2003 | 23,1 | $У_9$ | 19,4 | 25,9 |
| 2004 | 22,9 | $У_{10}$ | 23,1 | 21,9 |
| 2005 | 23,3 | $У_{11}$ | 23,0 | 22,9 |
| 2006 | 22,9 | $У_{12}$ | 22,5 | 25,4 |
| 2007 | 21,2 | $У_{13}$ | 31,5 | 28,3 |
| 2008 | 50,3 | $У_{14}$ | 33,4 | 35,3 |
| 2009 | 28,6 | $У_{15}$ | 36,0 | 34,3 |
| 2010 | 29,2 | $У_{16}$ | 35,6 | 34,1 |
| 2011 | 48,8 | $У_{17}$ | 32,5 | 35,9 |
| 2012 | 19,5 | $У_{18}$ | 35,5 | 30,0 |
| 2013 | 38,0 | $У_{19}$ | 25,5 | 29,8 |
| 2014 | 19,1 | $У_{20}$ | 25,7 | 22,2 |
| 2015 | 20,1 | $У_{21}$ | 16,5 | 18,9 |
| 2016 | 10,3 | $У_{22}$ | 14,0 | 13,7 |
| 2017 | 11,6 | $У_{23}$ | 11,6 | 14,1 |
| 2018 | 12,9 | $У_{24}$ | 17,6 | ***17,1**** |
| 2019 | 28,2 | $У_{25}$ | ***25,1**** | ***24,0***** |

statistically significant differences ($p < 0,001$) over 25 years were established only for three time periods when the rates decreased significantly: in 2004 ($23,4^{0}/_{0000}$) compared to 2003 ($31,9^{0}/_{0000}$), in 2010 compared to 2009 (16,5 and $22,0^{0}/_{0000}$, respectively) and in 2012 compared to 2011 (11.5 and $16,2^{0}/_{0000}$, respectively).

It is noteworthy that in the Smolensk Region, despite pronounced fluctuations in MM indicators, no statistically significant differences were found either when comparing regional indicators by year over 25 years, or when comparing regional with federal levels ($p > 0,001$). The current problem of statistical reliability of the compared indicators, especially at the level of the constituent entity of the Russian Federation, is due to the small size of the researched population.

The methodology for calculating and publishing MM rates in accordance with ICD-10 suggests always indicating the numerator (the

*Table 3*

Presentation of statistical information necessary for calculation and analysis of maternal mortality rates

*Таблица 3*

Представление статистической информации, необходимой для расчета и анализа показателей материнской смертности

| Год / Year | Число случаев материнской смерти в РФ / The number of cases of maternal death in the Russian Federation | Число родившихся в РФ / The number of people born in the Russian Federation | Показатель МС в РФ, $^0/_{0000}$ / MDR indicator in the Russian Federation, $^0/_{0000}$ |
|---|---|---|---|
| 2007 | 354 | 1 610 122 | 22,0 |
| 2008 | 354 | 1 713 947 | 20,7 |
| 2017 | 149 | 1 690 307 | 8,8 |
| 2018 | 146 | 1 604 344 | 9,1 |

number of registered cases of MM), as well as the denominator used to calculate the MM indicator, i.e. number of live births or total number of births [1]. In fact, this presentation of the indicator makes it possible to assess the "contribution" to the level of maternal mortality of a decrease or increase in the absolute value of cases of MM and the absolute number of births (or live births). Thus, in Russia from 1995 to 2019, the number of maternal deaths decreased by 5,4 times, from 727 to 134. At the same time, the number of births increased by 1,54 times in the period from 2000 (1 266 800) to 2014 (1 942 683). And from 2014 to 2019, the number of births decreased by 1,34 times (from 1 942 683 to 1 481 074, respectively). Table 3, as an example, shows selected data for the Russian Federation for the years 2007–2008 and 2017–2018 on presentation of statistical information necessary for calculation and analysis of MM.

It should be noted that with the same absolute number of MM cases in 2007 and 2008 (354 each), the MM indicator level decreased from 22,0 to $20,7^0/_{0000}$ due to an increase in the number of births. And in 2018, the MM rate ($9,1^0/_{0000}$) was higher compared to 2017 ($8,8^0/_{0000}$), although the absolute number of cases of MM decreased from 149 in 2017 to 146 in 2018, which is explained by a decrease in the number of births.

The pronounced fluctuation in MM rates in the Smolensk Region is due to the small number of cases of maternal death against the backdrop of a reduction in the number of births. For the period from 1995 to 2019, the highest level ($92,5^0/_{0000}$) corresponds to 7 cases of MM in 2000. Moreover, when the case of death is 1 (2016–2018), due to a decrease in the number of births in the region, the level of MM indicators is various and is 10,3, 11,6 and $12,9^0/_{0000}$, respectively.

## CONCLUSION

Since the moment of public openness, MM indicators have been characterized by upward and downward deviations; particularly pronounced fluctuations in MM levels are observed at the regional level. To identify trends when studying maternal mortality, it is possible to use the technique of "leveling" dynamic series. Moreover, if at the federal level the alignment of indicators is achieved by calculating a moving average over three years, then at the regional level — at least over five points (in 5 years). In general, during the period from 1995 to 2019, some success was made in reducing MM rates at the federal and regional levels.

A comparison of regional indicators by year and against the national level can be supplemented by assessing the reliability of the difference in the compared values and reflecting this information in regional reporting.

When publishing MM indicators, it is advisable to indicate not only the calculated rates, but also the absolute values of the numerator and denominator to identify their "contribution" to the level of the indicator for each year studied.

The development of software with an algorithm for computing the moving average, reliability and presentation of materials on maternal mortality in accordance with the recommendations of ICD-10 will improve the analysis of such a significant social phenomenon as maternal mortality, and present this indicator in statistical collections as a separate table in the demography (population) section.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

**Competing interests.** The authors declare that they have no competing interests.

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# SURVEY OF DOCTORS ON PREVENTION, SCREENING AND WAYS OF ROUTING OF PATIENTS WITH MALIGNANT SKIN NEOPLASMS

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**ABSTRACT.** Malignant neoplasms of the skin ranks one of the leading places in the overall structure of oncological morbidity in the Russian population, second only to breast cancer. In 2021, there were 7.82 cases of melanoma and 46.93 cases of non-melanoma skin cancer per 100,000 population. Dermatovenerologists, general practitioners, therapists, as well as doctors of other medical specialties in their daily practice are faced with malignant skin tumors. The aim of our research was to study the awareness of doctors of various specialties, as well as people without higher medical education, about the risk factors and prevention of malignant skin tumors, as well as about the patient routing paths. We interviewed doctors of various medical specialties and people without a higher medical education regarding risk factors and prevention of malignant skin tumors, as well as patient routes. The median of correct answers was 16 out of 22 (72.7%). Only 4 out of 463 people answered all questions correctly (0.9%, 95% CI 0.24–2.2). Most often, incorrect answers were given to questions related to screening. It seems appropriate to include questions on organizational measures to reduce the burden of melanoma incidence in training programs for doctors who face skin tumors in their practice, as well as specialists of healthcare organization and public health.

**KEY WORDS**: survey; prevention; malignant neoplasms of the skin; screening; routing.

# ОПРОС ВРАЧЕЙ О ПРОФИЛАКТИКЕ, СКРИНИНГЕ И ПУТЯХ МАРШРУТИЗАЦИИ ПАЦИЕНТОВ СО ЗЛОКАЧЕСТВЕННЫМИ НОВООБРАЗОВАНИЯМИ КОЖИ

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**РЕЗЮМЕ.** Злокачественные новообразования кожи занимают одно из лидирующих мест в общей структуре онкологической заболеваемости населения России, уступая только раку молочной железы. В 2021 году было выявлено 7,82 случая меланомы и 46,93 случая немеланомного рака кожи на 100 тысяч населения. Врачи-дерматовенерологи, врачи общей практики, участковые терапевты, а также врачи других медицинских специальностей в своей повседневной работе сталкиваются со злокачественными новообразованиями кожи. Целью нашего исследования было изучить информированность врачей различных специальностей, а также людей без высшего медицинского образования о факторах риска и профилактике злокачественных новообразований кожи, а также о путях маршрутизации пациентов. Нами были опрошены врачи разных медицинских специальностей и люди без высшего медицинского образования относительно факторов риска и профилактики злокачественных новообразований кожи, а также о путях маршрутизации пациентов. Медиана правильных ответов составила 16 из 22 (72,7%). Верно на все вопросы ответили только 4 человека из 463 (0,9%; 95%ДИ 0,24–2,2). Чаще всего неверные ответы давались на вопросы, касающиеся проведения скрининга. Представляется целесообразным включение вопросов, посвященных организационным мероприятиям по снижению бремени заболеваемости меланомой, в программы повышения квалификации врачей, которые имеют право проводить дифференциальную диагностику злокачественных новообразований кожи, а также специалистов по организации здравоохранения и общественному здоровью.

**КЛЮЧЕВЫЕ СЛОВА:** опрос; профилактика; злокачественные новообразования кожи; скрининг; маршрутизация.

## INTRODUCTION

Malignant neoplasms (MN) of the skin occupy one of the leading places in the structure of oncological morbidity of the Russian population. Thus, in 2021, 7.82 cases of melanoma and 46.93 cases of non-melanoma skin cancer per 100 thousand population were detected [4]. In their daily work, doctors of different specialties — dermatologists, oncologists, therapists, general practitioners and others are involved with these diseases.

## AIM

To study the awareness of doctors of various specialties and people without higher medical education about risk factors and prevention of malignant skin neoplasms, as well as patient routing pathways.

## MATERIALS AND METHODS

We interviewed 463 people, including 372 women (81%) and 87 men (19%) aged 20 to 72 years. Among the respondents, 80 were dermatologists (17.4%), 14 were oncologists (3.1%), 184 were doctors of other specialities (40.1%), and 181 were without higher medical education (39.4%). The questions asked, response options, and comments are presented in the “discussion” section. Statistical processing of the survey results consisted of calculating the proportion attributable to each of the presented answer choices, as well as the proportion of correct answers to the questions with the corresponding exact proportion confidence interval (Klopper-Pearson). Calculation of confidence intervals was performed in the R statistical system (version 3.3) [32].

## RESULTS

Distribution of respondents answers to the questions is presented in Figures 1 and 2. For clarity of the graph, all correct answers were placed on the first variant. The great majority of respondents answered each of the questions correctly; nevertheless, a significant percentage of respondents made mistakes in most of the questions. The median number of correct answers was 16 out of 22 (72.7%). Only 4 out of 463 respondents answered all questions correctly (0.9%; 95% confidence interval 0.24–2.2). The most frequently incorrect answers were given to the questions: which of the following is most important for effective screening (197 correct responses out of 457; 43.1%; 95% confidence interval 38.5–47.8); which of the following is not an optimal screening goal (222 correct responses

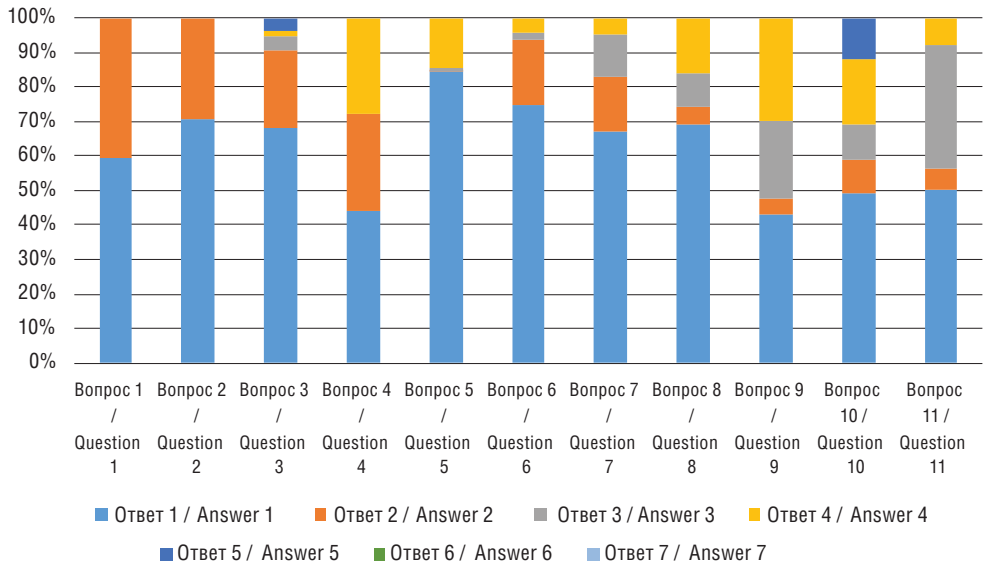


Fig. 1. Distribution of respondents' answers to the questions 1–11 of the questionnaire on the prevention of skin cancer

Рис. 1. Распределение ответов респондентов на вопросы 1–11 анкеты о профилактике злокачественных новообразований кожи

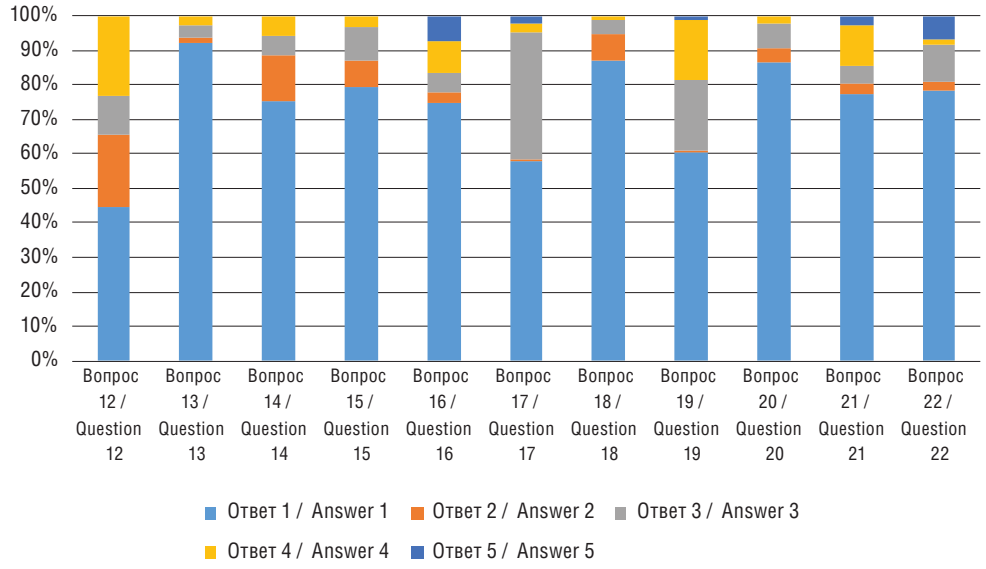


Fig. 2. Distribution of respondents' answers to the questions 12–22 of the questionnaire on the prevention of skin cancer

Рис. 2. Распределение ответов респондентов на вопросы 12–22 анкеты о профилактике злокачественных новообразований кожи

out of 450; 49.3%; 95% confidence interval 44.6–54.1); which of the melanoma screening strategies appears to be most effective (205 out of 458; 44.8%; 95% confidence interval 40.1–49.4); select the incorrect statement (screening risks question) (230 correct answers out of 458; 50.2%; 95% confidence interval 45.5–54.9); traumatisation of pigmented nevus can lead to malignancy (272 correct answers out of 459; 59.3%; 95% confidence interval 54.6–63.8).

## DISCUSSION

**1. Can traumatisation of pigmented nevus lead to the malignancy?**

Answer options: 1. No. 2. Yes.

The role of mechanical trauma in the pathogenesis of melanoma has been a topic of debate in the medical literature for many years. One study showed that trauma did not cause malignisation of melanocytic tumours in hamsters [21].

Another study concluded that skin trauma in Xiphophorus fish cannot cause melanoma [22]. In yet another study, most melanoma patients denied the association between possible trauma and melanoma formation [26]. Trauma does not appear to be a risk factor for melanoma, but may contribute to the progression of pre-existing melanoma. In addition, trauma may draw the patient's attention to pre-existing melanoma [31].

**2. Does prophylactic removal of nevi reduce the chance of melanoma?**

Answer options: 1. No. 2. Yes.

For a 20-year-old person, the lifetime risk of any nevus transforming into melanoma by age 80 is approximately 0.03% (1 in 3,164) for men and 0.009% (1 in 10,800) for women. Thus, prophylactic removal of nevi does not reduce the chance of melanoma [24].

**3. Which localisation of nevus is the most dangerous for the appearance of melanoma?**

Answer choices: 1. Melanoma appears in most cases on healthy unchanged skin. 2. Melanoma in most cases appears on the background of a previous nevus.

The probability of transformation of the nevus in melanoma is extremely low, also traumatisation of the nevus does not cause its malignancy, and therefore, the localisation of the nevus for the appearance of melanoma does not play a role.

**4. Specify the correct statement.**

Answer options: 1. Melanoma in most cases appears on healthy unchanged skin. 2. Melanoma in most cases appears on the background of a previous nevus.

According to various studies, on average 30% of melanomas are associated with a nevus, while the remaining 70% appear de novo, i.e. on unchanged skin [10, 11, 17, 23].

**5. Which of the listed risk factors is the most important for the appearance of melanoma?**

Answer options: 1. Ultraviolet B spectrum (UVB). 2. Smoking. 3. Alcohol abuse. 4. Regular traumatisation of nevi.

UVB is a known risk factor for melanoma [15]. Smoking is not a risk factor for melanoma; moreover, some studies have shown an inverse association between smoking and melanoma risk in men [35]. There are different data on alcohol and melanoma risk in the literature, with some studies reporting a moderate risk of melanoma in people who drink alcohol [20]. Other studies have not found such an association [30]. However, even in those studies where an association was found, the authors point out that their data are insufficient to consider alcohol a risk factor.

**6. Which of the following is understood as primary prevention of skin melanoma?**

Answer options: 1. The limiting skin exposure to ultraviolet radiation as the main provoking factor for melanoma. 2. Examination of the skin for the purpose of early diagnosis, both independently by the patient and by a specialist. 3. Completion of medical examinations. 4. Observation of suspicious neoplasms in dynamics.

Primary prevention — a set of measures aimed at preventing the development of the disease. Such a measure is the limitation of exposure of the skin to ultraviolet radiation (UVR). Examination of the skin for the purpose of early diagnosis, medical check-ups, observation of suspicious neoplasms belong to secondary prevention [33].

**7. Which of the following is understood as secondary prevention of skin melanoma?**

Answer options: 1. Examination of the skin for the purpose of early diagnosis, both independently by the patient and by a specialist. 2. Limitation of skin exposure to ultraviolet radiation as the main provoking factor for melanoma. 3. Regular application of sunscreen. 4. Refusal to visit the solarium.

Secondary prevention — a set of measures aimed at early detection, prevention of exacerbations, complications and chronicity of diseases. Secondary prevention includes examination of the skin for early diagnosis. The limitation of skin exposure to ultraviolet radiation, regular use of sunscreen and avoidance of sunbeds are primary prevention [36].

**8. Which of the listed specialists has no rights, according to the Russian legislation, to carry out differential diagnostics of malignant skin neoplasms?**

Answer options: 1. All those listed have this right. 2. A dermatovenerologist. 3. A general practitioner. 4. A district therapist.

According to the Russian legislation, a district general practitioner, a dermatovenerologist and a general practitioner have the right to perform differential diagnosis of skin MN. In case of suspicion of MN they refer the patient to an ambulatory oncological care centre or to a primary oncological cabinet for primary specialised medical and sanitary care [5, 8].

**9. Which of the following is most important for effective screening?**

Answer options: 1. The disease should have a recognisable latent or early symptomatic phase. 2. There must be effective treatment options available for late stages of the disease. 3. The disease should be included in the list of socially important diseases. 4. Surrogate endpoints for screening must be clearly stated.

For screening to be effective, the following principles must be met: the disease is an important medical problem; there is a cure for the disease; diagnosis and treatment are available; the disease has a recognisable latent or early symptomatic phase; a method for detection has been developed; the progression of the disease from latent to manifest is clear; the economic costs of disease detection are balanced against the total costs; case detection should be an ongoing process [40]. Effective treatment options for late-stage disease, inclusion in the list of socially important and clear formulation of surrogate endpoints are not among the important principles of screening.

**10. Which of the following is not an optimal goal of screening?**

Answer options: 1. A statistically significant reduction in surrogate indicators. 2. Reduction in disease incidence through detection and treatment of disease precursors. 3. Reducing the severity of the condition by identifying people with the disease and offering effective treatment. 4. Increasing treatment choices by identifying conditions or risk factors earlier in life when more options are available. 5. Reducing mortality through early detection and early treatment of the condition.

The goals of screening, as recommended by the World Health Organisation, may be: to reduce mortality by early detection and treatment of the condition; to reduce morbidity by detecting and treating precursors of the disease; to reduce the severity of the condition by identifying and treating patients; to expand treatment choices by identifying conditions or risk factors early in life [34]. A surrogate endpoint is a biomarker designed to replace an endpoint in a study. The use of surrogate points has several advantages — an easier identification and measurement, smaller required sample size, duration and cost of clinical trials. Surrogate endpoints may not reflect the immediate goals of treatment or may be unreliable [6].

**11. Select the incorrect statement.**

Answer options: 1. Screening does not have risks. 2. Screening can lead to false negative results. 3. Screening can lead to iatrogenic complications. 4. Screening can lead to false positive results.

In addition to the benefits, screening has risks, such as false positive results. For example, some women with false positive mammography results have increased anxiety and are less likely to attend repeat screening procedures [16]. In addition, false-negative results are also possible, leading to a false sense of safety and lack of timely treatment, which worsens the prognosis of the disease [19]. In some situations, screening may has risks of iatrogenic complications [13].

**12. Which melanoma screening strategy appears to be the most effective?**

Answer options: 1. Annual examination of all skin with dermatoscopy in people at risk for melanoma. 2. Annual examination of all skin with dermatoscopy in people over 35 years of age. 3. Examination of all skin with dermatoscopy when a patient self-reports a bothersome neoplasm to a physician. 4. Examination of all skin with dermatoscopy in all patients who come to the medical centre for various reasons.

Annual dermatoscopy skin examinations in people at risk for melanoma would seem to be the optimal screening strategy because it would capture the population most likely to develop melanoma. Routine screening of patients who are not at risk appears to be labour intensive and costly with questionable efficacy [27]. Skin examination with dermatoscopy when a patient self-reports a bothersome neoplasm is an important diagnostic condition, but such screening is not aimed at early detection of skin MN and usually identifies already invasive tumours. It is not always possible to examine the skin with dermatoscopy in all patients who come to a medical centre for various reasons due to limited time.

**13. Which of the following would improve the quality of skin melanoma screening better than other variants?**

Answer options: 1. Pre-identification of risk groups and screening in high risk groups. 2. Screening patients only in the age group of 60 years or more. 3. Examination of patients with more than 100 moles only. 4. Examine only those patients who have complaints.

Patient's age above 60 years is a risk factor for melanoma, but melanoma also occurs at earlier ages [4]. The number of nevi in a patient more than 100 is also a risk factor, but melanoma can also appear in people with a small number of nevi. Examining only those patients who have complaints will not lead to detection of melanoma in the initial stages [5]. Early identification of at-risk groups will allow patients with various risk factors for melanoma to be targeted.

**14. At an appointment, the therapist has identified that a patient is at high risk for melanoma of the skin. Which routine plan do you think would be optimal?**

Answer options: 1. Refer the patient to a dermatologist for monitoring of skin neoplasms. 2. Refer the patient to the primary oncology office at the outpatient clinic. 3. Refer the patient to a specialised oncological institution for cytological examination. 4. Refer the patient to a specialised oncological institution for histological examination.

Patients at risk for melanoma require regular whole skin examination with dermatoscopy [12]. Referral of the patient to the primary oncology office of the polyclinic is required if the patient has clinical signs of melanoma. According to the equipment standard, there is no dermatoscope in such cabinets, which means that it is difficult to detect melanoma at the stage when it has no clinical signs [9]. Referral to a specialist oncology centre for cytological or histological examination is a variant of routing when there is a sign of melanoma [5]. Referring a high-risk patient to a dermatologist for monitoring of skin neoplasms is the best option, as the dermatologist has a dermatoscope, according to the standard equipment, and often has equipment for fixing dermatoscopic images with subsequent follow-up [8].

**15. A patient comes to the general practitioner complaining of a darkening mole. Which routing plan do you see as the most optimal?**

Answer options: 1. Refer the patient to a dermatologist for dermatoscopy. 2. Refer the patient to a specialised oncology facility for histological examination. 3. Refer the patient to the primary oncology office of the outpatient clinic. 4. Refer the patient to a specialised oncological institution for cytological examination.

The darkening of the mole may be a sign of melanoma, but it can also be the result of other causes, such as trauma. Differential diagnosis in this situation requires dermatoscopy, which can be performed by a dermatologist [5]. As stated in the second paragraph of the previous question, due to lack of equipment, the diagnosis will not be able to be effective [9]. Until the morphological verification stage, non-invasive diagnosis is optimal [5].

**16. Which of the listed risk factors is the most significant for melanoma development?**

Answer options: 1. A personal history of melanoma in anamnesis. 2. Light hair colour. 3. The presence of freckles. 4. The patient has never received a whole skin examination by a specialist. 5. The Total number of nevi on the body is up to 50.

The patient's history of never having a whole skin examination by a specialist is not a risk factor for melanoma. The total number of nevi on the body up to 50 is also not a risk factor [5]. According to the melanoma risk scale, light hair colour and the presence of freckles have a minimum score and a personal history of melanoma has a maximum score [1].

**17. A 35-year-old woman came for a check-up for a bothersome neoplasm. On history taking, she denies a personal history of skin cancer, but notes basal cell carcinoma in her father, as well as heavy sunbed use during her student years. Which of the following is most worrying about a high risk of melanoma?**

Answer options: 1. Attendance a solarium. 2. Female gender. 3. Family history of basal cell skin cancer. 4. Age of 35 years. 5. Patient is not at risk for melanoma.

Age of 35 years is not a risk factor for melanoma. In Russia, women have melanoma more often than men [4], but gender is not a risk factor. A family history of basal cell skin cancer increases the probability of melanoma, but is not a significant risk factor [7, 38]. Sunbed use is a known and significant risk factor [37].

**18. Which of the following is most appropriate for melanoma prevention for the patient from the previous question?**

Answer options: 1. Advise the patient to minimise UVR, including avoiding solarium use. 2. Advise the patient to apply sunscreen with UVB protection once daily. 3. Counselling on minimising UVR exposure is not required as she is 35 years old and the most dangerous sunburns occur in childhood. 4. Counselling

the patient on the benefits of natural sunlight to maintain vitamin D levels.

Counselling the patient to minimise UVR exposure will ensure that the patient does not increase her risk of melanoma [37].

**19. A 27-year-old man came for a preventive skin neoplasm check-up. Denies a personal and family history of skin MN, sunburns and sunbed use. He had a history of mild eczema since early childhood, for which he had received topical glucocorticoids. Examination reveals up to 50 pigmented nevi with even borders and uniform colouration. Which of the following is of greatest concern for a high risk of melanoma?**

Answer options: 1. The patient is not at risk for melanoma. 2. Male gender. 3. History of skin disease and treatment for it. 4. Number of nevi up to 50 pieces. 5. Age of 27 years.

Age 27 years, male gender, history of skin disease and treatment with topical hormones, and number of nevi under 50 are not risk factors for melanoma. Thus, this patient has no risk factors [5].

**20. A 65-year-old female patient visited a dermatologist for a chronic skin disease in the hand area. The dermatologist noticed a suspicious neoplasm in the forehead area, of which the patient had no complaints. The neoplasm has irregular borders, diameter about 1 cm, black in colour with different shades of brown. Which doctor's tactics are most consistent with the Russian legislation?**

Answer options: 1. After finishing the discussion of the skin disease, offer the patient to perform dermatoscopy of the suspected neoplasm, as well as a complete skin examination. 2. Continue the consultation about the skin disease and then advise the patient to see an oncologist to diagnose the neoplasm. 3. Perform a biopsy of the suspicious neoplasm. 4. After discussion of the skin disease, photograph the neoplasm and advise the patient to come back in 3 months to assess the dynamics.

The described clinical picture should raise suspicion of melanoma. A dermatologist is not allowed to perform a biopsy of a malignant neoplasm [5]. Not only melanoma may have such a clinical picture, for example, seborrhoeic keratosis may look similar, so it is advisable to perform a dermatoscopy before sending the patient to an oncologist. If melanoma is suspected, observation is inappropriate, as it may lead to a worsening of the prognosis of the disease. Thus, the tactic of a dermatovenerologist, which is most consistent with Russian legislation, is as follows: to suggest the patient to perform dermatoscopy of the suspected neoplasm, as well as a complete skin examination, since other parts of the body may also have MN and other life-threatening conditions manifested by skin rashes [2, 3]. If dermatoscopic signs of malignancy are detected, to provide a referral to a primary oncological centre [5, 8].

**21. A 57-year-old man with a family history of melanoma and multiple sunburns in childhood came in for evaluation of skin neoplasms. He reports that he has had at least 10 skin biopsies in the past, all of which were interpreted as dysplastic nevi with mild to moderate atypia. On examination, the patient is found to have more than 100 nevi, some of which are greater than 5 mm in size and multiple colours. What is the most appropriate secondary prevention tactic for this patient?**

Answer options: 1. Consider using skin neoplasm mapping to help identify new/changed nevi. 2. Discuss health related quality of life and provide a validated quality of life screening questionnaire. 3. Consider using artificial intelligence (AI) algorithms to assess his nevi. 4. Advise on sun safety (i.e. reduce UVR exposure, use sun-protective clothing). 5. Prescribe nicotinamide 500 mg twice daily for systemic chemoprophylaxis.

Mapping of skin neoplasms is a medical procedure that involves photofixation of the patient's entire skin and dermatoscopic images of the neoplasms for dynamic surveillance, which significantly improves the quality of secondary prevention [25]. Sun safety counselling is related to primary prevention of melanoma [18]. AI for the evaluation of skin neoplasms is a way to support physician decisions and is not a prevention in itself. There are studies showing that nicotinamide supplementation can be used as primary prevention of skin MN [29].

**22. A patient asks you about skin self-examination for early detection of melanoma. Which of the following would be the most appropriate response?**

Answer options: 1. Self skin examination should be performed monthly and suspicious neoplasms should be reported to a health care provider. 2. Self skin examination should be

limited to areas of the body exposed to the sun (i.e., face, scalp, hands). 3. Recommend the use of a smartphone app to aid in the detection of neoplasms, as all digital apps are validated screening tools. 4. Recommend that the patient purchase a dermatoscope to visualise lesions once a month and identify the "ugly duckling" symptom. 5. Self-examination of the skin is not recommended as people who do it are more likely to find thicker tumours.

Self-examination is a form of secondary prevention of skin MN and should be recommended to the patient. Such inspection should not be limited to specific areas of the skin [14]. Various smartphone apps exist to improve the quality of self-examination, but not all of them are validated and therefore not always effective [39]. Advising a patient to purchase a dermatoscope will not improve the effectiveness of secondary prevention of skin MN, as dermatoscopy is ineffective when used by a person without specialised training [28].

## CONCLUSION

The majority of respondents successfully completed the test and gave correct answers to most questions. However, only 0.9% of respondents gave correct answers to all questions (95% confidence interval 0.24–2.2). Incorrect answers were often given to questions related to screening, suggesting that physicians need to be further informed about the aims and objectives of organising screening activities. It seems advisable to include questions on organisational measures to reduce the burden of melanoma morbidity in advanced training programmes for doctors who have the right to perform differential diagnosis of malignant skin neoplasms, as well as specialists in health care organisation and public health.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

**Competing interests.** The authors declare that they have no competing interests.

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# SOME ETHICAL AND LEGAL ASPECTS OF MEDICAL CONFIDENTIALITY IN PEDIATRICS

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**ABSTRACT.** The article deals with the problems of ethical and legal regulation of medical secrecy. Special attention is paid to the legal regulation of medical secrecy in relation to children. This is due to the fact that an underage is a special subject of law who does not have full legal capacity, the replenishment of which falls on his legal representatives. The problem of patient's confidentiality is closely connected with the right to informed voluntary consent of minors, as the decisive factor of being granted this right is children's age: up to 15 years (up to 16 years for drug addicts) or those who have reached 15 years (16 years for drug addicts). The problems of legal regulation include absence of a clear procedure in the law for informing parents or other legal representatives about the state of health of children aged 15–18 years. In this regard, the analysis of articles of the Federal Law of November 21, 2011 was carried out. No. 323-FZ "On the basics of protecting the Health of citizens in the Russian Federation", affecting the provisions on granting minors aged from 15 (or 16 for drug addicts) to 18 years of age the right to medical secrecy. Subsequent amendments made to Article 22 of Federal Law No. 323 of 31.07.2020 deprived them of this right, and legal representatives were given the opportunity to receive all information about the health status of their minors, including information about early pregnancy, sexually transmitted diseases, drug abuse, etc. The argument for such an innovation was the opinion that not all minors can cope with such problems on their own, as well as a reference to articles 56 and 63 of the Family Code of the Russian Federation, obliging parents to take care of the health of their children. Without having this information, parents will not be able to fulfill this obligation. At the same time, the legislator did not fix the obligation of a medical organization on its own initiative to provide information about the health status of a minor patient to his legal representatives. The reaction of adolescents to changes in the law depriving them of the right to medical secrecy was generally negative; being mainly effected by psychological features of the transition age, negativism and protest inherent in adolescents, unwillingness to be under the care and control of parents, etc. The article offers some solutions of these problems. This study confirms that

medical secrecy is one of the topical and vulnerable topics of ethical and legal regulation of medical activity, especially in pediatrics.

**KEY WORDS**: bioethics; medical law; medical secrecy; informed consent; rights of minors; legal representatives.

# НЕКОТОРЫЕ ЭТИКО-ПРАВОВЫЕ АСПЕКТЫ ВРАЧЕБНОЙ ТАЙНЫ В ПЕДИАТРИИ

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**РЕЗЮМЕ.** В статье рассматриваются проблемы этического и правового регулирования врачебной тайны. Отдельное внимание уделено правовой регламентации врачебной тайны в отношении детей. Обусловлено это тем, что несовершеннолетний — особый субъект права, не обладающий полной дееспособностью, восполнение которой ложится на его законных представителей. Проблема врачебной тайны тесно сопряжена с правом на информированное добровольное согласие несовершеннолетних, причем определяющим обстоятельством в наделении их этим правом служит возраст детей: до 15 лет (до 16 лет для больных наркоманией) или достигших 15 лет (16 лет для больных наркоманией). К проблемам правового регулирования можно отнести отсутствие в законе четкого порядка информирования родителей или иных законных представителей о состоянии здоровья детей в возрасте 15–18 лет. В связи с этим проведен анализ статей Федерального закона от 21 ноября 2011 г. № 323-ФЗ «Об основах охраны здоровья граждан в Российской Федерации», затрагивающих положения о наделении несовершеннолетних в возрасте от 15 (или 16 для наркозависимых) до 18 лет правом на врачебную тайну. Последующие изменения, внесенные в статью 22 ФЗ № 323 от 31.07.2020 г., лишили их этого права, а законным представителям предоставили возможность получать всю информацию о состоянии здоровья своих несовершеннолетних детей, включая сведения о ранней беременности, заболеваниях, передающихся половым путем, злоупотреблении наркотическими веществами и т.д. Аргументом для такой новации послужило мнение о том, что не все несовершеннолетние могут справиться с данными проблемами самостоятельно, а также ссылка на статьи 56 и 63 Семейного кодекса РФ, обязывающие родителей заботиться о здоровье своих детей. Не владея указанной информацией, родители не смогут исполнить это обязательство. В то же время законодатель не закрепил обязанность медицинской организации по своей инициативе предоставлять сведения о состоянии здоровья несовершеннолетнего пациента его законным представителям. Реакция подростков на изменения в законе, лишающие их права на врачебную тайну, была в общем негативной; здесь во многом сказались психологические особенности переходного возраста, присущие подросткам негативизм и протест, нежелание находиться под опекой и контролем родителей и др. В статье предлагаются некоторые решения перечисленных проблем. Данное исследование подтверждает, что врачебная тайна — одна из актуальных и уязвимых тем этического и правового регулирования медицинской деятельности, особенно в педиатрии.

**КЛЮЧЕВЫЕ СЛОВА:** биоэтика; медицинское право; врачебная тайна; информированное согласие; права несовершеннолетних; законные представители.

Medical confidentiality is one of the oldest categories of medical ethics. All ethical documents of antiquity emphasise the doctor's duty to keep information about the patient's illness, intimate and family life at all costs. In ancient India, a doctor who wished to be successful had to fulfil the following requirements: "A doctor who comes only by invitation, and when visiting a patient's home, concentrates exclusively on what is related to the patient, who examines the patient thoroughly, without rushing, but also without spending too much time, and who does not disclose what may harm or embarrass the patient, and who prescribes the correct treatment, achieves success" [24]. It shows that the institution of protecting patient information (doctor-patient confidentiality) was formed and has existed for several millennia on the basis of the regulation on the protection of patient information [1]. The fundamental document that influenced all subsequent centuries was the "Hippocratic Oath" (5th century BC), which contained the following provision: "Whatever I may have seen or heard in the course of treatment, or even without treatment, concerning human life that should never be divulged, I will keep silent about it, considering such things a secret" [6].

In the future, especially in the late nineteenth and early twentieth centuries, the problem of medical secrecy became the subject of numerous discussions, discussed in detail on the pages of medical and legal press. Various opinions were expressed: from the unconditional preservation of information about the patient to allowing the doctor to decide in which cases he would preserve or violate the patient's secrecy, i.e. secrecy was considered as an ethical category. It should be noted that during this period the legislation of a number of European countries (Germany, Austria, France, Belgium, Hungary, Italy, Portugal) already had a norm regarding the preservation of medical secrecy. In Russia and some European countries such as Netherlands, England, Switzerland, Norway, Greece, Spain there was no such legislation [21].

At present, medical confidentiality has become one of the rules of bioethics and a legal concept. An ensuring the protection of medical confidentiality is not only the most important manifestation of moral duty and moral responsibility of a doctor, but also his legal obligation. Thus, medical confidentiality is a complex concept that includes medical, legal, social and ethical components.

Observance of medical secrecy is the basis for a doctor-patient relationship of trust, as well as an important condition for the protection of the patient's social status. This applies in the first place to diseases that are subject to negative social attitudes and the risk of discrimination.

Confidentiality is guaranteed by international and national documents. For example, the Declaration of Geneva of the World Medical Association, adopted by the General Assembly of the World Medical Association in 1948, states: "I will respect the secrets entrusted to me, even after the death of my patient" [8]. "The Lisbon Declaration on the Rights of the Patient" (which adopted by the 34th World Medical Assembly, in September/October 1981) states, "The patient has the right to expect that the physician will treat all medical and personal information entrusted to him as confidential" [17]. The provision on medical confidentiality is also contained in the Declaration of Helsinki of the World Medical Association (adopted at the 18th General Assembly of the MMA in June 1964), the Convention on Biomedicine and Human Rights (adopted by the Council of Europe on 4th April 1997), the Universal Declaration on Bioethics and Human Rights (adopted by resolution of the *General Conference of UNESCO* on the report of Commission III at the 18th plenary session on 19th October 2005) [5, 14, 30]. The requirement to observe medical confidentiality is also postulated in the "Code of Ethics of the Russian doctor", approved by the 4th Conference of the Association of Doctors of Russia in November 1994; "Code of Medical Ethics of the Russian Federation", approved by the All-Russian Pirogov Congress of Doctors on 7th June 1997; "Code of Professional Ethics of the Doctor of the Russian Federation", adopted by the First National Congress of Doctors of the Russian Federation (Moscow, 5th October 2012) [11, 12, 31]. In accordance with Article 71 of the Federal Law No. 323 of 21th November 2011 "On the Fundamentals of Health Protection of Citizens in the Russian Federation", the observance of medical secrecy is included in the Oath of a doctor, which is given by persons who have completed the mastery of the basic educational program of higher medical education, when they receive a document on higher professional education. "Receiving the high title of doctor and starting professional activity", doctors solemnly swear to keep medical secrecy and act exclusively in the interests of the patient [26].

The protection of information constituting medical confidentiality is becoming more complicated due to the digitalization of the healthcare system and the widespread introduction of computer technologies [2]. Thus, electronic case histories actively used nowadays by medical organizations may be more convenient in many respects, but at the same time they create a potential possibility of transferring a huge amount of confidential information.

In our country, the legal basis for maintaining medical confidentiality is guaranteed by Articles No. 23 and No. 24 of the Constitution of the Russian Federation, which specify the right of a person to the protection of personal privacy and the inadmissibility of dissemination of information without his or her consent. The provision on the observance of medical confidentiality is enshrined in Article No. 13 of the Federal Law of 21.11.2011 № 323 "On the Fundamentals of Health Protection of Citizens in the Russian Federation" [26]. Medical confidentiality is included in the basic principles of health protection according to paragraph 9 of Article No. 4 of the Federal Law No. 323.

Part 1 of Article No. 13 "Observance of medical confidentiality" of the Federal Law No. 323 of 21.11.2011 lists information that constitutes medical confidentiality: "...information about the fact of a citizen's application for medical care, his health condition and diagnosis, other information obtained during his medical examination and treatment constitute medical confidentiality" [26]. It should be noted that the article does not disclose what is included in "other" information. Certainly, this should include the nature and course of the patient's disease, the results of all diagnostic tests, diagnosis, possible complications, therapy, patient's reports about his intimate and family life, physical abnormalities, mental characteristics and anything that he wishes to conceal, such as profession, financial and official status, religious views and other information that he entrusted to the doctor. The information collected in the course of medical examination and treatment may be accessible only to a certain circle of persons, established either by law or by the patient himself. According to paragraph 4 of Article No. 13 of the Federal Law No. 323 of 21.11.2011, a list of legal grounds for providing information constituting a medical secret without the consent of a citizen or his legal representative was established [26].

The process of providing medical care in paediatric practice, as well as the observance of medical confidentiality, has its own specifics and difficulties due to the age of the child.

According to Article No. 1 of the United Nations Convention on the Rights of the Child of 20.11.1989, a child is recognized as any person "up to the age of 18 years" [16]. The same is stated in the Federal Law No. 124 of 24.07.1998 "On Basic Guarantees of the Rights of the Child in the Russian Federation" (in the edition of 28.12.2016), which defines the concept of "child" — a person up to the age of 18 years [27].

The Federal Law No. 323 of 21.11.2011 contains many norms that establish the peculiarities of the legal status of underage citizens when providing them with various types of medical care [26]. We mean differentiation of legal relations depending on their age: minors up to 15 years old (drug addicts up to 16 years old) and minors from 15 (from 16 years old for drug addicts) up to 18 years old. Each of these subjects has certain specifics of their status when receiving medical care.

It is known that children under 15 years of age have a relative non-self-sufficiency of participation in receiving medical care: parents or legal representatives of a minor act as subjects of legal relations when their children seek medical assistance, i.e. they are participants in all relations between a doctor and a patient. This is primarily due to the age-related anatomic-physiological and psychological features of children and adolescents, their underdeveloped system of values and inadequate setting of life priorities due to their lack of social and psychological experience. A child under the age of 15 is an insufficiently mature individual who lacks the full autonomy to formulate his or her preferences reasonably and to protect his or her own well-being. Parents (legal representatives) are endowed with moral and legal rights to make certain decisions concerning children, so a child's autonomy depends to a large extent on the protection and support of adults. This is in accordance with the article No. 56 of the Family Code of the Russian Federation — the protection of the rights and interests of the child is carried out by parents (or persons replacing them) [23].

A child from 15 to 18 years old, according to Russian legislation (paragraph 1 of Art. 54 of the Family Code of the Russian Federation, paragraph 1 of Art. 21 of the Civil Code of the Rus-

sian Federation, part 1 of Art. 87 of the Criminal Code of the Russian Federation), is also considered a person who has not reached the age of majority, i.e. a minor who has not acquired full legal capacity [7, 23, 25]. Art. 60 of the Constitution of the Russian Federation establishes that "A citizen of the Russian Federation can independently exercise their rights and obligations in full from the age of 18" [15]. It is considered that due to his age a minor from 15 to 18 years old cannot fully realize the meaning of his actions, bear legal responsibility for his actions, defend himself in case of violation of his rights.

However, article 20 of Federal Law No. 323 provides that minors from the age of 15 may exercise their natural rights to life and health and decide independently on medical interventions. This is confirmed by part 2 of article 54 of the Federal Law No. 323, which states that minors over 15 years of age or minors over 16 years of age with drug addiction have the right to informed voluntary consent to medical intervention or to refuse it [26].

With regard to minors, the law on medical confidentiality (paragraph 4 of part 4 of Article 13 of the Federal Law No. 323 of 21.11.2011) allowed the provision of information to one of his parents or other legal representative: in the case of providing medical care to a minor in accordance with paragraph 2 of part 2 of Article 20 of this Federal Law (when providing narcological assistance to a minor with drug addiction or during medical examination of a minor to establish the state of narcotic or other toxic intoxication), as well as to a minor under the age established by paragraph 2 of Article 54 of this Federal Law (i.e. the age of 15 years and 16 years for a minor with drug addiction), to inform one of his parents or other legal representative [26].

As for minors over 15 years of age, the law was silent. Thus, according to the norms of medical legislation, minors over 15 years of age were endowed with the right to medical confidentiality under this article, i.e. the provision of information constituting medical confidentiality to their legal representatives was envisaged only with the written consent of a minor over 15 years of age.

This raises the question of whether the teenager is ready to understand and evaluate such complex information that conditions the giving of consent. These provisions of the Federal Law No. 323 of 21.11.2011, granting minors over 15 years of age the right to independent informed consent and medical confidentiality, raised many questions and came into conflict with the legislation regulating the peculiarities of the legal status of minors and establishing in some cases a special procedure for the exercise of their rights [19]. In particular, questions have been raised regarding the protection of the interests of a minor from 15 to 18 years of age in the case of causing harm to health. Thus, in the case of causing harm to a person under the age of 18 or unlawful interference in the sphere of his health, a minor, not having full legal capacity, is not able to protect himself. If a minor wants to go to court to defend his interests, he must first turn to his legal representatives, who will represent his interests in court. Accordingly, medical confidentiality is automatically violated [29]. Another example: according to the Civil Code of the Russian Federation, a person who has not reached the age of 18 years and is considered incapacitated cannot independently conclude a transaction ("an agreement"), including for the provision of paid medical services [7]. Such a contract is valid only if approved in writing by his/her legal representative. Consequently, the fact of the applying for medical assistance becomes known to the legal representative, but, despite this, he will not be able to obtain information about the state of health of a minor over 15 years of age, if the minor has not included him in the list of persons to whom this information may be communicated. Some medical institutions gave information to parents, guided more by common sense than by the law and believing that "parents are always parents, they should know what ails their children". Other medical organizations were clearly following the law. All this indicated the vulnerability of the legal status of a minor [3].

On 13 November 2019, a law concerning information about the health status of minors was introduced to the State Duma, "On Amending Article No. 22 of the Federal Law 'On the Fundamentals of Health Protection of Citizens in the Russian Federation'". On 31st July 2020, the law was signed by the President of the Russian Federation and published. The new version of Article No. 22 of the Federal Law No. 323 is supplemented with the instruction: "...In respect of persons who have reached the age established by part 2 of article No 54 of this Federal Law, but have not acquired full legal capacity, information about the state of health is provided to these persons, as well as until these persons reach the age of majority to their legal representatives" [26].

The establishment of this provision seems justified, because in accordance with Article No. 63 of the Family Code of the Russian Federation parents are obliged to take care of their children's health, and without information about the state of their health, they will not be able to fulfil this obligation [23]. Failure of parents or other legal representatives to fulfil their obligations to maintain and educate minors entails administrative responsibility in accordance with article No. 5.35 of the Code of the Russian Federation on Administrative Offences [10]. Article No. 69 of the Family Code also provides for the deprivation of parents' rights for evasion of parents duties [23].

The reasons for the changes are also stated in the Explanatory Note to the federal law "On Amending Article 22 of the Federal Law «On the Fundamentals of Health Protection of Citizens in the Russian Federation»" [9]. As follows from the Explanatory Note, the legislative norms in the previous interpretation did not give the opportunity to fully realize parents the obligation to take care of the health of their children. It is emphasized that older adolescent children are often not inclined to inform their parents, adoptive parents and guardians about the problems of the transition period (early pregnancy, sexually transmitted diseases, injuries sustained during conflicts with peers, addiction to alcoholic drinks, smoking tobacco products, substance abuse, drug addiction, etc.) [9]. The explanatory note to the draft law noted that "concealment of information about early sexual activity, combined with the lack of awareness of many adolescents about contraception and sexually transmitted diseases, can lead to an early pregnancy, abortion, infertility".

Conflicts caused by bullying, children seeking psychological counselling, suicide attempts and other facts of teenagers' social life may also be overlooked by parents. In their conclusions, the authors of the amendments to the law rely on the existing practice of legal regulation on this problem (including foreign practice), requests from citizens, statistical data, and the results of sociological surveys of minors, including data from WHO (World Health Organization) reports.

It remains unclear, however, whether information on the health status of minors should be provided unconditionally to parents or whether it should be provided only at the request of legal representatives. This provision of the law requires clarification on the part of the legislator. From the outset, neither the legislator nor the Ministry of Health has clarified how and when parents or other legal representatives should be informed: at their request or the medical organization itself should take the initiative in this matter. The question also arises: if it is necessary to inform, when: before or after the medical intervention?

The formulation in the law initially suggested that the initiative to inform the legal representatives should be entrusted to the medical organization. It seemed logical to inform the parents even before the start of the proposed medical intervention, for example, at the time of the minor's request for medical assistance. However, in practice it would be very difficult to implement this norm.

In December 2020, due to the difficulties associated with the enforcement of a number of articles in Federal Law No. 323 relating to minors, the legal department of the Ministry of Health of the Russian Federation, in accordance with the letter of the "Faculty of Medical Law", clarified that the obligations imposed on medical workers and medical organizations, as defined in Articles 73 and 79 of Federal Law No. 323, do not include the obligation to inform the legal representatives of a minor who visited a medical organization without a legal representative [18]. Thus, it is necessary to inform the legal representatives of a minor only if the legal representatives themselves request it. In other words, the initiative to obtain information constituting medical confidentiality should belong to the legal representatives, and the obligation to provide them should be imposed on the medical organization only in the presence of a request.

Although medical workers are not obliged to inform the legal representatives themselves when a minor asks for help, the child's legal representatives, in accordance with the amendments to part 2 of Article 22 of the Federal Law No. 323 of 31.07.2020, have the right, on their own initiative, not only to familiarize themselves with medical documents, but also to obtain all necessary information from the attending physician or other medical worker who is involved in the provision of medical care to the minor [26].

In the above-mentioned clarification of the Ministry of Health of 25.12.2020 it is also noted that in accordance with paragraph 7 of Article 79 of Federal Law No. 323 medical organizations are obliged to inform citizens in an acces-

sible form, including using the Internet, about the medical activities carried out and about medical workers of medical organizations, about their education and qualifications, as well as to provide other information necessary for the independent quality assessment [18]. The clarification also refers to the Order of the Ministry of Health of Russia from 30.12.2014 № 956n, which provides for the placement on the official websites of medical organizations of information about the rights and obligations of citizens in the field of health protection [20]. Thus, the Ministry of Health proposes that medical organizations place an indication on their websites that, due to legislative changes, they will provide legal representatives with information about the health status of their minor children if requested.

The changes in the law have affected only medical confidentiality, but not the right of a minor to independently request medical assistance. Thus, from the moment a child reaches the age of 15, he or she can still visit any doctor without the accompaniment of legal representatives, receive information in the absence of legal representatives, and has the right to give informed voluntary consent to medical intervention or refuse it. In practice, however, problems may arise in the provision of paid medical services to minors. According to the Civil Code of the Russian Federation (Article 26), their provision is a deal for which a minor needs the written consent of his or her legal representatives — parents, adoptive parents or guardian. The deal made by a minor is also valid in case of its subsequent written approval by his parents, adoptive parents or guardian (Art. 26) [7]. Thus, when concluding an agreement on the provision of medical services, a medical organization may require the presence of legal representatives. In this case, the parents may become aware of the fact of seeking medical assistance even before the actual start of medical care. In other cases, except in the case of paid medical services, the legal representatives of minors over the age of 15 may receive information on the child's state of health upon request, either during the provision of medical care or a medical service, or after it has been provided, or not at all, in the absence of a request on their part.

Despite the new provision in the law, parents are still unable to fully realize their right to care for minors, as doctors are not obliged to provide access to information on the health status of children without a request from their legal representatives. Only upon request a parent could have information from the medical office of an educational establishment, a district polyclinic or another establishment where systematic and routine medical care is provided to children and adolescents. No one is obliged to provide parents with information on visits to other medical organizations.

The absence in the law of a clear obligation of a medical organization to inform legal representatives of the fact that a minor over 15 years of age has sought medical assistance creates legal uncertainty and effectively nullifies the right of legal representatives to information about the health status of minors, since even the most conscientious parents may never find out about a child's visit to a doctor.

Giving a minor the right to make such complex decisions is controversial. In the absence of information about the minor's health status, the parent may not have the actual ability to dissuade the child from medical intervention or convince him or her of its necessity, or to advise him or her to see another doctor or other medical organization. Even if the parent has timely access to the information, he or she cannot legally influence the child's decision regarding medical intervention by virtue of Article 54 part 2 of Federal Law No. 323. The parent of a minor over 15 years of age, for example, has no right to force the child to undergo treatment or to refuse a risky operation. In fact, the only means of influencing the minor's decision may be the doctor's explanation of the consequences of medical intervention or refusal of it. It is good if it concerns medical interventions that do not pose a threat to the life and health of the minor. But at present, a juvenile is often faced with the problem of making decisions alone in cases that pose a threat to his or her life and health. These are primarily problems such as substance abuse, dangerous diseases, including mental health problems, suicidal behavior, sexual identity disorders (the gender dysphoria) and other problems that minors find difficult to cope with on their own. Adolescents may conceal such information to avoid parental control and interference in their personal space. And a doctor is not obliged to seek out parents on his or her own to inform them about their children's health status.

It is obvious that giving an adolescent patient from the age of 15 the right to give "informed consent" or refusal of it himself and the absence in the law of a clearly enshrined obligation of the medical organization to inform the legal repre-

sentatives about the fact of application of a minor over 15 years old for medical help in the clinical practice of different specialists can be ambiguous.

In contrast to the daily practice of a paediatrician, the situation with teenage pregnancy requires special attention. Given a girl's right to make a decision from the age of 15, she may consent to abortion or be in favor of carrying the child to term. Doctors also find themselves in a difficult situation. According to the law, the doctor will not independently find the parents of the minor to inform them of their daughter's pregnancy, but will inform them of this fact only if they request it.

Another situation that requires a sensitive attitude on the part of doctors is related to the detection of STIs (sexually transmitted infections) in adolescents. In this case, the doctor's role is to inform the patient about his/her area of responsibility, but the question arises: despite their "adult" age, will every teenager be able to approach the situation reasonably, assess all the risks and bear responsibility? It should be noted that the law regarding HIV infection is stricter: according to part 2 of article 13 of Federal Law No. 38 "On preventing the spread in the Russian Federation of the disease caused by the human immunodeficiency virus (HIV-infection)" (dated 30.03.1995 in the edition of 14.07.2022), if HIV infection is detected in a minor under 18 years of age, the employee of the medical organization that conducted the medical examination notifies one of the parents or other legal representative [28].

Another difficult situation arises when an adolescent seeks psychotherapeutic help. As a rule, minors who conceal information about their health are afraid of judgement from their parents and do not want their closest relatives to learn about their problems. The relationship with parents is often the most important, difficult and stressful for a teenager. Sometimes disclosing information to parents can be harmful to adolescents, causing them moral distress. Fear of disclosure to parents may be one of the barriers to the adolescent's access to a therapist. This is a threat to the trusting relationship between the doctor and the adolescent patient.

It should be noted that the comments of the Legal Department of the Ministry of Health dated 25.12.2020 also do not definitively put an end to the issue of medical confidentiality for minors over 15 years of age. The response to the letter emphasizes that the Ministry of Health of Russia is not empowered to clarify the legislation of the Russian Federation in relation to the issue in question, accordingly, these explanations cannot be legally binding [13].

Despite the changes of Article 22 in 2020 that information about the state of health of minors over the age of 15 years is provided both by them and until they reach the age of majority to their legal representatives, the legislator has not yet made changes to Part 4 of Article 13 of the Federal Law No. 323 regulating the provision of information constituting a medical secret without the consent of the citizen.

As for minors themselves, many young people in social networks actively spoke out against the amendments to abolish medical confidentiality for adolescents. The reasons cited were the lack of trusting relationships between parents and children, the deliberately negative attitude of parents to a number of diseases, total control by parents, the possibility of their interference in personal life, the impossibility of discussing problems with a psychologist in secret from parents, and other arguments.

It should be noted that the teenage years is the most difficult period in the life of a child who does not yet have sufficient psychological maturity to make independent considered decisions. This is the time of personality formation, formation of most characterological types, intertwining of contradictory tendencies of social development. It is at this age that different typological variants of the norm ("accentuations of character") appear most vividly, as character traits are not yet smoothed and not compensated by life experience. For this period are illustrative of the negative manifestations, disharmony in the structure of personality, curtailing the previously established system of interests of the child, the protest nature of his behavior in relation to adults. At a transitional age, the child realizes that he is an individual, and tries in every way to prove it to everyone, and parents in the first place. He is not ready to be constantly under the care and control of parents, telling about health problems, preferring to discuss them with friends or simply ignoring them [4, 22, 29]. Some adolescents noted that the lack of confidentiality could cause minors to simply stop seeking help from doctors, making the situation even worse. Opponents of the cancellation of medical confidentiality for minors also note that not all parents will act in the interests of the teenager when dealing with medical issues; abuse of rights, threats and

blackmail by parents cannot be ruled out. The situation can be ambiguous in dysfunctional families, with the presence of family conflicts, indifferent or cruel treatment of the child, etc. In the environment of adolescents, the growth of criminal medical services is also possible.

Thus, our analysis of the state of the problem of medical confidentiality confirms that this is one of the urgent and vulnerable topics of ethical and legal regulation of medical activity, especially in paediatrics.

First of all, it is advisable to include in the legislation cases when the preservation of medical confidentiality in respect of minors over 15 years of age should be considered strict in order to protect their interests. This concerns cases involving the disclosure of the diagnosis of a particular disease, the stigmatization of a child, sometimes even the hospitalization in a drug treatment in the prevention institution, a gynecological clinic, and so on. It is unacceptable that such facts become known to the child's peers.

On the whole, the amendments to the Federal Law "On the Fundamentals of Health Care for Citizens in the Russian Federation", which provide that parents or other legal representatives of a child shall have the right to receive information on the health status of their children who have not reached the age of majority (18 years) but who have already reached the age of informed voluntary consent (15 years) to medical assistance and medical intervention, are assessed favorably. The legislator believes that this measure will help parents and other legal representatives to realize the right to bring up their minor children and wards.

The right of parents (legal representatives) to receive information on the health status of their minor children, including information on early pregnancy, sexually transmitted diseases, drug abuse, etc., is exercised only at their request. However, the legislator has not established a direct obligation of a medical organization to provide information on the health status of a minor patient to his/her legal representatives on its own initiative: a medical organization is obliged to respond only to a request from a legal representative on the health status of a minor. All this indicates an inconsistency in the mechanism of realization of the parents right to information on the state of health of their children.

In our opinion, raising the age at which information on the state of health of a child can be provided to his or her parents until the age of majority seems to be justified in general, since not all minors over the age of 15 can cope with health-related problems on their own.

At the same time, the new norm formulated in part 2 of Article 22 of Federal Law No. 323 needs to be specified by the legislator or in official explanations. It is necessary to provide a clearer explanation of Article 13 on the preservation of medical confidentiality in the practice of providing medical care to minors: what information and at what stage can or should be provided to legal representatives. Otherwise, uncertainty in the procedure for providing information about underage patients may lead to violations of their rights.

Undoubtedly, it is necessary to further improve the current legislation governing medical confidentiality for minors in order to ensure the consistency of the relevant provisions in various legislative acts of general and special norms, to establish a mechanism for taking into account the opinion of underage citizens and to create an adequate procedure for providing information and maintaining medical confidentiality in the process of providing them with medical care.

Of course, it is impossible for the law to reflect all possible situations arising in paediatric practice. And here we move from the legal plane to the sphere of ethics. Only a thinking doctor, from the standpoint of his experience, understanding of the psychology of the teenager and his legal representatives, informal approach will be able to make the right decision and give recommendations to the teenager to prevent the violation of interpersonal relations in the triad of doctor-adolescent-parents. In such conditions the professional and personal qualities of the doctor and his fulfilment of the principles of medical ethics play an important role. The doctor's role is to provide adequate information depending on the child's personality type, to gain the trust of the patient and his relatives, and to avoid conflict situations. The actions of a doctor working with children of different ages is a kind of creative process, they should not be limited only to his professional role, because he acts as an pedagogue, and as a psychotherapist, and, most importantly, as a direct agent of socialization of the child. It is very important to help the patient realize the value of his own personality, to teach him to accept himself as he is, with his disease, to help him believe in the effectiveness

of treatment, to guide him psychologically towards recovery or improvement of his condition.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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# OPTIMIZATION OF RADIATION PROTECTION OF CHILDREN DURING X-RAY EXAMINATION — EXISTING NATIONAL AND INTERNATIONAL APPROACHES

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**ABSTRACT.** The use of modern imaging modalities based on sources of ionizing radiation, is an essential part of system of medical care in pediatric practice. Fixed increase in availability and amount of X-ray imaging (radiography, computed tomography, interventional examinations, etc.) leads to corresponding increase in patient doses. To ensure the radiation safety of the population of the Russian Federation from medical sources of ionizing radiation, an integrated approach is applied using the basic principles of radiation safety — justification and optimization. One of the fundamental principles of radiation safety is the principle of optimization, which is reflected in all national legislative documents. Unfortunately, modern approaches to optimization of radiation protection of children are not sufficiently covered in these documents. The analysis of existing national and international regulatory documents has indicated significant differences in the implementation of optimization of radiation protection of children from X-ray examinations. In international practice, the optimization principle is widely used, based on the concept of diagnostic reference levels and quality assurance programs for X-ray examinations. The national legislative documents have been harmonized with the international documents (considering diagnostic reference levels, quality assurance programs, control of patient doses, etc.). However, they are hindered by incomplete development of practical methodology and lack of information about the specifics of radiation protection of children. In addition, current guidelines that define the quality assurance program do not cover all methods of X-ray examinations and do not contain any information about quality assurance programs for pediatric X-ray examinations. Therefore, the question of the need to improve the legal and regulatory framework in the field of radiation safety of children during X-ray examinations remains relevant.

**KEY WORDS:** X-ray diagnostics; radiation protection; radiation safety; X-ray examination; medical exposure; children.

# ОПТИМИЗАЦИЯ РАДИАЦИОННОЙ ЗАЩИТЫ ДЕТЕЙ ПРИ ПРОВЕДЕНИИ РЕНТГЕНОРАДИОЛОГИЧЕСКИХ ИССЛЕДОВАНИЙ — СОВРЕМЕННЫЕ ОТЕЧЕСТВЕННЫЕ И ЗАРУБЕЖНЫЕ ПОДХОДЫ

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**РЕЗЮМЕ.** Применение современных методов диагностики, в том числе с использованием источников ионизирующего излучения, является неотъемлемой частью системы оказания медицинской помощи в педиатрической практике. Повышение доступности и распространенности рентгенорадиологических исследований (рентгенологические исследования, компьютерная томография, интервенционные исследования и пр.) ведет к росту доз облучения пациентов. Для обеспечения радиационной безопасности населения Российской Федерации при медицинском облучении применяется комплексный подход с использованием основных принципов радиационной безопасности — обоснования и оптимизации. Одним из основополагающих принципов радиационной безопасности является принцип оптимизации, который отражен во всех отечественных нормативно-методических документах. К сожалению, вопросы оптимизации радиационной защиты детей в этих документах освещены недостаточно. Проведенный анализ существующих отечественных и зарубежных нормативно-методических документов показал наличие различий в реализации принципа оптимизации радиационной защиты детей при медицинском облучении. В зарубежной практике широко используется принцип оптимизации, основанный на концепции референтных диагностических уровней и программах обеспечения качества проведения рентгенорадиологических исследований. Отечественная нормативно-правовая база в вопросах оптимизации радиационной защиты гармонизирована с зарубежной (РДУ, программа обеспечения качества, контроль доз и пр.). Однако к ее недостаткам можно отнести неполную проработанность практической методологии и отсутствие информации о специфике радиационной защиты детей. Кроме того, действующие методические указания, которые определяют программу обеспечения качества, охватывают не все методы рентгенорадиологических исследований и не содержат какую-либо информацию о программах обеспечения качества в случае, если рентгенорадиологические исследования выполняются педиатрическим пациентам. Именно поэтому актуальным становится вопрос о необходимости совершенствования законодательной и нормативно-правовой базы в области радиационной безопасности детей при медицинском облучении.

**КЛЮЧЕВЫЕ СЛОВА:** лучевая диагностика; радиационная защита; радиационная безопасность; рентгенорадиологические исследования; медицинское облучение; дети.

## BAKCGROUND

Nowadays, the basic principles of patient protection from medical radiation exposure are reflected in all fundamental national regulatory documents [13, 16, 21]. Unfortunately, there is no information about the peculiarities of radiation protection of children in these fundamental documents, although many problems are unique for children's radiation diagnostics compared to adults. That is why taking into account the peculiarities of children's organism is an important element for providing effective medical care to the paediatric population.

Children have a number of peculiarities that cause differences in approaches to radiation protection between adults and paediatric patients during X-ray radiological examinations [10]. For example, it is necessary to take into account anatomical and physiological features of the child's body, differences in radiosensitivity of individual organs, tissues and the body as a whole in children at different age periods. Another factor that distinguishes imaging in children from imaging in adults is the continuous changes in the imaging of various organ systems during normal childhood development. In addition, children are characterised by a rather wide range of anthropometric characteristics, even within the same age category [30].

For the successful performance of radiotherapy in paediatrics, it is important to create a favourable and comfortable atmosphere for children. If necessary, immobilisation devices can be used to allow children to undergo X-ray radiological examinations without sedation, as young children are generally unable to remain still and in a certain position for the required time. X-ray radiological examinations should also take into account that verbal contact with children is not always possible, often parents or legal representatives of the child are involved in the X-ray radiological examinations process [30].

In addition, in recent years there has been an active introduction into medical practice of new equipment and techniques that significantly expand the possibilities of radiation diagnostics, but at the same time increase the radiation dose to patients. When applying new diagnostic methods, children can receive much higher doses per examination than adults, which requires special measures for planning and performing X-ray radiological examinations in children [1, 10, 14].

In this regard, the issue of radiation safety of patients, including children, is becoming more and more relevant. The basic principles of radiation protection of patients from medical exposure, which include the principle of justification and optimisation, are reflected in all fundamental domestic regulatory documents (The Federal law "On Radiation Safety of the Population", 99/2009, Basic Sanitary Rules For Radiation Safety (BSRFRS)-99/2010), as well as in a number of guidelines and recommendations (Methodological Recommendations 2.6.1.0066-12, Methodological Guidelines 2.6.1.2944-11, Methodological Guidelines 2.6.1.1892-04, etc.). Unfortunately, these documents contain almost no information on the specifics of exposure and radiation protection measures for children. In addition, most of the presented documents need to be updated [6, 7, 9, 13, 16, 21].

## AIM

The aim is to conduct a comparative analysis of existing Russian and foreign approaches to optimise radiation protection of children under medical exposure and to identify elements of radiation protection that need to be updated.

## RESULTS

Radiation safety of patients of any age should be ensured for all types of medical irradiation, provided that the maximum benefit from X-ray radiological procedures is achieved and negative radiation-induced effects on the organism are minimized [3, 4, 13, 16, 30, 31]. The main tool for realizing this goal is the use of the fundamental principles of radiation safety, the main one of which is the principle of optimization [13, 16, 21, 30, 31].

### *The optimization principle*

The aim of X-ray radiological examinations optimization is to obtain high-quality diagnostic information with the lowest achievable radiation exposure taking into account social and economic factors [3, 19, 20, 36]. Optimization of X-ray radiological examinations in children is of particular importance because the risk of radiation effects in children is higher than in adults, and children have a longer life expectancy during which these effects may manifest themselves [10, 43].

Optimization of radiation protection includes improvement of X-ray radiological equipment, compliance of technical parameters of the equipment, and quality control of performed radiation diagnostics [13, 16, 19, 20].

According to Basic Sanitary Rules For Radiation Safety 99/2010 [16], optimization of radiation protection of patients in radiotherapy diagnostics should be implemented by the following means:

- the use of appropriate equipment and techniques in which the patient receives the lowest dose necessary to obtain an image or other diagnostic information of adequate quality;
- the use of diagnostic reference dose levels (DRDLs) for individual examinations;
- measuring or calculating the dose received by patients;
- ensuring the quality of the studies.

The first step in the optimization process is the selection of appropriate equipment for radiotherapy. The use of appropriate equipment and associated software is an important component of successful X-ray radiological examinations. It is advisable to use equipment (X-ray machines, CT scanners, etc.) designed specifically for children, especially in facilities with a high paediatric patient load. Radiological equipment used for X-ray radiological examinations in children should have the widest range of settings to optimize the protection of children [3, 19, 20].

Commissioning of radiology equipment should include prospective evaluation of patient doses and image quality parameters. In addition, paragraph 3.171 of GSR Part 3 [3] requires that even after any significant maintenance or repair work has been carried out, periodic measurements of the physical parameters of the medical equipment should be carried out (a monitoring of operational parameters [16]). In international practice, many documents from international and national organizations, as well as national and regional professional bodies, have been developed that provide detailed guidance on the quality control tests that should be performed at the recommended frequency [22–25, 29, 33–35].

As most radiology equipment and medical imaging protocols are designed for adult patients, X-ray radiological examinations may need to be modified for paediatric use. One of the key practical methods of optimization is to control the technical parameters of X-ray radiological examinations in order to achieve the lowest possible radiation dose to obtain a high-quality diagnostic image. For this purpose it is recommended to take into account anthropometric parameters of the patient [3, 30]. The radiologist should know the features of all parameters and protocols and understand which one to choose in each case. The parameters of medical imaging protocols are subject to periodic review to ensure adequate diagnostic image quality, effective low-radiation performance and minimization of patient exposure [30].

An important component of optimizing radiation protection of children is the introduction of a system of diagnostic reference levels (DRL) recommended by the International Commission on Radiological Protection as a measure to reduce radiation dose to patients. DRL are defined as the value of a selected dose value for standard X-ray radiological examinations performed on standard equipment, for standard patients or phantoms, and are set as the 75th percentile of the distribution of dose values associated with the selected X-ray radiological examinations [19, 20, 31, 38, 39, 44, 45].

All X-ray radiological examinations performed in children, whether associated with high dose or low dose, should have an DRL. To determine paediatric DRL values, in addition to the generally accepted grading by age, it is useful to set DRLs based on anthropometric characteristics, as anthropometric data of children can vary widely within even a single age period [30].

A key goal of using DRLs is to keep patient doses as low as possible to achieve high image quality and the necessary diagnostic information [19, 20, 31, 38]. The DRL serves as a means of checking whether a patient's exposure level is greater than is sufficient to provide reliable diagnostic information. Whenever DRLs are consistently exceeded, appropriate investigations to identify the causes and corrective actions to improve clinical practice should be taken immediately. In addition, DRL should be reviewed and updated regularly, in particular when equipment or examination methods change [31].

It is important to note that exceeding DRL for individual patients is not a violation of radiation protection requirements. DRL are not a standard, but are used as a reference dose value for the purposes of internal quality control of procedures [40–42]. The established DRLs make it possible to identify medical organiza-

tions or radiotherapy departments where radiation protection of patients should be optimized in the first place [37, 38].

In foreign practice, the establishment of DRL and the use of the optimization principle are an integral element of patient protection at the international [3, 4], European [26, 32] and national [28, 46, 47] levels. International [26, 47] and national data collection programs to determine patient doses and revise DRL values are regularly conducted [27, 28, 46].

In the Russian Federation, the principle of optimization is enshrined at all levels of legislation on radiation protection in medicine. In the Federal Law No. 3 "On Radiation Safety of the Population", the optimization principle is formulated as a principle of medical radiation protection [21]. The principle of optimization is formulated as keeping individual doses and the number of exposed persons at any source of ionizing radiation at the lowest and achievable level, taking into account economic and social factors.

In BSRFRS -99/2010 [16] the principle of optimization of patient protection is formulated in the clause 4.7 as the achievement of a useful medical effect of X-ray radiological examinations, diagnostic information of high quality or therapeutic results at the lowest possible exposure levels. The clause 4.8 contains the main ways of ensuring the optimization process. In Radiation Safety Norms-99/2009 [13] the principle of optimization is formulated similarly to BSRFRS-99/2010, but additional information isn't provided.

One of the most effective ways of optimization is the use of DRL. The concept of DRL is described in detail in Methodological Recommendations 2.6.1.066-12 "Application of DRL for optimization of radiation protection of the patient in general-purpose radiological examinations" [6]. However, in practice the optimization principle is implemented formally. One of the reasons is the absence of medical physicists in the staff of radiology departments. The existing radiation safety system is mainly oriented to medical personnel. An improvement and complication of modern methods of radiation diagnostics do not allow medical staff to perform the dosimetry of patients, analysis of their exposure levels, establishment of low-dose protocols properly [2].

It is recommended to periodically review DRL, for example, every 3–5 years. The specifics of setting and using DRL in paediatric practice are not described in Methodological Recommendations 2.6.1.066-12.

It should be noted that MR 2.6.1.3387 "Radiation Protection of Children in Radiation Diagnostics" and methodological recommendations "Hygienic Requirements for Limiting Radiation Doses to Children in Radiological Investigations" [5, 10] are fully devoted to radiation protection of children.

However, despite the fact that the main emphasis is placed on children, the activities are more theoretical than practical. However, the peculiarities of radiological exposure of children and a number of methods to limit and reduce radiation exposure are specified. For example, it is recommended to focus on the justification of procedures and to exclude examinations that are not necessary, to use alternative non-ionizing imaging methods, to use modern X-ray equipment and individual means of patient protection. Protocols for X-ray radiological examinations of children should take into account the age characteristics of patients, their anthropometric characteristics, disease specifics, equipment features and requirements for personnel. The guidelines «Hygienic requirements for limiting radiation doses to children during radiological examinations» also pay attention to private methods of radiological examination of children — radiography and rentgenoscopy, as the most frequently used ones [5].

### *Quality assurance program*

Organizational measures aimed at the improvement of radiation protection of patients, including children, are an integral part of the optimization. Such measures include a comprehensive quality assurance program that includes aspects of quality control and continuous improvement of the quality of radiotherapy diagnostics (GSR Part 3, paragraph 3.170 and 3.182) [3].

To provide radiation safety of the public, patients and staff, it is necessary to carry out quality control activities, which include the following sections: control of diagnostic and auxiliary equipment, ensuring radiation safety of patients, education and re-education of personnel involved in the process of X-ray radiological examinations [11, 12].

An important component in this process is medical equipment. For the staff of a medical facility that uses ionizing radiation sources in its

practice, special training in the use of equipment or software should be provided. There should be a full understanding of the characteristics of the equipment, terminology or software, including the associated implications for radiation protection of patients and staff [3].

Quality control of equipment includes performing maintenance, identifying worn and damaged parts, checking the operation of all protective devices and interlocks, having and maintaining reporting forms, and monitoring the technical condition of the equipment. In addition, it is necessary to carry out daily control procedures, parameter constancy tests and calibration of diagnostic and auxiliary equipment, as well as control of microclimate of premises for compliance with sanitary and epidemiological requirements and operating conditions recommended by the equipment manufacturer [3].

In medical organizations the control of radiation doses to patients is mandatory. Paragraph 3.168 of GSR Part 3 requires that patient dosimetry should be performed during X-ray radiological examinations [3]. In foreign practice, X-ray machines are equipped with clinical dosimeters and integrated into a unified PACS (Picture Archiving and Communication System) or RIS (Radiological Information System), which allows collecting and recording data automatically. Knowledge of typical doses forms the basis for the application of dose reduction methods within the framework of optimization. Image storage capabilities allow for methodical evaluation and documentation of information without creating additional images reducing the patient's dose.

Another key point is the training of medical staff in radiation protection. All procedures, especially high-dose procedures, should be performed by experienced paediatric staff because of the potential high dose to patients. Mechanisms for improving the competence of health care professionals in radiation protection include traditional education and training, such as in medical school, or specialized training for the profession, web-based or on-the-job training [3].

Professional organizations and communities play a role in ensuring radiation protection and safety in the medical use of ionizing radiation. Their functions may include setting standards for training, qualifications and competence in a given area of specialization and publishing guidance for practice. Professional organizations should play a leading role in developing principles of patients referral for investigation when justifying medical exposures for each patient. In addition, professional organizations and communities promote the dissemination of accurate information on radiation protection and safety for physicians, patients and their parents.

The main current national regulatory and methodological documents on radiation protection of patients and medical staff do not address the issues of quality assurance in radiation diagnostics. These documents address only some aspects of quality control within the framework of the program of control of technical parameters of diagnostic equipment [13, 15, 16].

Current guidelines, which define the quality assurance program, include requirements for control of diagnostic and auxiliary equipment, ensuring radiation safety of patients, as well as requirements for training and retraining of personnel involved in the process of diagnostic examinations (Methodological Guidelines 2.6.7.3651-20, Methodological Guidelines 2.6.7.3652-20) [11, 12]. But, unfortunately, they do not include all X-ray radiological examinations — only computer tomography (CT), positron emission tomography (PET) and PET/CT methods. In addition, these documents do not contain any information on quality assurance programs for X-ray radiological examinations performed on paediatric patients.

The system of monitoring and recording patient doses is an integral part of radiation protection optimization. In the Russian Federation, this system is implemented in all medical organizations within the framework of the USCID (unified system of control and accounting of individual radiation doses to citizens) and statistical reporting form No. 3 "Information on patient doses during medical X-ray radiological examinations" [17, 18]. Within the framework of this system, it is possible to obtain information on collective and average effective doses for the most common X-ray radiological examinations (radiography, fluoroscopy, computed tomography, interventional studies, etc.) at the level of a medical organization. Unfortunately, the reliability of these data is low because the doses of individual patients are not taken into account and are averaged over the entire medical organization.

Estimated dose values (effective dose) are used to estimate radiation doses to individual

patients. Measured dose values are not centrally collected. Effective doses are calculated using transition factors (from measured dose to effective dose) [8, 9]. These transition factors are developed for a limited number of X-ray radiological examinations and age categories, and only if they correspond to the study parameters for which the transition factors were calculated. In the absence of an appropriate set of study parameters or when new study methods are introduced, it is difficult to calculate the effective dose. Therefore, typical effective doses are used without taking into account the specifics of individual patients and peculiarities of the study in each particular case. As a consequence, it is reasonable to improve the methods of assessment of patient doses and radiation risks during X-ray radiological examinations.

Control of diagnostic and auxiliary equipment and the quality of operational parameters is carried out in all medical organizations. It should be noted that, as a rule, it takes place only within the framework of maintenance. A sufficient number of medical physicists in the staff of medical organizations is required to implement this process in daily practice.

## CONCLUSION

Thus, in despite of the fact that the domestic regulatory and legal framework for radiation protection optimization is harmonized with foreign ones (DRL, quality assurance program, dose control, etc.), its defects include incomplete elaboration of practical methodology and lack of information on the specifics of radiation protection of children. Unfortunately, there is no information on the means and specifics of radiation protection of children in the fundamental documents, although taking into account the peculiarities of children's organism is a necessary link for providing effective medical and preventive care to the child population.

The development of measures to control and assess the effectiveness of X-ray radiological examinations in the Russian Federation is entrusted to the Federal Service for Supervision of Consumer Rights Protection and Human Welfare. However, as this is outside its competence (for example, to monitor the correctness and accuracy of measurements of operational parameters), the implementation of the optimization process should be carried out jointly with the Ministry of Health of the Russian Federation, which is currently planned to be done within the framework of the draft of the new Federal Law on Radiation Safety of the Population. In addition, quality criteria and regular audits should be introduced into the practice of medical institutions as an element of radiation protection.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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# MANUFACTURING OF MEDICAL INSTRUMENTS IN THE FIRST PERIOD OF THE GREAT PATRIOTIC WAR

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**ABSTRACT.** Despite the available information that the USSR had been preparing for war events, those of June 22, 1941 were a surprise. In the early days of the beginning of the Great Patriotic War, obvious shortcomings were revealed in planning the deployment of sectors of the national economy important for defense, including the location of most of the warehouses and enterprises of strategic importance near the country's western borders. The heroic efforts of the military and civilians to evacuate medical warehouses, industrial enterprises and their staff turned out to be ineffective. Already in the summer of 1941, it became clear that the country tool industry was not able to function in full force, warehouses with ready-made medical products were lost, and supply chains were destroyed. The Government of the Soviet Union promptly reacted to the situation, as evidenced by the Order of the People's Commissariat of Health of the USSR No. 379 issued on August 5, 1941, which transferred the production of medical instruments to a military footing. The restructuring of the work was carried out under the leadership of the Technical Council of the People's Commissariat of Health of the USSR, alongside the practical implementation at the factories of the Glavka of the medical instrumental industry (Glavmedinstrumentprom). A key role was played by the initiative which started in the years of the pre-war five-year plans to improve production work, which became a huge stepping stone during the war. As a result, in the most difficult conditions for industry in the first years of hostilities, it became possible to increase the implementation of the production plan and improve labor discipline, which was the contribution of the rear and, on the whole, ensured the Victory of the Soviet people in the Great Patriotic War.

**KEY WORDS:** history of medicine; medical products; medical instrument; Glavinstrumentprom; the Great Patriotic War.

# ПРОИЗВОДСТВО МЕДИЦИНСКИХ ИНСТРУМЕНТОВ В ПЕРВЫЙ ПЕРИОД ВЕЛИКОЙ ОТЕЧЕСТВЕННОЙ ВОЙНЫ

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**РЕЗЮМЕ.** Несмотря на имеющиеся сведения о том, что СССР готовился к войне, события 22 июня 1941 года оказались неожиданностью. В первые дни Великой Отечественной войны вскрылись ошибки в планировании дислокации отраслей народного хозяйства, важных для обороны, в том числе это касается расположения большей части складов и предприятий, имевших стратегическое значение, у западных границ страны. Героические усилия военных и гражданских лиц по эвакуации медицинских складов, промышленных производств и трудящихся на них лиц оказались малоэффективными. Уже летом 1941 года стало понятно, что инструментальная промышленность в нашей стране не способна полноценно функционировать, склады с уже готовыми медицинскими изделиями были потеряны, а логистические цепочки разрушены. На ситуацию оперативно реагировало Правительство Советского Союза, о чем свидетельствует вышедший 5 августа 1941 года Приказ Наркомздрава СССР № 379, который переводил изготовление медицинских инструментов на военные рельсы. Перестройка работы проводилась под руководством Технического совета Наркомздрава СССР, практическая реализация — на заводах Главка медицинской инструментальной промышленности (Главмединструментпром). Ключевую роль сыграл начатый еще в годы довоенных пятилеток почин по совершенствованию производственной работы, что стало огромным заделом во время войны. В результате, в тяжелейших для промышленности условиях первых лет боевых действий, удалось увеличить выпуск медицинских изделий, что было еще одним вкладом тыла в Победу советского народа в Великой Отечественной войне.

**КЛЮЧЕВЫЕ СЛОВА:** история медицины; медицинские изделия; медицинский инструмент; Главмединструментпром; Великая Отечественная война.

## INTRODUCTION

In the available literature there were no scientific articles devoted to analysis of medical instrument industry in early Great Patriotic War and measures taken to re-organize production to comply with military activities. Yet, historical experience in the current contexts of confrontation between Russia and the West might be rather useful.

The sudden treacherous attack of Nazi Germany made it impossible to remove most of the warehouses with medical instruments from the western, subsequently occupied, territories of the USSR. Major-General of Medical Service P.M. Zhuravlev testified about the loss of large stocks of medical equipment concentrated in the border districts already in the first days of the war. However, due to heroic efforts of the Red Army and the authorities, more than 1200 wagons of medical products and several enterprises with employees were evacuated to the back areas of the country [5, 24]. At the same time, already at the beginning of the Great Patriotic War there was a shortage not only of medical devices, but also of resources and production capacities for their manufacturing. In summer and autumn of 1941 Great Britain and the United States initiated delivery of medical devices to the USSR, but the volumes were clearly insufficient [23]. Both civilian health care and military medics had problems with medical

products. Surgeons used to construct self-made devices for drip transfusion. As an example, V.S. Yurov made the device for drip transfusion using a glass tip of an Esmarch mug and an eye pipette, and demonstrated it at the conference of surgeons of the Voronezh front (10-13.11.1942) [4]. The necessity to take urgent measures, despite the catastrophe at the front, is emphasized by the Directive of the People's Commissariat of Health of the USSR No. 379 "On increasing of production of most important medical instruments, devices and equipment" issued on 5 August 1941 [2].

## AIM

To show putting the industry of medical instruments production on war footing in the early phase of the Great Patriotic War.

## OBJECTIVE

Search and actualization of materials evidencing the huge work on changing the nomenclature of medical devices, and improving production processes during wartime. The scientific novelty of the research is that for the first time, on the basis of archival materials brought into scientific circulation, we described governmental operational management of vital medical instruments production in wartime. The historiography was enriched with previously unpublished data on one of the branches of the USSR national economics, reorganized during wartime.

## MATERIALS AND METHODS

The system-analytical method was applied on the basis of search and exploration of archival documents of the State Archive of the Russian Federation (SARF) and the Russian State Archive of Economics (RSAE), previously not introduced into scientific circulation.

## RESULTS

Following the directive of the People's Commissariat of Health of the USSR, more than 150 items of medical products were withdrawn from production (Table 1), which allowed to increase output of most in-demand products in current circumstances (Table 2).

In 1941:

1. Technical specifications for surgical instruments and medical devices were developed and approved by the Technical Council of the USSR People's Commissariat of Health.
2. The nomenclature of manufactured products was revised. Products that are not essential in wartime were taken out of production (Tables 1, 2).
3. A new manufacturing process of fittings for "Record" syringes was applied in order to replace bar brass with sheet brass.
4. A new method of manufacturing of Kocher and Pean arterial splints, anatomical and surgical tweezers was introduced at the V.I. Lenin Surgical Instruments factory, which made it possible to save metal and improve the quality of products.
5. The Surgical Instruments factory named after M. Gorky began self-supply of semi-finished products due to installation and mastering of forging equipment.
6. At the factory of disinfection equipment No. 1 in Penza the method of welding developed by Academician E.O. Paton was mastered.
7. Systems of electromedical devices were reconstructed and chromium plating of electric lamps was introduced.
8. Structural and component drawings for medical items and technical processes for them were approved.
9. The nomenclature of products made of non-ferrous and deficient metals was revised in order to replace them with non-deficient ones, plastics, wood and others.
10. Many medical products were upgraded to improve their quality and simplify the manufacturing process.
11. New products were developed: flexible saws Olivekron, «Record» syringes of continuous action and with bayonet lock needle, disinfection chamber type APK (at the Kazan Auto Body Factory), straight and angular tips for dental drills, as well as mass production of Miller needles (at the factory "Tehnolog") [13].

In 1942 this work was continued as follows:

1. A wooden frame for C-1 chamber was designed.
2. Skinning of Diterichs splint parts was mechanized.
3. Lock-nut stamping was introduced.
4. Elimination of reflective sheets in C-1 chamber furnaces.

*Table 1*

List of products removed from the production of Glavmedinstrumentprom factories from 15.08.1941 [2]

*Таблица 1*

Список изделий, снимаемых с производства заводов «Главмединструментпрома» с 15.08.1941 года [2]

1. Агглютиноскопы / Agglutinoscopes
2. Аппарат Брауна для смешанного наркоза / Brown apparatus for mixed anesthesia
3. Аппарат Ланге / Lange apparatus
4. Аппарат Лемана / Lehman apparatus
5. Аппарат Соколовского / Sokolovsky apparatus
6. Векорасширитель Мелингера на оба глаза / Melinger's eyelid speculum for both eyes
7. Векоподъемник ветеринарный / Veterinary eyelid lifter
8. Дилататоры Кольмана для передней и задней уретры / Kolman dilators for anterior and posterior urethra
9. Долота хирургические прямые 8, 10 и 12 мм / Straight surgical chisels 8, 10 and 12 mm
10. Долота по Коллену 8, 10 и 12 мм / Chisels according to Collen 8, 10 and 12 mm
11. Долота по Коллену желобоватые 10, 12 и 14 мм / Collen bits are grooved 10, 12 and 14 mm
12. Долота Лякке / Lakke bits
13. Дрель костная с 6 сверлами / Bone drill with 6 drills
14. Детские костные кровати / Children's bone beds
15. Жомы кишечные эластичные прямые и изогнутые / Intestinal sphincter elastic straight and curved
16. Жомы Мейо / Mayo clamps
17. Жомы Спасокукоцкого / Spasokukotsky clamps
18. Зеркало Келли / Mirror Kelly
19. Зеркало Киллиана большое 90 см / Killian mirror large 90 cm
20. Зеркало Френкеля детское / Frenkel's mirror for children
21. Зонд Труссо / Trousseau probe
22. Зеркало ушное Гартмана широкое / Hartmann's ear speculum wide
23. Зонды Баумана пуговчатые / Bauman probes bellied
24. Зажим носовой Зефиана / Zefian nose clip
25. Иглодержатель Матье 14 см / Needle holder Mathieu 14 cm
26. Иглодержатель Троянова / Troyanov's needle holder
27. Иглодержатель для сосудистого шва всех размеров / Needle holder for vascular suture of all sizes
28. Игла парацентезная Люце / Luce Paracentesis needle
29. Инструмент для сближения ребер / Costa Approach Tool
30. Инструмент для держания щеки П формы / U shape cheek holding tool
31. Иглы Галле / Halle needles
32. Инструмент для держания щеки 1 формы / Tool for holding the cheek 1 form
33. Клеммы Коллена всех размеров / Collen terminals in all sizes
34. Клеммы Робертса / Roberts terminals
35. Крючки Фолькмана 3-х зубчатые тупые и острые / Volkmann hooks 3-toothed blunt and sharp
36. Крючки Греффе для операции косоглазия большой / Greffe hooks for strabismus surgery large
37. Крючки для хордотомии правые и левые / Hooks for chordotomy right and left
38. Кюретки Ольгаузена тупые и острые № 1, 3 и 5 / Curettes Olgausen blunt and sharp No. 1, 3 and 5
39. Крючки Шмидта для миндалин / Schmidt hooks for tonsils
40. Конхотом Гартмана № 2 / Conchotom Hartmann № 2
41. Конхотом Гартмана № 4 / Conchotom Hartmann № 4
42. Крючки ушные Гартмана острые / Hartmann Ear hooks sharp
43. Крючки острые Фразье / Frazier sharp hooks
44. Крючки глазные Крюкова / Kryukov Eye hooks
45. Крючки Ру пластинчатые / Hooks Ru lamellar
46. Крючки Брауна / Brown Hooks
47. Кресло Симса / Sims chair
48. Кровать Рахманова / Rakhmanov's bed
49. Кровать клиническая / Clinical bed
50. Конхотом Гартмана № 1 / Conchotom Hartmann № 1
51. Конхотом Гартмана № 3 / Conchotom Hartmann № 3
52. Конхотом Грюнвальда Гартмана № 2 / Conchotome Grunwald Hartmann №2
53. Конхотом Штруйкина / Conchotom Shtruikin
54. Компрессор по Корвену / Korven compressor
55. Ложки изогнутые для гайморовой полости гибкие 3-х размеров / Curved spoons for the maxillary cavity, flexible, 3 sizes
56. Ложки по Мартелю 3-х размеров / Spoons according to Martel 3 sizes

*Продолжение табл. 1 / Continuation of table 1*

57. Ложки для операций в уретре / Spoons for operations in the urethra
58. Ложки глазные по Гебре 4-х размеров / Eye spoons according to Gebra, 4 sizes
59. Ложки Аксенфельда для передней и задней стенки / Axenfeld spoons for the front and back wall
60. Ножницы прямые тупоконечные 13,5 см и 16,6 см / Scissors straight blunt 13.5 cm and 16.6 cm
61. Ножницы остроконечные и Рихтера 14,5 и 17,5 см / Pointed scissors and Richter 14,5 and 17.5 cm
62. Ножницы Купера 17,5 см / Cooper scissors 17.5 cm
63. Ножницы нейрохирургические, Оливекрона, Шмидта и по Денди / Neurosurgical scissors, Olivekron, Schmidt and Dandy
64. Набор долот Лякко / Set of chisels Lyakko
65. Ножи для снятия гипсовых повязок Эсмарха / Knives for removing Esmarch's plaster casts
66. Ножи фистульные брюшистые и остроконечные / Fistula knives, belly and pointed
67. Ножи Тобольда / Tobold knives
68. Ножи для хордотомии по Фразье / Frazier cordotomy knives
69. Ножи для вскрытия мозговой оболочки / Knives for opening the meninges
70. Ножи Вебера для слезного канала прямой / Weber knives for the lacrimal canal straight
71. Ножницы реберные Нельсона / Nelson rib scissors
72. Ножницы реберные Пильтца / Piltz rib scissors
73. Набор инструментов для изготовления и наложения клипс / A set of tools for making and applying clips
74. Нож Галле / Galle Knife
75. Ножницы Зибольда / Siebold scissors
76. Ножницы Нельсона / Nelson's scissors
77. Нож фаланговый / Knife phalanx
78. Нож Киллиана Белленджера / Killian Bellenger Knife
79. Нож для нервного ствола / Knife for the nerve trunk
80. Нож Гюнтера серповидный / Günther sickle-shaped knife
81. Нож акушерский ветеринарный скрытый / Hidden obstetric veterinary knife
82. Нож акушерский крючковатый / Obstetrical hooked knife
83. Нож Эшле для вспарывания миндалин / Ashle knife for ripping tonsils
84. Набор для интубации / Intubation kit
85. Набор кюреток с ручкой Краузе и Вагнера / Curette set with Krause and Wagner handle
86. Подъемник для лопатки / Blade lifter
87. Пинцет для вскрытия 10 см / Tweezers for opening 10 cm
88. Пинцет Снеллена для левого и правого глаза / Snellen tweezers for the left and right eyes
89. Пинцет ушной Трельча с крючком / Ear tweezers with hook
90. Пинцеты для гипофиза 3-х размеров / Pituitary forceps 3 sizes
91. Прожектор Киллиана / Killian Spotlight
92. Пелот Шнекка / Pelot Schnekk
93. Пластинка Рабиновича / Rabinovich plate
94. Петля (тонсилотом) Тидинга / Tiding's loop (tonsilotome)
95. Прибор для исследования слуха / Device for the study of hearing
96. Подъемник Зауэрбруха / Sauerbruch lift
97. Пинцеты для вскрытия 12 см / Tweezers for opening 12 cm
98. Пинцеты для фиксации Греффа без замка / Tweezers for fixing Greff without a lock
99. Пинцеты Бизальского / Bizalsky tweezers
100. Пинцеты Домберга / Domberg Tweezers
101. Петля (тонсилотом) Бюнингса / Bunings Loop (tonsilotome)
102. Петля Скеллена / Skellen loop
103. Петля пиявки Гертлю / Gertlu leech loop
104. Ранорасширитель для ляменктомии / Lamenctomy retractor
105. Ранорасширитель по Шереру / Scherer retractor
106. Ранорасширитель по Аксенфельду / Axenfeld retractor
107. Ранорасширитель по Адсону / Adson retractor
108. Распатор реберный Робертса / Roberts costal raspator
109. Распатор Лангенбека режущий снизу / Langenbeck raspator cutting from below
110. Распатор по Виллингеру / Villinger Raspator
111. Стол Хоулли / Holly's table
112. Скальпели Коллена всех размеров / Collen's scalpels of all sizes
113. Скальпели остроконечные изогнутые / Scalpels pointed curved
114. Турникет Лимберга / Limberg Turnstile
115. Трубки трахеотомические с обтуратором / Tracheotomy tubes with obturator
116. Тонсилотомы Матье всех размеров / Mathieu tonsilotomas of all sizes

*Окончание табл. 1 / Ending of table 1*

117. Шприц Анеля / Anel's syringe
118. Шприц Жане 100,0 и 200,0 с металлическим поршнем / Janet syringe 100.0 and 200.0 with metal plunger
119. Шприц Жане с резиновыми всех размеров / Janet Syringe with rubber all sizes
120. Шприц непрерывного действия / Continuous syringe
121. Шпатель мозговой с освещением / Brain spatula with lighting
122. Шабера Кунти прямой и изогнутый / Shabera Kunti straight and curved
123. Шкафы медицинские металлические / Metal medical cabinets
124. Шприц для парафина / Paraffin syringe
125. Щипцы Янсена-Штилле со 2-й передачей / Jansen-Stille tongs with 2nd gear
126. Щипцы Борхардта с 2-й передачей / Borchardt tongs with 2nd gear
127. Щипцы Гудзона / Hudson tongs
128. Щипцы Листона прямые со 2-й передачей / Liston forceps straight with 2nd gear
129. Щипцы Кофлера / Kofler forceps
130. Щипцы Олье, изогнутые по ребру / Ollie forceps curved along the rib
131. Щипцы для держания трубчатых костей по Олье / Forceps for holding tubular bones according to Olya
132. Щипцы для держания кости по Коллену / Forceps for holding bone according to Collen
133. Щипцы для кускования опухоли всех видов / Forceps for lumping tumors of all types
134. Щипцы для биопсии по Антуану большие и малые / Antoine biopsy forceps large and small
135. Щипцы Зенгера / Zenger forceps
136. Щипцы зубные № 1,2, 51а, 79, 37, 39, 13-с, 22-с, 67, 7, 20, 30, 31, 59, 58 / Tooth forceps No. 1,2, 51a, 79, 37, 39, 13-s, 22-s, 67, 7, 20, 30, 31, 59, 58
137. Щипцы ушные с острыми ложечками / Ear forceps with sharp spoons
138. Щипцы Юраша / Yurash tongs
139. Щипцы для извлечения пуговиц и булавок / Pliers for extracting buttons and pins
140. Щипцы Шнейдера / Schneider forceps
141. Щипцы Шумахера / Schumacher forceps
142. Щипцы Люка / Luke's tongs
143. Щипцы Цителли / Citelli Forceps
144. Щипцы Брюнингса для перегородок / Bryunings septa tongs
145. Щипцы Винтера / Winter's tongs
146. Щипцы Гофа / Gough tongs
147. Щипцы Гейкена / Heiken forceps
148. Электроингалятор масляный / Electric oil inhaler
149. Биксы 28х16 / Beaks 28x16
150. Пинцеты Геана 10 см (входит в глазной набор) / Gean's tweezers 10 cm (included in the eye kit)
151. Ножи Тобольда (входит в отоларингологический набор и заменен ножом для 4-го миндалика) / Tobold knives (included in the otolaryngological set and replaced by the knife for the 4th tonsil)»
152. Ложки костные № 3 малые (входят в большой операционный набор и в нейрохирургический набор) / Small bone spoons № 3 (included into the large operating set and in the neurosurgical set)
153. Пинцеты Кохера 14 см (входят в большой хирургический ветеринарный набор) / Kocher's tweezers 14 cm (included in the large surgical veterinary kit)
154. Щипцы Мориц Шмидта (входят в отоларингологический набор) / Forceps Moritz Schmidt (included in the otolaryngological set)
155. Щипцы Федерона почечные (входят в большой операционный набор) / Federon renal forceps (included in a large operating set)

Improvement of production process, including manufacturing cost reduction, initiated before the Great Patriotic War, continued actively [6, 14]. In 1941, the difference between planned and actual costs decreased 5 times compared to 1940, when it was about 10% (Fig. 1).

The work carried out turned out to be effective. The number of the majority of manufactured medical products, as well as the number of gross and marketable products in general, exceeded the pre-war level (Tables 3 and 4). The required limits of production were exceeded, being 107.1% at average in 1940 [8], 125–130% in 1941 [15], and 109.2% in 1942 [20]. The proportion of defective products in 1941 (1624 thousand roubles (3.4%)) increased compared to 1940 (3116 thousand roubles (2.78%)) [7], but already in 1942 (1386 thousand roubles (3.0%)) the number of rejects came close to the pre-war rates [21]. Obviously, the ongoing reorganization of production in the chaos of the first year of the war caused growth of defective products, which decreased in 1942 as the work was adjusted. The net profit of "Glavmedinstrumentprom" enterprises in the early period

*Table 2*

A list of the main products, the output of which is increased due to those discontinued [1, 3]

*Таблица 2*

Список основных изделий, выпуск которых увеличивается за счет снимаемых с производства [1, 3]

| **Наименование изделия / Name** | **Увеличение выпуска на... (шт.) / Increase in output by... (pcs.)** |
|---|---|
| Пинцеты Кохера 13 см / Kocher tweezers 13 cm | 25 000 |
| Пинцеты Пеана 12 см / Pean tweezers 12 cm | 25 000 |
| Пинцеты анатомические 13 см / Anatomical tweezers 13 cm | 28 000 |
| Пинцеты хирургические 13 см / Surgical tweezers 13 cm | 22 000 |
| Иглодержатели Матье 17 см / Mathieu Needle holders 17 cm | 15 000 |
| Корнцанги прямые и изогнутые 26 см / Forceps straight and curved 26 cm | 10 000 |
| Скальпели брюшистые / Belly scalpels | 50 000 |
| Скальпели остроконечные / Pointed scalpels | 50 000 |
| Скальпели глазные брюшистые средние / Scalpels ophthalmic medium abdominal | 5000 |
| Скальпели брюшистые остроконечные / Scalpels abdominal pointed | 5000 |
| Шприцы «Рекорд» / Syringes “Record” | 30 000 |
| Иглы к шприцам / Needles for syringes | 1 000 000 |
| Иглы для переливания крови / Needles for blood transfusion | 50 000 |
| Каркасы для лечения ожогов / Scaffolds for burn treatment | 10 000 |
| Щипцы для держания кости по Фарабефу / Forceps for holding bone according to Farabef | 5000 |
| Долота Ламботта 13 см / Chisels Lambotta 13 cm | 10 000 |
| Столы операционные походные / Surgical operating tables | 1000 |
| Установка Брауна / Brown's device | 3000 |
| Ножницы Купера / Cooper's scissors | 40 000 |
| Маски для наркоза / Masks for anesthesia | 8000 |
| Тележки с носилками / Trolleys with stretchers | 1000 |

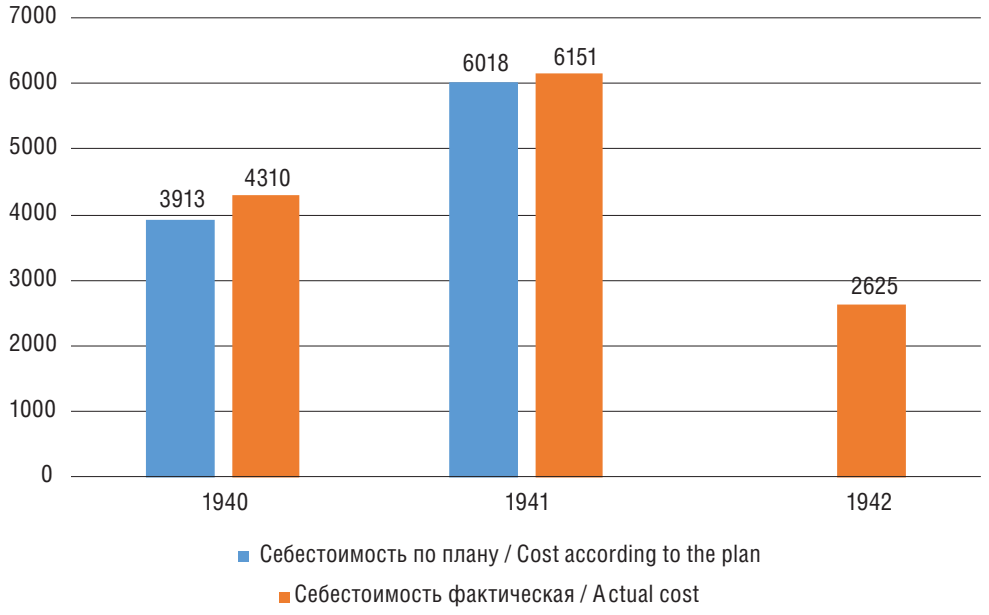


Fig. 1. Dynamics of the cost of manufactured products at the enterprises of Glavmedinstrumentprom (thousand rubles) [14, 19]

Рис. 1. Динамика себестоимости выпускаемой продукции на предприятиях «Главмединструментпрома» (тыс. руб.) [14, 19]

*Table 3*

Fulfillment of the plan for gross and marketable output for existing plants (thousand rubles) [10, 17]

*Таблица 3*

Выполнение плана по валовой и товарной продукции по действующим заводам (тыс. руб.) [10, 17]

| Показатель / Significative | План / Planned | | Факт / Actually | | |
|---|---|---|---|---|---|
| | на 1941 / for 1941 | на 1942 / for 1942 | за 1940 / for 1940 | за 1941 / for 1941 | за 1942 / for 1942 |
| Валовая продукция (в ценах 1926/27 гг.) / Gross output (in 1926/27 prices) | 89 450 | 87 150 | 69 850 | 80 108 | 82 060 |
| Товарная продукция (в действующих отпускных ценах) / Marketable products (in current selling prices) | 94 960 | 90 177 | 67 995 | 82 814 | 80 020 |

*Table 4*

Fulfillment of the plan for the manufacture of the main products (thousand pieces) [11, 18]

*Таблица 4*

Выполнение плана по изготовлению главнейших изделий (тыс. шт.) [11, 18]

| Изделие / Product | План на 1941 г. / Planned for 1941 | План на 1942 г. / Planned for 1942 | Фактическое количество / Actual Quantity | | |
|---|---|---|---|---|---|
| | | | 1940 г. / 1940 | 1941 г. / 1941 | 1942 г. / 1942 |
| Пинцеты / Tweezers | 1555 | 1200 | 862 | 1306 | 1117 |
| Ножницы / Scissors | 1143 | 1100 | 361 | 927 | 636,4 |
| Шприцы / Syringes | 600 | 450 | 327 | 514 | 274,1 |
| Скальпели / Scalpels | 470 | 500 | 304 | 541 | 501,8 |
| Стерилизаторы и укладки / Sterilizers and styling | 92 | 80 | 47 | 66 | 51,9 |
| Коробки Шимельбуша / Shimelbush boxes | 40 | 50 | 12 | 15 | 41,2 |
| Автоклавы / Autoclaves | 4,2 | 4,2 | 2,836 | 3,167 | 2,363 |
| Дезкамеры / Dezcamera | 5,47 | 4,2 | 4,505 | 0,487 | 2,389 |
| В т.ч. АПК / Incl. APC | 0,565 | 0,4 | – | 0,296 | 0,19 |
| Автодушевые установки / Auto shower complexes | 0,25 | 0,24 | 0,149 | 0,18 | 0,215 |
| Линзы очковые / Spectacle lenses | – | 350 | – | – | 93,7 |

of the Great Patriotic War sharply decreased and amounted to: in 1940 — 20 235 thousand roubles [9], in 1941 — 20 235 thousand rubles [7], in 1942 — 20 235 thousand roubles [8], in 1942 — 20 235 thousand roubles [9], in 1940 — 20 235 thousand roubles [9], in 1941 — 20 235 thousand roubles [9]. [9], in 1941 — 16 785 thousand roubles. [12], in 1942 — 4178 thousand roubles [22], which can be explained, in our opinion, by reduction of the nomenclature of expensive products, despite the increase in production rates.

## CONCLUSION

The importance of medical devices for 'civilian' and military health care during the Great Patriotic War is emphasized by urgent emergency measures taken by the Soviet government in the first months after the outbreak of the war. The directive of the People's Commissariat of Health of the USSR of 5 August 1941 mobilized medical industry. In the earlier years of the Soviet five-year plan, factories faced the usual shortages of raw materials and other difficulties, which were minimized, also through co-operation. After the outbreak of the Great Patriotic War, the industry appeared to be fragmented. In spite of this, in 1941 the operating plants, overcoming difficulties with raw materials supply, transportation, lack of personnel, output increased in the second half of the year, compared to the first half. "Glavmedinstrumentprom", affiliated with the People's Com-

missariat of Health of the USSR, managed to restore efficient work in the shortest possible time having implemented recommendations of the Technical Council. The plan to reduce production costs was fulfilled. Labour discipline at the plants was strengthened, the number of absenteeism decreased 5 times compared to 1940. [16].

The historiography has been enriched with information from state archives, allowing to present in detail the efforts of the Government and responsible staff to reorganize the national economy during the Great Patriotic War.

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# 140 YEARS ANNIVERSARY OF THE FIRST RUSSIAN MILITARY REHABILITATION CENTER NAMED AFTER G.A. ALBRECHT

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Federal Scientific Center of Rehabilitation of the Disabled named after G.A. Albrecht. Bestuzhevskaya 50, Saint-Petersburg, Russian Federation, 195067

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**ABSTRACT.** The 140th anniversary of the Albrecht Federal Scientific Center of Rehabilitation of the Disabled Persons is celebrated in March 2023. On March 5, 1883, the Military Department of the Russian Empire issued an order approving the regulations of the Military Council on the organization of the Mariinsky Shelter for amputated soldiers. Creation of such an institution was the beginning of the opening of new areas of rehabilitation and created prerequisites for the formation of enterprises and institutions that dedicated their activities to assisting disabled people. It was in 1916 when G.A. Albrecht started reformation of prosthetic care for disabled veterans at the Mariinsky shelter. Thanks to the activities of professor Albrecht, the Mariinsky shelter was transformed into a scientific and methodological center managing the entire organization of prosthetic practice. During the Great Patriotic War, the activities of the Institute did not stop and the remaining staff, headed by doctor B.A. Betekhtin, continued active work on providing special surgical and prosthetic care to the wounded solgiers. In 1983 clinics of the Leningrad Research Institute of Prosthetic sand the Leningrad Research Institute for the Examination of the Ability to work and the Organization of work of the disabled were united. Today, the successor of the noble cause of the Mariinsky shelter is the Albrecht Federal Scientific Center of Rehabilitation of the Disabled — the undisputed leader in solving diverse issues of complex rehabilitation of disabled people not only with diseases and defects of themusculoskeletal system, but also with disorders of the central nervous system. Between the date of the formation of the Mariinsky shelter and present days lies a long and difficult path of formation and development of the rehabilitation system in the Russian Federation, primarily for disabled people due to combat traumas.

**KEY WORDS:** Federal Scientific Center of Rehabilitation of the Disabled named after G.A. Albrecht; rehabilitation; prosthetics; anniversary; disabled people.

# ПЕРВОМУ В РОССИИ ЦЕНТРУ РЕАБИЛИТАЦИИ ИНВАЛИДОВ ИМ. Г.А. АЛЬБРЕХТА 140 ЛЕТ

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**РЕЗЮМЕ.** В марте 2023 г. исполнилось 140 лет Федеральному научному центру реабилитации инвалидов им. Г.А. Альбрехта Минтруда России. 5 марта 1883 г. Военным ведомством Российской Империи был издан приказ, которым утверждалось положение Военного Совета об организации Мариинского приюта для ампутированных воинов. Создание подобного учреждения стало началом открытия новых направлений реабилитации и создало предпосылки для образования предприятий и учреждений, которые связали свою деятельность с помощью инвалидам. С приходом в 1916 г. Г.А. Альбрехта в Мариинский приют начинается реформация протезной помощи инвалидам войн. Благодаря деятельности Германа Александровича Мариинский приют трансформировался в научно-методический центр, руководящий всей организацией протезной практики. Во время Великой Отечественной войны деятельность института не прекратилась, и оставшиеся сотрудники во главе с врачом В.А. Бетехтиным выполняли работу по оказанию раненым специальной хирургической и протезной помощи. В 1983 г. происходит объединение клиник Ленинградского научно-исследовательского института протезирования и Ленинградского научно-исследовательского института экспертизы трудоспособности и организации труда инвалидов. Сегодня продолжателем благородного дела Мариинского приюта является Федеральный научный центр реабилитации инвалидов им. Г.А. Альбрехта Минтруда России — бесспорный лидер в решении разноплановых вопросов комплексной реабилитации инвалидов не только с заболеваниями и дефектами опорно-двигательного аппарата, но и с нарушениями центральной нервной системы. Между датой образования Мариинского приюта и сегодняшним днем лежит долгий и трудный путь становления и развития системы реабилитации в Российской Федерации, в первую очередь для инвалидов вследствие боевой травмы.

**КЛЮЧЕВЫЕ СЛОВА:** Федеральный научный центр реабилитации инвалидов им. Г.А. Альбрехта; реабилитация; протезирование; юбилей; инвалиды.

140 years ago, on March 5, 1883, an order was issued by the Military Department of the Russian Empire and approved the position of the Military Council “On the organization of the Mariinsky shelter for soldiers after amputation”.

Nowadays, the successor to the noble work of the Mariinsky shelter is the Federal State Budgetary Institution “Federal Scientific Center for Rehabilitation of Disabled Persons named after H.A. Albrecht” of the Ministry of Labor and Social Protection of the Russian Federation (FSCRD named after H.A. Albrecht), which is an undisputed leader in solving diverse issues of complex rehabilitation of disabled persons not only with lesions of musculoskeletal system, but also with disorders of the central nervous system.

A long and difficult path of formation and development of the rehabilitation process, accompanied by numerous transformations both structural, and functional lies in period from the day of formation of Mariinsky shelter and present days.

The organization of Mariinsky shelter was the beginning of an opening of new areas for

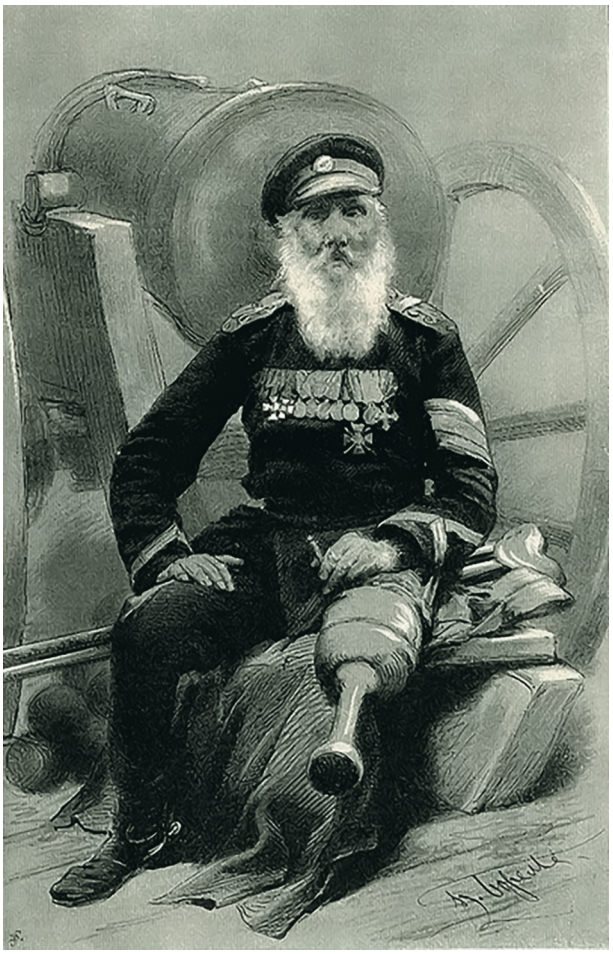

Fig. 1. Vasily N. Kochetkov. Peter Borel's engraving

Рис. 1. Василий Николаевич Кочетков. Гравюра Петра Бореля

rehabilitation, which, in turn, created the prerequisites for the formation of other institutions and enterprises connected in their activities with helping disabled. This process took place continuously throughout the historical development of the Mariinsky shelter, regardless of the forms of government of our state. That is why this historical path is so attractive and interesting [4].

Historical prerequisite for the establishment of the Mariinsky shelter is the outcome of bloody and liberating Russo-Turkish War that ended in 1878. More than 35,000 soldiers and officers became disabled as the result of the fighting. According to the information of the Main Military Medical Department, in 1879, about 1600 veterans of military operations needed prosthetics [6]. The issue of enterprising the first multifunctional rehabilitation center for medical care and preparation for prosthetics for armless and legless disabled people in Russia, their professional and social rehabilitation and adaptation became actual.

The March 5, 1883 may be considered the starting point of the system of state assistance to armless and legless soldiers who were maimed in military operations.

The creation of the Mariinsky shelter, which expanded assistance to the disabled, was quite predictable, as the supply of "artificial arms or legs" also included "lower ranks" who had served in the army for 25 years and had no civilian specialty. The first private workshops for prosthetics and orthopedic footwear were estab-

Fig. 2. The building of the Mariinsky shelter, built in 1902 according to the project of a military engineer, Colonel A.M. Vishnyakov

Рис. 2. Здание Мариинского приюта, построенное в 1902 г. по проекту военного инженера, полковника А.М. Вишнякова

lished by maimed men who had received civilian specialization in the Mariinsky shelter.

Thus, the main reasons for the organization of the world's first specialized center for prosthetics, medical and social rehabilitation should be considered the political situation that developed in Russia in the second half of the nineteenth century — numerous wars, which were accompanied by a massive flow of amputees, and high social consciousness, when charity was the norm of social morality.

At that time, at the end of the nineteenth century, in military medical and administrative circles, there was a mature understanding of the fact that the mobilization resources of the Empire were not unlimited. A significant part of maimed soldiers in need of prosthetics were experienced, skilled, battle-hardened soldiers.

Russian society of past time knew the story of the soldier V.N. Kochetkov, whom contemporaries called "the soldier of three emperors" (Fig. 1).

It is known that the soldier began his military service in 1811 in the Life Guards Grenadier Regiment. He was a participant of the Patriotic War of 1812, the Russo-Turkish wars of 1828–1829 and 1877–1878. As the member of the Kazan Jaeger Regiment, during the Crimean War of 1854–1855 participated in the defense of Sevastopol. By personal example he inspired recruits. In one of the battles during the defense of Shipka Pass, 92-year-old Vasily Kochetkov lost a leg, later he was provided with a working prosthetic hip of the "goat leg" type. The soldier died at the age of 107 and was honored with a state funeral in Vyborg.

Contemporaries unanimously spoke about the Mariinsky shelter as an extremely important institution, bringing great benefit to many thousands of maimed soldiers, bringing them back to useful activity, making them able to work again (Fig. 2). The fact of the existence of such an exemplary institution as the Mariinsky shelter contributed to the strengthening of patriotic feelings of the Russians and the realization of the great importance of charity as a norm of public morality.

In the last third of the 19th century in Russia, the main link in the system of medical care for wounded and maimed soldiers was the Military Department. The selection of those in need of prostheses was made by district and provincial military chiefs in the field. According to the existing instructions (circulars) of the General Staff of the Military Medical Department, groups of 10–20 people in need were sent together with an escort for treatment at the expense of the treasury.

The diverse activities of the shelter were regulated by the superiors of the Military District, the Main Department of the Red Cross, the Ladies' Trustee Committee and the Honorary Trustee.

The Ladies' Trusteeship or Charity Committee, established in 1878 at the request of Countess Sophia Andreyevna Bobrinskaya (Shuvalova), who headed it until 1903, played an important role in providing prostheses (Fig. 3). Sophia Andreevna experienced the personal tragedy of the death of her favorite son, who was an officer and died of his wounds at the age of 24.

In the first 10 years, the shelter annually accepted up to 100 people and issued up to 250 prostheses. In the next 10 years, after the Russo-Japanese War, the number of patients of the Mariinsky shelter significantly increased to 987 people, to whom

Fig. 3. Portrait of Countess Sophia A. Bobrinskaya. Artist Franz Xaver Winterhalter

Рис. 3. Портрет графини Софьи Андреевны Бобринской. Художник Франц Ксавер Винтерхальтер

Fig. 4. Professor Herman Alexandrovich Albrecht

Рис. 4. Профессор Герман Александрович Альбрехт

3120 prostheses were made. It became necessary to expand the area of the shelter. At the same time a second three-story building was built in the yard [5]. The successful experience of the Mariinsky shelter was replicated throughout the empire: similar institutions were organized in Moscow, Kiev, Saratov, Rostov-on-Don, Kharkov.

With the beginning of the World War I (1914–1918) the number of disabled people increased almost in 10 times. The work of the Mariinsky shelter had to meet the wartime conditions. The period of stay of the disable on prosthetics was reduced to 1 month, and the period of testing of prostheses — to 1 week. From that time until nowadays, 7 days is considered to be the standard period of trial wear of a prosthetic limb, and the prosthetics time averages 30 to 40 days for complex and atypical prosthetics.

Prosthetics technicians and doctors mobilized to the active army in 1914 were urgently recalled from the front by special decrees to assist amputees. It is worth noting that this situation was repeated in 1941, when it became nec-


Fig. 5. G.A. Albrecht, A.K. Schenk, G.I. Turner, E.Yu. Osten-Saken (standing)

Рис. 5. Г.А. Альбрехт, А.К. Шенк, Г.И. Турнер, Э.Ю. Остен-Сакен (стоит)

essary to take administrative measures to bring prosthetics specialists back to the rear.

In 1915, the future director of the Mariinsky shelter, H.A. Albrecht, was recalled from the front and took up the position of junior doctor at that time (Fig. 4). His personality in the formation and development of the Mariinsky shelter as a scientific and practical institution is so significant that it is difficult to overestimate.

Herman A. Albrecht was born in Pskov on September 11, 1877, graduated in 1903. He graduated from the Military Medical Academy (MMA) in 1903, "recognized in the degree of a physician with distinction" and then arrived to the Ryazan regiment as a junior doctor. In 1904 he was seconded to the Military Medical Academy as an assistant of the clinical military hospital. For 10 years he had been working in the clinic of Prof. H.I. Turner, where he acquired extensive knowledge in the field of orthopedics, which formed the basis of his further activity. In 1907, his dissertation "About pathology and therapy of lateral curvatures of a knee" was published, and at the meeting of the Academy H.A. Albrecht was awarded the degree of Doctor of Medicine.

During The World War I, Herman Aleksandrovich worked as chief physician of a hospital and head of an evacuation station on the North-Western Front (1914–1915). After his appointment to the Mariinsky shelter in 1916, he presented a project of state reform, which envisaged a complete reorganization of prosthetic care for disabled warriors. H.A. Albrecht regarded prosthetics as a special field of medicine and technology with important state and economic significance. He believed that the work in this field requires cooperation of various specialists: doctors, engineers, masters of prosthetics, who should be trained at appropriate courses. He also believed that it was necessary to deploy a network of prosthetic workshops throughout the country and to organize an experimental base for the development of new, more advanced prostheses [2].

The scientist did a lot for the development of prosthetics, but he took a special interest in the design of artificial upper limbs. He created the first domestic samples of active prostheses for people with amputated hands, as well as so-called working aids. H.A. Albrecht significantly reorganized the work of the Mariinsky shelter, which was not only engaged in supplying disabled war veterans with prostheses. At the same time, at other medical sites (Turner Institute,

Fig. 6. Celebration of the 25th anniversary of G.A. Albrecht's activity: guests, employees of the Institute, representatives of the authorities, 1928

Рис. 6. Празднование 25-летия деятельности Г.А. Альбрехта: гости, работники института, представители власти, 1928 г.

Mariinsky shelter) numerous operations were carried out to prepare disabled people for prosthetics. A great role in this process belonged to graduates of the MMA — H.I. Turner, R.R. Vreden, A.K. Shenk, E.Yu. Osten-Saken, M.S. Yusevich, T.M. Stepanov, and many others (Fig. 5).

The events of October 1917 radically changed the fate of the Mariinsky shelter. At the beginning of 1918 it was transferred by the Soviet authorities from the Military Department to the People's Commissariat of Social Welfare (Order of the Commissar for Military Affairs No. 76 of 21.01.1918). At the same time, funds were allocated for the purchase of prosthetic and orthopedic products for the supply of maimed citizens of the country, a project was developed and the necessary allocations were determined for the organization of prosthetic-assembly, bandage and shoe and orthopedic workshops [3]. In March 1919, the Petrograd Mariinsky shelter for supplying maimed soldiers was renamed into the Institute for supplying maimed citizens with prosthetic and orthopedic products, and in 1932 it became the Leningrad Research Institute of Prosthetics (LRIP). H.A. Albrecht was appointed director of the Institute. In 1928, the 25th anniversary of H.A. Albrecht's scientific activity was widely celebrated. The photo of that time depicts leading orthopedic traumatologists, as well as representatives of the authorities, engineers, prosthetists and other employees of the Institute (Fig. 6).

H.A. Albrecht was the director of the institute until the end of his life, until 1933. He transformed the institute into a scientific and methodological center, personally directing the entire organization of prosthetic practice and training personnel in all medical fields, as well as technical workers. Since 1922 the Institute became the training base of the Department of Orthopedics, Traumatology and Prosthetics of the Leningrad Institute for Advanced Training of Doctors. It also organized advanced training courses for master prosthetists of various specialties.

In 1928, thanks to the efforts of H.A. Albrecht, a 30-bed inpatient clinical base for prosthetics and surgery was established. In 1932, while Herman Alexandrovich was still alive, the institute received a research status. The Institute established the Department of Orthopedics and Prosthetics, which was headed by H.A. Albrecht. At the same time the workshops of the Institute were reorganized into a prosthetic fac-

Fig. 7. The Leningrad Research Institute of Prosthetics staff during the war. P.I. Belousov, A.N. Vitkovskaya, V.A. Betekhtin, representative of the Red Army, L.I. Schwindt

Рис. 7. Коллектив ЛНИИП во время войны. 1-й ряд, слева направо: П.И. Белоусов, А.Н. Витковская, В.А. Бетехтин, представитель Красной армии, Л.И. Швиндт

tory. In 1935 it was separated into an independent enterprise, and the shoe shop was reorganized in 1938 into a factory of orthopedic footwear. In the 1930s, the Institute began to disseminate knowledge on prosthetics in printed form. Since 1936, instructions, methodological letters, and manuals were published, in particular, "Practical Guide to Prosthetic Technology" and "Instruction on the Use of Lower Extremity Prostheses (Artificial Legs)" compiled by Dr. S.O. Weinzweig. For the first time, a scientific analysis of the static-dynamic characteristics of the hip prosthesis from the perspective of theoretical biomechanics was published (Albrecht H.A., 1937). The theoretical basis for a number of studies was the work of S.O. Weinzweig published in 1929 "About the types of gait of a healthy person and its relation to the gait on an artificial limb". In 1936, the first Russian "Guide to Prosthetic Technology" by V.A. Betekhtin was published. In 1935, under the editorship of Prof. E.Yu. Osten-Saken, the first issue of the Institute's works "Issues of Prosthetics" was published [3].

In the same year, a research and development design bureau was established to ensure professional development of new prostheses and related equipment.

The Great Patriotic War (1941–1945) did not interrupt the scientific work of the Institute, although most of the staff, including doctors and technicians, were mobilized to the Red Army. Leningrad was in the enemy siege. However, in spite of the most difficult conditions amid hunger, bombing and destruction, the work of the Institute continued. The remaining employees of the Institute — doctors B.A. Betekhtin (Director of the Institute), P.I. Belousov, A.N. Vitkovskaya, L.D. Shvindt and several people of the middle and junior staff performed the work on rendering special surgical and prosthetic aid to the wounded (Fig. 7). During the war years, 1221 patients passed through the Institute's hospital and 915 operations were performed.

After the end of the war, due to the considerable flow of wounded and maimed, it was necessary to quickly restore the activities of the Institute's pre-existing departments. The set tasks were practically solved already in 1948. A laboratory for testing prostheses and laboratory for researching new materials were opened. Later, departments for adults (male and female), physical therapy and physiotherapy departments, biomechanical and clinical laboratories, X-ray room and, for the first time in Russia, department for children were opened. The leading specialists of the Institute — I.S. Sheremet (Director of LRIP in 1946–1948), Professors L.E. Rukhman and M.S. Pevzner.

In the post-war years, new designs of prosthetic arms and legs for disabled war veterans appeared, and the Institute's specialists, having experience in practical prosthetics and prosthetic construction, were in dire need of scientific confirmation of the correctness of the chosen areas of activity and search for new solutions. In the 1960s, groups were established for the development of upper and lower limb prostheses and orthopedic footwear. The main direction was the creation of highly functional, repairable active plastic prostheses of upper limbs. This work was headed by Dr. F.S. Vorontsov, who was a Doctor of Technical Sciences.

In the work of clinical departments, it is necessary to note the establishment of the first pediatric department in Russia. L.E. Rukhman, Head of the Children's Clinic, made a great contribution to this, both in practical and scientific aspects. The closest assistant of Prof. L.E. Rukhman was a doctor of the pediatric clinic, and later — a senior researcher A.N. Vitkovskaya. Thanks to her initiative, the Institute developed the scientific direction of prosthetics for disabled children with limb defects.

In 1971, Prof. V.I. Filatov was appointed Director of LRIP. The beginning of the 1970s was a period of increased attention to prostheses with an external energy source (electric and pneumatic drive). Under the guidance of S.F. Godunov and his students, bone-plastic methods of lower limb amputation with displacement of the medial plantar flap taken from the foot were developed in the Department of Complex Prosthetics for Adults. Reconstructive surgery received a new leap. New treatment technologies have been proposed for malformations of limb stumps. In the rehabilitation of disabled people, the main attention was paid to the methods of physiotherapeutic treatment and therapeutic physical training. In 1972, the idea of creating special functional and aesthetic clothing as a means of domestic and social rehabilitation of people with physical disabilities was proposed, and in 1976 a new subdivision — a group for the creation of functional and aesthetic clothing appeared in the Institute under the leadership of V.M. Volkova.

In 1983, the Institute moved to a new building at 50 Bestuzhevskaya Street. At the same

time, the clinics of the Leningrad Research Institute of Prosthetics (LRIP) and the Leningrad Research Institute of Expertise of Working Ability and Organization of Work for the Disabled (LRIEWAAVD) were merged. Candidate of Medical Sciences A.I. Boldyrev, who had been acting Director of the Institute of Prosthetics until the appointment of Dr. A.N. Keyer to this position, was appointed Chief Physician.

Since July 1983, the clinic organized orthopedic departments for children (preschool and school), prosthetic and orthopedic rehabilitation departments for adults and complex hand prosthetics. Prosthetics were performed both at the Leningrad Prosthetic-Orthopedic Enterprise and in the scientific laboratories of the Institute. In 1983, new operating rooms, departments of physical treatment methods, physiotherapy and four expert departments were opened.

In the first decade after the unification of the clinics, more than 11,000 patients were provided with high-tech prostheses of the upper and lower limbs. The number of reconstructive and restorative surgeries, especially for hand defects in children and adults, increased dramatically, and methods of lengthening short stumps using the Ilizarov distraction and compression apparatus were introduced to correct limb deformities [8]. Reconstructive surgery was widely used to restore the bearing capacity of malformed stumps of the lower limb. In amputations at the level of the foot, tibia, and thigh, it was proposed to apply skin transplantation of the plantar surface of the foot on the neurovascular bundle using microsurgery.

In 1989 there was an important event in the life of the Institute. The country's government decided to industrialize the prosthetic industry. This task was entrusted to the "Energia" Space Corporation (RSC "Energia").

The great experience of the Institute was in great demand. In order to scale up the practical application of research and practical results, a group of Institute specialists was created, which had direct contact with "RCC «Energia representatives»".

Providing rehabilitation (vocational and social) assistance to disabled people has been the main activity of the clinic since 1990. A Rehabilitation Council was formed, approving rehabilitation programs for each patient and giving work recommendations.

The fifth orthopedic department of surgical training and prosthetics for disabled military service personnel was organized in 1991 as a rehabilitation center for soldiers-internationalists who were injured during military operations in the Republic of Afghanistan. O.N. Gorchaninov, Candidate of Medical Sciences, Honored Doctor of Russia, was appointed head of this department, with Dr. K.K. Shcherbina as his scientific supervisor.

It should be noted that in the current conditions of the special military operation in Ukraine, the lessons and experience of the Great Patriotic War and the Afghan campaign have never been more in demand.

It was shown that the primary prosthetics of warriors who underwent amputation due to mine blast wounds should be carried out exclusively in the conditions of a specialized hospital, and the prosthetics itself should be implemented in the form of therapeutic and training.

The consequences of mine blast wounds of the limb are characterized by a significant number of stump diseases and malformations that prevent further prosthetics. During the Great Patriotic War at least 39% of those in need of prosthetics had pronounced stump diseases and malformations, during the Afghan campaign — up to 44%. During the counter-terrorism operation in the Caucasus, at least 77% of the wounded needed operative and conservative preparation of the residual limb for prosthesis [7].

Such significant number of stump diseases and malformations is an inevitable consequence of the severity of modern mine blast trauma and the only correct tactic of military surgeons is to save the wounded person's life, and the formation of a stump suitable for prosthetics is referred to the rehabilitation stage. It is the therapeutic and training prosthetics that allows to determine the necessity and volume of reconstructive intervention on the stump in order to eliminate its diseases and malformations, as well as the interdependence of the stages of surgical treatment and prosthetics.

The scientific and technical part underwent changes at the same time. G.N. Burov, Candidate of Medical Sciences, was appointed Deputy Director for Scientific and Technical Work, who united the scientific medical and technical parts in 1991. Seven scientific and technical departments were formed, including laboratories and sectors. New designs of upper and lower limb prostheses were developed, orthotics was developed, new samples of orthopedic footwear

were created, and the technology of manufacturing of receiving sleeves was improved [1].

The end of the 20th century was marked by the merger of two institutes, which already had a common clinic and were located in the same building. The St. Petersburg Scientific and Practical Center for Expertise, Prosthetics and Rehabilitation of Disabled Persons named after H.A. Albrecht after the merger not only allowed the institutes to retain their status and all scientific directions, but also made it possible to acquire a greater thematic diversity.

Doctor of medical sciences, Prof. I.V. Shvedovchenko became the General Director of the Center. With arrival of Igor Vladimirovich, one of the main directions of the clinic's work was defined — reconstructive surgeries for children with congenital and acquired limb defects.

Since 1999, the clinic has been developing and implementing measures for the development of medical and social expert assessment of children. In 2003, a rehabilitation center for disabled children was opened in the old building of the Mariinsky shelter on Bolshoy Sampsonievsky avenue.

In 2017, the St. Petersburg Scientific and Practical Center for Medical and Social Expertise, Prosthetics and Rehabilitation of Disabled Persons named after H.A. Albrecht was transformed into the Federal Scientific Center for Rehabilitation of Disabled Persons named after H.A. Albrecht. The Center was headed by Corresponding Member of the Russian Academy of Sciences, Doctor of Medical Sciences, Professor, Honored Scientist Gennady Nikolayevich Ponomarenko. His arrival was marked by innovative transformations in the Center. The task was difficult: on the one hand, to raise the prestige of the institution to the level that has always been inherent in the Mariinsky shelter, and on the other hand, to develop and introduce innovative digital technologies into rehabilitation practice, which at the modern technical level will make it possible to solve those tasks that are united by the modern concept of "rehabilitation".

The structure of the Center included the Institute of Rehabilitation and Habilitation, the Institute of Prosthetics and Orthotics, a clinic and the Children's Rehabilitation and Rehabilitation Center for Children with Disabilities (RCCD); later, the Institute of Early Assistance and Support and the Federal Methodological Center were opened.

A laboratory of innovative technologies of prosthetics and medical robotics has been established at the Institute of Prosthetics and Orthotics. Among the main directions of its activities: development of technologies for individual prosthetic and orthopedic products using additive technologies: 3D-scanning, 3D-modeling and 3D-printing; development of remote technologies using 2D- and 3D-scanning; performing finite element calculations of prosthetic and orthopedic parts and assemblies in order to simulate tests conducted in accordance with the requirements of national and international regulatory and technical documentation; manufacturing and testing of prosthetic and orthopedic devices (POI) samples manufactured using additive technologies, including for patients who have been injured as a result of mine blasts.

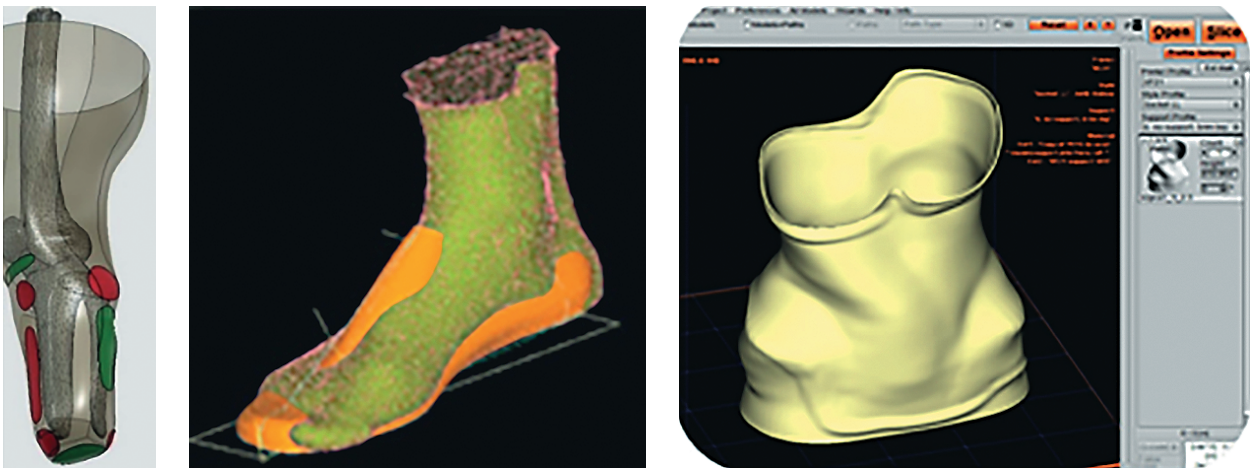


Fig. 8. Digital modeling of the POI: the receiving sleeve of the prosthesis, orthopedic pads, functional corset

Рис. 8. Цифровое моделирование ПОИ: приемной гильзы протеза, ортопедических колодок, функционального корсета

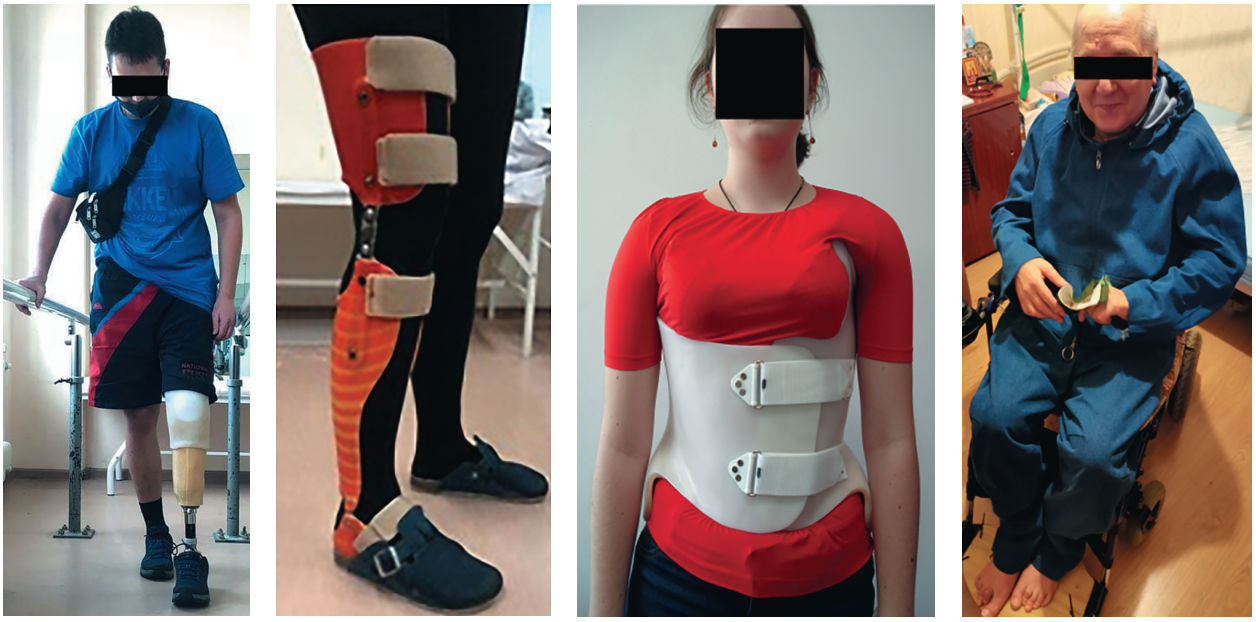

Fig. 9. Manufactured using digital technologies (3D scanning, 3D printing and computer-aided design of POI)

Рис. 9. Изготовленные по цифровым технологиям методом 3D-сканирования, 3D-печати и автоматизированного проектирования ПОИ

For the first time in the Russian Federation, scientific and technical development and implementation of a complex of innovative digital technologies for the production of highly specific individual prostheses and limb orthoses, corsets, orthopedic footwear, functional and aesthetic (special) clothing as a single technological process, including: remote data collection with 3D-scanning of the patient's figure, torso, limb, limb stump; analysis of objective biometric information; formation of electronic geometric 3D models of body segments and digital profiles of POI; 3D-printing of POI; instrumental biomechanical assessment of functional properties of POI (Fig. 8).

Due to the use of 3D-scanning and additive manufacturing process, the production of POI of the same quality as with the use of traditional plaster technologies is achieved, but at the same time the duration of their production is significantly reduced, the financial costs of providing patients with POI are reduced, and the degree of satisfaction of the population's need for POI is increased (Fig. 9).

The clinic of the Center annually provides specialized, including high-tech medical care and rehabilitative treatment to 5000 patients from 75 regions of the Russian Federation. It is the clinical base of the Center's research institutes. Activities are carried out within the framework of social policy, high-tech medical care and compulsory medical insurance.

The Children's Rehabilitation and Restoration Center provides outpatient and inpatient conservative treatment for children with neurological pathology (including cerebral palsy) and diseases of the musculoskeletal system (including various forms of posture disorders, scoliosis). An interdisciplinary center has been established for children with autism spectrum disorders (ASD) in order to improve the quality of rehabilitation.

From 2017 to 2022, the Centre organized the National Congresses "Rehabilitation — XXI Century: Traditions and Innovations". In June 2018, Federal Service for Supervision in Education and Science successfully accredited the educational activity on training in the system of higher professional education (postgraduate studies, residency). The results of many years of work of the Center's staff were summarized in 2018 in the National Guide "Rehabilitation of Disabled People", written by a team of leading specialists in various sections of comprehensive rehabilitation of disabled people [9].

Nowadays, the Scientific Center for Rehabilitation of Disabled Persons named after H.A. Albrecht is the oldest and only one institution in Russia, which includes unique scientific and practical laboratories of innovative digital technologies of prosthetics, prosthetics and orthotics, a center for expert evaluation and pro-

duction of prosthetic and orthopedic products. The Center's employees continue and multiply the glorious heritage of the Mariinsky shelter with their high professionalism and loyalty to the age-old traditions of Russian science.

## ADDITIONAL INFORMATION

**Contribution of the authors.** All the authors made a significant contribution to the development of the concept, research and preparation of the article, read and approved the final version before publication.

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## ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

**Вклад авторов**. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

**Конфликт интересов.** Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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# 100 YEARS ANNIVERSARY OF THE DEPARTMENT OF PUBLIC HEALTH AND HEALTHCARE WITH THE COURSE OF ECONOMICS AND HEALTHCARE MANAGEMENT OF THE FIRST ST. PETERSBURG STATE MEDICAL UNIVERSITY NAMED AFTER ACADEMICIAN I.P. PAVLOV

© *Nikolay I. Vishnyakov,* *Klara I. Shapiro*

The First Saint Petersburg State Medical University named after Academician I.P. Pavlov. L'va Tolstogo 6–8, Saint Petersburg, Russian Federation, 197022

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**ABSTRACT.** The article presents information about the establishment in 1923 and the development of the Department of Public Health and Healthcare for 100 years. The heads of the department are listed in chronological order, information about their contribution to the formation of the teaching and scientific activities of the department is presented. The main directions of scientific research at different stages of the department development are highlighted. An important indicator of the activities of the scientific and teaching staff of the department has always been the amount of successfully defended candidate and doctoral thesis on the most pressing problems of the organization of public health and healthcare. The problems of teaching the discipline "Public health and healthcare" at a medical university are highlighted separately. In the section of the article devoted to scientific research, the authors dwell in more detail on the main directions of the science of public health and healthcare organization: planning and organization of outpatient and inpatient medical care for the population, research and scientific justification of optimal forms and ways of organizing both urban and rural healthcare. At all times, attention of the scientific staff of the department has been focused on the problems of demography, the peculiarities of the morbidity of the urban population; new forms of organization of medical care. In the XXI century, the staff of the department paid special attention to the issues of expertise and quality management of medical care. At present time significant attention is paid to the implementation of research results in the area of practical healthcare, the main aspects of international cooperation of the department; postgraduate training of doctors, residents, masters in accordance with provided by the department health organization programs. The article notes that significant achievements of the department became possible thanks to the highly qualified scientific and teaching staff activities for the entire previous period.

**KEY WORDS:** Department of Public Health and Public Health; University; 100th anniversary.

# 100 ЛЕТ КАФЕДРЕ ОБЩЕСТВЕННОГО ЗДОРОВЬЯ И ЗДРАВООХРАНЕНИЯ С КУРСОМ ЭКОНОМИКИ И УПРАВЛЕНИЯ ЗДРАВООХРАНЕНИЕМ ПЕРВОГО САНКТ-ПЕТЕРБУРГСКОГО ГОСУДАРСТВЕННОГО МЕДИЦИНСКОГО УНИВЕРСИТЕТА ИМЕНИ АКАДЕМИКА И.П. ПАВЛОВА

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**РЕЗЮМЕ.** В статье отражена информация о создании в 1923 году и развитии кафедры общественного здоровья и здравоохранения за 100 лет. В хронологическом порядке перечислены заведующие кафедры, указан их вклад в становление педагогической и научной деятельности. Выделены основные направления научных исследований на разных этапах развития. Важным показателем работы научно-педагогического коллектива кафедры всегда было число успешно защищенных кандидатских и докторских диссертаций по самым актуальным проблемам организации здравоохранения и общественного здоровья. Отдельно выделены проблемы преподавания дисциплины «Общественное здоровье и здравоохранение» в медицинском вузе. В разделе статьи, посвященном научным исследованиям, более подробно авторы останавливаются на магистральных направлениях науки об общественном здоровье и организации здравоохранения: планирование и организация амбулаторной и стационарной медицинской помощи населению, исследование и научное обоснование оптимальных форм и путей организации как городского, так и сельского здравоохранения. Во все времена в центре внимания научных сотрудников кафедры были проблемы демографии, особенности заболеваемости населения городов, новые формы организации медицинской помощи. Особое внимание в XXI веке сотрудники кафедры стали уделять вопросам экспертизы и управления качеством медицинской помощи. Большое внимание уделяется вопросам внедрения результатов научных исследований в практическое здравоохранение, основным аспектам международного сотрудничества кафедры; послевузовской подготовке врачей, ординаторов, магистров по программам организации здравоохранения. В статье отмечается, что существенные достижения кафедры стали возможными благодаря высококвалифицированному научно-преподавательскому составу за весь предыдущий период.

**КЛЮЧЕВЫЕ СЛОВА:** кафедра общественного здоровья и здравоохранения; университет; 100-летие.

The Department of Public Health and Healthcare with a Course of Economics and Health Management of the First St. Petersburg State Medical University named after I.P. Pavlov was opened in 1923 and then called the Department of Social Hygiene. The first head of the department was Prof. Alexander F. Nikitin, a student of the outstanding hygienist G.V. Khlopin.

From 1928 for 11 years the department was headed by Grigory Isaakovich Dembo, a well-known figure in the field of public medicine in pre-revolutionary times, participant of the Pirogov congresses, and editor of the «Physician's Newspaper». The staff of the department at that time was very small — one professor and two assistants: B.S. Segal and M.S. Belkin.

A significant role in the activities of the department during its formation was played by Evgeny Vasilievich Polyakov. Thus, already in 1923, E.V. Polyakov, being a student, created in the Institute the first in the country student scientific society (SSS) in a medical university.

In 1939–1940s the department was headed by Boris Samoilovich Segal.

The Great Patriotic War caused a reorganization of the whole work of the department. All assistants left for the Soviet army. During this period the department was headed by Ilya Davidovich Strashun, a full member of the USSR Academy of Medical Sciences, Doctor of Medical Sciences, Professor, a well-known scientist in the field of national history of medicine, social hygiene and health care organization.

Fig. 1. Solomon Y. Freidlin

Рис. 1. Соломон Яковлевич Фрейдлин

In the harsh conditions of the siege of Leningrad, he gave all lectures and conducted practical classes with students by his own.

The education program included the study of some issues of military hygiene training and peculiarities of organization of work of rear health care institutions in military conditions. At the same time, I.D. Strashun was also the rector of the institute.

From 1945 to 1978 the department was headed by a prominent health care manager, Honored Scientist of the RSFSR, Doctor of Medical Sciences, Professor Solomon Yakovlevich Freidlin (Fig. 1). During these years, the system of teaching of social hygiene and health care organization was completely reformed, the emphasis was placed on the training of doctors — health care managers.

Under the guidance of Prof. S.Y. Freidlin, 7 doctoral dissertations and more than 50 candidate dissertations on topical issues of health care organization were performed and defended at the department. S.Y. Freidlin published the "Course of lectures on social hygiene and health care organization", a number of monographs ("Organization of work of in-patient department of city hospital", "City outpatient clinic", "Follow up monitoring of population", "Prevention of traumatism and organization of traumatological care", etc.), which became table books for the majority of health care managers of the country.

From 1978 to 1993, the Department was headed by a major scientist in the field of social medicine, theory and practice of health care management, Honored Scientist of Russia, Doctor of Medical Sciences, Prof. Vladimir Alexeevich Minyaev (Fig. 2), who had extensive experience in the management of practical health care. For 23 years, Prof. V.A. Minyaev was the rector of the 1st Leningrad Medical Institute. His the most famous works are on the organization of health care in a large city, on the economics of health care, and on hospital organization.

Under the guidance of Professor V.A. Minyaev, 5 doctoral and 25 candidate dissertations were performed and defended.

From 1993 to the present time the department has been headed by Prof. Nikolay Ivanovich Vishnyakov, the student of Prof. V.A. Minyaev,

Fig. 2. Vladimir A. Minyaev

Рис. 2. Владимир Алексеевич Миняев

Fig. 3. Nikolay I. Vishnyakov

Рис. 3. Николай Иванович Вишняков

Honored Worker of Science of the Russian Federation (Fig. 3). He continues the traditions of the department in the field of improvement of the educational process and scientific research. Under the guidance of N.I. Vishnyakov 28 doctoral and 106 candidate dissertations were defended.

Special attention **in teaching** the organization of health care is given to the economics of health care, study of the results of introduction of a new economic mechanism in urban health care, as well as the study of the organization of urban health care in the conditions of health insurance, the prospects for the use of insurance medicine and legal basis of domestic health care.

Various types of academic work (mastering lecture material, independent training, solving situational tasks, preparing assignments on sanitary and hygienic education of the population, performance and discussion of term papers, business and role-playing games) contribute to mastering the culture of thinking, development in written and oral speech, logically correct design of research results.

In order to facilitate the assimilation of material by students in preparation for these classes, the department has compiled and published in the necessary quantities methodological recommendations. For the last 10 years 14 methodical manuals have been published. The textbook, compiled and constantly corrected by staff of the department, has had 9 editions.

Student Scientific Society (SSS) actively works at the department. A great educational and auxiliary value is the annual student conferences on topical issues of health care. Many scientific student works were awarded diplomas of I and II degrees and published in the press.

**Scientific research** of the department is multifaceted and characterized by depth and relevance. In the first years of work scientific researches were characterized by hygienic orientation. The main scientific direction was a study of the role of social factors of health in urban residents. In the period of formation of normative base of public health care especially actual were the works carried out at the department on planning of outpatient care, scientific substantiation of load of doctors, middle medical staff, organization of treatment after leaving a hospital, scientific organization of work in outpatient clinics, development of norms in specialized care of rural population. In the late 1960s of the twentieth century, the department's research on the development of specialized medical care became widespread.

Much attention was paid to the study of health problems of the population of large cities, demography, mortality, morbidity with temporary loss of ability to work, disability.

Studies on the problems of planning and organization of inpatient medical care for the population are of great scientific and practical

importance. V.A. Minyaev's method of expert assessments of patients' need for hospitalization proved to be a fundamentally new approach to determining the norms of hospital care in a large city.

In subsequent years, the main efforts of the staff were directed to the research and scientific substantiation of optimal forms and ways of organization of urban health care in the conditions of its reforming.

At the turn of the XX and XXI centuries, the peculiarities of radical social and economic reforms and their impact on the demographic situation and morbidity of the Russian population were reflected in the studies aimed at developing recommendations to improve public health and organization of medical care.

Under the guidance of the department the justification and analysis of the activity of new forms of organization of medical care were developed: nursing care departments, andrological care for children, consultative and diagnostic departments and centers, center of psychosomatic medicine, surgical day clinic, new forms of activity of commissions for examination of drivers, recommendations on various aspects of the work of a general practitioner.

In the following years, the studies highlighting **economic aspects** of medical care and the peculiarities of the work of medical organizations and their subdivisions of different forms of ownership, scientific justification of these activities and the development of recommendations to optimize their work, management of a large commercial organization and medical and organizational foundations of entrepreneurial activity, substantiating marketing technologies became relevant. The works of the department reflected the issues of tariff policy as a tool to optimize various types of medical care and the organization of paid services. Special attention was paid to the issues of e**xpertise and quality management of medical care** in outpatient and inpatient health care, methodological foundations and technology of information support of health care management in a large city.

In total, 54 doctoral and 228 candidate dissertations were performed and defended at the department, more than 10,000 scientific works were published.

The department annually publishes the collection of scientific works "Problems of urban health care", included in the RSCI publications. The edition publishes articles by employees of specialized departments of medical universities of the country and employees of practical health care. The 27th issue of the edition was published in 2022.

Scientific research of the department is actively implemented not only in the educational process, but also in work of practical and health care institutions in St. Petersburg and other cities of the country. In particular, the methodical recommendations "The experience of realization of intradepartmental self-financing relations of medical and preventive institutions of Leningrad in the conditions of economic experiment in public health" and the information letter "The experience of organization of obstetric-pediatric-therapeutic complexes as one of the temporary forms of organization and remuneration of labor in regional medical association in the conditions of new economic mechanism" were approved by the Ministry of Health care and recommended for implementation in all regions of the country. The teaching staff took part in the perspective planning of urban health care development. Thus, the concept of urban health care development up to 2003 was actually drawn up under the guidance of the department.

Scientific and pedagogical cooperation of the department with foreign institutes and universities, as well as medical and preventive institutions is multifaceted. In the post-war time the department took an active part in training of personnel for health care of such foreign countries as Czechoslovakia, Bulgaria, Cuba, Sudan, Yemen, China, Belgium, Jordan; active scientific cooperation with the medical academy of Gdansk (Poland), with medical academies of Dresden, Frankfurt (Germany), Plovdiv (Bulgaria) was carried out. Scientific works of the department staff have been published in specialized editions of many countries of the world. Prof. V.A. Minyaev was a WHO (World Health Organization) consultant, Prof. V.G. Koryukin was a WHO expert on the problems of economic reforms in health care.

In 1999–2001, the department participated in the implementation of the TEMPUS/TACIS program "Management in Health Care" together with the Higher School (Leiden, the Netherlands) and the University of Wales (Swansea, Great Britain). The program for clinical residents "Management in Healthcare" was developed and implemented, 10 manuals and

Fig. 4. The staff of the Department of Public Health and Healthcare with the course of Economics and Health Management of the First St. Petersburg State Medical University named after Academician I.P. Pavlov (the photo made in 2023)

Рис. 4. Коллектив кафедры общественного здоровья и здравоохранения с курсом экономики и управления здравоохранением Первого Санкт-Петербургского государственного медицинского университета им. акад. И.П. Павлова (фото сделано в 2023 году)

monographs were published, including “Economics of Healthcare”, “Quality Control of Medical Care”, “Management in Healthcare”, “Marketing in Healthcare”. Interactive training has been introduced.

The contribution of the department to practical public health care is determined not only by the above provisions, but also by constant participation of its staff in annual professional development courses. More than 500 residents of all specialties are trained annually in the related discipline “Public Health and Health Care” in the volume of 36 hours, which is included in the mandatory educational standard of a doctor.

Professional retraining cycles in the specialty “Health Care Management and Public Health” in the amount of 504 hours are held annually by 50 to 100 doctors of various specialties.

504 hours are annually completed by 50 to 100 doctors of various specialties. Also, more than 70 managers of medical organizations (per year) undergo advanced training in the volume of 144 hours on the cycle “Topical issues of health care organization and public health”.

Very actual cycle for doctors of all clinical specialties “Organization of examination of temporary incapacity for work” — 144 hours. This cycle, held in a distance format, is attended by doctors not only from St. Petersburg, but also from other regions of Russia.

Leading specialists of medical organizations are involved in the classes.

Such volume of educational and scientific work became possible thanks to the scientific and teaching staff of the department of the previous period: Prof. N.G. Petrova and E.N. Penyugina, K.I. Shapiro. Penyugina, K.I. Shapiro, associate professors I.E. Golovchiner, O.A. Gusev, A.P. Kovaleva, L.A. Alekseeva, assistant A.A. Kozyrev and others. Nowadays the best traditions of the department are embodied by professors K.S. Klyukovkin, L.V. Ko-

chorova, I.M. Barsukova, associate professors M.A. Andreeva, M.V. Okulov, N.Y. Smirnova, V.S. Skripov, senior lecturer Candidate of Medical Sciences O.N. Klushnikov, assistant professors, Candidate of Medical Sciences P.I. Konstantinova, R.Y. Rotar, M.O. Bondarenko. Classes with students and clinical residents at training bases in hospitals, outpatient clinics and women's consultative clinics are conducted by the staff (associates) of the department Dr. Y.P. Linets, Dr. O.V. Emelyanov, Candidate of Medical Sciences O.G. Nikitina, Candidate of Medical Sciences S.I. Stozharova, with clinical residents in the Territorial Fund of Compulsory Medical Insurance (CMI) — Prof.V.V. Stozharov.

Thus, all activities (educational, scientific work, international cooperation) of the Department of Public Health and Health Care are subordinated to the main task — to train a physician-manager with high moral qualities, deeply understanding modern problems of health, health care and medicine (Fig. 4).

## ADDITIONAL INFORMATION

**Contribution of the authors.** N.I. Vishnyakov — approval of the final version of the article; K.I. Shapiro — writing and editing text, concept and design.

**Conflict of interest.** The authors declare the absence of obvious and potential conflicts of interest related to the publication of this article.

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## ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

**Вклад авторов.** Н.И. Вишняков — утверждение окончательного варианта статьи; К.И. Шапиро — написание и редактирование текста, концепция и дизайн.

**Конфликт интересов.** Авторы декларируют отсутствие явных и потенциальных конфликтов интересов в связи с публикацией данной статьи.

**Финансирование**. Исследование не имело финансовой поддержки.

# ПРАВИЛА ДЛЯ АВТОРОВ

*Утв. приказом и.о. ректора*
*ФГБОУ ВО СПбГПМУ Минздрава России от 23.06.16*

## НАСТОЯЩИЕ ПРАВИЛА ДЛЯ АВТОРОВ ЯВЛЯЮТСЯ ИЗДАТЕЛЬСКИМ ДОГОВОРОМ

Условия настоящего Договора (далее «Договор») являются публичной офертой в соответствии с п. 2 ст. 437 Гражданского кодекса Российской Федерации. Данный Договор определяет взаимоотношения между редакцией журнала «Medicine and health care organization / Медицина и организация здравоохранения» (далее по тексту «Журнал»), зарегистрированного Управлением Федеральной службы по надзору в сфере связи, информационных технологий и массовых коммуникаций по Северо-Западному федеральному округу 17 мая 2016 года, свидетельство ПИ № ТУ78–01872, именуемой в дальнейшем «Редакция» и являющейся структурным подразделением ФГБОУ ВО СПбГПМУ Минздрава России, и автором и/или авторским коллективом (или иным правообладателем), именуемым в дальнейшем «Автор», принявшим публичное предложение (оферту) о заключении Договора.

Автор передает Редакции для издания авторский оригинал или рукопись. Указанный авторский оригинал должен соответствовать требованиям, указанным в разделах «Представление рукописи в журнал», «Оформление рукописи». При рассмотрении полученных авторских материалов Журнал руководствуется «Едиными требованиями к рукописям, представляемым в биомедицинские журналы» (Intern. committee of medical journal editors. Uniform requirements for manuscripts submitted to biomedical journals // Ann. Intern. Med. 1997; 126: 36–47).

В Журнале печатаются ранее не опубликованные работы по профилю Журнала.

Журнал не рассматривает работы, результаты которых по большей части уже были опубликованы или описаны в статьях, представленных или принятых для публикации в другие печатные или электронные средства массовой информации. Представляя статью, автор всегда должен ставить редакцию в известность обо всех направлениях этой статьи в печать и о предыдущих публикациях, которые могут рассматриваться как множественные или дублирующие публикации той же самой или очень близкой работы. Автор должен уведомить редакцию о том, содержит ли статья уже опубликованные материалы и предоставить ссылки на предыдущую, чтобы дать редакции возможность принять решение, как поступить в данной ситуации. Не принимаются к печати статьи, представляющие собой отдельные этапы незавершенных исследований, а также статьи с нарушением «Правил и норм гуманного обращения с биообъектами исследований».

Размещение публикаций возможно только после получения положительной рецензии.

Все статьи, в том числе статьи аспирантов и докторантов, публикуются бесплатно.

## ПРЕДСТАВЛЕНИЕ РУКОПИСИ В ЖУРНАЛ

Авторский оригинал принимает редакция. Подписанная Автором рукопись должна быть отправлена в адрес редакции по электронной почте на адрес medorgspb@yandex.ru или lt2007@inbox.ru. Автор должен отправить конечную версию рукописи и дать файлу название, состоящее из фамилии первого автора и первых 2–3 сокращенных слов из названия статьи. Информацию об оформлении можно уточнить на сайте: http://www.gpmu.org/science/pediatrics-magazine/Medicine_organization.

## СОПРОВОДИТЕЛЬНЫЕ ДОКУМЕНТЫ

К авторскому оригиналу необходимо приложить экспертное заключение о возможно-

сти опубликования в открытой печати (бланк можно скачать на сайте https://www.gpmu.org/science/pediatrics-magazine/).

Рукопись считается поступившей в Редакцию, если она представлена комплектно и оформлена в соответствии с описанными требованиями. Предварительное рассмотрение рукописи, не заказанной Редакцией, не является фактом заключения между сторонами издательского Договора.

При представлении рукописи в Журнал Авторы несут ответственность за раскрытие своих финансовых и других конфликтных интересов, способных оказать влияние на их работу. В рукописи должны быть упомянуты все лица и организации, оказавшие финансовую поддержку (в виде грантов, оборудования, лекарств или всего этого вместе), а также другое финансовое или личное участие.

## АВТОРСКОЕ ПРАВО

Редакция отбирает, готовит к публикации и публикует переданные Авторами материалы. Авторское право на конкретную статью принадлежит авторам статьи. Авторский гонорар за публикации статей в Журнале не выплачивается. Автор передает, а Редакция принимает авторские материалы на следующих условиях:

1) Редакции передается право на оформление, издание, передачу Журнала с опубликованным материалом Автора для целей реферирования статей из него в Реферативном журнале ВИНИТИ, РНИЦ и базах данных, распространение Журнала/авторских материалов в печатных и электронных изданиях, включая размещение на выбранных либо созданных Редакцией сайтах в сети Интернет в целях доступа к публикации в интерактивном режиме любого заинтересованного лица из любого места и в любое время, а также на распространение Журнала с опубликованным материалом Автора по подписке;
2) территория, на которой разрешается использовать авторский материал, — Российская Федерация и сеть Интернет;
3) срок действия Договора — 5 лет. По истечении указанного срока Редакция оставляет за собой, а Автор подтверждает бессрочное право Редакции на продолжение размещения авторского материала в сети Интернет;
4) Редакция вправе по своему усмотрению без каких-либо согласований с Автором заключать договоры и соглашения с третьими лицами, направленные на дополнительные меры по защите авторских и издательских прав;
5) Автор гарантирует, что использование Редакцией предоставленного им по настоящему Договору авторского материала не нарушит прав третьих лиц;
6) Автор оставляет за собой право использовать предоставленный по настоящему Договору авторский материал самостоятельно, передавать права на него по договору третьим лицам, если это не противоречит настоящему Договору;
7) Редакция предоставляет Автору возможность безвозмездного получения справки с электронными адресами его официальной публикации в сети Интернет;
8) при перепечатке статьи или ее части ссылка на первую публикацию в Журнале обязательна.

## ПОРЯДОК АКЛЮЧЕНИЯ ДОГОВОРА И ИЗМЕНЕНИЯ ЕГО УСЛОВИЙ

Заключением Договора со стороны Редакции является опубликование рукописи данного Автора в журнале «Medicine and health care organization / Медицина и организация здравоохранения» и размещение его текста в сети Интернет. Заключением Договора со стороны Автора, т. е. полным и безоговорочным принятием Автором условий Договора, является передача Автором рукописи и экспертного заключения.

## ОФОРМЛЕНИЕ РУКОПИСИ

Редакция журнала приветствует полностью двуязычные статьи.

**Статья должна иметь (НА РУССКОМ И АНГЛИЙСКОМ ЯЗЫКАХ):**

1. Заглавие (Title). Должно быть кратким (не более 120 знаков), точно отражающим содержание статьи.
2. Сведения об авторах (публикуются). Для каждого автора указываются: фамилия, имя и отчество, место работы, почтовый адрес места работы, e-mail, ORCID. Фамилии авторов рекомендуется транслитерировать так же, как в предыдущих публикациях или по системе BGN (Board of Geographic Names), см. сайт http://www.translit.ru.
3. Резюме (Summary) (1500–2000 знаков, или 200–250 слов) помещают перед текстом статьи. Резюме не требуется при публикации рецензий, отчетов о конференциях, информационных писем.

Авторское резюме к статье является основным источником информации в отечественных

и зарубежных информационных системах и базах данных, индексирующих журнал. Резюме доступно на сайте журнала «Medicine and health care organization / Медицина и организация здравоохранения» и индексируется сетевыми поисковыми системами. Из аннотации должна быть понятна суть исследования, нужно ли обращаться к полному тексту статьи для получения более подробной, интересующей его информации. Резюме должно излагать только существенные факты работы.

Рекомендуемая структура аннотации: введение (Background), цели и задачи (Purposes and tasks), методы (Materials and methods), результаты (Results), выводы (Conclusion). Предмет, тему, цель работы нужно указывать, если они не ясны из заглавия статьи; метод или методологию проведения работы целесообразно описывать, если они отличаются новизной или представляют интерес с точки зрения данной работы. Объем текста авторского резюме определяется содержанием публикации (объемом сведений, их научной ценностью и/или практическим значением) и должен быть в пределах 200–250 слов (1500–2000 знаков).

4. Ключевые слова (Key words) — от 3 до 10 ключевых слов или словосочетаний, которые будут способствовать правильному перекрестному индексированию статьи, помещаются под резюме с подзаголовком «ключевые слова». Используйте термины из списка медицинских предметных заголовков (Medical Subject Headings), приведенного в Index Medicus (если в этом списке еще отсутствуют подходящие обозначения для недавно введенных терминов, подберите наиболее близкие из имеющихся). Ключевые слова разделяются точкой с запятой.
5. Заголовки таблиц, подписи к рисункам, а также все тексты на рисунках и в таблицах должны быть на русском и английском языках.
6. Литература (References). Список литературы должен представлять полное библиографическое описание цитируемых работ в соответствии с NLM (National Library of Medicine) Author A.A., Author B.B., Author C.C. Title of article. Title of Journal. 2005;10(2):49–53. Фамилии и инициалы авторов в пристатейном списке приводятся в алфавитном порядке, сначала русского, затем латинского алфавита. В описании указываются ВСЕ авторы публикации. Библиографические ссылки в тексте статьи даются цифрой в квадратных скобках. Ссылки на неопубликованные работы не допускаются.

*Книга*: Автор(ы) название книги (знак точка) место издания (двоеточие) название издательства (знак точка с запятой) год издания.

Если в качестве автора книги выступает редактор, то после фамилии следует ред.

Преображенский Б.С., Темкин Я.С., Лихачев А.Г. Болезни уха, горла и носа. М.: Медицина; 1968.

Радзинский В.Е., ред. Перинеология: учебное пособие. М.: РУДН; 2008.

Brandenburg J.H., Ponti G.S., Worring A.F. eds. Vocal cord injection with autogenous fat. 3rd ed. NY: Mosby; 1998.

*Глава из книги*: Автор (ы) название главы (знак точка) В кн.: или In: далее описание книги [Автор (ы) название книги (знак точка) место издания (двоеточие) название издательства (знак точка с запятой) год издания] (двоеточие) стр. от и до.

Коробков Г.А. Темп речи. В кн.: Современные проблемы физиологии и патологии речи: сб. тр. Т. 23. М.; 1989: 107–11.

*Статья из журнала*

Автор (ы) название статьи (знак точка) название журнала (знак точка) год издания (знак точка с запятой) том (если есть в круглых скобках номер журнала) затем знак (двоеточие) страницы от и до.

Кирющенков А.П., Совчи М.Г., Иванова П. С. Поликистозные яичники. Акушерство и гинекология. 1994; N 1: 11–4.

Brandenburg J. H., Ponti G. S., Worring A. F. Vocal cord injection with autogenous fat: a long-term magnetic resona. Laryngoscope. 1996; l06 (2, pt l): 174–80.

*Тезисы докладов, материалы научных конф.*

Бабий А.И., Левашов М.М. Новый алгоритм нахождения кульминации экспериментального нистагма (миниметрия). III съезд оториноларингологов Респ. Беларусь: тез. докл. Минск; 1992: 68–70.

Салов И.А., Маринушкин Д.Н. Акушерская тактика при внутриутробной гибели плода. В кн.: Материалы IV Российского форума «Мать и дитя». М.; 2000; ч. 1: 516–9.

*Авторефераты*

Петров С.М. Время реакции и слуховая адаптация в норме и при периферических поражениях слуха. Автореф. дис… канд. мед. наук. СПб.; 1993.

*Описание интернет-ресурса*

Щеглов И. Насколько велика роль микрофлоры в биологии вида-хозяина? Живые системы: научный электронный журнал. Доступен по: http://www.biorf.ru/catalog.aspx?cat_id=396&d_no=3576 (дата обращения 02.07.2012).

Kealy M.A., Small R.E., Liamputtong P. Recovery after caesarean birth: a qualitative study of women's accounts in Victoria, Australia. BMC Pregnancy and Childbirth. 2010. Available at: http://www.biomedcentral.com/1471–2393/10/47/. (accessed 11.09.2013).

Для всех статей, имеющих DOI, индекс необходимо указывать в конце библиографического описания.

По новым правилам, учитывающим требования международных систем цитирования, библиографические списки (References) входят в англоязычный блок статьи и, соответственно, должны даваться не только на языке оригинала, но и в латинице (романским алфавитом). Поэтому авторы статей должны давать список литературы в двух вариантах: один на языке оригинала (русскоязычные источники кириллицей, англоязычные латиницей), как было принято ранее, и отдельным блоком тот же список литературы (References) в романском алфавите для Scopus и других международных баз данных, повторяя в нем все источники литературы, независимо от того, имеются ли среди них иностранные. Если в списке есть ссылки на иностранные публикации, они полностью повторяются в списке, готовящемся в романском алфавите.

В романском алфавите для русскоязычных источников требуется следующая структура библиографической ссылки: автор(ы) (транслитерация), перевод названия книги или статьи на английский язык, название источника (транслитерация), выходные данные в цифровом формате, указание на язык статьи в скобках (in Russian).

Технология подготовки ссылок с использованием системы автоматической транслитерации и переводчика.

На сайте http://www.translit.ru можно бесплатно воспользоваться программой транслитерации русского текста в латиницу. Программа очень простая.

1. Входим в программу Translit.ru. В окошке «варианты» выбираем систему транслитерации BGN (Board of Geographic Names). Вставляем в специальное поле весь текст библиографии на русском языке и нажимаем кнопку «в транслит».
2. Копируем транслитерированный текст в готовящийся список References.
3. Переводим с помощью автоматического переводчика название книги, статьи, постановления и т.д. на английский язык, переносим его в готовящийся список. Перевод, безусловно, требует редактирования, поэтому данную часть необходимо готовить человеку, понимающему английский язык.
4. Объединяем описания в соответствии с принятыми правилами и редактируем список.
5. В конце ссылки в круглых скобках указывается (in Russian). Ссылка готова.

Примеры транслитерации русскоязычных источников литературы для англоязычного блока статьи

Книга: Avtor (y) Nazvanie knigi (znak tochka) [The title of the book in english] (znak tochka) Mesto izdaniya (dvoetochie) Nazvanie izdatel'stva (znak tochka s zapyatoy) god izdaniya.

Preobrazhenskiy B. S., Temkin Ya. S., Likhachev A. G. Bolezni ukha, gorla i nosa. [Diseases of the ear, nose and throat]. M.: Meditsina; 1968. (in Russian).

Radzinskiy V. E., ed. Perioneologiya: uchebnoe posobie. [Perineology tutorial]. M.: RUDN; 2008. (in Russian).

Глава из книги: Avtor (y) Nazvanie glavy (znak tochka) [The title of the article in english] (znak tochka) In: Avtor (y) Nazvanie knigi (znak tochka) Mesto izdaniya (dvoetochie) Nazvanie izdatel'stva (znak tochka s zapyatoy) god izdaniya]. (dvoetochie) stranisi ot i do.

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**ОТВЕТСТВЕННОСТЬ ЗА ПРАВИЛЬНОСТЬ БИБЛИОГРАФИЧЕСКИХ ДАННЫХ НЕСЕТ АВТОР.**

Остальные материалы предоставляются либо на русском, либо на английском языке, либо на обоих языках по желанию.

**Структура основного текста статьи.**

Введение, изложение основного материала, заключение, литература. Для оригинальных исследований — введение, методика, результаты исследования, обсуждение результатов, литература.

В разделе «методика» обязательно указываются сведения о статистической обработке экспериментального или клинического материала. Единицы измерения даются в соответствии с Международной системой единиц — СИ. Фамилии иностранных авторов, цитируемые в тексте рукописи, приводятся в оригинальной транскрипции.

В конце каждой статьи обязательно указываются вклад авторов в написание статьи, источники финансирования (если имеются), отсутствие конфликта интересов, наличие согласия на публикацию со стороны пациентов.

**Объем рукописей.**

Объем рукописи обзора не должен превышать 25 стр. машинописного текста через два интервала, 12 кеглем (включая таблицы, список литературы, подписи к рисункам и резюме на английском языке), поля не менее 25 мм. Нумеруйте страницы последовательно, начиная с титульной. Объем рукописи статьи экспериментального характера не должен превышать 15 стр. машинописного текста; кратких сообщений (писем в редакцию) — 7 стр.; отчетов о конференциях — 3 стр.; рецензий на книги — 3 стр. Используйте колонтитул — сокращенный заголовок и нумерацию страниц, для помещения вверху или внизу всех страниц статьи.

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# ИЗДАТЕЛЬСТВО ПЕДИАТРИЧЕСКОГО УНИВЕРСИТЕТА ПРЕДСТАВЛЯЕТ

## ОРТОПЕДИЧЕСКАЯ СТОМАТОЛОГИЯ. ПРОТЕЗИРОВАНИЕ НЕСЪЁМНЫМИ КОНСТРУКЦИЯМИ ЗУБНЫХ ПРОТЕЗОВ

*М. Ф. Сухарев, С. Б. Фищев, М. Г. Рожкова*


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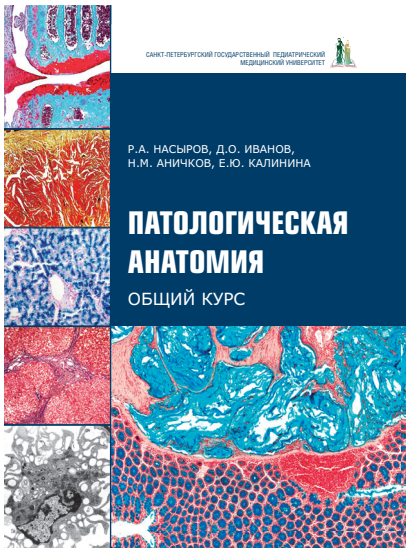


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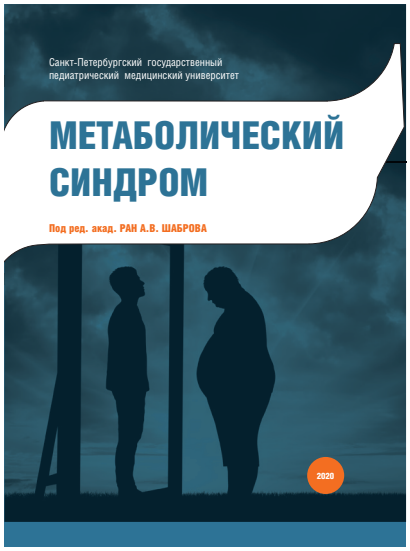


Монография посвящена одной из ведущих проблем современного здравоохранения — метаболическому синдрому. Представлены исторические аспекты изучения метаболического синдрома и ассоциированных с ним заболеваний сердечно-сосудистой системы, критерии диагностики, эпидемиологические данные, проанализирована роль таких факторов, как микробиом кишечника, адипокины, оксидативный стресс, нарушение пищевого поведения в патогенезе метаболического синдрома. Рассмотрено влияние метаболического синдрома на бронхолегочную патологию, гастроэнтерологическую патологию, половые дисфункции. Описаны перспективные методы обследования пациентов с метаболическим синдромом, современные подходы к терапии. Монография будет интересна врачам терапевтических специальностей, научным работникам, преподавателям, аспирантам, студентам медицинских вузов.

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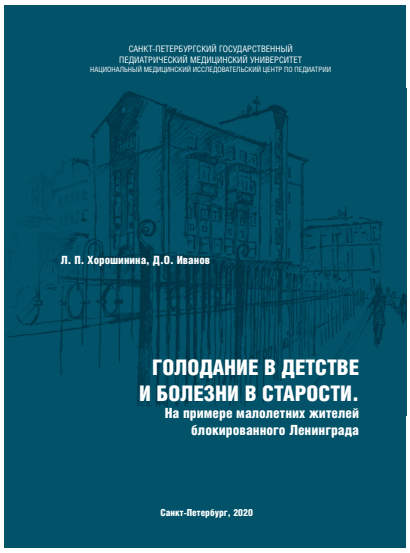


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