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Newborns' routing organization in subjects of the Russian Federation

Dmitry O. Ivanov, Alexey V. Yakovlev

Saint Petersburg State Pediatric Medical University, Saint Petersburg, Russia

ABSTRACT

Reduction of infant mortality is a priority task for achieving the national development goals of the Russian Federation. The paper analyzes the influence of regional routing of newborns on the infant mortality rate in the subjects of the Russian Federation. The infant mortality rate for the period January–November 2023 in the Russian Federation is below the target value and amounts to 4.1‰, which is lower than the rate for the same period of 2022 (4.3‰). At the same time, subjects implementing insufficiently effective intraregional routing of newborns have a high rate of neonatal deaths in the early and late neonatal period concerning medical organizations of the I and II level of medical care. In order to improve the availability and quality of medical care for newborns, as well as to reduce the number of re-hospitalizations of newborns between medical organizations of the same level, including those requiring emergency surgical correction, it is necessary to update regional and interregional routing schemes in the provision of care to newborns, taking into account the orders of medical care, principles of territorial planning (with a detailed description of the areas of responsibility of each medical organization located on the territory of the subject).

Keywords: routing of newborns; infant mortality; organization of medical care for newborns; newborns.

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Организация маршрутизации новорожденных в субъектах Российской Федерации

Д.О. Иванов, А.В. Яковлев

Санкт-Петербургский государственный педиатрический медицинский университет, Санкт-Петербург, Россия

АННОТАЦИЯ

Снижение младенческой смертности — приоритетная задача для достижения национальных целей развития Российской Федерации. В статье представлены результаты анализа влияния региональной маршрутизации новорожденных на показатель младенческой смертности в субъектах Российской Федерации. Показатель младенческой смертности за период январь–ноябрь 2023 г. в Российской Федерации ниже целевого значения и составляет 4,1 ‰, что ниже показателя за тот же период 2022 г. (4,3 ‰). При этом в субъектах, реализующих недостаточно эффективную внутри-региональную маршрутизацию новорожденных, отмечается высокий показатель смертей новорожденных в раннем и позднем неонатальном периоде в медицинских организациях I и II уровня оказания медицинской помощи. С целью повышения доступности и качества медицинской помощи новорожденным, а также снижения количества перегоспитализаций новорожденных между медицинскими организациями одного уровня, в том числе требующих экстренной хирургической коррекции, требуется актуализация региональных и межрегиональных схем маршрутизации при оказании помощи новорожденным с учетом порядков оказания медицинской помощи, принципов территориального планирования (с подробным описанием зон ответственности каждой медицинской организации, находящейся на территории субъекта Российской Федерации), угрозометрических принципов выбора медицинской организации (с формализацией карт оценки тяжести состояния пациента, угрозометрических шкал для оценки риска транспортировки), использования возможностей федеральных медицинских организаций в соответствии с нозологической формой.

Ключевые слова: маршрутизация новорожденных; младенческая смертность; организация медицинской помощи новорожденным; новорожденные.

Как цитировать

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BACKGROUND

The maternal and child health service in the Russian Federation (RF) was developed based on the “Concept of the demographic policy of the Russian Federation until 2025”¹ and the national project “Healthcare,”² which includes the federal project “Development of children’s healthcare, including the creation of a modern infrastructure for the provision of medical care to children,”³ which is aimed to reduce infant mortality. This indicator is a key component of the indicator “Increasing life expectancy to 78 years” of the Unified Plan for achieving national development goals of the RF for the period up to 2024 and the planning period up to 2030 according to the Decree of the President of RF V.V. Putin, “On National Goals and Strategic Objectives for the Development of the Russian Federation for the Period up to 2024” (no. 204, dated May 7, 2018)⁴. The infant mortality rate by 2024 is 4.5 cases per 1000 born children (%) and 3.9 cases per 1000 born children (%) by 2030 [1, 5].

The approaches to establishing the perinatal service of the constituent entities of RF include developing a three-level system of medical care and organizing an effective interaction between medical organizations at all levels and federal centers [6, 11].

According to the World Health Organization, territorial planning and organization of a three-level system of medical care involves a rational territorial distribution of institutions, medical technologies, and types of medical care across three levels, ensuring the availability and quality of all types of medical care and its clinical and economic efficiency [14].

The organization of intraregional routing of newborns is based on the principles of territorial planning, considering the location of the network of medical organizations providing medical care in specialty and transportation time, staffing, available equipment, threat-metric principles for choosing a medical organization based on a nosological form and the patient’s condition severity at the time of transportation, and timely operational decisions. Moreover, a systematic approach plays a crucial role in establishing neonatological services, which improves the quality and availability of medical care, whereas medical,

social, and economic effects are ensured owing to the rational distribution of forces and resources [2–4, 7, 10, 12].

Early and late neonatal mortality significantly contribute to infant mortality rate. Thus, in the RF, this indicator demonstrated stable positive dynamics. Furthermore, the development of a network of perinatal centers in the entities led to the reduction of infant mortality in the RF. Additionally, the implementation of perinatal regionalization programs resulted in a decrease in neonatal mortality rates [8, 9, 13].

The irrational routing of newborns between medical organizations of the entity significantly affects infant mortality rates.

A structured routing system in the entity enables significant improvement in the quality of medical care for newborns.

In recent years, effective routing of pregnant women has been organized in the entities of the RF, including federal perinatal centers. Moreover, children born in maternity institutions and level I and II hospitals and requiring specialized, including high-tech, medical care should be promptly routed to a specialized institution.

MATERIALS AND METHODS

The statutory instruments on the organization of routing of the child population in “Neonatology” of 64 entities of the RF, regulating intra- and interregional routing of newborn children, were analyzed. For a comparative analysis of the efficiency of routing in the analyzed regions, open data of Rosstat for January–November 2022–2023 were used as the base material⁵.

RESULTS AND DISCUSSION

An analysis of statutory instruments on the organization of routing of the child population in “Neonatology” revealed that 58 (90.6%) regions in the RF have an order approved by the Ministry/Department of Health of the entity, which regulate the routing of the child population on the territory of the entity, including newborns delivered in 2023, and 6 entities do not have a regional statutory instrument approving “Neonatology” routing.

The statutory instrument was drawn up with detailed territorial planning schemes in 35 (54.6%) constituent entities of the RF. It indicates the lists of medical organizations of the constituent entity considering the level of organization and the service areas for the child population including the regional district and transport accessibility.

Statutory instruments characterized by compliance with the principles of territorial planning with a description of the areas of responsibility of each medical

¹ Decree of the President of Russia (10/09/2007, no. 1351): “On Approval of the Concept of the Demographic Policy of the Russian Federation for the Period up to 2025.” Access mode: <http://government.ru/docs/all/61461/>.

² Passport of the national project “Healthcare.” Access mode: <http://government.ru/info/35561/>.

³ Federal project: “Development of children’s healthcare, including the creation of a modern infrastructure for the provision of medical care to children.” Access mode: <https://minzdrav.gov.ru/poleznye-resursy/natsproektzdravookhraneniye/detsstvo>.

⁴ Decree of the President of Russia (05/07/2018, no. 204): “On National Goals and Strategic Objectives for the Development of the Russian Federation for the Period up to 2024.” Access mode: <http://www.kremlin.ru/acts/bank/43027>.

⁵ https://rosstat.gov.ru/storage/mediabank/EDN_04-2024.htm.

organization and threat-metric principles (approved maps for assessing the severity of the patients' condition and scales for evaluating the risk of transportation) are presented with two constituent entities of the Central and Volga Federal Districts. The infant mortality rates in these constituent entities are below the planned target value of the RF and have been consistently low (Table 1).

Accounting for the severity of the patient's condition and formalizing the map for assessing the condition severity have been approved only in 14 regions (21.8%), and the use of threat-metric scales for assessing the risk of transportation and choosing a medical organization was noted only in 9 (14.06%) of the analyzed constituent entities of the RF (Fig. 1).

Routing of patients requiring emergency and elective surgical correction is exhibited in all the presented statutory instruments, whereas the description of the use of the capabilities of federal medical organizations

is indicated in the routing schemes only in 19 constituent entities of the RF (29.6%).

Five of the constituent entities of the Northwestern Federal District had a regional statutory instrument that was characterized by a formal indication of the principles of routing and territorial planning schemes.

According to Rosstat data, in January–November 2023, two of the studied entities showed negative dynamics in the infant mortality rate. An increase in infant mortality by 0.5 and 0.9 per mille was noted. Additionally, an increase in infant mortality was observed in the early and late neonatal periods. Moreover, in five entities, the percentage of deaths of children aged <1 year at home and at level I and II hospitals ranged from 13% to 34.6%. In two regions with increased infant mortality rates, the percentage of deaths at home and at level I and II hospitals was 34.6% (Table 2).

The rate of early and late neonatal mortality in the structure of infant mortality was up to 50% (Table 3).

Table 1. Infant mortality indicators (according to Rosstat data) for the period January–November 2022–2023

Таблица 1. Показатели младенческой смертности (по данным Росстата) за период январь–ноябрь 2022–2023 гг.

Subject of the Russian Federation / Субъект Российской Федерации	Number of infants who died under 1 year of age / Число детей, умерших в возрасте до 1 года						
	persons / человек				per 1000 births / на 1000 родившихся		
	2023	2022	increase, decrease / прирост, снижение	2023 in % to 2022 / 2023 в % к 2022	2023	2022	2023 in % to 2022 / 2023 в % к 2022
Moscow Region / Московская область	234	247	–13	94.7	3.5	3.7	94.6
Nizhniy Novgorod Region / Нижегородская область	84	103	–19	81.6	3.9	4.4	88.6

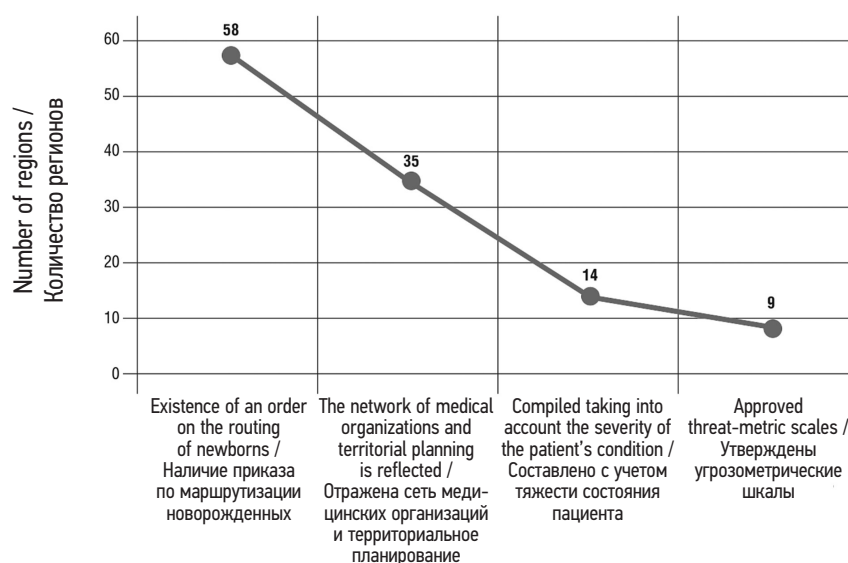


Рисунок. Анализ нормативно-правовых актов по организации маршрутизации детского населения по профилю «неонатология»
Figure. Analysis of normative-legal acts on the organization of routing of children's population in the profile of "neonatology"

Table 2. Number of children under 1 year of age who died between January–November 2023 in the 5 subjects of the Northwest Federal District by place of death

Таблица 2. Число детей до 1 года, умерших за январь–ноябрь 2023 г. в 5 субъектах Северо-Западного федерального округа, в зависимости от места смерти

Subject of the Russian Federation / Субъект Российской Федерации	Total number of deaths under 1 year of age / Всего умерших до 1 года, чел.	Number of deaths under 1 year of age in hospitals of I and II level, at home / Количество умерших до 1 года в стационарах I и II уровня, на дому, чел.	Percentage of deaths under 1 year of age in level I and II hospitals, at home out of the total number of deaths / Процент умерших до 1 года в стационарах I и II уровня, на дому от общего количества умерших
Murmansk Region / Мурманская область	26	9	34.6
Republic of Karelia / Республика Карелия	11	3	27.2
Novgorod Region / Новгородская область	9	2	22.2
Kaliningrad Region / Калининградская область	23	3	13
Republic of Komi / Республика Коми	26	9	34.6

Table 3. Number of children who died under 1 year of age per 1,000 live births for the period January–November 2023 in 5 subjects of the North-Western Federal District by period of death

Таблица 3. Число детей, умерших в возрасте до 1 года на 1000 родившихся живыми, за период январь–ноябрь 2023 г. в 5 субъектах Северо-Западного федерального округа по периодам наступления летального исхода

Subject of the Russian Federation / Субъект Российской Федерации	Infant mortality, ‰ / Младенческая смертность, ‰	Early neonatal mortality, ‰ / Ранняя неонатальная смертность, ‰	Late neonatal mortality, ‰ / Поздняя неонатальная смертность, ‰
Murmansk Region / Мурманская область	5.26	2.22	0.4
Republic of Karelia / Республика Карелия	2.8	1.0	0.8
Novgorod Region / Новгородская область	2.4	1.1	0.8
Kaliningrad Region / Калининградская область	3.2	1.0	1.1
Republic of Komi / Республика Коми	4.5	2.1	0.9

CONCLUSIONS

In most of the presented entities, mortality in the early neonatal period accounted for the largest number of cases. Thus, reducing losses in this group is the main reserve for decreasing infant mortality in general.

The high percentage of deaths at level I and II hospitals in the entities indicates the insufficient effectiveness of the routing schemes proposed in the region.

The reserve for reducing infant mortality includes identifying controllable factors that directly affect mortality. An example of this is the organization of timely and high-quality treatment of pregnant women and newborns in organizations that meet the required level of medical care by arranging an effective routing in the region.

To improve the availability and quality of healthcare and reduce the number of rehospitalizations of newborns, the following are required:

- Updating regional and interregional routing schemes for providing care to newborns, including those requiring emergency surgical correction.
- Taking into account the procedures for providing medical care and the principles of territorial planning (with a detailed description of the areas of responsibility of each medical organization located in the territory of a constituent entity of the RF).
- Use of threat-metric principles for selecting a medical organization (with formalization of assessment cards of the severity of the patient's condition and threat-metric scales for assessing the risk of transportation).
- Use of the capabilities of federal medical organizations according to a nosological form.

ADDITIONAL INFORMATION

Authors' contribution. 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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AUTHORS' INFO

***Dmitry O. Ivanov**, MD, PhD, Dr. Sci. (Medicine), Professor, Chief Freelance Neonatologist of the Ministry of Health of Russia, Rector, Head of the Department of Neonatology with Courses of Neurology and Obstetrics and Gynecology, Saint Petersburg State Pediatric Medical University, Ministry of Healthcare of the Russian Federation; address: 2 Litovskaya st., Saint Petersburg, 194100, Russia; ORCID: 0000-0002-0060-4168; eLibrary SPIN: 4437-9626; e-mail: doivanov@yandex.ru

Alexey V. Yakovlev, Deputy Chief Physician for Neonatology, Saint Petersburg State Pediatric Medical University, Ministry of Healthcare of the Russian Federation, Saint Petersburg, Russia; ORCID: 0000-0002-5537-8559; eLibrary SPIN: 6556-7179; e-mail: yakovlev.av@hotmail.com

* Corresponding author / Автор, ответственный за переписку

ОБ АВТОРАХ

***Дмитрий Олегович Иванов**, д-р мед. наук, профессор, главный внештатный неонатолог Минздрава России, ректор, заведующий кафедрой неонатологии с курсами неврологии акушерства и гинекологии ФП и ДПО, ФГБОУ ВО «Санкт-Петербургский государственный педиатрический медицинский университет» Минздрава России; адрес: Россия, 194100, Санкт-Петербург, ул. Литовская, д. 2; ORCID: 0000-0002-0060-4168; eLibrary SPIN: 4437-9626; e-mail: doivanov@yandex.ru

Алексей Владимирович Яковлев, заместитель главного врача по неонатологии, ФГБОУ ВО «Санкт-Петербургский государственный педиатрический медицинский университет» Минздрава России, Санкт-Петербург, Россия; ORCID: 0000-0002-5537-8559; eLibrary SPIN: 6556-7179; e-mail: yakovlev.av@hotmail.com