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THE DYNAMICS OF INFANT MORTALITY RATES AND FETOINFANTILE LOSSES IN THE TERRITORIES OF THE FAR EASTERN FEDERAL DISTRICT

The aim of the study was to study the features of the dynamics of the infant mortality rate (including early neonatal mortality), as well as the indicators of perinatal mortality, stillbirth and fetoinfantile losses in the territories of the Far Eastern Federal District in comparison with the data for the Russian Federation for 2012-2023. In the Far Eastern Federal District, as in Russia as a whole, for several decades there has been a positive trend in reducing mortality in children up to 1 year. This is considered one of the important achievements of the region in the socio-economic and medical spheres. A detailed analysis and comparison of infant mortality rates in certain regions of the country is an important tool that allows you to quickly identify the most disadvantaged regions of the Russian Federation, and then understand in detail the causes of the current situation and its correction. The article carried out a retrospective analysis of statistical data on infant mortality in the subjects of the Far Eastern Federal District in the period 2012-2023. The emphasis is on the analysis of the following components: stillbirth, early neonatal mortality, perinatal mortality, infant mortality, the ratio of stillbirth to early neonatal mortality, fetoinfantile losses. It is concluded that there are areas with a low level of prevention of fetoinfantile losses and significant differences in the medical and social efficiency of the maternity and childhood service are assessed.

Keywords: infant mortality, stillbirth rate, early neonatal mortality, perinatal mortality, fetoinfantile losses.

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Introduction. The crisis demographic situation in the Russian Federation, accompanied by a low birth rate and high mortality rates of the population, poses many tasks for the health care system, among which the priority are protecting the health of women during pregnancy, protecting the health of children in the antenatal period and preserving the life of already born children, the quality of their health in small generations that will appear in the coming years. Today it is the main challenge for the system of protection of motherhood and childhood, which requires solving the problem of saving every life that has taken place and the national gene pool, preserving Russia as an evolving state.

In Russia, infant mortality (IM), along with life expectancy and maternal mortality, is one of the key indicators characterizing the social well-being of the population. At the beginning of 2025, the Government of the Russian Federation prepared and published a "Unified Plan for Achieving the National Development Goals of the Russian Federation until 2030 and for the Future until 2036," indicating specific targets in terms of health care that will be used to assess the effectiveness and efficiency of the work of the heads of regions. One such indicator is infant mortality. The IM indicator allows us to judge how successfully the regional authorities are coping with the problems associated with the birth and survival of children, ensuring the quality and availability of medical care for pregnant women and newborns, and the development of prenatal and neonatal care. Thus, reducing IM is one of the priority areas of activity of our state and medical communities, primarily neonatal and pediatric services.

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As part of the implementation of the activities of the national projects "Health" and "Demography", other federal projects not included in national projects, as well as the draft strategy for demographic and family policy for the period up to 2036, it is planned to reduce IM in the Russian Federation to 3.9 ppm by 2030, by 2036 - to 3.7 ppm.

Achieving this level of IM requires a systematic approach that includes strengthening the health care system, improving the quality of care, mass preventive measures, and addressing social and economic problems affecting the health of children and mothers.

Infant mortality has traditionally occupied and occupies an important place in the demographic development of Russia and the Far East, as evidenced by numerous publications on this topic [1-2, 8-9, 11, 13, 16]. In the Far Eastern Federal District (FEFD), as in Russia as a whole, a positive trend in reducing the mortality rate of children up to 1 year has been achieved for several decades, which cannot be said about other age groups. This is considered one of the important achievements of the region in the socio-economic and medical spheres.

Detailed analysis and comparison of IM indicators in certain regions of the country is an important tool that allows you to quickly identify the most disadvantaged regions of the Russian Federation, and then understand in detail the reasons for the current situation.

The aim of this study was to study the features of the dynamics of the IM indicator (including early neonatal mortality), as well as the indicators of perinatal mortality (PM), stillbirth (SB) and fetoinfantile losses in the territories of the Far Eastern Federal District in comparison with the data for the Russian Federation for 2012-2023.

Material and methods. A retrospective analysis of statistical data on infant mortality in the subjects of the Far Eastern Federal District in the period 2012-2023 was carried out. The starting point for the analysis was 2012, when the Russian Federation switched to the international criteria for live birth recommended by WHO. Emphasis is placed on the analysis of the following components: stillbirth (the ratio of the number of stillbirths to 1000 live and dead births), early neonatal mortality (ratio of neonatal deaths in the first 7 days of life to 1,000 live births), perinatal mortality (ratio of the number of stillbirths and deaths of newborns in the first 7 days of life to 1,000 live and dead births), infant mortality (under-year mortality), stillbirth to early neonatal mortality

Table 1

Ranking of territories of the Far Eastern Federal District by infant mortality rate in 2012-2023

	2012		2023	
	IM	rank	IM	rank
Republic of Buryatia	8.3	3	4.4	4
Republic of Sakha (Yakutia)	9.6	5	3.2	1
Trans-Baikal Territory	7.4	2	7.0	8
Kamchatka Territory	11.3	7	5.1	7
Primorsky Krai	10.4	6	5.0	6
Khabarovsk Territory	11.5	8	3.7	2
Amur region	13.8	9	3.8	3
Magadan region	8.4	4	4.5	5
Sakhalin Oblast	6.5	1	3.7	2
Jewish AR	15.5	10	7.4	9
Chukotka AO	21.2	11	19.1	10

Table 2

Ranking of territories of the Far Eastern Federal District by the level of perinatal mortality in 2012-2023

	2012		2023	
	PM	rank	PM	rank
Republic of Buryatia	9.40	3	6.22	5
Republic of Sakha (Yakutia)	12.66	7	4.83	1
Trans-Baikal Territory	8.90	2	10.87	10
Kamchatka Territory	11.89	4	5.75	3
Primorsky Krai	12.22	5	6.70	6
Khabarovsk Territory	12.90	9	7.86	8
Amur region	12.67	8	5.19	2
Magadan region	13.34	10	7.21	7
Sakhalin Oblast	8.87	1	5.89	4
Jewish AR	12.58	6	8.95	9
Chukotka AO	16.69	11	17.17	11

Table 3

Ranking of territories of the Far Eastern Federal District by the level of early neonatal mortality in 2012-2023

	2012		2023	
	ENM	rank	ENM	rank
Republic of Buryatia	2.63	3	0.78	4
Republic of Sakha (Yakutia)	4.55	5	0.72	3
Trans-Baikal Territory	2.24	1	2.02	9
Kamchatka Territory	6.66	11	1.02	6
Primorsky Krai	5.28	8	1.78	7
Khabarovsk Territory	5.00	7	0.69	2
Amur region	4.73	6	1.01	5
Magadan region	3.59	4	1.81	8
Sakhalin Oblast	2.38	2	0.66	1
Jewish AR	6.09	10	2.25	10
Chukotka AO	5.56	9	11.47	11

ratio, fetoinfantile losses (sum of stillbirths and under-year deaths).

Official publications of open data of the Federal State Statistics Service (Rosstat) were used as information sources [10]. The study was carried out using statistical, mathematical methods, as well as methods of comparative analysis. Publications in domestic scientific journals and monographs on this topic also became a source of information.

For the period of preparation of the material, the data of Rosstat of Russia for 2024 on infant, perinatal mortality and stillbirth were not officially available.

Results and discussion. *Infant mortality.* As already noted, today the value of the IM indicator reflects not only the quality of medical care provided by the maternity and childhood service, this is one of the criteria for assessing the work of the heads of the constituent entities of the Russian Federation. Rosstat data show that for several decades, the IM coefficient both in the Russian Federation as a whole and in the Far Eastern Federal District has been steadily decreasing. For 2012-2023, the IM indicator in the Russian Federation decreased by 51.2% (from 8.6 to 4.2 per 1000 live births), in the Far Eastern Federal District - by 56.9% (from 10.9 to 4.7 per 1000 live births).

The greatest success in reducing IM over the specified period was achieved by the Amur Region (by 72.5%), the Khabarovsk Territory (by 67.8%), the Republic of Sakha (Yakutia) (by 66.7%). In the Trans-Baikal Territory, the IM indicator decreased by only 5.4%, in the Chukotka Autonomous Okrug - by 9.9%. In the remaining territories, the IM decreased by about half.

The ranking of the territories of the Far Eastern Federal District shows a change in their position over the studied period. Higher ranking places in 2023 were taken by the Republic of Sakha (Yakutia) - from 5th to 1st place, Khabarovsk Territory - from 8th to 2nd place, Amur Region - from 9th to 3rd. Kamchatka and Primorsky Krai did not change their indicators, and the Jewish Autonomous Region and Chukotka Autonomous Region, as in 2012, close the rating (Table 1).

Perinatal mortality. The study of regional characteristics of perinatal mortality is of great importance for substantiating the main directions for improving assistance to newborns. The analyzed period in the Far Eastern Federal District and the Russian Federation as a whole was characterized by a tendency to reduce perinatal mortality. As a result of the analysis, it was found that in the Far Eastern Federal District, the perinatal mortality rate in the period from 2012 to 2023. decreased by 43.1% from 12.32 to 7.01 per 1000 children born alive and dead. In the Russian Federation, over the same period of time, there was a decrease in the PM indicator by 35.1%.

PM indicator in 2012-2023. more than halved in the Republic of Sakha (Yakutia), Amur Region, Kamchatka Territory. In two territories of the Far Eastern Federal District, there was an increase in the PM coefficient (Trans-Baikal Territory, Chukotka Autonomous Okrug).

Higher ranking places in terms of PM in 2023 compared to 2012 were taken by the Republic of Sakha (Yakutia) - from 7th to 1st place, Amur Region (from 8th to 2nd), Magadan Region (from 10th to 7th). The Trans-Baikal Territory, the Republic of Buryatia, the Sakhalin and Jewish Autonomous Regions moved to lower positions in the ranking (Table 2).

Early neonatal mortality. Early neonatal mortality, as a component of PM, also showed a persistent downward trend during the time period studied. In the Far Eastern Federal District, the ENM indicator decreased 3.8 times from 4.85 ‰ in 2012 to 1.27 ‰ in 2023. In the Russian Federation, during the same time, the RNS indicator decreased 3 times from 3.64 ‰ to 1.23 ‰.

It can be seen that the decrease in the RNS indicator occurs differently in different territories of the Far Eastern Federal District. The Khabarovsk Territory looks the most successful in terms of ENM dynamics, where it was possible to reduce this indicator by 7.2 times over 12 years (from 5.0 ‰ to 0.69 ‰), Kamchatka Territory - by 6.5 times (from 6.66 ‰ to 1.02 ‰) and the Republic of Sakha (Yakutia) - by 6.3 times (from 4.55 ‰ to 0.72 ‰).

It should be noted that all territories of the Far Eastern Federal District (with the exception of the Chukotka Autonomous Okrug) have significantly improved their ENM indicators. When ranking territories by the value of the ENM indicator, consistently low ENM indicators are observed in the Sakhalin Region (2nd rank in 2012 and 1st in 2023). Khabarovsk Territory moved from 7th position to 2nd, the Republic of Sakha (Yakutia) - from 5th to 3rd, Kamchatka Territory - from 11th to 6th. The Trans-Baikal Territory and the Magadan Region worsened their rating, the Chukotka Autonomous Okrug and the Jewish Autonomous Okrug continue to be among the outsiders (Table 3).

Stillbirth. Numerous works by domestic and foreign researchers emphasize that a decrease in stillbirth is an important indicator of progress in the field of health care and improving the quality of life of the population [1, 2, 11, 16]. Infant mortality includes cases when a child was born alive and died after birth. Cases when a child dies before birth fall into the statistics of stillbirth. Stillbirth is the second component of perinatal mortality, which is a more stable indicator than infant mortality. If over 12 years (from 2012 to 2023) in the Far Eastern Federal District, infant mortality decreased by 2.3 times, ENM - by 3.8 times, then stillbirth - only by 23.2% (in the Russian Federation by 2 times, 3 times and 17.2%, respectively). At the same time, in the Republic of Sakha (Yakutia), it was possible to reduce the SB by almost half (by 49.3%) from 8.11 ‰ to 4.11 ‰. Significant success in reducing MR was achieved by the Chukotka Autonomous Okrug and the Amur Region (a decrease of 48.8% and 47.4%, respectively), the Magadan Region (by 44.6%). Minimal changes in the SB indicator were noted in the Khabarovsk (9.2%) and Kamchatka (9.6%) regions. In two territories of the Far East, an increase in the SB indicator (Trans-Baikal Territory and Jewish Autonomous Region) was noted.

The rating of the territories of the Far Eastern Federal District in terms of stillbirth for 2012-2023. has undergone major changes (Table 4). Some territories managed to achieve better results, others, despite the improvement in the SB indicator, moved to lower positions. Thus, the lowest values of the SB indicator in 2023 were noted in the Republic of Sakha (Yakutia) (1st rank in 2023, 8th in 2012), the Amur Region moved from 7th place to 2nd, Magadan Region - from 9th to 6th. The Khabarovsk Territory, where the MR indicator for 12 years decreased by only 9.2%, in 2023 began to occupy the penultimate place, second only to the Trans-Baikal Territory, where the stillbirth rate increased. The Jewish Autonomous Region, Sakhalin Oblast, and the Republic of Buryatia worsened their positions.

In the works of many authors, it is noted that when analyzing the regional features of IM, one of the serious problems is its underestimation. One of the signs with a high degree of probability indicating this underestimation is a noticeable excess of the ratio of the number of deaths in the first week of life to the number of stillbirths [4, 14-15].

In most economically developed countries of the world, this ratio does not exceed 1 to 2. In general, in Russia in 2012 this indicator was 1/1.7, in the Far Eastern Federal District - 1/1.5. After the transition of the country in 2012 to the international criteria for registering dead and live births, this ratio significant-

Table 4

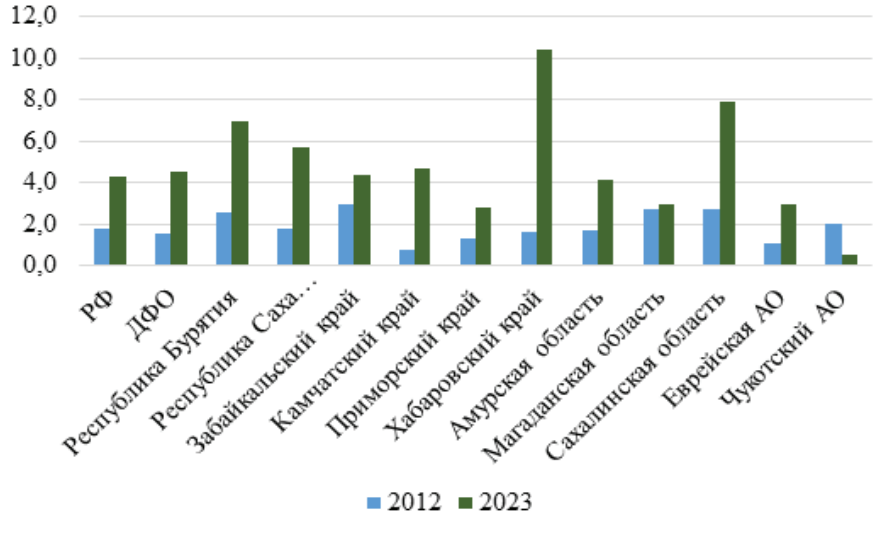
Ranking of territories of the Far Eastern Federal District by stillbirth rate in 2012-2023

	2012		2023	
	SB	rank	SB	rank
Republic of Buryatia	6.77	4	5.44	7
Republic of Sakha (Yakutia)	8.11	8	4.11	1
Trans-Baikal Territory	6.66	3	8.85	11
Kamchatka Territory	5.23	1	4.73	3
Primorsky Krai	6.94	5	4.92	4
Khabarovsk Territory	7.90	6	7.17	10
Amur region	7.94	7	4.18	2
Magadan region	9.75	9	5.40	6
Sakhalin Oblast	6.49	2	5.23	5
Jewish AR	6.49	2	6.70	9
Chukotka AO	11.13	10	5.70	8

Table 5

Ranking of Far Eastern Federal District territories by the level of fetoinfantile losses in 2012-2023

	2012		2023	
	FIL	rank	FIL	rank
Republic of Buryatia	15.07	3	9.84	5
Republic of Sakha (Yakutia)	17.71	6	7.31	1
Trans-Baikal Territory	14.06	2	15.85	10
Kamchatka Territory	16.53	4	9.83	4
Primorsky Krai	17.34	5	9.92	7
Khabarovsk Territory	19.40	8	10.87	8
Amur region	21.74	9	7.98	2
Magadan region	18.15	7	9.90	6
Sakhalin Oblast	12.99	1	8.93	3
Jewish AR	21.99	10	14.10	9
Chukotka AO	32.33	11	24.80	11



Number of stillbirths per 1st deceased in the early neonatal period in 2012 and 2023

ly increased to 4.3 in 2023 in the Russian Federation and 4.5 in the Far Eastern Federal District.

It should be noted that in the Far Eastern Federal District there are a number of territories where the share of stillbirths in perinatal mortality accounts for more than 80% (> 1/4): the maximum indicators were registered in the Khabarovsk Territory (1/10.4), Sakhalin Oblast (1/7.9), Republic of Buryatia (1/7.0). In 2023, the Khabarovsk Territory had one of the highest rates in the Russian Federation of the ratio of the number of deaths in the first week of life to the number of stillbirths after the Republic of Khakassia (28.6), the Chuvash Republic (18.0) and the Lipetsk Region (11.5) (Fig. 1).

Numerous studies conducted by specialists of the Research Institute of Pediatrics and Children's Health, National Research Institute of Public Health named after N.A. Semashko, RNIMU named after N.I. Pirogov, Institute of Demography of the National Research University Higher School of Economics, Peoples' Friendship University of Russia, Russian Medical Academy of Continuing Professional Education [1, 3-5, 8-9, 12, 14-15] show that such a situation can add up due to falsification of data at the regional level. Infant mortality, unlike stillbirth, is an indicator that the authorities pay attention to. Therefore, deaths of children in the early neonatal period can be "transferred" to stillbirth, because this indicator is not a criterion for assessing the work of the subject's administration. The deterioration of indicators is not beneficial to either the medical organization, or the chief specialists, or the regional Ministry of Health, as a result of which the real picture of the level of perinatal mortality and its components in certain territories and in the region as a whole may be distorted. Ultimately, this leads to an inadequate assessment of the organization of medical care in the maternal and child health system.

ENM and SB are influenced by similar factors - the quality of medical care, its availability, a woman's behavior during pregnancy and the quality of child care in the first week of life. If the level of medical care is growing in the territory as a whole, it is logical to expect a simultaneous decrease in both indicators. Moreover, the SB level should not be significantly higher than the level of early neonatal mortality.

Another indicator that allows you to eliminate the influence of possible manipulations with statistics in the territories and reflects the real problems of perinatal medicine is the indicator of fetoinfantile

Table 6

Total ranking of Far Eastern Federal District territories in 2012-2023

	2012 год							2023 год						
	IM	PM	ENM	SB	AIL	Σ	av.rank	IM	PM	ENM	SB	FIL	Σ	av.rank
Republic of Buryatia	3	3	3	4	3	16	3	4	5	4	7	5	25	5
Republic of Sakha (Yakutia)	5	7	5	8	6	31	6	1	1	3	1	1	7	1
Trans-Baikal Territory	2	2	1	3	2	10	2	8	10	9	11	10	48	9
Kamchatka Territory	7	4	11	1	4	27	4	7	3	6	3	4	23	4
Primorsky Krai	6	5	8	5	5	29	5	6	6	7	4	7	30	6
Khabarovsk Territory	8	9	7	6	8	38	8	2	8	2	10	8	30	6
Amur region	9	8	6	7	9	39	9	3	2	5	2	2	14	2
Magadan region	4	10	4	9	7	34	7	5	7	8	6	6	32	7
Sakhalin Oblast	1	1	2	2	1	7	1	2	4	1	5	3	15	3
Jewish AR	10	6	10	2	10	38	10	9	9	10	9	9	46	8
Chukotka AO	11	11	9	10	11	52	11	10	11	11	8	11	51	10

losses. Fetoinfantile losses (FIL) include all cases ¬ stillbirth and death of children in the first year of life and are an integrated indicator. which characterize not only the health of the population and its reproductive potential, but is also used as a criterion for a comprehensive assessment of the activities of various medical organizations of the maternal and child health system, responsible for making management decisions in optimizing activities to prevent infant and perinatal mortality [6-7, 12].

The dynamics of fetoinfantile losses in the Far Eastern Federal District is characterized by positive trends, most of the territories of the Far Eastern Federal District in 2012-2023. managed to achieve significant success in reducing this indicator. Thus, in the Amur Region, the FIL indicator decreased by 63.3%, in the Republic of Sakha (Yakutia) - by 58.7%. The only territory where the FIP indicator increased by 12.7% was the Trans-Baikal Territory.

Thus, the Republic of Sakha (Yakutia) moved from 6th to first place with minimal fetoinfantile losses, the Amur Region moved from 9th position in 2012 to 2nd place in 2023. Among the outsiders in terms of FIL in 2023 are still Chukotka Autonomous Okrug, Jewish Autonomous Okrug and Khabarovsk Territory. The Trans-Baikal Territory significantly worsened its position, moving over 12 years from 2nd place to 10th.

After ranking the territories of the Far Eastern Federal District, a total ranking was carried out separately for each indicator, the results of which are presented in Table 6.

In terms of the sum of all indicators, the first place in the ranking as of 2023 was occupied by the Republic of Sakha (Yakutia), significantly ahead of other territories over the past 12 years. In 2nd place, the Amur Region, which moved from the outsiders of the rating to the second position, with a minimal margin from it in 3rd place, is the Sakhalin Region. 4th and 5th places in the ranking in the Kamchatka Territory and the Republic of Buryatia. Khabarovsk and Primorsky Territories occupied the middle position among all territories of the Far Eastern Federal District, dividing 6th place. The most unfavorable subjects by rating were the Chukotka Autonomous Okrug, the Trans-Baikal Territory, the Jewish Autonomous Okrug, as well as the Magadan Region.

Conclusion. Thus, the analysis of the regional characteristics of infant and perinatal mortality made it possible to identify the territories of the Far Eastern Federal District with a low level of prevention of fetoinfantile losses and assess significant differences in the medical and social efficiency of the maternity and childhood service. Despite the positive trends in the decline in infant and perinatal mortality rates, fetoinfantile losses in the Far Eastern Federal District, reserves remain in most territories to further reduce reproductive losses and improve the demographic situation in the region.

When analyzing infant mortality rates and their components, it should be remembered that distortion of the true picture of mortality in order to achieve target indicators of the demographic development of territories makes it difficult to analyze the demographic situation, does not allow forming the right priorities and making the right and effective management decisions to correct it.

The authors declare no conflict of interest.

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DISEASES OF THE CIRCULATORY SYSTEM IN THE WORKING-AGE POPULATION OF THE REPUBLIC OF SAKHA (YAKUTIA) IN 2011–2023

Epidemiological characteristics and patterns of chronic non-communicable diseases in the working-age population (WAP) are often neglected nowadays. Disease rates in the WAP are not the object of statistical observation, which significantly complicates the conduct of targeted studies. Diseases of the circulatory system are the main cause of premature deaths, which determines the relevance of establishing their rates in the WAP, including the analysis of their changes and features during the spread of COVID-19 and in the early post-pandemic period.

Materials and methods. We calculated incidence and prevalence rates of circulatory system diseases (CSD) in the WAP of the Republic of Sakha (Yakutia) and analyzed their dynamics in 2011–2023. We also assessed the statistical significance of differences between the disease rates in Yakutia and the Russian Federation before, during and after the pandemic of the novel coronavirus disease. Direct ranking was used to determine the place of Yakutia among the constituent entities of the Russian Federation in terms of CSD rates.

Results. We established that during the study period, Yakutia belonged to a large group of Russian constituent entities with average CSD rates. We observed a statistical increase in the CSD prevalence in Yakutia in 2022–2023 and in the chronicity rate in 2020–2023. The high rate of increase in the latter indicates a more severe course of chronic CSDs during the COVID-19 pandemic and the early post-pandemic period in the WAP.

Conclusions. The study of trends and regional characteristics of morbidity of the working-age population is an important component of raising effectiveness of government measures taken to increase life expectancy and reduce mortality. The results of such studies should be taken into account when developing local programs of state guarantees for the provision of free medical care.

Keywords: working-age population, diseases of the circulatory system, incidence, prevalence, chronicity rate, COVID-19.

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Introduction. The current demographic and health situation in the Russian Federation and the Republic of Sakha (Yakutia) (hereinafter referred to