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Assessment of collective measles immunity in child population of Irkutsk

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Abstract. The aim. Evaluate the efficacy of measles immunization in Irkutsk's child population by measuring serological anti-measles antibody levels.

Materials and methods. An assessment of measles immunity levels was conducted among 588 Irkutsk children. Serum concentrations of antibodies to measles virus (IgG) were measured using an enzyme immunoassay and a reagent set designed for both qualitative and quantitative analysis.

Results. Measles virus immunoglobulin G concentrations varied among children of different age groups. Children aged 3-5 years had a concentration of 0.67 ± 0.06 IU/ml. In children aged 6-7 years who underwent revaccination, the concentration was 0.68 ± 0.06 IU/ml. For those aged 12-13 years, the concentration was 0.47 ± 0.04 IU/ml, and adolescents aged 15-17 years had a concentration of 0.42 ± 0.05 IU/ml. The concentration in children aged 3-5 years who did not undergo routine revaccination (Group 2) was 0.46 ± 0.03 IU/ml.

Discussion. Seronegative outcomes surpass 7% across all age demographics, indicating inadequate collective immunity against measles.

Conclusions. Further research is required to elucidate collective specific immunity to vaccine-controlled infections (such as rubella and mumps) across different pediatric age groups, and to identify individual characteristics impacting the development of anti-infectious immunity.

Keywords: measles, measles immunity, children, vaccine prevention.

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Introduction. Measles infection can be considered as a classic example of an infectious disease, the possibility of elimination of which is beyond doubt, since there are real theoretical and practical prerequisites for the complete elimination of this infection [15, 16, 17]. Thanks to the

introduction of measles vaccines in 1963, significant progress has been made in the prevention and spread of measles, and the widespread introduction of measles immunization has saved millions of lives through the formation of population immunity and the prevention of major annu-

al measles epidemics around the world. Nevertheless, the issues of effective collective and individual protection against measles infection are of increased interest to specialists of various profiles [2, 7, 17]. An increase in the incidence of measles infection is observed both in for-

foreign countries and on the territory of the Russian Federation [1, 11, 16]. According to the Unified Interdepartmental Information and Statistical System (EMISS), the number of registered measles cases in the Russian Federation is increasing dynamically. So, in 2022, 65 cases were registered, in 2023 – 8,881, and in 2024 – 14,166 cases of measles in children aged 0-17 years. There were no cases of measles infection in the Irkutsk region in 2022, 37 cases in 2023, and 38 cases in 2024 [1, 3, 14].

According to a number of experts, the increase in measles incidence is not related to the quality of vaccines, but to a number of external factors, such as an increase in the frequency of vaccination refusals [10], the passivity of the medical community, and the import of measles infection from other countries represented by different strains of the measles virus. In addition, post-vaccination immunity depends on the individual and genetic characteristics of each individual [6, 9, 13].

The assessment of immunity to the measles virus is carried out both within the framework of State monitoring and as part of scientific research on population immunity in different regions of the Russian Federation. [3, 11, 12, 16]. Seromonitoring of measles immunity is carried out in established "indicator" groups, and as for the child population – only at regulated ages, therefore, our chosen research goal is to assess the actual protection of children in Irkutsk by determining the intensity of serological anti-measles immunity.

Materials and methods: The assessment of the level of immunity to measles infection in 588 Irkutsk children attending children's organized groups attached to 10 medical organizations of the city was carried out.

To assess the intensity of specific immunity to measles, we identified 5 age groups. Group 1: children aged 3-5 years, born in 2019-2021 (n=94); Group 2: children aged 6-7 years, born in 2016-2018 (n=162), who for some reason did not receive the second vaccine; Group 3: children aged 6-7 years, 2016-2018 Group 4: children aged 12-13 years, born in 2010-2012 (n=115); Group 5: children aged 15-17 years, born in 2006-2008 (n=104). The study did not include "indicator" ages regulated by the Methodological Guidelines (MU) 3.1.2943-11 for the organization and conduct of serological monitoring of the state of collective immunity.

The concentration of antibodies was determined by enzyme immunoassay

(ELISA) using a set of reagents for the quantitative and qualitative determination of class G (IgG) immunoglobulins to measles virus in the blood serum of VECTOR-BEST JSC (Novosibirsk, Russia) in accordance with the manufacturer's instructions. The following reference values were used to interpret the results: ≥ 0.18 IU/ml — seropositive; less than 0.12 IU/ml — seronegative; from 0.12 to 0.18 IU/ml — indeterminate "gray zone".

Inclusion criteria: signed informed consent from parents and/ or legal representatives, absence of signs of acute illness or exacerbation of chronic one month before and at the time of the study, availability of information provided by the medical organization about the vaccine history.

The study complies with recognized standards: Declaration of Helsinki (2013 edition); Federal Policy for the Protection of Human Subjects ("General Practice", US Federal Policy for the Protection of Human Subjects); Guidelines of the European Medical Agency for Good Clinical Practice (European Medicines Agency Guidelines for Good Clinical Practice), approved and approved by the Committee on Biomedical Ethics at the Federal State Budgetary Institution of the Russian Academy of Sciences (extract from the Minutes of the meeting No. 8.2 dated 11/24/2023).

Before starting the study, all participants (or their legal representatives) signed an informed consent form approved by the ethics committee, voluntarily confirming their consent to participate in the study.

Research results and discussion.

When analyzing the vaccination history, it was found that the first administration of the vaccine was carried out to all children in the study groups, and the coverage of revaccination at the age set by the National Vaccination Calendar was also high (Table 1).

Analysis of the structure of the results of the level of antibodies to the measles virus in the studied age groups revealed that the maximum proportion of seropositive individuals was determined in Group 3 among revaccinated children aged 6-7 years – $85.2 \pm 6.54\%$, and significantly exceeded (< 0.05) the proportion of positive results in children of the same age in Group 2 – $67.1 \pm 7.23\%$, who did not receive the second vaccine. The minimum proportion of seropositive individuals – $51.0 \pm 9.6\%$ – was determined at the age of 15-17 years (Figure 1).

During the analysis of the distribution of the shares of seronegative results depending on age, it was shown that at the age of 3 years, after vaccination, anti-measles antibodies are detected in all children, by the age of 4 the share of se-

The proportion of vaccinated and revaccinated children in each age group according to the National Vaccination Calendar

Group	Age	Number of children	Proportion of children vaccinated with the first dose	Proportion of children vaccinated with the second dose
Group 1	3-5	n=94	100	0
Group 2	6-7	n=162	100	0
Group 3	6-7	n=113	100	100
Group 4	12-13	n=115	100	93
Group 5	15-17	n=104	100	91.2

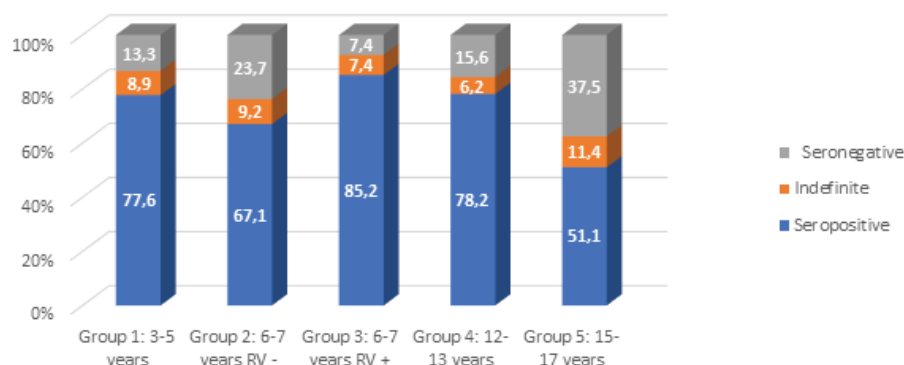


Fig. 1. Structure (%) of the results of IgG levels to measles virus in children in the study groups

ronegative results is $12.3 \pm 7.98\%$, and by the age of 5 it reaches maximum values – $16.1 \pm 8.01\%$. At the age of 15, 16, 17 years, the proportion of seronegative diseases is statistically significantly higher. $33.3 \pm 15.2\%$, $21.1 \pm 11.3\%$, $35.5 \pm 13.9\%$ Accordingly, there are also uncertain ("gray zone") results (Figure 2).

According to MU 3.1.2943-11, the measles situation can be considered safe if no more than 7% of seronegative results are detected in each age group. According to the results of our study, the level of tension of collective immunity to the measles virus is insufficient in all the age groups studied. The proportion of seronegative outcomes in all age groups exceeds 7%, especially it is high at the age of 12-13 years, 15-17 years. In the age group of 6-7 years, the proportion of seronegative results in children who did not receive routine revaccination was 3.2 times higher ($p < 0.05$) than in those who were revaccinated according to the National Vaccination Calendar.

The concentration of IgG to measles virus in children aged 3-5 years (Group 1) was 0.67 ± 0.06 IU/ml; in Group 2 – 0.46 ± 0.03 IU/ml; at the age of 6-7 years in the group of revaccinated (Group 3) – 0.68 ± 0.06 IU/ml; at the age of 12-13 years – 0.47 ± 0.04 IU/ml, and the lowest concentration of IgG for measles was observed in adolescents aged 15-17 years – 0.42 ± 0.05 IU/ml (Figure 3).

According to the analysis of the concentration of IgG to the measles virus and the proportion of seronegative results, the lowest levels of anti-measles IgG combined with a high proportion of seronegative results were observed in Group 3 and Group 5, children aged 15-17 years, which should draw attention to children of these age groups as less protected from measles infection (Figure 3).

An analysis of the concentration of IgG to the measles virus and the proportion of seronegative results, depending on age, gives a more expanded picture. It was found that in children aged 5 years, a lower level of antibodies to the measles virus is combined with the highest proportion of seronegative results, and attracts attention in terms of low protection from measles infection, like adolescents aged 15-17 years, who also have lower concentrations of anti-measles IgG accompanied by an increased proportion of seronegative results (Figure 4). It should be noted that the absence of antibodies was also found in 75.3% of children vaccinated with two doses of the vaccine, which is confirmed by the results of other studies [10].

The level of anti-measles IgG, which

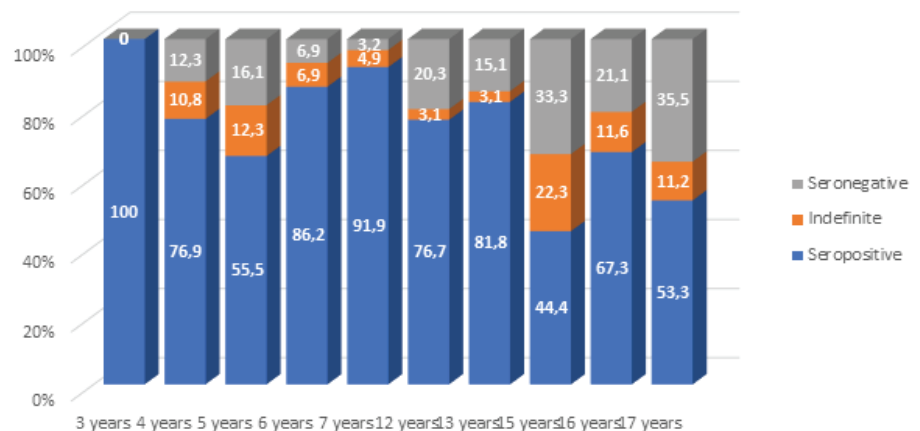


Fig. 2. Structure (%) of the results of IgG levels to measles virus in children of different ages

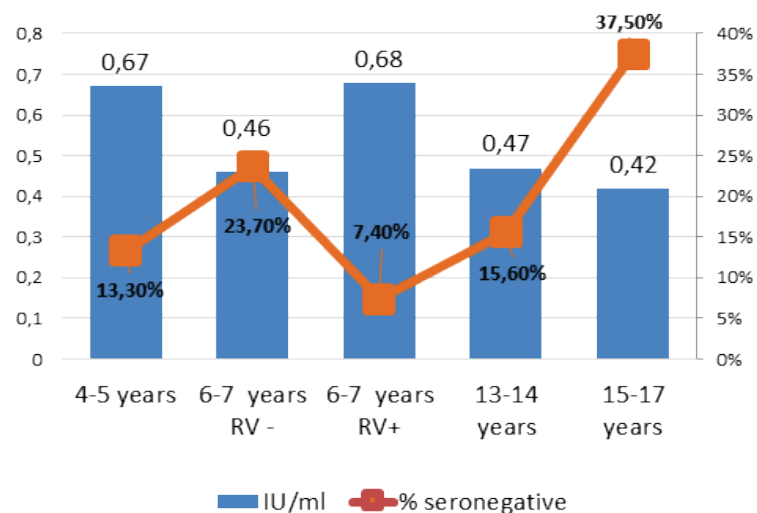


Fig. 3. Average concentration level (IU/ml) and percentage (%) of IgG results for measles virus in children in the study groups

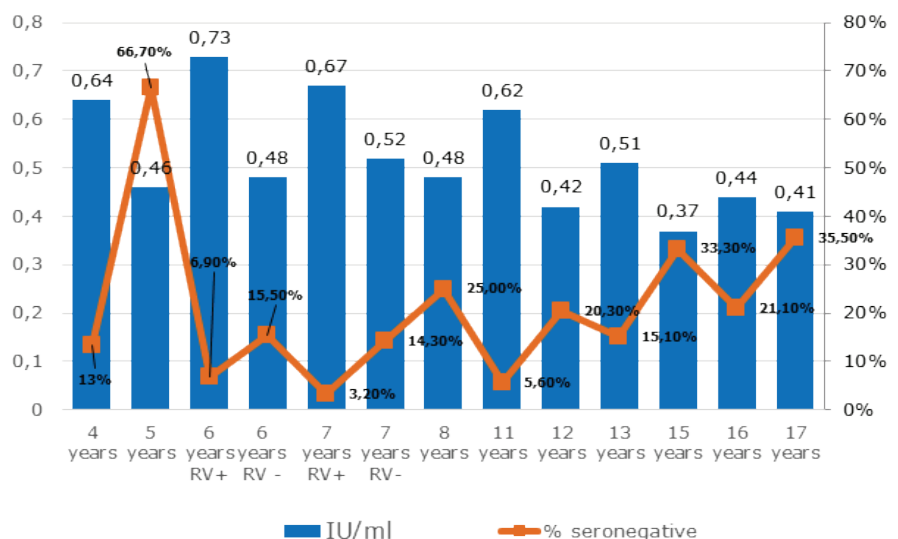


Fig. 4. Average concentration level (IU/ml) and percentage (%) of IgG results for measles virus in children, depending on age

is taken into account when assessing the state of collective and personal immunity against measles infection, makes it possible to identify the presence of a vaccine failure, if reliable data on vaccination are available, at the same time, there are a number of other protective factors of the body that can prevent the development of the infectious process in contact with the measles virus [4, 9], which is confirmed by the analysis the results obtained in our study. Despite the fact that the proportion of children who are seronegative to the measles virus in our selected age groups exceeds the established level, nevertheless, it allows us to protect against the spread of measles infection, since no significant foci and widespread spread of measles have been registered in children's groups and in the Irkutsk region.

According to a number of authors, if there is no immune response to the introduction of the vaccine for any reason in the case of a history of measles vaccination and the level of protective anti-measles IgG is not determined or is not lower than reference values, then the risk of infection and severe measles infection is high. Probably, the body of such children has a number of features that prevent the formation of personal anti-infective immunity, which requires further study, especially given the effect of the SARS CoV-2 virus on the state of humoral immunity in childhood, and the possible effect on the ability to produce specific antibodies to various infectious agents [2, 5, 9]

Nevertheless, the results obtained indicate the possibility of measles infection in certain age groups in case of contact with the virus, which should be taken into account when organizing anti-epidemic measures in organized children's groups. When monitoring contact persons in measles foci and making a diagnosis of measles infection, close attention is required for children with a history of double measles immunization combined with a negative result of measles IgG, since the presence of exanthema and a complete vaccination history does not exclude the diagnosis of measles infection. Thus, vigilance in this matter will eliminate the underdiagnosis of measles, ensure the timeliness of anti-epidemic measures and prevent the growth of the existing outbreak.

According to the results of the study, additional booster immunization with a monovaccine against measles was carried out in all seronegative children, in the absence of revaccination, complex vaccines were used, including against rubella and mumps. According to form No. 6 of the state statistical reporting for 2024, the

level of coverage of the quality of immunoprophylaxis in the city of Irkutsk is at a regulated level.

Conclusion: In general, the results presented by us indicate the need to continue assessing collective specific immunity to vaccine-controlled infections in children of different age groups, in the context of the implementation of government programs aimed at combating childhood infectious diseases, the introduction of complex vaccines and the ongoing circulation of the SARS CoV-2 virus. It is also necessary to continue studying the individual characteristics of the formation of specific immunity to various infections in childhood.

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References

1. Minta AA, Ferrari M, Antoni S, et al. Progress Toward Measles Elimination Worldwide, 2000–2023. *MMWR Morb Mortal Wkly Rep*. 2024; 73:1036–1042. <http://dx.doi.org/10.15585/mmwr.mm7345a4>.
2. Stojiljkovic V.D., Bichurina M.A., Lavrentieva I.N. et al. Rise in 2017–2018 measles morbidity in Serbia and Northwest Russia. *Russian Journal of Infection and Immunity*. 2020; 10, (4): 729–734. <https://doi.org/10.15789/2220-7619-RIM-1342>. EDN GZNNJD.
3. WHO. A monthly summary of the epidemiological data on selected Vaccine-preventable diseases in the WHO European Region. Reported measles cases for the period January–December 2018 (data as of 01 February 2019). 12. WHO. 2018 Assessment report of the global vaccine action plan.
4. Смердова М.А., Топтыгина А.П., Андреев Ю.Ю. и др. Гуморальный и клеточный иммунитет к антигенам вирусов кори и краснухи у здоровых людей. *Инфекция и иммунитет*. 2019. 9 (3–4): 607–611. <https://doi.org/10.15789/2220-7619-2019-3-4-607-611>. EDN NBEGWZ / Smerdova M.A., Toptygina A.P., Andreev Yu.Yu. et al. Humoral and cellular immunity to measles and rubella virus antigens in healthy subjects. *Russian Journal of Infection and Immunity*. 2019; 9, (3–4): 607–611. (In Russian). <https://doi.org/10.15789/2220-7619-2019-3-4-607-611>. EDN NBEGWZ.
5. Алешкин В.А., Тихонова Н.Т., Герасимова А.Г. и др. Проблемы на пути достижения элиминации кори в Российской Федерации. *Журнал микробиологии, эпидемиологии и иммунобиологии*. 2016; 5: 29–34. <https://doi.org/10.36233/0372-9311-2016-5-29-34> / Aleshkin V.A., Tikhonova N.T., Gerasimova A.G. et al. Problems on the Path to Measles Elimination in the Russian Federation. *Journal of microbiology, epidemiology and immunobiology*. 2016 (5): 29–34. (In Russian). <https://doi.org/10.36233/0372-9311-2016-5-29-34>.
6. Юнасова Т.Н., Горенков Д.В., Рукавишников А.В. и др. Анализ заболеваемости

кори в России и проблемы профилактики кори на этапе элиминации. *Биопрепараты. Профилактика, диагностика, лечение*. 2019 (3):154–160. <https://doi.org/10.30895/2221-996X-2019-19-3-154-160>. EDN NIMOFH / Yunasova T.N., Gorenkov D.V., Rukavishnikov A.V. et al. Analysis of measles incidence in Russia and problems of measles prevention at the elimination stage. *Biological Products. Prevention, Diagnostics, Treatment*. 2019; 19 (30): 154–160. (In Russian). <https://doi.org/10.30895/2221-996X-2019-19-3-154-160>. EDN NIMOFH.

7. Шамшева О.В., Колтунов И.Е. На пути ликвидации управляемых инфекций // Детские инфекции. 2013;12(2):3–7. <https://doi.org/10.22627/2072-8107-2013-12-2-3-7> / Shamsheva O.V., Koltunov I.E. Towards the elimination of preventable diseases. // *Children infections*, 2013; 12(2):3–7. (In Russian). <https://doi.org/10.22627/2072-8107-2013-12-2-3-7>

8. Москалева Е.В., Петрова А.Г., Рычкова Л.В. и др. Динамическая оценка иммунного статуса у детей после перенесенной новой коронавирусной инфекции. *Acta Biomedica Scientifica*. 2025; 10 (2): 172–179. <https://doi.org/10.29413/ABS.2025-10.2.17>. EDN XNSRMA. / Moskaleva E.V., Petrova A.G., Rychkova L.V. et al. The dynamic assessment of immune status in children after a new coronavirus infection. *Acta Biomedica Scientifica*. 2025;10 (2): 172–179. (In Russian). <https://doi.org/10.29413/ABS.2025-10.2.17>. EDN XNSRMA.

9. <https://www.fedstat.ru/indicator/38208>

10. Сонис А.Г., Гусякова О.А., Гильмиyarova Ф.Н. и др. Характеристика напряженности противокоревой иммунитет в зависимости от возраста. *Инфекция и иммунитет*. 2020; 10(2): 375–380. doi: 10.15789/2220-7619-POR-1173 EDN QVOBMT / Sonis A.G., Gussyakova O.A., Gilmiyarova F.N. et al. Pattern of resilient age-related measles immunity. *Russian Journal of Infection and Immunity*. 2020; 10 (2): 375–380 (In Russian). doi: 10.15789/2220-7619-POR-1173. EDN QVOBMT.

11. Костинов М.П. Иммунопрофилактика кори с применением комбинированных вакцин. *Эпидемиология и вакцинопрофилактика*. 2020; 19(4): 57–62. <https://doi.org/10.31631/2073-3046-2020-19-4-57-62>. EDN ZGNUMG / Kostinov M.P. Practical aspects of epidemiology and vaccine prevention the combination vaccine against measles. *Epidemiology and Vaccinal Prevention*. 2020 19(4): 57–62. (In Russian). <https://doi.org/10.31631/2073-3046-2020-19-4-57-62>. EDN ZGNUMG.

12. Топтыгина А.П., Мамаева Т.А., Алешкин В.А. Особенности специфического гуморального иммунного ответа против вируса кори. *Инфекция и иммунитет*. 2013; 3(3): 243–250. EDN RDIIFD / Toptygina A.P., Mamaeva T.A., Alioshkin V.A. Peculiarities of specific humoral measles immune response. *Russian Journal of Infection and Immunity*. 2013; 3 (3): 243–250. (In Russian). EDN RDIIFD.

13. Eliminating measles and rubella: framework for the verification process in the WHO European Region 2014. World Health Organization. Regional Office for Europe. <https://iris.who.int/handle/10665/350499>

14. Москалева Е.В., Петрова А.Г., Рычкова Л.В. [и др.]. Состояние показателей иммунного статуса у детей после перенесенной новой коронавирусной инфекции. *Acta Biomedica Scientifica (East Siberian Biomedical Journal)*. 2021; 6 (2): 58–62. DOI 10.29413/ABS.2021-6.2.6. EDN SAQYNT / Moskaleva E.V., Petrova A.G., Rychkova L.V. et al. Indicators of the immune status in children after a new coronavirus infection. *Acta Biomedica Scientifica (East Sibe-*

rian Biomedical Journal). 2021; 6 (2): 58-62. (In Russian). <https://doi.org/10.29413/ABS.2021-6.2.6>. EDN SAQYNT

15. Цвиркун О.В., Герасимова А.Г., Тураева Н.В. и др. Эффективна ли существующая в Российской Федерации схема вакцинации против кори? *Эпидемиология и Вакцинопрофилактика*. 2025;24(2):4-13. <https://doi.org/10.31631/2073-3046.2025-24-2-4-1> / Tsvirkun O.V., Gerasimova A.G., Turaeva N.V. et al. Is the Existing Measles Vaccination Schedule in

the Russian Federation Effective? *Epidemiology and Vaccinal Prevention*. 2025; 24(2):4-13. (In Russian). <https://doi.org/10.31631/2073-3046-2025-24-2-4-13>

16. Ерещенко А.А. Лабораторный мониторинг эффективности поствакцинального противокорьевого иммунного ответа. *Медицинская иммунология*. 2020; 22 (3): 563-568. doi: DOI 10.15789/1563-0625-LMO-1876. EDN GTVJTA / Erreshchenko A.A. Laboratory monitoring of post-vaccination measles immunity. *Medical Immunol-*

ogy. 2020;22 (30): 563-568. (In Russian). <https://doi.org/10.15789/1563-0625-LMO-1876>. EDN GTVJTA.

17. Русакова Е.В., Семенов Т.А., Ноздрачева А.В. и др. Корь проблемы на этапе элиминации. *Известия ГГТУ. Медицина, фармация*. 2020; 3:52-59 / Rusakova E.V., Semenov T.A., Nozdracheva A.V. et al. Measles: Problems at the Elimination Stage. *Izvestiya GGTU. Medicina, farmaciya*. 2020; 3: 52-59 (In Russian).

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Analysis of performance indicators of the St. Joasaph Belgorod Regional Clinical Hospital

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Abstract. One of the most important indicators of population health is its morbidity rate, and the goal of any healthcare system is to improve public health. Assessing the performance of a healthcare facility plays a key role in its management and can significantly impact its effectiveness and the achievement of better outcomes. The aim of our study was to analyze the performance indicators of the St. Joasaph Belgorod Regional Clinical Hospital for 2022-2024. The analysis of the facility's performance indicators was conducted using statistical forms No. 14 and No. 30.

Our study revealed a decrease in the number of patients admitted for emergency care and hospital bed utilization. Diseases of the circulatory system were the leading causes of hospitalizations and mortality. The number of surgeries using high medical technologies increased by 20.23%. The top five surgeries are: heart surgery (100%), kidney and ureter surgery (42.8%), nervous system surgery (35.04%), vascular surgery (27.9%), and musculoskeletal surgery (27.54%).

The study resulted in a breakdown of postoperative mortality rates, with the leading mortality rates following vascular surgery, abdominal surgery, and heart surgery.

Keywords: analysis, indicators, medical institution, morbidity, mortality, structure

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