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Comprehensive assessment of the effectiveness of sanatorium treatment for tuberculosis in children

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ABSTRACT. Introduction. The sanatorium stage is an important component of the comprehensive therapy and rehabilitation of children with tuberculosis and individuals from risk groups. To evaluate its effectiveness, a systematic approach is required that takes into account the dynamics of a set of clinical and functional indicators. **The aim of the research** — to test a comprehensive assessment table for determining the effectiveness of the sanatorium stage of treatment at the Federal State Budgetary Institution Children's Tuberculosis Sanatorium “Pushkinsky” of the Ministry of Health of Russia (DTS). This table was developed jointly by the Department of Phthysiology of the Federal State Budgetary Educational Institution of Higher Education Saint Petersburg State Pediatric Medical University and the Federal State Budgetary Institution DTS “Pushkinsky” of the Ministry of Health of Russia. **Materials and methods.** Analysis of medical records of patients undergoing rehabilitation at the sanatorium with diagnoses of “respiratory tuberculosis” and “latent tuberculosis infection” was carried out, and treatment effectiveness was assessed using a special table, where key indicators were assessed in points upon admission and discharge. As a result, the effectiveness coefficient was calculated: the quotient of the sum of points upon admission divided by the sum of points upon discharge. Treatment included medication (chemotherapy) and non-medication methods (halotherapy, ionotherapy, exercise therapy, massage, and physical therapy). **Results.** The use of an assessment table allowed for standardized assessment of treatment outcomes. Based on the effectiveness coefficient, four outcome categories were identified: “significant improvement”, “improvement”, “unchanged”, and “worsening”. The analysis revealed positive dynamics in most of the assessed parameters in patients in both groups.

KEYWORDS: patients of the sanatorium, children, tuberculosis, latent tuberculosis infection, sanatorium treatment, rehabilitation, treatment efficacy

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Комплексная оценка эффективности санаторного лечения туберкулеза у детей

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РЕЗЮМЕ. Введение. Санаторный этап является важным компонентом комплексной терапии и реабилитации детей, больных туберкулезом, и лиц из групп риска. Для оценки его эффективности необходим системный подход, учитывающий динамику совокупности клинико-функциональных показателей. **Цель исследования.** На базе ФГБУ «Детский туберкулезный санаторий “Пушкинский”» Минздрава России (ДТС) провести апробацию комплексной оценочной таблицы для определения эффективности санаторного этапа лечения, разработанную совместно кафедрой фтизиатрии ФГБОУ ВО СПбГПМУ Минздрава России и ФГБУ ДТС «Пушкинский» Минздрава России. **Материалы и методы.** Проведены анализ медицинских карт пациентов, проходивших реабилитацию в санатории с диагнозами «туберкулез органов дыхания» и «латентная туберкулезная инфекция», оценка эффективности лечения с помощью специальной таблицы, где ключевые показатели оценивались в баллах при поступлении и выписке. В результате высчитывался коэффициент эффективности: частное от деления суммы баллов при поступлении на сумму баллов при выписке. Лечение включало медикаментозные (химиотерапия) и немедикаментозные (галотерапия, ионотерапия, лечебная физкультура, массаж, физиотерапия) методы. **Результаты.** Использование оценочной таблицы позволило стандартизировать оценку результатов лечения. На основе коэффициента эффективности были выделены четыре категории результатов: «значительное улучшение», «улучшение», «без перемен» и «ухудшение». Анализ показал положительную динамику большинства оцениваемых параметров у пациентов обеих групп.

КЛЮЧЕВЫЕ СЛОВА: пациенты санатория, дети, туберкулез, латентная туберкулезная инфекция, санаторное лечение, реабилитация, эффективность лечения

Источник финансирования. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.

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INTRODUCTION

Tuberculosis remains one of the most significant medical and social challenges facing global public health¹. The specific features of the immunopathogenesis of tuberculosis infection in childhood, the tendency to develop complicated forms of the disease, and the high frequency of residual changes after cure underscore the urgency of finding the most effective approaches to rehabilitation and follow-up care for this patient population [1]. The foundation of tuberculosis treatment is long-term, multi-drug chemotherapy, the success of which depends not only on timely diagnosis and the appropriate selection of a treatment regimen, but also on the conditions under which it is administered [2]. In this context, sanatorium-based rehabilitation is traditionally regarded as a crucial element of comprehensive therapy, providing the opportunity for continuous monitoring of chemotherapy administration and the implementation of intensive general restorative and pathogenetic treatment in a favorable ecological environment [3, 4].

Sanatorium rehabilitation is an important stage in the comprehensive therapy of children with tuberculosis following hospitalization, after surgical intervention, and for those in high-risk groups for tuberculosis.

Rehabilitation in pediatric phthisiology is conducted for two groups of patients:

1) children at high risk of tuberculosis — those infected with *Mycobacterium tuberculosis* with latent tuberculosis infection and children from tuberculosis hotspots;

2) children with active tuberculosis and those who have recovered from tuberculosis².

The sanatorium phase is aimed at the treatment, rehabilitation, and prevention of tuberculosis in this patient population.

Sanatorium treatment offers the best opportunity for comprehensive medical rehabilitation, provided that the facilities themselves are ade-

quately prepared and patients are referred there based on medical indications.

The advantages of the sanatorium phase of rehabilitation include the ability to develop and implement a comprehensive rehabilitation program, including psychological support and patient education [7].

However, there is currently no unified, standardized approach to evaluating the effectiveness of this rehabilitation phase. Traditional assessment, based on the analysis of isolated clinical or laboratory-instrumental indicators, is often fragmentary and subjective in nature and does not reflect the comprehensive, multi-component dynamics of the patient's condition resulting from the application of the entire complex of rehabilitation measures [5]. This complicates the comparative analysis of treatment outcomes, the planning of individualized rehabilitation programs, and the objective assessment of the quality of care provided. Internationally, there is also a growing recognition of the importance of a comprehensive assessment of treatment outcomes that goes beyond bacterial cure and includes parameters of functional status and quality of life, which is particularly relevant in pediatric practice [2, 6].

Assessing the outcomes of sanatorium rehabilitation is difficult because there are no universally recognized criteria for concepts such as “significant improvement”, “improvement”, “no change”, and “worsening”, which are commonly used to characterize the effectiveness of rehabilitation measures.

Often, the impact of sanatorium rehabilitation treatment is assessed by physicians arbitrarily and lacks an evidence-based foundation. Since rehabilitation in a tuberculosis sanatorium is comprehensive, its evaluation must be based on a set of indicators reflecting the dynamics of various organs and systems in the child or adolescent, that is, it must be of an integrated nature.

AIM

Conducting a pilot study of a comprehensive assessment of the effectiveness of the sanatorium phase of rehabilitation using an assessment table developed jointly by the Federal State Budgetary Institution “Pushkinsky Children’s Tuberculosis Sanatorium” of the Ministry of Health of Russia and the Department of Phthisiology at the St. Petersburg State Medical University (SPbSPMU) of

¹ World Health Organization. Global Tuberculosis Report 2023. Geneva: World Health Organization; 2023. Available at: <https://www.who.int/publications/i/item/9789240083851> (accessed: November 5, 2025).

² Order of the Ministry of Health of the Russian Federation dated October 23, 2019 No. 878 “On Approval of the Procedure for Organizing Medical Rehabilitation for Children.” Available at: <http://publication.pravo.gov.ru/Document/View/0001201912240050> (accessed: October 20, 2025).

the Ministry of Health of Russia, and the implementation of the comprehensive treatment effectiveness assessment table into the daily practice of phthisiologists at tuberculosis sanatoriums to improve the quality of rehabilitation care provided.

MATERIALS AND METHODS

To achieve this objective, a retrospective analysis was conducted of 120 medical records of patients aged 11–17 who underwent rehabilitation at the Federal State Budgetary Institution “Pushkinsky Children’s Tuberculosis Sanatorium” of the Russian Ministry of Health in 2023–2024. The patient cohort consisted of 75 boys and 45 girls.

All 120 patients were divided into two equal groups, with 60 patients in each. The first group consisted of 60 patients with respiratory tuberculosis in the continuation phase of chemotherapy and clinically cured. The second group included 60 patients with latent tuberculosis infection (LTI). A comprehensive rehabilitation program, including preventive anti-tuberculosis treatment, was developed for them.

For both groups, at all stages — from admission to discharge — a comprehensive approach to rehabilitation was applied, combining pharmacological and non-pharmacological methods. Pharmacological treatment included chemotherapy (maintenance or preventive), while non-pharmacological support consisted of a wide range of procedures: halotherapy, air ionization therapy, phytotherapy, therapeutic exercise, massage, breathing exercises, oxygen therapy, physical therapy, and other restorative techniques.

The main research method was an assessment table developed in collaboration with the Department of Phthisiology at SPbSPMU, which allowed for the quantitative (in points) evaluation of key parameters upon admission and discharge, followed by the calculation of an integral efficacy coefficient. Statistical data analysis was performed using methods of variational statistics and descriptive statistics in Microsoft Excel 2019, including the construction of histograms, the determination of mean values, and standard deviations (σ), which were used to define the confidence intervals for the effectiveness coefficient (three-sigma rule).

The table assesses the dynamics of 10 indicators, such as symptoms of intoxication, phy-

sical development (percentile assessment), separately — body weight, peripheral lymph node reaction, recombinant tuberculin test (RTT), imaging data, including multislice computed tomography (MSCT), assessment of pulmonary function (PF), clinical and biochemical blood test data, and the status of chronic infection foci.

For each indicator, gradations are established, which are scored in points. For example, a hyperergic RTT test is scored as 5 points, a pronounced normergic reaction as 4 points, a moderate reaction as 3 points, a mild reaction as 2 points, and a negative reaction as 1 point.

Each indicator is assessed twice: upon admission and prior to the patient’s discharge. As a result, an effectiveness coefficient (EC) was calculated: the quotient of the sum of points at admission divided by the sum of points at discharge, which was used to evaluate the results.

The control limits for the EC were calculated using the three-sigma method, whereby:

- the mean EC value was $M=1.57$; $1\sigma=0.21$;
- “significant improvement” — 1.79 and above;
- “improvement” — 1.78–1.15;
- “no change” — 1.14–0.94;
- “deterioration” — 0.93 and below.

The table was filled out as follows (Fig. 1): scores were entered into the “before” and “after” columns, then the coefficient was calculated as the quotient of the sum of scores upon admission divided by the sum of scores upon discharge.

RESULTS

The study analyzed 120 tables from the medical records of children undergoing rehabilitation at the sanatorium. Pre- and post-treatment scores were evaluated, total pre- and post-treatment scores were calculated, and the effectiveness coefficient was determined according to the described method.

An evaluation of the treatment outcomes at the sanatorium demonstrated the high effectiveness of the measures taken (Fig. 2). A “significant improvement” was recorded in 19% of the children. An “improvement” was noted in 77% of the children, indicating a positive trend. In 3% of children, the condition remained largely unchanged (“no change”), which may be due to the short duration of the stay. In 1% of children, a “worsening” was recorded, which is also associated with

Оценка эффективности лечения

Признаки	5 баллов	4 балла	3 балла	2 балла	1 балл
признаки туб. интоксикации:					
Температура	субфебр.	субфебр.	норм.	норм.	норм.
оценка поступл. / выписка	/	/	/	/	/
Аппетит	снижен постоянно	непостоянный (весовые прибавки отсутствуют)	избирательный (весовые прибавки непостоянные)	хороший (весовые прибавки постоянные)	отличный (весовые прибавки постоянные)
оценка поступл. / выписка	/	/	/	/	/
Прочие симптомы интоксикации: недомогание слабость бледность	присутствует	4 признака	2-3 признака	1 признак	нет
оценка поступл. / выписка	/	/	/	/	/
Физ.развитие/масса тела (центильный интервал)	Дисгармоничное/отклон. от ср. на 2-3 кор., прибавки веса нет	Дисгармоничное/отклон. от ср. на 2-3 кор., есть прибавка веса	гармоничное/отклон. от ср. на 1 кор., прибавки веса нет	гармоничное/средн. (4кор.) прибавки веса нет	гармоничное/есть прибавка веса
оценка поступл. / выписка	/	/	/	/	/
Чувствительность по данным иммунологических проб	Гиперергическая	нормергическая выраженная по пробе с АТР	умеренная по пробе с АТР	слабо выраженная по пробе с АТР	нормергическая RM, проба с АТР отр.
оценка поступл. / выписка	/	/	/	/	/
Динамика Rg, МСКТ	РГ признаки активности	снижение активности ф.	ф. уплотнения ф. нач. кальцинации	стабилизация (фиброз, кальцинаты)	патологии нет
оценка поступл. / выписка	/	/	/	/	/
Реакция периф. лимфоузлов	выражена	выражена умеренно	микрополиадения	пальпируются в 4-х гр.	не выражена
оценка поступл. / выписка	/	/	/	/	/
Динамика гемограммы	СОЭ увел. на 5 и более мм/ч от N, лейкоцитоз с палочкояд. сдвигом 10% и более	СОЭ увел. не более 5 мм/ч, лимфопения до 5% от N, лейкоцитоз незначит.	СОЭ увел. незначительно	норма, верхняя/нижняя граница нормы	норма
оценка поступл. / выписка	/	/	/	/	/
Гемоглобин	снижен на > 10г/л	снижен на 6-10 г/л	снижен на 1-5 г/л	норма, нижняя	норма
оценка поступл. / выписка	/	/	/	/	/
Биохимия	выраженные изменения	умеренные изменения	незначительные изменения	норма, верхняя/нижн	норма
оценка поступл. / выписка	/	/	/	/	/
Функция внешнего дыхания	значит. нарушения	умерен. нарушения	легкие нарушения	оч. легкие нарушен.	норма
оценка поступл. / выписка	/	/	/	/	/
Обострение очагов хр. неспец. инф.	обострение	стихание обострения	нестойкая ремиссия	стойкая ремиссия	хр. очагов нет
оценка поступл. / выписка	/	/	/	/	/
Общий итог поступл. /выписка	/	/	/	/	/

Fig. 1. Evaluation table (the figure is prepared by the authors using their own data)

Рис. 1. Оценочная таблица (рисунок подготовлен авторами по собственным данным)

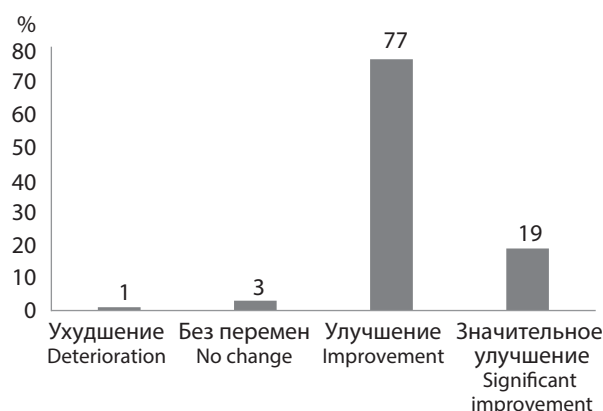


Fig. 2. General results of treatment in the sanatorium (the figure is developed by the authors)

Рис. 2. Общие результаты санаторного лечения (рисунок разработан авторами)

the short duration of the stay and, in some cases, with non-compliance with the treatment regimen.

The effectiveness table allowed for the analysis of trends in individual indicators most significant for a specific child. Thus, during the study, trends in RTT test results, weight gain, and PFT were examined.

For all three indicators studied, “improvement” was predominant among 120 patients. One in five children showed “significant improvement” in the RTT test and PFT. At the same time, in several children these indicators remained “unchanged” (in 15% of cases), and “deterioration” was extremely rare (in 2% of patients). This requires individual vigilance regarding such children to prevent activation of the disease process.

An analysis of the medical records of children treated for tuberculosis revealed a generally positive treatment trend (Table 1).

An assessment of the dynamics of the RTT test revealed that in the majority of children (90%), a decrease in sensitivity to the allergen was observed. At the same time, in 20% of them, the RTT tests became negative, which corresponded to “significant improvement”. In 7% of children, the results of the RTT test were “unchanged”. In 3% of patients, a “worsening” was recorded, manifested as an increase in sensitivity according to the RTT test results.

A positive trend is also evident in weight dynamics: 90% of the children began to gain weight, with 10% of them showing a substantial increase (“significant improvement”). Weight remained stable (“no change”) in 8% of children, while a slight decrease in body weight (“deterioration”) was noted in 2% of patients.

Table 1
Evaluation of the effectiveness of treatment of patients with respiratory tuberculosis

Таблица 1

Оценка эффективности лечения пациентов с туберкулезом органов дыхания

Показатели Indicators	Значительное улучшение (абс./ %) Significant improvement (abs./ %)	Улучшение (абс./ %) Improvement (abs./ %)	Без перемен (абс./ %) No change (abs./ %)	Ухудшение (абс./ %) Deterioration (abs./ %)
Проба с аллергеном туберкулезным рекомбинантным Test with recombinant tuberculosis allergen, n=60	12/20	42/70	4/7	2/3
Функция внешнего дыхания Function of external respiration, n=60	11/18	39/65	9/15	1/2
Масса тела Weight, n=60	6/10	48/80	5/8	1/2

Таблица составлена авторами / The table is prepared by the authors

Table 2
Evaluation of the effectiveness of treatment of patients with latent tuberculosis infection

Таблица 2

Оценка эффективности лечения пациентов с латентной туберкулезной инфекцией

Показатели Indicators	Значительное улучшение (абс./ %) Significant improvement (abs./ %)	Улучшение (абс./ %) Improvement (abs./ %)	Без перемен (абс./ %) No change (abs./ %)	Ухудшение (абс./ %) Deterioration (abs./ %)
Проба с аллергеном туберкулезным рекомбинантным Test with recombinant tuberculosis allergen, n=60	12/20	44/73	3/5	1/2
Функция внешнего дыхания Function of external respiration, n=60	17/28	39/65	3/5	1/2
Масса тела Weight, n=60	13/21	42/70	4/7	1/2

Таблица составлена авторами / The table is prepared by the authors

The assessment of cardiac function also confirms the general trend: improvement was recorded in 83% of children (including “significant improvement” in 18%). In 15%, the indicators remained the same (“no change”), and “deterioration” was observed in only 2%.

Analysis of treatment outcomes in children with LTI (Table 2) revealed that among the 60 children examined, 20% showed a “significant improvement” in RTT test results, i.e., the test became negative. In 73% of patients, “improvement” (decreased sensitivity to RTT) was observed; in 5%, the results remained unchanged, which is associated with the short duration of treatment. In 2% of children, “deterioration” occurred, manifested as increased sensitivity.

Regarding weight gain, the assessment of treatment efficacy showed “significant improvement” in 21% of children, while “improvement” was noted in 70%. In 7% of children, weight remained at the same level (“no change”), which may also be related to the short duration of observation, while 2% of children experienced a decrease in body weight (“worsening”).

Regarding PFT (pulmonary function tests) indicators, 28% of children showed “significant improvement”, 65% showed “improvement”, and in 5% the results remained “unchanged”. In 2% of children, PFT impairment became more pronounced, which was classified as “deterioration”. These data highlight positive trends in treatment,

although they also indicate the need for further monitoring of some patients.

The most pronounced positive trends in PFT results were observed in children who had no local manifestations of tuberculosis. We believe this is due to the absence of morphological changes in lung tissue in the presence of only LTI. As for the trends in RTT test results and weight gain, a similar trend was observed in both groups.

A comprehensive assessment of the effectiveness of rehabilitation for all 120 children, presented as a distribution curve, is shown in Figure 3. It can be seen that the graph has a “bell-shaped” curve, indicating a distribution of data that is close to normal. The three-sigma rule in statistics states that in most cases, the values of a variable fall within three standard deviations of the mean. About 68% of the values fall within the interval “mean $\pm$ 1 standard deviation”. In our study, $M \pm 1\sigma$ “improvement” — 1.78–1.15 — was observed in 77% of children;

About 95% of the values fall within the interval “mean $\pm$ 2 standard deviations”. Almost all values (about 99.7%) fall within the range of the mean $\pm$ 3 standard deviations.

Statistical analysis revealed that only the “deterioration” value below the lower limit within three standard deviations constitutes an outlier. This deviation is anomalous and therefore warrants attention. One possible reason for this may be the lack of effect from the therapeutic measures

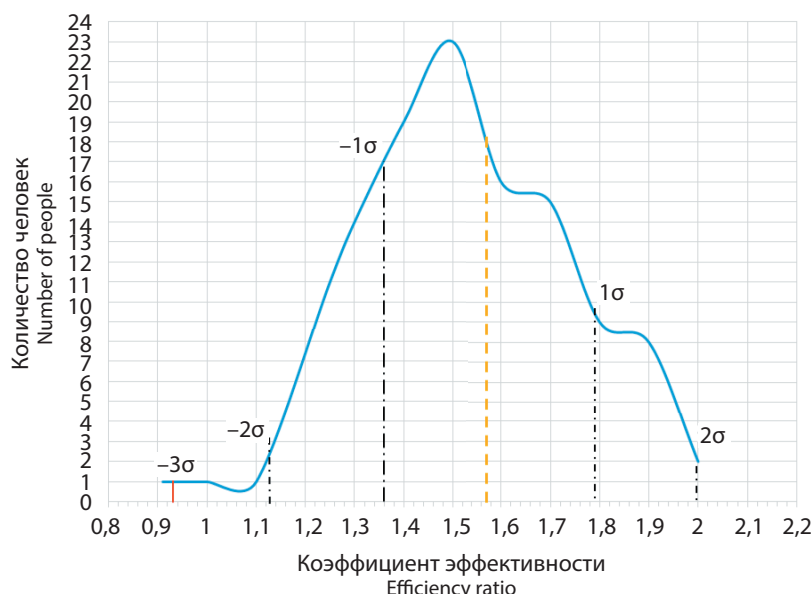


Fig. 3. Treatment effectiveness (the figure is developed by the authors)

Рис. 3. Эффективность лечения (рисунок разработан авторами)

being implemented for these patients due to their individual characteristics (likely an undiagnosed comorbid condition). Thus, by using three standard deviations, it is possible to identify potential problems at an early stage and take corrective actions to improve the effectiveness of rehabilitation. The choice of evaluation criteria is logical and consistent with statistical patterns.

CONCLUSION

1. The use of a structured assessment form helps minimize subjective evaluation of a patient's clinical condition, as it focuses on strictly defined and objectively measurable indicators.

2. This tool ensures the collection of more accurate and representative data suitable for comparative analysis. A key advantage of the method is the ability to compare the patient's condition between admission and discharge from the sanatorium.

3. The implementation of a systematic approach contributes to the optimization of planning for the treatment and rehabilitation process. Consistent and standardized assessment of the dynamics of key clinical and functional parameters creates a basis for making informed management decisions aimed at improving the quality of rehabilitation care provided.

4. Continuous monitoring of changes in various clinical, laboratory, and functional indicators within a unified system ensures timely adjustments to the individual treatment and rehabilitation program. Thus, the use of an assessment table not only formalizes the process but also facilitates a more flexible and personalized approach to the management of each patient.

ADDITIONAL INFORMATION

Authors' contribution. Study concept and design — M.E. Lozovskaya, E.Yu. Vlasova. Collection of material: A.R. Sapozhnikova, E.Yu. Vlasova, G.G. Karasev. Material processing — E.Yu. Vlasova, Yu.A. Yarovaya, G.G. Karasev, A.R. Sapozhnikova. Text writing — M.E. Lozovskaya, E.Yu. Vlasova. Compiling a list of references — K.P. Yulina. Statistical evaluation of data — M.E. Lozovskaya, E.Yu. Vlasova, Yu.A. Yarovaya. Scientific editing by M.E. Lozovskaya.

All authors read and approved the final version before publication.

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

Consent for publication. Written consent was obtained from legal representatives of the patients for publication of relevant medical information within the manuscript.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

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REFERENCES

1. Korol' O.I., Lozovskaya M.E. Tuberculosis in children and adolescents. Saint Petersburg; 2005. (In Russian).
2. Thomas B.E., Shanmugam P., Malaisamy M., Oving S., Suresh C., Subbaraman R. et al. Psycho-socio-economic issues challenging multidrug resistant tuberculosis patients: a systematic review. *PLoS One*. 2016;11(1):e0147397. <https://doi.org/10.1371/journal.pone.0147397>.
3. Lozovskaya M.E., Osipova M.A., Suslova G.A., Bykova V.V., Karasev G.G., Bykova A.I. New organizational aspects of sanatorium care and rehabilitation of children and adolescents infected with tuberculosis. *Tuberculosis and Lung Diseases*. 2017;95(1):22–26. (In Russian). <https://doi.org/10.21292/2075-1230-2017-95-1-22-26>.
4. Zorkaltseva E.Yu., Pugacheva S.V. Effectiveness of preventive anti-tuberculosis treatment of children in a specialized sanatorium and outpatient settings. Experience from Irkutsk Oblast. *Tuberculosis and Lung Diseases*. 2025;103(1):68–73. (In Russian). <https://doi.org/10.58838/2075-1230-2025-103-1-68-73>.
5. Osubko I.V., Myakisheva T.V., Avdeeva T.G. Criteria for the effectiveness of tuberculosis treatment at the sana-

- torium stage. *Palliative Medicine and Rehabilitation*. 2010;(1):24–26. (In Russian).
6. Bauer M., Leavens A., Schwartzman K. Health-related quality of life and tuberculosis: a longitudinal cohort study. *Health Qual Life Outcomes*. 2020;18(1):375. <https://doi.org/10.1186/s12955-015-0250-4>.
 7. Latent tuberculosis infection in children: clinical guidelines. Russian Society of Phthisiologists, National Association of Non-Commercial Organizations of Phthisiologists “Association of Phthisiologists”. Moscow; 2024. Available at: <https://rof-tb.ru/structure/> (accessed: 20.10.2025). (In Russian).
 4. Зоркальцева Е.Ю., Пугачева С.В. Эффективность профилактического противотуберкулезного лечения детей в специализированном санатории и амбулаторно. Опыт Иркутской области. *Туберкулез и болезни легких*. 2025;103(1):68–73. <https://doi.org/10.58838/2075-1230-2025-103-1-68-73>.
 5. Осубко И.В., Мякишева Т.В., Авдеева Т.Г. Критерии эффективности лечения туберкулеза на санаторном этапе. *Паллиативная медицина и реабилитация*. 2010;(1):24–26.
 6. Bauer M., Leavens A., Schwartzman K. Health-related quality of life and tuberculosis: a longitudinal cohort study. *Health Qual Life Outcomes*. 2020;18(1):375. <https://doi.org/10.1186/s12955-015-0250-4>.
 7. Латентная туберкулезная инфекция у детей: клинические рекомендации. Российское общество фтизиатров, Национальная ассоциация некоммерческих организаций фтизиатров «Ассоциация фтизиатров». М.; 2024. Доступно по: <https://rof-tb.ru/structure/> (дата обращения: 20.10.2025).

ЛИТЕРАТУРА

1. Король О.И., Лозовская М.Э. Туберкулез у детей и подростков. СПб.; 2005.
2. Thomas B.E., Shanmugam P., Malaisamy M., Ovung S., Suresh C., Subbaraman R. et al. Psycho-socio-economic issues challenging multidrug resistant tuberculosis patients: a systematic review. *PLoS One*. 2016;11(1):e0147397. <https://doi.org/10.1371/journal.pone.0147397>.
3. Лозовская М.Э., Осипова М.А., Суслова Г.А., Быкова В.В., Карасев Г. Г., Быкова А.И. Новое в органи-

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