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

© *Natalya K. Tikhonova, Anna R. Kalinina*

Smolensk State Medical University. Krupskaya 28, Smolensk, Russian Federation, 214019

**Contact information:** Natalya K. Tikhonova — D.Sc. (Medicine), Associate Professor of the Department of Health Organization and Public Health. E-mail: nktikhonova@mail.ru ORCID: 0000-0003-1192-3305

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

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

## ЗДРАВООХРАНЕНИЕ КИТАЯ И РОССИИ. ОБЩНОСТЬ, РАЗЛИЧИЯ И СОТРУДНИЧЕСТВО

© *Наталья Константиновна Тихонова, Анна Романовна Калинина*

Смоленский государственный медицинский университет. 214019, Российская Федерация,  
г. Смоленск, Крупской ул., д. 28

**Контактная информация:** Наталья Константиновна Тихонова — д.м.н., доцент кафедры общественного здоровья и здравоохранения. E-mail: nktikhonova@mail.ru ORCID: 0000-0003-1192-3305

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

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

## BACKGROUND

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

The history of Russian-Chinese relations has been developing for several centuries. Official relations between Russia and China were established back in 1689 with the signing of the Treaty of Nerchinsk. An important element of interaction between Russia and China in the XVIII–XIX centuries was the distribution of natural science, including medical knowledge [4]. During this period, Russian doctors the first being O.P. Wojciechowski arrived at the Russian Spi-

ritual Mission in Beijin. The practical and scientific activities of doctors from the Russian Empire made a significant contribution to improving the image of Russian doctors for the Chinese population. Russian scientists became interested in Chinese medicine, and the inhabitants of the Celestial Empire got acquainted with European methods of treatment [6]. The role of the Soviet Union in the formation of the Chinese national health system is difficult to overestimate. The USSR contributed to the training of national medical personnel of the People's Republic of China, the construction of hospitals and medical educational institutions for the training of Chinese specialists in the territory of the People's Republic of China. Soviet doctors and teachers were sent to China, and advanced Soviet medical literature translated into Chinese was published. At the All-China Meeting of Higher Medical Education Specialists (1954), a unified curriculum for all medical

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

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

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

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

## PURPOSE AND TASKS

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

## MATERIALS AND METHODS

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

## RESULTS

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

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

The Russian Federation is not only coping with the pandemic of a new coronavirus infection with dignity, but has also provided assistance to countries in need of the world, thereby making a significant contribution to strengthening the global healthcare architecture. The coordinated joint work of the Russian Federation and the People's Republic of China in accor-

dance with the intergovernmental agreement on cooperation in the field of emergency prevention and response during the pandemic helped to cope with a common problem [5].

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

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



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

*Demographic situation* of the Russian Federation and China. The average life expectancy in Russia in 2020 was 73.2 years and ranked 96th in the world (men — 68.2 years, women — 78.0 years) [23]. In China — 77.4 years and 48th place in the world (men — 74.7, women — 80.5) [22]. *The birth rate* in 2020 in the Russian Federation was 12.1 per 1000 population [24]. In China, this indicator is lower and amounted to 11.3 per 1000 population, which, along with a decrease in the birth rate in the birth rate reflects the state's

policy to combat overpopulation [13]. The dynamics of *the mortality rate* in the Russian Federation in 1971–2020 is negative (9 per 1000 population and 12.8 per 1000 population, respectively). The average annual increase was 0.73% [25]. In China, in the same period, there was a decrease in the mortality rate from 9.9 per 1,000 people to 7.4 per 1,000 people in 2020 [14]. High mortality of the population is the most acute demographic problem of the Russian Federation and is caused by the consequences of social cataclysms. In the statistics of *maternal mortality* in 2020, both in the Russian Federation and in the PRC, there was a decrease in this indicator compared to 2003: in the Russian Federation by 1.9 times (from 49 to 17 deaths per 100 thousand live births) [29] and by 1.7 times — in the PRC (from 48 to 29 deaths per 100 thousand live births) [18]. In China, this indicator exceeds the average established world level. *The infant mortality rate* in the Russian Federation decreased from 28.9 per 1,000 live births in 1971 to 4.5 in 2020 [28]. In China, this ratio in 2020 was 5.5 per 1,000 live births, which is 13.8 times less than in 1971 (76 per 1,000 live births) [17]. In the world ranking for this indicator, Russia ranks 40th, China — 68<sup>th</sup> out of 236 countries. *The neonatal mortality rate* in 2001–2020 in the Russian Federation decreased from 8.6 to 2.3 per 1,000 live births, respectively [30]. In China, since 2001, neonatal mortality has decreased moderately from 19.9 per 1,000 live births to 3.5 in 2020 [19].

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

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

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

2. Insurance of students and pensioners living in cities (Urban resident basic medical insurance — URBMI, 2007), provides medical care to children, primary and secondary school students and unemployed residents not covered by the UEBMI system, allocates additional sub-

sidies to low-income citizens, as well as young children, students with disabilities. It is financed by the state and at the expense of annual contributions of citizens from \$ 20 to \$ 100.

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

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

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

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

## CONCLUSION

The analysis of the healthcare systems of the Russian Federation and the People's Republic of China has established both similarity and their differences. High life expectancy, low mortality rate in China, despite the low birth rate relative to the Russian Federation, allowed the country to take higher places in the ranking of world health indices. At the same time, the improvement of the maternity care system in the Russian Federation contributed to a fixed decrease in the maternal mortality rate, which in China still remains above the established world level. Both states are at the average level of international health indexation. Russia surpasses China in terms of healthcare spending as a percentage of GDP and per capita, and is more prepared to work in conditions of epidemics. The advantage of the Russian healthcare system is free medicine for all citizens of the country. The main problem of China's healthcare system is the inequality of access to state medical care. The levels of medical care are different for rural and urban population, between different cities and even within the same city and depend on the place of residence

and employment of the patient. The selectivity of the state health insurance system for the Chinese population is compensated by folk medicine. The popularization of traditional medicine, fixed and funded by the state as an official method of treatment, is a distinctive feature of the Chinese healthcare system. In Russia, traditional medicine is fixed by law, but funds are not allocated for its promotion. The recognition of traditional Chinese medicine at the state level increases the availability of medical care with minimal costs for it. To strengthen and develop the healthcare system of the Russian Federation and China, further cooperation and exchange of experience are necessary. The revival of a network of medical and paramedic-obstetric stations in sparsely populated areas of the country, mobile medical teams within the framework of the reform of primary health care contribute to increasing the availability of medical care to the population of the Russian Federation. It should be noted that modern trends of reforming the healthcare system to expand TCM in China cannot be extrapolated with the reforms in the Russian healthcare system. Any foreign experience should be adapted to national conditions.

## ADDITIONAL INFORMATION

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

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

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