

**Conference Paper**

# Modern Trends and Prospects for the Development of Russian Healthcare: The Role of Digital Technologies

**Yudin V.I.<sup>1</sup> and Shirokova O.V.<sup>2</sup>**
<sup>1</sup>State budgetary healthcare "Children's dental clinic No. 37 Of the Moscow Department of health", Moscow, Russia

<sup>2</sup>Russian Presidential Academy of National Economy and Public Administration, Institute of Public Administration and Management, Moscow, Russia

**Abstract**

Health care as an open system is affected by external fluctuations: the processes of globalization, digitalization and informatization; modernization and virtualization; increasing complexity of problems and volumes of information; increasing share of qualified, creative work; challenges and threats of the future, increasing social tension and devaluation of values. All this leads to a change in the management paradigm, which is based on future management, advanced development, self-education and self-development.

Data analysis of VTSIOM secondary sociological studies and author's analysis of the content of discussions from August 2018- to February 2019 of medical professionals' online communities were conducted.

The study has identified the following current trends: the growth of informatization, virtualization, the emergence of new medical technologies, the formation of the global medical market, the change in the management paradigm of public and non-profit health organizations, the formation of new requirements for managers and staff of medical organizations.

Global trends are linked to the growing popularity of digital healthcare. Medical institutions, diagnostic laboratories and insurance companies are gradually getting involved in the digitalization process and creating a single electronic system. This task is included in the National strategy for the development of artificial intelligence in Russia. The study has fixed that the problem of accessibility and quality of medical care in the country remains relevant, which is confirmed by the data of independent sociological studies. The main risks of digital medicine development are data security and insufficient professional competence of medical personnel in the field of information technology. It is important to support the processes the of users number of medical relevant social networks: iVrach.com, imedicina.ru, vrachirf.ru, doctocnarabote.ru, novmed.net, medtusovka.ru, doctor.net.ru as well as consolidation of Russian technology companies in developing their own up-to-date software products for digital medicine.

**Keywords:** Digital Healthcare; digital technologies; quality of medical services, telemedicine, Russian healthcare, risks of digitalization Introduction.

Corresponding Author:

Yudin V.I.

yudin00@mail.ru

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## 1. Introduction

Modern information technologies introduced in health care in recent years have become an important part of various activities and contribute to improving the quality and efficiency of providing timely medical care to the population. Priority directions of digital medicine development in the near future are:

- 1) implementation of individual electronic medical records (EHRs);
- 2) development of the "connected patient" concept»;
- 3) the telemedicine development [3]; [10];
- 4) development of research and application of 3D printing technologies for creating skin and organs;
- 5) the use of automated expert systems (big data, blockchain technology);
- 6) innovative technologies for doctors and medical insurance agents professional development;
- 7) information technologies in the sphere of interaction between medical institutions and other participants implementing health care functions;
- 8) development and use of mobile devices and applications for the diseases diagnosis.

In the last few years significant positive changes in the direction of improvement of Russian health care and improve access to health care services are observed: strengthening the preventive direction of Russian medicine; improving primary health care, increased accessibility to remote areas; increase in the number of medical organizations, providing under the MLA; developing PPPs in the field of medicine; a growing number of projects in the field of healthcare Informatics. In 2018, life expectancy in Russia reached its historical maximum, averaging 72.9 years, and infant and maternal mortality reached historical lows.

However, despite the positive changes achieved in the sphere, the problem of accessibility and quality of medical care in our country is still relevant both for the country's population as a whole, and for different territories and social groups. Thus, according to VTSIOM surveys: in 2014-2016, according to the majority of Russians, the situation in the health sector corresponded to estimates of "rather bad" or "very bad" (46% – in 2014, 55% - in 2015 and 48% - in 2016), in 2018, respondents point to the problem of reducing confidence in doctors in the last few years-the average score is 3.2 out of 5 possible (compared to 3.5 in 2015). According to the population, the most urgent problems of Russian health care are: insufficient level of professional training

of doctors (37% in 2017, 50% in 2018 and 33% in 2019) and insufficient equipment of medical institutions with modern equipment (31% - in 2017 and 33% - in 2019) inaccessibility of medical care for the population (inconvenient location of hospitals, expensive medicines, services) (35% in 2017 and 25% - in 2019), problems of prevention, diagnosis of diseases at early stages (49% – in 2018) and lack of health care funding (24% – in 2019). Every second respondent (52%) called expanding access to modern medical technologies as the most expected measure of the state to extend active longevity.

We believe that some of these problems can be solved through the introduction of modern digital technologies, including the program for the introduction of artificial intelligence in the public health system, which was supported by 35% of respondents [2]

## 2. Methodology and Methods

The most current trends in global health are as follows:

- the Informatization growth, virtualization, the emergence of new medical technologies (genetic and cellular engineering, molecular genetic diagnostics, bioinformatic data analysis, the creation of biological products, non-invasive medicine and telemedicine, etc.);
- increasing commercialization and "marketization" of health care and the formation of the global medical market (the formation of the health industry; deepening the specialization of countries in the profiles of medical care; blurring the boundaries between health care and other public spheres);
- changing the paradigm of public and non-profit healthcare structures management (application of management methods inherent in the private sector in the public sector) [12]; [13];
- formation of new requirements for managers and employees of a medical organization (client orientation, digital competence, personal brand formation) [11].

Data analysis of VTSIOM secondary sociological studies[4]; [5]; [8]; [9]. and author's analysis of the content of discussions from August 2018- to February 2019 of medical professionals 'online communities [14] were conducted.

### 3. Results and Discussion

The research identified the following priority areas for the development of digital medicine:

1) Implementation of individual electronic medical records (EHRs). A single information base will allow you to quickly resolve the issue of providing assistance in natural disasters and emergency situations of various types. Since instant access to individual information about the health status of each individual in need with their individual health characteristics (blood type and RH factor, chronic and past diseases, the state of the immune system, intolerance to certain drugs, and much more) will make the assistance provided as effective as possible.

2) Development of the "connected patient" concept. The concept is a system of monitoring the current state and providing medical services using built-in smart devices. For those staying in inpatient medical institutions, such rapid individual monitoring will ensure that the dynamics of vital parameters after medical procedures are monitored, and will reduce the time of the patient's stay in the hospital. After discharge from the hospital, continued monitoring makes it possible to reduce or avoid critical conditions and provide timely advice.

3) The development of telemedicine involves the use of communication modern means for remote provision of medical and consulting services, before our eyes turns into a real tool for effective treatment and, without exaggeration, saves lives. Healthcare is actively working to create and develop communications within a single digital circuit (doctor-patient), today, – the state information system in the field of healthcare (EGISZ), in which telemedicine is linked by other subsystems "electronic medical card", "electronic registry" and registers of medical organizations, doctors and medicines and occupies a key position in Russia,.

4) Regenerative and cellular technologies, bionic prostheses with feedback, human organ transplantation, genetic engineering, creation of targeted drugs, stem cell transplantation, 3D printing technologies for creating skin and organs, and many others have been used in recent decades in Russia.

5) Using automated expert systems (big data, blockchain technology, etc.). Today, medical organizations generate and accumulate huge amounts of data, so the need to collect, store and analyze constantly growing amounts of information and optimize them causes the creation of information systems and their further development. In this way, the mutual transfer of information between different medical information systems (medical institutions) could be carried out correctly and fully, while the created personal

account of the patient in the EGISZ could collect data from all health centers where a particular patient applied. The use of automated expert systems is a particularly significant process in the development of digital healthcare.

6) Innovative technologies for training and professional development of doctors and medical insurance agents. The healthcare Technology professional development program is the most widely used abroad today. Interaction with each other between doctors from different medical institutions through online symposiums and conferences becomes possible with the expansion of Internet networks and data transfer speeds. Developing this direction, it becomes a real practice to attract colleagues for remote consultations, this is especially important for Russia with its huge territory and polygamy of remote localities, since it will allow the doctor remotely getting advice from more experienced colleagues and solving a complex problem of the patient.

The study has shown that about 73 % of all the medical forums dedicated to discussions of patients' treatment problems (remote consultations with difficulty in diagnosis, the discussion of a clinical case, data exchange on a specific topic or issue, a collective search for a solution of a specific problem, etc.).

7) Information technologies in the sphere of interaction between medical institutions and other participants implement health care functions. First of all, we are talking about pharmaceutical companies, thus, it should be emphasized that the availability of funds for this industry in Russia is almost six times lower than in Europe and the United States. Meanwhile, making a prescription for medical drugs in electronic form allows you excluding its issuance on hand in paper form and the associated risks. At the same time, increasing the efficiency of the process and administration for pharmacy chains, it becomes possible to choose the most accessible point where it is more convenient for the patient to get medicines.

Development and use of mobile devices and applications for the diagnosis of diseases is especially important for Russian regions where medical institutions are experiencing certain difficulties. The improvement of existing individual medical devices that are used massively at the family level, such as tonometers, blood glucose meters, scales, cardiographs, insulin injectors, etc., is promising. Their use for remote monitoring of the patient's condition with the possibility of recording and transmitting via connection to various transmitting devices (smart phones and computers) through interfaces standardized by ISO and IEEE will also allow you to take readings online and accumulate them for further use.

The majority of experts call technical aspects-the reliability of the medical information system (MIS) and a single database, which can cause leakage of confidential patient

data as the main risk in the process of the medical field Informatization [7]. According to another study, the lack of competence of medical personnel in the field of information technology and doubts about the ability to master high-tech computerized procedures remains a high risk for the medical community [6].

## 4. Conclusion

The study has determined the new phenomena in the medical field. They as follows: introduction of electronic medical records, telemedicine, the use of blockchain technologies and big data, the use of mobile devices and applications for the diseases diagnosis, the emergence of a new type of relationship between doctors and patients in social networks. They lead to changes in the medical care organization, in particular, to the creation of a multidisciplinary medical centers, specialist clinical centers, virtual medical organizations, medical information and monitoring systems, incubators at leading medical universities.

We believe that this will lead to the solution of Russian healthcare systemic problems and will contribute to the improvement of medical services quality.

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