

Innovation management in the development of regional healthcare

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Abstract — The transformation of Russia into a highly developed world power is impossible without a cardinal improvement in the its citizens' health. In modern conditions prospects for the further healthcare sector development are directly related to innovation processes. Innovations should make medical care accessible, aimed at the most effective result and improving the provided medical services quality, taking into account the latest scientific achievements and their practical application in the work of healthcare institutions of various ownership forms and specializations.

The article analyzes the innovation management process in the health care based on the study of the circumstances in the industry, taking into account the development of innovations in various areas. The authors argue that innovations in healthcare are multifaceted and encompass both management, and the high-tech assistance provision and the informatization of the industry.

The analysis results revealed the specificity, characteristics, directions of health care innovation development. The authors identified activities by the state and medical institutions for the innovation management and factors affecting this process.

Keywords — innovation, health financing mechanism, nanotechnology, digital health care, innovative development directions, telemedicine, artificial intelligence

I. INTRODUCTION

Development and implementation of innovations in the health care system, both in the field of prevention and treatment of diseases, and in the sphere of socio-economic development of medical institutions, their organizational and management activities are important and significant in the direction of public health policy oriented towards a systems approach to care for the nation health.

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healthcare institutions of various ownership forms and specializations.

Innovative development of the Russian Federation and specifically the health sector is defined in the program documents of the socio-economic development of the country until 2020 [1], [2].

Innovations in the healthcare field should be aimed primarily at improving the efficiency of primary care setting, the effective use of funds, the resource-saving technologies introduction and the development of new organizational and legal forms of medical organizations against the background of the development of scientifically based approaches to the standards formation for managing patients for various types of medical care at all levels of its rendering. The innovation introduction is required not only at the level of the medical institution itself, but also at the state level through the state innovation policy implementation.

The aim of the investigation is to study the impact of innovation management on the effective development of the regional healthcare and improving the medical services quality.

II. MATERIALS AND METHODS (MODEL)

Complex economic analysis methods were used in the process of achieving the goal of the research..

III. RESULTS AND DISCUSSION

A. The essence and components of innovation in health care

Innovations in healthcare are a system of measures in the industry, covering various aspects of medical activity, namely institutional (organizational and managerial), financial and economic, technological, the purpose of which is to optimize and increase the efficiency of using all available resources in providing medical care that meets the residents' needs in a variety of services that improve their life quality.

At the heart of the objective prerequisites of the need for innovation in the health care system we highlight the following points:

1. Increased level of public interest of Russians to health issues.
2. Enough broad public support, an increase in the volume of research and development carried out (hereinafter - R & D), an increase in funding for medicine.
3. Annual increase in financing of private investors in the field of medical innovation.
4. Setting state policy priorities to increase the population life expectancy and improve the life quality.

The technological aspects of innovations in the healthcare field are developing in various directions: the provision of high-tech patient care and the use of information technology (the so-called digital health care).

Nanomedicine develops several areas, including the creation of fundamentally new drugs for a particular disease; the latest methods of incurable diseases treatment; creation of implants and replacement of living tissues; targeted delivery of drugs into the cell.

Another area that is an important innovative technologies component in healthcare is digital technologies as one of the priorities for the development of the industry worldwide.

In Russia, the advanced projects in the field of digitalization of the healthcare sector are two information platforms:

- Unified State Healthcare Information System (USHIS). It will connect the information systems of all medical organizations and specialized departments, will allow to maintain unified electronic medical records and registers of persons with certain diseases. Medical information systems have been already introduced in 83 regions, where electronic health records of 46 million patients are maintained, there is an opportunity for an electronic doctor appointment, etc. Last year, in a pilot mode, personal account "My Health" was launched on the portal of public services
- The Unified Medical Information and Analytical System of Moscow (UMIAS), which has been operating since 2012. The number of portal users exceeds 9 million patients and 10 thousand medical workers. On the portal, you can make an appointment, get a referral for an examination, issue a sick-list and a medical card.. Moscow is the only metropolis in which all clinics are combined into a single system. 97% of recipes issued in Moscow are electronic.

Besides that, the state develops education and professional retraining, taking into account the digitalization of health care. In 2016 on the basis of the First MSMU named after I.M.Sechenov the country's first Department of information and Internet technologies in medicine was established. It is planned to open similar departments in other universities [3].

Key areas of digital medicine development in the short term are [4]:

- introduction of electronic medical records;
- development of the "connected patient" concept –the condition monitoring and medical services provision with the help of embedded intelligent devices;
- telemedicine.

At the center of health in the XXI century there are data - electronic health records (EHR), which digitally collect all data on the state of human health from the moment of his birth. Today, EHRs are already used in 94% of US hospitals. A unified state healthcare system is being created in Russia. At the same time, its local segments exist and successfully operate in many regions of our country today.

Important component of digital medicine is carrying medical sensors that will transmit data online about the physiological bodyparameters and human activities. Their wide distribution will not only encourage people to lead a healthy lifestyle, but also provide the ability to remotely monitor the health status of patients.

In the future, this approach should significantly reduce the number of visitors to medical organizations.

Telemedicine will solve the problemof quality and efficiency of medical care, especially for citizens living in places remote from large medical centers, as well as for chronic patients, patients undergoing rehabilitation, and age patients who need constant monitoring.

The law on telemedicine, signed in July 2017 [5], introduced changes to a number of legal acts regulating the use of IT-technologies in the health sector, and legally enshrined the concept of "telemedicine technologies" designed to provide remote communication of doctors and patients.

The expected results of the implementation of the Digital Healthcare program are:

- 1) Citizens of the Russian Federation will be provided with affordable medical care at the place of demand that meets the criteria for timeliness, personalization, prevention, manufacturability and safety.
- 2) The productivity and efficiency of using material, human, informational and other resources and data in the provision of medical services will be improved (by 2025 by no less than 30%), while maintaining the quality of medical care for all patients in accordance with regulatory documents of the Ministry of Health of Russia .
- 3) An ecosystem of digital health will be created in Russia through the transfer of innovative solutions to medical organizations and the support of domestic start-up companies in this area [6].

B. Innovation management features in health care

The main state policy vectors of the innovation in the field of health care are identified by the Concept of Health System Developmen in the Russian Federation until 2020:

- mechanisms to stimulate innovation in the health care system at the level of all Russian regions;

- determination of the health infrastructure for innovation in resource management;
- formation the direction of innovation;
- the development of effective procedures for the control of innovations in the activities of health authorities at various levels of management of medical organizations.

Creating an organizational-economic mechanism for managing innovations in healthcare requires taking into account the peculiarities of the innovation process, covering the whole cycle from the inception of the idea to its practical implementation.

In order to ensure the sustainability of high-quality medical service, it is necessary to introduce adequate information technology into the health care system.

Among the technologies that in the near future should fundamentally change medicine, making it "smarter", not to mention the blockchain. It will allow medical institutions to combine their existing data, and thus increase the efficiency of their use, while ensuring accessibility and, at the same time, security.

Remote patient monitoring and telemedicine depend on the network availability and development of the Internet of Things technology. In the long term, an increase in the use of 3D printing technology for creating skin and organs is expected.

The ability to provide monitoring of medical technological and economic information will improve the quality and validity of management decisions. A focus on minimizing costs and improving the quality of medical care is the basis for the management of health care technologies.

The innovativeness of this approach in relation to health facilities in the system of economic entities is determined by the specifics of medical activity. Unfortunately, today, the absence of clear and clear criteria for medical public and private services does not allow an objective assessment of the results of work in the healthcare industry. So that there is a need to use the principle of a production enterprise in the work of hospitals, where the service (work) is performed as a process of producing specific products. And while the medical service is not measurable and variable, both at the qualitative and at the quantitative level of assessment, it needs a certain standardization based on non-numerical mathematics methods. This will allow health care institutions to monitor the efficiency of the use of material resources spent on medical services based on the following indicators: the number of beds in hospitals, staff of doctors, turnover of beds, number of visits to patients, hospital capacity and others.

The transition in the health care system to an industrial innovation type of management is a promising direction of cardinal reform, which really takes into account the state of the market economy in the country. And it is aimed at ensuring that the quality of life of the population grows on the basis of the widespread use of innovative technologies in the health sector in general and medical services in particular.

C. Barriers to innovation in health care

The main problem of modern health care is not only the increase in costs due to the emergence of the latest expensive high-tech and pharmaceutical products, but also structural changes in the economy.

For example, the prices for medicines and services are quite high in relation to the level of population income. In the conditions of market relations, according to the law of supply and demand, a market price forming both for medicines and medical services is often not adequate [7].

Market equilibrium prices tend to change under the influence of state control over prices. Unfortunately, today government intervention in market pricing is characterized by forced pricing below the market equilibrium and demand. This situation is due to social problems associated with the low incomes of a significant part of Russians, limited access to consumer goods, income inequality, etc. The present economic deformation violates the postulates of the formation of the equilibrium price according to the laws of supply and demand.

Growing demand and increasing costs for health services make it difficult for the government to provide them, leading to increased pressure on all types of state budgets. These trends are characteristic not only for Russia, but also for the whole world. The governments of all states are trying to find a solution that would increase the availability, improve the quality and efficiency of the medical services provided by the state, without further burdening the state budget.

To solve these problems, public-private partnership (PPP) should be widely used. PPP is a combination of forms of medium and long-term cooperation of the state and business structures for solving socially important tasks on mutually beneficial terms [8].

In Russian health care, besides economic factors, there are a number of factors that create significant obstacles to the introduction of innovations in the healthcare industry, among which are the following:

- the development and implementation of medical innovations is not related to the possibilities of their use in practice. As a result, innovations are not in demand, which complicates the process of the emergence and use of innovations of the next generation;

- the decentralization processes of the management system in health care have increased the multidirectional nature of the scientific research system, the training of qualified personnel and practical medicine;

- there is a significant gap between R & D and its practical implementation in health care;

- in practice, health care is not always able to act as a competent customer with a clearly grounded plan of measures for the creation and introduction of technological innovations;

- the process of creating legal regulation of PPP is more relevant than ever, since relations in the sphere of PPP are only beginning to emerge;

- the process of legal regulation on drug provision of the population is completely absent.

D. Innovation implementation mechanism in public and private medical institutions

Foreign authors C. B. Rye and J. R. Kimberly developed a classification of factors that influence the introduction of innovative technologies in medical institutions, both public and private. Experts identify 4 groups of factors:

Firstly, it is the state of the external environment in the form of the presence of demand for the latest technologies, the level of competition in the field of medicine, the specifics of government regulation and other institutional factors.

Secondly, the innovations introduction is significantly influenced by the existence of relations between health facilities. But at the same time, there can be connections between scientific organizations (institutes) and hospitals, polyclinics and hospitals, between regional and federal centers, etc. In addition, relationships within the medical institution itself can play a significant role.

Thirdly, the innovative technologies introduction is influenced by the specific nature of the medical organization itself, represented by its organizational structure, resource capabilities, development strategies, etc.

Fourth, the degree of influence is directly related to the characteristics of a certain innovative technology [9].

The state has a significant impact on the work of health facilities. Two main factors are state influence in the form of the mechanism of purchasing medical equipment for the needs of medical organizations and the method of payment for services provided on the basis of innovative technologies.

It is believed that high competition between health care providers promotes the spread of new technologies a priori. But, recently, some researchers have noted that a high degree of competition between health facilities may lead to excessive introduction of new technologies.

It is rather difficult to technically identify the links within and between medical organizations, and even more so to determine how they can influence the introduction of innovations. But, nevertheless, there is a positive effect of the relations of hospitals with specialized educational institutions on the introduction of new technologies in hospitals. This is due to the fact that in educational institutions (medical universities) a significant amount of research is carried out. Therefore, medical institutions affiliated with educational institutions quickly learn about the benefits of new technologies, and sometimes take part in their development and testing.

A special role in the process of introducing innovations is played by active medical institutions that carry out research and development, acquire rights to patents and patent licenses, prepare and conduct clinical research, train and develop personnel, market research, and purchase equipment to provide high-tech medical care to the population. At the same time, we understand the latter as a system of measures for medical and diagnostic medical services that are carried out in

a hospital with the use of complex and unique medical technologies that have significant resource-intensiveness, of complete clinical value and funded by the federal budget.

The mechanism of innovation in public and private medical institutions is not the same. Firstly, private structures are more mobile with regard to innovative changes. Secondly, the financing of innovations is not constrained by state financing, but is carried out by private investors, who seek to get more profit from the provision of high-tech and high-quality services. Although we note that the specialized state centers that provide high-tech assistance to the population have more opportunities in terms of purchasing equipment and in using scientific developments in the field of medicine.

The main subjects of the introduction innovations process in private medical institutions are the owners or their representatives, managers, heads of departments of medical institutions (managers), as well as doctors and other specialists, including technical and administrative personnel.

In the process of introducing innovations, owners, as a rule, do not try to enter into the details of the process. Practical interest for them is associated with the outcome of a decision, which will be obtained as a result of the purchase of the latest equipment and the introduction of high-tech medical care. There are various options for the participation of the owner in making decisions about purchasing new equipment and introducing innovations that are directly dependent on the type (specialization) of health facilities, its size, etc.

For hospitals that operate in such a legal form as joint-stock companies, the main role of owners is to accept or reject decisions on the innovations introduction, which are proposed by the leadership of the hospitals, and the process is controlled by representatives of the shareholders. The meeting of shareholders approves the budget of health facilities, including issues that are associated with both the purchase of medical equipment and the mastery of modern technology.

The managers of non-state clinics have a sufficiently large degree of freedom in the preparation and decision-making under framework control by the owner. In principle this accelerates the process of adopting and introducing innovative technologies.

Experts note that, unlike state health care institutions, in most private clinics the main role, if not in making all decisions, then at least in their preparation and implementation, lies with the top managers who manage the medical organization. In some clinics, managers have a certain share of shares of their own health care facilities, simultaneously combining the roles of owner and manager. With rare exceptions in private clinics the top manager combines the role of director and head physician. But, more often than not, managers, even if they have a medical education, do not combine administrative and managerial activities with medical practice. According to the heads of private clinics, and we support this point of view, the functional and administrative duties of the physician and the manager should be separated, including when making decisions on the introduction of innovations. It is logical that a

health care facility should be managed by a specialist who knows the specifics of a profile economic education.

And the head physician should be responsible for the quality of the treatment process and the provision of medical services. It seems logical to us to have such a division of functions in state clinics (ie, the presence of the head physician and the manager).

The heads of private medical institutions noted that there are administrative problems that in many respects interfere with the normal operation of clinics. For example, obtaining a license for additional types of services, renewal of a valid license, certification of doctors for the highest category - all these activities are extremely inefficient. In addition, there are other problems associated with ongoing inspections (often unreasonable and unscheduled), with the selection of highly qualified personnel.

In public health institutions, the main problem in introducing innovations is the resistance from personnel, which makes it difficult to master new medical services.

IV. CONCLUSION

Based on analysis we can draw the following conclusions:

1. The state regulates the healthcare industry because of its importance. This activity is carried out in several directions: financing, publication of program documents. One of these programs is the Concept of Health System Development in the Russian Federation until 2020. The state has outlined the main goals and objectives of innovative healthcare development, stages and directions of development.
2. Innovations in healthcare are a system of measures in the industry, covering various aspects of medical activity, namely institutional (organizational and managerial), financial and economic, technological. Its main purpose is to optimize and increase the efficiency of using all available resources in providing medical care that meets the residents' needs in a variety of services that improve their life quality.

3. The implementation of innovative projects depends on a number of factors and conditions necessary for their implementation, among which one should pay attention to:

- the level of competition in the health sector, the specifics of government regulation and other institutional factors;
- the level of interrelations between research organizations and health facilities;
- the specifics of the medical organizations themselves, their resource capabilities, development strategies;
- the presence of certain innovative technologies (digitalization of health care), requiring appropriate infrastructure, funding and staffing.

3. The mechanism for introducing innovations in public and private medical institutions has certain differences related to the financing and capabilities of health facilities in terms of

staffing, their acceptance or rejection of innovations, the positions of the administration and owners.

It remains unchanged that the main goal of managing innovations in healthcare is providing quality medical services to the population of Russian regions in order to make them more accessible, increase life expectancy and fully satisfy residents in diverse, modern and high-tech medical services.

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