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INFORMATION TECHNOLOGIES IN MEDICINE AS A WAY TO COMBAT COVID-19

***Abstract.** The article is devoted to the social role of information technologies in modern medicine. The authors provide a classification of medical information systems in accordance with the hierarchy of the health care system. Special attention is paid to the importance of using remote electronic technologies to combat the new coronavirus infection. Examples of foreign and domestic medical information systems for identifying patients in contact with COVID-19 are given. The conclusion is made about the need for further development of telemedicine.*

***Keywords:** healthcare, information technology, information and reference systems, telemedicine, challenges, new coronavirus infection COVID-19.*

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ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ В МЕДИЦИНЕ КАК СПОСОБ БОРЬБЫ С COVID-19

***Аннотация.** Статья посвящена социальной роли информационных технологий в современной медицине. Авторы приводят классификацию медицинских информационных систем в соответствии с иерархией системы здравоохранения. Особое внимание уделяется значимости использования дистанционных электронных технологий для борьбы с новой коронавирусной инфекцией. Приводятся примеры зарубежных и отечественных медицинских информационных систем по выявлению пациентов, контактных с COVID-19. Делается вывод о необходимости дальнейшего развития телемедицины.*

***Ключевые слова:** здравоохранение, информационные технологии, информационно-справочные системы, телемедицина, задачи, новая коронавирусная инфекция COVID-19.*

In 2020, a new coronavirus infection presents an unprecedented challenge to health systems. It is not a secret that medical centers and hospitals around the world had to take every ounce of energy to fight against COVID-19. Every now and then, in the media information about the deaths of medical staff, doctors and nurses who help patients with coronavirus infection appears. It is hard to believe that in December 2020 12 doctors died from the coronavirus infection in Italy. Moreover, 237 doctors have died in this country since the beginning of the COVID-19 pandemic [1]. In this regard,

many countries have begun to implement information technologies in their health systems more actively. These innovations should help not only speed up the process of patient care, but also reduce morbidity and mortality risk among health workers.

Information technologies (IT) include processes, methods of searching, collecting, storing, processing, providing, distributing information and ways to implement such processes and methods. Nowadays, the most widely used kinds of information technology are cellular communications, mobile phones, personal computers and the Internet. The introduction of IT in medicine in our country began about ten years ago and it is gaining more and more momentum every year. First of all, the use of information technologies in medicine helps to accelerate the medical issues solutions. Secondly, it can be used for distance learning of health workers career enhancement and exchange of skills. Thirdly, with the help of IT, one can remotely monitor the availability of pharmaceutical substances and medicines in the warehouses of pharmacies. Finally, such technologies make it possible for doctors to consult patients on-line without endangering the health of the doctors [2, 3].

Classification of medical information systems corresponds to the structure of health care. In other words, it is formed according to the hierarchical principle and absolutely. In this way, there are medical information concepts of three different levels: the local level, the level of medical and preventive institutions and the initial level.

Among the information systems of the local level there are computer telecommunications medical networks that contribute to the formation of a common information space at the region of Russia.

Medical information concepts of medical institutions are divided into the following groups:

- 1) IT of advisory centers;
- 2) Data banks of health services;
- 3) Personalized medical registers;
- 4) Screening systems whose purpose is to perform pre-medical preventive examination of residents and identify risk groups of people;
- 5) IT of medical and preventive institutions;

6) IT of research institutes and medical institutes.

According to the initial level, the main task of such IT is computer support for the activities of medical workers of different specialties. These IT include:

- 1) Information and reference systems;
- 2) Consulting and diagnostic systems;
- 3) Instrument and computer systems;
- 4) Automated workplaces of specialists [2].

In the context of the spread new coronavirus infection, crowdsourcing monitoring of morbidity has become particularly important among medical IT. An example of a successful application of an active crowdsourcing monitoring system is the «FluTracking» platform, which is implemented in Australia and New Zealand. Initially, it was a simple and fast monitoring system for working with volunteers who reported cases of flu. In the year of 2020, this system has been adapted for COVID-19. It is used for monitoring, instantly providing data and warnings about the places where outbreaks occur. Currently, similar platforms are being implemented all over the world, including Russia [4].

Russian scientists have also developed a system for tracking those who have been in contact with COVID-19, called «Public services.COVID tracker» («Госуслуги.COVID трекер»). The device uses «Exposure Notification» technology to capture the data of gadgets that are in the immediate vicinity. Then users who have been the close contact with the patient during the 14 days will receive a push notification with the date of the potentially hazardous contact. At the same time, no one will see any data of the patient [5].

In addition, in the Sverdlovsk region, a scheme to control the self-isolation regime of patients with COVID-19 is being developed. This scheme will work via smartphones. Medical consultations will also be carried out with the phones. For today, 156 medical organizations are connected to the network of telemedicine consultations in our region. The Ministry of Health of the Sverdlovsk region and «Russian Post» have also announced the launch of a combined project to provide telemedicine

consultations «doctor-patient» with the help of postmen. According to this plan, postmen will deliver tablets to patients for consultation [6].

To sum up, the COVID-19 pandemic has shown the importance and significance of e-health development. In developed countries, the disease has accelerated its introduction as a tool to fight the infection. Remote diagnosis and treatment systems for COVID-19 have also been actively implemented in Russia. However, this is only the first step. Further work has to improve the system of telemedicine and crowdsourcing disease monitoring.

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