

Information technologies and artificial intelligence in the fight against pandemics

Documented pandemics have occurred in the world at intervals of 10 to 50 years since the sixteenth century. In the 20th century, a smallpox pandemic worldwide claimed the lives of, according to various estimates, from 300 to 500 million people. This is a very contagious disease that only people suffer. It was possible to take control of it only after mass vaccination of the population. Before that, the lethality of the virus reached 40%.¹

The bubonic plague three times caused pandemics that claimed millions of lives. An acute infectious disease then was characterized by high mortality-over 90% (now - no more than 10% with proper treatment). Pandemics have occurred since 514 in Egypt and ending with a 10-year pandemic in China and India from 1894-1904.

To prevent the development of infection before the phase of an epidemic or pandemic,² it is necessary to develop early methods and technologies for detecting viral diseases, as well as involve a number of organizational and technological measures that limit and impede the spread of infection.

The aim of the work is to show the full range of measures to prevent a pandemic both at the level of laboratory research and the application of information technology at the stage of early detection of viral diseases, and at the level of organizational and legal measures on the part of the state, corporations and international institutions. The article discusses various approaches to early diagnosis of viral diseases, in which the base of virus samples play a critical role, in particular, in the diagnosis of COVID-19.³ Examples of technologies developed by the giants of the information industry to identify signs of COVID-19 disease in the process of self-diagnosis are given.⁴ Remote medical monitoring allows round-the-clock medical monitoring of cases of COVID-19 disease in conditions of home isolation, thereby reducing the need for infection protection systems and reducing the impact on healthcare providers.⁵

To reduce the spread of viral infections, information technologies are being developed to track the contacts of a sick person and his location, which are certified at the state level and regulate the behavior of the population in a pandemic.⁶ At the same time, the development of digital identity technology is being carried out all over the world, which will also help increase the effectiveness of the fight against pandemics.⁷ Digital certification of those who tested positive for COVID-19 can also be implemented using microchips implanted under the patient's skin.⁸

The article proposes to consider the possibility of diagnosing a viral disease in a patient using a photograph of his saliva taken with the help of a nozzle on a smartphone, which allows receiving with an increase of the order of 1000 times and its subsequent transfer to a diagnostic center, where artificial intelligence will make a preliminary diagnosis.^{9,10} This technology refers to the mobile health care system - mHealth. Governments in developed countries have recognized the need for remote health systems. Mobile health systems allow human health to be monitored and data transferred from a mobile phone to a clinic anywhere in the world.

Volume 8 Issue 3 - 2020

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Received: May 29, 2020 | **Published:** June 25, 2020

The pandemic has turned into a wide open gate for adopting artificial intelligence in healthcare. Faced with a lack of staff and an excessive burden on patients, an increasing number of hospitals are turning to telemedicine and artificial intelligence technologies to help them deal with the pandemic. So, in Moscow, artificial intelligence was connected to the diagnosis of COVID-19.¹¹ Data from all centers of computed tomography in Moscow will be processed by artificial intelligence in a single reference center, regardless of tests for corona virus infection.

Acknowledgments

None.

Conflicts of interest

Author declares that there is no conflict of interest.

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