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The Emergence of New Infectious Diseases Is a Global Problem for Humanity

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Abstract: On the threshold of the 21st century, humanity has come to realize the importance of global tasks of ensuring the safety of people's lives. These tasks, among security issues, have become among the most important priorities of the countries of the world, as well as the international community. The most urgent need to solve these problems has manifested itself in connection with the challenges and threats that have arisen in the demographic, environmental, political, and social spheres of human life. The mentioned challenges and threats were the most striking signs of the systemic crisis of civilization.
Key words: infectious diseases, mortality, morbidity, epidemic, prevention.

General difficulties and contradictions in the relationship between nature and man, as well as within society, that have a planetary scale and urgently require their resolution are considered to be global problems of humanity. As it is now becoming more and more clear, they are not only hypothetically, but also quite realistically, already today they are sources of emergency situations. Knowledge of these problems and the threats they generate allows states and the world community - and confrontation with global problems is possible only through the united efforts of humanity - to take preventive measures to reduce their potential danger. This can be achieved by solving the problem as a whole, reducing the negative impact of its individual components, or, at worst, by counteracting specific disasters that may arise as a consequence of the unresolved problem.

Of course, not every global problem is fraught with dangers that have reached the point of imminent threat of emergency situations in the near future. An example of such a hypothetical challenge is the problem of large celestial bodies falling to Earth. Although such a decline is possible, it is not yet predicted based on actual data. However, there are global problems that are not just knocking on the door, but have already entered the common human home.

Among them is the threat of the emergence of new infectious diseases and their epidemics, the consequences of which could be catastrophic for the entire human race. This tragic threat was quite unexpected for modern civilization, since modern medicine, although it assumed the possibility the emergence of new infections as a result of ongoing evolutionary processes and mutation of microorganisms, but did not reliably assess the degree of existing danger. It seemed that everything would work out with “traditional” dangerous infections, which have been well studied and, to a large extent, defeated. The emergence of new infections was considered unlikely, and they themselves were not so dangerous, at least not threatening fatal consequences.

It is worth recalling that the history of the spread of “ordinary” long-known infections indicates that epidemics played a huge destructive role in the life of civilization.

Mass infectious diseases have been known since ancient times. During the Peloponnesian War (431-404 BC), the epidemic described by Thucytides, which went down in history under the name of plague, raged in Athens.

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The undoubted bubonic plague was an epidemic in Byzantium and other countries that began during the time of Emperor Justinian. This pestilence is considered the first of the three great plague pandemics. She ruled for more than 100 years - from 531 to 650. The second great plague pandemic, called the Black Death, began in 1348 and lasted over 300 years until 1666, devastating countries and cities. True, some historians believe that this disaster was in the pandemic stage for only 4 years. The Third Great Plague Pandemic began in China in 1892 and ended within 15 years by most estimates. Epidemic of bubonic plague in India during the period 1896-1907. killed about 3 million people, the epidemic of 1910-1913 in China and India ended tragically for 1 million people, the same number died during the epidemic in India in 1921-1923.

Leprosy was widespread in the Middle Ages, which became epidemic in the era of the Crusades, when the Crusaders brought it to Europe from the Middle East.

Throughout human history, smallpox has been widespread. In Germany, for example, in the second half of the 18th - first quarter of the 19th centuries, mortality from smallpox in some years amounted to up to 23% of all mortality cases, and up to 5% of the population fell ill with it.

During the Napoleonic Wars, a typhus epidemic broke out, striking the armies with great force. The remnants of Napoleonic army retreating from Russia brought typhus to Germany, where it caused devastation. In the 19th century, significant outbreaks were observed during the famine in Finland in 1867-1868, in Upper Silesia and Ireland (1850) and in other places.

At the beginning of the 19th century, a hitherto unknown cholera appeared in Western Europe. Spreading from India, since 1823 it has given rise to six pandemics that have captured Europe and America. The last major cholera epidemic occurred in 1958 in India. There are no official data on losses from it, but it is believed that many hundreds of thousands of people became victims of the epidemic.

In 1918-1919, many countries were gripped by a pandemic of influenza ("Spanish flu"), which, along with widespread morbidity, also caused enormous mortality. The disastrous epidemic swept all corners of the globe. In a year, the disease claimed 22 million inhabitants, which was more than twice the number of deaths on all fronts of the First World War. The general weakness and sharp rise in temperature that occurred at the onset of the disease led to complete helplessness of the sick, who died from exhaustion in entire villages. 12 million people died in India. On average, 12 people out of every 100 thousand people died in Argentina, 680 in England and Wales. What has been particularly striking about this pandemic has been its ability to reach the most remote corners of the globe. Thus, in New Zealand, the number of deaths from influenza reached 6 million people, and in Alaska it was not uncommon for settlements to become completely extinct. On the secluded islands of the South Pacific, the flu claimed almost the entire population. Residents of this part of the globe did not know respiratory diseases before the outbreak, so they had no immunity to them. Then influenza pandemics recurred many times. Over the many years since the Spanish flu pandemic, humanity has well studied the insidious habits of the flu and developed a vaccine against it. Every year, the vast majority of countries on all continents carry out extensive preventive work prior to the occurrence of influenza outbreaks. However, this disease has not yet been completely overcome. Every year, millions, hundreds of millions of the working population and students are taken away from everyday activities for treatment for periods of 10 to 20 days or more. The flu often brings severe complications and ends in death.

In addition to this most common disease, in the middle of the 20th century there were outbreaks of epidemic cerebrospinal meningitis and polio in children.

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In Russia, for the first time, chronicles record an epidemic in the last quarter of the 11th century - "a pestilence on people throughout the Russian land" (1083). Subsequently, epidemics were observed repeatedly in the country. So, in 1203 and 1320 the pestilence engulfed Novgorod and the surrounding area. But especially dangerous epidemics came to Rus' in 1418 and 1420. In addition to Novgorod, they extended to Staraya Russa and Porkhov. Lagoda, Torzhok, Tver, Dmitrov, other lands. Many settlements died out. In 1570, during the rampant oprichnina in Russia, a plague brought from the West began. The plague was noted in 28 cities. In Moscow, the disease claimed 600-1000 lives every day. In 1710, a pestilence epidemic swept through almost all of European Russia. Due to widespread diseases in the St. Petersburg province, the harvest was not harvested, and in Pskov "the pestilence was so great that the living did not have time to bury the dead." In 1830, cholera began in Russia, which raged and spread throughout the empire for three years. In the first year, 42 thousand died, in 1831 - 100 thousand people. Riots broke out in various places. In total, over 1830-1840, more than 300 thousand people died from cholera in Russia. In 1849, in the south of Russia, about 300 thousand people fell ill with scurvy, of which almost 70 thousand people died. In total, from the 10th to the 19th centuries, more than 180 epidemics occurred in the country. Epidemics in Russia also happened later - let us remember the spread of cholera and typhoid fever during the period of civil war and devastation.

At the same time, it can be stated that humanity, with few exceptions, today is able, in general, to control the prevalence of the most dangerous infectious diseases known since ancient times. In fairness, it must be admitted that even today in different parts of the world, including in our country, emergency situations related to infectious diseases periodically arise. Thus, according to the World Health Organization (WHO), of the 51 million people who die annually in the world, the cause of death for 16 million people is infectious parasitic diseases.

The problem under consideration is that despite the capabilities of modern sanitation, medical science and health care systems, in recent decades new, hitherto undetected and previously unknown dangerous infections have begun to emerge. Today, the warning of the 1990 session of the general meeting of the USSR Academy of Medical Sciences sounds very convincing: ". .. today everyone should overcome one of the misconceptions of the 20th century that infectious diseases have faded into the background, do not play a significant role in human pathology and are not a pressing problem for health care." WHO notes that over the past 20 years, more than 30 new pathogens have been identified that are causative agents of previously unknown diseases. They are usually called emerging (unexpectedly appeared) infections that cause emergency epidemic situations that are unforeseen in their consequences.

New viral infections are acquiring particular significance and danger and pose an extremely serious problem for practical healthcare. The main reasons for their occurrence, according to leading experts, are constant changes in the genome (the set of genes contained in a single set of chromosomes of a given cell), changes (most often deterioration) in social living conditions and conditions of the external natural environment.

Currently, new infectious diseases include primarily the viral hemorrhagic fevers Lassa and Ebola (in Russia Omsk hemorrhagic fever), "Legionnaires' disease", HIV infection and some others, which appeared mainly at the turn of 1970-1980. Their extreme danger is confirmed by the comparative speed of spread, severity and high mortality rate.

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Thus, with Ebola fever, pain of various localizations, a feverish state suddenly arise, and degradation and prostration quickly set in. After a week, bleeding from the nose and gums, bloody vomiting, vascular insufficiency, and shock appear. The mortality rate for this disease reaches 85%.

Lassa fever begins with headaches, vomiting, and abdominal pain. In the second week, severe swelling occurs, pleurisy, heart and kidney failure, encephalopathy, and shock develop. The mortality rate is 36-76%.

Legionnaires' disease is manifested by a mild fever followed by a sharp rise in temperature, cough, and chest and abdominal pain. Complications include hypoxia, renal failure, and shock. The fatality rate is 15-20%.

The complex and severe course of diseases is characteristic of Lyme disease, hemorrhagic colitis, hemorrhagic nephrozo-nephritis and many, many other infections.

Since many new infectious diseases are very dangerous, often fatal and fraught with epidemics, the problem of combating them, along with other serious global problems, is becoming a priority at the international and national levels. The main directions of countering emerging epidemic emergencies of this type are rapid and complete diagnosis of the disease and the use of effective vaccines and antiviral (in case of viral infections) drugs to save people.

Over the past six centuries, each emerging pandemic process has been different from the previous one. Therefore, when new infections arise, humanity is forced to solve a whole series of problems anew in search of means of protection against the impending disaster.

This requires quite quickly: identification of pathogens against which it is necessary to develop vaccines and antiviral drugs;

identification of population groups in need of vaccination;

designing vaccines against pathogens with high genetic heterogeneity;

studying the genotypes of pathogens on which the effectiveness of various drugs depends;

urgent development of vaccines and antiviral drugs against pathogens capable of unexpectedly and suddenly changing the structure of a segmented genome, which can lead to pronounced changes in antigenic and biological properties;

development of highly sensitive and specific express diagnostic methods.

However, the implementation of this strategy is extremely difficult. Moreover, with the emergence of each new pandemic, it seems as if it took into account the experience of the previous one and was at least one step ahead of the capabilities of science. Defending humanity has been forced to retreat for a number of years before the onslaught of aggressively advancing infections.

Perhaps the most significant in this regard is the emergence in the second half of the 20th century of human acquired immune deficiency syndrome (AIDS), which rightly received the name “plague of the 20th century.”

The global spread among people of the seemingly less contagious human immunodeficiency virus (HIV), the causative agent of AIDS, occurred so rapidly that experts involuntarily began to come to the conclusion that there were very serious reasons for this process. AIDS has become a kind of indicator of the lack of self-preservation instinct in our civilization. It was revealed not only that there was a discrepancy between the methodological level of the research being carried out and the complexity of the problems that need to be solved to eliminate this disease, but also the surprising short-sightedness of the forecasts of the future epidemic situation that were available in the first half of the 80s. It turned out that their creators were based not on poorly studied, but still objectively existing, internal patterns of the emergence and change of epidemics, but on extrapolation of

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seemingly quite obvious external manifestations of these processes: the number, structure and dynamics of the appearance of infectious diseases over the period of time available to them. And ultimately they were wrong.

Thus, the struggle to preserve the health of the nation and the issues of medical protection of the country's population from "traditional" diseases are complicated by the emergence of new, especially dangerous infections. Because of them, the scale of epidemic disasters that arise spontaneously or man-made can exceed all shocks of this kind hitherto known to mankind. Humanity, including our country, will have to make enormous efforts to resist them. It is necessary to use many resources, incur high costs and make significant sacrifices in order to prevent, and, if necessary, eliminate possible large-scale emergency situations of an epidemic nature. This requires the rapid development of effective preventive agents, the creation of new vaccines and treatment methods. including AIDS, the use of strict quarantine methods. In many cases, changes in people's lifestyles, living conditions, and much more will be required. Only concentration on this direction of national and international efforts can promise humanity a favorable prospect in the fight against this constantly growing and renewed danger.

Perhaps, in addition to the specific areas mentioned above in counteracting new infections, there are some more general approaches of a natural biological, genetic, environmental or other nature, in the implementation of which humanity would be able not only to cope with new infections that have already arisen, but also to prevent them at a distant approach emergence. But this is still from the category of general ideas that have not even formed into a hypothesis.

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