

Relevance of the problem and the current situation with infectious morbidity in the Russian Federation

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Abstract

The article provides an overview of domestic and foreign literary sources devoted to an urgent challenge in modern health care — infectious morbidity. The extraordinary socio-economic importance of infectious diseases at the present stage throughout the world, including in the Russian Federation, based on their global spread and high economic losses associated with disability, treatment costs and anti-epidemic measures. In recent decades, the emergence of previously unknown “new” infectious diseases and the return of “old” infections, many of which pose a high epidemiological danger and are characterized by high mortality, have been noted. Among the significant reasons for the emergence of “new” infections, an increase in infectious diseases, changes in the nature of the course of known diseases, it is necessary to note such reasons as a change in a person's lifestyle and the introduction of new technologies. In Russia, a high incidence of acute respiratory infections is recorded annually. An increase in the incidence of acute intestinal infections of viral etiology and a decrease in the incidence of these diseases of bacterial etiology are noted. An urgent problem is the high level of morbidity and mortality from infection caused by the human immunodeficiency virus, as well as the incidence of chronic viral hepatitis and an increase in mortality from their unfavorable outcomes. Natural focal infections remain an important problem, among which hemorrhagic fever with renal syndrome and tick-borne infections occupy a significant place. The threat of the invasion of infections that cause emergencies in the field of sanitary and epidemiological welfare of the population into the Russian Federation territory remains. Infectious diseases are becoming one of the leading causes of premature mortality in the working-age population. In 2020, the Russian Federation faced the pandemic of the new coronavirus infection COVID-19, which led to high morbidity and mortality. Thus, infectious diseases are an urgent problem for the Russian Federation at the present stage, necessitates the development of a targeted program to reduce morbidity and mortality from infectious diseases.

Keywords: infectious morbidity, mortality, economic damage, acute respiratory infections, viral hepatitis, HIV infection, intestinal infections.

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Throughout the world, infectious diseases represent an urgent public health problem due to their mobility, prevalence, threat to public health, and the premature mortality of the population [1–3]. According to the World Health Organization (WHO), 2 billion people globally suffer from infectious diseases every year, of whom 17 million of them die [3]. The level of infectious morbidity is one of the most significant indicators characterizing population health. This indicator depends on a number of factors, such

as socio-economic well-being, sanitary culture of the population, measures implemented to prevent infectious diseases, and activity management of the infectious diseases service, among others [4]. Analyzing the mortality rates enables scientists to determine the significance of individual nosological forms, thus facilitating the accurate assessment of the effectiveness of anti-epidemic measures, the quality of medical care provided, and the state of the health care system as a whole [5].

This study aimed to analyze the infectious morbidity and mortality rates from infectious diseases among a population from the Russian Federation (RF). It has been confirmed that infectious morbidity and mortality rates from infectious diseases represent one of the significant health problems of the region based on the results of an analysis of the literature from 2005–2020, and in accordance with the Central Statistical Database of the Federal State Statistics Service for 2005–2019, Form 2 “Information on infectious and parasitic diseases” for 2005–2019, and the Federal State Statistics Service information on the number of diseases.

The urgency of managing infectious diseases in the Russian Federation, and throughout the world, is determined by their epidemic potential and their ability to spread widely. According to scientists, globalization has also affected the nature and components of the epidemic process, accelerating the emergence and spread of infectious diseases [6].

The emergence of previously unknown infectious diseases has been noted in recent decades, along with the return of “former” infections, many of which pose a high epidemiological threat and are characterized by high mortality [2]. The changes in human lifestyle and the introduction of new technologies should be emphasized among the significant causes behind the emergence of “new” infections, an increase in infectious morbidity, and changes in the nature of the course of known diseases [6]. To a greater extent, the return of former infections is associated with the insufficient development of preventive programs and the negative attitudes of populations toward preventive vaccination [7].

Scientists have noted that the extraordinary social and economic significance of the global spread of infectious diseases is associated with high economic losses due to the disability of the population, the cost of treating patients, and anti-epidemic measures [8,9]. Thus, in 2019, the economic damage in the Russian Federation from only 36 infectious diseases amounted to 646 billion rubles. Among these, acute respiratory viral infections (ARVIs), tuberculosis, acute enteric infections (AEIs), chickenpox, infection caused by the human immunodeficiency virus (HIV), and chronic viral hepatitis C are the most economically significant [7,8].

Over the past 10 years (2010–2019), there has been a tendency toward a decrease in the incidence of 34 infectious and 16 parasitic diseases in the Russian Federation [7]. In the structure of mortality in the region, infectious and parasitic diseases rank sixth (23.5 per 100,000 population in 2015; 21.3 per 100,000 population in 2019) [10]. At the same time, according to Polybin et al., a higher overall mortality

rate from infectious diseases was recorded in the region from 2006–2016 compared to some European countries [3]. In 2018, the standardized mortality rate from infectious diseases in the region was 3.5 times higher than that in the “new-8” EU countries; furthermore, the mortality rate from infectious diseases in the Russian Federation increased by 8% from 2012–2016 [11].

According to Ulumbekova, an increase in infectious morbidity and an increase in mortality rate indicate that, in the Russian Federation, most infectious diseases are not detected in a timely manner and, consequently, are not treated adequately. To a certain extent, this is due to the reduction in the capacity of the infectious diseases service resulting from the health care system reform. The studies conducted by the authors have demonstrated the relationship between the supply of resources to the infectious services and the infectious morbidity of the population [12].

ARVIs and influenza dominate the range of infectious diseases throughout the region; together, they account for 90% of the morbidity for all infectious diseases [7]. The incidence of ARVIs in the region from 2010–2018 reached 20,862 cases per 100,000 population [7]. The high incidence of ARVIs is associated with several factors, such as airborne transmission, high virulence of pathogens, and the formation of unstable type-specific immunity.

Recently, the annual increase in the coverage of the Russian Federation population with influenza vaccination has contributed to a steady decrease in its incidence. The incidence of influenza in 2019 was 37.31 per 100,000 population; the vaccination coverage reached 50.5% of the population or 11.2 times higher than that in 2010 (417.39) with a coverage of 40.4% of the population [7].

ARVIs are becoming one of the five leading causes of death and can pose a threat to demographics on a global scale. Globally, up to 650,000 people die from ARVIs every year [13]. In 2019, 492 lethal outcomes were registered from influenza and ARVIs in the region, with the mortality rate reaching 0.3 per 100,000 population [10]. ARVIs rank first in the list of causes of economic damages from infections, which are associated with a high medical aid appealability and disability of the population [8,9]. In fact, in 2019 alone, the economic damage sustained from acute upper respiratory tract infections of multiple and unspecified localization amounted to 518,428,786.5 rubles [7].

Meanwhile, AEIs have a significant role in the overall structure of the infectious morbidity of the populations in the Russian Federation and the rest of the world, and this is determined by their

widespread distribution as well as the significant economic and social losses associated with this disease. Over 4 billion cases of AEIs are registered in the world every year [2]. In 2019 alone, 20,355 cases of AEIs were recorded in the region [7]. In the range of the general morbidity of the population with intestinal infections, a significant segment is presented by unspecified AEIs, which are primarily linked to problems regarding the availability of specific laboratory diagnostics. Thus, at the end of 2019, AEIs of an established etiology reached 168.62 cases per 100,000 population, while AEIs of unspecified etiology reached 334.09 cases per 100,000 population [7].

In the Russian Federation, as in the rest of the world, cases of viral AEIs have increased in recent years, especially in children. About 60% of AEIs of established etiology are viral infections, among which the norovirus and rotavirus infections are the most common [14]. At the same time, the incidence of bacterial AEIs has decreased. For example, salmonellosis decreased by 24.0% (from 35.8 per 100,000 population in 2010 to 24.2 per 100,000 population in 2019). The economic damage from rotavirus infection in 2019 amounted to 8,431,262.1 rubles, which was 3.4 times more than that from salmonellosis (2,502,405.5 rubles) [9]. In 2019, mortality from intestinal infections in the region was 0.2 per 100,000 population (269 cases) [10].

One of the essential problems of our time in the Russian Federation and in the rest of world is the incidence of viral hepatitis [15]. The relevance of this pathology is determined by its large-scale spread, frequent registration among young people, a high risk of infection of medical staff, the high cost of treatment, and the low availability of etiotropic therapy [16]. However, the incidence of acute forms of parenteral viral hepatitis in the region is decreasing, mainly due to the introduction of preventive vaccination against hepatitis B. Thus, for the period of 2010–2019, the incidence of acute hepatitis B decreased by 3.7 times (from 2.20 to 0.57 per 100,000 population), thereby resulting in a decrease in the incidence of chronic viral hepatitis B [7].

Chronic viral hepatitis is of high socio-economic importance for the Russian Federation and many countries in the world [15,17]. About 180 million people are infected with hepatitis C globally, and 70% of them have a chronic course [18]. According to the WHO assessment criteria, the Russian Federation is among the territories with a high prevalence of viral hepatitis C. In addition to the adverse epidemic situation, the problem of this disease in the region is associated with a high economic burden and low availability of antiviral

therapy for patients [16]. According to official statistics, in 2019, 1470 cases of acute hepatitis C were detected in the region (1.00 per 100,000 population). The primary incidence of chronic hepatitis C in 2019 was 30.92 per 100,000 population (45,376 cases) [19]. An analysis of the state of medical care for patients with chronic hepatitis C in the region revealed a low coverage of antiviral therapy, which amounted to an average of 4.12% of patients across federal districts in 2017 and 3.5% in 2018 [20].

In one third of patients with chronic hepatitis, severe complications develop, including decompensated hepatic cirrhosis and hepatocellular carcinoma, which cause high disability and mortality among the young population [18,21]. From 2012 to 2016, mortality from viral hepatitis increased 1.4 times in the Russian Federation [7].

Similarly, HIV infection and acquired immunodeficiency syndrome (AIDS) represent a socially significant public problem on a global scale [2,22,23]. In 2019, 81,716 cases of HIV infection were registered in the region, with the incidence rate of 55.6 per 100,000 population [7]. The highest morbidity is among the working age population. In 2019, 84% of HIV cases were first diagnosed in patients over the age of 30. [7]. In 2019, 18,928 HIV patients died in the region, and the mortality rate was 12.9 per 100,000 population [7,10].

Zoonotic infectious diseases also hold a significant position in the range of infectious diseases in this region. In the Russian Federation, hemorrhagic fever with renal syndrome (HFRS) ranks first in morbidity among zoonotic infectious diseases [24]. About 90% of all HFRS cases registered in the region occur in the Volga Federal District. High rates of HFRS morbidity are also registered in the Republics of Bashkortostan, Tatarstan, Mordovia and Mari El; in the Chuvash and Udmurt Republics; in the Orenburg, Ulyanovsk, Penza, Samara, and Saratov regions; and in the Perm Territory characterized by a steady upward trend [7,25]. In 2019, the incidence of HFRS was 9.53 per 100,000 population (13,996 cases), of whom 40 cases were fatal [7].

Due to the vast territories in the region, a complex epidemiological situation for tick-borne infections has also emerged. Ixodic tick-borne borreliosis is recorded in 75 territories, and tick-borne encephalitis is detected in 48 territories with different levels of morbidity [7].

With the instability of the epidemiological situation with infectious diseases in the world, the risk of importing infectious diseases into the Russian Federation increases. In turn, this situation has induced emergency situations in the sanitary and epidemiological well-being of the population, which

is characterized by high levels of contagiousness, severe clinical presentation, and high mortality rates [26–28]. At the same time, cholera remains an urgent problem at the international level [29, 30]. From 2010–2019, cases of cholera imported by Russian citizens returning from India were registered in the region (2010, 2012, 2014) [30]. Cases of malaria importation to the Russian Federation territory are also registered annually, mainly from non-CIS countries, such as Africa, Asia, South America, the Caribbean, and Oceania. In 2019, the incidence rate of malaria in the region was 0.07 per 100,000 of population [7].

The increase in the incidence of measles in the population in recent years can be regarded as return of “old” infections. In 2019, 4491 cases of measles were registered in the region (including 2395 children). The incidence rate was 3.06 per 100,000 population, which exceeded the 2018 level by 1.8 times. The key factor of the increase in the incidence of measles in this region is the decrease in the coverage of the population immunized against measles, which can be attributed to the worsening epidemic situation for measles throughout the world [7].

Previously unknown infectious diseases include coronavirus infection caused by a new strain, COVID-19, from which a global pandemic first occurred in 2020 up to the present. Imported cases of coronavirus infection started to be registered in the region at the end of January 2020. As of January 26, 2021, there are now 100,486,859 patients affected by coronavirus in the world, of whom 2,156,109 have died. The mortality rate from COVID-19 is 2.1 per 100 people. In the Russian Federation, 3,756,931 cases of SARS-CoV-2 coronavirus infection have been recorded (7.5 per 100,000 population), and the number of deaths from coronavirus infection reached 70,482, corresponding to a mortality rate of 1.8 per 100 persons [31–34].

Preventive and anti-epidemic measures performed in the region, along with common approaches to the diagnostics and treatment of COVID-19 infections have contributed to a decrease in the incidence of coronavirus infections in the population [33]. Among other options, the most promising approach in reducing the incidence of COVID-19 is the large-scale vaccination of the population against this infection, which has begun in the region [32].

An analysis of Russian and international literary sources has revealed that infectious diseases represent one of the most significant healthcare problems in the 21st century. In the Russian Federation, a decrease in the primary and general morbidity of the population is noted with a simultaneous increase in mortality from infectious diseases. A high inci-

dence of ARVIs has been recorded, an increase in the incidence of viral AEIs has been established, and the rates of morbidity and mortality from HIV infection have consistently remained high. Meanwhile, the implementation of preventive vaccination against viral hepatitis B has led to a significant decrease in the incidence of acute and chronic viral hepatitis B. At the same time, the incidence of chronic viral hepatitis C remains an urgent problem due to the low availability of antiviral therapy. In fact, an increase in mortality from chronic viral hepatitis has been recorded.

Zoonotic diseases, including HFRS and tick-borne infections that are significant in their range, represent an important public health problem in the region. The threat of carrying infections from foreign countries into the Russian Federation territory remains, provoking emergency situations in the sanitary and epidemiological well-being of the population. In 2020, the Russian Federation, like other territories in the world, faced the COVID-19 pandemic brought about by coronavirus infections, which led to high morbidity and mortality rates among the population.

Infectious diseases represent an urgent problem for the Russian Federation, and their persistence necessitates the development of a targeted program to reduce the morbidity and mortality rates from such diseases.

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