EPIDEMIOLOGY

PARENTERAL CHRONIC VIRAL HEPATITIS IN THE ARCTIC ZONE OF THE REPUBLIC OF SAKHA (YAKUTIA) AS THE MOST IMPORTANT MEDICAL AND SOCIAL PROBLEM

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ABSTRACT

Background. *The severe course of parenteral viral hepatitis and their further chronicity are associated with the presence of immunodeficiency disorders, frequency of which increases significantly in harsh climate. The article discusses the spread of parenteral viral hepatitis in the Arctic zone of the Republic of Sakha (Yakutia) and the issues of organizing medical care for patients with chronic viral hepatitis at the regional level.*
The aim of the study. *To analyze the incidence rates of parenteral viral hepatitis in the Arctic regions of Yakutia in order to improve the health care system using the example of remote areas of hard access.*
Methods. *The work uses materials from official statistics of the territorial department of Rospotrebnadzor for the Republic of Sakha (Yakutia) for 2000–2022 and information from the "Chronic viral hepatitis in the Republic of Sakha (Yakutia)" register.*
Results. *In the Arctic regions of Yakutia, problems are observed in chronic forms of viral hepatitis B, C and D, as well as in their outcomes, such as cirrhosis and liver cancer, leading to early disability and mortality. In the general structure, hepatitis B infection prevails, which indicates the presence of family foci of infection. All this requires a complex of not only therapeutic, but also advanced anti-epidemiological measures.*
Conclusion. *The difficult epidemiological situation regarding parenteral viral hepatitis, caused by extreme natural and climatic conditions, genetic characteristics of the indigenous population and the lack of medical institutions specializing in the treatment of chronic viral hepatitis, dictates the need to strengthen systematic on-site monitoring studies and telemedicine consultations in the Arctic zone of Yakutia. Thanks to this, residents of hard-to-reach areas of the Arctic zone of the Republic of Sakha (Yakutia) will be able to receive targeted subsidized care for the treatment of chronic hepatitis without traveling to Yakutsk.*

Key words: *parenteral viral hepatitis, cirrhosis, cancer, Yakutia, Arctic zone, health-care organization*

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ПАРЕНТЕРАЛЬНЫЕ ХРОНИЧЕСКИЕ ВИРУСНЫЕ ГЕПАТИТЫ В АРКТИЧЕСКОЙ ЗОНЕ РЕСПУБЛИКИ САХА (ЯКУТИЯ) КАК ВАЖНЕЙШАЯ МЕДИКО-СОЦИАЛЬНАЯ ПРОБЛЕМА

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РЕЗЮМЕ

Обоснование. *Тяжёлое течение парентеральных вирусных гепатитов и дальнейшая их хронизация связаны с наличием иммунодефицитных состояний, частота которых значительно возрастает в условиях сурового климата. В данной статье рассматривается распространение парентеральных вирусных гепатитов в Арктической зоне Республики Саха (Якутия) (РС(Я)) и вопросы организации медицинской помощи больным хроническими вирусными гепатитами (ХВГ) на уровне региона.*

Цель исследования. *Провести анализ показателей заболеваемости парентеральными вирусными гепатитами в арктических районах Якутии для совершенствования мероприятий системы здравоохранения на примере труднодоступных отдалённых территорий.*

Методы. *В работе использованы материалы официальной статистики территориального управления Роспотребнадзора по РС(Я) за 2000–2022 гг. и сведения из регистра «Хронические вирусные гепатиты в РС(Я)».*

Результаты. *В арктических районах Якутии отмечается неблагополучие по хроническим формам вирусных гепатитов B, C и D, а также по их исходам, таким как цирроз и рак печени, приводящим к ранней инвалидизации и смертности. В общей структуре превалирует инфекция, вызванная вирусом гепатита B, что свидетельствует о наличии семейных очагов инфекции. Всё это требует комплекса не только лечебных, но и углублённых противоэпидемиологических мероприятий.*

Заключение. *Сложная эпидемиологическая ситуация по парентеральным вирусным гепатитам, обусловленная экстремальными природно-климатическими условиями, генетическими особенностями коренного населения и отсутствием медучреждений, специализирующихся на лечении ХВГ, диктует необходимость усиления в Арктической зоне Якутии систематических выездных мониторинговых исследований и телемедицинских консультаций. Благодаря этому жители труднодоступных районов Арктической зоны РС(Я) смогут получать целевую субсидированную помощь для лечения ХВГ без выезда в Якутск.*

Ключевые слова: *парентеральные вирусные гепатиты, цирроз, рак, Якутия, Арктическая зона, организация здравоохранения*

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BACKGROUND

Viral hepatitis B, C and D remain one of the urgent problems of practical health care. In the Russian Federation, the total number of patients with chronic hepatitis B (CHB) is more than 3 million people, chronic hepatitis C (CHC) – from 1.5 to 2.5 million people, hepatitis D has been recorded in more than 10 million people [1-3].

The total number of patients with chronic viral hepatitis (CVH) in the region is almost 15 thousand people, about 1.4 thousand people (9.5 %) of which live in the Arctic zone (AZ). At the same time, a significant part of the AZ population is made up of representatives of the North indigenous peoples.

The Yakutia AZ is characterized by severe natural and climatic conditions, a low level of social infrastructure (including insufficient development of the health care system) and poorly developed transport accessibility [4]. All this determines the severe course of these diseases and their high chronicity [5]. It is important to note that hepatitis B, C and D viruses are important etiological factors for the development of primary cancer [6–8].

THE AIM OF THE STUDY

To conduct an analysis of viral hepatitis incidence rates in the Arctic regions of the Republic of Sakha (Yakutia) to improve health care measures in the hard-to-reach and remote areas of Yakutia.

METHODS

The study uses official statistics from the territorial Rospotrebnadzor administration in the Republic of Sakha (Yakutia) for 2000–2022 and information from the register of patients with viral hepatitis developed by the Reference Center for Monitoring Viral Hepatitis based at the Central Research Institute of Epidemiology of Rospotrebnadzor [9].

RESULTS AND DISCUSSION

The Arctic zone of the Republic of Sakha (Yakutia) is characterized primarily by extreme climatic conditions, an extremely vast territory (1.6 million km^2), focal nature of industrial and economic development, a significant share of small and medium-sized rural settlements (with a population of up to 1 thousand people) and poorly developed social and transport infrastructure. All this creates significant problems in organizing medical care. Currently, the Arctic zone of the Republic of Sakha (Yakutia) includes 13 districts (Abyisky, Allaikhovsky, Anabarsky, Bulunsky, Verkhnekolymsky, Verkhoyansky, Zhigansky, Momsky, Nizhnekolymsky, Olenyoksky, Srednekolymsky, Ust-Yansky and Eveno-Bytantaysky), in which about 64 thousand people live, i.e. 6.4 % of the region›s population.

The incidence of acute hepatitis B (AHB) in Yakutia, including the Arctic zone, is steadily declining. From the early 2000s to the present, this figure has dropped to levels that do not cause particular concern (fig. 1). Of course, this is due to the large-scale vaccination of the population. Thus, if in 2000, 2.6 % of citizens subject to vaccination (under 55 years of age) were vaccinated against hepatitis B in the region, then since 2011 this figure has not dropped below 95 %. For example, in 2022, 764,238 people (96.6 %) were vaccinated.

Over the entire observation period, the greatest increase in the incidence of acute respiratory viral infections was noted in 2002. During this period, acute respiratory viral infections were registered in almost all districts, with the exception of Anabarsky and Srednekolymsky, although in 2003–2005 and 2008–2009, the incidence rate also exceeded the national average.

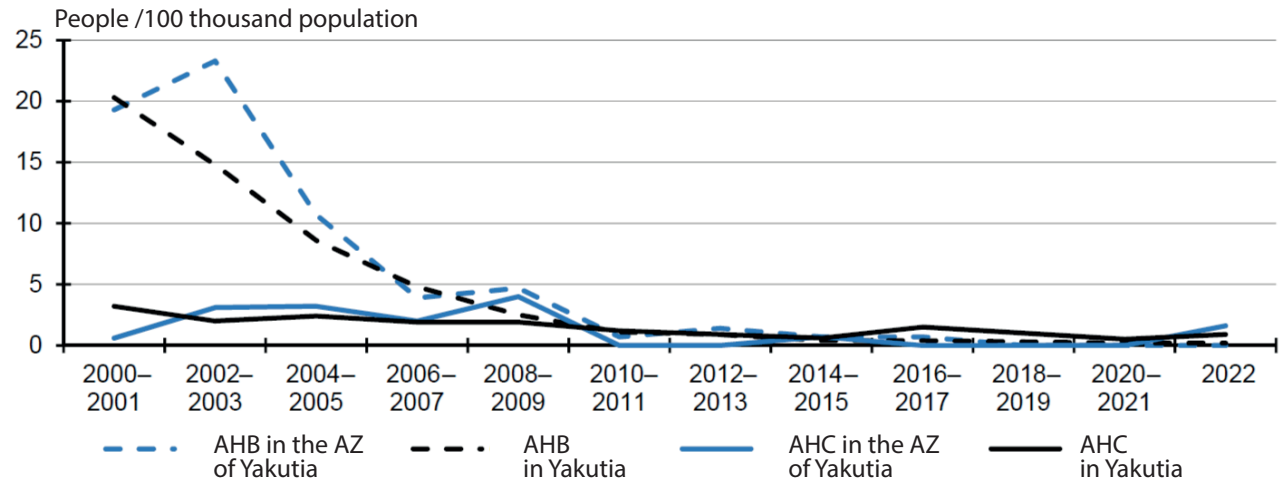

FIG. 1.
Incidence of acute hepatitis B (AHB) and acute hepatitis C (AHC) in 2000–2022

The incidence of acute hepatitis C (AHC) in the Republic of Sakha (Yakutia) has also decreased. AHC rarely occurs in a manifest form, when it can be detected in the disease phase, and the chronic course is characterized by latent forms, detected only with specific diagnostics. Thus, due to insufficiently complete examination of the Arctic population, the official figures for AHC may be somewhat underestimated.

As noted above, the incidence of chronic hepatitis B in Yakutia over a long-term period, and especially in the Arctic zone, is significantly higher than the national average (fig. 2). Thus, in 2016–2017, this indicator in the Arctic Zone of the Republic of Sakha (Yakutia) was 63.5 people/100 thousand people, while in the Russian Federation this value was at the level of 10.2 people/100 thousand population ($p < 0.05$). Currently, about 64 thousand people live in the Arctic Zone of the Republic of Sakha (Yakutia), i.e. about 6.4 % of the total population of the region. Nevertheless, out of 101 new cases of chronic hepatitis B identified in the region in 2022, 15.2 % were recorded among residents of the Arctic.

In 2023, the high frequency of the hepatitis B marker detection among the local AZ population of the Republic of Sakha (Yakutia) was once again confirmed by the employees of the Republican Center for Public Health and Medical Prevention. As a result of the analysis of rapid testing data ($n = 1776$), CHC was detected in 0.6 % of cases, CHB – in 3.4 %. Worsening of the disease course and a high degree of chronicity in hepatitis B causes super-infection with the hepatitis D virus.

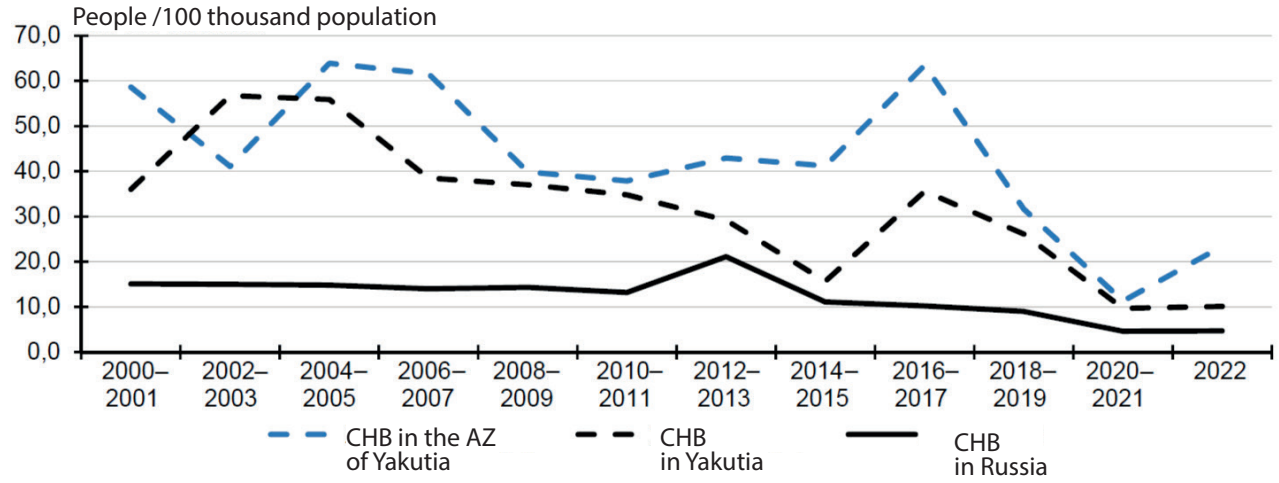

FIG. 2.
Incidence of chronic hepatitis B in Yakutia and Russia

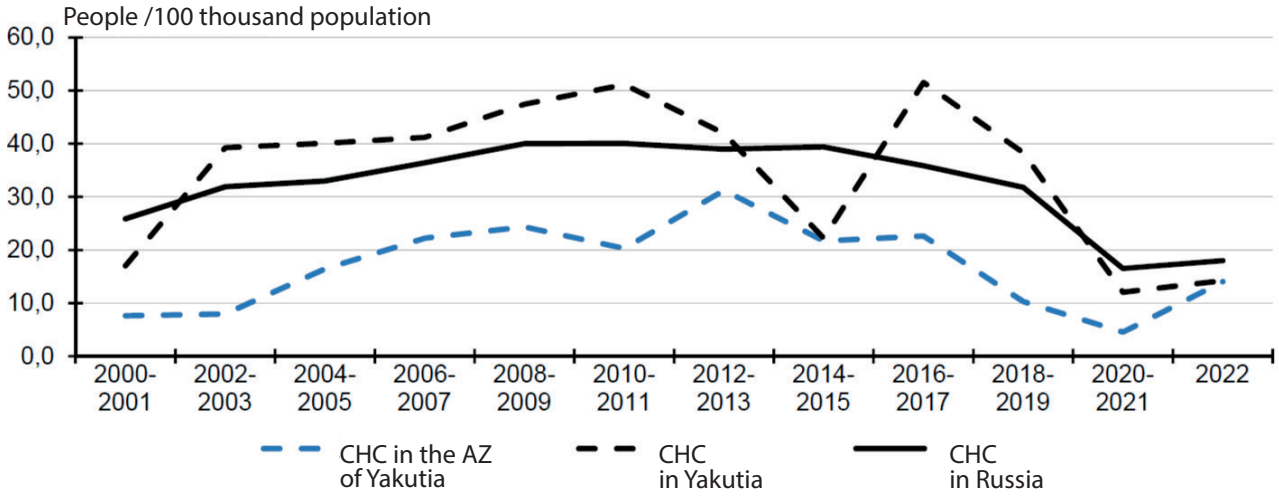

FIG. 3.
Incidence of chronic hepatitis C in Yakutia and Russia

Unfortunately, official statistics do not take into account data on the chronic hepatitis D (CHD) incidence, although its chronicity leads to the stage of cirrhosis much faster than with other forms of this disease. Studies conducted in different regions of Yakutia have shown an exceptionally high frequency (17.2–31.7 %) of detection of antibodies to the hepatitis delta virus [10]. As a result, an approximate estimate of the CHD prevalence in the region can only be given based on data from infectious disease departments in Yakutia and the results of individual screening studies.

The intensity of the CHC epidemic process in the Republic of Sakha (Yakutia) varies greatly. Nevertheless, almost every year regional rates of hepatitis C incidence exceed similar rates in the country (fig. 3).

It is important to note that the relatively low number of newly detected cases of chronic hepatitis C in the AZ of the Republic of Sakha (Yakutia) is mainly due to the fact that the disease is latent in most infected people, and large-scale screening has not been carried out in these territories. The data on the incidence of chronic hepatitis C for 2020–2021 also do not reflect the true picture, and the reason for this is the COVID-19 pandemic.

In almost half of patients with CHC, immune activation leads to a chronic inflammatory condition that can affect a number of organs outside the liver [11]. According to our earlier studies, extrahepatic manifestations are more often diagnosed in women (58.8 %), representatives of indigenous peoples (67.4 %), and in patients who did not receive antiviral treatment (65.6 %) [12]. The most common were: joint syndrome – in 56.4 %; cognitive impairment – in 35.2 %; type 2 diabetes mellitus – in 31.7 %; cardiovascular disease (coronary heart disease, arterial hypertension) – in 37.6 %, etc. (fig. 4).

In 2001–2003, studies on the prevalence of viral hepatitis B, delta, and C in the Arctic zone were conducted by the staff of the Institute of Health. Schoolchildren, conscripts, and employees of educational and medical institutions (n = 4,049) from the Abyisky, Verkhoyansky, Zhigansky, and Eveno-Bytantaysky uluses were examined. The largest number of HBsAg-positive individuals was detected in the Eveno-Bytantaysky (*n* = 128) and Zhigansky (*n* = 96) uluses. Of the 1,150 examined, antibodies to hepatitis C were detected in 23 (2 %) people, mainly from the Zhigansky District (12 people). Of the total number of those examined with hepatitis D (*n* = 106), antibodies were detected in 8.5 %, mainly in those examined from the Zhigansky and Abyisky Districts. According to the author, the data obtained indicate a problem with hepatitis D in the Arctic zone [10].

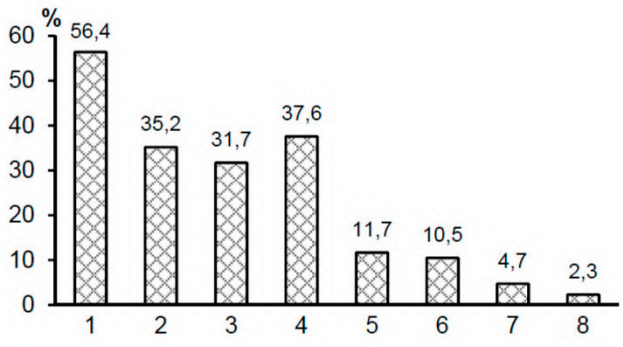

FIG. 4.
Extrahepatic complications in patients with HCV infection: 1 – joint syndrome; 2 – cognitive impairment; 3 – diabetes mellitus type 2; 4 – cardiovascular disease; 5 – hypo- and hyperthyroidism; 6 – vision impairment; 7 – hearing impairment; 8 – glomerular nephritis

One of the achievements of the infectious disease service of the Republic of Sakha (Yakutia) is the electronic register (ER) launch "Chronic viral hepatitis of the Republic of Sakha (Yakutia)", introduced into the regional healthcare system as a pilot project in November 2012. Unlike the existing statistical forms of recording, the ER provides an opportunity for a more comprehensive analysis of the incidence and adverse outcomes of chronic viral hepatitis both in the republic as a whole and separately by district. All this allows for a significant improvement in the system of medical care.

As of October 2023, the ER contains information on 14,781 people (table 1). There are 484 patients registered with viral liver cirrhosis in the region, including 75 (15.5 %) with CHB without delta agent, 207 (42.8 %) with CHD, 186 (38.4 %) with CHC, and 16 (3.3 %) with mixed infection. There are 47 people registered with primary liver cancer, including 9 (19.1 %) with CHB, 10 (21.3 %) with CHD, 26 (55.3 %) with CHC, and 2 (4.3 %) with mixed infection.

Of the total number of people in the ER, 9.5 % are the AZ residents. The largest number of people with CVH in the AZ was registered in the Bulunsky, Zhigansky, Verkhoyansky, Oleneksky and Srednekolymsky districts, the smallest – in the Momsky, Nizhnekolymsky and Eveno-Bytantaysky districts. Liver cirrhosis was recorded in 54 (11.2 %) people; in the Zhigansky district, a patient with hepatocellular carcinoma as a result of hepatitis D was also identified. In general, as studies have shown, CVH complications develop more often in men (76.0 %). Liver cirrhosis in 51.8 % (28 people) is caused by the hepatitis D virus, in 27.8 % (15 people) – by the hepatitis B virus, in 16.7 % (9 people) – by the hepatitis C virus. Mixed hepatitis caused the liver cirrhosis development in 3.7 % (2 people). Most often, cirrhosis was diagnosed in patients from the Verkhoyansky, Zhigansky and Oleneksky districts. There are no cases of cirrhosis in the Allaikhovsky, Anabarsky, Nizhnekolymsky and Eveno-Bytantaysky districts.

Among the persons registered in the AZ of the Republic of Sakha (Yakutia), 22 people died from hepatitis and its complications in 2021–2022, including 9 people from hepatitis B, 7 people from hepatitis C, 6 people from hepatitis D. A significant portion of the deceased were residents of the Srednekolymsky (6 people),

TABLE 1

DISTRIBUTION OF PATIENTS WITH CHRONIC VIRAL HEPATITIS BY ETIOLOGY ACCORDING TO THE REGISTRY DATA

Diagnosis	The Republic of Sakha (Yakutia)		The Arctic zone of the Republic of Sakha (Yakutia)		
	people	%	people	%	in % of the number of people in the register
Hepatitis B	6260	42.4	910	66.4	14.5
Hepatitis C	6779	45.9	296	21.7	4.4
Hepatitis D	1241	8.4	125	9.1	10.1
Mixed hepatitis	501	3.3	37	2.8	7.4
Total	14781	100	1368	100	9.5

Verkhoyansky (4 people), Abyysky (4 people) and Zhigansky (3 people) uluses.

In the structure of chronic viral hepatitis in the AZ, hepatitis B has the largest share (66.4 %), followed by hepatitis C (21.7 %). It is interesting that the ratio of infection caused by hepatitis B and C viruses is the same on average in the region. This fact indirectly indicates the epidemiological relevance of hepatitis B for the indigenous population of the republic. In the infection spread caused by the hepatitis B virus, the main route of transmission is intrafamilial. Based on this, it is necessary to adjust the preventive and anti-epidemic measures taken, as well as to strengthen comprehensive monitoring studies in hard-to-reach Arctic settlements.

Thus, the AZ of the Republic of Sakha (Yakutia) is one of the disadvantaged territories of the region in terms of chronic viral hepatitis, and this is directly related to the living conditions of the population, the genetic characteristics of the indigenous population, as well as the remoteness of their residence from large settlements. All this complicates full laboratory and instrumental diagnostics and provision of a complex of medical and social assistance.

A significant issue is the inequality in access to medical care in the region. For example, insufficient staffing of medical organizations with infectious disease specialists and epidemiologists in the Republic of Sakha (Yakutia) is one of the most problematic issues of regional healthcare. As of January 1, 2023, there are 89 infectious disease specialists in Yakutia, of which only 31 people work in the uluses. It is important that out of 13 Arctic uluses, where there are about 100 settlements on a total area of more than 1.6 million km^2, only 5 districts have infectious disease doctors (Verkhnekolymsky, Verkhoyansky, Zhigansky, Nizhnekolymsky, Oleneksky). Limited access to medical services, a lack of medical equipment and personnel are currently a serious obstacle to ensuring an adequate level of healthcare for all Arctic residents.

Based on the above, in order to reduce the incidence and mortality from viral hepatitis, the Ministry of Health of the Republic of Sakha (Yakutia) has prepared a draft target regional program "Improving the methods of providing medical care to patients with chronic hepatitis B, C and D for 2022-2024 in the Republic of Sakha (Yakutia)". Since 2021, the Republican Hepatology Center has been operating on the basis of the Yakutsk Republican Clinical Hospital, through which patients with chronic viral hepatitis from all over Yakutia have undergone treatment (as of January 01, 2024 – 870 people). A number of other medical institutions in the region are also involved in the treatment of patients with hepatitis in the Republic of Sakha (Yakutia), but all of them are located outside the AZ of the Republic of Sakha (Yakutia). Therefore, providing assistance to patients from remote and hard-to-reach areas of Yakutia requires closer attention. Based on this, since 2024, for the first time in the region, targeted subsidies have been allocated specifically for the AZ residents of the Republic of Sakha (Yakutia) for the purchase of antiviral drugs for the chronic hepatitis C treatment. Currently, patient selection is carried out through telemedicine consultations conducted by the chief freelance infectious disease specialist of the Ministry of Health of the Republic of Sakha (Yakutia). During 2024, it is planned to treat 150 AZ residents of the Republic of Sakha (Yakutia).

Given the extremely specific conditions of the region, the decentralization principle is the key to improve the availability and quality of medical services in the AZ of the Republic of Sakha (Yakutia). First of all, it is also necessary to introduce systematic specific serological and virological examinations of the population and pay due attention to providing the AZ with highly qualified specialists from among the graduates of the North-Eastern Federal University in Yakutsk as the main source of personnel in the republic. It is worth noting that in 2022 alone, 80 doctors were trained in the republican hepatology school as part of the continuous medical education program, including 5 people from the Arctic regions. This event has been held annually for 22 years with the invitation of leading Russian specialists. Particular attention in the region is paid to raising awareness

of viral hepatitis issues not only among health workers, but also among patients and their relatives.

CONCLUSION

The complex epidemiological situation with chronic viral hepatitis, caused by extreme natural and climatic conditions, genetic characteristics of the indigenous population and the lack of medical institutions specializing in the treatment of chronic viral hepatitis, dictates the need to strengthen systematic mobile monitoring studies and telemedicine consultations in the Arctic zone of Yakutia. Thanks to this, residents of AZ hard-to-reach areas of the Republic of Sakha (Yakutia) will be able to receive targeted subsidized assistance for the chronic viral hepatitis treatment without traveling to Yakutsk.

Important measures include eliminating the personnel shortage by increasing the prestige of the infectious disease doctor profession, creating comfortable working conditions, increasing wages, improving the system of training personnel in infectious diseases, and increasing the number of target referrals. It is also necessary to conduct medical and social surveys of the population on the satisfaction with medical care in order to assess and adjust the measures taken by the Russian Ministry of Health to improve the epidemiological situation and services provided to the population.

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Conflicts of interest

No potential conflict of interest relevant to this article reported.

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