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COMPREHENSIVE RISK ASSESSMENT OF EPIDEMIOLOGICAL SITUATION AGGRAVATION AS REGARDS NATURAL-FOCAL INFECTIOUS DISEASES DURING THE XXI FIFA WORLD CUP IN THE RUSSIAN FEDERATION IN 2018

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КОМПЛЕКСНАЯ ОЦЕНКА РИСКОВ ОСЛОЖНЕНИЯ ЭПИДЕМИОЛОГИЧЕСКОЙ ОБСТАНОВКИ ПО ПРИРОДНО-ОЧАГОВЫМ ИНФЕКЦИОННЫМ БОЛЕЗНЯМ ПРИ ПРОВЕДЕНИИ XXI ЧЕМПИОНАТА МИРА ПО ФУТБОЛУ В РОССИЙСКОЙ ФЕДЕРАЦИИ В 2018 г.

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The paper identifies major epidemiological threats associated with holding the XXI World Cup in 11 cities of the Russian Federationю Epidemiological conjuncture of enzootic natural focal infectious diseases of bacterial and viral etiology registered in FWC-2018 host-entities was analyzed from the standpoint of epidemiological risk. It is shown that hemorrhagic fever with renal syndrome was the most significant internal threat for the Republic of Tatarstan and Mordovia, Samara and Nizhny Novgorod Regions, Ixodidae tick-borne borreliosis – for Moscow, Saint Petersburg, and Sverdlovsk Region. The average risk of tick-borne viral encephalitis was determined for the Sverdlovsk Region. During the World Cup-2018, the probability of Crimean hemorrhagic fever occurrence existed in the Rostov Region (medium risk), West Nile fever – in Volgograd Region (medium risk). A clearer understanding of the epidemiological threats picture enabled us to formulate better strategies and possible to scientifically substantiate a set of preventive measures in areas of epidemiological risk.

Keywords: natural-focal infectious diseases, epidemiological risk, comprehensive risk assessment, FIFA World Cup-2018

Определены эпидемиологические угрозы, сопряженные с проведением в 11 городах Российской Федерации XXI Чемпионата мира по футболу (ЧМ-2018). Проведен анализ эпидемиологической конъюнктуры по эндемичным (энзоотичным) природно-очаговым инфекционным болезням бактериальной и вирусной этиологии в принимающих ЧМ-2018 субъектах. Показано, что геморрагическая лихорадка с почечным синдромом являлась наиболее значимой внутренней угрозой для республик Татарстан и Мордовия, Самарской и Нижегородской областей; иксодовые клещевые боррелиозы – для Москвы, Санкт-Петербурга и Свердловской области. Для клещевого вирусного энцефалита средний риск определен для Свердловской области. В период проведения ЧМ-2018 вероятность возникновения случаев заболевания крымской геморрагической лихорадкой существовала в Ростовской области (средний риск), лихорадкой Западного Нила – Волгоградской области (средний риск). Таким образом, дифференцирование и ранжирование внутренних эпидемиологических угроз по степени опасности позволило обосновать комплекс профилактических мероприятий в зонах эпидемиологического риска.

Ключевые слова: природно-очаговые инфекционные болезни, эпидемиологический риск, комплексная оценка риска, ЧМ-2018

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CHF – Crimean Hemorrhagic Fever
FWC-2018 – FIFA World Cup-2018
HFRS – Hemorrhagic Fever With Renal Syndrome
ITBB – Ixodidae Tick-Borne Borreliosis
TBVE – Tick-Borne Viral Encephalitis
WNF – West Nile Fever

Between June 14 and July 15, 2018 final matches of the largest international sports event FIFA World Cup took place in 11 cities of the Russian Federation. 32 teams took part in the World Series. More than 550 thousand fans from 152 countries and autonomous territories visited Russia.

During FWC-2018, the probability of occurrence of endemic infectious diseases of bacterial and viral etiology increased considerably in the entities involved. First of all, it was due to the increase in human contingent concentration and contacts with natural-focal complexes, which could develop into emergency situation of sanitary-epidemiological character.

In that context, an important task was more accurate forecasting of potential epidemic events for scientific substantiation and implementation of targeted measures, in sufficient volumes and with adequate frequency, on epidemiological risk management [1] at the stage of preparation to FWC-2018.

Objective of the study was to conduct complex assessment of epidemiological risk in relation to natural-focal diseases, endemic for 11 entities hosting the games of FWC-2018, in order to enhance the effectiveness of preventive activities.

Material and Methods. Comprehensive assessment of internal epidemiological risk was performed according to original method developed through the offices of the authors [2]. We used official data from the Rospotrebnadzor Administrations in 11 entities of the Russian Federation and personified information contained in primary registration Forms (Form 058/u and Form 060/u) over the period of 2013–2017 on reported cases of the following nosological forms: HFRS, ITBB, TBVE, WNF, and CHF.

Statistical processing of the results was conducted using conventional methods of variation statistics with Excel 2007 (Microsoft Inc., USA) software package.

Results and Discussion. Retrospective analysis has revealed that the most common infection in the territories under study was HFRS. In total, more than 10 thousand cases of the infection were recorded in 2013–2017. The majority of them were in the territory of the Republic of Tatarstan (36.7 % of all registered cases), Nizhny Novgorod (20.5 %) and Samara (18.6 %) Regions, and the Republic of Mordovia (11.4 %). The territories geographically fall under Privolzhsky Federal District (PFD) (9073 cases of the diseases). Among all HFRS cases across the country, PFD rates amounted to 86.4 %. It testified to the fact that PFD was characterized by the most serious potential epidemic hazard as regards HFRS in Russia [3]. HFRS incidence is registered here annually. 100 % of the cases are associated with Hantavirus, Puumala serotype. The red-backed vole is the main reservoir of the virus in nature and source of human infection [4]. The morbidity among the population is wide spread. The most active foci of infection are in zones vastly covered with forests, including park areas in such major cities as Samara, Nizhny Novgorod, Saransk and Kazan. Up to 15 % of the total HFRS morbidity rates by the entity are registered here annually.

In the cities of federal significance (Moscow and St. Petersburg) average HFRS morbidity rates reached up to 1.4 and 1.1 per 100,000 population, respectively. However, HFRS cases were for the most part imported ones and infection occurred during the trips of the residents to areas at risk. In other constituent entities, where FWC-2018 took place, epidemic and epizootic situation on HFRS was less tense. There are active natural HFRS foci in the Southern Federal District; however morbidity rates among the population remain low. HFRS cases are reported only in Volgograd Region (22 cases over the analyzed period) and Krasnodar Territory (52). Characteristic features of HFRS manifestations in this region are: prevalence of severe and moderate forms of infection with high lethality index owing to Dobrava virus; lack of seasonality, associated with peaks of numbers of the main natural host and source of human infection – Caucasian wood mouse, which can be observed any time of the year, resulting in maintenance of epidemiological risks throughout the year [5].

During FWC-2018, epidemiological situation aggravation as regards WNF was likely to occur in the cities where permanently active natural foci of the disease had formed – in endemic territories of the Southern and Privolzhsky Federal Districts (Rostov-on-Don, Volgograd and Samara). All cases of infection were of local origin with prevalence of urban population in morbidity patterns. In the entities of the Southern Federal District, WNF incidence significantly decreased over the past five years: 11.5 times lower across the Volgograd Region (60 cases compared to 691 cases in 2008–2012) and 6.5 times – in the Rostov Region (19 and 125 cases, respectively). In the territory of the Samara Region infection has been registered since 2012. Between 2012 and 2017, 37 cases of WNF in 12 administrative territories of the Region, including Samara city, were reported.

Through the season 2017, on average, across the Russian Federation and separate constituent entities, WNF morbidity rates were lower than the long-term annual average. All in all, 12 cases of the diseases were registered (2016 – 135 cases) in 7 entities of the country. Eight out of them were reported in the entities hosting FWC-2018 (Saint Petersburg – imported cases of the disease, Moscow, Rostov-on-Don, and Samara). Maximum of WNF cases was recorded in the Samara Region (3 cases). Circulation of West Nile virus was also detected in natural biotopes of Sochi city however human infections over the analyzed period were not identified.

Ixodidae tick-borne borreliosis is the most common and frequent among the infectious diseases transmitted

by ticks, its cases being on the record in all the involved into FWC-2018 entities.

When comparing the number of ITBB cases in different entities over the analyzed period, we have found out that the highest number of them was in Moscow (4274 cases, morbidity rate – 7.0 per 100,000 population), Sverdlovsk Region (3124 cases, the rate – 14.4), and St. Petersburg (1616 cases, the rate – 6.2). In Moscow and St. Petersburg the majority of infections with ITBB occurred during the trips to recreation areas around the cities. In Kaliningrad Region the total number of cases reached up to 549, morbidity index – 11.4, 2.5 times exceeding the average index across the Russian Federation (4.6). Sporadic ITBB incidence was reported in the Republics of Mordovia and Tatarstan, Volgograd, Rostov, and Samara Regions. In general, a downward trend as regards ITBB morbidity rates, established over the last decade, retained. Increase in ITBB incidence during the period preceding FWC-2018 was registered in Krasnodar Territory and St. Petersburg (1.5 times), Nizhny Novgorod and Sverdlovsk (1.2 times), and Kaliningrad Region (1.1 times). High ITBB rates were recorded among urban population. It evidenced raise in the frequency of contacts with ticks, expansion of recreational open spaces, and exploration of new territories surrounding the cities.

Areal of TBVE dissemination covers all the territory of Kaliningrad and Sverdlovsk Regions, greater part of Nizhny Novgorod Region, Samara Region and Republic of Tatarstan, including cities hosting FWC-2018 games, as well as 6 administrative areas of Saint-Petersburg. The most unfavorable as regards TBVE situation over the 5-year term was reported in the Sverdlovsk Region, where intensive morbidity rate (2.7) 2 times exceeded the average across the Russian Federation (1.4). The Region accounted for up to 6.6 % of all registered in the country patients. It should be noted that the expansion of TBVE nosoareal was established here. Other entities under investigation are classed among the territories with low TBVE incidence. Long-term annual average morbidity rate in St. Petersburg was 1.05 and Kaliningrad Region – 1.2 per 100,000 populations. Sporadic incidence with yearly number of patients raging from 1 to 4 was recorded in Nizhny Novgorod, Samara Regions and the Republic of Tatarstan. Both in the entities and across the Russian Federation, a downward trend retains. It reflects cyclical pattern of TBVE morbidity. In 2017 cases of the disease were registered in all the entities under consideration, except from the Republic of Tatarstan. The increase by contrast to 2016 was noticed in the Kaliningrad (1.8 times) and Sverdlovsk (1.2 times) Regions. Maximum of the disease manifestation was observed from early June to mid September 2017, which posed a risk of infection to the participants and guests of FWC-2018. In Moscow city and Krasnodar Territory imported cases of TBVE were registered. All of them were among persons who travelled to the territories at risk and were not vaccinated against TBVE [6].

Natural CHF foci are established in the territory of Krasnodar, Rostov, and Volgograd Regions. In the Rostov Region, 38 administrative areas are endemic as regards CHF. Over the five-year period, 266 cases of the disease were reported (1.2 per 100,000 populations). The Southern Federal District on average accounts for 48.3 % of the total incidence across Russia. Persistent natural CHF foci are found in 23 administrative areas of the Volgograd Region, including at the venue of the FWC-2018 matches – Volgograd city. The CHF has been officially registered here since 2000, reports on patients during the period of 2013–2017 were on annual basis (in total 33 cases, morbidity rate – 0.2 per 100,000 population). Cases CHF infection in the Krasnodar Territory over the last years were not detected.

In 2017, in the territory of the involved in FWC-2018 entities, as well as across the Russia in general, decrement in CHF morbidity rates was noted: in the Rostov Region – 1.5 fold, and in the Volgograd Region – 3.5 fold [6]. Cases of the disease were reported during the period of May-August, their maximum number being fixed in June (in the Volgograd Region 72.2 % of all patients, in the Rostov – 45.1 %), which coincided with the terms of FWC-2018.

Natural tularemia foci were in active state too; positive findings of tularemia microbe in ambient environment objects were detected annually. However considerable increase in the incidence in the territory of the FWC-2018 entities was not registered. As a rule, only single cases of tularemia were reported. Every year, during the analyzed period, cases of tularemia infection were registered in Saint Petersburg (44 cases; 12 cases in 2017), Moscow (18 cases, 2 out of them – in 2017), Nizhny Novgorod (17, 6 out of them – in 2017). Sporadic incidence was observed in the territories of the Rostov (5 cases in 2017) and Sverdlovsk (1 case in 2014, 4 cases – in 2017) Regions.

Among other natural-focal infectious disease, 1042 cases of pseudotuberculosis were registered in the entities hosting FWC-2018 over the analyzed term, 941 – in St. Petersburg; 391 cases of leptospirosis (the majority was in the Krasnodar Territory – 149, Moscow – 78, Republic of Mordovia – 61, Saint Petersburg – 38); 5 cases of anthrax (Volgograd Region, 2015; Rostov Region, 2014, and the Republic of Tatarstan, 2014); 4cases of rabies among humans (Volgograd region, 2013; Sverdlovsk Region, 2013; Nizhny Novgorod region, 2015; the Republic of Tatarstan, 2014).

On the basis of the results (Table) of risk assessment conducted, we have put forward the recommendations on strengthening epizootiological monitoring when performing the survey of green areas in FWC-2018 host-cities, especially natural biotopes adjacent to the sports event venues, as well as territories of the popular tourist hiking routes; on increase in scope, terms and frequency of non-specific preventive measures in areas of high risk of infection.

Table

Comprehensive risk assessment of epidemiological situation aggravation as regards natural-focal infectious diseases in 11 entities involved in FWC-2018

RF constituent entities	Infectious disease				
	HFRS	TBVE	ITBB	WNF	CHF
Republic of Tatarstan	high risk	very low risk	low risk	very low risk	–
Nizhny Novgorod Region	high risk	very low risk	medium risk	–	–
Samara Region	high risk	very low risk	very low risk	low risk	–
Republic of Mordovia	high risk	–	low risk	–	–
Moscow	low risk	–	high risk	very low risk	–
Saint Petersburg	low risk	low risk	high risk	very low risk	–
Krasnodar Territory	low risk	–	medium risk	very low risk	very low risk
Volgograd Region	low risk	–	very low risk	medium risk	low risk
Sverdlovsk Region	low risk	medium risk	high risk	–	–
Rostov Region	very low risk	–	very low risk	low risk	medium risk
Kaliningrad Region	very low risk	low risk	medium risk	–	–

high risk; medium risk; low risk; very low risk; – no risk

Conclusions. Defined have been the major internal epidemiological threats to the entities involved in FWC-2018. Advance, forehand assessment of risks allowed for carrying out targeted and effective complex of prophylactic activities. Sanitary-epidemiological welfare of the participants, guests of the sports event was provided despite the coincidence of FWC-2018 terms with the period of seasonal morbidity rate increase as regards endemic, natural-focal infectious diseases of bacterial and viral etiology.

Disclosures:
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CLINICAL PECULIARITIES OF MYASTHENIA GRAVIS IN KRASNODAR REGION

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КЛИНИЧЕСКИЕ ОСОБЕННОСТИ МИАСТЕНИИ В КРАСНОДАРСКОМ КРАЕ

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Among 344 myasthenia patients living in the Krasnodar Territory were examined. Of these, 246 were women (71.5 %) and 98 men (28.5 %), the ratio of men to women was 1:2.5. The average age of patients with myasthenia gravis at the onset of disease was 46.2±0.97. In the majority of cases, the generalized form of the disease prevailed (82.8 %). The eye shape