

ranga. The database can be updated and edited. The protein spectra files can be entered into “MALDI Biotyper 3.0” and newer versions database by creating reference spectra and importing them into the Taxonomic Tree.

Protein spectra were obtained at 10–20-fold study of the samples extracted with acetonitrile/formic acid on a mass spectrometer “Microflex LT” (Bruker Daltonics, Germany) using a “Flex Control 3.3” program. The database was tested with eight strains isolated in Siberia and at the Far East in 2012–2016, and 18 *Leptospira* cultures from the collection of Gamaleya State Research Centre for Epidemiology and Microbiology. The results of identification of pathogenic *Leptospira* completely coincided with the data of multilocus sequencing. The created database is intended for specialists of microbiological and scientific laboratories engaged in diagnostics and study of leptospirosis.

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**INFORMATION TECHNOLOGY APPLICATION FOR NATURAL FOCI INFECTIONS MONITORING AND PREDICTION**

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Amur Region’s climate-geographical features, flora and fauna specifics led to the emergence of persistent natural foci of several infections, including tick-borne encephalitis, hemorrhagic fever, tularemia, and listeriosis. Amur Region registers from 100 to 200 cases of natural foci infections every year. The largest share of these infections is tick-borne.

The Amur Region Rospotrebnadzor Service introduced in 2017 the Epidemiological Surveillance System (EpiS), creating one information space for the entire epidemiological service network in the region and ensuring connectivity with the primary healthcare organizations. EpiS enabled rapid collection and exchange of information, supports epidemiological investigations with accurate geo-location based on GLONASS/GPS coordinates and delivers outbreak early warning capabilities. The natural foci locations and Anthrax cases historical data for the past 180 years was converted into an electronic register of the territories and sites and embedded into the EpiS. It is planned to expand this registry for other natural foci infections.

Operational information on morbidity in conjunction with the historical information and other epidemiologically significant factors is displayed in the Emergency Operations Center (EOC) in near real-time on detailed regional maps. The EOC strengthens and supports current situation monitoring as well as in-depth epidemiological investigation and analysis of the situation.

In 2018 the Amur Region Rospotrebnadzor Service also introduced modern methods for predicting morbidity based on the deep neural networks technology. This forecasting method demonstrated its effectiveness for a number of infections, in particular, Influenza-like illness (ILI) and Acute Intestinal infections, due to the integrated consideration of historical data, socio-hygienic characteristics and environmental factors. The prognostic models are built on the entire available data archive and allow identifying stable patterns leading to a change in the morbidity dynamics. The prediction accuracy reached 85–90% for the ILI. The use of such forecasting methods allows strengthening preventive measures to combat infectious morbidity.

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**ANALYSIS AND FORECASTING INCIDENCE OF BRUCELLOSIS IN THE REPUBLIC OF DAGESTAN**

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From 300 to 500 cases of brucellosis among people are registered in Russian Federation annually. Sixty three percent of these cases occur in the North Caucasus Federal District (NCFD). Assessing the structure of the brucellosis incidences among the population of NCFD during 2005–2017 we found that 2122 reported cases (67%) occurred in the Republic of Dagestan.

The current situation calls for the need to improve methods of epidemiological diagnosis. To assess the epidemiological situation of brucellosis and to forecast the epidemic situation in the Republic of Dagestan for 2018 we analyzed the official statistics of brucellosis cases among people. The forecast for the number of cases was executed using two methods — the classical method of linear approximation and by the method developed by us, using the Wald’s graph plot. The proposed method allows to determine the monthly minimum and maximum number of cases of brucellosis in the forthcoming period, therefore predicting the total minimum and maximum levels of morbidity.

According to the result of the statistical analysis, the threshold level of incidence of brucellosis disease (Mediterranean fever) in the Republic of Dagestan between 2005–2017 amounted to 14 cases. The average values of incidence of disease during long-term observations fluctuated between 12 and 20 cases during different seasons of the year, with the most cases occurring in June.

As a result of the conducted analysis, it was established that in the Republic of Dagestan in 2018, the monthly increase in the incidence level amounted to 1.6 new cases of brucellosis, the aggregate minimum prognosis of the incidence level is 10 new cases, while the maximum prognosis is 28 new cases. 123 cases are forecast in the Republic of Dagestan in 2018.

Therefore, according to the latest findings utilizing Wald’s graph plot, it has been established that the brucellosis epidemiological situation in the Republic of Dagestan in 2018 is unstable. The exceedance of the threshold level points to the possible decline of the epidemiological situation. The suggested method of brucellosis epidemiological case forecast contributes to the optimization of the epidemiological process management, allows for the timely evaluation of the activity of the epidemic outbreak areas and prompt and swift decision making for the purposes of their localization and liquidation.

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**THE DYNAMICS OF TICK VECTORS INFECTION RATE WITH IXODIC TICK BORRELIOSIS CAUSATIVE AGENTS IN KHABAROVSK REGION DURING THE EPIDEMIC SEASON OF 2017–2018**

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Ixodic tick borreliosis are among the most prevalent illnesses in the group of tick-borne diseases in Russia.

The objective of the research was to perform a comparative evaluation of infestation rate of engorged Ixodic