CRIMEAN FEDERAL UNIVERSITY

WORKS OF E.N PAVLOVSKY - NATURAL FOCAL DISEASES

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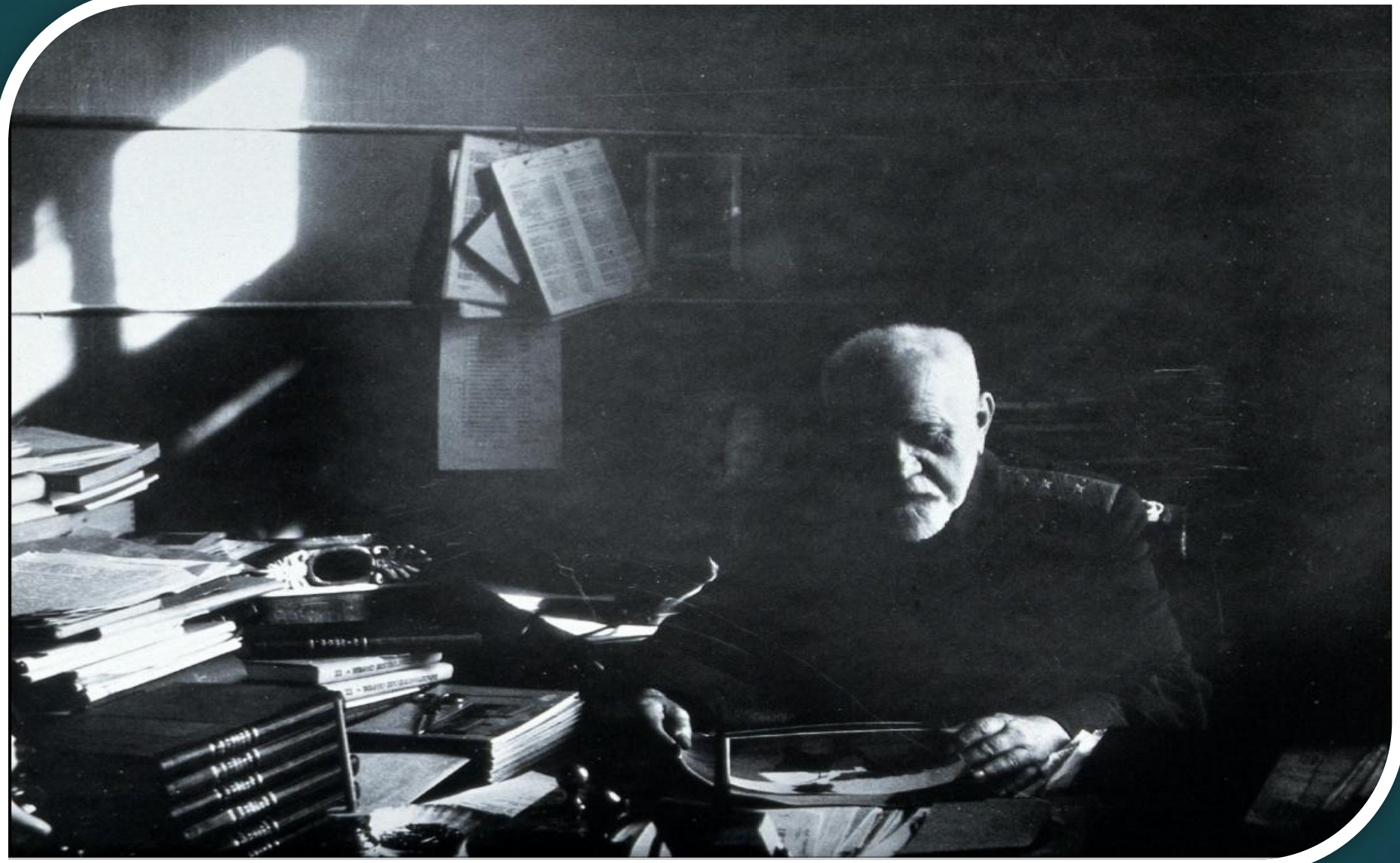
GROUP – 196B

Who is E.N PAVLOVSKY?

- Yevgeny Nikanorovich Pavlovsky (Russian: Евге́ний Никано́рович Павло́вский; 22 February (N.S. 5 March) 1884, today's Voronezh Oblast – 27 May 1965, Leningrad)
- He was a Soviet zoologist, entomologist, academician of the Academy of Sciences of the USSR (1939), the Academy of Medical Sciences of the USSR (1944), honorary member of the Tajik Academy of Sciences (1951), and a lieutenant-general of the Red Army Medical Service in World War II.



- Under Pavlovsky's direction, they organized numerous complex expeditions to the Central Asia, Transcaucasus, Crimea, Russian Far East and other regions of the Soviet Union to study endemic parasitic and transmissible diseases (tick-borne relapsing fever, tick-borne encephalitis, Pappataci fever, leishmaniasis etc.)
- Yevgeny Pavlovsky introduced the concept of natural nidality of human diseases, defined by the idea that microscale disease foci are determined by the entire ecosystem. This concept laid the foundation for the elaboration of a number of preventive measures and promoted the development of the environmental trend in parasitology

- Yevgeny Pavlovsky researched host organism as a habitat for parasites (parasitocenosis), numerous matters of regional and landscape parasitology, life cycles of a number of parasites, pathogenesis of helminth infection
- . Pavlovsky and his fellow scientists researched the fauna of flying blood-sucking insects (gnat) and methods of controlling them and venomous animals and characteristics of their venom.

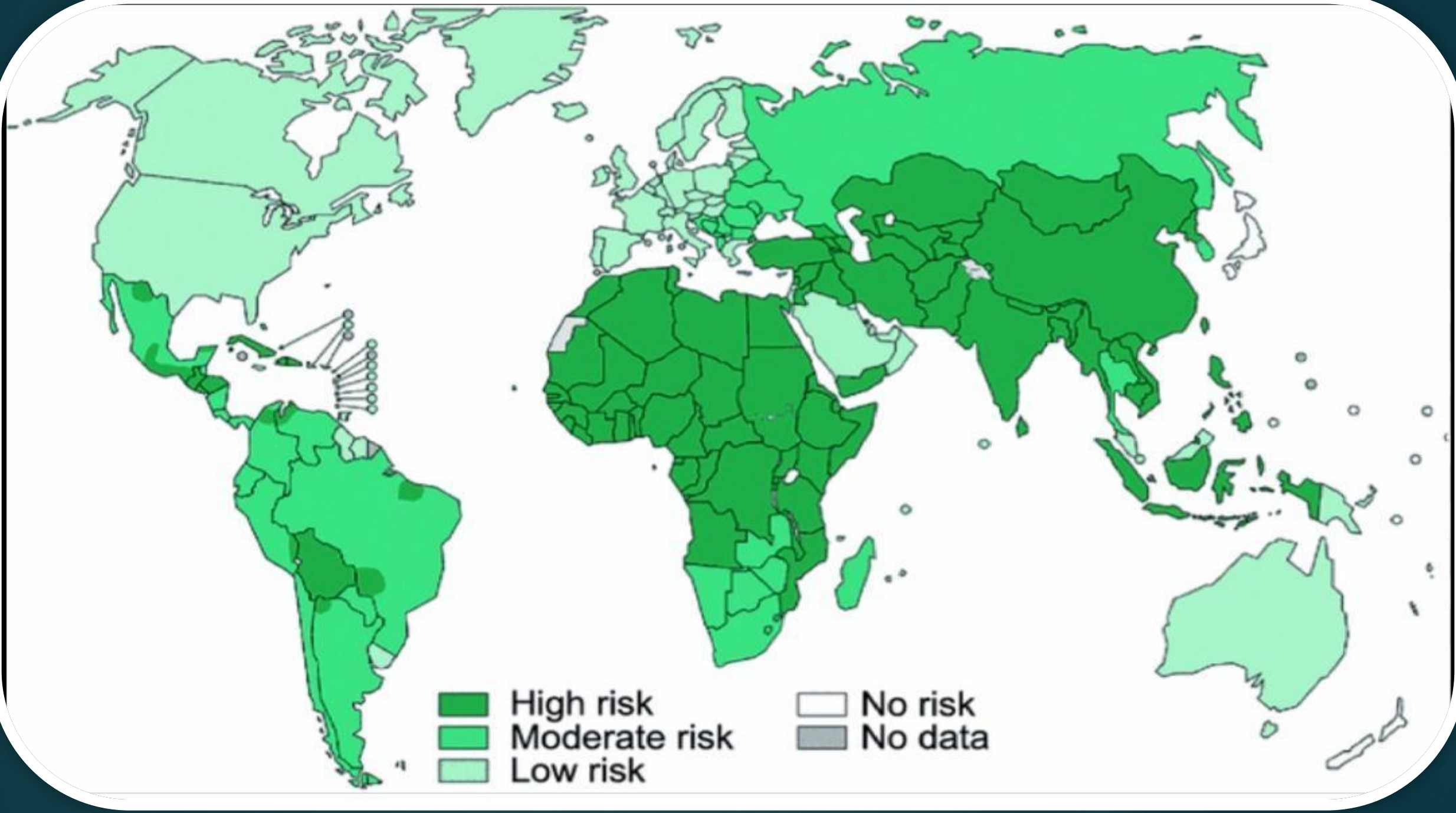
Honors of Pavlovsky

- Pavlovsky was a deputy of the Supreme Soviet of the USSR of the 2nd, 3rd, and 4th convocations.
- He was a recipient of the Stalin State Prize (1941, 1950), the Lenin Prize (1965), the Mechnikov Gold Medal of the Academy of Sciences of the USSR (1949), and gold medal of the Soviet Geographical Society (1954).
- Yevgeny Pavlovsky was awarded five Orders of Lenin, four other orders, and numerous medals.

What are natural focal diseases

- Natural focal diseases are caused by biological agents associated with specific landscape
- The natural focus of such diseases is defined as any natural ecosystem containing the pathogen's population as an essential component.
- In such context, the agent circulates independently on human presence, and humans may become accidentally infected through contact with vectors or reservoirs.

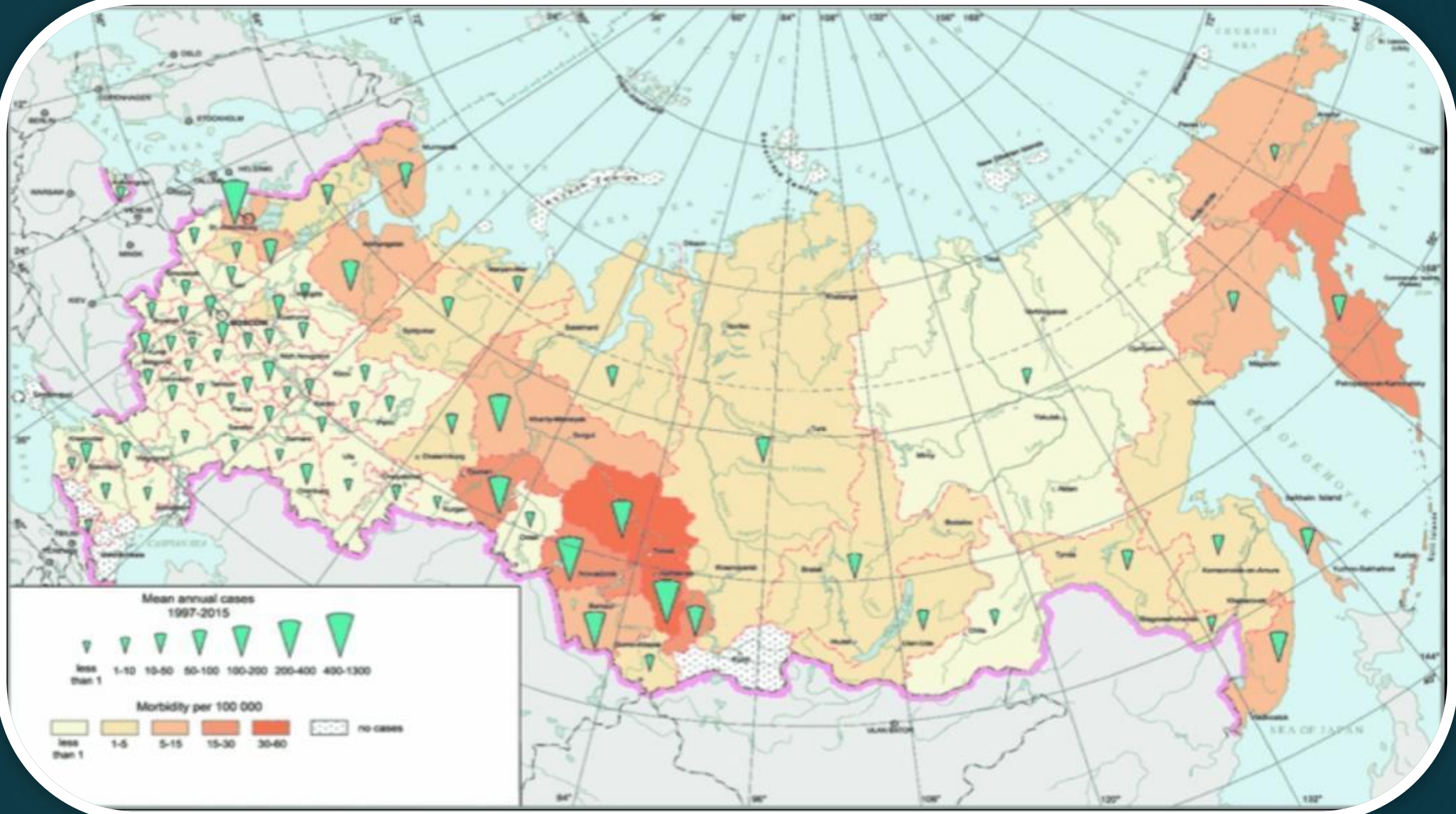
- Some viruses (i.e., tick-borne encephalitis and Congo-Crimean hemorrhagic fever virus) are paradigmatic examples of natural focal diseases.
- When environmental changes, increase of reservoir/vector populations, demographic pressure, and/or changes in human behavior occur, increased risk of exposure to the pathogen may lead to clusters of cases or even to larger outbreaks.


High risk
Moderate risk
Low risk
No risk
No data

- Intervention is often not highly cost-effective, thus only a few examples of large-scale or even targeted vaccination campaigns are reported in the international literature.
- To develop intervention models, risk assessment through disease mapping is an essential component of the response against these neglected threats and key to the design of prevention strategies, especially when effective vaccines against the disease are available.

Natural focal diseases in Russia

- Natural-focal diseases constitute a serious hazard for human health.
- The aim of this study is to identify the diversity and geography of natural-focal diseases in Russia and to develop cartographic approaches for their mapping, including mathematical-cartographical modeling.
- The degree of epidemic hazard in Russia by natural-focal diseases is reflected in a synthetic medico-geographical map that shows the degree of epidemic risks due to such diseases in Russia and allows one to estimate the risk of disease manifestation in a given region.

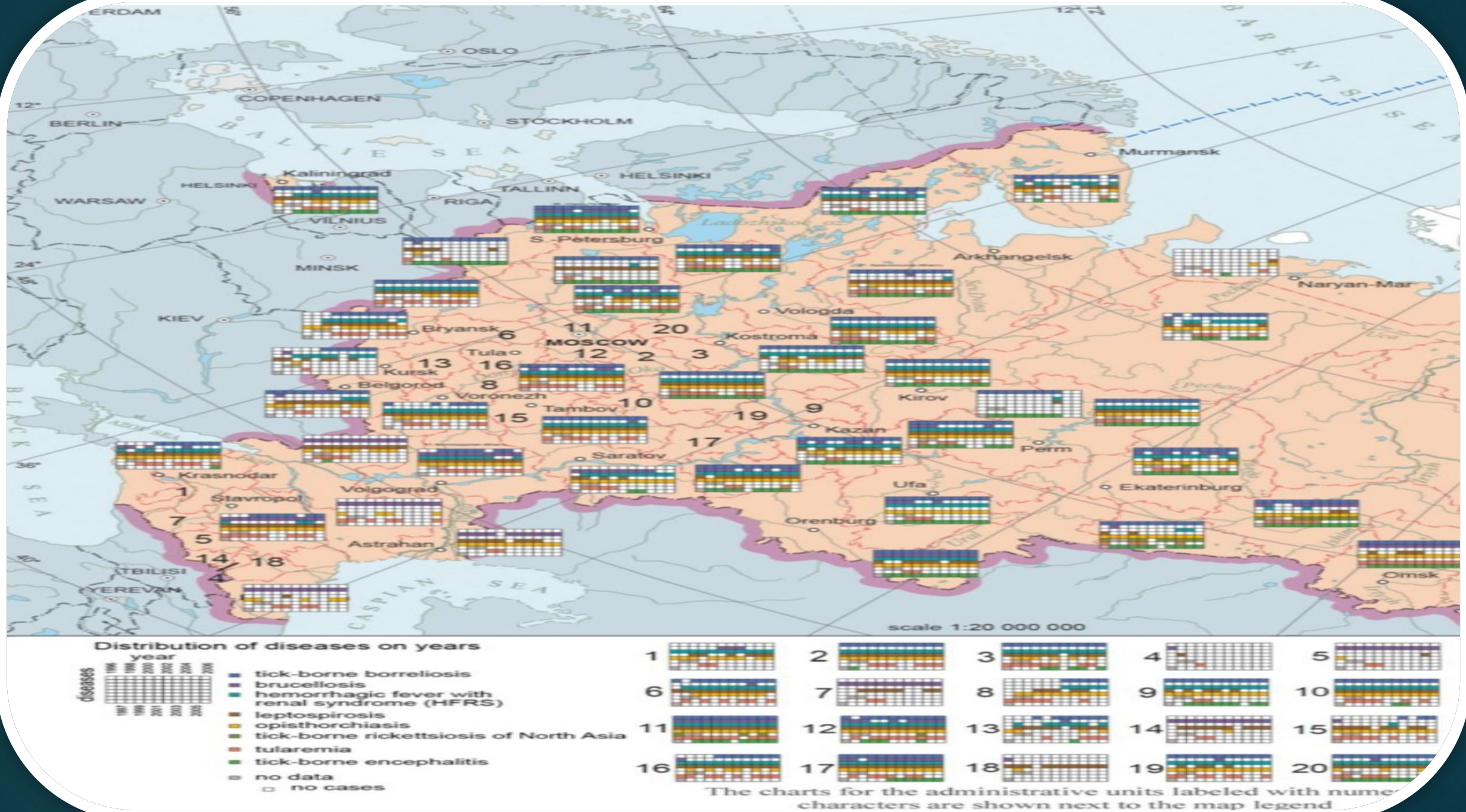

Mean annual cases
1997-2015
less than 1
1-10
10-50
50-100
100-200
200-400
400-1300
Morbidity per 100 000
less than 1
1-5
5-15
15-30
30-60
no cases

- Natural-focal disease prevention is one of the most important problems of public health. The agents and vectors of these diseases are part of natural landscapes and the spread of these diseases, which may be a serious hazard for the population, is determined by natural factors.
- In accordance with a theory of focality (or nidality) of disease proposed by Russian academician Eugene Pavlovsky in 1939, some pathogens are associated with specific landscapes
- The determinant feature of natural-focal disease is that the pathogen of such a disease circulates in the nature independently of human presence

- As a rule, the humans became infected when they get into the focus and contact the infectious vector or, in some cases, the reservoir host
- In Pavlovsky's original theory, based on tick-borne pathogens in Russia, the focus of infection contains three critical elements: vectors, vertebrate hosts, and susceptible recipient hosts such as humans or animals.
- Nowadays, the natural focality has been proved also for non-vector-borne zoonoses such as hemorrhagic fever with renal syndrome, leptospirosis, etc. Finally, natural focality for a large group of sapronotic infections, whose agents live in soil or aquatic ecosystems, has also been substantiated.

- Morbidity due to some natural-focal diseases such as tick-borne encephalitis and ixodid tick-borne borreliosis (the Palaearctic analog of Lyme disease that is widespread in the North America), as well as some helminthoses with natural focality, such as opisthorchiasis, remains high in the Russian Federation
- Therefore, we deal with a broad range of natural-focal diseases that may harm the population and visitors of different regions of Russia.

- In recent decades, increasing human activities (e.g., intensive suburban construction around big cities, expansion and growth of recreational pressure) have led to a significant increase in contact between the population and the natural foci and in favorable epidemiological conditions for the spread of natural-focal diseases
- Despite the increased attention to this issue in the past decade many research questions pertaining to natural-focal diseases remain unanswered.
- Development of the principles and methods of synthesizing medico-geographical information and obtaining new knowledge about the spatial distribution patterns of natural-focal diseases using new approaches.


OSLO
COPENHAGEN
STOCKHOLM
HELSINKI
TALLINN
RIGA
VILNIUS
MINSK
WARSAW
BERLIN
KIEV
Kaliningrad
S.-Petersburg
MOSCOW
Murmansk
Arkhangelsk
Naryan-Mar
Vologda
Kostroma
Kirov
Kazan
Perm
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Astrahan
Krasnodar
Stavropol
Bryansk
Tula
Kursk
Belgorod
Voronezh
Tambov
TBILISI
YEREVAN
Omsk
BARENTS SEA
BALTIC SEA
BLACK SEA
CASPIAN SEA
scale 1:20 000 000
Distribution of diseases on years
year
diseases
tick-borne borreliosis
brucellosis
hemorrhagic fever with renal syndrome (HFRS)
leptospirosis
opisthorchiasis
tick-borne rickettsiosis of North Asia
tularemia
tick-borne encephalitis
no data
no cases
The charts for the administrative units labeled with nume
characters are shown next to the map legend

THANK YOU
FOR YOUR
ATTENTION