

Global Perspectives on Health Geography

Svetlana Malkhazova
Varvara Mironova
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Mapping Russia's Natural Focal Diseases

History and Contemporary Approaches

 Springer

Global Perspectives on Health Geography

Series editor

Valorie Crooks, Department of Geography, Simon Fraser University, Burnaby, BC, Canada

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With Contributions by Vadim Rumyantsev and Mikhail Soldatov

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ISSN 2522-8005 ISSN 2522-8013 (electronic)
Global Perspectives on Health Geography
ISBN 978-3-319-89604-5 ISBN 978-3-319-89605-2 (eBook)
<https://doi.org/10.1007/978-3-319-89605-2>

Library of Congress Control Number: 2018937709

Original publication: Медико-географический атлас России «Природноочаговые болезни» / под ред. С.М. Малхазовой. 2-е изд., перераб. и доп. – М.: Географический факультет МГУ, 2017 – 216 с. Medico-geographical Atlas of Russia “Natural Focal Diseases” / edited by S.M. Malkhazova. 2nd revised edition. – Faculty of Geography, Lomonosov Moscow State University, Moscow, 2017. – 216 p.

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Foreword

Numerous natural focal (or natural nidal) diseases, the pathogens of which inhabit natural landscapes, pose a serious danger to human health. In the last few decades, increasing anthropogenic activity (agricultural development in new regions, suburban real estate development and increasing recreational pressure) has led to a substantial increase in contact between the population and natural foci, as well as the creation of epidemiological preconditions for the spread of such diseases. In addition, the migration of people from epidemiologically unsafe areas, an enormous increase in the scale of tourism, including international travel, and increasing international shipments have raised the risk of infection with diseases that find Russia's environmental conditions favourable. The geography of natural focal diseases, the socio-economic preconditions of their spread and the spatial structure of focal territories on different spatial and temporal levels must be studied in order to support epidemiological monitoring and the development of sanitary and preventative measures that protect the population from disease.

Maps, literature, archival materials, government statistics (collected by the Russian Federal State Statistics Service for socio-economic measures and the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing for natural focal disease morbidity rates in the population) and data collected as part of field research served as sources for this book. The study was conducted based on the administrative and territorial divisions in the Russian Federation as of 2015.

The monograph includes the following thematic chapters:

1. Introduction
2. Natural and Socio-economic Conditions
3. Natural Focal Disease Hosts and Vectors
4. Major Natural Focal Disease Distribution
5. Spatial Organization of the Sanitary and Epidemiological Service

The book is unique in the combination of cartographic and textual information, infographics, photos and analytical material that it contains. It consists of about 80 original maps on a scale between 1:25,000,000 and 1:60,000,000 for Russia and 1:120,000,000 for the world. A number of model regions are shown on a scale between 1:3,000,000 and 1:5,000,000. The bibliography, which lists more than 400 sources on natural focal diseases and research methodologies, most by Russian authors, is valuable in its own right.

The prepared series of maps allows the reader to gauge the amount of information available on natural focal diseases in Russia, to highlight regions that necessitate additional targeted research and to identify natural and socio-economic disease preconditions, the geographic ranges of the main pathogen hosts and vectors, and the spectrum of most commonly diagnosed natural focal diseases.

Nosogeographic maps depict population morbidity rates and perennial disease dynamics for 85 administrative subjects of the Russian Federation. For the majority of maps, the temporal depth of analysis is approximately 20 years (1997–2015). Twenty-three disease units have

been mapped. Taken together, the maps allow for the evaluation of the epidemiologic danger posed by a specific territory and the stability of a disease's behaviour in a particular region, followed by conclusions on the necessity of developing and carrying out specialized preventative and therapeutic measures.

The book is aimed at public health, medical, science and education professionals, as well as a wide range of readers with an interest in issues of human health and the environment.

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Acknowledgements

The monograph was compiled based on materials collected and produced by the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rosпотребнадзор) with financial support from Russian Geographical Society (RGS) and Russian Foundation for Basic Research (RFBR). Section 3 was prepared with support from the following grant: Russian Science Foundation (RSF) Grant # 14-50-00029 ‘A Scientific Basis for the Creation of a National Depository Bank of Living Systems’. Geographical analysis of the distribution of the West Nile Fever (Section 4) has been supported by the grant programme from Russian Science Foundation (RSF) (Project № 17-77-20070 ‘An initial assessment and projection of the bioclimatic comfort in Russian cities in XXI century against the context of climate change’).

The book’s authors thank their colleagues and graduate and undergraduate students of the Faculty of Geography at Moscow State University for their professional consultations and help in data compilation and processing and preparing the Book for print. The authors are grateful to members of the Department of Biogeography of the Faculty of Geography at Lomonosov Moscow State University and the members of the Medical Geography and Human Ecology commission of the Moscow Centre of the RGS for their valued advice and suggestions throughout their discussion.

While preparing this monograph, we received very helpful comments and recommendations from our colleagues. We would like to express our most sincere gratitude to P. V. Pestina, N. V. Ryabova, T. V. Vatlina, O. S. Adischeva, L. V. Ezerova, A. E. Beljaev and O. P. Chernyavskaya.

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Abstract

This chapter contains a short summary of natural focal disease theory, which was developed by Evgeny Pavlovsky, a Soviet scientist, in the 1930s. This theory generalized material and data that had been gathered on natural focal infectious and parasitic diseases and the complex networks of mutually linked and mutually dependent pathogen, animal host and arthropod vector populations, which make up a biotic component that is organically linked to natural landscapes. The history of research on natural focal diseases in Russia, the contributions of Russian and Soviet scientists to the development of the theory of the emergence and spread of natural focal diseases and modern achievements in this discipline are also described. The understanding of what makes a natural focus is discussed, along with the theory's main tenets. The level of cartographical research on the spread of natural focal diseases in Russia is briefly characterized, and the methodology of map compilation is also explained. The chapter includes a geographical map of Russia and a map of its federal administrative divisions, which simplifies the later connections between the thematic content, geographic units and units of territorial divisions.

1.1 Natural Focal Disease Theory

The notion of diseases having natural foci was first proposed by Danylo Zabolotny (Fig. 1.1) at the turn of the twentieth century.

In 1939, Evgeny Pavlovsky, a member of the Academy of Sciences (Fig. 1.2), presented the main tenets of natural focal disease theory, which were based on his own research and that of his predecessors, at the General Conference of the Academy of Sciences of the USSR (Pavlovsky 1946). A final version of his theory is presented in his 1964

monograph (Pavlovsky 1964, 1966), for which he received the country's highest honour—the Lenin Prize.

Over the following decades, natural focal disease theory was continuously developed both by Pavlovsky himself and several generations of his students and followers (Korenberg 2010). Natural focal disease theory, which explained the causes for the emergence and continued existence of a large group of diseases, made a hefty contribution to the development of many disciplines: epidemiology, parasitology, medical geography, biogeography and ecology. Despite the fact that the phenomenon has not been sufficiently studied, today it is utterly clear that this is one of the greatest scientific achievements of the twentieth century.

In the English-language literature, along with the term focus, the term nidus is more widely used, and the science studying the phenomenon of natural foci is commonly called the landscape epidemiology (Meade and Emch 2010; Kanaroglou et al. 2016). In the works of the Russian authors, both terms are found with the former being used more often. Therefore, in this book, which is devoted to the study of natural focal diseases in Russia, we will adhere to the term focus/focal/focality.

At the turn of the twentieth century, it was widely believed that humans could only contract infections directly or indirectly from other humans. One of the main theoretical accomplishments of natural focal disease theory is that it discovered the possibility of disease transmission between a single individual and wild animals. The theory's essence is in the acknowledgment of the fact that pathogens that cause a number of diseases emerged and exist in nature independently of humans and are members of natural ecosystems. This new perspective on the possibility of contracting an infectious disease pathogen from a natural source had a significant influence on the further development of epidemiology and preventative medicine.

As shown by numerous studies, natural focal diseases can be caused by viruses, various bacteria, Protozoa and helminths (Natural Focality of Diseases... 2003). The exact number of such diseases is currently unknown. Still recently