

Геосистемы бассейна реки Есиль распределяются в соответствии с законами широтной зональности. Почвенно-климатические условия изменяются с севера на юг с постепенным уменьшением бонитировочного балла, однако в пределах припойменных геосистем наблюдаются самые высокие показатели, достигающие 225 баллов. В пределах речного бассейна преобладающее количество занимают озерно-аллювиальные равнины с субэаральными лессовидными суглинками. Территория Есильской субгеосистемы поделена на 10 подгеосистем, основными параметрами выделения которых послужили разные условия формирования стока. За период с 2010 по 2020 годы геосистемы в пределах поймы подверглись существенным изменениям в соответствии с гидрометеорологическими показателями бассейна реки Есиль, которые в 2020 году в весенний период отличались от данных прошлых лет (2015г., 2017г., 2019г.) в сторону увеличения, обусловив сложную обстановку в Акмолинской и Северо-Казахстанской областях.

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GEOGRAPHICAL BACKGROUND OF POPULATION MORBIDITY – INTEGRAL ENVIRONMENTAL QUALITY INDICATOR

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In 2015, the UN General Assembly, as a “plan for achieving a better and more sustainable future for all”, developed 17 interrelated sustainable development goals, the third direction of which is good health and well-being, that is, ensuring a healthy lifestyle and promoting well-being for all at any age [1]. Therefore, the efforts of all states of the world should be aimed at strengthening public health in order to achieve sustainable development of the country.

According to WHO, the formation of public health is influenced by a number of global factors, among which 24 risk factors are described. They are responsible for 44% of all deaths and 34% of the disease burden; at the same time, figure 1. shows the burden of disease or years of healthy life lost, which are measured by DALY indicator, which reflects the greater significance of “non-fatal” loss of health, on the one hand, and mortality at a younger age, on the other hand.

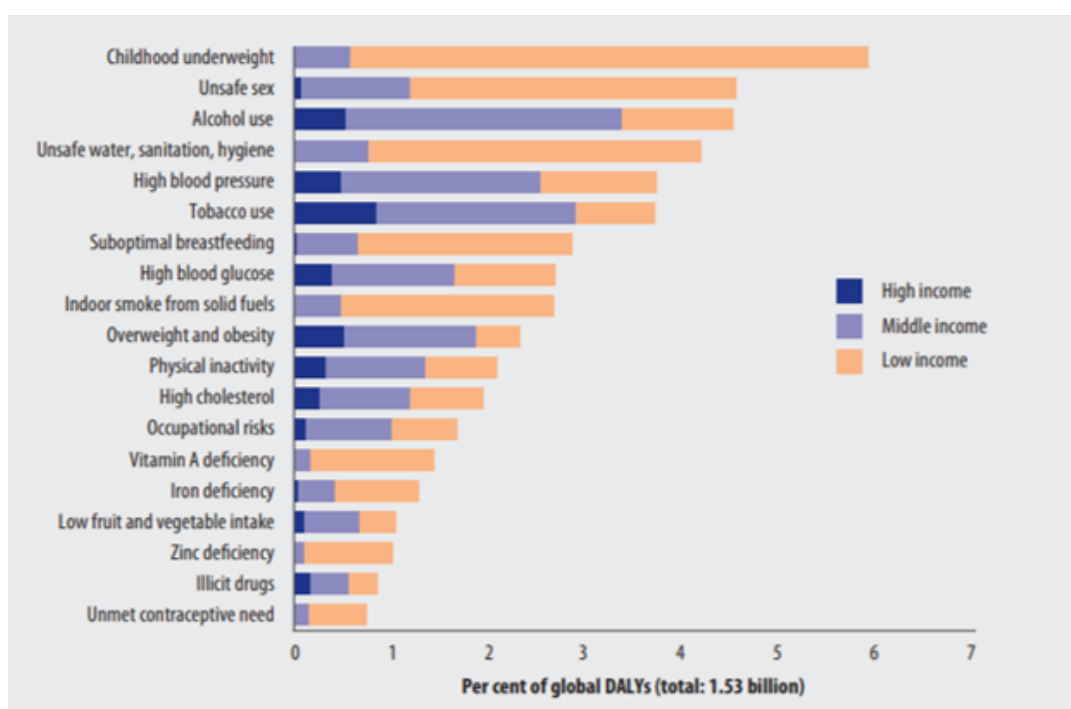


Figure 1. Percentage of disability-adjusted life years (DALYs) attributed to 19 leading risk factors, by country income level.

A source: Publications of the World Health Organization

It should be noted that non-medical determinants are also presented above, which are the main contribution to the formation of health and are geographical prerequisites for morbidity, such as indoor air pollution associated with the use of solid fuels in the household; professional risks; undrinkable water, low level of sanitation and hygiene, etc. [2].

Geographic distribution: The nature of risk factors differs significantly in high-, middle- and low-income countries. According to the World Bank, Kazakhstan is currently included in the list of middle-income countries [3].

WHO notes that human health depends on 8-10% of the health care system, and the main part of the impact is exerted by such factors as ecology, environment, clean water, atmospheric air, the state of water bodies, soil, socio-economic factors, employment, level of education, salary level, marital status, lifestyle, demographics, heredity and others [4].

Therefore, it is relevant to conduct medical-geographic studies of the geographical prerequisites for the incidence of the population (hereinafter - GPIP), which are used to assess the quality of the environment. Based on the dynamics and spatial differences of the GPIP, it seems possible to assess the degree of regional environmental tension, medical and geographical contrast

and risk to public health, which makes it possible to periodically compare the dynamics of the sets of prerequisites for human diseases.

According to the qualitative structure of the geographical prerequisites for human diseases, one can judge the conditions for the emergence of medical and geographical situations, while the important areas are: determining the levels of environmental risk of manifestation of the geographic prerequisites for human diseases; identification of separate classes of geographical prerequisites for human diseases in the structure of problematic medical and environmental areas and situations; classification of the territory according to the set of geographical prerequisites for human diseases and medical and environmental situations with the determination of the dominant factors of the emerging environmental risk; forecasting the dynamics of geographical prerequisites for the incidence of the population and potential medical and environmental situations using special socially-oriented GIS modules [5]. That is, the geographical prerequisites for the incidence of the population are subject to the geographical patterns of the natural territorial system, its functioning, depending on the nature of economic specialization, and are closely related to the anthropogenic load, with the specifics of the economic activity of the population. In the "nature-economy-population" system, the GPIP should be considered as an integral criterion for the state and quality of the environment.

An analysis of the nature of the impact of GPIP in the context of countries and different regions of the country can be carried out on the basis of the theoretical conceptual model of the geographical prerequisites for the incidence of the population developed at the Institute of Water and Environmental Problems of the Siberian Branch of the Russian Academy of Sciences, Barnaul city, by Dr. I. A. Khlebovich (Figure 2) [6]. It outlines the key blocks, which later received a special interpretation and are considered as links in a single analytical process of medical and geographical research:

- the formation and structure of the GPIP. It reflects the structure and dynamics of the emerging combinations of natural and anthropogenic links of the GPIP and their role in the emergence of problematic medical and geographical areas and situations;

- formation and structure of natural prerequisites for morbidity in the population. This block occupies a special relationship in the structure of the GPIP. The block of natural prerequisites will always be characteristic of the medical-geographical system, although it may lose its priority value;

- formation of the structure of anthropogenic prerequisites for human diseases. It reveals the links between the existing socio-economic status of the territorial system and the structure and groups of priority toxicants that can cause various forms of human pathology;

- regional features of the geographical prerequisites for human diseases in the model region. This model gives an idea of the process of transformation of morbidity prerequisites in territorial complexes as a result of constant and episodic economic loads;

- the structure of the polluting complex of the environment includes subblocks that can have a negative impact both on individual components and on the geosystem as a whole;

- the structure of the self-cleaning complex of the environment reveals the mechanisms of processes, as a result of which the homeostasis of the system is restored when it is exposed to both natural and anthropogenic factors;

- the scheme of geographical prerequisites for the incidence of the population in the formation of problematic medical and environmental areas reveals the mechanism for the emergence of problematic medical and environmental areas, from which problematic medical and environmental situations are formed;

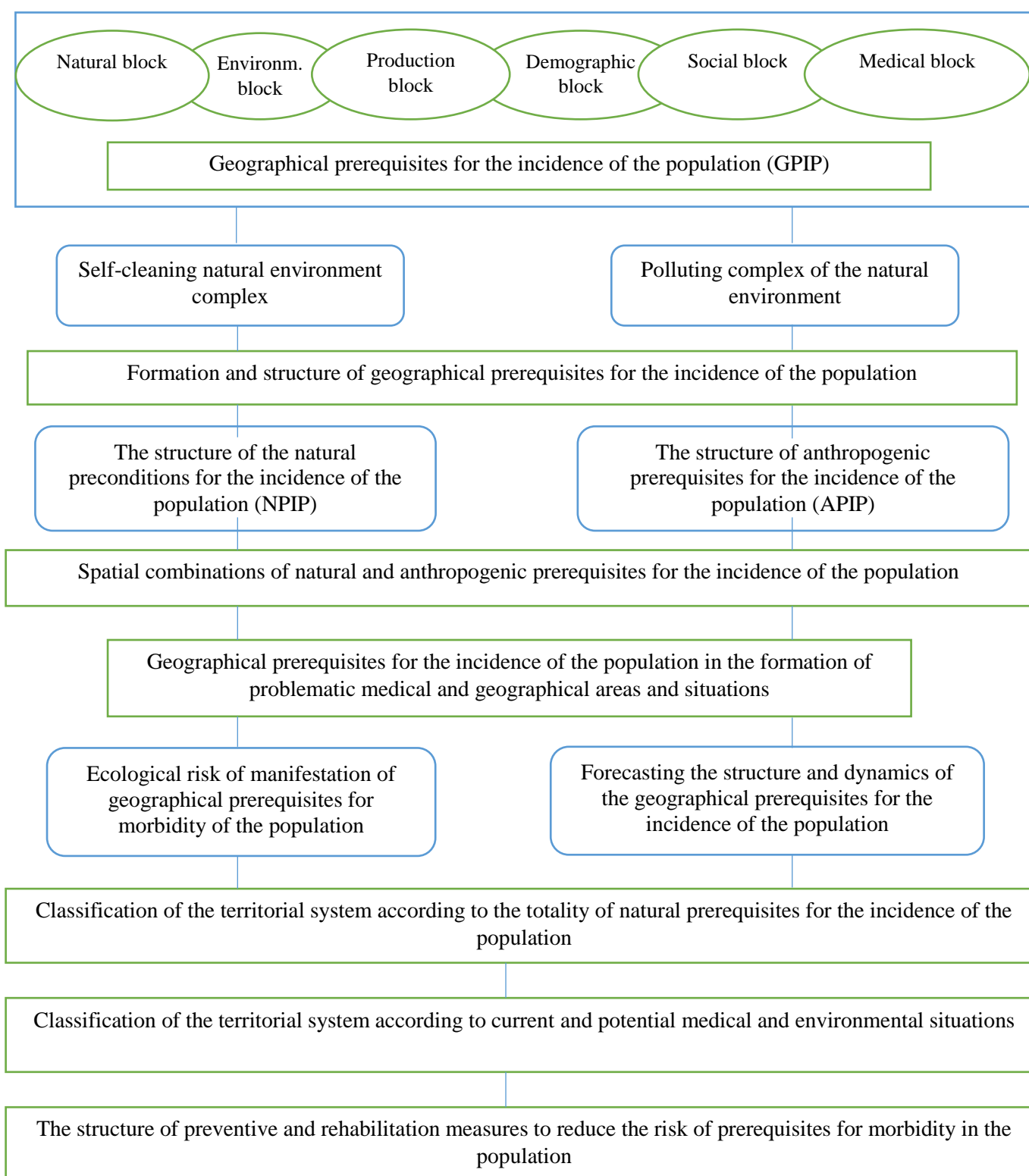


Figure 2. Conceptual model of the geographical prerequisites for the incidence of the population

- the ecological risk of the manifestation of geographical prerequisites for the incidence of the population makes it possible to assess the priority factors of the territorial system in terms of toxigenicity, their tension in natural and territorial medical-geographical systems;

- forecasting the dynamics of geographical prerequisites for the incidence of the population according to such parameters as the totality of geographic prerequisites for the incidence of the population and problematic medical and geographical areas and situations;

- classification of territorial systems according to the spatial combination of geographical prerequisites for the incidence of the population is used in the ranking of the territory of the regional order, as well as in determining the priority of medical and environmental situations with permanent or temporary tension.

Thus, this Conceptual model can be considered as one of the variants of the model of formation and influence of the geographical preconditions for the incidence of the population in various regions of the Republic of Kazakhstan, and can be used as a methodological basis for the medical and geographical analysis of the geographic prerequisites for the incidence of the population. Further, using the methods of evidence-based statistics, it can be proposed for widespread use in modern geographical science and in practical healthcare for the implementation of preventive measures by akimats of regional territories.

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USING VIRTUAL AND AUGMENTED REALITY TECHNOLOGIES IN GEOGRAPHY LESSONS

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INTRODUCTION

The main goal of teaching geography is to educate a person who fully understands the geographical picture of the world, has developed geographical thinking, knows, and uses the methods and language of geography. Also, the main goal of education is to increase the effectiveness of various technologies and teaching methods.