JEHS JOURNAL OF EDUCATION, HEALTH AND SPORT

eISSN 2391-8306

OPEN ACCESS

Vol. 95 | Issue 1 |

DOI: 10.12775/JEHS.2026.95.76260

ORIGINAL ARTICLE

Medical and geographical assessment of the resort and recreational potential of the Ukrainian Black Sea coast under martial law and tasks of post war recovery

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ARTICLE INFORMATION

Received: 15.07.2026

Revised: 20.08.2026

Accepted: 03.09.2026

Article type: Original Article

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Shashero, A., Vykhovanets, H. 2026. Medical and geographical assessment of the resort and recreational potential of the Ukrainian Black Sea coast under martial law and tasks of post-war recovery. Journal of Education, Health and Sport, 95(1): 76260. DOI: 10.12775/JEHS.2026.95.76260

ABSTRAKT

The resort network of the Ukrainian Black Sea coast has developed over more than a hundred years on the basis of a combination of maritime climate, mineral waters and therapeutic mud of coastal estuaries and lakes. The full scale Russian invasion disrupted the traditional territorial structure of recreational resource use in the region, temporary occupation of part of the coast and hostilities in the coastal belt led to loss of access to individual therapeutic resources, destruction of sanatorium infrastructure and a sharp decline in the flow of visitors. The purpose of the article is a medical and geographical assessment of the current state of the resort and recreational potential of the Black Sea region and substantiation of priority directions for its post war recovery. The study applies comparative geographical, cartographic and systemic methods of analysis, the information base included materials of state statistics, scholarly publications on medical geography and resort management, as well as open data on the state of natural therapeutic resources of the region in 2024 and 2025. It is established that the mud therapy base of the estuaries of the Black Sea coast suffered the greatest losses, while the balneological potential of the mainland part of the region remains practically unused. Four principles of medical and geographical recovery of the regional resort network are proposed, namely priority of preserving population health, diversification of the location of therapeutic functions, gradual reconstruction from periphery to centre, and integration of resort infrastructure with the needs of internally displaced persons and veterans.

KEYWORDS

medical geography, resort management, natural therapeutic resources, Ukrainian Black Sea coast, post war recovery, veteran rehabilitation

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Introduction

Medical geography is a branch of social geography that studies the spatial patterns of population health, the spread of disease, and the territorial organisation of health care systems, including resort and sanatorium management as a tool of prevention and medical rehabilitation [1, 2]. Classic works in the cultural geography of health care showed that place affects health not only through the physical characteristics of the environment, but also through the social and symbolic meanings that people attach to particular territories, resorts among them [1]. Later research within health geography developed this position further, showing that an analysis of inequality in access to therapeutic resources requires taking into account not only the natural properties of a territory but also the social organisation of space [3].

The Ukrainian Black Sea coast, in particular the Odesa, Kherson and Mykolaiv regions, has historically formed one of the largest resort districts of the country thanks to a combination of maritime climate, mineral waters and therapeutic mud of coastal estuaries [8, 9]. The territorial organisation of tourist and recreational activity in the region and a qualimetric assessment of its recreational potential have been studied by Ukrainian geographers over the past decade [8, 12, 13]. At the same time, the full scale Russian invasion in February 2022 fundamentally changed the conditions under which the regional resort network functions. Part of the coast came under temporary occupation, another part suffered destruction as a result of hostilities and missile strikes, and access of visitors to a significant share of therapeutic resources was lost or substantially limited.

Under these conditions medical geography acquires new practical significance, since it alone is able to combine the assessment of natural therapeutic resources with the tasks of public health, in particular with the need for mass medical and psychological rehabilitation of veterans and internally displaced persons [14, 15]. World experience in organising the resort and spa industry demonstrates that effective recovery of therapeutic territories after crisis events requires a systemic geographical approach that takes into account not only the natural resource base but also accessibility, safety and social demand for therapeutic services [10, 11].

Despite a considerable body of research on resort management in Ukraine before 2022, special medical and geographical studies devoted to the transformation of the resort network of the Black Sea coast under war conditions and to the substantiation of spatial priorities for its recovery remain scarce. The purpose of the article is a medical and geographical assessment of the current state of the resort and recreational potential of the Ukrainian Black Sea coast and the substantiation of a system of principles for its post war recovery.

Materials and methods

The information base of the study consisted of materials of state statistics of Ukraine on the network of sanatorium and resort facilities [19], scholarly publications by Ukrainian and foreign authors on medical geography, resort management and wellness tourism economics [1 to 18], as well as open reports of international organisations on the global wellness industry and health inequality [16, 17]. Materials of previous studies of the territorial organisation of recreational activity of the Ukrainian Black Sea coast were also used [8, 12, 13], which contain a qualimetric assessment of the natural therapeutic resources of the region before 2022 and served as a basis for comparison.

A comparative geographical method was applied to establish differences in the state of resort territories before and after the start of the full scale invasion, a cartographic method for the spatial localisation of preserved and temporarily lost therapeutic resources, and a systemic analysis for constructing principles of post war recovery of the resort network. The degree of accessibility of therapeutic resources was assessed on a three point scale, namely accessible resource, restrictedly accessible resource and temporarily inaccessible resource, taking into account the status of the territory as of mid 2025.

Results and discussion

Structure of natural therapeutic resources of the Ukrainian Black Sea coast

The natural resource base of resort management on the Ukrainian Black Sea coast is formed by three main groups of resources. The first group is the coastal bioclimatic of the southern part of the Odesa, Mykolaiv and Kherson regions, traditionally used for climatotherapy and thalassotherapy and forming the base of the coastal resorts of Zatoka, Karolino Buhaz, Skadovsk and Berdiansk [9, 11]. The second group consists of therapeutic mud and brine of saline estuaries and lakes, above all the Kuialnytskyi and Khadzhy-

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beiskyi estuaries near Odesa, as well as the estuaries of the Tyliluh and Buh Dnipro groups, which by composition and therapeutic properties rank among the most valuable in Europe [8, 9]. The third group is formed by mineral waters, in particular chloride sodium and sulphide springs, used by balneological sanatoria in the mainland part of the region.

Before 2022 the resort network of the region included state, communal and private sanatoria, children's health camps and a network of boarding houses, concentrated mainly in the coastal belt [8, 12, 13]. Studies of the qualimetric assessment of the region's recreational potential, carried out before the full scale invasion, revealed the unevenness of its development, namely a high concentration of sanatorium and resort capacity around Odesa and Berdiansk against a background of weak use of the balneological potential of mainland districts [12, 13]

Impact of hostilities and temporary occupation on the resort network of the region

The full scale invasion fundamentally changed the geography of accessibility of the resort resources of the Black Sea coast. The Azov resort zone centred on Berdiansk has been under temporary occupation since spring 2022, which has made any restorative treatment in this territory impossible and led to destruction or misuse of sanatorium infrastructure. The Kherson coastal zone, in particular Skadovsk and adjacent coastal settlements, remains under temporary occupation or within a zone of active hostilities, and the mine threat on beaches and in coastal waters makes the use of beach and climatic resources impossible even in liberated sections of the coast.

The Odesa coastal zone, including the Kuialnytskyi estuary, formally remained beyond the front line, yet experienced a substantial functional burden of a different kind. Part of the sanatorium infrastructure was reoriented towards receiving internally displaced persons, while regular missile strikes on coastal infrastructure and the mine threat in the waters of the Black Sea limited the traditional recreational flow and made beach recreation [14, 15]. Thus, according to the three point accessibility scale applied in this study, the therapeutic resources of the Azov zone should be classified as temporarily inaccessible, the resources of the Kherson coast as restrictedly accessible, and the resources of the Kualnytskyi estuary and the Odesa coastal zone as conditionally accessible with substantial infrastructural and safety limitations.

Medical and geographical priorities of post war recovery

World experience in organising the spa and wellness industry shows that recovery of therapeutic territories after crisis events is effective only when it is aligned with actual social demand rather than automatically reproducing the pre war structure of demand [10, 11]. For the Ukrainian Black Sea coast the main new social demand has become the mass need for medical, physical and psychological rehabilitation of veterans and their family members, as well as support for the mental health of internally displaced persons [14, 15]. This requires reorienting part of the resort infrastructure towards rehabilitation programmes of orthopaedic, cardiological and psychotherapeutic profile using precisely the therapeutic resources most valuable to the region, namely the mineral mud of the estuaries and the maritime climate.

A second priority is demining of the coastal belt and coastal waters, without which recovery of any of the maritime climatic resorts is impossible [15]. A third priority is diversification of the geography of therapeutic functions towards mainland balneological resources, which do not depend on the state of the coastal belt and can already develop at this stage of recovery. A fourth priority is integration of resort infrastructure with the national network of veteran medical rehabilitation, which is consistent with the broader sustainable development goals of ensuring a healthy way of life and strengthening institutions at the local level [16, 17].

Principles of the spatial organisation of the recovered resort network

On the basis of the analysis conducted, four geographical principles are proposed that should be applied in spatial planning for the post war recovery of the resort network of the Ukrainian Black Sea coast. Priority of preserving population health. Any decision on the recovery or mothballing of a therapeutic territory is taken first of all with regard to the safety of visitors and staff, and only then with regard to economic feasibility.

Diversification of the location of therapeutic functions. Development of the resort network should not be concentrated exclusively in the coastal belt but should also rely on mainland balneological resources, which reduces the dependence of the whole system on the security situation along the coast.

Gradual reconstruction from periphery to centre. Recovery of therapeutic territories begins with sites remote from the front line and cleared of mine threat,

and gradually extends towards more vulnerable coastal territories as the security situation improves.

Integration with the needs of veterans and internally displaced persons. The spatial distribution of restored sanatorium capacity is aligned with the geography of the settlement of veterans and internally displaced persons, and not only with the pre war map of recreational demand.

These principles do not contradict the traditional foundations of the territorial organisation of resort management, in particular the consideration of natural resource potential and transport accessibility [8, 9, 12], but supplement them with a requirement of safety and social reorientation that is specific to the period of war and post war recovery.

Conclusions

The medical and geographical assessment of the resort and recreational potential of the Ukrainian Black Sea coast has revealed a deep territorial differentiation in the consequences of the full scale Russian invasion. The Azov resort zone is temporarily occupied and effectively inaccessible, the Kherson coast is restrictedly accessible because of mine danger and proximity to the front line, while the resources of the Odesa coastal zone and the Kuiialnytskyi estuary remain conditionally accessible, though with substantial infrastructural and safety limitations. The most stable reserve for the development of resort management at this stage is the mainland balneological potential of the region, which until now has been used considerably less than coastal resources.

The proposed principles of priority of preserving population health, diversification of the location of therapeutic functions, gradual reconstruction from periphery to centre, and integration with the needs of veterans and internally displaced persons form a coherent system for spatial planning of the post war recovery of the resort network. Further research should be directed towards a quantitative qualimetric assessment of the losses of the region's natural therapeutic resources and towards the development of pilot rehabilitation tourism programmes based on the mainland balneological resorts of the Black Sea coast.

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