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Developing a system of multi-evaluation of the impact of global climate change on human health in Russia

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High people sensitivity to weather and space factors, particularly encumbered by various illnesses, was from time immemorial. Now, in terms of global climate change, accompanied by frequent and severe restructuring of atmospheric processes, thermal anomalies, droughts, environmental change through meteorological and heliogeophysical factors affect the human body particularly intense, causing adverse effects to health.
There are currently beginning to develop methods for evaluating multifactor of the external environment and prevention of their negative influence on people. For those sensitive to such influences, with adverse weather in response to sudden changes in weather factors pathological of meteopathic reactions may arise. In doing so, even among healthy individuals it is up to 35-45% of meteosensitive. Meteopathic reactions lead to the appearance and progression of pathological disorders, and the associated increase in chronic diseases. In this connection the tasks solution related to assessing the impact of meteorological and climatic variations of different space-time scale on the health of the population of Russia becomes extremely important, especially for the people with cardiovascular disease. This is confirmed by as clinical observations, and the state of vital systems of meteosensitive people.
Based on the results of comprehensive research of Pyatigorsk State Research Institute of Curortology (PSRIC), the A. M. Obukhov Institute of Atmospheric Physics of the Russian Academy of Sciences (IAP), and Hydrometeocenter of Russia in the region of Caucasian Mineral Waters (CMW) by scientists of IAP and PSRIC there was established a system of Operational Medical Weather Forecast (OMWF), which aims to have possibility on time to host events for the prevention of meteopathic reactions of people with high meteodependence. Also, we have introduced improved definition of Weather Pathogenicity Index (WPI) for medical weather forecast.
As a basis of medical weather forecasts we use developed by the joint efforts of our two institutions (PSRIC and IAP) typification of biotropic weather conditions on the basis of climatograms analysis (synoptic-meteorological conditions, helio-geomagnetic activity) and monitoring the health of people with various illnesses in the process of health resort treatment for CMW low-altitude resorts. This classification in modified form is now being adapted to the megapolis conditions by the example of Moscow. In the originating methodology of multiple-factor estimation of the impact of global climate change on human health in Russia a complex study of the atmosphere condition (especially in the case of inversions, leading to a sharp escalation of air pollution) is included, with simultaneous control of weather biotropy degree at meteosensitivity patients during different types of weather: anticyclonic, cyclonic, and frontal, causing changes in blood pressure and other adverse reactions of the organism.
In the course of the works there are studied meteopathic reactions in patients with ischemic heart disease (IHD), including those with concomitant hypertension (CH) in connection with the combined influence of dynamic, meteorological, geophysical and environmental factors in the Moscow megalopolis and at the mountain cardiology resort of Kislovodsk. There are compared the results of resort treatment from the group of patients who had in obtaining information about the occurrence of pathogenic meteotropic weathers appointed preventive measures, designed for individual nosological forms, with a control group of patients, for which, regardless the type of weather, the standard complex of resort treatment had been set, without special measures for meteotropic reactions prevention. As a measure to improve meteo-prophylaxis of patients with cardiovascular diseases and improve the system of medical weather forecast for low-mountain resort a methodology of planned meteo-prophylaxis by directed using unique natural healing factors (natural aero-ionization, volatile phytoorganic substances, etc.) in the

complex with a standard resort treatment has been developed and proposed to introduce.

It was found that on days with high temperature, there is a higher level of air pollution in the territory of Moscow, that may be related to temperature inversions in the surface layer, the lack of movement of air masses (calm), which impede the scattering of chemicals air pollutants. The criteria for calculating the pathogenicity index of different types of weather depending on ozone and submicron aerosol concentration in the surface air in Moscow and Kislovodsk are specified. The results indicate a crucial theoretical and practical significance and prospects of organization of occurring everywhere monitoring of air, features of cross-border transfer of aerosol pollution of the atmosphere (for the concentration and physical and chemical characteristics of the aerosol and its distribution on the territory).

The results of the work serve as the basis for a system of multi-evaluation of the impact of global climate change on human health in Russia, with the effective use of medical weather forecast that, in general, aimed at raising the health of Russian citizens within the National Project Ḧealth..

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