PREVENTIVE HEALTHCARE: TOPICAL ISSUES OF HEALTH RISK ANALYSIS

UDC 001.89; 613
DOI: 10.21668/health.risk/2021.1.01.eng

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Research article

PRIORITIES IN SCIENTIFIC SUPPORT PROVIDED FOR HYGIENIC ACTIVITIES ACCOMPLISHED BY A SANITARY AND EPIDEMIOLOGIC SERVICE: HOW TO FACE KNOWN THREATS AND NEW CHNALLANGES

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Scientific support provided for activities accomplished by the Federal Service for Surveillance over Consumer Rights Protection and Human Well-being is considered to be a most significant tool for raising productivity and efficiency of the system functioning. A concept on scientific support provided for Rospotrebnadzor's organs and authorities in 2021–2025 focuses on creating an integral, coordinated, efficient, stable, and adaptive system of scientific support provided for activities aimed at securing sanitary-epidemiologic welfare of the population. A peculiar feature of this concept for 2021–2025 is an emphasis on science-intensive analysis technologies and predictions based on digital informational and analytical support provided for strategic and operative decisions on minimizing risks and damage to population health. Another emphasis is on significance of fundamental hygienic research. The concept sets the tasks to develop scientific grounds for cellular and sub-cellular technologies applied to diagnose health disorders under exposure to occupational and environmental factors as well as lifestyle-related ones. It is necessary to create a personified medical and preventive platform for preserving life and health; the platform should be based on risk assessing, monitoring and prediction, mathematical modeling of processes occurring in a body, and the latest data on physiology and toxicology. The Concept also covers issues related to developing innovative technologies for preventing and rehabilitating diseases associated with environmental and occupational factors basing on science-intensive cross-disciplinary studies and the most up-to-date hardware and software complexes. More enhanced hygienic and epidemiologic research is an extremely important and promising vector in scientific development. The Concept outlines the necessity to promptly make new technologies available to experts who are responsible for control, surveillance, inspections, licensing, and other activities within Rospotrebnadzor system.

The Concept on scientific support is being implemented via «Scientific substantiation for the national system for providing sanitary-epidemiologic welfare, health risk management, and raising life quality of the RF population», a specialized scientific-research program for 2021–2025. More than 80 % resources allocated within the specialized program will be assigned for solving the most vital tasks and preventing future threats. Finding solutions to major strategic tasks set by the Concept and the specialized scientific program will allow achieving greater contributions made by organs and authorities of the sanitary-epidemiologic service into scientific, technological, and socioeconomic development of the country including a contribution into developing and implementing competitive scientific-technical products.

Key words: *Rospotrebnadzor, hygienic studies, scientific support, concept on scientific support, specialized scientific program.*

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At present scientific and technologic development is becoming more and more rapid, competition is getting stronger, and geopolitical factors tend to exert greater influence on the society thus bringing about new global challenges; all this requires developing and implementing new conceptual decision-making models as regards strategies for economic and social development. Fundamental factors of the global crisis that started in 2009 (economic instability, loss of more than 5 million workplaces in the leading world economies [1]; growing gap between developed and developing countries [2]) have been aggravated with epidemiological problems. Thus, the agenda of the World Economic Forum in Davos in 2021 was given with a slogan «The Great Reload in an epoch after COVID-19 pandemic» even in October last year. «New normality» concept that came to life when the crisis had just begun has become wider used [3, 4]; it means that it is impossible to return to values and levels of the past; a change of paradigms, both regarding public and individual behavior; and occurrence or changes in risks for human life, health, and well-being [5, 6].

The existing situation requires serious changes in former approaches, most of all, when it comes to preserving human capital and achieving a considerable growth in it. Most states, Russia included, are well aware of it: «Each our new step, each new law, or a state program should be assessed, first of all, bearing in mind the top national priority which is preserving the country population and achieving considerable population growth» (as it was stated by the RF President in his Message to the Federal Assembly of the Russian Federation issued on January 21, 2020)[1].

In countries that are planning to invest into «health-oriented» projects new conceptual approaches are being developed to implementing «reasonable regional strategies»; innovative and high-tech clusters and Centers of Excellence are being created; development funds for priority technological, social, and ecological projects are being organized. A greater attention is being paid to increasing intensity and efficiency of cooperation between academician centers, centers at higher educational establishments, departmental centers and business; the focus is also on developing the most competent and authoritative scientific schools, on creating new technological platforms, and making decisions basing on reaching a consensus between all the stakeholders. Maximum support is being provided for development of high-tech services that are competitive at the global markets [6–8].

Threats and challenges related to hygienic safety are not so obvious and are not being discussed as vividly as ones related to biological (epidemiologic) safety. It is especially true in the current situation when the whole world is concentrating on issues related to COVID-19 pandemic. But it certainly doesn't mean that hygienic issues are becoming less significant in terms of their ability to cause medical and demographic losses [9–12].

Ambient air contamination, especially in large and medium-sized industrial centers, causes health risks including carcinogenic ones. In some cases these risks are assessed as intolerable and they result in additional deaths, respiratory diseases, diseases if the circulatory system, oncologic diseases, diseases of the immune and endocrine system etc. In Russia poor ambient air quality annually causes proximately 3,000 deaths and more than 800 thousand diseases cases[2] [13–15].

It is still not prohibited by legislation to discharge contaminated sewage into water objects including those used as sources for communal and drinking water supply. Considerable efforts made by the state authorities aiming at providing people with high quality drinking water have yielded some positive results as there has been almost a 20 % decrease

[1] The RF President Message to the Federal Assembly of the Russian Federation issued on January 21, 2020. Parlamentskaya gazeta (The Parliament bulletin). Available at: https://www.pnp.ru/politics/opublikovan-polnyy-tekst-poslaniya-prezidenta-federalnomu-sobraniyu.html (02.02.2021) (in Russian).

[2] On sanitary-epidemiologic welfare of the population in the Russian Federation in 2019. The state report. Moscow, The Federal Service for Surveillance over Consumer Rights Protection and Human Well-being, 2020, 299 p. (in Russian).

in a share of drinking water samples taken from centralized water supply systems that deviated from hygienic standards. But still, approximately 8 % people living in the country are not provided with drinking water that has proper quality and is truly safe [16, 17].

Accumulated industrial and consumer wastes (approximately 31.6 billion tons) are deposited on a territory with its total square being approximately equal to 4.0 million hectares. Since such damping grounds are usually located close to residential areas, they deteriorate quality of the environment and often cause social confrontations. Contamination of underground water sources and soils including agricultural ones is often registered in many RF regions; sanitary standards and requirements to agricultural products as food raw materials are also violated rather frequently [18–20].

There are still issues related to persistent noise exposure on urban territories including zones influenced by airfields and airports [21]. Health risks caused by exposure to physical factors require precise quantitative assessment and preventive activities.

Pesticides and agricultural chemicals are being produced in larger quantities, their range is growing as new products are being introduced on a market and implemented into everyday practice; the same goes for nanoparticles and nanomaterials as new substances and materials are being synthesized and distributed in such industries as chemistry and petrochemistry, pharmaceutics, construction and finishing materials manufacture, agriculture, etc. All this leads to a considerable growth in a range of chemicals that people have to contact. Overall, approximately 89.1 million people (62.6 % of the country population) live under exposure to complex chemical burden determined by contaminated food products, drinking water, ambient air, and soils [22, 23]. It requires wide-scale advanced toxicological and hygienic studies including those accomplished with the best available laboratory instruments and procedures.

Workers' health preservation and improvement is still a pressing issue, especially given a steady rise in retirement age [24].

Education and lifestyle of the rising generation should not be neglected. These issues have always been paid special attention to by the sanitary authorities; however, given fundamentally new approaches to organizing the educational process for children, namely, digital technologies being applied during lessons, changes in the structure of educational activities, less frequent and less intensive physical activity, etc., it is necessary to develop innovative approaches to managing health risks for children since their health deteriorates due to all the above-mentioned changes in the educational process [25, 26].

We should also mention that the existing sanitary-hygienic situation is developing under influence exerted by climatic changes that create not only economic and epidemiologic risks but also sanitary-hygienic ones. Permafrost thawing in the Arctic regions imposes a threat that an emergency can occur at industrial objects with such adverse consequences as ambient air, soils, and water objects being contaminated with chemicals including extremely hazardous ones. In dry arid regions climatic changes aggravate problems related to agricultural and drinking water supply with all negative outcomes including medical and demographic ones [27, 28].

Influence exerted by all the above mentioned negative trends on population health which is associated with risks in the sphere of sanitary-epidemiologic welfare of the RF population cannot be properly assessed without technical support provided for the overall decision-making and practical actions.

Obviously, the current activities performed by Rospotrebnadzor are provided with the up-to-date scientific instruments and procedures which mostly correspond to the best available world practices.

Today research and development in the sphere of providing sanitary-epidemiologic welfare for the population is accomplished by 28 scientific organizations within Rospotrebnadzor structure. Approximately 5,000 people are employed by these scientific organizations including 11 RAS academicians and corresponding members, 380 Doctors of Sciences, and more than 1,200 Candidates of Sciences.

Laboratory support provided for social and hygienic monitoring and control activities includes up-to-date technological base that allows performing gas and high-performance liquid chromatography, atomic-absorption analysis, mass spectrometry with inductively coupled plasma, etc. Existing procedures for measuring admixtures in ambient air, air inside buildings, drinking water, soils, and food products, allow performing control over them in their reference concentrations that guarantee safety of the environment for people. Biological monitoring is also being developed at the moment [29–31].

Science-intense procedures for analyzing sanitary-epidemiologic situation often involve using the latest geoinformation systems together with the up-to-date mathematical instruments (fuzzy sets theory, neural networks, situation modeling, etc.); it provides an opportunity to perform spatiotemporal analysis of how risks and damage to health are distributed and develop in dynamics [32, 33].

Cellular and sub-cellular technologies, including proteome and metabolome analysis, are used to assess sanitary-hygienic situation and create an evidence base to prove negative effects produced by environmental factors on human health. They allow obtaining exposure «traces» that reflect a metabolic state of a body and getting an insight into pathogenesis of health disorders under exposure to certain substances or agents [34].

Scientific approaches to creating a risk-oriented model of control and surveillance activities performed by Rospotrebnadzor allowed simultaneous reduction in overall number of inspections and stricter control over objects that created major risks and threats for population health.

Scientific support is considered the most significant tool for raising efficiency and productivity of the overall sanitary-epidemiologic service functioning; given that, a work group has developed «The Concept of scientific support provided for Rospotrebnadzor organs and authorities in 2021–2025 and brunch programs on topical issues related to provision of Rospotrebnadzor activities» which was approved by the Head of the Service on December 21, 2020 No. 869 (hereinafter called the Concept).

The document was developed taking into account basic provisions and targets fixed by the strategic documents issued in the RF, including those related to modern science development. These documents include «The Strategy for medical science development in the Russian Federation up to 2025 (approved on by the RF Government Order issued on December 28, 2012 No. 2580-r)»[3]; «The Strategy for scientific and technological development in the Russian Federation» (approved by the RF President Order on December 01, 2016 No. 642)[4]; The RF President Message to the RF Federal Assembly on March 01, 2018[5] «On national goals and strategic tasks in the RF development for a period up to 2024»; The RF President Order dated May 07, 2018 No. 204[6] «The basics of the state policy in the sphere of providing chemical and biological safety in the Russian Federation up to 2025 and further on» (approved by the RF President Order dated March 11, 2019 No. 97)[7]; The RF President Order dated June 06, 2019 No. 254 «On the

[3] The Strategy for medical science development in the Russian Federation up to 2025: The RF Government Order issued on December 28, 2012 No. 2580-r. *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_140249/ (02.02.2021) (in Russian).

[4] The Strategy for scientific and technological development in the Russian Federation: The RF President Order issued on December 01, 2016 No. 642 (last edited on March 15, 2021). *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_207967/ (02.02.2021) (in Russian).

[5] The RF President Message to the RF Federal Assembly on March 01, 2018. *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_291976/ (02.02.2021) (in Russian).

[6] On national goals and strategic tasks in the RF development for a period up to 2024 The RF President Order dated May 07, 2018 No. 204. The official Internet-portal for legal information. Available at: http://www.consultant.ru/document/cons_doc_LAW_291976/ (02.02.2021) (in Russian).

[7] The basics of the state policy in the sphere of providing chemical and biological safety in the Russian Federation up to 2025 and further on: The RF President Order dated March 11, 2019 No. 97. *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_319787/ (02.02.2021) (in Russian).

strategy for the public healthcare development in the Russian Federation up to 2025»[8]; «Basics of the state policy in the sphere of providing nuclear and radiation safety in the Russian Federation up to 2025 and further on» (approved by the RF President Order dated October 13, 2018 No. 585)[9].

Primary goals set by the Concept include progressive development of specialized science aimed at creating integral, coordinated, efficient, stable, and adaptive system of scientific support provided for activities aimed at securing sanitary-epidemiologic welfare of the population.

Priorities for scientific research in the sphere of hygiene, population health improvement, and sanitary surveillance development have been determined in full conformity with the functions the Service performs and powers it possesses and taking into account challenges and threats, both existing and predicted ones (for a short-term and middle-term periods). These priorities include the following:

– substantiating procedures for systemic assessing, predicting, and managing health risks and life quality related to environmental factors;

– giving scientific grounds for complex measures aimed at assessing and managing health risks for employable population in leading industrial and agricultural branches;

– developing procedures for systemic assessment, predicting, and managing health risks for children, teenagers, and young people related to environmental factors, peculiarities of their activities and life style;

– giving scientific grounds for risks management and assessment aimed at providing food safety;

– developing scientific grounds for a digital and medical-preventive platform for health improvement on the basis of population and individual risks prediction and assessment of damage to health associated with environmental factors and life quality;

– developing procedures for hygienic standardization and control basing on international data, mathematic modeling and health risk assessment methodology;

– scientific support for providing radiation safety in Russia in order to minimize health risks.

Each priority is given vital tasks and subjects for scientific research, for example:

– developing new procedures for identification and quantitative assessment of environmental factors including screening and biological monitoring;

– developing methodical grounds for assessing and predicting influence exerted by various factors on health of people from different population groups using chemical, clinical, functional, immunologic, genetic, cytological, non-invasive, and alternative procedures;

– determining cause and effect relations and their parameters in development of work-related and occupational morbidity and developing a scientifically grounded risk management system for employable population's health;

– giving scientific grounds for minimizing risks for children and teenagers health given specific conditions of the modern educational process;

– developing toxicological procedures for assessing xenobiotics, new substances and materials, including nano-sized ones, basing on examining overall toxic and specific effects (mutagenic, carcinogenic, gonadotoxic, embryotoxic, teratogenic, neurotoxic ones, etc.);

– developing theory and practice of hygienic standardization taking into account the latest scientific advances in medicine and biology, including those achieved at cellular, genetic, and molecular levels;

– updating state safety regulations when ionizing irradiation sources are used taking

[8] On the strategy for the public healthcare development in the Russian Federation up to 2025: The RF President Order dated June 06, 2019 No. 254. *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_326419/ (02.02.2021) (in Russian).

[9] Basics of the state policy in the sphere of providing nuclear and radiation safety in the Russian Federation up to 2025 and further on: The RF President Order dated October 13, 2018 No. 585. *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_308884/ (02.02.2021) (in Russian).

into account the latest technical, scientific, and industrial developments;

– examining mechanisms of health disorders occurrence and development under exposure to a set of factors (genetic, natural-climatic, technogenic, biological, environmental, occupational, related to life style, etc.) using science-intense diagnostic and information platforms;

– developing etiologic and pathogenetic grounds for preventing non-communicable diseases associated with risk factors; developing scientific grounds for a personified medical and preventive platform for life and health preservation based on risk assessment, monitoring, and prediction, etc.

A peculiar feature of this Concept for 2021–2025 is an emphasis on science-intensive analysis technologies and predictions based on digital informational and analytical support provided for strategic and operative decisions on minimizing risks and damage to population health. The Concept stipulates that it is necessary to develop algorithms and procedures for data collection and processing, scenario modeling, building up intellectual hard- and software complexes; these complexes should have a capacity to generate new conclusions that might not always be obvious even for experts and they should be capable to do it basing on analyzing multi-dimensional and variable data sometimes even in on-line mode.

The provisions fixed in the Concept fully correspond to goals and tasks set within the Program for fundamental scientific research in the Russian Federation for a long-term period (2021–2030) that was approved on December 31, 2020 by the RF Government Order No. 3684-r[10], Rospotrebnadzor being an involved performer.

The departmental document (The Concept) highlights the necessity to provide support for fundamental hygienic research that in future can give a new impulse to applied studies with significant practical results. It sets the tasks to develop scientific grounds for identifying and monitoring over proteomic profiles, expression, and polymorphism of certain genes and ultrastructural disorders in a body occurring under exposure to occupational and environmental factors and factors related to life-style. It is also necessary to create a personified medical and preventive platform for life and health preservation basing on risks assessment, monitoring, and prediction, mathematic modeling of processes occurring in a human body, and the latest data on physiology and toxicology. The Concept also fixes the tasks to develop innovative technologies for preventing and rehabilitating diseases associated with environmental and occupational factors basing on science-intensive cross-disciplinary studies and the most up-to-date hardware and software complexes. A lot of studies concentrate on managing risks for children's and teenagers' health given implementation of new information technologies and significant changes in behavioral patterns and lifestyle.

More enhanced hygienic and epidemiologic research is an extremely important and promising vector in scientific development. First of all, in comes to scientific developments that focus on examining mechanisms and consequences of effects produced by environmental contamination on post-vaccination immunity formation and support and on an epidemiologic process itself. Such borderline studies are especially vital both in the existing sanitary-epidemiologic situation and taking into account similar threats and risks that might occur in future [35–39].

But still it is obvious that scientific research should satisfy practical needs of Rospotrebnadzor. It requires making new technologies instantly available to experts who are responsible for control, surveillance, inspections, licensing, and other activities within Rospotrebnadzor system. The latter requires certain efforts made not only by scientific organizations but also workers from practical sections in the Service who should master new competences and skills (Figure).

[10] On Approval of Program for fundamental scientific research in the Russian Federation for a long-term period (2021–2030): The RF Government Order issued on December 31, 2020 No. 3684-r On Approval of Program for fundamental scientific research in the Russian Federation for a long-term period (2021–2030). *Garant.Ru. Information and legal portal*. Available at: http://www.garant.ru/products/ipo/prime/doc/400070256/ (02.02.2021) (in Russian).

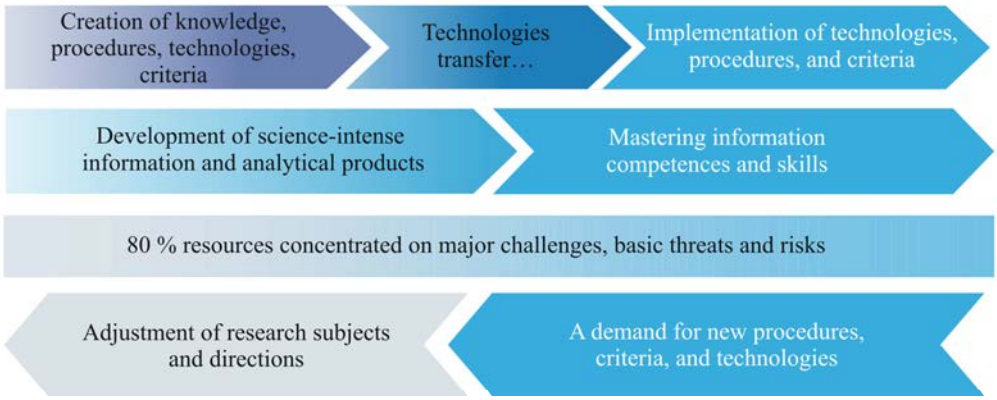

Figure. A conceptual scheme showing interaction between theory and practice given new challenges and threats

In its turn, mastering new procedures and techniques that involve work with information flows and analysis results will allow experts employed by Rospotrebnadzor authorities and centers for hygiene and epidemiology to provide proper feedback, when new tasks are set forth for scientists as per results obtained via control and surveillance activities and social and hygienic monitoring and a demand occurs for new technologies, procedures, criteria, etc.

The Concept on scientific support is being implemented via a specialized scientific and research program for 2021–2025 called «Scientific substantiation for the national system for providing sanitary-epidemiologic welfare, health risk management, and raising life quality of the RF population». The Program contains a list of 169 scientific research works that should allow solving 26 major tasks in 7 scientific schools in the sphere of hygiene. 143 research works have been inspected by the RAS and included into state tasks formulated for departmental scientific research that should be performed by relevant scientific organizations in 2021.

The specialized program is assumed to assign more than 80 % of all its resources for solving the most vital tasks and preventing future threats. Some scientific organizations within Rospotrebnadzor system will have to change directions and contents of their scientific research.

The specialized program is also assumed to simultaneously preserve basic research vectors but also be dynamic to a certain extent as it will provide an opportunity to adjust certain scientific research as a response to occurring vital tasks and challenges. Besides, the program will be able to react to any changes in provisions fixed in strategic documents such as «Ecology», «Demography», and «Public healthcare» National projects, the RF Government Order No. 3680-r issued on December 20, 2020[11], «The activity program («roadmap») on developing and enhancing the system of federal state sanitary-epidemiologic surveillance for 2021–2028», «The activity plan within the Childhood Decade for a period up to 2027» (approved by the RF Government Order on January 23, 2021 No. 122-r)[12] etc.

Research works being accomplished at present and planned for the future are diverse; their subjects are also diverse and there are different programs that cover them. It also involves a necessity to solve a great number of tasks and engage a lot of experts as well as to generalize and integrate all the obtained results; sanitary-epidemiologic legislation is to be up-

[11] On Approval of The activity program («roadmap») on developing and enhancing the system of federal state sanitary-epidemiologic surveillance for 2021-2028: The RF Government Order issued on December 20, 2020 No. 3680-r. *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_373356/ (02.02.2021) (in Russian).

[12] On Approval of «The activity plan within the Childhood Decade for a period up to 2027»: The RF Government Order issued on January 23, 2021 No. 122-r. *KonsultantPlus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_373356/ (02.02.2021) (in Russian).

dated and it will require drawing up diverse regulatory and methodical documents. Given all that, it is obvious that close contacts between scientific organizations and practical divisions of the Service call for new approaches to organizing scientific research and implementation of project management instruments.

A plan is to raise efficiency of immediate and long-term planning and coordination between scientific research and development activities via taking into account all obtained scientific results and their implementation into practice. The Concept envisages development of monitoring activities and procedures for assessing efficiency and productivity of researchers, divisions, and work teams as a whole; new activities aimed at raising scientific research to new levels are to be developed and implemented.

Interaction between scientific organizations within Rospotrebnadzor system and territorial bodies, including other federal executive authorities, is to be enhanced. An important tool in this interaction is creation of reference centers for topical hygiene issues and data exchange between them based on concluding agreements on cooperation (including those involving several parties). These agreements will contain clear substantiation for topicality of a problem being solved and scientific and practical significance of expected results.

The Concept also determines basic trends in personnel policy basing on assessing efficiency of each researcher and a specific share of researchers who are younger than 39 in the overall number of researchers employed by an organization. There will be an increase in activities aimed at training highly qualified personnel as well as attracting young experts via integration of scientific research and educational activities and creation of science and education centers involving HEE that train experts in a required sphere.

There is also intent to establish and develop partnership and accomplish joint research works with foreign scientific centers on basic scientific and practical issues that provide sanitary-epidemiologic welfare of population. A priority here is cooperation with EAEU member states and development of interaction with the WHO, ILO, CCA, IAEA, UNCTAD, OECD, WTO, and other international organizations on topical issues related to sanitary-epidemiologic welfare and development and implementation of activities aimed at providing it.

It seems advisable to consider a possibility to create a center for strategic planning of scientific research in the sphere of hygiene, toxicology, and chemical safety. This center should also have control functions, be able to perform intradepartmental examinations and analysis; it will also generalize results obtained via scientific works and coordinate activities of Problem Commissions in order to draw up up-to-date integrated documents in sanitary legislation, new procedures for sanitary-epidemiologic surveillance, prevention programs and activities.

Overall, it is assumed that if basic strategic goals fixed in the Concept are reached and basic tasks set by it are solved, it will allow:

– providing high-quality scientific and methodical basis and increasing efficiency of control and surveillance activities performed by Rospotrebnadzor;

– increasing contribution made by authorities and organizations within the Sanitary-Epidemiologic Service into scientific-technological and socioeconomic development of the country, including developing and implementing competitive science and engineering products;

– providing authorities and organizations within Rospotrebnadzor system with science-intense efficient tools for controlling, analyzing, and predicting sanitary-epidemiologic situation;

– making fundamental and applied scientific research correspond to up-to-date international standards and requirements;

– creating conditions for transition to a new high-quality and intense interaction between scientific research organizations and authorities and organizations within Rospotrebnadzor system;

– using research equipment and budgets allocated for research organizations more efficiently;

– increasing quality of highly qualified personnel training and providing support for young researchers and experts;

– enhancing international scientific cooperation on issues related to providing sanitary-epidemiologic welfare and making it more efficient.

Activities performed by «All-Russian society of hygienists, toxicologists, and sanitary inspectors» will allow consolidating resources and efforts made by the Service aiming at providing sanitary-epidemiologic welfare. This new organization was created as per the Order by the Head of the Service and legally registered on February 02, 2021 by the RF Ministry of Justice.

Funding. The research was not granted any sponsor support.

Conflict of interests. The authors declare there is no any conflict of interests.

References

1. Schwab K. The Fourth Industrial Revolution. New York, Crown Business Publ., 2017, 192 p.

2. Nekhorosheva L.N. The change of innovative landscape in the context of development «Industry 40» of technological and economic development: problems and priorities. *Tsifrovaya transformatsiya ekonomiki i promyshlennosti: problem i perspektivy: monografiya*. Sankt-Peterburg: Izdatel'stvo «Sankt-Peterburgskii politekhnicheskii universitet Petra Velikogo», pp. 29–49 (in Russian).

3. Yudaeva K. New Normal for Russia. *Ekonomicheskaya politika*, 2010, no. 6, pp. 196–200 (in Russian).

4. El-Erian M.A. Navigating the new normal in industrial countries. *International Monetary Fund*, 2010. Available at: https://www.imf.org/en/News/Articles/2015/09/28/04/53/sp101010 (02.02.2021).

5. Ivanov O.B. Global risks and new challenges human civilization faces. *ETAP: ekonomicheskaya teoriya, analiz, praktika*, 2020, no. 2, pp. 7–20 (in Russian).

6. World Economic Forum. Third global Risk Reports. Weforum, 2020. Available at: http//www.weforum/org/events0world-economic-forum-2020 (02.02.2121).

7. Istomina E.A. Protection from new social risks: issues of interdisciplinary research. *Rossiiskoe pravo: obrazovanie, praktika, nauka*, 2020, no. 4, pp. 63–72 (in Russian).

8. Tuchkova E.G. Problems of implementation socio-economic human rights in the context of the in industrial revolution. *Vestnik Universiteta im. O.E. Kutafina (MGYuA)*, 2019, no. 11, pp. 48–53 (in Russian).

9. Reis J., Spencer P.S. Decision-making under uncertainty in environmental health policy: new approaches. *Environ Health Prev. Med*, 2019, no. 24, pp. 57.

10. Future Global Shocks. *OECD. Better policies for better lives*. Available at: http:// www.oecd.org/gov/risk/futureglobalshocks.htm (02.02.2020).

11. Environmental, Health, and Safety Guidelines. General EHS guidelines. *International Finance Corporation: World Bank Group*, 2020. Available at: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_cor-porate_site/sustainability-at-ifc/policies-standards/ehs-guidelines (02.02.2020).

12. Sheikh H. Cooperation and not isolation will help us fight COVID-19. *World Economic Forum*, 2020. Available at: https://www.weforum.org/agenda/2020/04/cooperation-not-isolation-will-help-fight-covid-19/ (20.07.2020).

13. Novikov S.M., Shashina T.A., Dodina N.S., Kislitsin V.A., Skovronskaya S.A., Matsyuk A.V., Panchenko S.V., Arakelyan A.A. The experience of empirical research on comparative assessment of radiation and chemical health risks due to exposure to environmental factors. *Gigiena i sanitariya*, 2019, vol. 98, no. 12, pp. 1425–1431 (in Russian).

14. Revich B.A., Khar'kova T.L., Kvasha E.A. Prodolzhitel'nost' zhizni i smertnost' v megapolisakh [Life expectancy and mortality in megacities]. *Chelovek v megapolise: opyt mezhdistsiplinarnogo issledovaniya*. In: B.A. Revich, O.V. Kuznetsova eds. Moscow, LENAND Publ., 640 p. (in Russian).

15. Valeulina N.N., Efremova V.M., Beketov A.L., Brylina N.A., Nikiforova E.V., Grechko G.Sh., Kolotova T.S. Otsenka riska dlya zdorov'ya naseleniya ot vozdeistviya khimicheskikh veshchestv, opredelyaemykh v atmosfernom vozdukhe goroda Chelyabinska za 2015–2017 gg. [Assessing health risks caused by exposure to chemicals detected in ambient air in Chelyabinsk in 2015–2017]. *Aktual'nye voprosy analiza pri obespechenii sanitarno-epidemiologicheskogo blagopoluchiya naseleniya i zashchity*

prav potrebitelei: materialy IX Vserossiiskoi nauchno-prakticheskoi konferentsii, 2019, pp. 95–100 (in Russian).

16. Fridman K.B., Novikova Yu.A., Belkin A.S. On the issue of the use of health risk assessment techniques for hygienic characteristics of water supply systems. *Gigiena i sanitariya*, 2017, vol. 96, no. 7, pp. 686–689 (in Russian).

17. Rakitskii V.N., Avaliani S.L., Shashiia T.A., Dodina N.S. Actual problems of population health risks management in Russia. *Gigiena i sanitariya*, 2018, vol. 97, no. 6, pp. 572–575 (in Russian).

18. Shilova Yu.O., Vitkovskaya S.E. Otsenka vozdeistviya poligona tverdykh bytovykh otkhodov na soderzhanie tyazhelykh metallov v pochve i rasteniyakh [Assessing impacts produced by a solid communal wastes landfill on heavy metal contents in soils and plants]. *Tendentsii razvitiya agrofiziki: otaktual'nykh problem zemledeliya i rastenievodstva k tekhnologiyam budushchego: materialy mezhdunarodnoi nauchnoi konferentsii, posvyashchennoi 85-letiyu Agrofizicheskogo NII*. Sankt-Peterburg, 2017, pp. 536–539 (in Russian).

19. Kleyn S.V., Vekovshinina S.A., Balashov S.Yu., Khoroshavin V.A., Ukhabov V.M. Hygienic evaluation of the carcinogenic risk to health of the population living in the zone of the exposure to places of the burial storage of waste of mining and processing enterprises. *Gigiena i sanitariya*, 2018, vol. 97, no. 1, pp. 10–15 (in Russian).

20. Unguryanu T.N., Gudkov A.B., Nikanov A.N. Health risk assessment of soil contaminants for health of urban population. *Profilakticheskaya i klinicheskaya meditsina,* 2012, no. 1, pp. 101–105 (in Russian).

21. Kartyshev O.A., Nikolaikin N.I. Criteria of the aviation noise assessment for aerodrome environs zoning of the airports and protective measures justification. *Nauchnyi vestnik Moskovskogo gosudarstvennogo tekhnicheskogo universiteta grazhdanskoi aviatsii*, 2017, vol. 20, no. 3, pp. 30–40 (in Russian).

22. Onishchenko G.G. Chemical safety is the most important constituent of the sanitary and epidemiological well-being of population. *Toksikologicheskii vestnik*, 2014, no. 1, pp. 2–6 (in Russian).

23. Khamidulina Kh.Kh. Modern chemical factors' risk and impact management international requirements and their implementation in the system of state sanitary-epidemiologic control. *Health Risk Analysis*, 2014, no. 2, pp. 14–17. DOI: 10.21668/health.risk/2014.2.02.eng

24. Bukhtiyarov I.V. Current state and main directions of preservation and strengthening of health of the working population of Russia. *Meditsina truda i promyshlennaya ekologiya*, 2019, vol. 59, no. 9, pp. 527–532 (in Russian).

25. Kuchma V.R., Sukhareva L.M., Rapoport I.K., Shubochkina E.I., Skoblina N.A., Milushkina O.Yu. Population health of children, risks to health and sanitary and epidemiological wellbeing of students: problems, ways of solution and technology of the activity. *Gigiena i sanitariya*, 2017, vol. 96, no. 10. pp. 990–995 (in Russian).

26. Cattaneo A., Cogoy L., Macaluso A., Tamburlini G. Child health in the European Union. Luxemburg, European Commission Publ., 2012, 134 p.

27. Vicedo-Cabrera A.M., Guo Y., Sera F., Huber V., Schleussner C.F., Mitchell D., Tong S., Lavigne E. [et al.]. Temperature-related mortality impacts under and beyond Paris Agreement climate change scenarios. *Climatic Change*, 2018, vol. 150, no. 3–4, pp. 391–402. DOI: 10.1007/s10584-018-2274-3

28. Gasparrini A., Guo Y., Sera F., Vicedo-Cabrera A.M. Projections of temperature-related excess mortality under climate change scenarios. *The Lancet Planetary Health*, 2017, vol. 1, no. 9, pp. e360–e367. DOI: 10.1016/S2542-5196(17)30156-0

29. Gileva O.V., Ulanova T.S., Veikhman G.A., Nedoshitova A.V., Stenno E.V. Methodical assurance of the assessment of toxic and essential elements in human biological matrices. *Gigiena i sanitariya*, 2016, vol. 95, no. 1, pp. 116–121 (in Russian).

30. Kuz'min S.V., Gurvich V.B., Dikonskaya O.V., Nikonov B.I., Malykh O.L., Yarushin S.V., Kuz'mina E.A., Kochneva N.I., Kornilkov A.S. Socio-hygienic monitoring and information analysis systems supporting the health risk assessment and management and a risk-focused model of supervisory activities in the sphere of securing sanitary and epidemiologic public welfare. *Gigiena i sanitariya*, 2017, vol. 96, no. 12, pp. 1130–1136 (in Russian).

31. Zemlyanova M.A., Tikhonova I.V. Occurrence of the risks for the development of respiratory diseases in children exposed to the chemical factors of alumina refinery-associated economic activity. *Zdorov'e naseleniya i sreda obitaniya*, 2019, vol. 320, no. 11, pp. 42–47.

32. Madeeva E.V., Khankhareev S.S., Bagaeva E.E., Boloshinova A.A. GIS application in the conduct of public health monitoring and inform management decisions. *Sanitarnyi vrach*, 2014, no. 5, pp. 16–19 (in Russian).

33. Arkhipova O.E., Chernogubova E.A., Likhtanskaya N.V. Spatiotemporal analysis of the incidence of cancer diseases case study of southern regions of Russian Federation. *InterKarto. InterGIS*, 2018, vol. 24, no. 1, pp. 109–122 (in Russian).

34. Zaitseva N.V., Zemlyanova M.A., Kol'dibekova Yu.V., Zhdanova-Zaplesvichko I.G., Perezhogin A.N., Kleyn S.V. Evaluation of the aerogenic impact of priority chemical factors on the health of the child population in the zone of the exposure of aluminum enterprises. *Gigiena i sanitariya*, 2019, vol. 98, no. 1, pp. 68–75 (in Russian).

35. Il'ina S.V., Savilov E.D. Technogenic environmental pollution and the effectiveness of vaccination in children's population. *Epidemiologiya i vaktsinoprofilaktika*, 2009, vol. 47, no. 4, pp. 57–62 (in Russian).

36. Boev M.V., Kryazhev D.A., Boev V.M. Effect of environmental factors on the formation of postvaccinal immunity. *Gigiena i sanitariya,* 2014, vol. 93, no. 5, pp. 52–54 (in Russian).

37. Zoran M.A., Savastru R.S., Savastru D.M., Tautan M.N. Assessing the relationship between surface levels of $PM_{2.5}$ and PM_{10} particulate matter impact on COVID-19 in Milan, Italy. *Sci. Total. Environ.*, 2020, no. 738, pp. 139825. DOI: 10.1016/j.scitotenv.2020.139825

38. Fattorini D., Regoli F. Role of the chronic air pollution levels in the COVID-19 outbreak risk in Italy. *Environ Pollution*, 2020, no. 264, pp. 114732. DOI: 10.1016/j.envpol.2020.114732

39. Adhikari A., Yin J. Short-term effects of ambient ozone, $PM_{2.5}$, and meteorological factors on COVID-19 confirmed cases and deaths in Queens, New York. *IJERPH*, 2020, no. 17, pp. 4047. DOI: 10.3390/ijerph17114047

Popova A.Yu., Kuzmin S.V., Zaitseva N.V., May I.V. Priorities in scientific support provided for hygienic activities accomplished by a sanitary and epidemiologic service: how to face known threats and new chnallanges. Health Risk Analysis, 2021, no. 1, pp. 4–14. DOI: 10.21668/health.risk/2021.1.01.eng

Received: 20.02.2021
Accepted: 20.03.2021
Published: 30.03.2021