



THE ENVIRONMENT AND HUMAN HEALTH

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The understatement of the significance of environmental impact on human health incurs considerable losses both on those who are responsible for ensuring human health and on those who are trying to ensure the priority of environmental problems. The social significance of the environmental priority is largely predetermined by the importance of an environment that is favorable for human health.

This is why ensuring environmental health has been defined as a priority of the national environmental policy, which is expressed by a very simple formula: it is impossible to be healthy in an unhealthy environment. This priority largely determines the content of the main trends in environmental policy as a whole. In the field of the economics of nature management and environmental protection, environmental health is an important component of assessing the total cost of natural resources and nature as a whole; it forms a basis for the economic assessment of the consequences of damage to human health from unfavorable environmental impacts. In the field of environmental law, environmental health determines the priority of preventing and compensating damage to human health from environmental pollution and other unfavorable impacts. In the field of education, environmental health is a priority in forming environmental culture.

Environmental health is equally important for solving public health problems. If this factor is not taken into account, no measures to ensure a high quality of medical service will yield expected results.

Thus, it is fundamentally important for both environmental health and public health care to substantiate the priority of problems associated with environmental health. Success in the realization of this priority at all stages, from substantiating it and assessing its scale to initiating measures to improve the situation, depends on the activity of civil society.

All this has predetermined the logic of the Public Chamber hearings «Environment and Health» and this issue of the bulletin, including the following trends:

- the substantiation of environmental health as a priority of environmental and health care policies (articles from the first section «General Problems» are devoted to this question);
- the assessment of environmental impacts, including chemical and radiation pollutions, on children's health and the substantiation of the importance of solving this problem as soon as possible to improve the demographic situation (articles of the section «Children's Health»); and
- finding ways in which civil society can participate in solving the problem of unfavorable environmental impacts on human health and the substantiating the fundamental importance of people's civil stand in solving this problem (articles of the section «The Public's Role»).

**The understatement of interconnection
between human health and environmental
health largely predetermines the low
priority of environmental problems
in our society.**

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PROBLEMS OF HEALTH IN ENVIRONMENTAL POLICY

Along with environmental management, environmental law, and environmental culture, one of the trends of environmental policy is assessing the environmental health of population. It is very important to consider this, because, unfortunately, very often health issues are viewed as minor and are excluded from environmental priorities. Meanwhile, human health cannot be normal in a degraded environment. Hence, it is very important to reveal and describe the most problematic and severe health states associated with high pollution levels. State and public organizations and mass media must focus maximally on these «hot spots». People should not only have reliable information but also understand that the solution of health-associated problems depends on their civil stand. Sometimes, the civil sector plays the leading role in revealing such hot spots, as was the case with the city of Dzerzhinsk in Nizhni Novgorod oblast.

For some reason, mass media today often state that owing to the shutdown of enterprises, which took place in previous years in many Russian cities, the quality of the environment has sharply improved. This is not quite so. Now it is very important to understand what awaits our country in the near future as far as the assessment of the environmental situation is concerned and what the contribution of unfriendly environmental factors to mortality and morbidity is. The World Bank Report (see B.A. Revich, «Estimating Mortality Factors and Possibilities to Reduce Them in Russia: Comments on the World Bank Report Dying Too Young», Studies On Russian Economic Development No. 6, 114–131 (2006)) describes the role of atmospheric pollution, which is, in our opinion, is somewhat understated. As for the contribution of drinking water pollution, it is very difficult to estimate it because of the lack of data about the content of carcinogens in it.

Characteristics of population distribution in our country – the concentration of citizens in large cities with a high level of environmental pollution – favor an increase in population risks. Unfortunately, we still employ the most inefficient way of population distribution, including in Moscow. We see conglomerations of «gigantic townships» within the city, although suburban territories, where urban settlements with the necessary infrastructure should be formed, remain undeveloped. As a result, an increasingly large share of population is concentrated on a limited territory with a high level of atmospheric pollution.

The situation in small «factory towns» is a result of the Soviet industrialization of the 1930s; now we are paying for it. In many of such towns, township-forming enterprises of the military-industrial complex are situated, which are often inoperative. Hence, it is unclear whom to blame, whom to amerce, and who must compensate for environmental damages and the resultant public health deterioration. Control bodies pay little attention to these small settlements, the Rosgidromet (Federal Service for Hydrometeorology and Environmental Monitoring) does not monitor them, and population has no reliable information about environment quality and environmental health hazards.

The current situation is such that, if public organizations or civilians themselves do not undertake this problem, nobody will know about the environmental situation in such towns.

A very high level of pollution is characteristic of a number of cities with old metallurgical enterprises. In the first place, we mean the city of Karabash, which has become a scene of political struggle between different parties. However, as far as I know, the environmental situation there is not improving and is even deteriorating. The local factory has begun to operate again and is connected with another large industrial association. Once, a very interesting concept was developed in Chelyabinsk oblast; it implied considerable revenues to the city's budget. This was quite realizable, especially with regard to colossal dumps of ore mining and metallurgical production, which contain tens of tons of gold, silver, platinum, and other metals. Yet, this concept has never been realized. The most difficult situation is in the city of Rudnaya Pristan', where a lead enterprise has been functioning for about 100 years and the environment contains high concentrations of lead.

Data on the quality of the environment in cities show fantastic levels of pollution. Some cities have organized their own systems for controlling the air quality; the example is Moscow. Today, this is the only Russian world-class system of controlling the quality of air. It is often the case that Rosgidromet controls traditional substances but is unable to take into account the specificity of environmental pollution in cities with chemical enterprises that contaminate the environment with persistent organic pollutants.

Russia signed but has not ratified so far the Stockholm Convention on Persistent Organic Pollutants. Unfortunately, our knowledge about them is insufficient, although the book *Dioxins in Russia* has already been published.

Hot spots in any country form one of the main trends of environmental policy. This is a specific work in places with the highest levels of pollution.

Eleven Russian cities were examined by the environmental review and received the status of territories of environmental emergency, but, unfortunately, this work has been stopped. The State Duma prepared a draft law on regulating economic and other activities in these territories, but it has not been coordinated with the Ministry of Finance yet. What does this status give to a city and its population? Here is an example: in a city of Chapaevsk, a new child hospital will be opened in the near future, the construction of which has been financed by the federal budget because this city received this status. The oblast budget financed the local child diagnostic center, which has been functioning for many years now. Necessary equipment has been received, including for the local maternity center. The main result of this activity is a decrease in infant mortality and improvement in a number of health indicators, which would be very difficult to accomplish otherwise.

Now to information: what do people know about the environment in which they live? Where should they go to receive this information? They may read Internet sites of Rospotrebnadzor (Federal Service for Surveillance on Consumer Rights Protection and Human Well-Being) and local administrations. However, although several years ago these sites used to publish, for example, full reports on the sanitary and epidemiological situation, now this information is disappearing from the pages of Rospotrebnadzor territorial centers. How do heads of our control bodies inform the government, presidential administration, State Duma, and other authorities? Rosgidromet publishes a list of the most polluted Russian cities, which is then cited by all our leaders. However, in my opinion, this list has very little in common with the actual situation. It includes cities with a relatively low level of pollution. More often than not, this is because control stations are located near highways. At the same time, the list does not contain such hot spots as Dzerzhinsk, Verkhnyaya Pyshma, Balei, and others.

We have very little information about pollution on rural territories, contaminated with residual amounts of pesticides. They may be near industrial and solid household waste sites, as well as near unauthorized landfills, which are literally a terra incognita. Meanwhile, papers by our foreign colleagues, such as classical US studies on the epidemiology of congenital defects on the territories of the giant states of New York and California show that loci of congenital defects are clearly linked to industrial waste landfills. According to our estimates, there are about 100 such zones in Russia; however, if we take into account rural settlements where pesticides and other wastes are stored, this figure will be substantially higher.

Biomonitoring methods play an important role in assessing environmental health, but there is no such system in Russia. In a number of countries, biomonitoring indicators form one of the criteria of the efficiency of environmental policy. All speculations about the causes of bronchial asthma morbidity decreases or increases are in vain, because this depends on diagnostic methods, the presence of skilled pediatricians, and other factors. Meanwhile, data on the concentrations of lead, mercury, dioxins, DDT, and other toxicants in blood or breast milk objectively reflect the impact of the polluted environment and foods on the human organism.

About 15 to 20 years ago, when the population was deeply interested in environmental problems, clinicians began to study problems of environmental health. Commissions and laboratories were created at clinical institutes; however, now clinicians have practically lost interest in these problems.

Nonprofit environmental public organizations should pay more attention to informing people about the state of the environment in settlements and about environmental health hazards. There are many non-governmental environmental organizations and large medical institutions in Russia, but none is engaged in problems of environmental health. There is a remarkable international organization ISDE (International Society of Doctors for the Environment), but there is no similar organization in Russia.

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CURRENT PRIORITIES OF THE NATIONAL ENVIRONMENTAL POLICY

At present, high mortality in Russia is one of the most difficult medical and demographic problems. The causes of this phenomenon are widely discussed in literature on demography, public health, sociology, etc. The main trend of these works is comparative analysis of mortality causes in Russia and abroad. The significance of major risk factors, currently typical of our country, has been studied in less detail. In the opinion of leading specialists in this field, the demographic crisis in Russia may be partly mitigated through preventive measures aimed at minimizing the impact of various mortality risk factors. Hence, to determine the main trends and priorities of environmental (preventive) policy, it is very important to evaluate the contribution of each risk factor, including unfriendly environmental factors, to additional mortality. By additional mortality, we mean fatal cases caused by external factors.

At present, the role of the relative contribution of unfriendly environmental factors to mortality in Russia has not been fully determined. Nevertheless, a number of works that have been conducted in different Russian regions over the past years show that the leading mortality risk factor among unfriendly environmental factors is atmospheric pollution. Studies that have been performed using risk assessment methods show that in Russian cities, the annual number of additional deaths from respiratory and cardiovascular diseases, caused by the impact of fine suspended particles alone, may equal, according to different estimates, from 40 000 (minimal estimate) to about 90 000 (maximal estimate). This is about 2–4% of the total mortality in the country's settlements. In megalopolises, such as Moscow, where these substances are regularly monitored, their contribution to the total mortality may reach 7%; and in the most polluted cities, this contribution may equal even 12%. The number of years lost because of atmospheric pollution may average 1.8 and, in the most polluted cities, even 4 years.

Along with mortality risks, we should take into account other socially significant indicators, such as cancer morbidity caused by atmospheric pollution. For example, owing to the increasing number of cars in all Russian cities, we observe an increase in emissions of dangerous carcinogens contained in automobile exhausts, such as benzene, 1,3-butadiene, soot, formaldehyde, PAHs, and so on. According to different estimates, intensive traffic and traffic jams may result in inadmissible risks for the health of people who live near highways, which is confirmed by classifications presented by both international and domestic organizations. In Moscow alone, this may cause 200–300 additional cancer cases per year.

In connection with the planned increase in the coal share in the country's fuel balance by 2010, the expected additional emission of 2 281 000 t of solids, 1 318 000 t of sulfur dioxide, and 391 000 t of nitrogen dioxide gives rise to special concern, as well as the emission (depending on the intensity and types of solid fuel combustion) of volatile substances, tars, and soot, which, in its turn, may lead to an additional decrease in average life expectancy by 1.96 years. Therefore, the main task today is to develop pure, competitive, and efficient energy sup-

The results of conducted studies show that risk assessment methods help to determine environmental policy priorities at the regional and local levels and to work out an action strategy and mechanism that would regulate those pollution sources and risk factors that are most dangerous for human health.

ply. Obviously, we will eventually have to burn coal. However, it is inadmissible to burn it in the form in which it is used today. Hence, the main problem is to implement in practice sufficiently reliable technologies of transforming coal into gaseous and liquid states, which either have been or are being developed both in our country and abroad. In other words, we mean the possibility to use coal in more friendly conditions; for example, Germany has already built several electric power stations complying with these requirements. Consequently, it is worth emphasizing once more that, if we need to increase the share of coal in the fuel balance, we will have to consider options of implementing new combustion technologies. Solving these tasks will also decrease the emissions of greenhouse gases, such as CO₂, which is very topical and important with regard to the latest indisputable proofs of the origin of climate changes.

To determine the nearest priorities among practical measures for civil society under construction and, in particular, for the Public Chamber, we may single out the following. Population health may be improved through both ensuring an optimal environment and preserving health itself by early diagnostics and better treatment, as well as by implementing different preventive programs. Meanwhile, we can hardly expect that the environment will improve in the near future. Unfortunately, environmental protection remains a minor trend among state priorities: the role of state environmental review has been considerably reduced, especially at the local and municipal levels, except for a number of federal projects (Sakhalin, Baikal); and the priority of economic problems compared to the environmental ones is obvious in Russian populated areas. In practice, there is no coordination in working out agreed decisions between interested federal executive bodies, industry, control and supervision bodies responsible for sanitary security and environmental safety, and the public. There are many problems that hinder the realization of state regulations (in particular, the Federal Law On Technical Regulation) and diminish the efficiency of the technical regulation reform. The existing normative and instructive documents on the quality of the environment are rather departmental than governmental, the obstacles in the way of their realization increasing year after year.

Hence, the most significant priorities in forming an efficient national environmental policy at the present stage may include a higher role of the Public Chamber and other public organizations interested in influencing the development of a new legislative and regulatory framework, coordinated with the legislations of other leading countries that have achieved impressive results in environmental protection.

With regard to improving legislative regulation,

the following aspect is noteworthy: to carry out a sufficiently effective environmental policy in modern Russia and to ensure normative and legal support for the development of market mechanisms to control the quality of the environment, legislative regulation on environmental protection (the priority being the conservation and improvement of the state of public health) should promote not only the rational use of natural resources (primarily, through the implementation of resource- and energy-saving technologies) but also new economic concepts based on assessing the potential and actual risks for health and the «costs – profits» and «costs – efficiency» ratios.

The results of conducted studies show that risk assessment methods help to determine environmental policy priorities at the regional and local levels and to work out an action strategy and mechanism that would regulate those pollution sources and risk factors that are most dangerous for human health.

In the future, the use of risk assessment methods may become decisive for proving the practical possibilities and mechanisms of the real sector of the modern economy in the field of environmental protection and the rational use of natural resources in the context of the growing significance of human health preservation

At the same time, to ensure progress in risk analysis as one of the leading technologies, which makes it possible to conduct an advanced strategy of environmental protection in Russia as a part of a more general problem of national security, we need a serious support from the country's legislative and executive authorities.

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THE SYSTEM OF SOCIOHYGIENIC MONITORING AS A MANAGEMENT MECHANISM

The state system of sociohygienic monitoring (SHM) is related to mechanisms of ensuring sanitary-epidemiological well-being.

Organizing and conducting SHM is a leading trend in the activity of Rospotrebnadzor (Federal Service for Surveillance on Consumer Rights Protection and Human Well-Being).

In the 1980s, every agency in our country had its own system to supervise and control people's health and environmental factors; in other words, there was no state monitoring. Rosgidromet (Federal Service for Hydrometeorology and Environmental Monitoring) controlled the quality of the atmospheric air in populated areas, the quality of seawater and coastal water, the quality of soil, and the radiological situation.

Since 1986, the state epidemiological service has been controlling the residual amounts of pesticides in foods.

For the first time in Russia, national-scale search for dependences of morbidity on levels of environmental pollution was launched in 1982 in the form of the State Information System AGIS – Health, within the framework of which a system of collecting and analyzing environmental and health factors was approved and coordination was organized between the State Service of Sanitary and Epidemiological Supervision and interested organizations and agencies (Goskomstat (State Committee for Statistics)), Rosgidromet, the Water Treatment Agency, establishments of medical statistics, etc.).

The term and notion sociohygienic monitoring (SHM) were legitimated by the Federal Law FZ-52 On Sanitary-Epidemiological Well-Being; the Russian government adopted new (the third over the past 12 years) Resolution no. 60 of February 2, 2006, On Approving the Provisions for Conducting Sociohygienic Monitoring, according to which SHM:

- establishes factors that negatively affect human health and assesses them (hygienic diagnostics);
- forecasts the state of people's health and habitat;
- determines urgent and long-term measures to prevent and remove the impact of harmful environmental factors on human health;
- works out decision-making proposals in the field of ensuring sanitary-epidemiological well-being; and
- informs the state authorities, local governments, organizations, and population about SHM results.

Analysis of SHM indicators helps to single out priorities and to plan the activity of Rospotrebnadzor, including its laboratory studies, as well as to plan supervisory measures and expert services.

At the federal level, the SHM FIF (Federal Information Fund) data make it possible to rank the country's territories according to individual indicators of chemical environmental pollution and groups of pollutants with regard to their action on the human organism, as well as to draw up lists of the main chemical pollutants of the atmospheric air, drinking water, and foods on individual territories.

To supply topical and reliable information about the state of health and the environment in Russia to state and local authorities, it is necessary to implement new IT systems. The bodies and institutions of Rospotrebnadzor in Leningradskaya, Vologda, Lipetsk, and Tyumen' oblasts, in the cities of Moscow and St. Petersburg, and in Altai Krai employ geoinformation systems, which make it possible to analyze obtained information about the environment and human health in greater detail.

Recently, the SHM data have been widely used to develop management decisions aimed at improving the quality of the environment in regions and strengthening the regulatory, legal, and methodological base of SHM at the regional level, as well as to prepare complex target programs.

The SHM data are reflected in state reports, supplied to executive bodies of different levels, and used to develop proposals on management decisions by the heads of Rospotrebnadzor territorial departments, by executive bodies in Russian constituent members, and by local authorities to ensure sanitary-epidemiological well-being and reveal and remove harmful environmental factors. The annual state report «On the Sanitary-Epidemiological Situation...» contains information about concentrations of harmful substances, the quantity of exposed population, territories of risk, and the value of this risk.

The SHM data and risk assessments underlay the National Plan of Measures on Environmental Hygiene (NPMEH) for the 2001–2003 Period and the new NPMEH project for 2007–2010.

In Voronezh, SHM results underlie recommendations on decreasing morbidity caused by bronchial asthma and chronic bronchitis, primarily for parents of children with bronchial and lung pathologies. The results of the multimedia health risk assessment have been used to prepare instructions of the Voronezh chief executive.

SHM data and risk assessments underlay the list of urgent measures of the Regional Plan of Measures on Environmental Hygiene in Astrakhan' oblast for 2003–2005, the realization of which ensured the improvement of the quality of the environment, a decrease in child morbidity, including in the zone of the Astrakhan' Gas and Chemical Complex.

SHM data and risk assessments were used to develop the Regional Plan of Measures on Environmental Hygiene in Rostov oblast for 2006–2010; similar local plans have been developed and approved by the chief municipal executives in all administrative units. These plans include urgent measures on the main environmental factors: the atmospheric air, drinking water, soil, labor conditions, the improvement of the quality and safety of foods, and child health protection.

With regard to SHM materials, the Center of Hygiene and Epidemiology of Chelyabinsk Oblast had developed the Plan of Measures on Environmental Hygiene and Health Improvement in Chelyabinsk Oblast for the Period until 2005, which was approved by a resolution of the governor of Chelyabinsk oblast.

SHM results and risk assessment in Penza oblast underlay the description of the situation and the choice of priorities for substantiating the list of urgent measures of the Regional Plan of Measures on Environmental Hygiene in Penza oblast for 2003–2006.

SHM data underlay the Law On Environmental and Health Protection of Novosibirsk Oblast Population from the Impact of Motor Transport; the oblast target program Supplying Drinking Water to Novosibirsk Oblast Population for 2000–2010; and the oblast target program Environmental Protection in Novosibirsk Oblast in 2004–2007.

SHM data were used to develop the Law of Kemerovo oblast On Approving the Medium-Term Regional Target Program Pure Water for 2006–2010 and the Resolution of the Kemerovo Administration Board no. 38 of May 17, 2005, On the Procedure of Regulating Harmful (Polluting) Atmospheric Emissions under Unfriendly Meteorological Conditions on the Territory of Kemerovo Oblast.

SHM results helped determine priority measures on child health protection in Murmansk oblast. In 2005, the Resolution of the Murmansk oblast government no. 147-PP of April 15, 2005, On Organizing Summer Recreation and Improving the Health and

Activity of Children and Teenagers of Murmansk Oblast in 2005 was adopted. The work within the Concept of Child Health Protection at Educational Institutions of Murmansk Oblast for 2003–2008, adopted at the proposal of Rospotrebnadzor specialists, continues.

The territorial Rospotrebnadzor department in Tyumen' oblast in cooperation with the Yekaterinburg Medical Scientific Center for Health Maintenance and Protection at Industrial Enterprises developed a program of controlling population health under a high lead exposure on Tyumen' territories endemic by iodine deficiency for the period from 2005 through 2008.

In Altai Krai, the SHM system includes the monitoring of acute and chronic intoxications. This work makes it possible to estimate reliably the toxicological situation in the territorial units of Altai Krai.

To implement Resolution no. 60 of February 2, 2006, On Approving the Provisions for Conducting Sociohygienic Monitoring and to develop SHM, it is of primary importance to implement biomonitoring and hygienic prenosological diagnostics, to implement modern information technologies at regional and local levels for supporting SHM databases, and to ensure methodological and program support for SHM. This will help transfer the SHM system to a qualitatively new stage in controlling population health.

Improving SHM organization and performance is one of the main tasks of the Concept of Developing the Federal Service for Surveillance on Consumer Rights Protection and Human Well-Being for 2007–2008 and for the Period until 2010, approved by the Rospotrebnadzor head on January 12, 2007.

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ON ENSURING ENVIRONMENTAL SAFETY

During my participation in the hearings of the Public Chamber Commission on Environmental Safety and Environmental Protection «Environment and Human Health» (January 23, 2007), I offered a number of proposals and comments on the draft project of the hearings.

The first one concerns «ensuring environmental safety and environmental protection». An approach to this problem should be systematic, i.e., it should connect all spheres of the social policy and economy both vertically and horizontally. The system accounts for all the factors that affect health, including the environment, and is aimed at preserving and improving the health of the individual, family, work team, and population of Russia and the world as a whole.

It is necessary to develop a system to control the state of the environment and health and to optimize all the parameters of the organizational structure; we should also ensure the participation of public organizations, liquidate duplication of functions, and stop substituting the notions and the contents of other structural components (governmental bodies and organizations, control bodies, research institutes, institutions of higher education, etc.).

To accomplish this, it is necessary to analyze complexly the factors of unfriendly environmental conditions in a number of cities, villages, and territories and to answer a number of questions. Why are the existing control policy, model, and technology ineffective? What strata are interested in an effective solution to the problems of environmental safety and health preservation and why? What strata are not interested in or counteract innovations and why?

It is necessary to define more clearly the role and place of the Public Chamber in solving respective problems of the state and civil society at the population, group, and individual levels, as well as at the national, regional, and local levels. Addresses at the hearings made the impression that we meant different roles and tasks for different levels; i.e., we do not see structural elements and links between them or interpret them differently.

The second point is that we do not hope to influence the authorities through state bodies and try to make population press the power. However, our population is not ready for this. We should make the authorities feel responsible for the inactivity of control systems, starting from the degree to which management and control mechanisms have been developed legislatively.

What should we do? First, we should strengthen the state control of managerial decision making on health and environmental problems. Again, we should not shift this task on the shoulders of population or administrative bodies. We should develop a respective system at all levels, which would imply interdisciplinary and interdepartmental coordination.

At the hearings, it was offered to organize a committee. I agree with this, but since this activity is beyond the limits of one sector or organi-

The united efforts of specialists in different disciplines, departments, and sectors in combination with modern methods of collecting, processing, and analyzing data and organizing and controlling communicative, psychological, and economic processes will help more effectively ensure environmental safety and protection in Russia. This will ultimately favor the improvement of the state of health and the quality of life.

zation, the committee should be headed at the level of the president or a vice premier. Similar committees should be organized at all levels. If this offer is attributed to the responsibility of the Ministry of Public Health and Social Development alone, we will have only interdisciplinary cooperation at best.

Third, it is necessary to train students, as well as specialists at faculties of advanced training, to inform population skillfully and to conduct effective environmental policy. This, again, should be interdisciplinary and intersectoral partnership; hence, it should be addressed not only to the Ministry of Public Health and Social Development but also to the Ministry of Education and Science, mass media, teachers, and other sectors. We should single out priorities, which will be most important for us for the near future, as well as objects and target groups with which we will work.

As for information, my opinion is that mere information will mean that we will only inform people that they live in a very unfriendly environment. It is important to ensure information about what measures should be taken. This should be accomplished through education. We should form a conscious attitude to environmental protection and develop a respective system of ensuring environmental safety and environmental protection; it is necessary to explain the measures developed for unprotected social groups. In other words, medical-environmental education is necessary. The Sechenov Research Institute for Public Health and Health Management at the Moscow Medical Academy and the Sector of Preventive Medicine at the Department of Public Health of the Faculty of Health Management are ready to participate in this work.

Fourth, it is not enough to create new scientific projects; we should ensure intersectoral and multi-factor scientific studies.

It seems to me that it would be better to coordinate them into one national project, which would envisage interference, monitoring, and efficiency assessment. At present, the majority of environmental studies remain at the level of analysis and description. Efficiency assessment should be not only medical but also economic and employ respective modern methods (clinical-economic and environmental-economic analysis).

Fifth, it is necessary to develop economic mechanisms of influencing primarily the private sector, because, as a rule, ethical mechanisms are not effective with private owners.

Sixth, it is necessary to integrate the above into the existing projects and programs, including those on sustainable development.

For example, there is a center of the WHO project «Urban Health» at our institute. We have included the component «Environment and Health» into this proj-

ect.

The goal of inquiry is developing, approving, and implementing environmentally oriented intersectoral approaches and models of developing public health in local communities of the Russian network «Healthy Cities, Districts, and Villages» with regard to health profiles and health-determining factors.

It seems purposeful to develop models of intersectoral cooperation for individual regions of environmental impact with regard to priorities in environmental protection, social development, environmentally safe town planning, and the development of transport.

Out of the 12 main components for developing interdepartmental trends in the Russian network «Healthy Cities, Districts, and Villages», four are connected with the environment and ecology: prevention of environment-induced diseases and states, improvement of the environment, healthy town-planning policy, and healthy conditions of life.

The united efforts of specialists in different disciplines, departments, and sectors in combination with modern methods of collecting, processing, and analyzing data and organizing and controlling communicative, psychological, and economic processes will help more effectively ensure environmental safety and protection in Russia. This will ultimately favor the improvement of the state of health and the quality of life.

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PROBLEMS OF ASSESSING ENVIRONMENTAL IMPACTS ON HEALTH AND THE MODERNIZATION OF STATISTICS

We have already got accustomed to the fact that the new generation of Russian children is burdened with different pathologies. For example, according to R.K. Ignat'eva's data (2006), only 59.3% of newborns have no perinatal pathology. According to the data of A.M. Zaprudnov, K.P. Grigor'ev, and L.A. Kharitonova (2004), the situation is even worse: only 30% of newborns may be considered healthy¹. The materials of the forum organized by the Health of the Nation League in 2007 contain even lower assessments: 15–25%².

However, it is necessary to state that modern statistical data do not make it possible to answer this question because they unite in one group (form no. 32, «Information about medical aid to pregnant women and obstetric patients») both ill-born children and healthy children who fall ill at maternities owing to various causes. Consequently, it is necessary to make a distinction between these positions in both accounting and reporting documentations and to use the obtained differentiated indices for different purposes. Some of them are for assessing the health of population (the share of children born healthy), whose health may be determined by environmental characteristics. The other reflect the share of children who were born healthy but fell ill at maternity obstetric centers in order to assess the quality of the operation of these medical establishments, which has nothing to do with environment impacts.

A vast statistical system of accounting all cases of seeking medical advice (except for diagnoses established by paramedics) has been functioning in our country for several decades. In other words, one could assume that the dynamics of morbidity within different population groups at the regional and territorial levels is studied and these data are sufficient to study and assess interconnections between morbidity and environmental characteristics.

However, according to data of the 2006 survey of managers of medical statistics in the constituent members of the federation, only some of social and departmental medical institutions present information about discovered cases in reporting form no. 12 for generalization. The generalizing documents of the Ministry of Public Health and Social Development do not account for the incidence of pathology among children at orphanages; at nursing homes, where children with severe pathology live; and, partially, at infant homes, let alone homeless and neglected children. In addition, some people work not at state but at departmental organizations and are serviced (including their children) at respective departmental medical establishments. This information is not presented for generalization, as well as that from private medical organizations, although calculations cover population as a whole. Thus, information about registered morbidity is admittedly distorted.

¹ In 2003, 650 diseases per 1000 children were registered at maternity obstetric centers.

² The Third All-Russian Forum «The Health of the Nation Is the Base of the Prosperity of Russia», Moscow, 2007. 36 pp.

Conclusions on the impact of environment changes on health should be based on scientifically reliable information, which reflects the real situation under specific conditions. It is necessary to offer and substantiate the etiopathogenetic mechanisms of environmental hazards by different health parameters based on a comprehensive idea of how statistical indices are formed. The majority of Russian studies are based on official morbidity (form no. 12) and mortality statistics. Alarming assessments of population health begin with descriptions of the ill health of the majority of newborns. To what extent are they objective?

The bad dynamics of the frequency of registered cases (regarded in the majority of works as morbidity dynamics), shown by our statistics, reflects not only the state of health but also other factors, including economic ones (for example, characteristics of compensations of medical workers).

The fact that morbidity statistics accounts for cases and states rather than the number of persons with these or those diseases and deviations has resulted in a situation where the huge and unique statistical work on accounting for morbidity fails to answer what number of people have this or that pathology, i.e., how many people (including children) are ill. Judging from the resulting reporting figures, two and more diseases fall on each child (the figures vary from 1.8 and 2.5 by federal district). However, this does not mean that every child has at least two diseases. According to our surveys, some children (10–12%) do not seek medical advice during the year, and 8–10% do not even have acute diseases. The main part (60% and more) catch colds, which are regarded by many authors as inevitable and even necessary (in other words, this is normal), while 16–18% are really ill (chronic pathologies and other health problems).

The range of the registered pathologies characterizes not only the frequency of registered cases but also the quality of medical aid, which is obvious, for example, from the share of unspecified cases within registered morbidity; over the past several years, this share has been increasing in the structure of death causes.

It is noteworthy that even at in-patient hospitals, symptoms, characters, and deviations, which have been discovered during clinical and laboratory examinations and are not classified under other rubrics, are registered as final diagnoses, exceeding the number of diagnoses in certain classes of diseases.

At the same time, public health organizations are being actively computerized, and databases, including nominal ones, are being formed. Accordingly, under the modern state of computer equipment at medical institutions, information about registered diagnoses may be developed in fundamentally new aspects (for example, determining the average age at which pathologies are discovered, calculating life expectancy under different types of pathology, etc.); it may be used to verify hypotheses and can bring new knowledge, as well as help different specialists, including in the field of environmental protection, in revealing and solving health problems.

Ensuring patients' safety during their contacts with the medical network is a specific environmental problem. It is necessary to assess the frequency of hospital infections; complications associated with infusion, transfusion, and injections; complications caused by orthopedic devices, implants, and transplants; and other complications from medical penetrations, which are mass today.

Russian statistics fails to reflect these problems to the full. Yet, the problem of assessing patients' safety is not only statistical. It primarily relates to the formation of clinical thinking; medical outlook; and medical moral qualities, which should help reflect adequately all course-of-disease aspects in medical documents.

Thus, it is obviously necessary to work out a new view on the extensional statistical activity. In the first place, it is necessary to revise both accounting and reporting documents that form the basis for state decisions.

To determine ways of decreasing mortality in our country and to study the impact of environmental characteristics on health, comparisons with other countries are necessary. It is fundamentally important to know whether our population is more subject to these or those diseases and, respectively, if death rate is higher than in other countries or the high levels of mortality in Russia are observed under a similar incidence of pathology but depend on other factors, such as the accessibility to modern medical methods of correcting pathologies. According to certain data, hypertension is as frequent in Russia as in other countries (for example, in Finland) and the incidence of and mortality from oncological diseases are also similar, while the incidence of diabetes mellitus and bronchial asthma in Russia is lower than in a number of other countries. In this connection, with regard to the environmental impact on the formation of these pathologies, it is necessary to take into account general biological regularities of the formation of pathology in human population and to conduct comparative studies on the basis of commensurable standardized methods.

While studying the impact of environmental changes on health, it is necessary to take into account that in our country, the sanitary situation is not sufficiently friendly even in cities. According to data of the World Health Survey (2003), 13.4% of families with children have neither water supply nor sewerage; another 20% (19.1%) of families have only one of these two conveniences (as a rule, water supply). This largely relates to small towns with private housing stock; however, even in large cities (oblast centers), there are still residential neighborhoods characterized by low sanitary indicators. Thus, not only the type of the settlement but also the quality of living conditions tells on the health of population.

One of the main characteristics of population health is the level of the physical development of children. According to our data, the physical development of the majority of children examined in 2000–2001 (more than 100 000 of children, primarily from child institutions) was in accordance with age regularities; compared to the respective assessments of the mid-1990s, positive tendencies were observed. No shifts in the menarcheal age in girls were registered against the data of the early 1990s.

The new generation of children begins its life with the same morphological characteristics (weight at birth) as in European countries. Recently, society has been focusing on personal responsibility for health, including quality control of consumable products and other elements of sustenance.

A fundamentally new fact has been discovered: the evening of gender differences in bodily sizes during puberty, including the disappearance of the so-called decussations, associated with different ages of the beginning of puberty in boys and girls, especially in large cities. Is this due to environmental characteristics or to other factors?

How is the physical development of children assessed in our country? Anthropometric measurements, from the first weighing at birth to measuring the height and mass of the body at all other stages of development, are widely spread at medical institutions, preschool establishments, and schools (despite certain difficulties with instruments and equipment in medical rooms), as well as in special studies and programs. However, the situation with assessing the physical development of children on the basis of anthropometric data is difficult and has been requiring solution for many years, if not decades. The colossal anthropometric material, obtained while examining children, has not been properly analyzed both at the individual level and in general. No domestic form contains generalizing information on assessing physical development, except for weight at birth (form no. 32) and the share of children with arrested development (form no. 54); however, even in these cases, methods of obtaining commensurable data by territory are not specified.

We have to state that at present, neither practical pediatrics, nor pediatric hygiene, nor social hygiene have universal skillfully developed guidelines for assessing the physical development of every child under observation irrespective of his or her place of residence and nationality.

Under modern conditions, the concept of local standards, which imply assessing the individual relative to his or her group, should be revised because on a number of territories and in some groups, environmental conditions in the broad sense of this expression do not ensure harmonic development of children. Hence, both individual and generalizing assessments should employ certain standards of how a child should grow and develop. These standards will help discover children who have deviations in their physical development, i.e., have not reached a certain height by a certain age (lag in height) or have insufficient or excessive weight relative to their height. Back in the 1980s, Russian scientists (I.M. Vorontsov, T.M. Maksimova, and others) developed Interregional Standards for Assessing the Height and Mass of Children

of 0–14 Years (Moscow, 1990). Quantitative indicators determining the boundaries of the norm in these tables and in the new standards of growth and development³ of children under five, which have been developed and are being implemented in 2007 by WHO, are close enough in different countries of the world. They may be used in Russia to ensure commensurability with other countries. To obtain global assessments among older children, special studies are necessary; in our country, aforementioned interregional standards may be used universally.

Social stratification is a real factor that determines the health of population, including children. Social differentiation is an objective process during the transformation of society, which tells on vital interests of the majority of population and causes both general and specific shifts in health. A social gradient in the formation of child health has been established as a social regularity: under worse socioeconomic conditions, children fall ill more frequently; they often have insufficient weight and other deviations. This regularity should be taken into account in assessing the impact of environmental characteristics on health. Although personal preventive activity is very important, the activity of the state and local authorities responsible for the sustenance of population should be regarded as decisive.

The social orientation of the state implies determining a state strategy in preserving health and not only decreasing the coverage of recognized risk factors associated with personal behavior. The state should control key factors, such as the environmental situation, the quality of drinking water and the main foods, conditions at workplaces, the cost of medicines, and so on. This also relates to the activity of the most important sustenance systems, including public health care. All these positions should be legally regulated, realized, and controlled.

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³ WHO child growth standards (www.who.int)

GENETIC-HYGIENIC MONITORING OF ENVIRONMENTAL POLLUTION AND HUMAN HEALTH

At present, there are different approaches to genetic-hygienic monitoring. As a rule, hygienists assess the quality of the environment by comparing the content of pollutants or their combinations to standard indicators. Geneticists determine the mutagenicity of individual components or total environmental pollutions and assess genetic damage in humans. Hygienists and geneticists very rarely conduct joint studies. Complex scientific and practical work is irregular, and today we have no full genetic-hygienic monitoring in Russia.

The main prerequisite for toxicogenetic studies is the idea that the human environment always contains a complex of factors and/or chemical substances that are potentially genotoxically dangerous and capable of modifying the effects under review. The impact of these factors on the human organism is not always predictable from knowledge about individual properties of each factor or substance, because, as is known, some factors or chemical substances can modify effects of the others.

Consequently, to assess the impact of this complex multicomponent system, it is necessary to determine total genotoxic effects. A simultaneous use of several test objects allows one to make reliable conclusions about the presence of mutagenic activity in environmental samples, because the set of genotoxicants may be different in each case.

The presence of mutagenicity in environmental samples makes it possible to assume that people who live in a given region have more genetic deviations than usual. To assess the level of genetic deviations, epidemiological methods are used (data on spontaneous abortions, congenital abnormalities, morphogenetic variants, hereditary diseases, diseases with a frank genetic component, and so on).

On the other hand, there are methods that make it possible to discover genetic deviations in somatic cells (the level of chromosomal aberrations, sister chromatid exchanges, micronuclei, DNA damages, and gene mutations in peripheral blood cells) and in human germ cells (aneuploidy and translocations in sperm) directly. In recent years, the micronucleus test has been often used, one of whose modifications is noninvasive (accounting for micronuclei in epithelial cells of the mucous membrane of the oral and nasal cavities) (L.P. Sycheva et al. and V.V. Yurchenko et al., 2002–2006).

However, it is necessary to take into account that there are categories of people for whom the probability of damages is high due to certain genetically predetermined factors (DNA repair deficiency, changes in the metabolism of genotoxicants, peculiarities of the oxidant status, etc.).

One of the main trends of environmental policy should be assessment of the genetic danger of environmental pollution.

As is known, individual toxic sensitivity is determined by genetic polymorphism, which forms the base of individual response to environmental factors. This is a result of differentiated effects of genes that determine the characteristics of xenobiotic metabolism (activation, detoxication, and excretion), DNA adducts formation and removal, abnormalities in genetic control of DNA repair, chromosomal instability, and specificities in the operation of the neuroendocrine and immune systems.

«Environmental genes», which belong to «susceptibility genes», are mainly responsible for great variations in different health indicators even in correct and representative samplings of cohorts under review for discovering a connection between the environment and health.

The latest achievements of molecular genetics in decoding the human genome open possibilities to create a «genetic passport» (V.S. Baranov et al., 2000; Yu.A. Revazova et al., 2003–2005), or a «metabolic passport» (L.A. Piruzyan, 2002–2004). It becomes possible to present to a person a substantiated list of unadvisable professions and/or dangerous contacts with unfriendly environmental factors according to his or her genetic characteristics, which will reflect the individual risk of this or that pathology.

It is possible to find such people at the stage of preliminary medical screening among workers contacting with potentially dangerous mutagens and carcinogens and to form groups of high genetic risks.

The monitoring system suitable for our country today may include the following stages:

- analytic estimate of the content of genotoxics in different environmental components;
- experimental determination of the total mutagenic activity of environmental pollutions; and
- determining accumulated mutagens in human biosubstrates and the level of genetic damages in human somatic and germ cells.

This system has been approved in a number of cities (Moscow, Yaroslavl', Chapaevsk, Dyat'kovo, Atbasar, etc.).

The proposed system of genetic-hygienic monitoring should be included into the framework of complex programs of social-hygienic monitoring of

the quality of the environment and health in Russia. It is very important to conduct complex monitoring studies on the assessments of the quality of the environment and the genetic health of population in Russian regions, because this not only makes it possible to determine the real genetic risk and to rank the territories according to the degree of genetic danger but also to recommend concrete preventive measures.

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HUMAN HEALTH RESEARCH PROSPECTS WITH REGARD TO RADIATION POLLUTION

The federal target program «Overcoming the Consequences of Radiation Accidents until 2010» is aimed at «completing for the most part by 2011 measures for socioeconomic rehabilitation of territories and radiation protection of people affected by radiation as a result of accidents at the MAYAK Production Association and Chernobyl Nuclear Power Plant and nuclear tests at the Semipalatinsk testing area and reducing the risk of environmental radiation pollution from potentially dangerous sources at the MAYAK Production Association». In the opinion of functionaries at the Ministry of Emergency Response, achieving this goal will make it possible to solve all the problems once and for all. Indeed, the practical measures planned by this program have reached their goal, even if not to the full, and there is no need to continue them in their current form. However, it is useless to hope that the problem of radiation consequences will be solved once and for all! This is a very shortsighted approach.

We may agree that there will be no need for capital investments in the future; however, the state of health will not improve owing to investments. To minimize long-term effects not only for people directly affected by radiation but also for their descendents in the first and second generations, it is necessary to monitor their state of health constantly and to ensure scientific support for this monitoring in order to process, analyze, and generalize new data. Results of this scientific support will form a base for developing necessary recommendations and measures aimed at minimizing the consequences and preserving the health of future generations. All foreign scientific studies, which never stop, are aimed toward this goal. In our country, the situation is different.

This year, all financial flows, or rather tiny brooks, have dried up. Hence, scientific support for the federal target program «Overcoming the Consequences of Radiation Accidents until 2010» has practically stopped.

Meanwhile, the consequences of this shortsighted attitude of officials to this problem are very serious, especially against the background of the demographic crisis in our country, to which, no doubt, the territories affected by radiation have made their contribution. For example, the medical-demographic situation in the Republic of Altai is one of the most hazardous compared to the country as a whole (N.A. Meshkov et al., 2003). The average lifetime of men and women in Altai is four years less than in Russia. Life expectancy in Altai is also lower than in Russia. The share of able population of 30 to 60 years of age in Altai is 10% lower than in regions with similar natural, climatic, and ethnic characteristics. At the turn of the 1990s, the republic saw a decrease in the population of people born in 1955–1962, although there had been no such differences previously. Analysis of gender and age distribution for 1991–2001 shows that the share of radiation-affected people and that of their descendents of the first and second generations are substantially lower than the shares of the same age groups in the Siberian Federal District and in Russia as a whole. For example, the

In our country, interest in radiation

problems arises only on special dates.

A date like this is April 26. Annually, on

the eve of this day, we remember and

discuss problems of the participants in

the liquidation of the Chernobyl disaster.

However, when grand meetings devoted

to this sad event are over, it sinks into

oblivion again. Yet, problems remain and

need a solution.

In the first place, these problems concern

the state of health of not only the

«liquidators» but also other categories,

including those affected by radiation

during nuclear tests on the Semipalatinsk

testing area and the accident at the MAYAK

Production Association.

ratios of the share of people of 20–29 years of age in Altai to those in Russia and in the Siberian Federal District are 0.91–0.95 and 0.88, respectively; the ratios of people of 40–54 years of age are 0.56–0.86 and 0.59–0.85, respectively (N.A. Meshkov, 2005). Mortality in this republic is higher than in the territories under comparison: the leading coefficient is 1.82 compared to the Siberian Federal District and 1.43 compared to Russia. Mortality caused by neoplasms, respiratory diseases, and congenital abnormalities in the Republic of Altai is definitely higher than in Russia. Mortality caused by diseases of the endocrine, nervous, and genitourinary systems is substantially higher than in Russia, while mortality associated with blood circulation diseases is definitely lower.

The results of lengthy epidemiological studies on morbidity dynamics among liquidators of the Chernobyl accident show changes in the pathology structure. Data have been obtained (V.K. Ivanov et al., 2005; N.A. Meshkov and T.A. Kulikova, 2005, 2006; and N.V. Denisyuk, 2006), according to which a radiation dose of more than 150–200 mSv is a risk factor of chronic cerebrovascular pathology at younger ages. Similar data have been obtained by Japanese scientists.

It is high time for officials to understand that it is impossible to «close» this problem at will. Studies on the state of the health of radiation-affected population should be continued at least as long as this population and its descendents in the first and second generations exist. As is known, Japanese scientists have been engaged in this problem for more than half a century and are obtaining new data, which help them correct their idea of long-term consequences of radiation impacts.

At present, the financing of studies on the Republic of Altai and Altai Krai has been stopped; although the federal target program «Overcoming the Consequences of Radiation Accidents until 2010» continues, «scientific support for making decisions on the main program measures» has been practically stopped for reasons that are clear only for functionaries at the Ministry of Emergency Response, who are responsible for this program.

The financing of the National Radiation and Epidemiological Register on the base of the Medical Radiological Research Center of the Russian Academy of Medical Sciences (the city of Obninsk) continues, even if the funds are insufficient. We have long been looking for the creation of regional registers with common ideology and methodology in territories affected by radiation, whose population needs systematic medical control. Unfortunately, this problem has not yet been solved officially, and no governmental resolution on this point has been adopted. Nevertheless, regional registers continue their work so far.

Russia is probably the only country in the world with such sad experience of various radiation accidents. Meanwhile, if we stop the activity of the registers, we will practically lose all information. At present, the situation needs a rapid decision on the further financing of the monitoring of the health of affected population and its scientific support. It is necessary to continue research into long-term consequences in populations directly affected by radiation during nuclear tests on the Semipalatinsk testing area and the accidents at the MAYAK Production Association and the Chernobyl Nuclear Power Plant, as well as among their descendents of the first and second generations.

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PASSIVE SMOKING IS THE MAIN «ENVIRONMENTAL FACTOR»

Tobacco smoke should be regarded as an environmental factor and as one of the most significant pollutants, which considerably affects human health. Unfortunately, when we speak about the environment, we often mean what takes place outside buildings. However, the environment, in fact, is what takes place outside the human organism. We spend most of the time inside buildings. The smoke in many of them is so heavy that it is dangerous to stay inside.

Criticism of the World Bank Report Dying Too Young often contains doubts concerning our data on deaths caused by environmental pollution. According to our estimates, they amount to 29 000 annually, while Professor B.A. Revich states that this figure equals 40 000. Compare: in Russia, smoking causes 330 000 deaths annually, which is 17% of total mortality in the country. The scale of «tobacco mortality» is substantially higher than the highest estimates of mortality caused by unfriendly environmental factors.

At the same time, passive smoking, about which we often forget, is almost as dangerous as active smoking. The point is that the lateral stream of smoke, which forms when one holds a cigarette or when it lies in the ashtray, contains approximately four times more carcinogens. The concentration of some substances in the lateral stream may be many times higher than during active smoking. For example, the content of aminobiphenyl, which causes bladder cancer, is 31 times higher than during active smoking.

According to the data of Professor D.G. Zaridze, a corresponding member of the Russian Academy of Medical Sciences, the risk of lung cancer among female nonsmokers who live with smoking husbands is 1.5–2 times higher than among women whose husbands do not smoke. As is known, tobacco smoke contains about 40 carcinogens: heavy metals, including mercury and lead; formaldehydes; cyanides; phenols; dichlorodiphenyltrichloroethane; and many other highly toxic substances.

If one undertakes search for publications devoted to environmental pollution inside buildings on the Medline portal, one will see that only six works are devoted to passive smoking in Russia. All of them are published in English. Compare: about 20 works in Russian are devoted to studies on the impact of radon ionizing radiation. These are, of course, incommensurable problems.

It is noteworthy that international refereed journals have published about 6 000 works devoted to passive smoking. The lag of this trend in Russia clearly shows our economic priorities, owing to which the problem of smoking, including passive smoking, is ignored and even hushed up. As is known, world tobacco companies used to finance many studies on environmental pollution inside buildings. They wanted to discredit the very idea that passive smoking was harmful. Obviously, Russia continues this fallacious practice.

In the international refereed journals have published about 6 000 works devoted to passive smoking. The lag of this trend in Russia clearly shows our economic priorities, owing to which the problem of smoking, including passive smoking, is ignored and even hushed up.

According to our data, at least 40% of children in Russia are at home when their parents are smoking. The situation in Ukraine is similar. According to data of K.S. Krasovskii, director of the Ukrainian Information Center for Problems of Alcohol and Drugs, 50–70% of children and teenagers regularly inhale tobacco smoke because their parents smoke at home.

It is no secret that the majority of people in Russia are involuntary passive smokers: those who work in offices or live in multiapartment buildings become smokers on landings; industrial workers, at their workplaces; and so on.

According to data of the California Environmental Protection Agency, passive smoking is a risk factor under low birth weights and may cause death during infancy. In addition, it may cause tympanum diseases and asthma in children (it provokes diseases or leads to acute conditions). In children, passive smoking may cause bouts of pneumonia and bronchitis. It has been proved that passive smoking in grown-ups increases the risk of the following fatal illnesses: heart ischemia, apoplexy, lung cancer (which is practically always caused by tobacco smoke), and pharynx cancer. There are also other diseases for which passive smoking is a risk factor, such as uterus cervix cancer and attacks of bronchial asthma in grown-ups.

Studies of the early 1990s have shown that for nonsmokers who live with smokers, the risk of heart ischemia («killer no. 1») increases by at least 25%. Thus, according to that estimate, in developed countries, passive smoking is the third leading death-causing risk factor after active smoking and alcoholism. It is of interest that for heart ischemia, there is no linear dependence of the risk on the dose, which is typical of lung cancer. In other words, the risk of heart attack for passive smokers increases even if they are present in a smoky room not every day and take only 1% of the smoke taken by an active smoker.

The conclusion is that tobacco smoke is one of the most widespread and toxic factors of environmental pollution. Nevertheless, in my opinion, the problem is understated. In documents on environmental safety, such as the resolution of the public hearings of the Public Chamber Commission on Environmental Safety and Protection «The Environment and Human Health» (Public Chamber of the Russian Federation, January 23, 2007), the problem of passive smoking is ignored.

In addition, I would like to draw attention to many Russian studies where environmentalists speculate that the health of population worsens in polluted areas. However, the social status of people in a giv-

en region is often neglected, as well as the share of smokers and the extent of passive smoking.

For example, the study by Professor V.A. Eroshina and coauthors shows that in Moscow, the difference in respiratory morbidity among children between the districts of Krylatskoe and Kapotnya may be practically fully attributed to socioeconomic factors and to smoking, including passive smoking.

I think that the problem of passive smoking should be included in the list of priority environmental problems. In other countries, mechanisms of struggling against passive smoking have been worked out. Unfortunately, in Russia this problem remains understated. At the same time, the lobby of tobacco producers in our country is very strong and has huge funds at its disposal.

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THE 2007–2010 NATIONAL ACTION PLAN TO PREVENT ENVIRONMENTAL HEALTH HAZARDS FOR THE FUTURE OF CHILDREN AND TEENAGERS AS A MECHANISM TO IMPROVE THE ENVIRONMENTAL SITUATION

The health of children and teenagers is a potential that every country has. At present, this potential in the Russian Federation has significantly decreased as a result of a five-million reduction in the number of children and the deterioration of the child population's health status over the past ten years. The health of children as an integral criterion reflects the multicomponent impact of the complex totality of factors of biological, social, and natural environments. A secure or insecure environment largely determines the health level of the growing generation.

The proceedings of the Fourth Ministerial Conference on Environment and Health, held by the WHO Regional Office for Europe in 2004 at the level of environment and health ministers, acknowledged that Europe has not so far provided all the conditions for the protection of child health and environment. Again was stressed the special vulnerability of the growing organism to the negative impacts of many environmental factors. Studies conducted in the WHO European region show that almost one-third of all diseases in the age group of 0–18 years is related to insecure and unhealthy life conditions (at home and in the environment), which lead to sizeable social and economic losses.

Among the main problems that lead to health deterioration in children are the impacts of polluted water, air, soil, and foodstuffs, which may cause gastrointestinal and respiratory diseases and in-born defects and disorders in the nervous system; imbalanced and insecure food in a large number of children; and problems caused by the retarded toxic (carcinogenic, neurotoxic, allergic, etc.) effects of numerous chemicals, which are present in the environment (stable chemical pollutants, heavy metals, tobacco smoke, and ionizing radiation).

The main result of the conference's work was the European action plan "The Environment and Child Health». Recommendations were adopted for each country to develop a national plan aimed to solve its most urgent problems of reducing the negative impacts of environmental factors on child health.

The sanitary and epidemiological situation in the Russian Federation remains unstable, and its influence is reflected on the demographic situation and the state of people's health, including children's health. Over the past ten years, the general morbidity level for children of 0–14 years has increased more than 1.5 times and was more than 208,400 per 100,000 people in 2003. Over this period, the incidence of bronchial asthma, peptic ulcer, and diseases of the endocrine and bone-muscle systems has increased more than two times.

The prevention of negative environmental impacts on health must be the leading trend in the policy of improving human health, especially that of children and teenagers, as the most sensitive and vulnerable age group. The draft of the «2007–2010 National Action Plan to Prevent Environmental Health Hazards for the Future of Children and Teenagers» contains priority measures to ensure a secure and healthy environment for the growth and development of children.

A high morbidity level is registered among 15–17-year-olds: 173,400 per 100,000 people of the same ages with a growing number of diseases of the endocrine system, respiratory organs, and digestive apparatus and menstrual dysfunctions. Health-risk behaviors continue to grow (the use of alcoholic beverages, tobacco smoking, addiction to drugs, and early sexual activity); we see the growth and rejuvenation of socially preconditioned diseases, such as tuberculosis, drug addiction, toxomania, alcoholism, and HIV/AIDS, among children and teenagers.

Among urgent child-health problems is still the problem of environmental pollution, including air pollution.

Despite a certain tendency toward improvement, the level of environmental pollution in some regions of Russia, especially in large industrial cities with developed chemical and metallurgical industries, is assessed as crisis-like in the terms of sanitary and hygienic stresses and as critical in the terms of environmental monitoring.

A large corpus of data indicates the deterioration of indices of the health status and physical development of children and teenagers who live in the conditions of anthropogenic pollution. The share of atmospheric air pollution in the total level of new-onset morbidity among the child population is 32%. The incidence of bronchial asthma among children, which is a marker sensitive to atmospheric air pollution, is much higher in industrial regions with high atmospheric pollution levels in the vicinity of industrial enterprises and thoroughfares.

Risk factors in the development of health disorders in school-age children are the unsatisfactory sanitary and epidemiological situation, related to the irrelevant physical infrastructure of schools, and intensive loads in new-type educational establishments (gymnasias, lyceums, and profile schools). For a number of regions, especially in rural areas, the bad quality and unsafety of potable water used in child and teenage establishments remains a crucial problem. The location of schools in environmentally tense zones significantly degrades health indicators. The students of elementary vocational education have additional risks of exposure to the adverse conditions of industrial training at enterprises of different forms of ownership.

The deterioration of economic conditions encouraged the labor activities of teenagers. Part-time employment of students at their leisure time became very typical; child and teenage labor is

employed by private businesses and in agriculture. Violations of labor law are widespread in under-age employment: illegal hiring, work without medical examination, longer working hours, and the employment of teenagers in unauthorized jobs and during night shifts. All these factors create high risks of health deterioration among working teenagers.

Significant violations in the nutrition and food status of children and teenagers have been revealed, among them: significant deviations from the recommended norms of food consumption by children of preschool and school ages, violations of nutrition balance in educational establishments, and retarded physical development. A serious problem is the deficit of some micronutrients, in particular, vitamins C, A, B1, B2, and β -carotene; iron; calcium; and other elements, which is another key cause of alimentary-dependent diseases.

Thus, providing more favorable conditions for the growth, development, and health formation of children is an extremely important task.

Only a target government policy can change this situation. In connection with this and taking into account the recommendations of the Fourth Conference on Environment and Health, a draft of «The 2007–2010 National Action Plan to Prevent Environmental Health Hazards for the Future of Children and Teenagers» has been prepared. Its designer is the Russian Ministry of Health and Social Development jointly with the Federal Service on Surveillance for Consumer Rights Protection and Human Well-Being. This work involved the leading hygienic research institutes of the Russian Academy of Medical Sciences, the Russian Ministry of Health and Social Development, and a number of ministries and departments (the Russian Federal Service for Hydrometeorology and Environmental Monitoring, the Russian Ministry of Education and Science, the Russian Federal Agency for Physical Culture, Sports and Tourism, and the Russian Ministry of Internal Affairs).

The plan's goal is to define national priorities in the development of measures aimed to solve urgent problems of hygiene in the interests of children and teenagers taking into account the specific socioeconomic features of the constituents of the Russian Federation. The main objective of the national plan under construction is to protect the health of Russia's growing generation.

The plan's preamble contains data reflecting the condition of the habitat and health of children and teenagers in the Russian Federation. With regard

to the leading risk factors, a draft List of Multi-level Priority Measures to Create a Secure Environment for the Population, Including Children has been developed. These measures include the development of draft federal laws and the adoption of Russian government resolutions aimed toward the creation of a legal framework to improve living conditions:

- «On Assessment and Control of Human Health Risks and Damages for Environmental Health Hazards»,
- «On Mandatory Civil Liability Insurance of Owners of Production Facilities That Are Hazardous for the Population and Environment»,
- «On Potable Water and Water Supply»,
- The Government Policy Concept of Healthy Nutrition for the Population.

The following normative and methodological documents will be developed:

- on harmonizing the hygienic standards of chemicals with international approaches, the hygienic codification of associated and combined impacts of various factors;
- on assessing health risks of food contaminants;
- on exposure to small doses of ionizing radiation;
- on providing the sanitary and epidemiological well-being of establishments for children and teenagers;
- on assessing the safety of goods for children;
- on optimizing nutrition in organized groups of children; and
- on improving the quality of medical and social support for different groups of children.

The draft contains topical fields of research, such as the development of criteria for the assessment of abilities in children of different ages to adapt to environmental impacts, the improvement of scientific and methodological approaches to child health monitoring in relation to environmental factors, and social and hygienic monitoring systems.

Measures are planned to reduce environmental hazards, including the implementation of the Single Federal Program «Russia's Nuclear and Radiation Security», the withdrawal of child institutions from the sanitary protection zones of industrial enterprises, the establishment of medical educational establishments on the territories of environmental risk for active rehabilitation of children, the development of physical infrastructure for all types of educational establishments for children and teenagers. There are plans to improve people's awareness of healthy ways of life and to ensure the availability of information on radioactive safety, nutrition quality and security, child health, and labor conditions.

The adoption of a document of this level will allow the government and society to focus on the provision of a secure environment, the improvement of the living conditions of children and teenagers, and the prevention of health disorders. The national action plan to prevent environmental health hazards for the future of children and teenagers will be the basis for the development of regional plans that will take into account urgent regional problems related to environmental conditions and human health. The joint efforts and wide participation of public and environmental organizations are necessary to develop and implement these plans.

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CHILD MORBIDITY IN ENVIRONMENTALLY UNFRIENDLY TERRITORIES AND METHODS OF ITS PREVENTION

In Irkutsk oblast, the cities of Bratsk, Angarsk, and Shelekhov belong to environmentally unfriendly territories. For the first two, the unfriendly state has been recognized by the conclusions of the State Environmental Review (SER); for the third, by a governmental resolution that adopted a federal target program on improving the environmental state of the city's territory.

Two territories – the city of Bratsk (1994–2002) and the city of Shelekhov (1996–2000) – implemented measures to improve the state of the environment, the sanitary situation, and the health of population, envisaged by federal target programs. These programs were the first stage of stabilizing the situation and solving the environmental problems of these territories.

In Angarsk, the realization of a similar program has not even begun. At the same time, the crisis of the 1990s stopped or reduced the capacities of a number of harmful industries and power engineering enterprises. This has led to a substantial decrease in industrial atmospheric emissions.

The implementation of program measures in the cities of Bratsk and Shelekhov and the shutdown of industrial and power engineering facilities in the city of Angarsk have improved a number of indicators depending on their efficiency. Overall, the state of the natural environment has stabilized, but the social-environmental situation remains tense.

Despite measures taken to mitigate the negative impact and funds of 5.13 billion rubles and \$US 9.5 million, allocated for these measures, Bratsk remains a city with a constantly high level of atmospheric pollution, the intensive pollution of surface and ground waters, and so on [A.Yu. Gas'kov and N.N. Yushkov, «Modern Environmental Protection in Municipal Units», in Proceedings of the Interregional Practical Scientific Conference. BrGTU, Bratsk, 2002, pp. 29–38].

A complex of urgent measures to enhance the environment and human health in the city of Shelekhov, Irkutsk oblast, in 1995–2000, the shutdown of a number of enterprises, and certain additional measures have decreased emissions by 16–27%. Atmospheric pollution has decreased by 16–25%, and the share of environmental child morbidity, by 21–24%. At the same time, according to risk assessments, only one-third of the observed morbidity decrease may be attributed to the implemented measures [V.M. Prusakov, V.Sh. Basaraba, E.A. Verzhbitskaya, et al., «Modern Environmental Protection in Municipal Units», in Proceedings of the Interregional Practical Scientific Conference. BrGTU, Bratsk, 2002, pp. 39–47].

In 1999–2005, emissions in Angarsk decreased by about 65%, and atmospheric pollution, by 31–43% compared to 1988–1990, which was primarily due to the shutdown of the Angarsk Petrochemical Company and two heat and power plants. From 1991 through 1997, under relatively high emissions, pollution decreased by 25–50%, which was

The rehabilitation of environmentally unfriendly territories, characterized by significant health risks, particularly among children, remains a topical problem.

obviously because of the impact of meteorological factors.

Analysis of materials on morbidity levels, based on children's applications for medical advice and of morbidity-related risks as a criterion of environmental impact in the territories of the above cities and the city of Irkutsk for the period of 17 years (1988–2004), including that in the publication by V.M. Prusakov, E.A. Verzhbitskaya, et al. [Bull VSNTs SO RAMN (8), 2005. pp. 48–55], shows the following:

- The dynamics of general child morbidity in the territories of these cities and the background territory of Irkutsk oblast as a whole shows 1.3–2.1 times growth, including 1.8 times growth in the background territories. This indicates a general downward tendency in the child health level in environmentally unfriendly and conditionally background (or control) territories, especially over the past five years.
- Relative risks of general child morbidity (indicators of environmental impact) in the territories under examination mainly decreased in 1991–1995 and then increased in 1996–1999 and in 2000–2004 up to the levels of 1988–1990 (the cities of Bratsk, Irkutsk, and Shelekhov) or lower (the city of Angarsk); averaged environmental relative risks of diseases of certain classes for 2000–2004 in these cities (five to eight classes of diseases) vary between 1.5 and 3 times.
- Taking into account the experience of applying the known criteria by state environmental review specialists to assess the environmental situation on the basis of medical and demographic indicators, we should attribute these territories to territories of critical environmental impact or environmental crisis.
- Environmental child morbidity in all the industrially developed territories under examination is formed by: (a) atmospheric pollution and (b) unaccounted unfriendly environmental factors, characteristic of each territory compared to the background ones. As a rule, the contribution of environmental morbidity caused by all these factors in total to general morbidity in all industrial territories is high and reaches 37–42%, including 15–29% from atmospheric pollution, i.e., 37–63% of environmental morbidity as a whole.
- Under the impact of environmental pollution and other unfriendly factors, the environmentally neglected territories develop adaptive response, including increased nonspecific resistance. The latter decreases the level of relative risks and the role of pollution as a factor of their formation. Such effects are observed in both individual areas and territories as a whole; they significantly dis-

tort the concept of the effectiveness of preventive measures. Expert analysis of the dynamics of harmful emissions, environmental pollution, and child morbidity in the territory in question and its individual areas is necessary to assess the efficiency of measures implemented.

- Although the removal of atmospheric pollution makes it possible to forecast a decrease in relative risks of general morbidity to a point below the definite criteria of environmental impact, the residual risk remains high for a number of classes of diseases; in other words, we cannot accomplish our goal by liquidating atmospheric pollution. It is necessary to reveal and study the role of other factors and to work out respective preventive measures.
- General child morbidity in environmentally neglected territories is formed under the influence of (a) atmospheric pollution; (b) unaccounted unfriendly factors characteristic of each territory compared to the background territories; and (c) miscellaneous unfriendly factors, common to both background territories and those under examination. To prevent the «background» growth of morbidity in all the territories, it is necessary to conduct special studies on revealing its forming factors and developing respective preventive measures. This should be taken into account when determining the tactics and strategy of decreasing environmental risks and child morbidity in the territories under examination.
- To improve the environmental state of a territory, it is necessary to implement:
 - measures to reduce harmful emissions and remove health risks of atmospheric and other environmental pollutions;
 - centralized medical-preventive measures to reveal, cure, and prevent (collectively and individually) environment-induced health disorders and rehabilitate chronic patients by (a) reducing morbidity among priority classes of diseases, which form general morbidity risks; (b) decreasing morbidity among classes of diseases, which are characterized by a high relative risk as a criterion for attributing a territory to environmentally neglected one but which do not make a substantial contribution to general mortality; and (c) revealing the factors of a high relative risk after pollution has been removed and developing measures to decrease and/or remove their impact; and
 - to conduct a full monitoring of atmospheric and other environmental pollutions and child morbidity and to ensure respective scientific support for an objective assessment of the efficiency of these measures.

To decrease and remove the impact of pollution on child morbidity, it is necessary to correct, revise, and implement target complex programs on transferring the territories of the industrial cities in Irkutsk oblast from the category of environmentally neglected ones with regard to medical, demographic, and other indicators; and on creating conditions for transition to sustainable socioeconomic development.

In Bratsk, such a federal target program of the second stage was developed: it envisaged liquidating the emergency environmental situation and creating conditions for sustainable socioeconomic development. In Shelekhov, a new program for the period until 2011 has been worked out, which envisaged developing conditions for liquidating the existing unfriendly situation and improving the city's environment and people's, primarily children's, health. However, starting from 2003, the city administration stopped active measures envisaged by this program. The effective mass prevention of child morbidity, which was previously conducted at schools and other children's institutions, has also been stopped. The target program of Angarsk, which was approved by the state environmental review and which envisaged the improvement and stabilization of the environmental situation, needs substantial revision, especially with regard to atmospheric protection. The liquidation of the emergency environmental situation should be formulated as a goal. However, since 2003, the new administration has been minimizing the work aimed at improving this program. It has stopped financing (a) the monitoring of additional specific admixtures and (b) the complex health target program Health and Education.

Target programs are the most effective way of removing pollutions, fulfilling medical preventive measures on improving child health, and conducting monitoring and scientific support of assessing the efficiency of these measures. A breakaway from target programs is a serious step backward.

Target programs mean mobilizing finances from all sources, including enterprises that pollute the environment. They are the main source of such programs. For example, out of 5 billion rubles spent in Bratsk on the environmental program, 800 million rubles were allocated from the federal budget and another 800 million from the oblast budget, while the rest of the funds were allocated by enterprises. Hence, we should involve enterprises in improving the environmental situation. For this, we need a federal law on the status of environmentally neglected zones.

Since atmospheric pollution in the majority of affected cities is a leading risk factor, it is necessary to develop MPE (maximum permissible emissions)

accumulated volumes for cities as a whole in order to determine priorities measures with regard to dangers for vulnerable groups, such as children and elderly people. This is a very important tool for determining priorities and controlling health care.

It is necessary to change the attitude of state and municipal authorities to problems of environmental protection and public health on environmentally affected territories.

To liquidate negative environmental impacts on children's and grown-ups' health on environmentally unsafe industrial territories, it is necessary:

- (1) to speed up the adoption of the federal law on the status of environmentally unsafe zones in elaboration of article 57 of the Federal Law On Environmental Protection;
- (2) to achieve the implementation of the national program of improving the situation in zones defined as environmentally unfriendly by the state environmental review (at least, in some of them), located in different climatic zones of Russia (within the framework of pilot projects) as the first step to liquidate environmental emergency situations and to transfer industrial cities to sustainable socioeconomic development;
- (3) to optimize the composition of controlled admixtures in the state monitoring of atmospheric and other environmental pollutions at the expense of specific pollutants on environmentally unsafe territories;
- (4) to develop MPE cumulated volumes for all environmentally unsafe territories, containing assessments of health risks as a means to determine priority vectors in liquidating the impact of atmospheric pollution on health; and
- (5) to ensure measures to liquidate environmentally unfriendly situations in territories and to create conditions to transfer these territories to sustainable socioeconomic development within the framework of target programs, including respective scientific support to assess the efficiency of preventive measures.

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THE IMPACT OF CHEMICAL POLLUTION ON CHILD HEALTH IN MAGNITOGORSK

The main contributor to atmospheric emissions is the Magnitogorsk Metallurgical Complex (MMC). Its share in the structure of emissions from stationary sources is almost 99% and from all the sources, 81%. The industrial site of the metallurgical complex is situated practically in the center of the city. The main sources of solid emissions are the production of cast iron (during agglomeration and in blast furnaces), steel (in oxygen-blown converters), ferrous alloys, and hot-rolled products; foundry and coke facilities; and various secondary processes. Gaseous emissions are due to combustion processes. Anthropogenic chemical compounds prevail in the atmospheric air and penetrate into the human organism mainly by inhaling.

According to lengthy observations over the past 15 years, the whole city's territory has shown excessive maximum permissible concentrations of multicomponent dust, NO₂, NO, carbon disulfide, phenol, ethylbenzene, styrene, benzpyrene, and iron. There are two large districts in the city: the western part and the eastern part. The western part is adjacent to industrial enterprises, particularly to the metallurgical complex, which results in a more marked chemical atmospheric pollution; the eastern part is about 15–17 km away from the metallurgical complex. In the western part, the content of suspended matters is on average 1.53 times higher; that of benzpyrene, 2.4 times higher; of iron, 1.99 times higher; of cadmium, 2.12 times higher; of manganese, 1.74 times higher; of chrome, 8.63 times higher; of lead, 2.12 times higher; and of zinc, 2.2 times higher than in the eastern part.

We have studied the health of preschool children on the basis of different indicators: the incidence of diseases according to data of deep medical screening, the frequency of congenital morphogenetic variants (CMGV), the adaptive potential (the state of the autonomic nervous system and the hormonal and mental statuses), and indicators of secretory immunity.

Comparative studies of the incidence of diseases according to data of deep medical screening among four- to seven-year-old children from preschool institutions, who live in these zones of the city, have shown a higher incidence of respiratory and blood diseases and mental and behavioral disorders, as well as a higher general morbidity, in the more polluted district (the western part) than in the less polluted one (the eastern part).

Crucial medical and genetic indicators – congenital morphogenetic variants – have been assessed. Congenital morphogenetic variants are persistent morphological changes in an organ or its part or in a part of the body, which are beyond or at the boundaries of the normal structure but do not lead to malfunction. Congenital morphogenetic variants may be inherited morphogenetic variants of the norm, reflect a small accidental deviation in embryonic development, and be a result of teratogenic or mutagenic effects.

Comparing the average number of congenital morphogenetic variants in Magnitogorsk with that in other Russian cities shows that this indicator in Magnitogorsk (2.90) is higher than in cities with a low lev-

By now, it is universally recognized that chemical pollution of the environment causes negative changes in children.

Despite the considerable number of works on interrelations within the «environment-public health» system, the assessment of regional impacts in order to develop efficient preventive and recreation measures remains topical.

The city of Magnitogorsk (Chelyabinsk oblast) is a large industrial center in the Southern Urals. Its geochemical and climatic characteristics hinder the scattering of harmful admixtures and favor constant chemical atmospheric pollution. This leads to a high anthropogenic load on the city's population. Magnitogorsk is annually on the list of 15 Russian cities stably characterized by excessive chemical atmospheric pollution.

el of chemical pollution, such as Plavsk (1.84) and Novozybkovo (1.84), and in the city of Yaroslavl', characterized by a mixed type of anthropogenic environmental pollution (2.63). The frequency of congenital morphogenetic variants is the same as in Novomoskovsk (2.91), an industrially developed city. It has been established that the number of congenital morphogenetic variants in the western part of Magnitogorsk (3.12) is higher than in the eastern part (2.78).

Since changes in the organism, caused by chemical environmental pollutions, may not be associated with diseases, we have examined apparently healthy children (health groups 1 and 2). Comparison between the districts has shown a lower (1.23 times) share of normal autonomic reactivity in the western part than in the eastern one. Thus, prolonged chemical atmospheric pollution acts as a nonspecific stressor and causes changes in children's autonomic reactivity. Exhaustion of spare capacities of the organism (both autonomic and central) is observed.

Studies of the hormonal status have shown that in all the children under examination, the concentrations of hormones in the blood plasma are in accordance with the age norms. However, deviations have been discovered, which show that in the more polluted district, the functional activity of the thyroid gland is ensured through stimulating the central mechanisms of the biosynthesis of thyroid hormones by the hypothalamic-pituitary system.

Results of the personal anxiety assessment seem very important, because this test reflects subjective sensations of ill-being, which largely predetermine children's behavior. A high level of anxiety is 1.59 times more frequent in the western (more polluted) part of the city than in the eastern one. On the contrary, a medium level of personal anxiety is 1.27 times less frequent in the western part.

Indicators of secretory immunity in the parotid fluid in apparently healthy children have been studied. It has been established that saliva of children living in the more polluted district contains two times less complement and its components C1 and C4, as well as 45 and 25% less Ig A and Ig M, respectively.

Overall, changes in the health of preschool children concern both morbidity and physiological, hormonal, and mental indicators in apparently healthy children.

The study has allowed us to make the following conclusions:

1. Sanitary analysis of chemical atmospheric pollution shows its high level in Magnitogorsk.
2. It has been discovered that the incidence of respiratory and blood diseases and mental and behavioral disorders, as well as the general lev-

el of morbidity are higher in the more polluted part of the city.

3. It has been established that the average number of congenital morphogenetic variants in Magnitogorsk (especially in its more polluted district) is higher than in other Russian cities.
4. Analysis of physiological, hormonal, and mental indicators has shown that the adaptive potential of apparently healthy children of 6 to 7 years of age, who live in the more polluted district, is lower than that in the less polluted one.

Today, there are many township-forming enterprises in Russia. At the same time, there is no research institute that would receive target funds and study the impact of atmospheric pollution on the health of children. In Magnitogorsk, there is the Department of Biomedical and Environmental Knowledge at Magnitogorsk State University, but such studies are not budgeted. However, even under these conditions, both in Magnitogorsk and in Russia as a whole, we are able to accomplish an important goal today: to inform population. We often communicate with teachers, including biology and ecology teachers, who, in their turn, work with children and their parents. Our experience shows that even teachers (!) have very little information and even this scanty information is distorted by mass media for the most part.

In this connection, in our opinion, we should work in alliance with schools and universities. At present, a concept of school local-study education is being developed. At the local level, sites are being created, such as «My Native Place». One of the pages is «The Environment and Economy of the Region». Moderate funds are allocated to this work. At present, we add real information about the impact of the substances contained in the atmosphere of Magnitogorsk. This information should be clear and comprehensible for teachers, because they do not visit sites of Federal Service for Supervision of Natural Resource Use (Rosprirodnadzor) and other ministries and agencies. We think that professional medical specialists in regions should be more active in this respect.

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PEOPLE'S HEALTH: NEW METHODS OF SOLVING OLD PROBLEMS

The health of the Russian population is in a critical state. Basic research into this problem shows a crisis of the state of health in each age group. If this tendency continues, the forecast of the future of our country may be extremely pessimistic. Hence, the problem of preserving people's health has become a priority for both the executive power and society.

Many factors cause serious problems with regard to preserving the Russian population's health. They are diverse, and it does not make sense to consider all of them. I would like to enumerate the main ones under the competence of public organizations:

- inaccessibility of the latest achievements in health improvement for the major part of population;
- the lack of information that could allow people to choose the optimal and efficient methods of health improvement; and
- the absence of coordination between personal efforts and the efforts of public associations, scientific organizations, authorities, and business communities.

Human health forms a base, which is influenced by personal ideas, lifestyles, culture, living conditions, and biological characteristics, as well as by the social, spiritual, economic, and physical environments.

Mental and physical health and emotional and psychological comfort are the only components of the «healthy lifestyle». These seemingly simple vectors include very many methods and approaches; their diversity and the possibility of choice will help people draw up personal «schedules» of health improvement and choose the optimal model of a healthy lifestyle.

The new strategy of work with population, which is being developed by the Russian Public Movement for Healthy Russia, is very important for solving these problems.

The Public Movement for Healthy Russia, which was organized in 1996, unites many experienced professionals. These are specialists in environmental protection, education, science, culture, rehabilitation, social protection, economics, and ecology.

Scientists of our movement regard the state of health as a system-forming factor. It indicates the degree of society's development and the quality of the environment.

The specificity of Russian regions, associated with edaphic-climatic, demographic, social, and environmental characteristics, requires deep studies of the state of people's health and the quality of the environment. A network of healthy nutrition centers allows us to draw additional resources to work out and implement new methods and means of healthy nutrition, which make it possible to improve the health of people, to form the values of healthy lifestyle, and to support the system of propagation and education. All this may help improve the state of people's health.

The basic component of the new strategy is the fact that it focuses on the individual within the environment. Means of realizing this strategy are the following:

- information about the state of the environment and the state of people's health;
- new methods of assessing the state of human health;
- the creation and development of innovative technologies of health improvement; and
- the generalization of experience and the development of information technologies to form healthy lifestyles.

In 2000, within the framework of the movement's programs, our Siberian Division, under the leadership of Director T.I. Novoselova, actively ensured interaction between organizations from different agencies of different forms of ownership to unite efforts in propagating the idea of healthy lifestyles among people. Different organizations participated in this: the Western Siberian Division of the Russian Academy of Ecology, the Siberian Division of the Russian Academy of Medical Sciences, the Novosibirsk State Medical Academy, the Novosibirsk Gossanepidnadzor (State Sanitary and Epidemiological Surveillance) Center, the Novosibirsk oblast's Department of Public Health, the Knowledge Society, the regional public movement Third Variant, the Fund of Mercy, and the Novosibirsk Red Cross Committee.

The discussion resulted in the movement's program Healthy Nutrition Is the Health of the Nation, developed by our Siberian Division. The Center of Healthy Nutrition and Psychophysiological Rehabilitation was organized in Novosibirsk.

In 2001, at the Civil Forum in Moscow, the Movement for Healthy Russia coordinated the panel discussion Human and Environmental Health. As a result, the main vectors of cooperation between state and public organizations were determined. It was proposed to develop a mechanism of implementing the concept of optimal nutrition through the creation of regional centers of healthy and dietary nutrition.

Individual functional nutrition is one of the main factors that determine human health and ensure the normal growth and development of children, prevention of diseases, and prolongation of life.

The formation of balanced nutrition and the attitude towards life are interconnected problems of an equal rank. At present, the life of each person depends on the system and quality of nutrition. Unhealthy nutrition among children leads to deviations not only in physical development but also in mental development; thirst for quick and easy methods of satisfying oneself, such as alcoholism and drug taking; and social diseases, such as tuberculosis and AIDS.

This is a state problem, and all social strata and all levels of the power and public should participate in solving it. In recent years, federal bodies have been taking active measures to implement the principles of state policy on healthy nutrition, the state priority being human health.

The main vector of Russian policy on healthy nutrition is to develop and implement complex programs aimed at creating conditions that would satisfy the needs of different groups of population in individual, functional, and healthy nutrition with regard to their traditions, habits, and economic positions, as well as regional industrial potentials and scientific requirements.

The Civil Forum and negotiations with the Ministry of Public Health resulted in the fact that the Russian Academy of Medical Sciences, the Ministry of Industry and Science, the Department of Social Development under the Russian government, the Movement for Healthy Russia, the Association of Developers and Manufacturers of Biologically Active Additives and Specialized Foods, and the New Century Fund for Health and Environment Protection created the interdepartmental working group Healthy Nutrition Is the Health of the Nation. The working group is involved in the whole range of problems of interaction between state and public organizations in healthy nutrition. One of its goals is to create an experimental model of implementing the provisions of the Concept of State Policy in the Field of Healthy Nutrition on the basis of the movement's Siberian Division. The Siberian Center of Healthy Nutrition became the core of this model. Scientific and public organizations, such as the RAMS Institute of Nutrition, the RAMS Siberian Division, the Novosibirsk State Medical Academy, the Association of Developers and Manufacturers of Biologically Active Additives and Specialized Foods, and the Movement for Healthy Russia, participated in the development of the provisions for the operation of the Siberian Center of Healthy Nutrition.

The main task of the healthy nutrition centers is the formation of public opinion concerning the

importance and necessity to preserve people's health and well-being. It is important that in all the spheres (science, production, and consumption), the preservation of the quality of life was determined as priority.

These healthy nutrition centers implement this task by coordinating informational, methodological, and practical technologies of different public, government, scientific, and commercial organizations.

Within the framework of the movement's regional divisions, the program of creating healthy nutrition centers is being actively implemented. These centers are being created on the basis of a universal scientific-methodological approach with regard to regional specificity. Today, demand for the methods of creating healthy nutrition centers is observed practically in all Russian regions.

Healthy nutrition centers of have been already opened in federal districts, such as the North-western (St. Petersburg), Central (Moscow, Bryansk, and Tambov), Volga (Nizhni Novgorod and Samara), Ural (Yekaterinburg), Siberian (Khakassia, Altai Krai, and Kemerovo, Tomsk, Tyumen', and Omsk oblasts), and Far Eastern (Khabarovsk).

The growing network of healthy nutrition centers helps attract additional resources for the development and implementation of new methods and means of healthy nutrition, which improve the health level of citizens, form healthy lifestyles, and support the system of propagation and education. All this may help reduce morbidity and save funds for medical care.

Taking into account Russia's national and territorial diversity, the government bodies drastically need professional partners with scientific knowledge and organizational skills to develop the mechanisms for practical implementation of the healthy nutrition policy and optimize people's nutrition.

The joint project, designed by the Russian Ministry of Public Health and Social Development and the All-Russia Public Movement for Healthy Russia to create the mechanism of implementing state and society concepts through the system of health nutrition centers, demonstrates an example of the successful pooling of efforts and setting partner's relations between the government and public structures. It gives the hope that all targets set will be met.

The efficiency of such an approach was acknowledged at the Russian Forum in Nizhniy Novgorod (2003), the Social Forum in Perm' (2004), the VIII All-Russia Congress «Optimal Nutrition Is the Nation's Health» (2005), and the I All-Russia Conference «Healthy Nutrition Centers Are the Regional Policy of People's Healthy Nutrition» (2006). The joint discussion of the implementation of the All-Russia Public Movement's program For Healthy Russia by government representatives, public organizations, and the scientific community at all-Russia forums has demonstrated mutual interest in pooling efforts to solve human health problems.

Note that the All-Russia Public Movement for Healthy Russia's goals and objectives are not limited to the problems of functional nutrition. As was stated above, the nation's health is a complex criterion that needs a systemic approach. The movement's programs, such as Sociomedical Rehabilitation, Childhood, Narcology, and some others are organic parts of the efficient mechanism for solving the common problem of public health.

Pooling the efforts of society, government structures, and business is the only possible and efficient way to solve health-related problems. In this case, the role of public organizations is seen in accumulating ideas and taking them to broad discussions. Public organizations may become intermediaries between society, the powers, and business in pinpointing urgent and critical social issues. The efficient implementation of the concept Healthy Nutrition is the Nation's Health by the All-Russia Public Movement for Healthy Russia proves that such cooperation is possible.

E.Yu. Shatalova
All-Russia Public Movement for Healthy Russia

PUBLIC ORGANIZATIONS AS A TOOL FOR UNITING PUBLIC RESOURCES

Within the framework of the ROLL Program, best practices in environmental low-cost technologies in the fields of mitigating health risks associated with environmental pollution, resource saving, biodiversity conservation, and environmental education were exchanged. Every fifth ROLL project contributed to the improvement of the health of the Russian population. At present, the team of this program works as the Fund for Sustainable Development (FSD). The main noteworthy point is that this fund has begun working with Russian business, which views the development of cooperation with public nongovernmental organizations as its long-term strategy.

It is worth mentioning that supporting the nongovernmental sector in Russia is a very important factor of business stability at the regional level. The forms and models of this cooperation deserve much attention, including the selection of the best practices of nongovernmental organizations (NGOs), which are already active partners in this market. Large Russian business develops its programs of social corporate responsibility in accordance with the international standards of the dialogue and cooperation with different sectors of society. There is a tendency to increase the responsibility of business at the local level. This process is being realized through adopting quality standards (ISO 9000), environmental management standards (ISO 14 000), and labor safety standards (ISO 18 000) and drawing up nonfinancial statements on social programs (AA 1000).

Cooperation with NGOs should be not only within the framework of state programs but also in partnership with Russian and international business. This is cooperation proper, because it is based on the use of business and state-order resources, as well as the mechanisms and technologies of public organizations that specialize in the mobilization of local resources. Many of such mechanisms are just being tested in Russia. Those that have proved to be effective may be disseminated.

At present, our Fund for Sustainable Development works in cooperation with three Russian organizations: SUAL Holding Co., OAO MKhK EuroKhim, and the Alcoa Foundation (an international organization with Russian representation).

What are they interested in and what do they allocate funds for in Russia? The funds are mainly allocated for supporting the sustainable development of the territories they are situated on and for ensuring relationships with local communities according to the new rules and international standards of dialogue and cooperation. To accomplish this, they use the simple mechanism of tender or grant programs.

Using the existing experience in developing, organizing, and conducting local competitions on topical trends for each region, the Fund for Sustainable Development offers Russian and international donors an effective tool for creating social partnerships at the regional level.

The subjects of the programs, based on close interconnection between the environment and human health, are clear and topical for the majority of Russian territories. This problem worries all the people and helps unite local resources for solving a number of topical questions.

For example, in 2005–2006, the Fund for Sustainable Development was realizing the program «The Environment and Human Health on the

In Russia, various international programs have been working for more than ten years; an unquestionably unique one among them was the ROLL Program (Dissemination of Experience and Results). It was essentially a Russian program. More than 450 organizations received a unique opportunity to introduce their developments and disseminate their positive expertise in other regions, which made it possible to restore broken partnerships in professional communities from Kamchatka to Karelia.

Sites of Aluminum Enterprises». This program worked in three pilot regions: in the city of Kamensk-Ural'skii (Sverdlovskaya oblast); in the city of Shelekhov (Irkutsk oblast); and in the village of Nadvoitsy, the city of Segezha, and Segezha district (the Republic of Karelia). It was part of the joint program of OAO SUAL Holding and the US Agency for Sustainable Development «Promotion of the Reform of Local Self-Government and Socioeconomic Development of the SUAL Territories». Eighteen projects, based on local initiatives and aimed towards resource saving, the organization of public services and amenities, the improvement of the quality of sewage treatment, and solving social problems, were supported. Of course, methods of solving problems depend on the scale of the programs. However, not all the problems can be solved using the small funds allocated as charitable assistance or within programs of socially responsible business on individual territories.

At present, the Fund for Sustainable Development works in the city of Nevinnomyssk (Stavropol' Krai) within the framework of the EuroKhim Program and the US Agency for Sustainable Development «The Environment and Human Health in the City of Nevinnomyssk and Other Regions of EuroKhim Presence». This program is aimed toward involving population in solving problems of health control through improving the quality of the environment. Which problems have been chosen as priorities? The following issues have been singled out as the most important: preserving and rehabilitating child health through improving the environmental situation at child social institutions, including the improvement of the quality of drinking water and air; implementing energy- and resource-saving technologies at social objects (schools, kindergartens, orphanages, hospitals, etc.); reducing environmental pollution through improving the treatment of household and industrial wastes, including the treatment of sewage and cooling water; planting and organizing public services and amenities; and decreasing the negative impact of agricultural activities on the environment through implementing ecological agricultural technologies.

We are beginning to work on the territories of the city of Samara, the city of Belaya Kalitva, and the village of Lyubuchany (Chekhov district of Moscow oblast) within the Alcoa program «Responsible for the Future». This program is aimed at environmental education of children and at solving socioeconomic problems of the territories with the participation of local NGOs. We continue to work with the SAUL Holding and to support environmental-social initiatives on the pilot territories in Irkutsk oblast, Sverdlovskaya oblast, and in Karelia.

What do such projects consist of? First, they make people more active and help strengthen confidence in themselves by showing a real, even if not too large, opportunity to achieve some results independently in cooperation with specialists. This is accom-

plished by tender programs, within which moderate grants are allocated. Of course, they cannot solve global problems of these territories. However, they usually engage specialists who solve various problems together with the public. The participation of Russian business in sustainable development at the local level through programs of social corporate responsibility is developing. This is also clear from materials confirming the participation of business in conferences on charity in Russia. For example, on March 6, 2007, under the aegis of the newspaper Vedomosti, the III Annual Conference «Charity in Russia», to which many corporations had been invited, took place. The year of 2006 was proclaimed the Year of Charity. Although business has different motivations for its participation in charity programs and programs of social responsibility, the beneficiaries of such programs are interested in their ultimate results: the country receives new resources for solving urgent problems of societal development. In other words, Russian international business displays its social activity, even if not to the desired degree. However, this is a beginning of the long-term process of returning traditions of business's participation in promoting development at the local level.

As opposed to our colleagues – clinicians or Rospotrebnadzor (Federal Service for Surveillance on Consumer Rights Protection and Human Well-Being) specialists – we help solve this problem in cases when, according to world statistics, 50% of health depends on the mode of life and may be controlled by people. Through its programs «The Environment and Health», the contributes to making healthy lifestyle fashionable. In particular, our programs support projects that can propagate healthy lifestyle through programs and clubs. The priority here is support by specialists who can work with children.

In conclusion, I would like to offer the following recommendations: we need support of nongovernmental organizations as a special mechanism of uniting resources of society; we have to solve problems associated with environmental pollution and health protection; it is necessary to support different youth-oriented programs, primarily environmental ones; and state structures and business should support programs on forest restoration and energy saving (such programs have been also realized within the framework of Fund for Sustainable Development programs) more than ever. This is what helps and may be solved by moderate means and with the participation of the public.

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CLEANER PRODUCTION VS. TOXIC EMISSIONS

The Center of Cleaner Production and Sustainable Development has been working in Russia for 12 years. We work in direct cooperation with industrial enterprises and help them transfer to environmentally cleaner production.

According to the UNEP definition, cleaner production means continuous changes in production practices, including those aimed at reducing the use of toxic materials and decreasing their number.

Cleaner production is achieved not only through the most advanced technologies but also owing to readiness to change production practices. The experience of our organization shows that the latter is of great importance.

While realizing our program, which is being implemented primarily in the northwest of Russia, we completed the loan for the Solombal'sk Pulp and Paper Complex. As a result of our work, harmful atmospheric emissions of methyl mercaptan stopped in this city.

In 2006, we fulfilled the mercury emission reduction program at OAO Caustic in Volgograd. We reduced mercury consumption by about 800 t, which is a significant achievement.

It is noteworthy that all mercury emissions from our three enterprises (in the cities of Kirovochepetsk, Sterlitamak, and Volgograd), which use mercury in caustic production, rouse no reprimand on the part of control bodies. They are within standard values. We are trying to reduce specific consumption and to reach the European level in this respect. OAO Caustic has received a EuroChlor grant to minimize mercury emissions.

Unfortunately, our proposals on this work at the Sterlitamak Khimprom, where powerful mercury emissions also take place, have found no support among the executive staff of this enterprise. Medium-level managers said, «Why should we reduce the level of mercury consumption? Of course, it is higher than in Europe, but, since we hear no claims from control bodies, it is not worth working over this, although mercury overconsumption means that mercury goes to the environment».

In our programs, we pay much attention to toxic compounds, such as dioxins; in particular, we conduct antidioxin programs at the Kotlas and Archangelsk Pulp and Paper Complexes, which are sources of dioxin pollution. The main difficulty is the necessity to conduct very expensive dioxin measurements. Fortunately, the managers at these enterprises understand the significance of reducing the level of dioxin pollution and have consciously accepted cleaner production programs. In Russia, dioxin consumption is neither restricted nor controlled. Along with the distribution of dioxins by the Severnaya Dvina River, there is another powerful channel, the Angara River.

Another important trend in our work is control over the chlorine treatment of drinking water, which inevitably results in a large number of dioxins. Obviously, they affect huge numbers of people. In this respect, we have been unable to do much so far because of the indefinite attitude of people to dioxins.

Cleaner production is achieved not only through the most advanced technologies but also owing to readiness to change production practices. The experience of our organization shows that the latter is of great importance.

I have familiarized myself with a number of papers on this subject, including the studies of the Institute for the Ecology of the North in Archangelsk and the Bashkir Ecological Center and the works by Professor B.A. Revich, which show that the impact of dioxins on health is very strong. In addition, they accumulate in the organism.

We also develop other trends, such as collecting pesticides and storing them on definite sites. With financial support from the Arctic Council, this work was conducted in 15 Russian regions; and the government of Denmark funded it in Pskov and Volgda. Unfortunately, it turns out that our oblast administrations do not need this work. It has been stopped, and we cannot continue it. This takes place despite negative events, such as the destruction of warehouses in Pskov, which was probably deliberate, into the bargain.

I support the thesis that it is necessary to solve the problems of the so-called «hot spots», where levels of pollution are especially high. We have already participated in such work. For the northwest of Russia (Murmansk, Archangelsk, Karelia, and the Komi Republic), such spots have been determined at the international level and approved by the Barents Euro-Arctic Council. The methodology of singling out such spots was based on thorough analysis of the situation, involving investors and local authorities. It was difficult to ensure such interaction, because local authorities regarded everything that concerns activities of large companies as internal affairs of these companies.

I am sure that our recommendations, summarizing the results of the hearings of the Public Chamber Commission on Environmental Safety and Environmental Protection «Environment and Human Health» (January 23, 2007), should include the proposal to continue the work on hot spots in other regions as well.

Why is it necessary? It is necessary because the civil society should press the responsible organizations «from below». When these organizations know that there are concrete hot spots and they have definite responsibilities to improve the situation there, opportunities will appear to work accordingly and to gradually remove the sources of pollution.

Russia has been delaying the ratification of the Stockholm Convention on Persistent Organic Pollutants for many years. Perhaps, it would be advisable to hear the provisions of this convention at the Public Chamber, because, as far as I understand, ratification is hindered by bureaucratic obstacles.

In conclusion, I would like to say that, in our opinion, much depends on the attitude of people and authorities to the prevention of polluting emissions.

The Center of Cleaner Production and Sustainable Development offers to hold a conference on

the improvement of our comprehension of environmental protection. We have entitled this conference «Orthodoxy, Man, and the Environment» and have received the blessing of the Patriarch of All Russia. We suggest that our materials and proposals on this conference should be considered by the Public Chamber.

The conference will be held in 2008 in Moscow and will deal with important problems, including the national state of health. In my opinion, compared to the 1980s, now we pay less attention to the fact that health, especially child health, depends on the state of the environment. This is due to economic changes that have ousted the necessity to ensure pure air, clean drinking water, and everyday contact with nature to the periphery of mass consciousness. However, this cannot reduce the negative impact of civilizational effects on the human organism; on the contrary, we need rapid changes in both the strategy of environmental protection and the individual's attitude to environmental problems.

All these and other problems will be discussed within the following sections:

- (1) Responsibility of the Individual for the State of the Environment: Legislation and Behavior;
- (2) Theological Comprehension of Relations between People and the Environment;
- (3) Environmental Education: The Growing Generation and Our Expectations;
- (4) Nature and the Health of the Nation: Charity and Mercy; and
- (5) Interaction between People and Nature as a Subject of Inquiry.

This conference will help draw the attention of people to the fact that they are personally responsible for actions against Nature as a God's creation and that they can and must find reserves, time, and patience to take real steps that will put an end to illegal actions. We understand the importance and necessity of financing, completed projects, and legal rules; however, very much depends on education and conscience irrespective of one's post.

A.P. Tsygankov

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