
AMBIENT AIR POLLUTION

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Air pollution is one of the most serious environmental threats to human health. By taking action to reduce air pollution, countries can reduce the burden of diseases such as stroke, heart disease, lung cancer and chronic or acute respiratory diseases, including asthma.

Ambient air pollution is one of the most serious environmental factors affecting the health of everyone in low-, middle- and high-income countries. In 2019, ambient (outdoor air) pollution in both urban and rural areas was estimated to cause 4.2 million premature deaths worldwide; this mortality is due to exposure to fine particulate matter, which leads to the development of cardiovascular, respiratory and cancer diseases.

WHO estimates that in 2019, about 37% of premature deaths associated with air pollution occurred as a result of coronary heart disease and stroke, 18% and 23% as a result of chronic obstructive pulmonary disease and acute lower respiratory tract infections, respectively, and 11% - as a result of cancer of the respiratory tract. People living in low- and middle-income countries bear a disproportionate burden of disease caused by outdoor air pollution: these areas account for 89% of cases (of the 4.2 million premature deaths). The highest disease burden is found in the WHO South-East Asia and Western Pacific regions. Recent estimates of the burden of disease indicate a major role of air pollution in the development of cardiovascular diseases, including fatalities.

One of the acute environmental problems of the present time is air pollution. In large cities, motor vehicles are among the main sources of air pollution. Exhaust gases from engines contain a complex mixture of more than two hundred components, including many carcinogens. Harmful substances enter the air almost within the human breathing zone. Therefore, road transport should be considered one of the most dangerous sources of air pollution. This work is devoted to the problems of air pollution from vehicle emissions and meteorological aspects of solving this problem. The work analyzes the state of air pollution from vehicle emissions in various cities and considers two ways to reduce air pollution: a short-term reduction in vehicle emissions during periods of adverse meteorological conditions (UNMC) based on a short-term forecast of air pollution and the implementation of long-term programs of technical and organizational measures to reduce vehicle emissions. Therefore, the achievement of hygienic standards is provided for in relatively frequently occurring unfavorable meteorological conditions, and in rare cases of abnormally dangerous situations, air purity is ensured by forecasting and regulating emissions. This

determines the great economic effect of forecasting air pollution. By short-term forecast in this work we mean a forecast of the level of air pollution up to a day in advance, which involves taking measures to prevent an increase in air pollution. A long-term forecast of air pollution means a forecast of estimated concentrations of impurities for the future 10-15 years, taking into account measures to reduce vehicle emissions. Currently, the global automobile fleet has exceeded 600 million units, of which 83 - 85% are passenger cars. According to forecasts, by 2010 it will reach 1 billion units /89.108/. The global annual emission of harmful substances from cars is 50 million tons. hydrocarbons, 200 million tons. carbon monoxide and 20 million tons. nitrogen oxides.

Policies to reduce air pollution

A key measure to protect public health is the fight against air pollution, which is the second largest risk factor for the development of non-communicable diseases.

Most sources of air pollution are beyond the control of individuals, requiring consolidated action by local, national and regional policymakers in sectors such as energy, transport, waste management, urban planning and agriculture.

There are many examples of successful policies to reduce air pollution: in industry: introduction of clean technologies that help reduce atmospheric emissions at industrial enterprises; improving urban and agricultural waste disposal systems, including capturing methane generated at waste disposal sites as an alternative to burning it (for use as biogas); in energy: ensuring access to affordable energy sources at home for cooking, heating and lighting; in transport: transition to environmentally friendly methods of energy production; priority development of high-speed urban transport, pedestrian and bicycle traffic in cities, as well as railway intercity freight and passenger transportation; a shift to cleaner diesel engines for heavy-duty vehicles, low-emission vehicles, and cleaner fuels, including low-sulfur fuels; in urban planning: increasing the energy efficiency of buildings, landscaping and reducing the area of cities, increasing their energy efficiency; in the electricity sector: increased use of low-emission fuels and non-combustion renewable energy sources (such as solar, wind or hydropower); combined generation of heat and electricity; and distributed energy generation (for example, small-scale power grids and rooftop solar panels); in municipal and agricultural waste management: waste reduction strategies, waste segregation, waste recovery and reuse or recycling, and improved biowaste management techniques such as anaerobic digestion of waste to produce biogas are feasible low-cost alternatives to open burning of solid waste, except in cases where combustion is unavoidable and combustion technologies with strict emissions controls must be used; And in health: shifting health services to a low-carbon path can contribute to more sustainable and cost-effective service delivery, as well as reducing environmental health risks for patients, health workers and communities. By supporting climate-friendly policies, the health sector can demonstrate leadership at the societal level and improve the delivery of health services.

In many Russian cities, vehicle emissions dominate over emissions from stationary sources. For example, in Moscow in 1995, motor vehicles emitted 586 thousand tons of harmful substances, which is 66% of the total emissions of harmful substances. Large cities with a determining contribution of vehicle emissions include primarily: St. Petersburg, Tyumen, Yekaterinburg, Orenburg. Special mention should be made of resort cities such as Sochi, Tuapse, Kislovodsk, where motor transport is the main source of air pollution. Vehicle emissions in these cities account for 92%, 85%, 77% of total emissions, respectively /33/. In our country, the hygienic standards for the permissible content of harmful substances in the atmosphere are maximum permissible concentrations (MPC). According to the definition given in / 63 /: "MPC are such concentrations that do not have a direct or indirect effect on a person and his offspring, do not worsen his performance, well-being, as well as the sanitary and living conditions of people." When assessing the state of air pollution, the average impurity concentrations for a month (year) are compared with the MPCs.s. long-acting, concentration averaged over 20 minutes is compared with the maximum single MPCm.r. The Ministry of Health has developed and approved maximum permissible concentrations for populated areas for several hundred substances; in our country there are maximum permissible concentrations for plants. In many cities around the world, concentrations of harmful substances in the air created by vehicle emissions exceed ambient air quality standards.

In many cities of our country, the level of air pollution exceeds the maximum permissible concentration standards. In this regard, the problem of reducing the negative impact of motor transport on human health, air and water basins, flora and fauna, and soil is very relevant. The level of air pollution with harmful impurities depends not only on the amount of emissions of harmful substances, but also to a greater extent on the conditions of dispersion of impurities in the atmosphere. Under certain meteorological conditions, the concentrations of impurities in the air increase and can reach dangerous levels. Short-term reductions in emissions during periods of increased air pollution can significantly improve air quality. The issues of regulating emissions and forecasting air pollution are closely related.

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