Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

ECOLOGICAL AND HYGIENIC ASSESSMENT OF ATMOSPHERIC AIR IN THE OBSERVATION AREAS OF THE REGION

Ibodullayeva Sevara Saliybayevna,
Ikramova Nargiza Alisher qizi,
Maxmudova Marg‘ubaxon Fayziraxmon qizi
Tashkent State Medical University, Tashkent, Uzbekistan

Abstract

Relevance of the problem.

Public health has always been and remains the primary criterion for the socioeconomic development of society, and its preservation and strengthening is one of the main priorities of state policy. The Basic Law of the Constitution, the Law "On the Sanitary and Epidemiological Welfare of the Population," stipulates that citizens have the right to a favorable living environment (the natural environment, working conditions, living, living, and recreational), factors that must not have a dangerous or harmful effect on the human body of present and future generations.

The environmental and hygienic situation in the regions is assessed as critical, driven by deteriorating air quality, drinking water, and soil quality in populated areas, declining nutritional quality and nutritional status, social and living conditions, and the level of healthcare development and quality of medical care, requiring radical change. This is particularly relevant for residents of 22 cities with a population of 14.3 million, where atmospheric chemical concentrations exceed 10 MACs. Approximately 73% of the country's population (109 million people) live in unfavorable environmental conditions in Uzbekistan, including residents of Tashkent.

A number of studies by domestic and foreign authors have shown negative consequences for the health of the population in connection with the quality of the environment, and health itself is considered as a criterion for the quality of the living environment and the effectiveness of environmental protection measures.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

The most significant environmental factor for humans is the atmospheric air of populated areas and its qualitative composition. At least 10 million tons of chemical emissions enter the atmosphere of the Republic of Uzbekistan annually, the largest contributors being sulfur dioxide (up to 35%), carbon monoxide (up to 30%), hydrocarbons (1.2%), nitrogen oxides (1%), and specific pollutants (up to 2%).

The scientific literature has accumulated significant data on changes in the levels and structure of morbidity in ecologically disadvantaged areas; in particular, the frequency of visits to medical institutions for diseases of the respiratory system, circulatory system, skin, and subcutaneous tissue increases by 2-4 times.

Most of the works are devoted to the study of the health of children living in the zone of intensive air emissions from industrial enterprises: the incidence rates are growing, a 2-3-fold increase in diseases of the blood and circulatory system, congenital malformations, bronchial asthma by 1.5 times, pneumonia and acute respiratory viral infections have been noted.

Today, risk assessment methodology is widely accepted for environmental factors and public health, particularly in the context of chronic exposure to industrial atmospheric pollutants. Research assessing public health risks from exposure to atmospheric chemicals in large industrial centers has demonstrated regional differences in environmental and health conditions, and the need to assess the comprehensive impact of chemicals on the body in each region, taking into account the multifactorial impact of chemicals.

The population of certain rural areas located near industrial centers experiences additional anthropogenic load and is exposed to a higher risk of developing various pathologies in the population, and existing socio-economic, industrial, sanitary-hygienic and medical differences between the city and the village can only exacerbate the incidence rates of rural residents.

Available literature provides data on rural morbidity for individual regions of the Republic of Uzbekistan or based on their occupational status: machine operators, field and crop growers, and poultry farmers. Studies assessing the health status of the rural population and its relationship to air quality are lacking.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

The objective of the study was to conduct a hygienic assessment of the risk of air pollution in rural areas adjacent to a major industrial center and its impact on public health to provide a scientific basis for medical and preventive measures.

Research Objectives

To provide a hygienic assessment of the levels and dynamics of air pollution from stationary sources in Tashkent and adjacent rural areas for the period from 2022 to 2025.

To study long-term morbidity levels in the city and surrounding rural areas for 2022-2025.

To assess the health risk to the population from chemical air pollution emitted by stationary sources in Tashkent city, suburban and control areas.

To justify a set of medical, preventive and social hygienic measures to preserve and strengthen the health of the population living in adjacent rural areas.

Research Results

Tashkent region is a traditional agricultural region with developed industry and processing in the region. Priority air pollutants in the region, its districts and in the city of Tashkent are common ones, typical for all industrial sources: suspended substances, carbon monoxide, sulfur and nitrogen dioxides. In Tashkent, excess concentrations of carbon monoxide up to 5 MAC are constantly recorded with specific pollutants - hydrogen sulfide (up to 1.4 MAC), carbon disulfide (up to 1.3 MAC), phenol (1.4 MAC) and formaldehyde (up to 5.8 MAC). The air pollution index for the studied period ranged from 14.2 to 6.0, with an average long-term value of 9.53. Identical chemical substances in the atmospheric air in the region were determined in concentrations below the MAC IZA - within 6.4-2.7 with an average long-term value of 4.02.

In rural areas of the region, the volume of gross air emissions into the atmosphere from industrial facilities is insignificant (no more than 0.6 thousand tons per year). The population of the suburban and adjacent areas with the industrial center of Tashkent are subject to additional anthropogenic and geochemical load from the city's enterprises due to atmospheric air pollution with chemicals not typical

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

for local industry. All the studied chemicals were determined in atmospheric air samples of the suburban Tashkent district. Total typical pollutants (suspended solids, carbon monoxide, sulfur and nitrogen dioxides) in concentrations from 0.38 mg/ m3 (sulfur dioxide) to 1.0 mg/ m3 (carbon monoxide); the API due to typical pollutants was 2.43. Specific substances of air emissions from enterprises in Tashkent were determined in the following concentrations: phenol (1.2 MPC), carbon disulfide (1.3 MPC), formaldehyde (1.5 MPC), hydrogen sulfide (up to 1.0 MPC) and their specific contribution to the API for the studied period ranged from 38.6% to 71% (5 = 65%), amounting to a total of 10.27 units.

Long-term dynamics of population morbidity rates in the region indicate deterioration of their health due to a significant increase in overall morbidity +43.3% (from 98302.7 to 140817.2 per 100 thousand people) and primary +9.7% (from 60306.8 to 66131.5). The most significant increase was noted in rural areas: overall +82.3%) (from 82806.1 to 150965.8 per 100 thousand people), and primary +13.7%) (from 47419.4 to 53946.7) with a consistently high level in the city of Ryazan: overall from 135239.8 to 134433.7 (0.6%) and primary from 90980.0 to 84346.8 (- 7.3%).

An analysis of morbidity in age groups of the region's population for the same period revealed a significant growth rate among children: overall +73.6% and primary +61.9%; accordingly, among adolescents +90.4% and +78.5%, while among the adult population +32.4% and +3.2%.

In the suburban and adjacent areas of the city, the incidence of the population as a whole and by age group (children, adolescents and adults) is significantly higher ($p < 0.05$) than the indicators in the control area for diseases of the respiratory system, circulatory system, blood and hematopoietic organs, and congenital malformations.

A reliable, direct, strong, and moderate correlation was established between gross air emissions of chemicals into the atmosphere from stationary sources and individual emission components (suspended substances, CO) and the incidence of various classes of diseases in the population as a whole and in children, primarily diseases of the respiratory system, blood and hematopoietic organs, neoplasms, endocrine system diseases, and congenital malformations ($p<0.05$).

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

A similar picture was revealed in a correlation analysis of morbidity and gross air emissions in Tashkent city and the suburban district ($p<0.05$). In the control district, such a correlation was not established for any of the indicators.

The assessment of the risk of chronic exposure to chemicals polluting the atmospheric air in Tashkent city and its suburban Tashkent district showed that the most susceptible organs are the respiratory system, circulatory system, child development processes, eye diseases, blood and hematopoietic organs and associated additional morbidity; in Tashkent city as a whole, the average level of additional morbidity (per 100 thousand population) for respiratory diseases was 35.0 and for circulatory system diseases 318.7, which is 1.7 and 3.7 times (respectively) higher than the data in the control district; in the suburban district these indicators were 44.7 and 278.2, respectively, against 21.0 and 85.7 in the control district, i.e. the increase in respiratory diseases was 2.1 times and in circulatory system diseases 3.2 times ($P < 0.05$).

Conclusions

The assessment of damage from chronic exposure to chemicals in the atmospheric air due to additional mortality revealed its increase in the city of Tashkent by +7.8% and in the suburban district by +5.1% against 1.9% in the control district; in general, its increase in the region due to three municipalities amounted to +2.5% or 8938 people. The main contribution to the additional morbidity of the population from respiratory diseases is made by suspended substances, being the reason for the primary visit to health care institutions in Tashkent in 93% of cases and in 100% of all chronic bronchitis; in the suburban district, respectively, 69.7% and 100%. No less significant is the role of nitrogen dioxide in the additional visits to health care institutions due to diseases of the circulatory system, primarily myocardial infarction (in the city of Tashkent - 77.5% of cases and in the suburban district - 82.9%). Additional overall mortality in the studied municipalities of the region in 51.3%–65.3%–91.2% of cases is due to exposure to suspended matter.

The incidence of disease in the industrial center of Tashkent and adjacent rural areas is growing against a backdrop of deteriorating socioeconomic status and

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

lifestyle. The average monthly wage is 10-25% below the subsistence level, less than half of respondents have access to transportation and communications, and the average standard of sanitary and technical improvements in housing in the region is 68.0%. The lifestyle and way of life in rural areas does not meet the parameters of a healthy lifestyle by many criteria: half of respondents noted an unsystematic, unbalanced, and inadequate diet and a lack of regular physical activity; 75% suffer from insufficient or inadequate sleep; 40% of respondents are dependent on nicotine , 34% are excessive alcohol users. Stressful situations have a significant impact, the consequences of which most respondents are unable to cope with using adequate methods and means.

References

1. Axmedova, P. B. (2025). ADENOTOMY IN CHILDREN WITH ALLERGIC RHINITIS AND BRONCHIAL ASTHMA. *Web of Medicine: Journal of Medicine, Practice and Nursing*, *3*(3), 459-466.
2. Durdona, Q. S. R. O. T. (2024). THE CURRENT STATE OF THE PROBLEM OF SEVERE ACUTE PANCREATITIS.
3. Ikramova, N. A., & Axmedova, R. D. (2025, April). THE IMPACT OF ATMOSPHERIC AIR POLLUTION ON HUMAN HEALTH. In *The Conference Hub* (pp. 7-10).
4. Ikramova, N. A., & Axmedova, R. D. (2025, March). THE IMPACT OF ATMOSPHERIC ENVIRONMENTAL POLLUTION ON HUMAN HEALTH: THE ROLE OF MOTOR VEHICLES AND INDUSTRIAL EMISSIONS. International Conference on Advance Research in Humanities, Applied Sciences and Education.
5. Ikramova, N. A., Jalolov, N. N., Mirsagatova, M. R., Kasimova, K. T., Sadirova, M. K., & Sultonov, E. Y. (2025, April). AMBIENT TEMPERATURE AND THE RISK OF THERMOREGULATORY DISORDERS AMONG TRAFFIC POLICE OFFICERS: AN EPIDEMIOLOGICAL ANALYSIS. International Conference on Advance Research in Humanities, Applied Sciences and Education.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

6. Ikramova, N. A., Mirsagatova, M. R., Jalolov, N. N., Kasimova, K. T., Sultonov, E. Y., & Sadirova, M. K. (2025, April). THE EFFECT OF THERMAL LOAD ON THE BODY OF OUTDOOR WORKERS: ANALYSIS BASED ON MEDICAL AND HYGIENIC INDICATORS. International Conference on Advance Research in Humanities, Applied Sciences and Education.
7. Ikramova, N. A., Sherqo'zieva, G. F., & Salomova, F. I. (2025). OZIQ-OVQAT MAHSULOTLARINING XAVFSIZLIGI MUAMMOLARI VA YECHIMLARI. *Медицинский журнал молодых ученых*, (13 (03)), 279-283.
8. Ikramova, N. A., Suyunov, M. Z., & Kholdarov, A. A. (2025, April). HYGIENIC ASSESSMENT OF PROFESSIONAL RISK FACTORS FOR ROAD PATROL EMPLOYEES IN HOT CLIMATE. In *The Conference Hub* (pp. 59-62).
9. Jalolov, N. N., & Ikramova, N. A. (2025, April). THE RELATIONSHIP BETWEEN AIR POLLUTION AND ARTERIAL HYPERTENSION. In *The Conference Hub* (pp. 169-173).
10. Jalolov, N. N., Umedova, M. E., & Ikramova, N. A. (2025, April). Occupational risk factors for workers operating in hot climates: the case of traffic police officers. International Conference on Advance Research in Humanities, Applied Sciences and Education.
11. Khakimova, D. S., Kobiljonova, S. R., & Salomova, F. I. (2023, June). Results of hygiene assessment of food of school students. //International Scientific-Practical Conference "Only English: Advances in Medical Research and Practice Conference" 23.05. 2023.-P. 78-79.
12. Kobiljonova SR, Jalolov NN, Sharipova SA, Mirsagatova MR. SPECTRUM OF CAUSE-SIGNIFICANT ALLERGENS CAUSING POLYNOSIS IN CHILDREN.
13. Kosimova, K. T., Jalolov, N. N., & Ikramova, N. A. (2025, April). THE RELATIONSHIP BETWEEN AIR POLLUTION AND ARTERIAL HYPERTENSION. International Conference on Advance Research in Humanities, Applied Sciences and Education.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

14. Kosimova, X. T., Ikramova, N. A., & Umedova, M. E. (2025). HAVONING IFLOSLANISHI VA ARTERIAL GIPERTENZIYA O ‘RTASIDAGI ALOQADORLIK.
15. Makhsudova, S. O. (2025). QUALITY OF LIFE OF PATIENTS WITH BRONCHIAL ASTHMA. *EduVision: Journal of Innovations in Pedagogy and Educational Advancements*, *1*(6), 567-595.
16. Malikov, Q. S. R. M. M. (2024). CORONARY HEART DISEASE AND CANCER.
17. Malikov, Q. S. R. M. M. (2024). DISEASES OF THE POPULATION FROM THE LEVEL OF AIR POLLUTION IN REGIONAL CONDITIONS.
18. Mirrahimova, M. X., Kohiljonova, S. R., & Sadullayevna, X. A. (2022). PREVALENCE AND RISK FACTORS OF ALLERGIC DISEASE IN CHILDREN.
19. Mirzayev, M. M., & Malikov, S. G. (2025). CORONARY HEART DISEASE AND CANCER. *Web of Medicine: Journal of Medicine, Practice and Nursing*, *3*(3), 215-224.
20. Mirzayev, M. M., & Malikov, S. G. (2025). DISEASES OF THE POPULATION FROM THE LEVEL OF AIR POLLUTION IN REGIONAL CONDITIONS. *Web of Scientists and Scholars: Journal of Multidisciplinary Research*, *3*(3), 104-111.
21. Murodiljon o'gli, M. M., & Gafurdjanovich, M. S. (2025, March). ASSESSMENT OF THE RISK OF DEVELOPING DIABETES MELLITUS IN MEN WITH DIFFERENT LEVELS OF CARDIOVASCULAR RISK. In *The Conference Hub* (pp. 64-71).
22. Qosimova, X. T., Ikramova, N. A., Juraboyeva, D. N., & Mukhtorova, D. A. (2025, March). THE ADVERSE EFFECTS OF SMARTPHONES ON COGNITIVE ACTIVITY IN THE EDUCATIONAL PROCESS AND WAYS TO MITIGATE THEM. In *The Conference Hub* (pp. 76-79).
23. Sadullaeva, K. A., Sadirova, M. Q., Ikramova, N. A., & Sotivoldieva, S. A. (2025). EFFECT OF NUTRITION ON HEALTH OF SCHOOL STUDENTS.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

24. Salomova, F. I. (2024, February). STIMULATION OF THE IMMUNE RESPONSE BY CYTOKINE PREPARATIONS AND THEIR STANDARDIZATION. Europen youth innovation society conference volume 1№.
25. Salomova, F. I., & Kim, E. S. (2025). METABOLIC DISORDERS IN CHILDREN WITH GASTROENTEROLOGICAL DISEASES AND FOOD ALLERGIES. *EduVision: Journal of Innovations in Pedagogy and Educational Advancements*, *1*(6), 495-503.
26. Salomova, F. I., Mirrahimova, M. X., Sadullayeva, X. A., & Kobiljonova, S. R. (2022, November). Prediction and prevention of food allergies in children. Uzbekistan-Japan International Conference «Energy-Earth-Environment-Engineering», November 17-18, 2022, Uzbek-Japan Innovation Center of Youth, Tashkent, Uzbekistan Uzbekistan-Japan International Conference «Energy-Earth-Environment-Engineering», November 17-18, 2022, Uzbek-Japan Innovation Center of Youth, Tashkent, Uzbekistan tezis Bet 81.
27. Salomova, F. I., Sadullaeva, H. A., Abdullaeva, D. G., & Kobilzhonova Sh, R. (2022). PREVALENCE AND RISK FACTORS OF ALLERGIC DISEASES IN CHILDREN IN HOT CLIMATIC CONDITIONS.
28. Salomova, F. I., Sherkuziyeva, G. F., Sharipova, S. A., & Qobiljonova Sh, R. (2025). INFLUENCE OF ENVIRONMENTAL FACTORS ON THE PREVALENCE OF ALLERGIC DISEASES DISEASES. *EduVision: Journal of Innovations in Pedagogy and Educational Advancements*, *1*(6), 451-460.
29. Sharipova, S. A., & Ikramova, N. A. (2024). CONSEQUENCES OF NOT BREASTFEEDING FOR THE MOTHER AND INFANT.
30. Sharipova, S. A., Ikramova, N. A., Bahriddinova, M. N., Toshpulatov, B. M., & Egamberdiyeva, Z. Z. (2025, March). SPECIFIC ASPECTS OF PREVENTION OF INFECTIOUS DISEASES. International Conference on Advance Research in Humanities, Applied Sciences and Education.

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

31. Sherko'zieva, G. F., Ikramova, N. A., Bakhriddinova, M. N., Toshpulatov, B. M., Boysarieva, M. R., & Abdurashidova, D. J. & Rasulov, RS (2025). *ATMOSPHERIC AIR AND HEALTH*.
32. Sherko'zieva, G. F., Ikramova, N. A., Bakhriddinova, M. N., Toshpulatov, B. M., Boysarieva, M. R., Abdurashidova, D. J., ... & Rasulov, R. S. (2025). ATMOSPHERIC AIR AND HEALTH.
33. Sherkuzieva, G. F. (2021). Сузиш бассейнлари сувининг ифлосланиш муаммоларининг замонавий холати. *Молодой ученый*, (21), 624-627.
34. Sherkuzieva, G. F., Salomova, F. I., & Ikramova, N. A. (2025). IBN SINO'S FERTILIZERS ON MEDICINES IN THE" MEDICINE EPISTLE". *Web of Medicine: Journal of Medicine, Practice and Nursing*, *3*(5), 257-260.
35. Sherqo‘ziyeva, G. F., Salomova, F. I., Sharipova, S. A., Yuldasheva, F. U., & Ikramova, N. A. (2025). Avtomobillashuv va uning ekologo–gigiyenik muammolari.
36. Tolipova, A. F. (2025). ARRHYTHMIC SYNDROME IN CHILDREN AND ADOLESCENTS WITH MINOR CARDIAC ANOMALIES. *Web of Medicine: Journal of Medicine, Practice and Nursing*, *3*(3), 440-447.
37. Zakirova, M. R. (2024). INTRANASAL IMMUNOTHERAPY OF ALLERGIC RHINITIS.
38. Zakirova, M. R. (2024). SOLUBLE FORMS OF MEMBRANE PROTEINS OF IMMUNE SYSTEM CELLS IN BRONCHIAL ASTHMA IN CHILDREN.
39. Кобилжонова ШР, Садуллаева ХА. IMPACTS OF THE ENVIRONM ENT ON HUMAN HEALTH.
40. Кобилжонова, Ш. Р. (2024). CLINICAL AND MORPHOLOGICAL FEATURES OF GASTRODUODENITIS IN CHILDREN WITH SALINE DIATHESIS.
41. КОБИЛЖОНОВА, Ш., ТОШЕВА, Ш., & ЗОКИРЖОНОВА, Г. (2023). Modern approaches to diet therapy for food allergies in children.
42. Миррахимова, М. Х., Садуллаева, Х. А., & Кобилжонова, Ш. Р. (2022). *Значение экологических факторов при бронхиальной астме у детей* (Doctoral dissertation, Россия).

Modern American Journal of Medical and Health Sciences
ISSN (E): 3067-803X
Volume 01, Issue 08, November, 2025
Website: usajournals.org

43. Саломова ФИ, Ахмадалиева НО, Кобилжонова ШР. Избыточный вес и ожирение у детей: ключевые факторы.
44. Саломова ФИ, Кобилжонова ШР. Оценка эффективности диетотерапии при пищевой аллергии у детей в различные возрастные периоды. Вестник TMA SPECIAL ISSUE Dedicated to The 10th International Symposium On Important Problems of the Environmental Protection and Human Health.
45. Саломова, Ф. И., & Кобилжонова, Ш. Р. (2024). Факторы риска аллергических заболеваний у детей дошкольного возраста.
46. Саломова, Ф. И., & Кобилжонова, Ш. Р. (2024, March). РАЗРАБОТКА СИСТЕМНЫХ АЛГОРИТМОВ СНИЖЕНИЯ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ. Международный форум «ANaMed Forum–New Generation 2025» Алматы: КазНМУ, 2025..
47. Саломова, Ф. И., & Кобилжонова, Ш. Р. (2024, May). ФАКТОРЫ РИСКА РАЗВИТИЯ АЛЛЕРГИИ У ДЕТЕЙ. Международный форум «ANaMed Forum–New Generation 2025» Алматы: КазНМУ, 2025.-С. 1154-1155.
48. Саломова, Ф. И., Искандарова, Г. Т., Садуллаева, Х. А., Шарипова, С. А., Шерқўзиева, Г. Ф., Нурматов, Б. Қ., & Садирова, М. К. (2022). Атроф муҳит ва инсон саломатлиги мутахассислиги амалий кўникмаларни ўзлаштириш бўйича" услубий кўрсатма.