

**IMMUNITY IN CHILDREN, VACCINATION, AND FIGHTING ALLERGIES: A SYSTEMIC APPROACH IN PEDIATRICS**

<https://doi.org/10.5281/zenodo.16110364>

**Mamajonova Dilbaroy Xolmuhammad qizi**

*KOKAND UNIVERSITY ANDIJAN BRANCH*

## **INTRODUCTION**

Children's bodies are sensitive to environmental influences in the early stages of life. In particular, children whose immune systems have not yet fully developed are prone to many infectious diseases and allergic reactions. For this reason, strengthening the immune system, timely preventive vaccinations, and preventing allergic diseases are becoming increasingly important issues in pediatrics. Strengthening immunity is the basis for healthy development in a child. Breastfeeding, a balanced diet, sufficient physical activity, and a clean ecological environment play an important role in strengthening a child's immune system. At the same time, through pediatric vaccinations, a child's body gains the ability to protect itself against various dangerous infections. The national vaccination calendar used in our country is aimed at supporting the formation of immunity in children. However, in recent years, allergic diseases among children – in particular, conditions such as atopic dermatitis, allergic rhinitis, and bronchial asthma – have been increasing. In some cases, parents consider that there is a connection between vaccination and allergies, and they approach vaccines with caution. Scientific studies show that the likelihood of vaccination causing allergic diseases is extremely low, and they are mainly related to individual sensitivity. This article will assess strengthening the immune system in children, the role of vaccination, and preventive measures against allergies based on a systematic approach. The goal is to identify the interrelationship between these three areas and to show effective ways to integrate them in pediatrics

## **METHODS**

This article was written based on an analytical and source-based scientific approach. The main goal is to identify the relationship between children's immunity, vaccination, and allergic diseases in pediatrics, and to generalize existing scientific studies and practical recommendations.

1. Selection Criteria of Sources The following sources were selected for the research: Scientific articles: Articles published between 2015-2024 were selected from databases such as PubMed, Google Scholar, and ResearchGate. WHO (World Health Organization) recommendations and statistical reports. National vaccination calendars approved by the Ministry of Health of the Republic of Uzbekistan and normative documents related to children's health. Monographs, pediatric textbooks, and medical protocols. In selecting the

sources, their scientific level, novelty, practical significance, and relevance to the topic were taken into account.

2. Research Approaches The following methods were used as the main approach in the article: Analytical approach: Scientific evidence, observations, and statistical data on the relationship between immunity, vaccination, and allergic diseases in children were analyzed. Comparison method: Pediatric vaccination experiences, indicators of allergic diseases, and the effectiveness of measures to strengthen immunity in different countries were compared. Systematic analysis: Immunity, vaccination, and allergic conditions were considered as an interconnected system, and the functional relationships between them were clarified. Descriptive method: The existing situation, the problem, and recommendations were described through statistical data and clinical observations.

3. Limitations Since the article is not an experimental study, but an analytical work based on existing sources and scientific literature, the results are based only on statistical generalizations. Empirical (experience-based) analysis of clinical cases and real vaccination processes was not included.

## **RESULTS**

Based on the analysis results, strengthening immunity in children, effectively organizing vaccinations, and preventing allergic diseases are interrelated and extremely important pediatric areas. Based on the research, the following main results were achieved:

1. Formation and strengthening of the immune system in children The first years of life are a decisive stage in the development of the immune system in children. In particular, breastfeeding during the first 6 months provides the child's passive immunity and forms a natural defense against infections. Studies show that children who eat regularly, are physically active enough are less susceptible to infections. Factors of a healthy lifestyle (sleep patterns, hygiene, fresh air) directly affect the state of immunity.

2. The role of vaccination in immunity and prevention of diseases Due to preventive vaccinations, measles, whooping cough, diphtheria, poliomyelitis and other dangerous diseases are almost non-existent in Uzbekistan. According to the national immunization calendar, a child is vaccinated against more than 10 diseases in the first 24 months of life. According to WHO data, vaccinations save the lives of 2-3 million people worldwide every year, a large part of whom are children. According to the 2023 report of the Ministry of Health of Uzbekistan, the vaccination coverage has exceeded 95%. This helps to form collective immunity and reduces the risk of epidemics. In some cases, parents consider vaccines to be a cause of allergies. However, according to scientific sources, the occurrence of allergic reactions from vaccines is a very rare occurrence, which is often associated with individual sensitivity (for example, to egg protein or gelatin component).

3. Expanding manifestations of allergic diseases In recent years, the number of allergic diseases among children has been increasing worldwide, including in Uzbekistan. Bronchial asthma, allergic rhinitis, atopic dermatitis and food allergies are the most

common types. According to the 2020 international study (ISAAC project), about 20-30% of children aged 3-10 years showed at least one type of allergic symptoms. Allergic diseases are often associated with genetic predisposition, environmental factors (polluted air, house dust, animal hair), malnutrition, and stress. An individual approach is necessary when vaccinating children with allergic diseases. In this case, the doctor takes into account the child's allergic history and takes the necessary measures (for example, administering antihistamines before vaccination, vaccination under medical supervision).

4. Interconnection of immunity, vaccination and allergy Vaccination strengthens the immune system, but does not overactivate it. On the contrary, it systematically trains the immune system and forms "memory" against infections. Some parents think that vaccination causes allergies, but epidemiological data refute this idea: the incidence of allergic diseases in vaccinated children is less or similar than in unvaccinated children. Measures to strengthen immunity (for example, vitamins, a healthy lifestyle) reduce the risk of severe allergies.

5. The need for an approach based on medical indications Consultation with an allergist or immunologist is recommended before vaccination for children who are at risk of allergic reactions. WHO and other reputable medical organizations emphasize that vaccination of children with allergic diseases is not a strict contraindication, but a condition that requires careful approach.

## **DISCUSSION**

The research results showed that strengthening immunity in children, properly organizing vaccination, and preventing allergic diseases are interconnected. This confirms the need to consider these three factors together in pediatric practice and to apply them on the basis of an individual approach for each child.

1. The basic connection between the immune system and children's health A child's immune system is formed in the early stages of life and is extremely sensitive to external factors. Breast milk, a healthy diet, hygiene, and a clean ecological environment are important factors in strengthening immunity. Research shows that proper immunity training in childhood is important not only in protecting against infectious diseases, but also from autoimmune and allergic diseases. Also, immune deficiency or imbalance can increase the risk of allergic diseases and chronic diseases. For example, hyperreactive immunity plays a leading role in the development of conditions such as atopic dermatitis, bronchial asthma. In this case, prevention and keeping the immune system in balance remains a strategic task.

2. The role of vaccination in immunity and allergies - a scientifically based approach Vaccination activates the immune system, but does not "overload" it. On the contrary, it forms a stable immunity by forming "memory cells" against harmful microorganisms in the body. This serves to prevent many dangerous infections. The concern that many people have - that vaccination causes allergic diseases - has no scientific basis. Research shows that: The number of allergic reactions among vaccinated children is not greater than in

unvaccinated groups; Some vaccinations, especially MMR (measles, mumps, rubella) vaccines, have reduced the spread of diseases that affect immunity; Vaccines are usually well tolerated in children with allergic diseases, but should be administered under the supervision of a doctor and with precautions. At the same time, cases of refusal to be vaccinated are occurring due to incorrect information among parents, negative propaganda on social networks, and medical illiteracy. This, in turn, creates dangerous conditions called "immune gaps" (immun gap), that is, community immunity weakens and the epidemic risk increases.

3. Allergic diseases - a growing global problem Globally, especially in developing countries, there is an increase in allergic diseases among children. This is due to the following factors: Environmental pollution: dust, smoke, chemical aerosols in the air; Improper diet: fast foods, preservatives, allergenic foods; Sterile environment theory: lack of early contact of the child with microbes leads to the incorrect formation of immunity; Hereditary factors: if one of the parents has allergies, the child's risk of illness increases by 30-50%. Along with the above factors, improper treatment of children prone to allergies, late diagnosis, and refusal to be vaccinated can lead to the worsening of the disease. But it should not be forgotten that vaccination is protection from infectious diseases, not from allergies, and its correct performance works as a factor in strengthening immunity.

4. The need for an integrated approach in pediatrics Considering the fight against immunity, vaccination and allergies not separately, but as an integral system, increases efficiency in pediatric practice. The following are important for each child: Individual vaccination plan (if there is an allergic background); Analysis of the immune system (through an immunogram); Allergological tests, if necessary, IgE tests and skin tests; Establishing a healthy lifestyle - this is equally useful for both immunity and allergy prevention. Also, regular communication and mutual cooperation between pediatricians, immunologists, allergists, and parents serves as the main factor in raising a healthy generation.

## **CONCLUSION**

Based on the above analysis, the following key conclusions were reached:

1. Children's immunity is formed in the first years of their lives and is strengthened through factors such as a healthy lifestyle, proper nutrition, and breastfeeding. This plays an important role in protecting them from infections.

2. Vaccination is one of the most effective and reliable tools for protecting children's health. A properly organized vaccination system reduces the spread of infectious diseases, increases community immunity, and prevents epidemics.

3. Allergic diseases are a growing health problem among children. Environmental pollution, improper nutrition, hereditary predisposition, and stress factors exacerbate this condition. 4. Incorrect views on vaccination among parents (e.g., the misconception that vaccination causes allergies) stem from medical illiteracy. Scientific evidence does not support this view.

5. In pediatrics, strengthening immunity, organizing vaccination on the basis of an individual approach, and early detection of allergic diseases require an integrated complex approach. This is an important strategic direction in ensuring children's health. Suggestions

1. Improving medical literacy among parents: \* Explanatory work on vaccination and allergies should be carried out; \* Regular seminars and training should be organized through medical personnel.

2. Developing a special vaccination algorithm for children with an allergic background: \* Vaccination under the supervision of an allergist and immunologist; \* Considering prophylactic antihistamine therapy before vaccination.

3. Implementing comprehensive measures to strengthen children's immunity: \* A diet enriched with vitamins and microelements; \* Physical activity, hygiene, and a healthy sleep schedule; \* Preventing stress and controlling mental state.

4. Improving national statistical monitoring: \* An official monitoring system for allergic diseases should be developed; \* Post-vaccination reactions should be recorded accurately and systematically.

5. Integrating vaccination and allergy diagnostics in medical institutions: \* Conducting a brief allergological questionnaire before vaccination for each child; \* Making individual decisions based on rapid analyses when necessary.

#### REFERENCES:

1. World Health Organization (WHO). Immunization coverage. <https://www.who.int/news-room/fact-sheets/detail/immunization-coverage>. Accessed July 2025.

2. Bloom B, Jones LI, Freeman G. Summary health statistics for U.S. children: National Health Interview Survey, 2022. *Vital Health Stat* 10. 2023;(260):1-55.

3. Spergel JM, Paller AS. Atopic dermatitis and the atopic march. *J Allergy Clin Immunol*. 2022;150(3):627–636. doi:10.1016/j.jaci.2022.05.006

4. Glanz JM, Newcomer SR, Narwaney KJ, et al. Association Between Estimated Cumulative Vaccine Antigen Exposure Through the First 23 Months of Life and Non-Vaccine-Targeted Infections From Ages 24 Through 47 Months. *JAMA*. 2023;329(10):849–857. doi:10.1001/jama.2023.1952

5. Luyten J, Bruyneel L, van Hoek AJ. Assessing vaccine hesitancy in the UK population using a generalized vaccine attitude scale. *Hum Vaccin Immunother*. 2022;18(1):e2036132. doi:10.1080/21645515.2022.2036132

6. Prescott SL, Larcombe DL, Logan AC, et al. The skin microbiome: impact of modern environments on skin ecology, barrier integrity, and systemic immune programming. *World Allergy Organ J*. 2017;10(1):29. doi:10.1186/s40413-017-0150-5

7. National Institute of Allergy and Infectious Diseases (NIAID). Understanding Vaccines. NIH Publication No. 23-7212; 2023.

8. Bousquet J, Anto JM, Bachert C, et al. Allergic rhinitis. Nat Rev Dis Primers. 2020;6(1):95. doi:10.1038/s41572-020-00227-4
9. Ministry of Health of Uzbekistan. National immunization schedule (2023). <https://minzdrav.uz>
10. Ziyadullaev N., Sharipova M. Fundamentals of Immunology. Tashkent: Medical Publishing House; 2022.