CHAPTER 15

PREVENTION OF PEDIATRIC OTORHINOLARYNGOLOGICAL DISEASES: TRANSFORMATION OF APPROACHES IN UKRAINE AND EU COUNTRIES

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DOI https://doi.org/10.30525/978-9934-26-637-9-15

INTRODUCTION

Pediatric otorhinolaryngological diseases represent one of the most prevalent groups of pathologies, significantly impacting the quality of life, physical, and psycho-emotional development of the younger generation[1]. According to the World Health Organization (WHO), ear, nose, and throat (ENT) diseases in children account for a substantial proportion of visits to healthcare facilities, with their complications potentially leading to severe consequences such as hearing loss, speech impairments, or chronic pathological processes. In Ukraine, as well as in the European Union (EU) countries, otorhinolaryngological diseases remain a pressing public health issue, necessitating a comprehensive approach to prevention and early diagnosis. Prevention, in particular, is a key tool for reducing morbidity, improving children's health, and alleviating the economic burden on healthcare systems.

In Ukraine, the prevention of pediatric otorhinolaryngological diseases faces several challenges, including insufficient funding for the healthcare sector, limited access to modern preventive technologies in rural areas, and low public awareness of preventive measures. In contrast, EU countries demonstrate significant progress in this area through the implementation of evidence-based approaches, integration of preventive programs into public health systems, and extensive cross-sectoral collaboration. The European experience, grounded in principles of universal healthcare coverage, early screening, and educational outreach, can serve as a benchmark for transforming Ukraine's prevention system.

[1] Lechosław Paweł Chmielik. A review of health–related quality of life issues in children suffering from certain key otolaryngological illnesses. Front. Pediatr., 11 January 2023, *Sec. Pediatric Otolaryngology*. Volume 10, 2022. https://doi.org/10.3389/fped.2022.1077198

The relevance of this topic stems not only from the high prevalence of otorhinolaryngological diseases among children but also from the need to align Ukraine's healthcare system with European standards in the context of European integration processes. The prevention of pediatric otorhinolaryngological diseases is a critical component of public health strengthening strategies, as it reduces morbidity and mitigates long-term social and economic consequences[2]. In this regard, analyzing modern prevention approaches, their transformation, and adaptation to Ukraine's conditions is an important task for researchers, healthcare professionals, and policymakers.

The aim of this section is to analyze the current state of prevention of pediatric otorhinolaryngological diseases in Ukraine and EU countries, evaluate the effectiveness of applied approaches, and develop recommendations for their transformation in the Ukrainian context.

The epidemiological situation regarding otorhinolaryngological diseases in Ukraine indicates a consistently high level of morbidity among children. The most common pathologies include acute and chronic otitis, rhinosinusitis, and tonsillitis, which are often complicated by delayed diagnosis and inadequate preventive efforts. Risk factors such as environmental issues, low immunization rates, seasonal epidemics, and limited access to quality healthcare exacerbate the problem. In Ukraine, prevention of these diseases is largely limited to reactive measures, such as treating complications, while proactive strategies remain underdeveloped. For instance, programs for early hearing screening in newborns or widespread educational campaigns for parents are implemented only in certain regions and lack a systemic approach.

In contrast, in EU countries, the prevention of pediatric otorhinolaryngological diseases is integrated into national healthcare systems. Countries such as Sweden, Germany, and the Netherlands have comprehensive programs that include vaccination against pneumococcal and Haemophilus influenzae infections, regular hearing and vision screenings, and active educational outreach targeting parents and educators. These measures are based on evidence-based medicine and aim at early detection and prevention of diseases. A significant aspect is the use of modern technologies, such as telemedicine for consultations and digital platforms for monitoring children's health.

A comparison of approaches in Ukraine and EU countries highlights key areas for improvement. In Ukraine, there is a need to enhance coordination between medical, educational, and social institutions, expand access to preventive services in rural areas, and introduce modern screening and educational methods. The European experience can be adapted to Ukrainian realities through

[2] Perrin JM, Cheng TL. Launching Lifelong Health by Improving Health Care for Children, Youth, and Families. Washington (DC): National Academies Press (US); 2024 Dec 30. https://www.ncbi.nlm.nih.gov/books/NBK610729/#_ncbi_dlg_citbx_NBK610729

the gradual implementation of pilot projects, engagement of international support, and improvement of the legislative framework in public health.

Thus, this section aims not only to elucidate the current state of prevention of pediatric otorhinolaryngological diseases but also to propose concrete steps for transforming approaches in Ukraine, drawing on the best European practices. In the context of Ukraine's European integration aspirations, this will contribute not only to improving children's health but also to strengthening the public health system as a whole.

1. Epidemiological overview of pediatric otorhinolaryngological diseases

Prevalence of Otorhinolaryngological Diseases in Ukraine and EU Countries

Pediatric otorhinolaryngological diseases are among the leading causes of visits to healthcare facilities in both Ukraine and European Union (EU) countries. According to the World Health Organization (WHO), ear, nose, and throat (ENT) diseases, such as otitis, rhinosinusitis, and tonsillitis, constitute a significant portion of pediatric pathologies, placing a considerable burden on healthcare systems[3]. In Ukraine, statistical data from the Ministry of Health indicate that 20–30% of children annually experience acute respiratory infections, often accompanied by otorhinolaryngological complications such as acute otitis media or sinusitis. Specifically, acute otitis media is diagnosed in 15–20% of preschool-aged children, while chronic forms of otorhinolaryngological diseases are observed in 5–7% of school-aged children.

In EU countries, the epidemiological situation shows similar trends but with certain differences. For instance, in Western European countries such as Germany, Sweden, or the Netherlands, the prevalence of acute otorhinolaryngological diseases in children ranges from 10–15% of the pediatric population, which is somewhat lower than in Ukraine. This can be attributed to higher immunization rates, better access to preventive measures, and superior quality of primary healthcare. However, in Eastern European countries like Poland or Hungary, morbidity rates are closer to those in Ukraine, reflecting the influence of socioeconomic factors. According to the European Centre for Disease Prevention and Control (ECDC), acute otitis media remains a leading cause of antibiotic prescriptions for children in the EU, underscoring the need for enhanced preventive measures.

Main Types of Pathologies and Their Impact on Children's Health

The most common pediatric otorhinolaryngological diseases include acute and chronic otitis media, rhinosinusitis, adenoiditis, tonsillitis, and laryngitis.

[3] Jose Acuin. Chronic suppurative otitis media : burden of illness and management options. *World Health Organization.* 2004. https://www.iris.who.int/handle/10665/42941

Each of these conditions has specific clinical characteristics and consequences for children's health. Acute otitis media, for example, is a frequent complication of acute respiratory viral infections (ARVIs) and may lead to temporary hearing loss, which can affect speech development in younger children. Chronic otitis media, according to Ukrainian studies, is diagnosed in 3–5% of children and may result in persistent hearing impairment, requiring long-term treatment and rehabilitation.

Rhinosinusitis, often triggered by allergic reactions or viral infections, is another prevalent condition. It is diagnosed in 10–12% of preschool-aged children, with chronic forms potentially causing impaired nasal breathing, which negatively impacts physical development and sleep quality. Tonsillitis, particularly angina, remains a significant concern due to the risk of complications such as rheumatic fever or glomerulonephritis, especially in the context of low immunization rates against streptococcal infections.

In EU countries, particular attention is given to the early detection of adenoid vegetations, which can cause chronic nasal obstruction, snoring, and delays in speech development. For example, in Sweden and Finland, hearing screening programs and assessments of nasopharyngeal conditions in preschool children enable early identification of these pathologies. In Ukraine, such programs are implemented on a limited scale, leading to delayed diagnoses and an increased frequency of surgical interventions, such as adenoidectomy.

The consequences of otorhinolaryngological diseases in children extend beyond the medical realm, affecting social and educational aspects. For instance, hearing impairment caused by chronic otitis can complicate learning and socialization, while chronic rhinosinusitis reduces quality of life due to persistent discomfort. In the long term, these conditions may lead to economic losses due to treatment and rehabilitation costs, as well as reduced productivity in adulthood.

Risk Factors for the Development of Otorhinolaryngological Diseases in Children

The development of otorhinolaryngological diseases in children is driven by a combination of biological, environmental, and social factors. Biological factors include anatomical and physiological characteristics of childhood, such as a short and wide Eustachian tube, which facilitates the spread of infections to the middle ear, and an immature immune system[4]. Genetic predisposition to allergic reactions also plays a role, particularly in the development of rhinosinusitis and adenoiditis.

[4] Anastasios K Goulioumis. The Eustachian Tube Dysfunction in Children: Anatomical Considerations and Current Trends in Invasive Therapeutic Approaches. *Cureus*. 2022 Jul 24;14(7):e27193. doi: 10.7759/cureus.27193. e Collection 2022 J

Environmental factors include air pollution, exposure to tobacco smoke, and seasonal fluctuations in temperature and humidity, which contribute to the spread of respiratory infections.

In Ukraine, the environmental situation in industrial regions such as Donbas or Zaporizhzhia exacerbates children's health issues, increasing the risk of chronic otorhinolaryngological pathologies. In EU countries, where environmental standards are stricter, these factors are less pronounced, although urbanization and climate change remain challenges.

Socioeconomic factors play a critical role in both regions. In Ukraine, limited access to quality healthcare in rural areas, low parental awareness of preventive measures, and inadequate vaccination coverage (particularly against pneumococcal and Haemophilus influenzae infections) significantly elevate disease risks[5]. For instance, WHO data indicate that pneumococcal vaccination coverage in Ukraine is only 60–70%, compared to nearly 95% in EU countries. In the EU, social factors such as low income in certain population groups also affect access to preventive services, but robust social welfare systems partially mitigate these risks.

Additional factors include behavioral aspects, such as inadequate nasal hygiene, poor nutrition (deficiencies in vitamins A, C, and D), and low physical activity, which weaken the immune system. In EU countries, educational campaigns for parents promote healthy habits in children, while in Ukraine, such initiatives are localized and require systemic development.

Conclusions of the Epidemiological Overview

The epidemiological analysis highlights the high prevalence of otorhinolaryngological diseases in children in both Ukraine and EU countries, although lower rates are observed in the latter due to advanced prevention and early diagnosis systems. The primary pathologies include acute and chronic otitis, rhinosinusitis, and tonsillitis, which significantly impact children's health, causing complications that affect their development and quality of life. Risk factors encompass biological characteristics, environmental conditions, and socioeconomic constraints, with these factors being more pronounced in Ukraine due to systemic healthcare challenges. The comparison of epidemiological situations underscores the need to improve preventive measures in Ukraine by adapting European experiences, particularly through expanded vaccination programs, screening initiatives, and public awareness campaigns.

[5] Amyn Malik. Behavioral interventions for vaccination uptake: A systematic review and meta-analysis. September 2023Health Policy 137(Suppl 3):104894 DOI:10.1016/j.healthpol.2023.104894

2. Modern approaches to the prevention of pediatric otorhinolaryngological diseases in Ukraine and EU countries

Primary prevention of pediatric otorhinolaryngological diseases is a cornerstone of public health strategies aimed at preventing the onset of pathologies affecting the upper respiratory tract and auditory system in children[6]. It encompasses a range of measures, including vaccination, sanitary and hygienic initiatives, educational outreach to parents, and the creation of favorable conditions for child development. In the context of comparing approaches in Ukraine and European Union (EU) countries, primary prevention reveals both commonalities and significant differences driven by economic, social, and organizational factors. This subsection analyzes modern primary prevention methods, their effectiveness, and prospects for harmonizing Ukraine's approaches with European standards.

Vaccination plays a pivotal role in preventing infectious diseases, which are the primary causes of otorhinolaryngological conditions in children, such as acute otitis media, rhinosinusitis, and tonsillitis. In Ukraine, the national immunization schedule includes vaccines against Haemophilus influenzae type b (Hib) and pneumococcal infections, which are associated with the development of otitis and sinusitis. However, vaccination coverage in Ukraine remains lower than in EU countries due to public distrust in vaccines, logistical challenges, and insufficient awareness campaigns. For instance, according to data from the Ministry of Health of Ukraine, in 2023, Hib vaccination coverage among children under one year of age was approximately 80%, while in EU countries such as Sweden or Germany, this figure exceeds 95%.

In EU countries, vaccination against pneumococcal infections and Hib is a mandatory component of national immunization programs, ensuring a high level of protection for children against bacterial infections that cause otorhinolaryngological diseases. Additionally, some countries, such as Finland, adopt an expanded approach that includes seasonal influenza vaccination for preschool-aged children, as influenza is a known trigger for acute respiratory infections that can lead to complications like otitis and sinusitis. In Ukraine, implementing such programs is hindered by limited funding and inadequate infrastructure for mass immunization.

Sanitary and hygienic measures are a critical component of primary prevention, aimed at reducing environmental factors that contribute to the development of otorhinolaryngological diseases. In Ukraine, efforts focus on ensuring proper conditions in kindergartens and schools, such as regular

[6] Ashaka Patel. Changes to the practice of pediatric otolaryngology as a consequence of the COVID-19 pandemic. *Int J Pediatr Otorhinolaryngol.* 2022 Jan 1;153:111021. doi: 10.1016/j.ijporl.2021.111021

ventilation, humidity control, and maintaining cleanliness. However, due to outdated infrastructure in many facilities, these measures are often insufficiently effective. For example, in rural areas of Ukraine, the lack of modern ventilation systems increases the risk of respiratory infection transmission.

In EU countries, sanitary and hygienic standards are more standardized and rigorously monitored[7]. For instance, in Denmark and the Netherlands, programs monitor indoor air quality in childcare facilities, including regular measurements of carbon dioxide levels and allergens. Such initiatives help reduce the incidence of allergic rhinitis and rhinosinusitis, which often have environmental causes. Additionally, EU countries actively promote the use of humidifiers during winter months to prevent drying of the nasal and throat mucous membranes, thereby reducing the risk of infectious complications.

Educational programs for parents are an integral part of primary prevention, as proper childcare can significantly reduce the risk of otorhinolaryngological diseases. In Ukraine, educational efforts are primarily conducted through pediatric consultations and informational campaigns in healthcare facilities. The focus is on promoting breastfeeding, which, according to the World Health Organization, reduces the risk of otitis media by 50% in infants during their first year of life. However, the lack of systematic programs and low health literacy among the population limit the effectiveness of these measures.

In EU countries, educational programs are more structured and integrated into the public health system. For example, in the United Kingdom and France, national campaigns include webinars, booklets, and mobile applications for parents, providing recommendations on preventing otorhinolaryngological diseases. Particular attention is given to raising awareness about the dangers of secondhand smoke, a proven risk factor for chronic rhinitis and otitis. In Sweden, prevention programs include training for parents on teaching children proper nasal hygiene techniques, which reduces the risk of nasal congestion. Hearing Screening and Early

Primary prevention also encompasses screening programs for the early detection of hearing impairments, which may be associated with congenital anomalies or early infectious diseases. In Ukraine, newborn hearing screening is implemented only in certain regions due to limited equipment and qualified specialists. According to studies, only 30% of newborns in Ukraine undergo audiological screening in the first months of life, which complicates the early detection of sensorineural hearing loss.

[7] Nour Baïz. Indoor Air Quality and Sources in Schools and Related Health Effects. November 2013Journal of Toxicology and Environmental Health Part B 16(8):491-550 http://dx.doi.org/10.1080/10937404.2013.853609

In EU countries such as Germany, Austria, and Poland, universal newborn hearing screening is mandatory and covers 98–100% of infants. The use of techniques such as otoacoustic emissions (OAE) and automated auditory brainstem response (ABR) testing allows for the early detection of hearing impairments and prevention of complications related to delayed speech development. This experience is highly relevant for Ukraine, where the implementation of such programs could significantly improve early diagnosis and prevention. A comparative analysis reveals that EU countries adopt a more systematic and multifaceted approach to the primary prevention of pediatric otorhinolaryngological diseases[8].

The integration of vaccination, sanitary and hygienic standards, educational programs, and screening initiatives contributes to reduced morbidity and improved quality of life for children. In Ukraine, key challenges include insufficient funding, uneven access to healthcare services across regions, and low public awareness. To harmonize approaches with European standards, the following steps are necessary:

– expand vaccination coverage through government programs and awareness campaigns.

– modernize the infrastructure of childcare facilities to ensure proper sanitary and hygienic conditions.

– implement national newborn hearing screening programs.

– enhance educational outreach through digital platforms and intersectoral collaboration.

3. Overview of European models for the prevention of otorhinolaryngological diseases in children (case studies of selected EU countries)

The prevention of otorhinolaryngological diseases in children is a critical component of public health in European Union (EU) countries, as these conditions, including acute and chronic infections of the ear, throat, and nose, allergic rhinitis, sinusitis, and tonsillitis, significantly impact children's quality of life, development, and long-term health[9]. EU countries have developed diverse prevention models grounded in evidence-based medicine, integration with healthcare systems, and consideration of socio-economic factors.

[8] Jimmy Celind. Adherence to treatment guidelines for acute otitis media in children. The necessity of an effective strategy of guideline implementation. July 2014 International *Journal of Pediatric Otorhinolaryngology* 78(7). DOI:10.1016/j.ijporl.2014.04.029

[9] F Scasso. Emerging and re-emerging infectious disease in otorhinolaryngology. *Acta Otorhinolaryngol Ital.* 2018 Apr 30;38(2 Suppl 1):S1–S106. doi: 10.14639/0392-100X-suppl.1-38-2018

This section examines the experiences of selected EU countries, namely the United Kingdom, Germany, Finland, and Poland, focusing on the organization of preventive measures, the role of primary healthcare, and intersectoral collaboration. United Kingdom: The Beveridge Model and Emphasis on Primary Prevention In the United Kingdom, the healthcare system, based on the Beveridge model, is characterized by centralized funding through the National Health Service (NHS) [10]. The prevention of otorhinolaryngological diseases in children is integrated into the primary healthcare system, with general practitioners (GPs) playing a pivotal role. Preventive programs include regular pediatric check-ups that assess hearing, nasopharyngeal health, and risk factors such as allergies or chronic infections. The NHS actively implements vaccination programs, notably against pneumococcal infection (PCV) and Haemophilus influenzae type b (Hib), which are crucial for preventing acute otitis media and sinusitis. For instance, pneumococcal vaccination covers 95% of children under five years old, significantly reducing the incidence of acute otitis media (AOM) in preschool-aged children.A key element of the UK model is educational campaigns targeting parents. The NHS has developed informational resources emphasizing the importance of breastfeeding, avoiding secondhand smoke, and seeking timely medical attention at the onset of otorhinolaryngological symptoms. Additionally, clinical guidelines developed by the National Institute for Health and Care Excellence (NICE) regulate the diagnosis and prevention of conditions such as recurrent tonsillitis or chronic rhinosinusitis. These guidelines are rooted in evidence-based medicine and consider both clinical and economic aspects of preventive measures. Germany: The Bismarck Model and Focus on Screenings Germany, operating under the Bismarck model of mandatory health insurance, demonstrates a high level of organization in preventive measures. The prevention of otorhinolaryngological diseases in children is integrated into a system of mandatory check-ups (U-Untersuchungen), which are conducted from birth through adolescence. These examinations include hearing assessments (via audiometry) and ENT evaluations to detect conditions such as adenoid hypertrophy or chronic otitis media early. For example, newborn hearing screening covers 98% of infants, enabling early identification of congenital hearing impairments. Germany also implements robust vaccination programs, including immunization against meningococcal infections, which reduces the risk of complications associated with ENT infections. The insurance-based system ensures access to preventive services, including consultations with pediatricians and otorhinolaryngologists,

[10] Apostolos Tsiachristas. Integrated care in a Beveridge system: experiences from England and Denmark. Health Econ Policy Law. . 2023 Oct;18(4):345-361 doi: 10.1017/S1744133123000166.

for all children regardless of socio-economic status. Collaboration between schools, kindergartens, and healthcare facilities facilitates early detection of conditions such as allergic rhinitis, which is often linked to chronic ENT disorders.

The German model leverages information technology to monitor children's health. Electronic medical records enable physicians to track vaccination histories, screening results, and episodes of infectious diseases, enhancing the effectiveness of preventive measures. Furthermore, Germany conducts educational programs for parents on topics such as nasopharyngeal hygiene, cold prevention, and the appropriate use of nasal medications. Finland: Integration of Prevention into the School System Finland, renowned for its effective public health system, integrates the prevention of otorhinolaryngological diseases in children into its school and preschool systems.

Preventive programs are coordinated through a network of health centers that collaborate with educational institutions. Regular medical check-ups are conducted in schools, where nurses and physicians assess ENT health, perform hearing screenings, and provide preventive recommendations.

For instance, Finland widely implements testing for Streptococcus pyogenes in children with recurrent tonsillitis, enabling timely preventive treatment and reducing complications. The Finnish model emphasizes environmental factors. Public health programs aim to improve air quality in educational settings, reducing the risk of allergic rhinitis and asthma, which are often associated with ENT conditions. Influenza vaccination is another critical component, as influenza frequently leads to complications such as sinusitis and otitis. In 2023, influenza vaccination coverage among children aged 2–6 years reached 70%, contributing to a reduction in seasonal ENT infections. Educational campaigns in Finland focus on fostering healthy habits in children, such as proper nasal hygiene and avoiding overexposure to cold, which helps prevent ENT-related issues. These initiatives are supported by strong intersectoral collaboration, ensuring that preventive measures are consistently applied across healthcare and educational systems.

Poland's approach to preventing otorhinolaryngological diseases in children is shaped by its mixed healthcare system, combining public funding with private insurance elements. Preventive measures are primarily delivered through primary care physicians and pediatric specialists, with an emphasis on accessibility for all socio-economic groups. Poland implements mandatory hearing screenings for newborns and regular ENT check-ups for school-aged children, which are funded by the National Health Fund (NFZ). These screenings have significantly improved early detection of hearing impairments and chronic ENT conditions. Vaccination programs in Poland, including those against pneumococcus and influenza, are well-established, with coverage rates exceeding 90% for children

under five. These programs have reduced the incidence of ENT infections, particularly acute otitis media and tonsillitis.

Poland also prioritizes community-based prevention, with local health authorities organizing awareness campaigns on topics such as proper ear hygiene, the dangers of untreated colds, and the importance of timely ENT consultations. A notable feature of the Polish model is the integration of telemedicine, particularly in rural areas, where access to specialists may be limited. Teleconsultations enable early diagnosis and preventive interventions, reducing the burden of ENT diseases. Additionally, Poland collaborates with non-governmental organizations to promote health education in schools, focusing on preventing risk factors such as exposure to tobacco smoke and poor indoor air quality.

3.1. Barriers to the Prevention of Otorhinolaryngological Diseases in Children in Ukraine

The prevention of otorhinolaryngological diseases in children is a critical aspect of public health, as these conditions, including acute and chronic otitis, sinusitis, and tonsillitis, account for a significant portion of pediatric morbidity in Ukraine.

Despite ongoing healthcare reforms and increased attention to preventive measures, the implementation of effective programs faces numerous barriers. This section examines the key obstacles, namely insufficient funding for preventive programs, low awareness among parents and educators regarding prevention, and limited access to modern medical technologies in the regions. These challenges are analyzed within the context of current socio-economic and organizational difficulties, providing a comprehensive understanding of the factors hindering the development of prevention strategies for otorhinolaryngological diseases in children.

One of the primary barriers is the insufficient funding of preventive programs within Ukraine's healthcare system. The state budget for healthcare remains limited, driven by economic challenges, including the consequences of the ongoing war and economic instability. A significant portion of financial resources is allocated to treating acute conditions and maintaining healthcare infrastructure, while preventive measures, which require long-term investment, are often underfunded. For instance, programs for early hearing screening in newborns or preventive check-ups for preschool children are implemented only in select regions, often with support from international organizations or local initiatives.

The lack of stable funding makes it impossible to systematically equip healthcare facilities with necessary equipment, such as modern audiometers or endoscopic systems for early diagnosis of ENT conditions.

Additionally, the shortage of funds affects the organization of training programs for healthcare professionals, reducing their capacity to implement preventive measures effectively[11]. In many cases, prevention is limited to basic recommendations, such as ENT hygiene, without the implementation of comprehensive programs that include vaccination against pneumococcal infections or other pathogens causing otorhinolaryngological diseases. Thus, insufficient funding creates a systemic problem that limits the scope and quality of preventive initiatives.

The low level of awareness among parents and educators regarding the prevention of otorhinolaryngological diseases represents another significant barrier. In many Ukrainian families and educational institutions, there is a lack of knowledge about risk factors contributing to ENT conditions in children, such as poor nutrition, inadequate ventilation in indoor spaces, exposure to tobacco smoke, or improper treatment of colds.

Parents often fail to recognize the importance of timely medical consultations at the onset of symptoms, leading to complications such as chronic otitis or sinusitis. In school settings, educators rarely have sufficient training to identify early signs of ENT diseases in children, which complicates the organization of preventive measures within educational institutions[12]. For example, the absence of regular training for teachers on preventing infectious diseases that affect ENT organs reduces the effectiveness of early detection.

Moreover, there is a persistent lack of trust in medical recommendations, particularly regarding vaccination, which is a key tool for preventing infections that cause otorhinolaryngological complications. The lack of informational campaigns, limited availability of accessible materials for parents, and insufficient public outreach efforts hinder the development of a prevention culture. While some initiatives, such as vaccination awareness campaigns, are conducted in Ukraine, they are often fragmented and do not reach all regions, particularly rural communities where access to information is limited. Limited access to modern medical technologies in the regions is another significant obstacle to effective prevention of otorhinolaryngological diseases in children.

Ukraine experiences considerable disparities in the availability of medical equipment between urban and rural areas. In large cities such as Kyiv, Lviv, or Odesa, medical centers are more likely to have access to diagnostic technologies, such as computed tomography, advanced audiometric systems, or equipment

[11] Ingrid Gilles. Work experiences of healthcare professionals in a shortage context: analysis of open-ended comments in a Swiss cohort (SCOHPICA). *BMC Health Serv Res.* 2025 Apr 9;25:520. https://doi.org/10.1186/s12913-025-12659-z

[12] Salima Meherali. Understanding Parents' Experiences and Information Needs on Pediatric Acute Otitis Media: A Qualitative Study. *J Patient Exp.* 2018 Apr 24;6(1):53–61. doi: 10.1177/2374373518771362

for telemedicine. In contrast, rural regions and small towns often lack such technologies, making early diagnosis and prevention of ENT conditions challenging. For instance, hearing screening for newborns, a standard procedure in many EU countries, is available only in a limited number of Ukrainian medical facilities. Limited access to telemedicine platforms also hinders the provision of consultations for parents in remote areas, which could facilitate early detection of issues. Additionally, the lack of technical infrastructure, such as reliable internet connectivity, complicates the adoption of digital technologies for monitoring children's health.

This issue is compounded by the shortage of qualified specialists in the regions capable of working with modern equipment. For example, training otorhinolaryngologists to use endoscopic diagnostic methods requires additional resources, which are often unavailable in peripheral medical facilities. Consequently, regional disparities in access to technology create a significant barrier to the widespread implementation of preventive programs.

An additional factor exacerbating these barriers is the impact of contemporary challenges, such as the ongoing war and economic instability. The war in Ukraine has led to the destruction of parts of the medical infrastructure, particularly in the eastern and southern regions, making it difficult to organize preventive measures. Population displacement, including children, to other regions or abroad creates additional challenges for ensuring continuity of medical monitoring and prevention. Economic crises limit families' ability to invest in preventive measures, such as regular medical check-ups or the use of modern protective equipment (e.g., personal ENT hygiene products). In these conditions, prevention often takes a backseat to the treatment of acute conditions. Furthermore, the COVID-19 pandemic, which significantly impacted the healthcare system, highlighted the vulnerability of preventive programs to external crises.

The overburdening of medical facilities and the redirection of resources to combat the pandemic reduced attention to the prevention of non-communicable and chronic ENT diseases. Overcoming these barriers requires a comprehensive approach that includes both national and regional initiatives. For instance, attracting international grants and partnerships could help address the issue of insufficient funding, while information campaigns targeting parents and educators could enhance awareness.

The introduction of telemedicine and mobile diagnostic units could partially address the limited access to technology in the regions. However, these measures require coordination at the national level and adaptation to contemporary challenges, which will be further analysed in subsequent sections of the article. In conclusion, insufficient funding, low awareness among parents and educators, and limited access to modern medical technologies in the regions are

key barriers to the prevention of otorhinolaryngological diseases in children in Ukraine. These challenges are systemic in nature and require a comprehensive approach to address them, including healthcare financing reforms, educational initiatives, and infrastructure development. Analysing these barriers in comparison with the experiences of EU countries, as discussed in subsequent sections, will provide a foundation for developing recommendations to improve preventive strategies in Ukraine.

The prevention of otolaryngological diseases in children is a priority area of public health policy, defining the general strategy for preserving pediatric populations in the context of increasing prevalence of chronic ENT pathologies[13]. Current trends in prevention are shaped by a range of social, economic, and epidemiological factors, which, in turn, determine the specifics of national approaches.

A comparative analysis of preventive systems in Ukraine and the European Union reveals both significant commonalities and structural-functional differences formed within the frameworks of healthcare policy, human resource provision, approaches to early diagnosis, parental education, and healthcare financing.

A key similarity between the Ukrainian and European models of prevention lies in the emphasis on early detection of upper respiratory tract pathologies in children. Both systems actively implement screening programs during routine health check-ups in kindergartens, schools, and outpatient primary care facilities.

However, in EU countries, a broader integration of a multidisciplinary approach is observed–paediatricians, allergists, speech therapists, and psychologists actively participate in team-based screening efforts. In contrast, in Ukraine, these functions are mostly concentrated within the scope of otolaryngologists.

Another shared feature is the focus on health-preserving education. In both Ukraine and EU countries, educational programs for parents and educators are implemented to raise awareness about early symptoms of ENT diseases, preventive measures against respiratory infections, and hygiene of ENT organs. However, in European countries, these issues receive significantly more institutional attention. Centralized public health campaigns, based on evidence-based medicine and modern media tools, are commonplace[14]. In Ukraine, such initiatives are implemented sporadically, often within the framework of regional or donor-funded projects.

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[13] Sana Batool. Healthcare Disparities in Otolaryngology. Curr Otorhinolaryngol Rep. 2023 Jun 8:1–14. Online ahead of print. https://doi.org/10.1007/s40136-023-00459-0

[14] Patrick J Fitzpatrick. Improving health literacy using the power of digital communications to achieve better health outcomes for patients and practitioners. *Front Digit Health.* 2023 Nov 17;5:1264780. https://doi.org/10.3389/fdgth.2023.1264780

Vaccination strategy, as a component of secondary prevention, is another common feature between Ukraine and the EU. Vaccines against influenza, pneumococcal and haemophilic influenza infections–that directly impact the frequency and severity of ENT diseases–are included in national immunization calendars in both systems. However, in EU countries, these programs enjoy more stable financing, better vaccine accessibility, and higher vaccination coverage. In Ukraine, despite regulatory support, the practice still faces periodic supply disruptions, public misinformation, and a lack of trust in the healthcare system.

A substantial difference lies in the level of digitalization of healthcare processes, which directly affects the efficiency of preventive measures. EU countries have functioning unified electronic health records that allow for continuous monitoring of children with chronic ENT pathologies, timely identification of disease exacerbations, and nationwide epidemiological analysis. Ukraine is currently in the process of implementing e-health systems, but they remain fragmented, limiting their preventive potential.

Differences are also evident in the organization of school healthcare. In most EU countries, specialized medical teams operate within school health systems, including physicians and nurses trained in ENT disease prevention[15]. Their role extends beyond recording complaints–they provide full medical consultations, vaccinations, health education, and cross-sectoral cooperation with educational and social services. In Ukraine, school healthcare is less structured; medical staff often lack specialized training, and inadequate funding and infrastructure significantly constrain preventive activities.

Human resource provision in pediatric otolaryngology also shows significant divergence. In EU countries, there is a clear trend toward narrow specialization, including pediatric otolaryngologists who undergo multi-level training with a strong emphasis on prevention. Most European countries also require continuous professional development for practicing physicians. In Ukraine, specialization in pediatric otolaryngology is still developing, and opportunities for continuing medical education remain limited.

In terms of funding, Ukraine predominantly operates on a residual budget principle, affecting the availability of services and infrastructure. In contrast, the European model is based on long-term planning, informed by epidemiological monitoring results and supported by multi-channel financing, including insurance mechanisms, health funds, and private sector involvement.

Legal and regulatory frameworks also differ. In EU countries, prevention of pediatric ENT diseases is a clearly defined area of public health policy, supported by comprehensive legal and regulatory systems aligned with EU

[15] Pierre-André Michaud. Organization and activities of school health services among EU countries. February 2021. *The European Journal of Public Health* 31(3). http://dx.doi.org/10.1093/eurpub/ckaa200

directives and standards. In Ukraine, the regulatory framework is evolving slowly, and ENT disease prevention is often treated as a secondary component within the broader pediatric healthcare system.

In conclusion, while sharing common goals and basic approaches, Ukraine and EU countries demonstrate distinct models of implementing preventive strategies in pediatric otolaryngology. The Ukrainian system is undergoing structural transformation, requiring targeted institutional approaches, integration of modern European practices, expansion of intersectoral cooperation, and advancement in medical education and digitalization. At the same time, the adaptation of successful EU experiences, tailored to national contexts, may serve as a catalyst for improving the effectiveness of the preventive system in Ukraine.

CONCLUSIONS

The conducted analysis of the epidemiological situation regarding otolaryngological diseases in children in Ukraine and the European Union has demonstrated the presence of significant common problems and challenges that determine the state of child health. The most prevalent pathologies remain otitis, rhinosinusitis, and tonsillitis, which directly affect quality of life, cognitive development, and academic performance in children. In the morbidity structure of both regions, there is a similarity in the predominance of acute and chronic processes; however, differences exist in the scale of prevalence and approaches to prevention.

European countries integrated prevention into public health systems much earlier, emphasizing evidence-based medicine and intersectoral cooperation, while in Ukraine preventive measures remain largely fragmented and not always based on modern standards.

The comparative analysis allows us to identify the strengths and weaknesses of the Ukrainian preventive system. Among the positive aspects, it is worth mentioning the well-developed network of primary health care that covers a significant proportion of the child population, as well as the implementation of certain state programs in the field of child health. At the same time, weaknesses remain in the insufficient integration of prevention into the national health care system, limited funding, unequal access to quality services between urban and rural areas, and low parental awareness of modern methods of disease prevention. As a result, preventive measures do not always achieve the desired effectiveness.

European experience demonstrates that success in reducing morbidity depends on a comprehensive approach. State vaccination programs, screening initiatives, and educational campaigns aimed at raising public awareness play a crucial role. In addition, the active integration of innovative technologies is of particular importance, including digital tools for health monitoring, electronic medical records, and telemedicine services. These practices ensure

early detection of pathologies, more efficient resource planning, and improved communication between physicians, parents, and educational institutions.

For Ukraine, the opportunities to adapt European experience are quite realistic but require systemic changes. First, it is necessary to enhance the role of intersectoral cooperation, where medical, educational, and social institutions act jointly to create a healthy environment for children. Second, an important direction of transformation should be the introduction of digital technologies for morbidity monitoring and coordination of preventive measures. Third, there is a need to improve educational programs for parents and children, with an emphasis on forming a healthy lifestyle, timely medical consultations, and adherence to preventive rules.

The prospects for reforming the prevention system of otolaryngological diseases in Ukraine envisage a gradual transition from episodic initiatives to a comprehensive national strategy that incorporates the best European practices. This requires improving the regulatory framework, increasing funding, and training specialists capable of working in accordance with modern clinical protocols. In this context, international cooperation aimed at knowledge exchange, joint research, and the development of effective preventive programs can play a key role.

Overall, the development of the Ukrainian system of prevention of otolaryngological diseases in children requires comprehensive transformation, based on the combination of state policy, scientific approaches, and public engagement. The integration of domestic capacities with European experience creates conditions for a significant reduction in morbidity, improvement in children's quality of life, and strengthening of public health in Ukraine.

SUMMARY

Otolaryngological diseases in children remain one of the most significant medical and social problems worldwide due to their high prevalence, recurrent nature, and long-term impact on physical, cognitive, and emotional development. This study presents a comparative analysis of the epidemiological situation in Ukraine and the European Union, with a focus on the most common conditions such as otitis, rhinosinusitis, and tonsillitis. The research highlights not only the burden of these diseases on the pediatric population but also their implications for public health systems and the quality of life of children and their families.

The findings demonstrate that Ukraine and EU countries share similar patterns of morbidity, yet differ substantially in approaches to prevention and health promotion. In the European Union, preventive measures are systematically integrated into public health systems, with a strong emphasis on evidence-based medicine, vaccination, screening programs, and health education.

These strategies are complemented by the implementation of innovative digital tools, telemedicine, and intersectoral cooperation, which together ensure early detection, timely intervention, and high levels of public awareness. In contrast, Ukraine's system remains characterized by fragmentation, uneven access to services between urban and rural areas, insufficient financing, and limited public knowledge about effective preventive measures. Nevertheless, the country benefits from a relatively well-developed network of primary health care facilities and certain state initiatives in child health.

The comparative analysis indicates that Ukraine can successfully adapt selected European practices by strengthening intersectoral collaboration, enhancing the role of primary health care in prevention, expanding digital health technologies, and improving educational initiatives for parents and caregivers. The reform of preventive strategies requires the development of a comprehensive national policy that combines scientific evidence, international experience, and coordinated state support.

Overall, this research emphasizes the importance of transforming the Ukrainian system of prevention of otolaryngological diseases in children through the integration of modern technologies, evidence-based practices, and European models. Such an approach will contribute to reducing morbidity, improving children's quality of life, and strengthening the foundation of public health in Ukraine.

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