

Current issues in the vaccination of healthcare workers

Tetiana V. Petrushevych, Olena V. Zublenko

BOGOMOLETS NATIONAL MEDICAL UNIVERSITY, KYIV, UKRAINE

ABSTRACT

Aim: To assess healthcare professionals' attitudes toward vaccination, evaluate vaccination coverage, and perform a SWOT analysis of immunoprophylaxis to identify strengths, weaknesses, opportunities, and threats.

Materials and Methods: A structured, anonymous 23-item questionnaire assessed knowledge and attitudes toward immunoprophylaxis among healthcare workers (HWs), covering demographics, vaccination awareness, infection prevention practices, attitudes, and professional motivation. The online survey (Google Forms) was conducted from May to December 2025 with ensured anonymity. Vaccination coverage was assessed using records of 1060 HWs from two public healthcare facilities, with comparative analysis across departments. A SWOT analysis was performed. For relative indicators, 95% confidence intervals (CIs) were calculated, accounting for sampling error associated with sample size (MedStat v.5.2).

Results: The majority of study participants demonstrated a positive attitude towards immunoprophylaxis: 72.4% (CI: 63.8–81.0) rated it as absolutely positive. However, gaps were identified: correct understanding of current COVID-19 vaccination recommendations was 28% (CI: 19.4–36.6), while 74% (CI: 65.6–82.4) correctly assessed continuation of vaccination schedules. The SWOT analysis showed generally positive attitudes toward vaccination and potential for improving coverage through education and management interventions.

Conclusions: Despite positive attitudes (72.4%) and satisfactory self-assessed knowledge, vaccination coverage among healthcare workers remains low (<30%): 29.7% for tetanus-diphtheria and 27.5% for hepatitis B. This reflects a clear gap between knowledge, motivation, and practice, indicating the need for integrated interventions, including education, communication skills development, and strengthened institutional vaccination policies.

KEY WORDS: immunoprophylaxis, healthcare workers, infection control, communication

Wiad Lek. 2026;79(6):1238-1243. doi: 10.36740/WLek/222567 DOI

INTRODUCTION

Immunoprophylaxis is one of the most effective measures for preventing infectious diseases and an important component of the infection control system in healthcare facilities. Vaccination of healthcare workers (HWs) is one of the key tools of modern preventive medicine, ensuring the safety of healthcare provision, reducing the spread of infections in healthcare facilities (HCFs), and protecting both staff and patients [1, 2]. HWs belong to groups at increased occupational risk of infection. Their immunization plays an important role not only in the prevention of vaccine-preventable diseases but also in combating antibiotic resistance, as a reduction in morbidity helps reduce the inappropriate use of antibacterial drugs and, consequently, slows the development of resistant strains of microorganisms [1].

In Ukraine, the importance of immunoprophylaxis among the general population is determined by several key factors. First and foremost, there remains a risk of the spread of vaccine-preventable infections such as measles, diphtheria, and viral hepatitis B. At the same

time, vaccination coverage among the adult population, including HWs, remains insufficient in some cases and stands at around 60–80%.

Although most HWs generally have a positive attitude toward immunoprophylaxis, their actual vaccination rates are often lower than the recommended levels. In particular, the rate of hepatitis B vaccination among HWs varies across countries, ranging from 60% to 90%, depending on the availability of relevant programs and the effectiveness of monitoring their implementation [3]. This highlights a gap between a positive attitude toward immunoprophylaxis and actual vaccination coverage, which does not always meet immunization targets.

In the context of these challenges, the issue of effective interaction between healthcare professionals and patients takes on particular importance, as the quality of communication directly influences the level of trust and acceptance of vaccination. Problems in healthcare professionals' communication with patients regarding immunoprophylaxis are linked to inadequate commu-

nication skills, a lack of time for consultation, the use of complex medical terminology, and reduced trust in vaccination due to the influence of misinformation [1, 4, 5]. These factors complicate the building of patient trust and acceptance of vaccination, reducing the effectiveness of preventive measures, which requires both thorough analysis and targeted intervention. Consequently, improving healthcare professionals' communication skills is one of the key areas for enhancing the effectiveness of immunoprophylaxis.

In view of the above, it is advisable to apply strategic assessment tools, in particular SWOT analysis. SWOT analysis is widely used to evaluate immunoprophylaxis programs at both national and global levels, enabling the identification of internal and external factors influencing the effectiveness of vaccination [6, 7].

AIM

To assess the attitudes of healthcare professionals from various disciplines towards vaccination, determine their vaccination coverage rates, and conduct a SWOT analysis of immunoprophylaxis among healthcare staff to identify strengths, weaknesses, opportunities, and potential threats.

MATERIALS AND METHODS

To assess knowledge and attitudes towards immunoprophylaxis among healthcare workers, a structured anonymous questionnaire was developed, consisting of 23 questions and comprising the following sections: general information about the respondent (age, gender, field of professional activity) – three questions; awareness of vaccination (vaccinations in accordance with the national schedule, vaccination against influenza, COVID-19 and other infections) – five questions; assessment of practical skills and behavioral aspects of infection prevention – five questions; attitudes towards vaccination (assessment of vaccine efficacy and safety, level of trust) – four questions; professional motivation and communication skills – six questions

During the study, primary data obtained through a survey of healthcare workers were used, as well as documentary materials containing information on vaccinations administered. The survey was conducted between May and December 2025. Data were collected using an online questionnaire (Google Forms) distributed via Google Drive.

A SWOT analysis [6, 7] was used to assess healthcare professionals' attitudes towards vaccination, vaccination coverage rates, and awareness of immunoprophylaxis. This enabled the identification of internal

and external factors influencing vaccination status and staff awareness, as well as an analysis of strengths, weaknesses, opportunities, and threats. The SWOT analysis included: strengths: medical training, access to evidence-based information, a high level of professional responsibility; weaknesses: lack of time, insufficient knowledge regarding certain aspects of vaccination, mistrust of certain vaccines, low motivation; opportunities: implementation of educational programs, national and local immunization campaigns, expanded access to free vaccines; threats: spread of misinformation, professional burnout, increased epidemiological risks.

The elements of the SWOT analysis were developed based on the results of the questionnaire and data on the actual vaccination coverage among the target population, which made it possible to assess both the vaccination rate and the target population's awareness.

To assess vaccination coverage, an analysis was conducted of records regarding preventive vaccinations received by 1060 HWs in two public healthcare facilities. A comparative analysis was carried out between different departments of multi-specialist hospitals to identify differences in vaccination rates.

Statistical data processing was carried out using the MedStat v.5.2 software. For relative indicators, 95% confidence intervals (CIs) were calculated, taking into account the sampling error associated with sample size.

ETHICS

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Participation was voluntary, and no personal data were collected. Prior to participation in the study, all respondents were duly informed about the purpose of the survey, its design, and the assurance of anonymity and confidentiality regarding their personal data and the information provided.

FRAMEWORK

The study was conducted as a fragment of the scientific project of the Department of Epidemiology and Evidence-Based Medicine, Bogomolets National Medical University, «Studying the impact of the Russian-Ukrainian armed conflict and the COVID-19 pandemic on the morbidity and mortality of the population of Ukraine» (state registration number 0125U001645; term: 2025-2027).

RESULTS

As part of the study, 104 questionnaires completed by healthcare workers were analyzed to assess their atti-

tudes towards immunization, level of awareness, and practical involvement in its implementation. Women predominated among the respondents – 86.5% (CI: 79.9–93.1), which corresponds to the gender structure of the healthcare system [8]. In terms of professional activity, 61% (CI: 51.6–70.4) of respondents were involved in clinical practice, whilst 39% (CI: 29.6–48.4) worked in healthcare management and organizational structures. The majority of study participants viewed immunoprophylaxis positively: 72.4% (CI: 63.8–81.0) classified their attitude as unambiguously positive. At the same time, 62.0% (CI: 52.7–71.3) of respondents reported being vaccinated against seasonal influenza annually. The vaccination rate was higher among representatives of healthcare management structures – 70% (95% CI: 56.0–84.0) – compared with healthcare practitioners in the clinical sector – 57% (95% CI: 44.8–69.2). Among those surveyed, 59% (CI: 49.6–68.4) of healthcare professionals were directly involved in organizing or conducting vaccination sessions.

Respondents generally rated their colleagues' awareness of vaccination and their own knowledge of current recommendations highly. At the same time, only 28% (CI: 19.4–36.6) answered questions on current COVID-19 vaccination recommendations correctly. In contrast, 74% (CI: 65.6–82.4) correctly identified the possibility of continuing the vaccination course without loss of efficacy. Awareness of the Immunoprophylaxis Development Strategy up to 2030 [9] was reported by 73% (CI: 64.5–81.5) of study participants.

When assessing communication aspects, it was found that 71% (CI: 62.3–79.7) of respondents frequently or occasionally encounter individuals who are skeptical about vaccination. In such situations, 88% (CI: 81.7–94.3) attempt to explain the benefits of vaccination, whilst 75% (CI: 66.7–83.3) use arguments based on the principles of evidence-based medicine. At the same time, 55% (CI: 45.4–64.6) reported difficulties in communicating with individuals who hold strong anti-vaccination beliefs.

Among the factors negatively affecting vaccination coverage, the most frequently cited were misinformation in the media – 61% (CI: 51.6–70.4), fear of possible side effects – 54% (CI: 44.4–63.6), and the influence of one's social circle – 32% (CI: 23.1–40.9). According to respondents, the views of family, friends, or colleagues can significantly influence an individual's decision regarding vaccination. The vast majority of respondents, namely 62% (CI: 52.7–71.3), believe that information campaigns alone are insufficient to significantly increase vaccination rates.

Thus, analysis of the data shows that the key barriers are predominantly informational and communication-related, which underscores the need to strengthen

systematic educational efforts and develop effective strategies to counter misinformation.

For a significant proportion of respondents – 79% (CI: 71.2–86.8) – the opportunity to influence vaccination rates by educating others is an important motivating factor.

Respondents rated their colleagues' awareness of vaccination highly – 84% (CI: 76.4–91.8), and their own knowledge of current recommendations – 80% (CI: 72.6–87.8), which demonstrates a general confidence in their professional competence regarding immunoprophylaxis.

The following key aspects can be identified based on the survey results:

- Correct understanding of current recommendations regarding COVID-19 vaccination – 28% (CI: 19.4–36.6). This figure indicates significant gaps in knowledge regarding current approaches;

- Correct assessment of the possibility of continuing the vaccination course without loss of efficacy – 74% (CI: 65.6–82.4). The majority of respondents demonstrated a correct understanding of the principles of immune response formation;

- Awareness of the Immunoprophylaxis Development Strategy up to 2030 – 73% (CI: 64.5–81.5). This indicates a sufficient level of awareness regarding the strategic directions for the sector's development.

The results obtained, taking into account the margin of error, indicate a generally positive attitude among healthcare professionals towards immunoprophylaxis and their active professional engagement. At the same time, the widening of CIs compared to a larger sample size points to increased statistical uncertainty and highlights the need for further research and systematic updating of educational programmes.

To assess vaccination coverage in healthcare facilities, data from 1,060 HWs were analyzed, divided into four groups: inpatient units for adults, inpatient units for children, outpatient units, and paraclinical units. Vaccination coverage against hepatitis B (HBV) and tetanus and diphtheria (TD) in various units was analyzed. Mandatory vaccination of HWs is regulated by regulatory and legal documents and relevant orders of the Ministry of Health of Ukraine [10]. In total, 292 individuals were vaccinated against HBV, representing 27.5% (CI: 24.8–30.2), and 315 individuals against TD, representing 29.7% (CI: 26.9–32.5).

Among the target population in inpatient units for adults, the highest number of vaccinations was recorded: 222 individuals against TD, accounting for 38.8% (CI: 34.8–42.8), and 201 individuals against HBV – 35.1% (CI: 31.2–39.0). In inpatient units for children, the proportion vaccinated against TD was 33.3% (CI: 21.9–44.7) and against HBV – 25.7% (CI: 15.2–36.4). In outpatient units,

Table 1. SWOT analysis of immunization (coverage and knowledge) among healthcare professionals

Strengths	Weaknesses
Higher vaccination rates in inpatient departments: tetanus/diphtheria 38.8% (CI: 34.8–42.8); positive attitude towards vaccination: 72.4% (CI: 69.6–75.2); personal practice of flu vaccination: 70% (CI: 56.0–84.0); self-assessment of knowledge: colleagues' awareness – 84%, own knowledge – 80%; active participation in organizing vaccination sessions – 59% (CI: 56–62).	Overall vaccination coverage against tetanus/diphtheria: 29.7% (CI: 26.9–32.5); low hepatitis B vaccination coverage: 27.5% (CI: 24.8–30.2); vaccination coverage among primary care practitioners seeing outpatients: tetanus/diphtheria – 14.5% (CI: 10.1–18.9); discrepancy between positive attitudes and actual vaccination; low awareness of current recommendations regarding COVID-19 – 28% (CI: 23.9–32.1); ambiguity in regulatory documents regarding the reporting of adverse events
Opportunities	Threats
Motivation to educate others: 79% (CI: 76.5–81.5); increasing vaccination coverage to ≥80%; training on communicating with sceptics: 55% (CI: 52–58); use of evidence-based practices: 75% (CI: 72.2–77.8); educational campaigns on current vaccination schedules; integration of vaccination into the infection control system; strengthening the role of managers as agents of change	High percentage of people not vaccinated against tetanus/diphtheria: 70.3% (CI: 67.5–73.1); not vaccinated against hepatitis B: 72.5% (CI: 69.7–75.3); risk of occupational infection (HBV, tetanus, diphtheria); risk of spreading nosocomial infections (HAI); misinformation in the media – 61%; fear of side effects – 54%; influence of peers – 32%; comments during inspections/audits

Source: compiled by the authors of this study

vaccination coverage was lower, at 14.5% (CI: 10.1–18.9) against TD and 23.4% (CI: 18.3–28.5) against HBV. In paraclinical units, vaccination coverage against TD was 20.9% (CI: 14.5–27.3) and against HBV was 4.1% (CI: 2.0–6.2).

A SWOT analysis was conducted based on the obtained data on vaccination coverage rates among the target population and the results of a survey on attitudes towards immunization. This made it possible to systematize the identified strengths and weaknesses, as well as to identify key opportunities and threats for increasing vaccination rates. The results of the SWOT analysis are presented in Table 1.

The SWOT analysis revealed that healthcare workers generally have a positive attitude towards vaccination and significant potential to improve immunization coverage through educational initiatives and proactive management decisions. At the same time, there remains a substantial gap between attitudes towards vaccination and actual vaccination practices, exacerbated by insufficient knowledge and the influence of misinformation. Therefore, increasing vaccination coverage requires a comprehensive approach that combines training, clear regulatory frameworks, and a strengthened role for managers as a key tool for improving vaccination rates among HWs.

DISCUSSION

According to the literature, critically low immunization rates were observed in Middle Eastern countries between 2020 and 2024: only 16.75% for hepatitis B virus (HBV) and 12.87% for tetanus/diphtheria [11]. These figures are consistent with earlier studies in the United States, where tetanus/diphtheria coverage among HWs in 2011 was only 26.9%, although this figure was

higher than that in the general population (11.1%) [12].

In 2018–2019, a sociological survey was conducted involving 1,384 healthcare professionals from four regions of Ukraine. The results revealed gaps in healthcare professionals' knowledge and perceptions regarding the organization of vaccination. The highest level of awareness regarding immunoprophylaxis was demonstrated by healthcare facility managers and specialists who had undergone specialized training in vaccination, whilst the lowest level of awareness was observed among clinical healthcare practitioners [13].

A study conducted in Poland in 2021 among 2,300 healthcare workers using a questionnaire assessed their attitudes and behavioral intentions regarding vaccination against COVID-19. It was found that 82.95% of respondents expressed willingness to be vaccinated against SARS-CoV-2. At the same time, HWs represent a group at increased biological risk due to their daily professional activities. Despite the relatively high level of declared willingness to be vaccinated, the overall proportion of HWs intending to be vaccinated against COVID-19 is considered insufficient [14]. COVID-19 infection among HWs affects the provision of healthcare services to the population [15].

In a study conducted in the United States in 2021, 1257 HWs were surveyed via a questionnaire. The study assessed COVID-19 vaccination status, professional contact with COVID-19 patients, reasons for deciding to get vaccinated or refusing the vaccine, and the main sources of information about vaccination. The results showed that the level of support for vaccination among HWs in the United States was only 60–67%. The main reasons for low uptake were low levels of trust in vaccines, a lack of reliable information, and the influence of personal beliefs [14]. The Centers for

Disease Control and Prevention (CDC) recommends that healthcare professionals actively encourage the public to get vaccinated against COVID-19. To increase the effectiveness of such measures, it is important to understand the general perception of vaccines among healthcare workers and other healthcare professionals [5].

The results of studies conducted in China in 2022 indicate that HWs generally demonstrate a high level of vaccine acceptance, which, however, varies depending on socio-demographic and professional characteristics. According to a meta-analysis, the level of willingness to be vaccinated among healthcare workers in China is around 78%, highlighting the need for targeted educational programmes. The implementation of these programmes may help increase vaccination coverage and support the development of herd immunity [16].

The use of SWOT analysis in conjunction with data from a healthcare professional survey allows for the systematization of factors influencing vaccination adherence, including organizational barriers and behavioral aspects [17]. The SAGE working group defines vaccine hesitancy as a delay in acceptance or refusal of vaccination despite its availability. Recognizing this phenomenon is important for developing a coordinated approach among specialists and allows for clearer identification of factors contributing to lower vaccination rates. At the same time, low vaccination coverage is not always due to hesitancy alone, a fact that must be taken into account when planning relevant measures [18].

LIMITATIONS OF THE STUDY

The authors of the manuscript acknowledge that the limitations of this review stem from the fact that the results reflect the views of the sample rather than the entire population of healthcare workers in Ukraine; the margin of error does not account for possible self-selection bias associated with voluntary participation in the survey; the data are sufficient

for analytical conclusions but require caution when extrapolated to the national level.

PROSPECTS FOR FURTHER RESEARCH

Future research will focus on analyzing the level of awareness among medical students regarding immunoprophylaxis. It is important to assess the effectiveness of educational programs in fostering professional knowledge and a responsible attitude towards vaccination. It is also advisable to compare the level of awareness among students from different years and faculties, which will help identify existing gaps and determine areas for improving the educational process, thereby positively influencing the training of future healthcare professionals.

CONCLUSIONS

Despite a positive attitude towards immunoprophylaxis (72.4%) and a satisfactory level of self-assessed knowledge among healthcare workers, actual vaccination coverage remains critically low (<30%). Specifically, 29.7% of HWs have been vaccinated against tetanus and diphtheria, and 27.5% against hepatitis B. This highlights a gap between knowledge, motivation, and practice and points to the need for systematic managerial and educational measures. The identified discrepancy underscores the need for comprehensive interventions combining educational programmes, the development of communication skills, and adherence to institutional policies to increase vaccination coverage among healthcare workers.

Therefore, an adequate level of vaccination among HWs is a vital component of Ukraine's public health system. Immunisation provides individual protection, reduces the risk of healthcare-associated infections (HAIs), enhances patient safety, and helps build trust in vaccination.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

CORRESPONDING AUTHOR

Olena V. Zublenko

Bogomolets National Medical University
34 Beresteyskyi Ave., 03057 Kyiv, Ukraine
e-mail: olena.zublenko@gmail.com

ORCID AND CONTRIBUTIONSHIP

Tetiana V. Petrushevych: 0000-0003-1256-2273    

Olena V. Zublenko: 0000-0003-4682-6484    

 – Work concept and design,  – Data collection and analysis,  – Responsibility for statistical analysis,  – Writing the article,  – Critical review,  – Final approval of the article

RECEIVED: 20.01.2026

ACCEPTED: 27.05.2026

