



COVID-19 Vaccination under Conditions of War in Ukraine

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Abstract

The COVID-19 pandemic, which spread around the world in 2020, changed the lives of millions of people and affected the life and functioning of all countries and people without exception. With the emergence of the opportunity to be vaccinated against COVID-19, the problem of making a decision about vaccination also appeared. But it has become increasingly clear that the coronavirus is moving into the group of annual viral epidemic diseases that occur every year in different countries during the seasonal wave of acute respiratory viral infections. The ongoing COVID-19 pandemic against the background of the adoption of serious quarantine measures indicates the need for large-scale vaccination of the population as the most effective way to protect against COVID-19. In this article, we pay special attention to vaccination, as the main factor in ensuring health, reducing the morbidity and severity of the course of the COVID-19 disease, and an important task of the state and modern public administration.

Keywords COVID-19 · Pandemic · Vaccination · Public Health · War · Ukraine

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Introduction

By the end of 2021, according to the research unit of the Oxford Martin School at the University of Oxford, UK (Unicef 2021), 55.3% of the world's population had received at least one dose of the vaccine. While in Ukraine this indicator is equal to 32% of the country's population, about 29% of Ukraine population is fully vaccinated. Such a rather small indicator was caused, according to the results of many studies, including by the distrust of the population in vaccination all over the world. The World Health Organization (WHO) established a working group on this problem back in 2012, and in 2019, this problem was included in the list of the ten most serious threats to the health of the global population.

The impact of the pandemic on people's psyches has been reasonably demonstrated by a number of scientific publications. These publications include the sense of security changes due to complete uncertainty, which creates a combination of uncertainty and danger; needs change, increasing dependence on others; a desire for cohesion and unity; values change: cooperation, attention, and care become priorities (Kruglanski 2020). In the conducted research, certain regularities of people's mental reactions to the situation of the coronavirus pandemic were revealed. Namely, increased fear of COVID-19 (Gritsenko et al. 2020), a decrease in the level of positive emotions (Raskazova et al. 2020), a decline in constructive thinking and an increase in psychopathological symptoms (Enikolopov et al. 2020), decrease in life satisfaction at various stages of the pandemic (Zacher and Rudolph 2020), construction of a new everyday life by the individual with changed life priorities, habits and behavioral scenarios (Yarmak et al. 2020), formation of the "collective picture of the disease" and the effect of "intelligibility" of COVID-19 (Pervychko et al. 2020), narrowing and negativizing the perspective of temporal dynamics, changing moral and ethical norms, etc.

It is also worth noting that humanity experienced a pandemic situation for the first time in the conditions of a developed information and communication society, where information spreads almost instantly. Everything quickly becomes available and affects the thoughts and behavior of people. The world has become interpenetrating, which has given unlimited opportunities and unprecedented risks, their combination and consequences. Thus, a threat that arose in one place potentially automatically threatens all. And this applies to war, famine, infections, etc. That is why joint struggle, joint consolidated efforts for resistance, and prevention have become important. In turn, the response and responsibility of public administration is also changing, which should become even more balanced, decisive, well-founded, transparent, understandable and friendly to people (Dutchak et al. 2020).

The World Health Organization declared that countries should work together, learn something from each other and coordinate their efforts, show a high level of solidarity, and citizens must maintain psychological stability; everyone should contribute to the fight against the virus (Shtogrin 2020; Petrova et al. 2017). Federal Chancellor of Germany Angela Merkel also confirmed this in her televised address, noting that the coronavirus is radically changing life and the idea of normality, social life, social interaction (Merkel 2020). We pointed out that Ukraine, in the conditions of a long-term extended anti-terrorist operation within the framework of the United Forces operation (since

2014), gained new experience in managing the state in the context of socio-economic and political changes, the influence of internal and external factors. However, there have been positive changes, namely, the Europeanization of society and the state; introduction of necessary systemic reforms; the population became an active subject of influence on the authorities, initiator and participant of transformations in the country and partnership management; consolidation of efforts of the state, civil society, business, etc. The country, the nation, having gained significant experience in confronting risks and threats, has become more resilient and hardy (Bilynska et al. 2019).

Modern variability, unpredictability, hybridity, combination of challenges and threats, complexity, ambiguity of their impact and turbulence of consequences have made the issue of ensuring stability, development of national resilience, which increasingly need scientific study and rethinking (Korolchuk 2020). This paradigm contributes to the formation of the proper preparedness of countries and nations and provides the best possible ways of predicting, overcoming, confronting any crises, threats and their consequences, preserving opportunities and resources for prospective development.

The “decline” of the COVID-19 wave is associated with the difficulties people in Ukraine faced with. Namely, the complication and limitation of people’s access to diagnostics and qualified medical care; a large number of people directly involved in military events and who have gone abroad; difficulties of keeping statistics in the temporarily occupied territories, etc. From March 26, 2022, during the period of martial law, the Cabinet of Ministers canceled (Law of Ukraine No. 1236–2020-p, 2020) the color zoning of the regions of Ukraine and the application of the corresponding anti-epidemic measures. From the first days, Ukrainians were forced to hide in overcrowded shelters, bomb shelters, subway stations, basements, without the opportunity to contact a family doctor or conduct a diagnosis. Millions of people were forced to move to relatively safer areas or go abroad, which also contributed to the spread of COVID-19.

However, despite the large number of citizens who are forced to hide from the war, being in crowded places and not being able to get tested or see a doctor, the number of cases of COVID-19 has decreased sharply since the beginning of the war the number of cases began to increase (from about 4000 new cases per day in the first days of war up to 400 new cases in April 2022) (Lyashko 2022a). The Ministry of Health and the Public Health Center of the Ministry of Health of Ukraine indicate the need for Ukrainians to continue to observe quarantine restrictions, even if you have already been vaccinated. If possible to avoid gatherings of people; to greet without contact; regularly wash hands with soap or treat with an antiseptic; stay at home when you feel bad; wear masks, keep a distance of 2 m (CPH 2021), get vaccinated if possible, etc.

The Impact of the War on the Public Health Priorities of Ukraine

The problem of the pandemic has receded into the background; however, “COVID-19 still continues to circulate, take lives, and additionally contributes to the fact that the burden on the health care system continues to grow”. This is evidenced by

the adopted Resolution of the Cabinet of Ministers of Ukraine No. 1423 of December 23, 2022 regarding the extension of the quarantine throughout the territory of Ukraine until April 30, 2023 (Law of Ukraine No. 1423, 2022).

Thus, the levels of epidemic safety in the regions were canceled; the mask mode is exclusively of a recommendatory nature; the need to have a COVID-certificate for visiting restaurants, cultural institutions, gyms have been abolished; suspending the suspension of employees who were suspended from work due to lack of vaccination against COVID-19; no COVID-19 documents are required for travel between regions of Ukraine (Zagorodnii 2022). We can see the changes before the start of a full-scale war (2022) and during martial law in Ukraine in the Fig. 1.

Apparently, mobilizing people in response to a larger threat helped to deal with even COVID-19 for a while. But the SARS-CoV-2 virus has not gone anywhere. He simply enters a new level of relations with humanity and, we hope, will no longer be able, even when it is mutated, to cause such serious damage. The active fight against infectious diseases continues with all available methods and measures. This priority still has a place in the work plans of the public health system both in Ukraine and in the world.

Among the urgent problems of public health in Ukraine, which determined the priority tasks of this sphere, in addition to threatening infections, a complex demographic situation, high morbidity and distrust of the medical system due to corruption and lack of healthy partnership, the following can be highlighted:

- Non-infectious diseases (cardiovascular diseases, diabetes, oncological diseases, chronic obstructive pulmonary diseases), which are the cause of more than 80% of disability and mortality, including premature, and, shortening the

	Before the start of a full-scale war	During martial law
Levels of epidemic safety	☑ Were applied	☒ Not applicable
Mask regime	⚠ Required	☑ Recommended
The presence of Covid documents for using services of restaurants, cultural institutions, gyms, etc.	⚠ Required	☒ Cancelled
Suspension from work of employees who must be vaccinated against Covid-19	☑ Was in effect	☒ Suspended
The presence of Covid documents for trips between regions	⚠ Required	☒ Cancelled

Fig. 1 Ministry of Health of Ukraine summary

duration of active life, leads to physical and psychological suffering of a person and social and economic overloads of the state. These health problems are associated with risk factors of an unhealthy lifestyle, untimely diagnosis and lack of control over certain health conditions, etc. Here, it is worth noting that quarantine restrictions in the conditions of a pandemic and the unavailability of proper medical care in conditions of war will provoke an increase in advanced stages of these pathologies and disability and mortality from them.

- The level of preventive vaccinations, because it is believed that vaccine-controlled infections should be controlled to eliminate the possibility of outbreaks and the development of epidemics, with the corresponding consequences. Thus, in the speech of Ihor Kuzin, Deputy Minister of Health, Chief State Sanitary Doctor of Ukraine it is noted that “...the full-scale invasion of the Russian Federation put many everyday issues on the back burner. However, health should always be a priority...children should be vaccinated according to the National Immunization Schedule. After all, vaccine-controlled infections are an enemy that cannot be seen, but which can sometimes cause considerable problems” (Ministry of Education and Science of Ukraine 2022).
- Establishing a “work team” to fight the disease, based on the principle of a patient-oriented approach, forming the patient’s trust in the doctor and greater loyalty on the part of doctors—this is about the ability of medical workers to increase their professional skill in matters of respectful attitude to the patient, to his problems (for example, giving time to questions about the impact of the disease on the patient’s daily life or family, forming an understanding of the need for health care, hopes for the effectiveness of the treatment applied in the case of the disease, explaining information about the diagnosis and treatment in detail and clearly, answering questions that arise, etc.). Such cooperation promotes trust, open dialogue and helps to achieve better results, which is especially important in tense times of emergencies and war.

It is vital during times of conflict when people need treatment and support more than ever to create conditions that impact motives and values. These scenarios include trust in the doctors, the ability to fight “as a team”, and the state’s institutions. According to data from the Razumkov Center, 55% of Ukrainians currently have faith in government institutions, up from 35% in 2020. A similar dynamic is also illustrated by Gradus Research, according to which 68% of Ukrainians rate the actions of the Ukrainian authorities since the beginning of the war as effective (Boyko 2022). Among social institutions, in 2022 Ukrainians have the most trust in the Armed Forces (96% trust them completely or to some extent), the President of Ukraine (82%), humanitarian and charitable organizations (78%), the Church (70%), universities (62%), women’s organizations (59.5%), state institutions (55%), police (55%), environmental organizations (54%) (Razumkov Center 2022).

The war caused new challenges to the health care system, such as:

- The emergence and increase in the number of certain groups of people in need of psycho-social and medical assistance: internally displaced persons (herein-

after IDPs); war-affected military (participants in combat events) and civilians (including those who were and are in temporarily occupied territories, orphaned children, disabled from injuries) and those who were forced to leave abroad, but dream of returning after the end of the war;

- A change in the demand for certain medical services in different regions and an aggravation of the disproportion of resource provision in the health care sector (The Pharma Media 2022a), for example, due to the increase in the number of gunshot wounds and polytrauma, psychological health problems (including from experiencing losses, violence, grief, witnessing shocking and traumatic events) and the increase in the number of people due to IDPs. Currently, in response to such a problem, there is a restoration of compliance with the provision of health care services, in particular for IDPs, and jobs for workers in the medical field—that is, strengthening the capacity of health care workers. Also, networks of mobile dispensaries are being deployed, the need for which is significant—currently almost a third (30%) of IDPs have problems with access to medical care (National Institute for Strategic Studies 2022).
- Destruction of infrastructure, establishments, equipment, disruption of logistical connections, lack of heat and electricity, lack of financial resources, which hinders the ability to provide high-quality medical care, medical care facilities, local response efforts, etc.

The military actions directly affected the availability of medicines: from the beginning of 2022, the State Enterprise “Medical Procurement of Ukraine” purchased medicines and equipment in the amount of 53% of the need; the draft of the State Budget for 2023 lays down the amount of financing for the purchase of medicines, which taking into account the projected level of inflation, the growth of the exchange rate of foreign currencies (a large part of the medicines in Ukraine are imported) and the exacerbation of chronic conditions, as well as the appearance of new diseases in population in need of medical treatment will lead to a shortage of quality pharmaceutical products. The problem will partly have to be solved by the citizens themselves, which will have a negative impact on their standard of living (Kotlyar 2022).

- The need to make quick management, political and regulatory decisions in the absence of adequate data and information, including in the temporarily occupied territories.
- The impossibility of observing the norms of prevention and treatment, leading a healthy lifestyle, lack of knowledge about the provision of pre-medical and psychological care in conditions of full-scale war and traumatic events, self-help, etc.
- Lack of professional staff in the health care sector, medical workers of all levels, especially those with experience in providing assistance for gunshot wounds, military polytrauma, contusions of various degrees, post-traumatic disorders, etc.

Thus, this problem also concerns medical workers, doctors and nurses who were forced to move to other cities and regions to escape the war—thousands of them (The Pharma Media 2022b). According to the Ministry of Health, the problem of a critical shortage of doctors in connection with the war is being solved through effective mechanisms: the potential opportunity to attract foreign medical workers who are ready to work in Ukraine temporarily on a volunteer basis in accordance with the adopted Law of Ukraine dated July 29, 2022 No. 2494-IX (Law of Ukraine No. 2494-IX, 2022). At the same time, this is an exclusively auxiliary step, since first of all it is necessary to stabilize the sectoral labor market, providing comprehensive support for the employment of IDP medical workers (National Institute for Strategic Studies 2022); the possibility of employment in another medical institution—the temporary involvement of IDP doctors in health care institutions is regulated by the order of the Ministry of Health of Ukraine dated March 4, 2022 No. 414 (Law of Ukraine No. 414, 2022), which for December 2022 was used by 4290 IDP who are medical workers, these are: 2,006 doctors, 1,503 specialists (nurses/brothers, midwives, paramedics, pharmacist assistants), 781 technical workers. The largest number of employed doctors and other healthcare professionals are registered in Lviv region, 284; Dnipropetrovsk region, 214; Poltava region, 150; and Kharkiv region, 130 (Ustinov 2022).

At the same time, there are reports of difficulties with employment for medical workers with the status of IDPs—they are forced to either accept less qualified professions or leave Ukraine, which worsens the personnel potential of the industry. The situation is complicated by the lack of up-to-date information on the exact number of available medical workers (Kotlyar 2022), since such accounting is not carried out centrally and systematically in wartime conditions. The World Health Organization (2022) recommends building a personnel policy with regard to the return of medical personnel, as well as developing a digital register of medical personnel. At the same time, in order to facilitate the search for vacancies for doctors, the Ministry of Health has collected them all in one place—on the Portal of vacancies in health care institutions of any form of ownership.

The solution to the personnel problem should not just be on preserving the capacity that already exists, but also on training medical professionals in accordance with plans for the demands of the war and the post-war period, particularly in the fields of physical rehabilitation and mental health care. It is important to note that the issue of safeguarding, maintaining, and enhancing mental health was not given enough consideration when it reached the first tier of significant tasks facing the nation, the healthcare system, and that it is now a priority for the advancement of public health in Ukraine. After all, as a result of the full-scale war, Ukrainians continue to experience extreme negative emotions and suffering—capture, violence, occupation, loss, etc. The fact that the number and importance of treating traumas caused to the mental health of Ukrainians has increased is already indisputable—after the end of the war, at least 15 million people will need psychological help (Lyashko 2022b).

At the initiative of the First Lady of Ukraine, together with the Ministry of Health of Ukraine, WHO and international partners, the National Program of Mental Health and Psychosocial Support is being formed to help everyone get the necessary

support and help in mental health issues, as needed, in order to preserve psychological resources for the future, revival and reconstruction. The Ministry of Health of Ukraine is actively establishing intersectoral interaction with other departments and partners in order for the Program to become effective and full-fledged (Mykychak 2022). Despite the fact that the state emphasizes the importance of rehabilitation, particularly psychological, its availability is currently low. The Ministry of Health provides information on the success of certain rehabilitation programs of the Ministry of Defense and the Ministry of Veterans, while a national rehabilitation policy has not yet been developed.

There is no doubt that the situation is worse in certain regions that are closer to the combat events, and terrorist missile attacks are hitting all over Ukraine, increasing the number and severity of the problems. So, for example, as of November 2022, according to the published statistics of the Minister of Defense of Ukraine, Oleksiy Reznikov (2022), “Russian troops have launched 16,000 missile strikes on the territory of Ukraine since the beginning of the full-scale invasion, and 97% of Russian targets are civilians: more than 12,300 strikes were carried out in the suburbs and villages, about 1.9 thousand hits are on houses, more than 500 hits are on military facilities, more than 250 hits—on transport infrastructure, about 220 hits aimed on energy infrastructure and more than 800—on other facilities”.

The adoption of the Law “On the Public Health System” (hereinafter the Law) was a positive thing for Ukraine in the war conditions, which provides an opportunity to update the health care system, unbalanced by years of sporadic unfinished transformations, to make it a modern, comprehensive system of public health, integrated to the European healthcare network. This is extremely important, because ensuring the proper level of health, prevention of diseases and quality of life requires organization, systematicity, consolidated efforts and responsibility of the government, society and every individual. These are the steps that build participation and trust. The development of the public health system is the science and practice that enables the synergy of joint efforts to prevent the increase in morbidity, injuries, disability, and mortality and to promote the preservation and improvement of health, including mental, to create a healthy environment for many years for sustainable prospective development and prosperity of future generations. In addition, the public health system provides effective intersectoral coordination and cooperation, operational management and monitoring of the processes of meeting needs, solving problems and gradual post-war recovery, especially in matters that require multisectoral solutions and interventions at the national and local levels (such as preparedness and responding to emergency situations, solving social, including special, needs of vulnerable groups, etc.).

The main focus of the public health care system’s development is disease prevention, as well as individuals’ duties and responsibilities to look after their own health, the health and hygienic upbringing of children, and not to endanger the health of others. These guidelines align with the goals and provisions of the Association Agreement between Ukraine and the European Union, the European Atomic Energy Community, and their member states regarding disease prevention and control, as well as the implementation of the Sustainable Development

Goals, which also call for the creation of public health initiatives that correspond to the Goals (Ukraine is a member of the United Nations).

The main provisions of the Law include preventing diseases, strengthening the health of the population, and increasing life expectancy; ensuring epidemiological surveillance and monitoring, preparedness and response to threats and emergency situations; preserving the function of ensuring biological safety and protection; development of an integrated approach, etc.

Timeliness, quality and availability of the following services were determined as priority areas of development in the field of public health in November 2022:

1. Primary care, outpatient, with the coordination of medical screening that are required and the support and treatment of patients with mental disorders;
2. Medical services for expectant mothers, labouring women, newborns, young children under the age of five, and users of assisted reproductive technologies;
3. Mental health care and psychological support;
4. Emergency medical care and disaster medicine, transplantation of human anatomical materials and rehabilitation;
5. Specialized medical care, rehabilitation services in the field of health care and psychological support for war veterans and their family members, family members of the deceased, IDPs.
6. Prevention, early diagnosis and treatment of non-infectious diseases (cardiovascular, cerebrovascular, bronchopulmonary, oncological diseases; type 2 diabetes; mental and behavioral disorders);
7. Treatment, localization and elimination of outbreaks of infectious diseases, epidemics, prevention of their occurrence and spread (vaccine-controlled diseases, including COVID-19, HIV/AIDS, tuberculosis, viral hepatitis B and C).

The provision of critically necessary medications (as listed in the list) and methods for implementing the programme of governmental guarantees of medical care for the public in accordance with those suggested by the World Health Organization are among the priority actions; as well as conditions and opportunities for leading a healthy lifestyle (observing a rational and balanced diet; reducing the level of use of tobacco products, alcohol and narcotic substances; increasing physical activity; including increasing the level of population coverage with preventive vaccinations, etc.); ensuring the needs of the health care system in professional medical personnel and measures of continuous professional medical education (including the development, approval and implementation of programs for training specialists (doctors and nurses) in infection control); strengthening the management capabilities of the health care system at the level of territorial communities; standardization of medical care and creation of an effective system of quality control of medical services, etc. (Law of Ukraine No. 1832, 2022).

International support and assistance for health care of Ukraine during the war is positive. According to the European Commission, more than 1000 medical evacuations of Ukrainian patients have already been carried out to EU countries (European Commission 2022). Since the beginning of the full-scale war, more than 4 billion

hryvnias have been transferred to the needs of the health care system. At the same time, according to the estimates of the Ministry of Health, Ukraine will need from 14.6 to 20 billion euros to rebuild the health care system.

The problem of a low level of vaccination against a number of infectious diseases, including measles and poliomyelitis, remained relevant in 2022 (Rigby 2022). The seasonal incidence of infectious diseases, including COVID-19, is increasing as well (Zaxid.net 2022). Vaccination rates have fallen sharply, in the vast majority due to security issues. An increase in the number of hospitalizations was observed, on average by 14% compared to a week earlier, almost 3 thousand Ukrainians were admitted to hospitals (Kuzin 2022).

The cooperation of civil society and volunteering is an effective strategy for the provision of resources for the healthcare system. Due to the lack of knowledge about the true needs of the healthcare system, coordination of this resource is still not ideal, making it challenging to provide aid to the areas that require it the most. This is specifically because the Ukrainian Cabinet of Ministers permitted medical facilities to stop keeping records of humanitarian help (National Institute for Strategic Studies 2022).

Consequently, war has a devastating effect on the health of the population: “immediate and long-term on the physical and mental health of all persons in the radius of the armed conflict” (Sheather 2022; Levy and Sidel 2008, 2016), its consequences, multifactorial, multifaceted and multidimensional, affect people, society, the state of the environment, including and on the infrastructure of the health care system.

Issue of Collective Immunity as a Disease Defence

It is important that the number of hospitalizations and deaths from COVID-19 is decreasing in the world, which is also a manifestation of collective immunity after vaccination. Therefore, it is worth focusing on vaccination, testing and monitoring the emergence of new variants that can cause waves of increased incidence of coronavirus infection (Svezentseva 2022). The most important factor in the success of vaccination in the world is the trust of people in the tasks of the state, in the ability of governments to communicate and in the vaccines themselves. The main obstacles on which vaccination critically depends are considered (OECD 2021a):

- The extent to which the government can instill and maintain public confidence in the efficacy and safety of vaccines.
- Competence and reliability of institutions providing them.
- Principles and processes that guide government decisions and actions regarding the procurement, distribution, prioritization, and administration of vaccines.
- The ability and effectiveness of regulatory bodies to resolve issues and keep informed as events arise, while maintaining public confidence in their review processes.
- The effectiveness of public engagement and communications, if able to accompany this process, because successful vaccination campaigns also

require governments to partner and support civil society organizations to conduct broad and well-managed community engagement. A deep understanding of the specific problems of different population groups, previous experience with vaccination and the health care system in general, religious and/or political preferences and socio-economic status, etc. is required.

- It is also important to ensure that government actions are open to public scrutiny and that public institutions interact with the population by early publicizing the necessary information about vaccination strategies, modalities and achievements to combat misinformation and “infodemics”, involve the public in the development of vaccination strategies, manage expectations of the public and explained the fairness of prioritizing the vaccination of a certain group of the population, because it is fairness that is a feature of human behavior that underlies social unity and trust.

There is broad agreement in the global scientific community that the most effective way to defeat the COVID-19 pandemic is mass vaccination of the population worldwide. But the achievement of collective immunity will require vaccination of a very large part of the population and is therefore a serious challenge (OECD 2021b). Despite the initial rally-around-the-flag effect seen at the start of the pandemic, many countries are witnessing a growing level of distrust in the government’s ability to manage the crisis and implement coherent policies (OECD 2021c, 281). The pandemic has fueled widespread misinformation that has undermined both understanding and acceptance of science and public policy (de Figueredo et al. 2020). Despite the general recognition that COVID-19 is a critical problem for people around the world, many are still reluctant to get vaccinated (Ipsos 2021). Data from seven OECD countries showed that a quarter of the population in France, Germany and the United States could refuse to be vaccinated against COVID-19. More than 50% of French people aged 25 to 34 and one third of Dutch people aged 25 to 34 said they would probably or definitely not get vaccinated (Kantar 2021).

Some evidence suggests that the more people who are vaccinated, the more likely they will be to accept vaccination. Thus, vaccination will gradually become the norm and increasingly perceived as a way out of restrictions (Bish 2011) and quarantine. Confidence in vaccines must also be complemented by confidence in the institutions responsible for vaccination. Trust is defined as a person’s belief that another person or institution will act in accordance with their expectations of positive behavior from others (OECD 2017), and institutional trust is recognized as a key indicator of government performance (OECD 2021c, 281).

Psychosocial Aspects of Vaccination Attitudes

The OECD has developed the Trust Framework as a guide for governments to design concrete policy measures to strengthen public trust, built around five dimensions of government authority that largely explain people’s trust. Overall, the success of vaccination campaigns will largely depend on the degree to which people trust the effectiveness and safety of vaccines, the competence and reliability of the

institutions that deliver them, and the principles that guide government decisions and actions. The OECD Trust Framework sets policy priorities for countries to build public trust during the deployment of vaccines against COVID-19 and provides examples of good practices that have been implemented to increase people's trust in vaccination campaigns, highlighting the importance of developing government capacity to build trust in vaccines and honesty and openness in this context (OECD 2021a).

Among the studies conducted on the COVID-19 pandemic, it is also worth noting the results of a long-term (6-month; March 16–August 16, 2020) survey of residents of the USA that the increased threat of the disease should improve attitudes toward vaccines. But the conducted observation showed a decrease in intention to get the COVID-19 vaccine when it becomes more available; a decrease in overall vaccine attitude and intention to get the vaccine, even for influenza. There is also strong evidence from the study that differential exposure to media channels and social networks can explain the observed asymmetric polarization of the population (Fridman et al. 2021).

Vaccination is one of the most important public health tools to reduce the spread and harm caused by dangerous diseases (Orenstein and Rafi 2017). The World Health Organization estimates that vaccines prevented at least 10 million deaths between 2010 and 2015 worldwide (Pullan and Dey 2021). Despite substantial evidence that vaccines are safe (Thelwall et al. 2021; Wiysonge, et al. 2021), skepticism about vaccination is growing (Sallam 2021; Verger and Dube 2020). Vaccination hesitancy has led to lower vaccine coverage and increased prevalence of vaccine-preventable diseases (VDs) (Murphy et al. 2021; Soares et al. 2021). Ironically, opposition to vaccines is usually a consequence of their effectiveness—because people are less susceptible to the disease—they are less concerned about contracting it (Machingaidze and Wiysonge 2021), resulting in greater vaccine hesitancy (Chou and Budenz 2020).

Research on this topic identifies a variety of situational and individual-level factors that influence vaccine attitudes and behavior, the most prominent of which are risk perception and demographic characteristics. Risk assessment is influenced by cognitive appraisals (i.e., objective features of the situation, such as the probability of outcomes), as well as affective reactions (Valensise et al. 2021), contextual factors (e.g., information that is most available or salient at the time) (Cordina and Lauri 2021). Media coverage plays a significant role in determining how seriously we take threats (Burke et al. 2021). Perceiving an increased risk of threat, people are more committed to interventions that can mitigate that threat, including vaccination (Grumbach et al. 2021). Thus, more positive attitude toward the COVID-19 vaccine has been shown to produce a greater likelihood of vaccination: when the threat of the disease is more salient, people show greater interest in vaccination during a pandemic (Salali and Uysal 2021): increased threat of the disease reduces hesitation to vaccines (Horne et al. 2015), increasing threat salience for a particular disease may also increase intentions to get vaccinated against other diseases (Goldman et al. 2021). But there is already a study that puts these results into some doubt, because during the six months of the COVID-19 pandemic, starting from a relatively early phase (March 2020)

and accumulating more than 5 million cases (August 2020), a decrease in pro-vaccination attitudes and intentions to get vaccinated against COVID-19, and a decrease in intentions to get a flu vaccine—these findings contradict previous predictions that increasing the spread of COVID-19 will improve attitudes towards vaccines (Fridman et al. 2021).

Attitudes toward vaccines are also influenced by a variety of demographic and ideological factors (Kohlhammer et al. 2007). For example, studies (Vandermeulen et al. 2008; Galarce et al. 2011) demonstrate a positive correlation between socioeconomic status (SES) and vaccine hesitancy. Sociodemographic factors have been linked to vaccine-related behavior: higher education levels are associated with greater likelihood of vaccination (Uddin et al. 2010), and age is also a predictor of vaccine uptake (Endrich et al. 2009). Attitudes and behavior toward vaccination are also influenced by political ideology (Baumgaertner et al. 2018; Reinhart 2020). What is important is that public statements of leaders of public opinion and political figures also influence willingness and uptake of vaccination (Hornsey et al. 2020). Notable research by social and behavioral scientists demonstrates that groups facing threats often come together, exhibiting stronger social cohesion (Gilligan et al. 2014) and more cooperative behavior (Bowles and Gintis 2002, 17). In addition, individuals' sense of shared identity plays a role in promoting cooperation and common behavior in response to threat (Drury et al. 2009a, b; Van Bavel et al. 2020). Viewing our results in the context of these findings, one might suggest that our respondents' sense of shared identity was dominated by their political ideology, as opposed to a broader (e.g. American) identity. It should also be taken into account that trust in mass media (news channels, social networks) or media exposure influences perceptions of the threat of COVID-19 and attitudes and behaviors regarding vaccination (Fridman et al. 2021).

The research conducted on attitude of people to vaccination and their results on the territory of Ukraine are not very encouraging. For example, surveys conducted by the Razumkov Center (March 2021) revealed that 51.5% of respondents had no intention of getting vaccinated against COVID-19; research by the Kyiv International Institute of Sociology (April 2021) showed that 52.2% of respondents were not ready for vaccination; research by the UNICEF Foundation (November 2021) found that among those who have not yet been vaccinated, 54.6% of respondents were not ready for vaccination. Based on the results of previous studies on this topic, it was found that a person's refusal to vaccinate is conditioned by ambivalent assessments of its possible consequences and cognitive aberrations (Ushkova 2021). However, it is important to note that the analysis of scientific sources shows that in scientific research on the identification of psychological aspects of the attitude to vaccination, the respondents were mainly students, and most of the research on this topical issue was conducted in medical and social aspects.

The complexity of the situation with the readiness of the population for vaccination is also related to the psychological aspects of a person's attitude to vaccination, which is still insufficiently covered by scientists of the problem. We are conducting such a study on the territory of Ukraine, the preliminary results of which show that the identification of psychological aspects of a person's attitude to vaccination

requires the study of the peculiarities of the value-semantic and cognitive spheres of individuals in the context of their attitude to vaccination against COVID-19.

Based on the above, as well as in connection with a rather complex situation with the population's readiness for vaccination and insufficient coverage by scientists of the problem of identifying the psychological aspects of a person's attitude to vaccination, the problem of studying the peculiarities of the value-semantic and cognitive spheres of individuals in the context of their attitude to vaccination arose from COVID-19.

The Issue of the Connection between Vaccination and Value Orientations

Value orientations as dispositions of social behavior are arranged in a certain hierarchical structure with a cognitive component, emotional and behavioral components (Karpenko 2009, 519). The concepts of "value orientations" and "values" are the object of research in a number of sciences, in particular, philosophy, sociology, psychology, which speaks of the multifacetedness and complexity of these concepts.

The system of value orientations, ideological in nature, is formed on the basis of higher social needs of the individual, acquired with life experience and is responsible for a person's relationship to life goals and means of their satisfaction and helps to determine what is really important in life. It is they who ensure the stability of the personality, its integrity, and give purposefulness to its interests and aspirations. According to some scientists, value orientations are the subject of education because they are elements of self-regulation of human behavior. According to the results of applied research, it was established that the family has the greatest influence on the formation of personality, and therefore on value orientations. In turn, the stability of the structure of value orientations determines such personality traits as reliability, active life position, integrity, loyalty to ideals and principles. Therefore, an important function of value orientations is the regulation of human activity. They affect both the higher structures of consciousness and the subconscious structures that determine the orientation of the will, intelligence and attention.

It is generally agreed that value is characterized by two properties—meaning and personal meaning. The meaning of a value is a set of socially significant properties, functions of an object or ideas that make them values in society, and the personal meaning of values is determined by the person himself. That is, an important condition for the formation of personal values is the internal acceptance of meanings realized by a person. M. Rokych gives the following definition of "values" concept—it is a firm belief that a certain way of behavior or the ultimate goal of existence is better from a personal or social point of view than the opposite or opposite way of behavior or the ultimate goal of existence. According to him, values are organized into systems, the total number of human values is quite small, and their origins can be found in culture, personality and society (Rokych 1973). Values are considered motives for activity and behavior, as they are inevitably correlated with a person's desire to achieve their own specific goals.

Orientation is considered as a system of dominant motives of human behavior and activity, which affects the components of the personality structure, mental states, as well as volitional, emotional, and cognitive mental processes. But it manifests itself not only in various forms of flow, such as affections, value orientations, tendencies, likes or dislikes, but also in various spheres of human activity. Among the main types of orientation, the following can be distinguished:

- Personal focus, based on motives of personal well-being, striving for primacy. A person with a developed personal orientation has little interest in other people and their feelings, his main interest lies in the plane of satisfying his needs and desires.
- Social orientation, which is based on the motives and aspirations of serving the motherland, the development of science, and the realization of the individual to obtain public benefit.
- Focus on mutual actions, which is based on the desire to maintain communication, establish contacts with people.
- Business orientation, characterized by the desire for knowledge, mastering new skills.
- Emotional orientation, which is based on a person's desire for emotional experiences (Tsaras et al. 2018).

The collective immunity as a reliable protection against the coronavirus and the ability to stop the epidemic can be achieved if 70% of the population is vaccinated. However, the preliminary results of our study reveal that during the pandemic, personal life strategies and meanings, value orientations are under threat. The war and its consequences are an undeniable factor in the additional global threat to every person in Ukraine and the deepening of uncertainty. A dynamic, unpredictable global threat destroys certain ideas of a person about safe and stable world, requiring additional efforts to adapt, search and establish new meanings. It was determined that in conditions of uncertainty, meaningful and value orientations act as a source of resources for internal stabilization and overcoming frustration from an unpredictable external situation. They are the basis of regulation of human life and activity in conditions of uncertainty and high speed of change. Therefore, we consider it important to draw attention to the issues of formation of patterns of value-meaning orientations of Ukrainian society, which is primarily ensured by proper public administration.

Conducting a diagnosis of people's attitude to vaccination in the context of the pandemic and their value-semantic and cognitive features, it was determined that the majority of adults have a neutral attitude to vaccination and rate their awareness of vaccination-related issues as average. Most of the respondents are already vaccinated, and among those who are not currently vaccinated, almost half do not plan to get vaccinated in the near future. Correlation analysis established that a more positive attitude towards vaccination is found in individuals who are oriented towards achievements, their own prestige or active social contacts, as well as in those for whom the sphere of professional life is of great importance. It was found that people who are more creative or active in social contacts, as well as those who more often prefer realistic, pragmatic,

synthetic or analytical thinking styles, rate their awareness of vaccination issues higher (Ivats-Chabina et al. 2021; Myronets et al. 2022).

It was found that the available personal experience of vaccination is more often characteristic of persons who are focused on self-development, their own prestige or active social contacts, as well as those for whom the spheres of family or professional life are of great importance. The data of factorial and comparative analyses make it possible to establish that persons who have already been vaccinated or those who intend to be vaccinated in the near future are focused on their own prestige and high financial situation, strive for achievements, self-development, self-improvement and self-realization, highly value the opportunity to preserve their individuality, uniqueness and uniqueness of his personality, while remaining in active interaction with others. For such persons, such areas of their life as professional activity, study and education, social and family life are more important.

Individuals who consider themselves to be more knowledgeable about various issues related to vaccination have a greater tolerance for uncertainty. Such features are more characteristic of people who prefer synthetic, pragmatic, analytical and realistic thinking styles. Individuals who rated their awareness and awareness of vaccination-related issues the lowest were found to be least tolerant of uncertainty and least likely to prefer analytical and realistic thinking styles. It was found that individuals with a high self-awareness rating regarding vaccination were more likely to prefer an idealistic thinking style compared to those with a low self-awareness rating (Ivats-Chabina et al. 2021; Myronets et al. 2022).

Differences in the features of the value-meaning sphere in persons who have already been vaccinated and those who are not currently vaccinated have been revealed. Thus, vaccinated persons are more focused on self-development and achievement, and the sphere of professional life is more significant for them, compared to those who is currently not vaccinated. Second, among nonvaccinated persons, those who plan to be vaccinated in the nearest future are the most oriented among others to the value of high material status and achievements. These persons are also marked by a higher level of intolerance to uncertainty, and the sphere of family life is more important for them, compared to those persons who do not plan to be vaccinated in the near future. Considering the above-mentioned, our research continues, as its relevance in conditions of waging a full-scale war, in response to the actions of an aggressor, and the continued spread of COVID-19 is undeniable.

Conclusions

The pandemic of the COVID-19 coronavirus infection, which is still raging around the world, and the war of the Russian Federation against Ukraine have changed the lives of many millions of people and have a negative impact on the daily life and functioning conditions of all states without exception. The COVID-19 crisis has exacerbated existing inequalities, potentially contributing to social exclusion, polarization and social unrest. The war in Ukraine intensified negative trends but contributed to the identification of real threats and the understanding of the importance of joint struggle. Undeniably increasing uncertainty, these

two global threats also act as global indicators of the global community's ability to confront modern threats, show cohesion, solidarity, mutual aid, integrity and resilience—while remaining committed, protecting and fostering universal human values such as cohesion, unity, cooperation, development, care, etc. The government's recovery efforts and how they are designed, implemented and communicated will have a lasting impact on public trust.

The ability of countries to face crises, challenges and threats lies, as the epidemic showed and the war confirms, in the readiness of everyone individually and in the readiness to stand together in order to successfully face the uncertainty, changeability of risks and threats, their complexity and unpredictability of consequences. Such readiness, this is resilience, can be ensured only on the basis of the formation of one's own beliefs, values and conscious activation of behavior aimed at protecting and strengthening each other; on commitment to act together, jointly, producing synergy of decisions and actions; ready to rethink and respond with other tools at any time. It depends on everyone. This is ensured by proper public administration. This is guaranteed by a developed civil society and a partnership between government, business and communities.

Vaccination is an indicator of the presence or absence of trust in the public administration of any country in the world. Nowadays, we understand that it will also show whether societies can cope with uncertainty and contribute to strengthening and resilience. There is broad agreement in the global scientific community that the most effective way to defeat the COVID-19 pandemic is mass vaccination of the population worldwide. It has been proven that the achievement of collective immunity will require vaccination of a very large part of the population (70%), and therefore, this is a serious issue that requires constant attention and study and decisions and actions. The COVID-19 pandemic and associated stressors, such as concern for one's life and health, isolation, "voluntary compulsory" vaccination, a hard and sometimes fatal burden on small businesses, a large flow of conflicting information, and the inability to freely and without restrictions visit loved ones and travel, have already resulted in mental disorders and psychological problems for many people on the planet and will continue to have a negative impact. That is why there is a need for systematic organizational work to prepare and carry out vaccination of the country's population against COVID-19.

Obtaining a synergistic effect from the establishment of active cooperation of all participants and those interested in public health formation in Ukraine, including representatives of authorities at all levels, private and business sectors, citizens, and international partners, the created public health system achieves an important goal and strengthens participation, responsibility, and trust. Even after almost 3 years of battling against COVID-19 and nearly a year of hostilities with occupiers and terrorists, the mechanisms created to guarantee public health and offer possibilities for social protection even under combat conditions as we mentioned above are still functional nowadays. However, the system is still evolving.

Creating real conditions for leading a healthy way of life and preserving health, accessibility to quality medical care is still an important task. After all, there is an understanding that, initiated in the conditions of quarantine measures due to the COVID-19 epidemic and complicated by the conditions of the war in Ukraine, the

difficult opportunities to apply for and receive the appropriate quality of medical care of various levels will lead to an increase in the number of both actual morbidity and more complex cases of diseases among Ukrainians. But Ukraine and the public health system are ready because there is a plan for the recovery and development of Ukraine after the war, supported by Heads of State and Government, ministers and high representatives, bilateral and multilateral partners, organizations and international financial organizations, which will support Ukraine on its path to recovery from the beginning and to long-term recovery. A separate sector is the issue of ensuring the recovery and development of the health care sector.

It is important to ensure the following: proper transparent and understandable public administration; competence and reliability of public and private institutions; the capacity and effectiveness of state regulatory authorities at all levels to address ever-emerging issues; the effectiveness of public involvement and communications, if they are able to ensure partnership, support and synergy of the measures and actions taken. It is necessary to form national resilience.

In this article, we also looked for answers to questions including how the ongoing war has affected public health priorities and how they have tested since the start of the war. We revealed that the war prompted the development of the public health system in Ukraine, highlighting among the first, the need to preserve and improve mental health and build resilience; creation of proper conditions for leading a healthy lifestyle; provision of professional personnel in the field of health care; formation of participation and cooperation in making managerial decisions that form and strengthen trust, motivation, conscious attitude. It is important that the communities and people of Ukraine are aware, patriotic, zealous, and convinced of the necessity for the development of democracy and freedom, as these factors contribute to the formation of contemporary Ukrainian values and are also responsible for the nation's motivation, health, and resilience. Respect, mutual aid, humanity, optimism, bravery, and trust are values in times of war. They enable us to unite in the face of any threat, whether it is a virus attack or a full-scale enemy invasion.

The priorities of health care changed in connection with the war and COVID-19; they have expanded and become clearer, more focused on delineating and solving real needs and problems and found even greater support from the world community. The priorities of self-awareness, self-motivation, purposefulness and an active position in matters of ensuring the safety of life and health, establishing cooperation during the war in Ukraine were manifested in the daily activities of the majority of Ukrainians. We are convinced that the study of issues related to the influence of certain factors in various spheres of life on the formation of value-oriented characteristics of individuals and the nation as a whole in times of emergency (for example, COVID-19) and war will continue for the next years—we will discuss the results later. This will also apply to research on vaccination issues. We claim that war has become a stronger trigger than infection, security issues have become bigger and more urgent than vaccinations. The problems caused by the war affect the formation of value orientations, respectively—integrity, loyalty to principles and ideals, active position, which will determine the orientation of motives, will and intellect.

Author Contribution Authors' contributions are equal.

Data Availability Data will be available on request.

Declarations

Ethics Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent to Participate Informed consent was obtained from all individual participants included in the study.

Consent for Publication All individual participants agreed to be included in the study.

Conflict of Interest The authors declare no competing interests.

References

- Baumgaertner, B., J.E. Carlisle, and F. Justwan. 2018. The influence of political ideology and trust on willingness to vaccinate. *PLOS ONE* 13: 0191728. <https://doi.org/10.1371/journal.pone.0191728>.
- Bilynska, M., O. Korolchuk, O. Kondratenko, and S. Mokretsov. 2019. Liquid democracy and liquid administration as the new key principles for the resilient public administration development in Ukraine. *Evropský Politický a Právní Diskurz* 6 (6): 104–112.
- Bish, A. 2011. Factors associated with uptake of vaccination against pandemic influenza: A systematic review. *Vaccine* 29 (38): 6472–6484. <https://doi.org/10.1016/j.vaccine.2011.06.107>.
- Bowles, S., and H. Gintis. 2002. *Origins of human cooperation: Genetic and cultural evolution of cooperation*. Cambridge: MIT Press.
- Boyko, T. 2022. War and trust: How effectiveness appears. *Left Bank*, 31 December 2022. https://bu.blog/tetiana_boiko/541002_viyina_dovira_yak_proyavlyaietsya.html. Accessed 13 Mar 2023.
- Burke, P.F., D. Masters, and G. Massey. 2021. Enablers and barriers to COVID-19 vaccine uptake: An international study of perceptions and intentions. *Vaccine* 39 (36): 5116–5128. <https://doi.org/10.1016/j.vaccine.2021.07.056>.
- Chou, W.Y.S., and A. Budenz. 2020. Considering emotion in COVID-19 vaccine communication: Addressing vaccine hesitancy and fostering vaccine confidence. *Health Community* 35 (14): 1718–1722. <https://doi.org/10.1080/10410236.2020.1838096>.
- Cordina, M., and M.A. Lauri. 2021. Attitudes towards COVID-19 vaccination, vaccine hesitancy, and intention to take the vaccine. *Pharmacy Practice* 19 (1): 2317–2319. <https://doi.org/10.18549/PharmPract.2021.1.2317>.
- CPH. 2021. CPH urges to continue to adhere to quarantine restrictions. <https://www.100lifekyiv.org/post/cgz-zaklykaye-prodovzhuvaty>. Accessed 13 Mar 2023.
- de Figueredo, A., C. Simas, E. Karafillakis, P. Paterson, and H.J. Larson. 2020. Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: A large-scale retrospective temporal modelling study. *Lancet* 396 (10255): 898–908. [https://doi.org/10.1016/S0140-6736\(20\)31558-0](https://doi.org/10.1016/S0140-6736(20)31558-0).
- Drury, J., C. Cocking, and S. Reicher. 2009a. The nature of collective resilience: Survivor reactions to the 2005 London bombings. *International Journal of Mass Emergencies and Disasters* 27 (1): 66–95. <https://doi.org/10.1177/028072700902700104>.
- Drury, J., C. Cocking, S. Reicher, A. Burton, D. Schofield, and A. Hardwick. 2009b. Cooperation versus competition in a mass emergency evacuation: A new laboratory simulation and a new theoretical model. *Behavior Research Methods* 41 (3): 957–970. <https://doi.org/10.3758/BRM.41.3.957>.

- Dutchak, S., N. Opolska, R. Shchokin, O. Durman, and M. Shevtsiv. 2020. International aspects of legal regulation of information relations in the global internet network. *Journal of Legal, Ethical and Regulatory Issues* 23 (3): 1–7.
- Endrich, M.M., P.R. Blank, and T.D. Szucs. 2009. Influenza vaccination uptake and socioeconomic determinants in 11 European countries. *Vaccine* 27 (30): 4018–4024. <https://doi.org/10.1016/j.vaccine.2009.04.029>.
- Enikolopov, S.N., O.M. Boiko, T.I. Medvedeva, O.U. Vorontsova, and O.Y. Kazmina. 2020. Dynamics of psychological reactions at the initial stage of the COVID-19 pandemic. *Psychological-Educational Studies* 12 (2): 108–126. <https://doi.org/10.17759/psyedu.2020120207>.
- European Commission. 2022. Ukraine: 1,000 Ukrainian patients transferred to European hospitals. https://ec.europa.eu/commission/presscorner/detail/en/IP_22_4882. Accessed 13 Mar 2023.
- Fridman, A., R. Gershon, and A. Gneezy. 2021. COVID-19 and vaccine hesitancy: A longitudinal study. *PLoS ONE* 16 (4): 15–18. <https://doi.org/10.1371/journal.pone.0250123>.
- Galarrce, E.M., S. Minsky, and K. Viswanath. 2011. Socioeconomic status, demographics, beliefs and A (H1N1) vaccine uptake in the United States. *Vaccine* 29 (32): 5284–5289. <https://doi.org/10.1016/j.vaccine.2011.05.014>.
- Gilligan, M.J., B.J. Pasquale, and C. Samii. 2014. Civil war and social cohesion: Lab-in-the-field evidence from Nepal. *American Journal of Political Science* 58 (3): 604–619. <https://doi.org/10.1111/ajps.12067>.
- Goldman, R.D., S. McGregor, S.R. Marneni, T. Katsuta, M.A. Griffiths, J.E. Hall, et al. 2021. Willingness to vaccinate children against influenza after the Coronavirus disease 2019 pandemic. *Journal of Pediatrics* 228: 87–93. <https://www.jpeds.com/action/showPdf?pii=S0022-3476%2820%2930987-2>. Accessed 13 Mar 2023.
- Gritsenko, V.V., A.D. Reznik, V.V. Konstantinov, T.Yu. Marinova, N.V. Khamenka, and R. Isralowitz. 2020. Fear of the coronavirus disease (COVID-19) and basic personality beliefs. *Clinical and Special Psychology* 9 (2): 99–118. <https://doi.org/10.17759/cpsp.2020090205>.
- Grumbach, K., T. Judson, and M. Desai. 2021. Association of race/ethnicity with likeliness of COVID-19 vaccine uptake among health workers and the general population in the San Francisco Bay area. *JAMA Internal Medicine* 181 (7): 1008–1011. <https://doi.org/10.1001/jamainternmed.2021.1445>.
- Horne, Z., D. Powell, J.E. Hummel, and K.J. Holyoak. 2015. Countering antivaccination attitudes. *Proceedings of the National Academy of Sciences* 112 (33): 10321–10324. <https://doi.org/10.1073/pnas.1504019112>.
- Hornsey, M.J., M. Finlayson, G. Chatwood, and C.T. Begeny. 2020. Donald Trump and vaccination: The effect of political identity, conspiracist ideation and presidential tweets on vaccine hesitancy. *Journal of Experimental Social Psychology* 88: 103947. <https://doi.org/10.1016/j.jesp.2019.103947>.
- Ipsos. 2021. Global Attitudes on a COVID-19 Vaccine: Ipsos survey for The World Economic Forum. https://www.ipsos.com/sites/default/files/ct/news/documents/2021-03/global-attitudes-on-a-COVID-19-vaccine-march-2021-report_.pdf. Accessed 13 Mar 2023.
- Ivats-Chabina, A., O. Korolchuk, A. Kachur, and V. Smilianov. 2021. Healthcare in Ukraine during the epidemic: Difficulties, challenges and solutions. *Wiadomości Lekarskie Medical Advances* 74 (5): 1256–1261.
- Kantar. 2021. COVID-19 vaccine faces an increasingly hesitant public. *Kantar*, 23 November 2020. <https://www.kantar.com/inspiration/coronavirus/COVID-19-vaccine-faces-an-increasingly-hesitant-public>. Accessed 13 Mar 2023.
- Karpenko, Z.S. 2009. Axiological personality psychology. Ivano-Frankivsk: Lileya-NV.
- Kohlhammer, Y., M. Schnoor, M. Schwartz, H. Raspe, and T. Schäfer. 2007. Determinants of influenza and pneumococcal vaccination in elderly people: A systematic review. *Public Health* 121 (10): 742–751. <https://doi.org/10.1016/j.puhe.2007.02.011>.
- Korolchuk, O. 2020. Definition of national resilience in Ukraine in the scientific opinion of domestic researchers (part 2). *Fundamental and Applied Researches in Practice of Leading Scientific Schools* 38 (2): 144–151. <https://doi.org/10.33531/farplss.2020.2.26>.
- Kotlyar, A. 2022. NSZU is still not ready for war. Why both doctors and patients suffer? *ZN.UA*, 29 September 2022. <https://zn.ua/ukr/HEALTH/nszu-dosi-ne-hotova-do-vijni-chomu-strazhdajut-i-likari-i-patsijenti.html>. Accessed 13 Mar 2023.
- Kruglanski, A. 2020. 3 ways the coronavirus pandemic is changing who we are. *The Conversation*, 20 March 2020. <https://theconversation.com/3-ways-the-coronavirus-pandemic-is-changing-who-we-are-133876>. Accessed 13 Mar 2023.

- Kuzin, I. 2022. COVID-19: In a week, almost 3 thousand Ukrainians were admitted to hospitals. *Radio Svoboda*, 30 December 2022. <https://www.radiosvoboda.org/a/news-COVID-19-hospitalizatsiia-kuzin/32201156.html>. Accessed 13 Mar 2023.
- Law of Ukraine No. 1236–2020-p. 2020. On the establishment of quarantine and the introduction of restrictive anti-epidemic measures to prevent the spread of acute respiratory disease COVID-19 on the territory of Ukraine. <https://zakon.rada.gov.ua/laws/show/1236-2020-%D0%BF#Text>. Accessed 13 Mar 2023.
- Law of Ukraine No. 414. 2022. On registration and reporting of medical workers who provide medical care outside the main place of work during the period of martial law on the territory of Ukraine. <https://document.vobu.ua/doc/10365>. Accessed 13 Mar 2023.
- Law of Ukraine No. 1423. 2022. On making changes to the order of the Cabinet of Ministers of Ukraine dated March 25, 2020 No. 338 and the resolution of the Cabinet of Ministers of Ukraine dated December 9, 2020 No. 1236. <https://ips.ligazakon.net/document/view/KP221423?an=13>. Accessed 13 Mar 2023.
- Law of Ukraine No. 1832. 2022. On the approval of priority areas of development of the health care sector for 2023–2025. <https://zakon.rada.gov.ua/rada/show/v1832282-22#Text>. Accessed 13 Mar 2023.
- Law of Ukraine No. 2494-IX. 2022. On the introduction of changes to some laws of Ukraine on increasing the availability of medical and rehabilitation assistance during the period of martial law. <https://zakon.rada.gov.ua/laws/show/2494-20#Text>. Accessed 13 Mar 2023.
- Levy, B.S., and V.W. Sidel. 2008. The health impact of war. *International Journal of Injury Control and Safety Promotion* 15(4): 189–195. <https://doi.org/10.1080/17457300802404935>.
- Levy, B.S., and V.W. Sidel. 2016. Documenting the effects of armed conflict on population health. *Annual Review of Public Health* 37: 205–218. <https://doi.org/10.1146/annurev-publhealth-032315-021913>.
- Lyashko, V. 2022a. The number of coronavirus patients has decreased in Ukraine. *Suspilne News*, 15 April 2022. <https://suspline.media/229066-v-ukraini-zmensilas-kilkist-hvorih-na-koronavirus-lasko/>. Accessed 13 Mar 2023.
- Lyashko, V. 2022b. The impact of war on mental health is enormous. *Ministry of Health of Ukraine*, 7 June 2022. <https://moz.gov.ua/article/news/vpliv-vijni-na-psihichne-zdorov%e2%80%99ja--kolos-alnij---viktor-ljashko>. Accessed 13 Mar 2023.
- Ministry of Education and Science of Ukraine. 2022. Joint statement of Ministry of Health, Ministry of Education and Science, UNICEF and WHO regarding routine vaccinations before the beginning of the new school year. <https://mon.gov.ua/ua/news/spilna-zayava-moz-mon-yunisef-ta-vooz-shodorutinnih-sheplen-do-pochatku-novogo-navchalnogo-roku>. Accessed 13 Mar 2023.
- Machingaidze, S., and C.S. Wiysonge. 2021. Understanding COVID-19 vaccine hesitancy. *National Medicine* 27(8): 1338–1339. <https://doi.org/10.1038/s41591-021-01459-7>.
- Merkel, A. 2020. Television speech of Chancellor Angela Merkel. <https://www.bundesregierung.de/breg-de/aktuelles/fernsehansprache-von-bundeskanzlerin-angela-merkel-1732134>. Accessed 13 Mar 2023.
- Murphy, J., F. Vallières, and R.P. Bentall. 2021. Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. *National Community* 12 (1): 29–30. <https://doi.org/10.1038/s41467-020-20226-9>.
- Mykychak, I. 2022. Preserving the mental health of Ukrainians is the main task for the future revival of the country. *Dnipropetrovsk Regional Center for Disease Control and Prevention of the Ministry of Health*, 18 September 2022. <http://www.dolc.dp.ua/wpress/?p=11375>. Accessed 13 Mar 2023.
- Myronets, O.M., M.O. Dei, O.L. Korolchuk, O.V. Butenko, and O.N. Slabetskyi. 2022. Participants and victims of armed conflicts and hostilities rehabilitation: Issues and prospects. *Journal of Nervous and Mental Disease* 210 (3): 156–162. <https://doi.org/10.1097/nmd.000000000000143>.
- National Institute for Strategic Studies. 2022. Resources of the health care system in conditions of war. <https://niss.gov.ua/news/komentari-ekspertiv/resursy-systemy-okhorony-zdorovya-v-umovakh-viyny-zhovten-2022r>. Accessed 13 Mar 2023.
- OECD. 2017. *Trust and Public Policy: How Better Governance Can Help Rebuild Public Trust*. Paris: OECD Publishing. <https://doi.org/10.1787/9789264268920-en>.
- OECD. 2021a. *Enhancing public trust in COVID-19 vaccination: The role of governments*. Paris: OECD Publishing. <https://doi.org/10.1787/eaec0ec5a-en>.
- OECD. 2021b. *Access to COVID-19 vaccines: Global approaches in a global crisis*. Paris: OECD Publishing. <https://doi.org/10.1787/c6a18370-en>.
- OECD. 2021c. *Government at a Glance 2021*. Paris: OECD Publishing. <https://doi.org/10.1787/1c258f55-en>.

- Orenstein, W.A., and Ah. Rafi. 2017. Simply put: Vaccination saves lives. *PNAS* 114 (16): 4031–4033. <https://doi.org/10.1073/pnas.1704507114>.
- Pervychko, E.I., O.V. Mitina, O.B. Stepanova, Yu.E. Konyukhovska, and E.A. Dorokhov. 2020. Perception of COVID-19 by the population of Russia in the context of the 2020 pandemic. *Clinical and Special Psychology* 9 (2): 119–146. <https://doi.org/10.17759/cpspe.2020090206>.
- Petrova, N.O., V.V. Nezhevelo, A.M. Klochko, K.V. Blyumska-Danko, and R.I. Cramar. 2017. Features and problematic aspects of food safety in the integration of Ukraine into the EU. *Journal of Engineering and Applied Sciences* 12 (18): 4787–4791.
- Pullan, S., and M. Dey. 2021. Vaccine hesitancy and anti-vaccination in the time of COVID-19: A Google Trends analysis. *Vaccine* 39 (14): 1877–1881. <https://doi.org/10.1016/j.vaccine.2021.03.019>.
- Raskazova, O.I., D.A. Leontiev, and A.A. Lebedeva. 2020. The pandemic as a challenge to subjective well-being: Anxiety and mastery. *Psychological and Pedagogical Studies* 1: 142–160.
- Razumkov Center. 2022. Citizens' assessment of the situation in the country, trust in social institutions, political and ideological orientations of Ukrainian citizens in the conditions of Russian aggression. *Razumkov Center*, 8 October 2022. <https://razumkov.org.ua/napriamky/sotsiologichni-doslidzhenia/otsinka-gromadianamy-sytuatsii-v-kraini-dovira-do-sotsialnykh-institutiv-politykoideologichni-orientatsii-gromadian-ukrainy-v-umovakh-rosiiskoi-agresii-veresen-zhovten-2022r>. Accessed 13 March 2023.
- Reinhart, R.J. 2020. Fewer in US continue to see vaccines as important. *Gallup*, 14 January 2020. <https://news.gallup.com/poll/276929/fewer-continue-vaccines-important.aspx>. Accessed 13 Mar 2023.
- Reznikov, O. 2022. 97% of Russian targets are civilians. *Word and Deed*, 28 November 2022. <https://www.slovoidilo.ua/2022/11/28/novyna/bezpeka/97-rosijskyx-czilej-cyvilni-reznikov-oprylyudnyv-statystyku-raketnyx-udariv-rf>. Accessed 13 Mar 2023.
- Rigby, J. 2022. Ukraine health crisis worsens as medics work amid shelling, WHO says. *Reuters*, 4 August 2022. <https://www.reuters.com/world/europe/ukraine-health-crisis-worsens-medics-work-amid-shelling-who-2022-08-04/>. Accessed 13 Mar 2023.
- Rokych, M. 1973. *The nature of human values*. New York: Free Press.
- Salali, G.D., and M.S. Uysal. 2021. Effective incentives for increasing COVID-19 vaccine uptake. *Psychological Medicine*, 20 September 2021. <https://doi.org/10.1017/S0033291721004013>.
- Sallam, M. 2021. COVID-19 vaccine hesitancy worldwide: A concise systematic review of vaccine acceptance rates. *Vaccine* 9 (2): 160–162. <https://doi.org/10.3390/vaccines9020160>.
- Sheather, J. 2022. As Russian troops cross into Ukraine, we need to remind ourselves of the impact of war on health. *British Medical Journal* 376: 499. <https://doi.org/10.1136/bmj.o499>.
- Shtogrin, I. 2020. The coronavirus pandemic: lessons for humanity and Ukraine. *Radio Svoboda*, 21 March 2020. <https://www.radiosvoboda.org/a/pandemiya-koronaviruskarantyn-vysnovky/30500165.html>. Accessed 13 Mar 2023.
- Soares, P., J.V. Rocha, and M. Moniz. 2021. Factors associated with COVID-19 vaccine hesitancy. *Vaccine* 9 (3): 300–302. <https://doi.org/10.3390/vaccines9030300>.
- Svezentseva, I. 2022. Corona virus: how the situation with the pandemic has changed in two months of war. *Suspilne News*, 30 April 2022. <https://suspilne.media/234105-koronavirus-ak-zminilasa-situacia-z-pandemieu-za-dva-misaci-vijni/>. Accessed 13 Mar 2023.
- The Pharma Media. 2022a. Shortage of personnel: there is a shortage of doctors in the Kyiv region. <https://thepharma.media/uk/news/30696-deficit-kadriv-na-kiyivshhini-brakuje-likariv-28102022a>. Accessed 13 Mar 2023.
- The Pharma Media. 2022b. The Vacancy Portal for doctors has become operational in Ukraine. <https://thepharma.media/uk/news/29960-v-ukrayini-zapracyuvav-portal-vakansii-dlya-medikiv-01082022b>. Accessed 13 Mar 2023.
- Thelwall, M., K. Kousha, and S. Thelwall. 2021. COVID-19 vaccine hesitancy on English-language Twitter. <https://www.profesionaldelainformacion.com/contenidos/2021/mar/thelwall-kousha-thelwall.pdf>. Accessed 13 Mar 2023.
- Tsaras, K., I.V. Papatasiou, V. Vus, A. Panagiotopoulou, M.A. Katsou, M. Kelesi, and E.C. Fradelos. 2018. Predicting factors of depression and anxiety in mental health nurses: A quantitative cross-sectional study. *Medical Archives (sarajevo, Bosnia and Herzegovina)* 72 (1): 62–67. <https://doi.org/10.5455/medarh.2017.72.62-67>.
- Uddin, M., G.C. Cherkowski, G. Liu, J. Zhang, A.S. Monto, and A.E. Aiello. 2010. Demographic and socioeconomic determinants of influenza vaccination disparities among university students. *Journal of Epidemiology & Community Health* 64 (9): 808–813. <https://doi.org/10.1136/jech.2009.090852>.

- Unicef. 2021. 42% of Ukrainians who have not yet been vaccinated against COVID-19 are ready to do it – research. *Unicef*, 5 November 2021. <https://www.unicef.org/ukraine/press-releases/vaccination-survey>. Accessed 13 Mar 2023.
- Ushkova, O.L. 2021. Understanding vaccine mistrust: From distorted perceptions to heated debate. *Social and Human Sciences* 2: 116–126.
- Ustinov, O.B. 2022. The state of employment of medics – internally displaced persons. *Ukrainian Medical Journal*, 6 December 2022. <https://www.umj.com.ua/article/236479/stan-pratsevlashtuvannya-medikov-vnutrishno-peremishhenih-osib>. Accessed 13 Mar 2023.
- Valensise, C.M., M. Cinelli, M. Nadini, A. Galeazzi, A. Peruzzi, G. Etta, et al. 2021. Lack of evidence for correlation between COVID-19 infodemic and vaccine acceptance. <https://arxiv.org/pdf/2107.07946.pdf>. Accessed 13 Mar 2023
- Van Bavel, J.J., K. Baicker, P.S. Boggio, V. Capraro, A. Cichocka, M. Crockett, et al. 2020. Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour* 4: 460–471. <https://doi.org/10.1038/s41562-020-0884-z>
- Vandermeulen, C., M. Roelants, H. Theeten, P. Van Damme, and K. Hoppenbrouwers. 2008. Vaccination coverage and sociodemographic determinants of measles–mumps–rubella vaccination in three different age groups. *European Journal of Pediatrics* 167 (10): 1161–1162. <https://doi.org/10.1007/s00431-007-0652-3>.
- Verger, P., and E. Dube. 2020. Restoring confidence in vaccines in the COVID-19 era. *Expert Review of Vaccines* 19 (11): 991–993. <https://doi.org/10.1080/14760584.2020.1825945>.
- Wiysonge, C.S., D. Ndwandwe, J. Ryan, A. Jaca, O. Batouré, B.-P. Melanga Anya, and S. Cooper. 2021. Vaccine hesitancy in the era of COVID-19: Could lessons from the past help in divining the future? *Human Vaccines & Immunotherapeutics* 18 (1): 1–3. <https://doi.org/10.1080/21645515.2021.1893062>.
- World Health Organization. 2022. Principles to guide health system recovery and transformation in Ukraine. https://www.euro.who.int/__data/assets/pdf_file/0005/538376/Ukraine-health-system-rec-consult-eng.pdf. Accessed 13 Mar 2023.
- Yarmak, O.V., E.M. Panova, A.G. Maranchak, and Z.S. Savina. 2020. The coronavirus as a social driver of the transformation of everyday life. *Social Sciences* 3: 27–35. <https://doi.org/10.18522/2687-0770-2020-3-27-35>.
- Zacher, H., and C.W. Rudolph. 2020. Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *American Psychologist* 76 (1): 50–62. <https://doi.org/10.1037/amp0000702>.
- Zagorodnii, M. 2022. COVID-19 during the war: what restrictions were lifted. *Ukrainian Pravda*, 20 May 2022. <https://life.pravda.com.ua/health/2022/05/20/248738/>. Accessed 13 Mar 2023.
- Zaxid.net. 2022. In Ukraine, the number of hospitalizations of patients with coronavirus has increased. https://zaxid.net/v_ukrayini_zrosla_kilkist_gospitalizatsiy_patsiyentiv_z_koronavirusom_n1555464. Accessed 13 Mar 2023.

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