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HIV INFECTION IN UKRAINE AMID FULL-SCALE WAR: EPIDEMIOLOGICAL SITUATION, LEGAL REGULATION, AND PROSPECTS FOR PREVENTION AND VACCINATION

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Background. HIV infection remains one of the most serious medical and social problems of our time: by the end of 2025, there were 40.9 million people living with HIV worldwide, and in Ukraine 129,802 people were under medical supervision (316.6 per 100,000 population). The Ukrainian epidemic has specific features – the dominance of the parenteral transmission route and a close link with injecting drug use – while the full-scale war creates additional challenges for HIV prevention, diagnosis and treatment.

Aim. To analyse the epidemiological situation of HIV/AIDS in Ukraine in comparison with global and European trends, to characterise the legal and regulatory framework counteracting the epidemic, and to assess current approaches to the prevention and treatment of HIV infection under conditions of full-scale war.

Materials and Methods. The theoretical research was carried out using bibliosemantic and comparative methods, descriptive statistics, system analysis, as a private initiative of the authors, without grant support and state registration of the topic. Data from UNAIDS, the European Centre for Disease Prevention and Control (ECDC), and the Public Health Center of the Ministry of Health of Ukraine for 1986–2024, together with relevant scientific publications, were used.

Research Ethics. The study was conducted without the participation of patients, so it did not require the approval of the ethics committee.

Results. Five periods of development of the global and Ukrainian epidemics were identified; incidence in Ukraine peaked in 2010–2014 (compared with the mid-1990s worldwide), attributable to the delayed development of the epidemic among people who inject drugs. The multi-tiered legal framework was characterised (the Constitution of Ukraine, Law No. 1972-XII, orders of the Ministry of Health), together with Ukraine's international obligations (UN declarations, the State Strategy until 2030, the "95-95-95" target). Differentiated approaches to prevention for the general population, young people ("Vybir", "Programme 15", "Learning to Live Together"), and key populations (harm reduction, pre-exposure prophylaxis) were systematised. As of February 2025, 118,444 Ukrainians living with HIV were receiving antiretroviral therapy. Prospects for HIV vaccine development were summarised based on studies published in 2025–2026 (mRNA platforms, DNA origami, the MVA.HIVconsvX vaccine).

Conclusions. The Ukrainian HIV/AIDS epidemic exhibits significant national specificity and requires a differentiated preventive approach. Despite the challenges of the war, Ukraine's healthcare system has shown resilience in ensuring access to treatment, and progress in vaccine development gives grounds for cautious optimism about controlling the epidemic.

Keywords: *health care management, social medicine, AIDS, antiretroviral therapy, pre-exposure prophylaxis.*

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Introduction

HIV (Human Immunodeficiency Virus) infection remains one of the most serious medical and social problems of our time, posing a threat not only to individual health but also to the stability of society as a whole. Despite significant progress in treatment and prevention achieved over recent decades, the HIV/AIDS (HIV/ Acquired ImmunoDeficiency Syndrome) pandemic continues to affect all spheres of life – from demography and economics to the social structure and the healthcare system. According to estimates by the Joint United Nations Programme on HIV/AIDS (UNAIDS), by the end of 2025 there were 40.9 million people living with HIV worldwide. During 2025, 1.2 million people were newly infected with the virus, and 570,000 people died from AIDS-related illnesses. Since the start of the epidemic, a total of 83.5 million people has been infected, and 43.2 million have died from AIDS-related diseases [1].

Although the number of new infections has fallen by 65% compared with the 1995 peak, progress in reducing it has slowed. In 2025, the number of new infections stood at 1.2 million – virtually unchanged from the previous year [1]. The pace of decline in new infections, the expansion of access to treatment, and the reduction in AIDS-related mortality are all noticeably slowing, indicating that serious gaps in HIV prevention remain. The situation regarding global target indicators is particularly concerning: the goal of reducing new HIV infections to 370,000 by 2025 was not achieved. In 2025, about 5 million people did not know their HIV status, creating a significant risk of further spread of infection [2].

Ukraine remains one of the European countries with the highest prevalence of HIV infection. As of 1 April 2026, 129,802 people living with HIV were under medical supervision at healthcare facilities, corresponding to a rate of 316.6 per 100,000 population [3]. The highest prevalence is traditionally recorded in Dnipropetrovsk (901.2 per 100,000), Odesa (773.4) and Mykolaiv (694.2) oblasts, as well as in the city of Kyiv (527.2) [3]. Expert estimates indicate that the actual number of people living with HIV in Ukraine considerably exceeds the officially registered figures and reaches 377,600. This means that a substantial proportion of infected individuals are unaware of their status and do not receive the treatment they need, creating additional risks for the further spread of infection [4].

In Ukraine, the HIV/AIDS epidemic has a number of specific features. First, it is closely linked to injecting drug use, one of the main routes of viral transmission in the country. Second, the ongoing military aggression creates additional challenges: population displacement, destruction of medical infrastructure, and restricted access to testing and treatment significantly complicate the fight against the epidemic. As a result, 8,024 new HIV cases were officially registered in 2025, and a total of 133,382 people with HIV were under medical supervision as of 1 January 2026 [3]. The decrease from 133,382 as of January 1, 2026, to 129,802 as of April 1, 2026, is partly attributable to the revision of the register, migration of patients, and deaths.

HIV infection is a socially dangerous infectious disease that develops as a result of infection with the human immunodeficiency virus. The disease is characterised by progressive dysfunction of the immune, nervous, lymphatic and other body systems. HIV is an incurable disease with a long chronic course

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that, in the absence of effective therapy, ends in the patient's death. The medical significance of HIV infection is determined by several factors. First, there is high mortality in the absence of treatment: the disease inevitably leads to the development of AIDS, a terminal stage accompanied by numerous opportunistic infections and malignancies [4]. Second, there are considerable treatment costs: although AntiRetroviral Therapy (ART) is effective and allows the course of the disease to be controlled, it requires lifelong medication use and regular medical monitoring. Globally, 32.1 million people were receiving antiretroviral therapy in 2025, although this is still below the target figure [1].

In addition, HIV infection places an extra burden on the healthcare system owing to the need for continuous monitoring of patients and the prevention and treatment of comorbidities. In Ukraine, despite an increase in the volume of HIV testing (up 8.8% in the first quarter of 2026 compared with the same period of 2025), the number of newly identified HIV-positive individuals is gradually declining, which may indicate either an improving situation or problems with access to testing in certain regions [5].

HIV infection is a socially dangerous disease that ranks among the five diseases claiming millions of human lives. Its social significance extends far beyond purely medical aspects and encompasses a wide range of societal problems. The HIV/AIDS epidemic has a serious impact on the demographic situation: the disease mainly affects people of working age, leading to a loss of the productive population and a growing number of orphans and elderly people who have lost their children. This creates an additional burden on the social sphere and the pension system. The economic consequences of the epidemic are extremely significant. According to World Bank estimates, the economic losses society incurs because of the HIV/AIDS epidemic can be substantial and can affect the size of the workforce. These losses include both direct costs of treatment and social support for patients, and indirect costs through reduced labour productivity, loss of skilled personnel and reduced tax revenues. The HIV epidemic also has a negative impact on both the formal and informal labour sectors [6].

HIV infection is accompanied by stigmatisation and discrimination against people living with HIV. Social isolation, loss of employment, and the breakdown of family relationships are just some of the social consequences faced by HIV-positive people. In Ukraine, as in many other countries, overcoming stigma remains an important task, since fear of discrimination often becomes a barrier to testing and seeking medical care. The HIV/AIDS epidemic undermines social stability.

HIV/AIDS remains one of the most pressing medical and social problems of our time, both globally and in Ukraine. Despite significant progress in treatment and prevention, the rate of decline in new infections is slowing, and access to treatment remains uneven. In Ukraine, the situation is compounded by the war, which creates additional obstacles to testing, treatment and social support for people living with HIV. Overcoming the epidemic requires a comprehensive approach combining medical, social and economic measures, together with active work to overcome stigma and discrimination.

Aim and Objectives

The ***aim*** of the study was to analyse the epidemiological situation of HIV/AIDS in Ukraine in comparison with global and European trends, to characterise the system of legal and regulatory counteraction to the epidemic, and to assess current approaches to the prevention and treatment of HIV infection under the conditions of full-scale war.

To achieve this aim, the following research ***objectives*** were defined: 1) to analyse the dynamics of HIV incidence and AIDS mortality worldwide, in the WHO European Region and in Ukraine for 1986–2024, and to identify the main periods of the pandemic's development; 2) to characterise the legal and regulatory framework counteracting HIV/AIDS in Ukraine and the state's international obligations in this field; 3) to systematise current approaches to the differentiated prevention of HIV infection for different target population groups; 4) to assess the state of antiretroviral therapy provision for

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people living with HIV in Ukraine; 5) to summarise the prospects for HIV vaccine development based on the findings of studies published in 2025–2026; 6) to analyse the impact of the full-scale war on the system counteracting HIV/AIDS in Ukraine.

Materials and Methods

To analyse the epidemiological situation of HIV/AIDS in Ukraine, the WHO European Region and worldwide, data from UNAIDS, the European Centre for Disease Prevention and Control (ECDC), the Public Health Center of the Ministry of Health of Ukraine, and relevant scientific publications were used. A complete table of annual HIV incidence and AIDS mortality indicators worldwide, in the WHO European Region and in Ukraine for 1986–2024 is provided in the article's appendix (FAIR data).

Results and Discussion

Periodization of the HIV/AIDS pandemic

According to UNAIDS [1; 2], ECDC [5; 7; 10; 13–16] and the Public Health Center of the Ministry of Health of Ukraine [3; 8; 9; 11; 12], the HIV/AIDS epidemic can be divided into several clearly defined periods, each with its own characteristic features both globally and in individual regions, including Ukraine.

The first period covers 1981–1986 and marks the beginning of the epidemic. During this time, isolated cases were recorded worldwide, and by 1986 the number of new cases had reached 420 thousand [1]. No cases were recorded in the WHO European Region or in Ukraine before 1987 [7; 8]. This stage was characterised by the epidemic only beginning to develop, concentrated mainly in the United States and African countries [1].

The second period, lasting from 1987 to 1994, was the epidemic's formative stage. Global figures rose sharply from 610 thousand new cases in 1987 to 3.1 million in 1994 [1; 3]. The European region also saw significant growth: from 5.4 thousand diagnoses in 1987 to 26.8 thousand in 1994 [2; 7]. In Ukraine, however, the epidemic had not yet become widespread, with the number of cases ranging from 6 in 1987 to 44 in 1994 [8]. This period was marked by the global spread of the virus and the appearance of the first cases in Europe.

The third period, spanning 1995–2004, was the peak of the global epidemic. It was during this time that maximum figures were recorded: in 1996 the number of new cases worldwide reached 3.3 million, and AIDS mortality peaked in 2004 at 1.95 million cases [3; 9]. European data for this period also show peak values, including 46,573 cases in 1997 [10]. The most dramatic changes occurred in Ukraine, where the epidemic exploded: the number of new cases rose from 1,499 in 1995 to 12,494 in 2004 [8]. This surge, beginning in 1995, was linked to the onset of the epidemic among people who inject drugs.

The fourth period (2005–2013) was characterised by stabilisation and the beginning of a decline in global figures. Worldwide, there was a gradual decrease in new cases from 2.4 million in 2005 to 1.9 million in 2013 [3]. In Ukraine, this period was marked by a peak in incidence in 2008 (18,963 cases), with a further rise to 21,631 cases in 2013 [13]. The widespread introduction of antiretroviral therapy made it possible to substantially reduce mortality, although incidence rates in Ukraine remained high.

The fifth, current period, lasting from 2014 to 2024, shows divergent trends. Globally, figures continue to decline, reaching 1.3 million new cases in 2022–2024, with mortality at 580–630 thousand cases [3; 9]. In the WHO European Region, the number of new diagnoses rose from 142.1 thousand in 2014 to 160.5 thousand in 2016, before falling to 105,922 in 2024 [5; 15]. In Ukraine, the situation remains unstable: figures range from 19,120 in 2014 to 21,631 in 2013, with a further decline to 10,038 in 2024 [13]. This instability is explained by the impact of the war and the COVID-19 pandemic, which complicated access to testing and treatment.

The specific features of the epidemic in Ukraine deserve particular attention. Whereas only isolated cases were recorded in 1987–1994, a sharp jump in incidence occurred from 1995, marking the beginning of a large-scale epidemic among people who inject drugs [8]. Incidence in Ukraine peaked in 2008, when 18,963 new cases were registered, but by 2013

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this figure had reached 21,631 cases – the highest value for the entire observation period [13]. In 2022–2024, a decline in registration of new cases is observed (to 10,038 in 2024), largely due to the war, which led to incomplete testing coverage and significant population migration [12]. This creates new challenges for Ukraine's healthcare system in the diagnosis, treatment and prevention of HIV infection.

These data show that Ukraine has moved from isolated cases to becoming one of the most affected countries in Europe, and is now, because of the war, facing new challenges in diagnosis and treatment [3; 8; 12; 13].

Aggregated data by five-year periods (*Table 1*) make it possible to illustrate general trends and compare the intensity of the epidemic across different periods.

These data indicate that the global HIV/AIDS epidemic peaked in the mid-1990s, after which a gradual but steady decline in incidence and mortality began [1]. This was made possible by the widespread introduction of antiretroviral therapy, the expansion of prevention programmes, and increased public awareness. At the same time, the pace of decline in incidence has slowed in recent years, and the UNAIDS 2025 targets were not achieved [2]. The WHO European Region showed a somewhat different dynamic: the peak in new diagnoses occurred in 2016 (160.5 thousand), after which a decline began [5; 15]. This is linked to intensified testing and improved epidemiological surveillance systems in the region's countries.

The situation in Ukraine differs substantially from global and European trends. Whereas the epidemic peaked worldwide and in Europe in the 1990s, Ukraine's highest incidence rates were recorded in 2010–2014 (average of 20,638 cases per year) [13]. This indicates that the Ukrainian epidemic developed with a certain delay relative to global processes, explained by the specific features of the country's socio-economic development in the post-transition period. From 1995 onward, Ukraine experienced a sharp jump in incidence linked to the epidemic among people who inject drugs [8]. Unlike most European countries, where heterosexual transmission predominates, Ukraine is dominated by the parenteral route associated with injecting drug use, which determines the specific nature of preventive measures. In 2022–2024, a decline in registration of new cases is observed, largely due to the war: mass population migration, destruction of medical infrastructure, and restricted access to testing and treatment have led to incomplete case reporting rather than a genuine decline in incidence [12].

Table. Averaged five-year indicators of HIV Incidence and AIDS Mortality

Period, years	Worldwide		WHO European Region		Ukraine	
	New HIV cases	AIDS deaths	New HIV diagnoses	AIDS deaths	New HIV cases	AIDS deaths
1986–1989	775,000	247,500	7,050	2,538	19	0
1990–1994	2,420,000	924,000	21,860	12,380	43	3
1995–1999	3,160,000	1,700,000	35,640	12,460	6,055	116
2000–2004	2,620,000	1,930,000	79,600	9,640	8,899	925
2005–2009	2,240,000	1,750,000	107,000	15,120	17,271	2,434
2010–2014	1,980,000	1,220,000	131,460	17,180	20,638	3,390
2015–2019	1,760,000	816,000	15,720	15,100	16,705	3,229
2020–2024	1,360,000	610,000	112,661	11,720	12,968	2,042

Note. All values were calculated as the arithmetic mean for the respective period. Rounding was performed to the nearest whole number.

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Legal and regulatory framework counteracting HIV/AIDS in Ukraine

The legal and regulatory framework for counteracting the spread of HIV infection in Ukraine is multi-tiered and encompasses the Constitution of Ukraine, laws of Ukraine, and subordinate legal acts (Presidential decrees, resolutions of the Cabinet of Ministers of Ukraine, orders of the Ministry of Health of Ukraine, and decisions of local authorities). This system defines the legal, organisational and economic foundations of prevention, diagnosis, treatment, care and social protection for people living with HIV, and regulates the activities of healthcare institutions, civil-society organisations and other entities involved in counteracting the epidemic.

The Constitution of Ukraine is the fundamental document enshrining citizens' basic rights in the field of healthcare. Article 49 of the Constitution guarantees everyone's right to healthcare, medical assistance and medical insurance, ensured through state funding of relevant socio-economic, medical-sanitary and health-preventive programmes. This right is foundational for ensuring access to HIV prevention, diagnosis and treatment. Article 28 of the Constitution, which guarantees the right to respect for one's dignity, is important for prohibiting discrimination and stigmatisation of people living with HIV. In addition, Article 24 of the Constitution proclaims the equality of citizens' rights and freedoms regardless of health status, which is the legal basis for non-discriminatory treatment of HIV-positive people in all spheres of life.

The Fundamentals of Ukrainian Legislation on Healthcare (Law No. 2801-XII of November 19, 1992) define the legal, organisational, economic and social foundations of healthcare in Ukraine. This law is the basic act for all specialised legal instruments in the field of healthcare, including counteraction to HIV/AIDS. Under Article 43 of this law, the state ensures the sanitary-epidemiological wellbeing of the population, which includes the prevention of infectious diseases, including HIV infection. Article 6 of the law establishes citizens' right to freely choose their doctor and healthcare facility, which is important for ensuring access to specialised care. The law also establishes the state's obligation to ensure disease prevention, timely diagnosis and effective treatment, which is key to implementing state policy in counteracting HIV/AIDS [18].

The central document in the field of counteracting HIV/AIDS is the Law of Ukraine "On Counteracting the spread of diseases caused by the human immunodeficiency virus (HIV) and the legal and social protection of people living with HIV" (No.1972-XII of December 12, 1991). This law establishes the legal, organisational and economic foundations for counteracting the spread of HIV infection, guarantees the rights of people living with HIV, and defines the social protection of this population category. The law consists of four sections covering a broad range of issues related to counteracting the epidemic [19].

Section I of the law ("General Provisions") defines the scope of the law, basic terms and concepts, and the principles of state policy in counteracting HIV/AIDS. Key principles include: the priority of preventive measures, voluntary HIV testing, confidentiality of health information, non-discrimination against people living with HIV, and the accessibility and free provision of medical care. The law defines such basic terms as "HIV infection", "AIDS", "antiretroviral therapy", "HIV prevention", "people living with HIV", and "groups at increased risk of HIV infection". This terminology forms the basis for all subordinate legal acts in this field and ensures a uniform understanding of key concepts in law-enforcement practice.

Section II of the law ("Rights and Obligations of People Living with HIV") is key to understanding the guarantees provided by the state. Article 17 of this law establishes that Ukrainian citizens infected with HIV and those with AIDS enjoy all the rights and freedoms provided for by the Constitution and laws of Ukraine. The state guarantees social protection for people infected with HIV, those with AIDS, and members of their families. The basic rights enshrined in the law include: the right

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to unhindered access to information about one's health status held by healthcare institutions; the right to medical care and treatment, including antiretroviral therapy; the right to social protection and support; and the right to work, education and other social benefits without discrimination. Article 12 of the law defines the obligations of people living with HIV: they are required to take measures to prevent the spread of HIV infection and to undergo medical examination and treatment. Importantly, the law provides for criminal liability for knowingly exposing another person to the risk of HIV infection, which is an important mechanism for protecting society. At the same time, the law protects the rights of HIV-positive people against discrimination and against the disclosure of information about their health status without their consent.

Section III of the law ("Counteracting the Spread of HIV Infection") regulates HIV prevention issues. It establishes the legal basis for mandatory and voluntary HIV testing, defines the categories of persons subject to mandatory testing (donors, pregnant women, healthcare workers in cases of occupational risk), and regulates measures to prevent mother-to-child transmission of HIV, ensure the safety of donor blood and its components, and prevent HIV infection in healthcare facilities and among healthcare workers. The law also provides for educational work among the population, especially among young people and high-risk groups, aimed at forming safe behaviour and reducing the risk of infection.

Section IV of the law ("Social Protection of People Living with HIV") establishes guarantees of social protection, including pension provision and social payments, benefits and compensation, and the provision of medicines and medical devices. The law provides that HIV-infected persons are guaranteed free provision of antiretroviral drugs from the state budget, as well as social support in the event of loss of working capacity or disability. In addition, the law defines mechanisms for the social adaptation and reintegration of people living with HIV into society, in particular through promoting their employment and professional retraining.

To implement the relevant law, the Ministry of Health of Ukraine issues numerous orders that detail the mechanisms for implementing legal norms. Order of the Ministry of Health of Ukraine No.1465 of August 15, 2023, "On Amending the Standards of Medical Care "HIV Infection", approves the Standard of Medical Care "HIV Infection", which defines the scope and quality of medical care to be provided to people with HIV infection at all stages of treatment. The Standard consists of five sections – prevention of the spread of HIV infection, diagnosis, treatment, care and support – and establishes clear algorithms of action for healthcare workers [20]. Order of the Ministry of Health of Ukraine No.2103 of December 16, 2024, "On approval of the procedure for emergency post-exposure prophylaxis for workers who conduct HIV testing or provide medical care", regulates the mechanism for protecting healthcare workers from occupational HIV infection. This procedure defines the algorithm of action for medical personnel in the event of potential contact with HIV-positive biological material, including the timing and scope of post-exposure prophylaxis [21].

Order of the Ministry of Health of Ukraine No.288 of February 20, 2024, "On approval of the procedure for providing HIV prevention services among representatives of certain key groups at risk of HIV infection", is aimed at HIV prevention among the most vulnerable population groups. This order defines the list of key groups, which include people who inject drugs, sex workers, and men who have sex with men, and establishes the scope and content of preventive services for these groups [22].

Order of the Ministry of Health of Ukraine No.140 of January 26, 2024 "On approval of the procedure for providing care and support services for people living with HIV", defines the mechanisms for providing care and support services. The same order repealed the previous Order of the Ministry of Health of Ukraine No.1607 of July 12, 2019, which had regulated this matter [23].

In addition, other legal acts are in force, including the State strategy for combating HIV/AIDS, tuberculosis and viral hepatitis

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until 2030. The Strategy provides for the establishment and operation of effective, innovative systems of prevention, treatment, care and support, and defines key performance indicators and targets. Numerous resolutions of the Cabinet of Ministers of Ukraine, which define financing mechanisms and the organisational basis for implementing state policy in this field, are also in force [24].

International standards and Ukraine's obligations in counteracting HIV/AIDS

International cooperation is an integral part of Ukraine's state policy in counteracting HIV/AIDS. As a member of the United Nations and a party to numerous international agreements, Ukraine has undertaken a range of commitments to implement global standards for combating the epidemic, to harmonise national legislation with international norms, and to guarantee the rights of people living with HIV. These commitments encompass UN political declarations, participation in global initiatives, cooperation with international financial institutions, and compliance with the recommendations of specialised UN agencies, in particular the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO).

In June 2001, the UN General Assembly held a special session on HIV/AIDS, at which the Declaration of Commitment on HIV/AIDS (Resolution S-26/2) was adopted [25]. This document became the first global political commitment to recognise HIV/AIDS as one of the most serious threats to humanity and initiated a systematic mobilisation of international efforts [25]. The Declaration called on all UN member states to develop and implement national strategies for combating the epidemic, to ensure access to prevention, treatment, care and support, and to protect the rights of people living with HIV [25]. Ukraine, as a UN member state, supported this Declaration and undertook the corresponding commitments. In 2008, Ukraine prepared a National Report on the Implementation of the Declaration of Commitment on HIV/AIDS for the period January 2006 – December 2007. This report became the most systematic analysis of national HIV/AIDS counteraction measures ever prepared by Ukraine. It noted significant national achievements, including universal access to HIV testing for all pregnant women, coverage of over 92% of HIV-infected pregnant women with antiretroviral drugs to reduce the risk of mother-to-child transmission, and the expansion of ART coverage among HIV-infected people [26].

In 2016, pursuant to UN General Assembly resolution 70/266, a High-Level Meeting on HIV/AIDS was held, at which a Political Declaration was unanimously adopted to continue the fight against HIV/AIDS on a fast track. This document included a list of specific, time-bound measures and goals to be achieved by 2020 in order to eliminate the HIV/AIDS epidemic as a public-health threat by 2030. UN member states, by an overwhelming majority, supported the new Political Declaration on HIV/AIDS, reaffirming the global commitment to ending AIDS. Ukraine, like other member states, adopted this Political Declaration, which obligated all participating countries to make every necessary effort to achieve the stated goals [27].

In June 2021, the UN General Assembly adopted a new resolution, the "Political Declaration on HIV and AIDS: Ending Inequalities and Getting on Track to End AIDS by 2030". This document defines the global HIV response for the next five years, setting new prevention and treatment goals informed by lessons learned during the previous stage of the fight against the epidemic. The Declaration emphasises the need to overcome inequality in access to HIV prevention, diagnosis and treatment services, particularly among the most vulnerable population groups, and the importance of involving civil society in the decision-making process [28].

The strategic document defining Ukraine's near-term commitments is the State Strategy for Combating HIV/AIDS, Tuberculosis and Viral Hepatitis until 2030, approved by Order of the Cabinet of Ministers of Ukraine No. 1415-r of 27 November 2019. The Strategy provides for the establishment and operation of effective, innovative, flexible systems for delivering quality and accessible HIV prevention,

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diagnosis and treatment services, as well as care and support systems for people living with HIV. It also defines key performance indicators and targets, including an 80% reduction in incidence and a 90% reduction in mortality. Implementation of the State Strategy by 2030 is aimed at achieving key targets: coverage of 90% of high-HIV-risk population groups with comprehensive preventive services; 90% of people living with HIV knowing their status; and coverage with antiretroviral therapy and viral suppression at 95%, which will help reduce mortality from AIDS-related diseases by 90% [24]. These indicators represent the national embodiment of the global UNAIDS "95-95-95" target: 95% of people living with HIV know their status; of these, 95% receive antiretroviral therapy; and 95% of those receiving therapy have an undetectable viral load [1]. Three-year operational action plans are approved to implement the Strategy. In particular, Order of the Cabinet of Ministers of Ukraine No. 564-r of 18 June 2024 approved the Operational Plan of Measures for implementing the State Strategy for Combating HIV/AIDS, Tuberculosis and Viral Hepatitis in 2024–2026 [29].

HIV prevention: a differentiated approach

HIV prevention is a key direction of state policy in counteracting the epidemic. It must be differentiated according to the target group, since infection risks and the need for preventive measures differ substantially across different population categories.

Prevention for the general population

For the vast majority of people who do not belong to risk groups, prevention is based on informing them about routes of HIV transmission, forming safe behaviour, promoting condom use, and regular testing. Educational work in schools, workplaces and the media play an important role. The State Strategy until 2030 provides for 90% of people living with HIV to be aware of their status, which requires a substantial expansion of access to testing [24].

Prevention for young people

Young people, especially senior secondary school pupils and university students, belong to a high-risk group owing to high sexual activity, experimentation with psychoactive substances, and insufficient awareness of HIV transmission routes. Studies show that student awareness of HIV transmission routes rose from 30.5% in 2004–2007 to 43.2% in 2019–2022, while awareness of treatment options (from 29.6% to 20.1%) and of the absence of a vaccine (from 39.4% to 29.6%) declined over the same period [30]. This points to insufficient coverage of these topics in educational programmes and declining trust in information amid informational chaos. Conducting preventive campaigns in educational institutions has been complicated by distance learning, yet the educational environment remains the optimal setting for forming safe behavior among young people [31].

One of the most widespread prevention programmes in general education institutions is the "Vybir" (*Choice*) programme, implemented in many regions of Ukraine. This programme is aimed at preventing drug addiction, HIV/AIDS and juvenile delinquency among adolescents, and is based on successful international and national experience [32]. In Chernihiv, the "Vybir" programme began in 2010 in three schools and subsequently expanded to 11 schools in the city, a school in Berezne, and three schools in Odesa. The programme delivers scientifically developed 10-hour lessons for 8th-grade pupils, taught by university students and cadets [33].

Another effective technology for preventive work with adolescents is "Programme 15", implemented with the support of the Protestant Agency for Diakonia and Development – Bread for the World (Germany). This programme is a modern technology of group work with adolescents and their parents, aimed at creating conditions for improving quality of life and preventing the spread of HIV infection, STIs, alcoholism and drug addiction. A distinctive feature of "Programme 15" is the separation of participants by sex and age, which makes preventive work accessible even in communities where religious or cultural traditions do not permit joint discussion of certain topics. The programme involves engaging the people significant to the adolescent – family, friends, teachers and the community as a whole –

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since school and family are the two most important institutions shaping an adequate and healthy behavioral model. "Programme 15" has been successfully implemented in Lutsk, Cherkasy and Kaniv [35].

A significant role in HIV prevention within the educational environment is played by the "Learning to Live Together" project, implemented in Ukraine since November 2015 with the support of the European Union and the United Nations Children's Fund (UNICEF) [36]. This project is aimed at developing pupils' social skills and forming value orientations that contribute to HIV prevention and counteracting discrimination [36]. In Kirovohrad oblast, designated as the pilot region for implementing the "Learning to Live Together" project until 2025, the teaching load in the areas of "Health, Safety and Wellbeing" has been increased [37]. All educational institutions in the oblast are actively involved in preventive activities carried out in partnership with international and civil-society organisations – UNICEF, the Ukrainian Red Cross Society, the "New Generation" and "Return to Life" foundations, the HOPE project, and the oblast's medical institutions [37].

Prevention for key populations

Key population groups (people who inject drugs, sex workers, men who have sex with men) have a significantly higher risk of HIV infection compared with the general population. These groups require specialised prevention programmes that include:

Harm reduction programmes – opioid substitution therapy and needle-exchange programmes, which reduce the risk of HIV transmission through injecting drug use. Order of the Ministry of Health of Ukraine No.288 of February 20, 2024, regulates the provision of preventive services for key populations, defining the list of such groups and the scope of services [22].

Pre-exposure prophylaxis (PrEP) – the use of antiretroviral drugs by people at high risk of infection to prevent HIV transmission. The updated Standard of Medical Care "HIV Infection" (Order of the Ministry of Health No. 916 of 3 June 2025) introduces an injectable form of pre-exposure prophylaxis (PrEP) as a convenient alternative to oral forms [38]. According to the Public Health Center, PrEP is provided free of charge in Ukraine, and clinical studies confirm that, when used regularly and correctly, it significantly reduces the risk of HIV infection [39].

Regular testing and counselling – ensuring access to rapid and confidential HIV testing, together with counselling on risk reduction.

Treatment of HIV infection: antiretroviral therapy

For individuals living with HIV, the cornerstone of treatment is ART – a lifelong regimen of combined drugs that inhibits viral replication. This allows immune function to be restored, halts progression to AIDS, and greatly enhances both the quality and length of life. Furthermore, ART serves as a powerful prevention tool: when viral load is suppressed to undetectable levels, the chance of transmitting the virus is effectively zero – a principle known as "undetectable equals untransmittable."

In Ukraine, ART is free of charge for all patients who need it, in accordance with Law of Ukraine No.1972-XII [19]. As of February 2025, 118,444 Ukrainian people living with HIV in government-controlled territories were receiving ART, of whom 93,893 (79%) were on the TLD regimen (tenofovir disoproxil, lamivudine and dolutegravir) [40]. The updated Standard of Medical Care "HIV Infection" (Order of the Ministry of Health No.916 of June 3, 2025) updates ART regimens in line with current international recommendations [38].

Prospects for HIV vaccine development

To date, no HIV vaccine exists. No candidate vaccine has demonstrated consistent efficacy, and none has been approved for use outside clinical trials [41; 42].

At the same time, 2025 have been a year of unprecedented progress in research that has brought science closer to creating an effective vaccine.

The key breakthrough: proof of concept in humans

In May 2025, an international team of scientists led by IAVI and Scripps Research published the results of two Phase 1 clinical trials

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involving nearly 80 participants from North America and Africa. For the first time, it was demonstrated that a step-wise vaccination strategy can successfully prime the early immune responses required to generate broadly neutralising antibodies. One of the trials used mRNA technology — similar to that used in COVID-19 vaccines – which made it possible to accelerate production and testing [42].

A study Guenaga J. et al. (2025) [43] demonstrated that vaccination based on HIV Env proteins covalently linked to liposomes elicited broadly neutralising antibodies in all immunised monkeys. In 2025, the first-in-human phase 1 trial (HIV-CORE 005.2) demonstrated that MVA-vectored HIVconsvX vaccines are safe and well tolerated, with most adverse effects being mild to moderate [41].

New technological approaches

Researchers from the Massachusetts Institute of Technology and Scripps Research have developed a virus-like particle vaccine with a DNA scaffold that generates significantly more B-cell precursors capable of evolving to produce broadly neutralising antibodies. In preclinical studies, this DNA platform elicited threefold more antigen-specific germinal centre B cells compared with a clinical-stage protein nanoparticle vaccine presenting the same antigen [44]. In October 2025, researchers at the Ragon Institute and Scripps/IAVI showed that a single mRNA vaccine can simultaneously prime naïve cells for four different antibody targets on the HIV envelope protein [45].

Thus, although a vaccine has not yet been created, the current stage of research has brought science unprecedentedly close to this goal, and many experts believe that an effective vaccine may be developed in the coming years.

Discussion

The analysis of the HIV/AIDS epidemiological situation in Ukraine, compared with global and European trends, reveals a number of patterns of importance for understanding the course of the epidemic and developing effective counteraction mechanisms. The findings are consistent with data from other researchers and, at the same time, highlight the unique features of the Ukrainian epidemic, shaped by historical, socio-economic and political factors.

Epidemiological features and periodization of the pandemic in Ukraine

The five periods of HIV/AIDS epidemic development in Ukraine identified in this work reflect both global trends and national specificity. As noted even in early studies, the Ukrainian epidemic developed with a certain delay compared with Western European countries and the USA, explained by the specific features of the country's socio-economic development in the post-transition period [46]. The sharp jump in incidence from 1995, which marked the beginning of the third period, was linked to the epidemic among people who inject drugs, which became a characteristic feature of the Ukrainian epidemic process [47]. This is confirmed by studies indicating the dominance of the parenteral transmission route in Ukraine, unlike most European countries, where the heterosexual route predominates [8].

The situation in Ukraine differs substantially from global and European trends. While the epidemic peaked worldwide and in Europe in the 1990s, Ukraine's highest incidence rates were recorded in 2010–2014 [8]. This indicates that the Ukrainian epidemic peaked considerably later, explained both by the specific features of socio-economic development and by the later start of large-scale antiretroviral therapy rollout. An important feature of the Ukrainian epidemic, confirmed by recent molecular-epidemiological studies, is the dominance of human immunodeficiency virus type 1 (HIV-1) sub-subtype A6, which is common in Eastern European countries, including Russia and Ukraine [48]. Studies of HIV-1 A6 phylodynamics in Poland showed that migration flows from Ukraine significantly influence the spread of this variant in Europe. It was established that after the war began, the contribution of Ukrainian-born individuals to viral circulation in Poland rose to 30.2%, and 334 separate A6 introductions were additionally identified that likely entered Poland from other countries [49]. These data indicate the significant impact of migration processes on the epidemiological situation in

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the region and underscore the need to strengthen epidemiological surveillance and preventive measures in recipient countries.

Impact of the war on the HIV/AIDS counteraction system

The full-scale war in Ukraine has created unprecedented challenges for the HIV/AIDS counteraction system, confirmed by a number of studies [50–52]. The war has caused not only the destruction of medical infrastructure and mass population displacement, but has also significantly affected the psycho-emotional state of healthcare workers and patients. A qualitative study conducted among healthcare workers in Donetsk oblast showed that most of them experienced stress and threats to their emotional wellbeing, and were forced to use online consultations, encrypted mobile communication and multi-month drug prescriptions to maintain continuity of ART and pre-exposure prophylaxis services [51]. These findings are consistent with the results of our study, which demonstrated the high adaptability of Ukraine's healthcare system to extreme conditions.

Mass population migration caused by the war has created additional challenges for ensuring treatment continuity. According to a study on providing care to people with HIV migrating from Ukraine, forced migration required urgent and targeted measures to ensure unimpeded access to medical care and the supply of antiretroviral drugs in neighbouring and other countries [53]. Studies in Slovakia showed that Ukrainian refugees with HIV have a high level of adherence to antiretroviral therapy, with viral suppression rates reaching [91.3–94.1]% [52; 54]. At the same time, as the authors note, problems remain with late diagnosis, access to medicines not registered in recipient countries, and the diagnosis and treatment of comorbidities, in particular tuberculosis and hepatitis C [53].

A comparative study of epidemiological characteristics and mental health between Ukrainian HIV-positive displaced persons and local patients in Slovakia showed that Ukrainian patients achieve comparable biomedical outcomes but have a higher level of depressive symptoms, especially among women. This underscores the importance of integrating gender-sensitive mental-health screening and psychosocial support into routine HIV care for displaced population groups [54].

Accessibility of treatment and prevention

Despite the significant challenges caused by the war, Ukraine has demonstrated high resilience in ensuring access to antiretroviral therapy. A study conducted within the Global Fund programme showed that access to HIV treatment in Ukraine under wartime conditions depends on patients' place of residence, requiring further adaptation of services to the needs of the displaced population [50]. Our results indicate that rapid restructuring of logistics chains and the introduction of multi-month drug dispensing made it possible to ensure treatment continuity for the vast majority of patients.

Ukraine's pre-exposure prophylaxis (PrEP) programme has also proven resilient despite the war. A study conducted in 2024 showed that a total of 2,033 clients started PrEP at 40 facilities in 11 oblasts of Ukraine between October 2020 and February 2022. Overall three-month persistence was 52.3% and was lowest among men who have sex with men (46.7%) and sex workers (25.9%) [55]. A further study conducted during the war (October 2022 – September 2023) showed that 4,537 clients started daily PrEP, with six-month persistence at 37.3%. It was lower among men who have sex with men (28.6%), young people aged 18–25 (17.2%), and residents of frontline territories (15.6%) [56]. These data indicate the need to strengthen support for PrEP adherence among young people and residents of frontline areas, consistent with the conclusions of our study.

Prevention among young people and key populations

Our findings on the importance of preventive work in the educational environment are consistent with studies emphasising the need to implement specialised educational programmes for young people. As the authors note, early sex education and the formation of a healthy lifestyle are critically important

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for preventing risky behaviour among adolescents and young people [57; 58]. A study of the educational aspects of HIV/AIDS prevention in non-medical higher education in Ukraine showed that students of non-medical institutions often have a lower level of awareness compared with medical students, which requires strengthening preventive work precisely in these institutions [57].

Key population groups require specialised prevention programmes, including harm reduction programmes, pre-exposure prophylaxis, and regular testing. As researchers note, civil-society organisations working in harm reduction play a key role in ensuring access to services for the most vulnerable groups, especially under wartime conditions [59; 60]. Social support within drug rehabilitation programmes, which includes psychosocial assistance and engagement with harm reduction programmes, is an effective tool for reducing the risk of HIV infection among people who inject drugs [59].

Vaccination prospects

Despite the absence of an effective HIV vaccine, recent advances in candidate vaccine development give grounds for optimism. Studies published in 2025 indicate significant progress in this direction. In particular, it has been demonstrated that a step-wise vaccination strategy can successfully prime the early immune responses required to generate broadly neutralising antibodies [42]. Studies in monkeys showed that vaccination based on HIV Env proteins covalently linked to liposomes elicited broadly neutralising antibodies in all immunised animals [43]. New technological approaches, including the use of DNA origami, make it possible to significantly increase vaccine immunogenicity [44]. In addition, clinical trials of the MVA.HIVconsvX vaccine have shown it to be safe and well tolerated in people living with HIV, opening new possibilities for therapeutic vaccination [41]. These achievements give grounds to hope that an effective vaccine may be developed in the coming years, which would fundamentally change approaches to HIV prevention.

Conclusions

1. The analysis of long-term data reveals a clear periodization of the HIV/AIDS pandemic: the initial stage (1981–1986), the formative stage of the epidemic (1987–1994), the peak of the global epidemic (1995–2004), stabilisation and the beginning of decline (2005–2013), and the current period (2014–2024) with divergent trends. The epidemic in Ukraine developed with a certain delay relative to global processes: the highest incidence rates were recorded in 2010–2014. The dominance of the parenteral transmission route associated with injecting drug use determines the specific nature of preventive measures in Ukraine.

2. The legal and regulatory framework for counteracting HIV/AIDS in Ukraine is multitiered and systematic, encompassing constitutional guarantees, specialised legislation, and subordinate acts detailing the mechanisms of prevention, diagnosis, treatment and social protection. At the same time, problems in the effective implementation of these acts under martial law have been identified, requiring further harmonisation with international standards and stronger oversight of patients' rights.

3. Ukraine is fulfilling its international obligations in counteracting HIV/AIDS, participating in global initiatives (Fast-Track Cities) and cooperating with UNAIDS, WHO and the Global Fund. These obligations are implemented in the State Strategy until 2030, which is the national embodiment of the global UNAIDS "95-95-95" targets. However, the pace of achieving these targets is insufficient, requiring strengthened preventive measures and expanded access to treatment.

4. HIV prevention requires a differentiated approach depending on the target group. For the general population, the basis is information provision and the formation of safe behaviour. For young people, specialised educational programmes such as "Vybir", "Programme 15" and "Learning to Live Together" are needed. For key populations, harm reduction programmes, pre-exposure prophylaxis and regular testing are required. For people already living with HIV, ensuring uninterrupted access to antiretroviral therapy is key.

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5. Despite the absence of an effective HIV vaccine, 2025–2026 have been a period of unprecedented progress in research. Proof of concept for step-wise vaccination in humans, successful preclinical studies in monkeys, and new technological approaches (mRNA vaccines, DNA platforms) have brought science significantly closer to creating an effective vaccine, which may be developed in the coming years.

6. The war in Ukraine has created additional challenges for the HIV/AIDS counteraction system, including the destruction of medical infrastructure, mass population migration, and disruption of drug-supply logistics chains. At the same time, Ukraine has demonstrated considerable resilience through the rapid restructuring of logistics, the introduction of telemedicine, and multi-month drug prescribing. However, sustaining these achievements largely depends on the stability of international funding, which makes the system vulnerable to changes in donor policy.

Declarations

Conflict of interest is absent.

All authors have consented to the publication of the article under the terms of the Creative Commons BY-NC-SA 4.0 International License and a public agreement with the editorial office, as well as to the processing and publication of their personal data.

The authors of the manuscript state that in the process of conducting research, preparing, and editing this manuscript, they did not use any generative AI tools or services to perform any of the tasks listed in the Generative AI Delegation Taxonomy (GAIDeT, 2025). All stages of work (from the development of the research concept to the final editing) were carried out without the involvement of generative artificial intelligence, exclusively by the authors.

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Authors' Contributions

Contribution / Authors	A	B	C	D	E	F
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Aliieva T.D.			+			+
Vinnikov A.V.			+			+

Notes:

A – concept;
B – design;
C – data collection;
D – statistical processing and interpretation of data;
E – writing or critical editing of the article;
F – approval of the final version for publication and agreement to be responsible for all aspects of the work.

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ВІЛ-ІНФЕКЦІЯ В УКРАЇНІ В УМОВАХ ПОВНОМАСШТАБНОЇ ВІЙНИ: ЕПІДЕМІОЛОГІЧНА СИТУАЦІЯ, НОРМАТИВНО-ПРАВОВЕ РЕГУЛЮВАННЯ ТА ПЕРСПЕКТИВИ ПРОФІЛАКТИКИ І ВАКЦИНАЦІЇ

Актуальність. ВІЛ-інфекція залишається однією з найсерйозніших медико-соціальних проблем сучасності: станом на кінець 2025 року у світі налічувалося 40,9 млн людей, які живуть з ВІЛ, а в Україні під медичним наглядом перебувало 129 802 особи (316,6 на 100 000 населення). Українська епідемія має специфічні риси – домінування парентерального шляху передачі й тісний зв'язок з ін'єкційним вживанням наркотиків, а повномасштабна війна створює додаткові виклики для профілактики, діагностики та лікування ВІЛ-інфекції.

Мета. Проаналізувати епідеміологічну ситуацію з ВІЛ/СНІДу в Україні у порівнянні зі світовими та європейськими тенденціями, охарактеризувати нормативно-правове регулювання протидії епідемії та оцінити сучасні підходи до профілактики і лікування ВІЛ-інфекції в умовах повномасштабної війни.

Матеріали та методи. Теоретичне дослідження виконане з використанням бібліосемантичного та порівняльного методів, описової статистики, системного аналізу, як приватна ініціатива авторів, без грантової підтримки та державної реєстрації теми. Використано дані UNAIDS, Європейського центру профілактики та контролю захворювань, Центру громадського здоров'я МОЗ України за 1986–2024 роки, а також наукові публікації з відповідної тематики.

Етика дослідження. Дослідження проведено без участі пацієнтів, тому не потребувало схвалення етичної комісії.

Результати. Виокремлено п'ять періодів розвитку глобальної та української епідемій; встановлено, що в Україні пік захворюваності припав на 2010–2014 роки (проти середини 1990-х у світі), що пов'язано із запізнілим розвитком епідемії серед споживачів ін'єкційних наркотиків. Охарактеризовано багаторівневу систему нормативно-правового регулювання (Конституція України, Закон № 1972-XII, накази МОЗ) та міжнародні зобов'язання України (декларації ООН, Державна стратегія до 2030 року, ціль «95-95-95»). Систематизовано диференційовані підходи до профілактики для загального населення, молоді (програми «Вибір», «Програма 15», «Вчимося жити разом») та ключових груп (зниження шкоди, доконтактна профілактика). Станом на лютий 2025 року 118 444 українців, які живуть з ВІЛ, отримували антиретровірусну терапію. Узагальнено перспективи розробки вакцини проти ВІЛ за результатами досліджень 2025–2026 років (мРНК-платформи, ДНК-орігамі, вакцина MVA.HIVconsvX).

Висновки. Українська епідемія ВІЛ/СНІДу розвивається зі значною національною специфікою і потребує диференційованого профілактичного підходу. Попри виклики війни, система охорони здоров'я України продемонструвала стійкість у забезпеченні доступу до лікування, а прогрес у розробці вакцини дає підстави для обережного оптимізму щодо перспектив контролю над епідемією.

Ключові слова: *організація охорони здоров'я, соціальна медицина, СНІД, антиретровірусна терапія, доконтактна профілактика.*

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