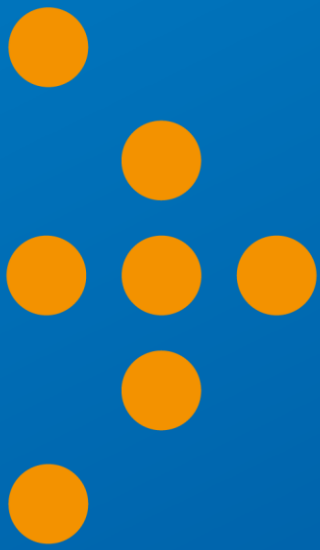
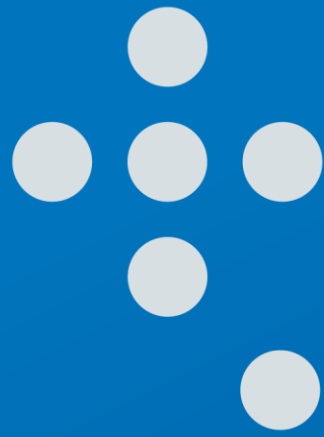




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Barriers to HIV prevention and treatment services arising from the COVID-19 pandemic



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Executive summary

The Coronavirus Disease 2019 (COVID-19) quickly spread around the world and since March 2020 has developed into a pandemic, which undoubtedly could not but affect the continuum and quality of HIV service provision.

The aim of this study was to assess the impact of the COVID-19 pandemic on the provision of HIV testing and treatment services in the selected regions in Ukraine.

The design included a quantitative and qualitative component. The study was conducted in five regions in Ukraine with different levels of HIV prevalence - Volyn, Dnipropetrovsk, Lviv, Odesa and the city of Kyiv. Information on HIV services provided in 2019–2021 was collected from 1,600 records of patients over the age of 18 who received services at the regional, district and city level in 46 healthcare facilities of three types – those that provide medical care to HIV diagnosed patients (AIDS Centres), primary health care centres and facilities providing antenatal care (ANC). The qualitative part included interviews with 15 medical doctors and 20 HIV patients. The war in Ukraine created a barrier to a comprehensive data collection as a number of facilities could not be visited due to the safety concerns and closure of health care facilities.

According to quantitative data collected from medical records, in 2021 compared to 2019 there was a decrease in antiretroviral treatment (ART) coverage in people diagnosed with HIV in health care facilities at the regional and district level, which may have been caused by the COVID-19 pandemic and the associated restrictions. The coverage ranged from the lowest of 79% in the regional-level to 88% in city-level facilities in 2021. Data on viral load suppression among those on ART show that the healthcare facilities of the City of Kyiv and the Volyn region were meeting the 95% target level of the Fast Track and State Strategy in 2020 and 2021. In three regions, the viral load suppression declined in the 2019-2021 period (Dnipropetrovsk, Odesa and Lviv). In the facilities in the Dnipropetrovsk and Odesa region the viral load suppression among those on ART was low in 2021 – 68.3% and 75.6%.

Considering the type of facilities, the best outcomes in terms of the viral load suppression were in the district-level facilities – 96.4% of their patients on ART had viral load less than 1000 copies/ml in 2021. However, in the regional-level and city-level facilities the percentage of patients on ART who were virally suppressed declined in the 2019-2021 period. In 2021, virally suppressed were only 73% of patients on ART in regional-level facilities and 77% in city-level facilities. This could be due to a smaller number of patients that district-level healthcare centers have compared to city and regional-level facilities.

According to the information provided by the participating AIDS centers in 2019, 43% of patients entered the treatment program in the clinical stages 1 and 2 of HIV infection. This percentage increased to 56% by 2021. Even though these figures show an encouraging trend, the problem of late detection and treatment remains relevant.

One important indicator of the quality of HIV care is early start of ART. The percentage of those who started ART within 7 days of diagnosis, that is early, increased from 27.6% in 2019 to 63.7% in 2021. There were substantial variations across regions in the percentage of patients who started ART early. The Lviv region, unlike the rest, shows a drop in the early start of ART in 2020 compared to 2019 and partial recovery in 2021. Lviv had also the lowest percentage of patients who started ART early – only 21% in 2021 while the best outcomes were in the Volyn region (83%). There were no substantial differences in the percentage of patients that started ART early by the administrative level of health care facilities. Overall, the proportion that started ART within 7 days of diagnosis increased in the 2019-2021 period, being the highest in city-level facilities (70%) and the lowest in district-level facilities (51%).

In terms of the types of HIV tests used, an increasing proportion of newly diagnosed HIV patients were screened for HIV using rapid tests (8% in 2019 and 41% in 2021). This increase in the use of rapid tests coincides with increased involvement of non-governmental organisations (NGOs) in testing for HIV and referring PLHIV to healthcare facilities.

Overall, the total number of people tested for HIV substantially decreased from 2019 to 2021, except in the Odesa region, in which it more than doubled. The most pronounced declines in HIV testing were in the Dnipropetrovsk and Lviv regions.

Contrary to this overall decline in HIV testing, there was an increase in HIV testing of partners of newly diagnosed with HIV in the observed time-period, from 63% in 2019 to 75% in 2020.

Prevention of mother-to-child transmission (PMTCT) of HIV is another important component of the HIV program. PMTCT data were collected from 117 HIV-positive pregnant women and women who had given birth. Considering such a small sample size, analysis was not done by the region and administrative level of healthcare facilities. A worrying finding is that a considerable percentage of pregnant women were diagnosed after the first trimester of pregnancy. In 2019 and 2020, 40% and 52% of pregnant women, respectively, were diagnosed with HIV late, that is after the 12th week of pregnancy. In 2021, this was the case with 27% of HIV positive pregnant women. Though the proportion of those diagnosed late declined in 2021 compared to the previous years, still approximately 1 in 4 pregnant women were diagnosed late in 2021. The percentage of newly diagnosed HIV positive pregnant women who started ART early was much lower than for other patients, ranging between 0% in 2019 to 5.6% in 2021.

Another indicator of the quality of HIV care is timely assessment of viral load in pregnant women before giving birth as that determines the mode of delivery and lowers the risk of transmission of HIV to neonates. In our sample, a minority of women (10% in 2020 and 5% in 2021) were not tested for viral load in the 34-36 weeks of pregnancy. HIV viral load data show encouraging findings - the percentage of pregnant women with viral load less than 1000 copies/ ml increased from 2019 to 2021 and reached the level of 95% in 2021.

During qualitative interviews, medical doctors who were interviewed indicated that during the COVID-19 epidemic there was a high workload related to testing and treatment of COVID-19 patients, which created some barriers in accessing HIV care for HIV patients. Patients' reports confirmed this as they mentioned long waiting times in order to receive HIV services and less regular CD4 and viral load testing compared to the time before the pandemic. An additional barrier related to treatment of HIV patients who do not live in regional centers or large cities was logistical difficulty in obtaining ARV drugs. Doctors noticed patients' fears of being infected with COVID-19 in hospitals and patients' requests to postpone clinical appointments. HIV patients indicated lower availability and quality of services at the local level, the reduction of the list of services at AIDS Centers, and cases of confidentiality violations by healthcare workers at district and city healthcare facilities.

Among the factors that ensured the availability and quality of HIV services under quarantine conditions, doctors mentioned clear coordination of processes in health care delivery and the ability to offer a full list of HIV services in one place, that is the AIDS Centers, flexible and patient-oriented approaches to dispensing ARV drugs with the assistance of social services and active involvement of patients' organizations. Similarly, HIV patients reported a possibility to obtain a larger supply of ARV drugs, delivery of drugs through courier services, a clearly organized appointment schedule to minimize the risk of being infected by COVID-19 in health care facilities, as well as remote consultations that included information about COVID-19 and psychological support. Most doctors emphasized that all efforts aimed at ensuring the continuity of services for PLHIV during the COVID-19 pandemic continued in their healthcare facilities after the end of quarantine measures.

In order to improve health care services for HIV diagnosed, doctors recommended importance of availability of larger supplies of rapid tests, the possibility of dispensing ARV drugs in primary care facilities and ANC clinics, and the ability to dispense ARV drugs for the period of up to one year. The doctors also outlined the importance of providing continuous training to infectious diseases doctors. Regarding the improvement of HIV services, interviewed HIV patients noted the need for better confidentiality in health care facilities, bringing HIV services closer to patients' place of residence, in general medicine practices and in pharmacies.

In conclusion, this study found that provision and quality of some services declined in the 2019-2021 period. There was a decrease in ART coverage in people diagnosed with HIV in selected health care facilities at the regional and district level, which may have been caused by the COVID-19 pandemic and the associated restrictions. In selected facilities in three regions, the viral load suppression declined in the 2019-2021 period and was low in Dnipropetrovsk and Odesa region. The total number of HIV tests also declined in the observed period. Some outcomes improved, such as early start of ART among newly diagnosed HIV patients and viral load testing before delivery in pregnant women.

It is hoped that the findings of this study will be used by stakeholders from the public and non-governmental sector to prioritize and plan the necessary policies and interventions aimed at ensuring earlier HIV diagnosis and high quality HIV care in Ukraine in emergency situations.

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Abbreviations

ANC	Antenatal care
ARVs	Antiretrovirals
ART	Antiretroviral treatment
COVID-19	Coronavirus disease 2019
MoH	Ministry of Health
NGO	Non-governmental organization
PHCC	Primary health care centre
PLHIV	People living with HIV
PMTCT	Prevention of mother-to-child transmission
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS
WHO	World Health Organization



Introduction

Ever since the World Health Organization (WHO) declared the Coronavirus Disease 2019 (COVID-19) pandemic on March 11 2020, there have been reasonable concerns about how it has affected the provision and quality of HIV prevention and treatment services globally.

To more effectively measure the progress towards HIV infection control, the Joint United Nations Programme on HIV/AIDS (UNAIDS) developed the 95-95-95 strategy, which assumes that at least 95% of all people living with HIV (PLHIV) should know their HIV status, of whom at least 95% should receive antiretroviral treatment (ART) and at least 95% should achieve HIV viral suppression below detectable viral load.¹ Crucial to achieving these targets and to minimize HIV transmission is to test as early as possible those infected with HIV and provide immediate ART. Lifelong and regular access to ART enables to suppress the viral load in an infected population and lowers its blood levels below those that enable its transmission.

The contribution of regions in Ukraine to the HIV epidemic varies significantly. In 2021, nearly two-thirds (62%) of PLHIV in Ukraine lived in 7 regions (so called *oblasts*, administrative divisions corresponding to regions or provinces): Odesa, Dnipropetrovsk, Kyiv, Mykolaiv, Kherson, Chernihiv and the City of Kyiv. The sexual route of HIV transmission was the most commonly reported (65% in 2021), whereas the parenteral route (associated with the use of drugs) remained high despite the downward trend (35% in 2021).²

As of January 1, 2022, there were 155,005 HIV positive citizens of Ukraine registered in healthcare facilities providing medical services to PLHIV, of whom 130,239 (84%) were receiving ART. However, approximately a third (37% in 2021) of the estimated number of PLHIV were unaware of their HIV-positive status. Among the persons registered in medical care in 2021, only 43% were infected recently. For most, the diagnosis of HIV infection was

¹ Jiang H, Zhou Y, Tang W. Maintaining HIV care during the COVID-19 pandemic. *Lancet HIV* 2020; 7(5):e308-e309.

² HIV infection in Ukraine: information bulletin № 53 / Ministry of Health of Ukraine. Kyiv, 2022.

established several years after infection, and some were already showing clinical manifestations of AIDS.³

Aim of the study

The aim was to assess the impact of the COVID-19 pandemic on access to HIV prevention and treatment services and their quality in selected regions in Ukraine.

Objectives of the study

1. To assess barriers to HIV services arising from the COVID-19 pandemic;
2. To compare the scope and types of HIV services provided before and during the COVID-19 pandemic;
3. To identify key factors influencing the availability, coverage and quality of HIV services;
4. To recommend solutions that should improve the availability of HIV services.

Methods

The study was designed to include both quantitative and qualitative data to be gathered at the same time without either data set affecting the other.

The quantitative data set consists of information collected at healthcare facilities about the number and type of HIV services provided to PLHIV in 2019-2021.

The qualitative data set consists of information collected from experts (health care professionals) and HIV patients obtained through in-depth interviews about the quantity and quality of HIV services and the impact of the COVID-19 pandemic on their provision.

³ HIV infection in Ukraine: information bulletin № 53 / Ministry of Health of Ukraine. Kyiv, 2022.

Geographical areas

The study was done in 5 regions (*oblasts*) - Volyn, Dnipropetrovsk, Lviv, Odesa, and the City of Kyiv – since these are the regions with the high number of PLHIV. Four of these represent the western and southern regions, and the fifth – the City of Kyiv as the nation's capital – has the highest HIV prevalence in Ukraine.

Sampling and recruitment of participants

For the collection of quantitative data the sample includes three types of healthcare facilities providing HIV services (regional, district and city-level), as follows:

- Facilities providing medical care to PLHIV ("Dovira" cabinets, ART sites, AIDS centers);
- Facilities providing primary health care;
- Facilities providing antenatal care (ANC).

These types of health facilities were chosen for the following reasons:

- Facilities providing medical care to PLHIV are responsible for recording cases of HIV infection (in paper and/or digital format), provision of medical care to PLHIV and coordination of interventions to control the HIV epidemic (n=17)
- Facilities providing primary health care involve decentralized services for PLHIV, some of which offer rapid tests for HIV (n=19)
- Facilities providing ANC offer HIV testing to pregnant women and joint management of HIV-positive pregnant women with facilities providing medical care to PLHIV (n=9)



Patient registries, Yavoriv Central District Hospital, Lviv Oblast

The quantitative data were collected from 46 healthcare centers: seven from the City of Kyiv, eight from the Lviv region, nine from the Volyn region, 10 from the Odesa region, and 12 from the Dnipropetrovsk region. Information on HIV services provided in 2019–2021 and registered cases of COVID-19 in 2020–2021 was collected from 1,600 patient cards. Of the total number of patients included, 117 were pregnant women. They were recruited from AIDS centres and from ANC clinics.

Table 1. Number of patients recruited by different types of facilities

	Facilities providing medical care to HIV patients	Facilities providing primary health care	Antenatal clinics	Total
Volyn region	22	21	18	61
Dnipropetrovsk region	545	80	6	631
Kyiv city	248	0	12	260
Lviv region	91	0	18	109
Odesa region	527	6	6	539
Total	1433	107	60	1600

The qualitative data were collected through in-depth interviews with 15 doctors across all types of healthcare facilities in all the regions (no more than one per facility) and 20 HIV patients.

HIV patients were recruited for the interviews by doctors at respective facilities and we collected their responses after they voluntarily agreed to do the interview.

The interviews were conducted face-to-face using a pre-agreed semi-structured questionnaire (guide).

Inclusion criteria

For healthcare facilities:	<ul style="list-style-type: none"> • providing HIV services at either the regional, district or city level;
For patient medical records:	<ul style="list-style-type: none"> • in facilities providing health care to PLHIV – cards of patients who, between 2019 and 2021, had been registered (and provided care) for at least one year; • at primary healthcare facilities – cards of patients tested in 2019–2021; • in antenatal care centers –patient cards of female HIV-positive patients in care in the period 2019-2021; • patient age over 18 years.
For PLHIV (in-depth interviews):	<ul style="list-style-type: none"> • receiving at least one service related to the treatment of HIV infection in 2019–2021; • age over 18 years.
For doctors (in-depth interviews):	<ul style="list-style-type: none"> • direct provision of HIV services and counseling of patients receiving HIV services.

Exclusion criteria

For quantitative data (patient cards):	<ul style="list-style-type: none"> • poor maintenance of medical records preventing data collection (unintelligible records, corrections that render interpretation ambiguous, etc.); • age below 18 years.
For qualitative data:	<ul style="list-style-type: none"> • PLHIV gave no informed consent or were under the influence of alcohol or drugs; • age below 18 years.

Difficulties and obstacles encountered during the study

One of the major issues encountered were barriers in communication with healthcare institutions, mostly owed to war-related emergencies.

Issues related to the collection of quantitative data

- Poor or delayed patient card maintenance due to power cuts and frequent air raid alerts at healthcare facilities associated with war operations.
- Insufficient human resources. Doctors were often too busy to fill out patient cards and had no available staff to delegate the task.

Issues related to the collection of qualitative data

- For the same reasons, mostly due to air raids, in-depth interviews with doctors and PLHIV often had to be postponed, sometimes for days or even weeks.
- Some PLHIV changed their minds and canceled or did not come for interviews.
- Some doctors reported other commitments and could not participate in an interview.

Issues related to data analysis

- The most common issue we encountered was that individual data were incomplete, and this was found in all the types of healthcare facilities. For example, some AIDS centers did not keep data of COVID-19 cases, and some facilities failed to keep records properly, which lead to missing data and incomplete analysis.

Results of quantitative data analysis

The goals of the UNAIDS Fast Track Strategy are that 95% of PLHIV are aware of their HIV status, of whom 95% should be receiving treatment, and 95% of people receiving treatment should achieve viral load below the detection limit so that they no longer spread the infection. These same goals are stated in the Ukrainian Strategy for Combating HIV, Tuberculosis (TB) and viral hepatitis by 2030.

In our study, where available, we compared our data with regional and national statistics and target indicators.

In terms of the gender distribution, as can be seen in Table 2, 54% of all HIV patients included were men.

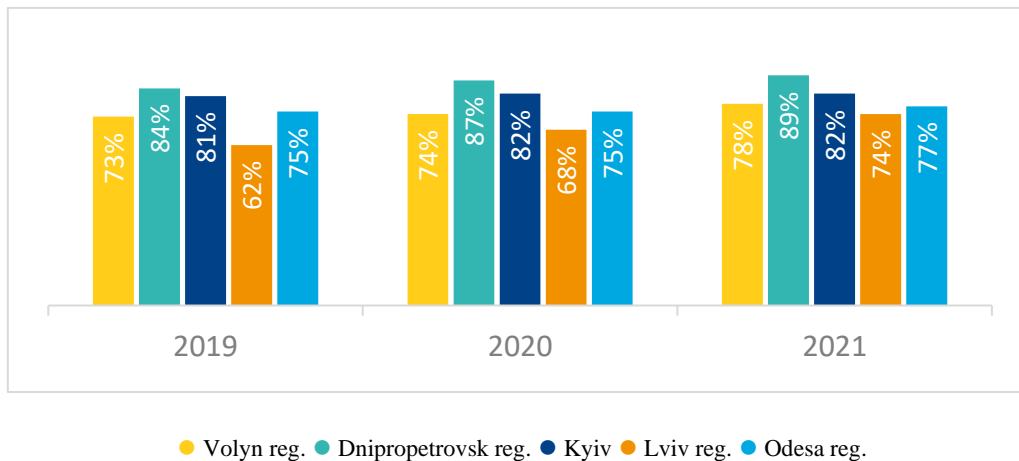
Table 2. Number of male and female HIV patients included in the study by the type of the facility

	Facilities providing medical supervision of PLHIV	Facilities providing primary health care	ANC clinics	Total
Men	796	68	0	864
Women	637	39	60	736
Total	1433	107	60	1600

Facilities providing medical supervision of PLHIV

According to the official statistics of the Centre for Public Health of the Ministry of Health (MoH), the ART coverage of diagnosed PLHIV in Ukraine was 87% in 2021, ranging from 74% in the Lviv region to 89% in the Dnipropetrovsk region (Figure 1). This indicates overall a suboptimal coverage as, according to the UNAIDS targets for ending HIV, it should be 95%. It is encouraging to observe that the ART coverage increased from 2019 to 2021 in the observed regions, in spite of the COVID-19 epidemic.

Figure 1. ART coverage of PLHIV in Ukraine by regions, 2019-2021



Source: MoH statistics

Our findings (Figure 2), show higher ART coverage in the facilities where we collected data compared to the national statistics in 2021, with the exception of Lviv where it was only 67% in 2021. The discrepancies between data collected in selected facilities and national data are particularly evident for Volyn.

Figure 2. ART coverage in diagnosed PLHIV in 2019–2021 in healthcare facilities included in the study

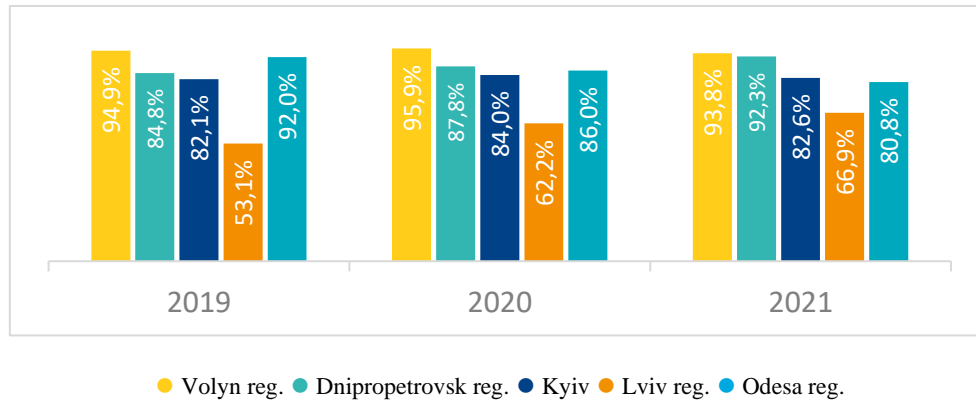


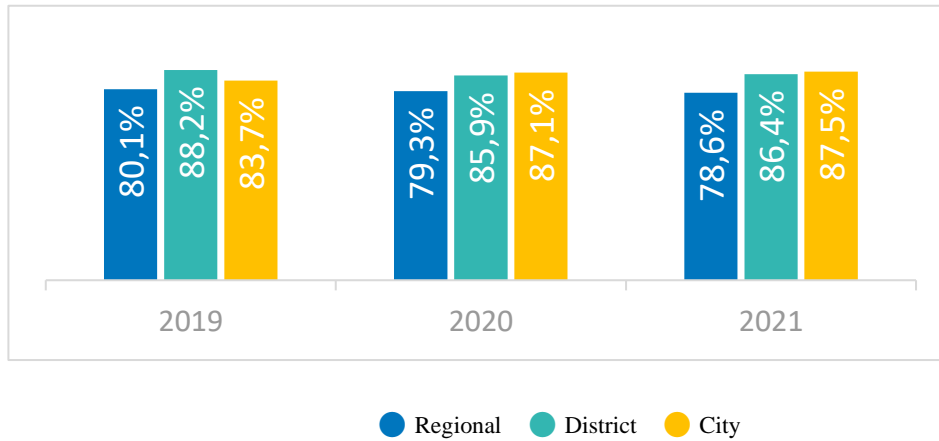
Table 3. Total number of diagnosed PLHIV in 2019-2021 in healthcare facilities included in the study

	2019	2020	2021	Total
Volyn region	3117	3231	3475	9823
Dnipropetrovsk region	16839	18947	20728	56514
Kyiv city	13016	13693	14454	41163
Lviv region	3946	3919	4044	11909
Odesa region	10837	15154	18340	44331
Total	47755	54944	61041	163740

Looking at ART coverage by the level of healthcare facilities – regional, district and city– we can notice that ART coverage is the lowest in regional facilities (Figure 3).

In 2020 compared to 2019 there was a decrease in ART coverage of people diagnosed with HIV in health care facilities at the regional and district level, which may have been caused by the COVID-19 pandemic, that was gaining momentum at that time, and the introduction of quarantine restrictions. This might have led to a decrease in the total number of patient visits to health care facilities, especially to regional-level facilities. The city-level health care facilities that provided data managed to improve the ART coverage in 2020 compared to 2019 and maintained it in 2021.

Figure 3. ART coverage of diagnosed PLHIV by the level of healthcare facilities included in the study, 2019–2021



Another target indicator of the Fast Track strategy is the percentage of PLHIV who receive ART and have viral load below the limit of detection (up to 1,000 copies/mL). Figure 4 shows that the healthcare facilities of the City of Kyiv and the Volyn region were meeting the 95% target level of the Fast Track and State Strategy in 2020 and 2021. In three regions, the viral load suppression declined in the 2019-2021 period (Dnipropetrovsk, Odesa and Lviv). In the facilities in the Dnipropetrovsk and Odesa region the viral load suppression among those on ART was low in 2021 – 68.3% and 75.6%.

Figure 4. Percentage of HIV patients receiving ART whose viral load is < 1000 copies/mL by regions, 2019–2021

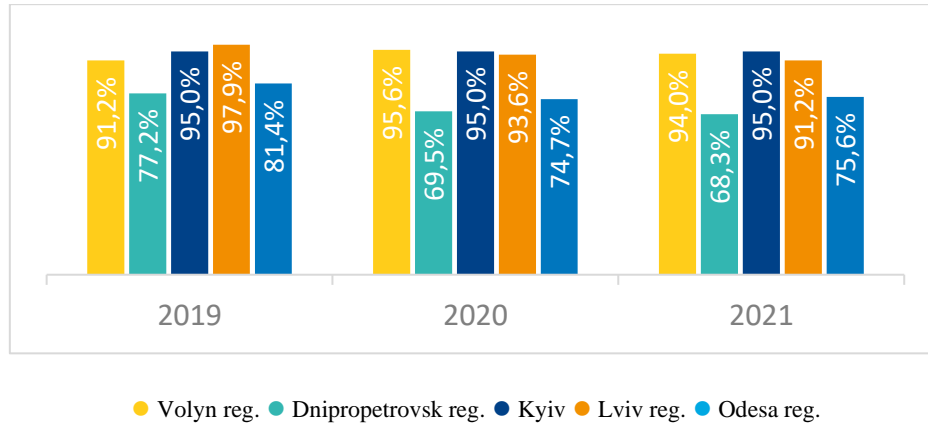


Table 4. Total number of HIV patients receiving ART in the facilities included in the study, 2019–2021

	2019	2020	2021	Total
Volyn region	2959	3097	3260	9316
Dnipropetrovsk region	14280	16637	19126	50043
Kyiv city	10683	11504	11940	34127
Lviv region	2097	2436	2707	7240
Odesa region	9975	13028	14822	37825
Total	39994	46702	51855	138551

Considering the type of facilities, the best outcomes in terms of the viral load suppression were in the district-level facilities – 96.4% of their patients on ART had viral load less than 1000 copies/ml in 2021 (Figure 5). However, in the regional-level and city-level facilities the percentage of patients on ART who were virally suppressed declined in the 2019–2021 period. In 2021, virally suppressed were only 73% of patients on ART in regional-level facilities and 77% in city-level facilities. In general, district-level healthcare centers have fewer patients to supervise than city and regional-level and may therefore support patients more effectively to adhere to ART.

Figure 5. Percentage of HIV patients on ART with the viral load <1000 copies/mL, by the level of healthcare facility, 2019–2021

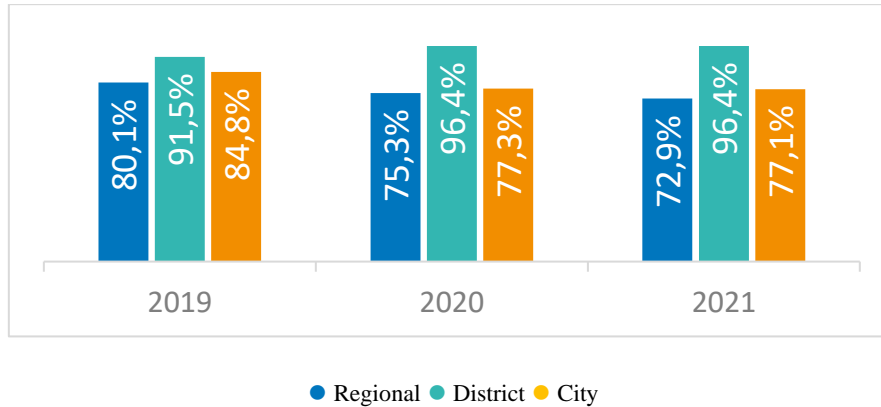


Table 5. Total number of HIV patients receiving ART in the facilities included in the study, 2019–2021

	2019	2020	2021	Total
Regional	8675	10590	12627	31892
District	8006	8307	8773	25086
City	23313	27805	30455	81573
Total	39994	46702	51855	138551

According to the information provided by the participating AIDS centers in 2019, 43% of patients entered the treatment program in the early clinical stages of HIV infection (stages 1 and 2). This percentage increased to 56% by 2021, and the increase was greater for patients with the stage of 2 HIV – from 12% to 21%, respectively. Even though these figures show an encouraging trend, the problem of late detection and treatment remains relevant.

Figure 6 shows that an increasing proportion of newly diagnosed HIV patients were screened for HIV using rapid tests from 2019 to 2021. This increase in the use of rapid tests coincides with increased involvement of non-governmental organisations (NGOs) in testing for HIV and referring PLHIV to healthcare facilities, which more than tripled from 2019 to 2021 (Figure 7).

Figure 6. Share of rapid tests used to screen for HIV infection in health care facilities included in the study, out of all types of tests used, 2019-2021

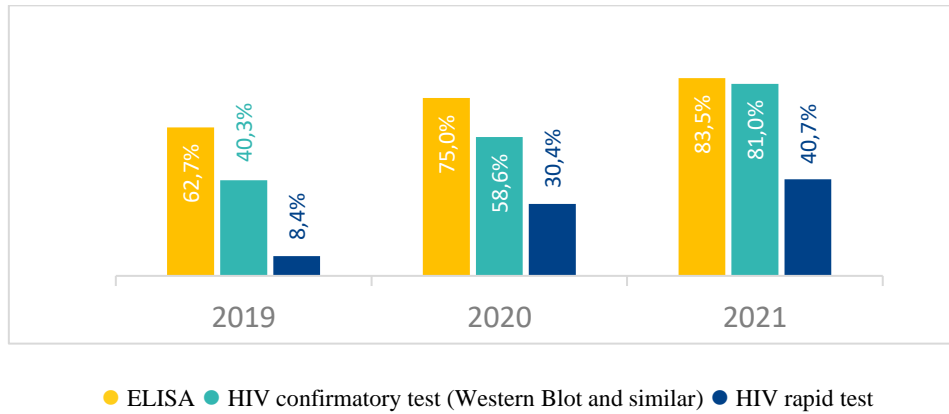


Figure 7. Percentage of PLHIV referred by NGOs to healthcare centers included in the study, 2019–2021

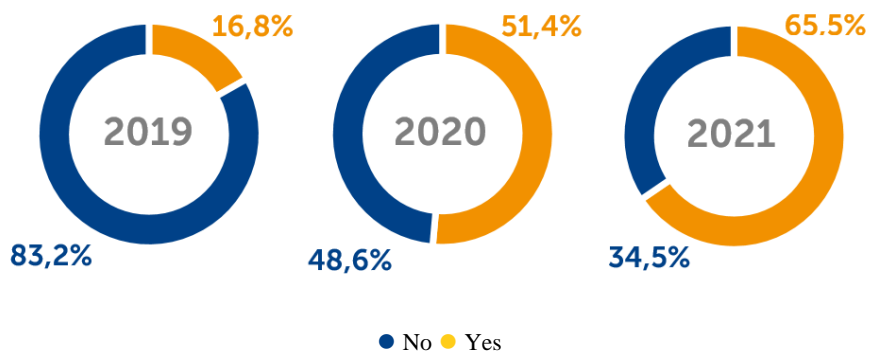


Table 6. Number of PLHIV whose cards were used to calculate the percentage of PLHIV referred by NGOs to healthcare centers included in the study, 2019–2021

2019	398
2020	484
2021	550
Total	1432

As shown in Figure 8, there was an increase in HIV testing of partners of newly diagnosed with HIV in the observed time- period. Partner testing is an HIV testing strategy that is recommended by WHO as an effective tool for identifying HIV positive persons.

Figure 8. Percentage of PLHIV whose partners tested for HIV at selected healthcare facilities, 2019–2021

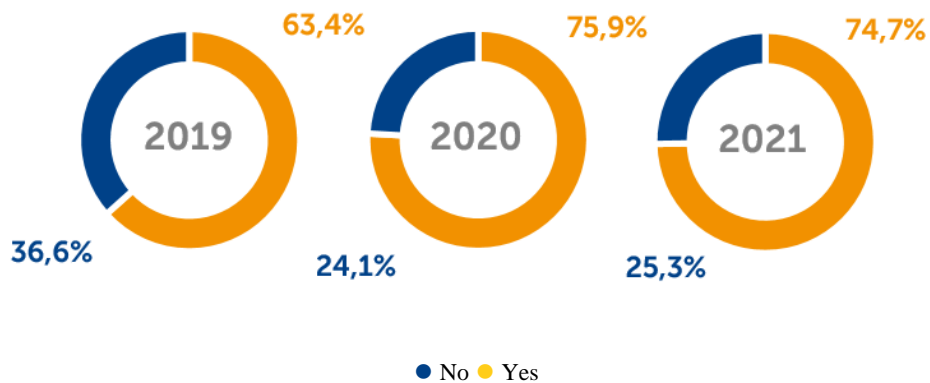
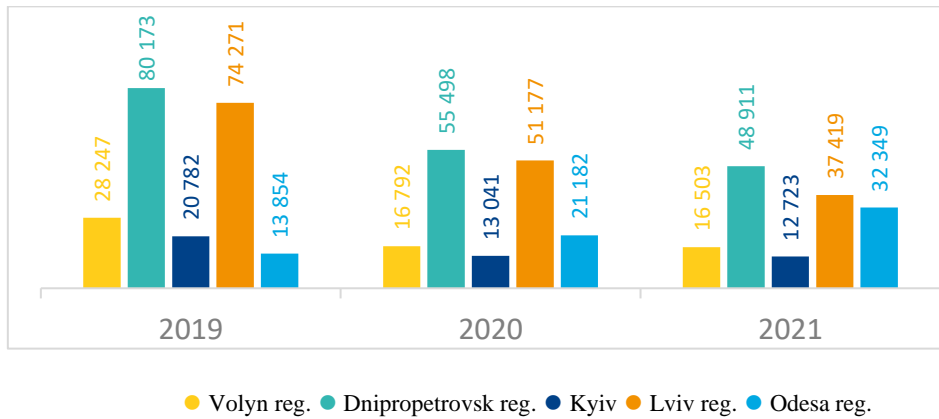


Table 7. Number of PLHIV whose cards were used to calculate the percentage of PLHIV whose partners tested for HIV at the selected healthcare facilities, 2019–2021

2019	396
2020	474
2021	542
Total	1412

However, the total number of people tested for HIV substantially decreased from 2019 to 2021, except in the Odesa region, in which it more than doubled (Figure 9). The most pronounced declines in HIV testing were in the Dnipropetrovsk and Lviv regions.

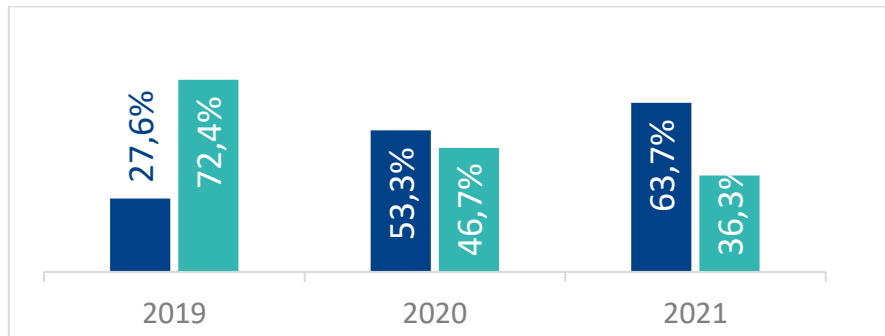
Figure 9. The number of people tested for HIV at the selected healthcare facilities, 2019–2021, by region



Early start of ART is an important indicator of the quality of HIV care and the ability of the health care systems to effectively link newly diagnosed with HIV to care. For ART to be considered early it should start within 7 days of diagnosis.

Figure 10 shows that the rate of early treatment increased in 2020 and continued to increase in 2021. Overall, the percentage of those who started ART within 7 days of diagnosis increased from 28% in 2019 to 68% in 2021.

Figure 10. The percentage of patients who started ART within 7 days of diagnosis in the selected healthcare facilities, 2019-2021



● Treatment started within 7 days (early start) ● Treatment started later than 7 days

Table 8. Number of patients whose cards were used to calculate the percentage of patients who started ART within 7 days of diagnosis in the selected healthcare facilities, 2019-2021

2019	392
2020	471
2021	537
Total	1400

There were substantial variations across regions in the percentage of patients who started ART early (Figure 11). Region-wise Lviv, unlike the rest, shows a drop in the early start of ART in 2020 compared to 2019 and partial recovery in 2021. Lviv also had the lowest percentage of patients who started ART early – only 21% in 2021 while the best outcomes were in the Volyn region (83%).

Figure 11. The percentage of patients who started ART within 7 days of diagnosis in selected healthcare facilities, 2019–2021, by region

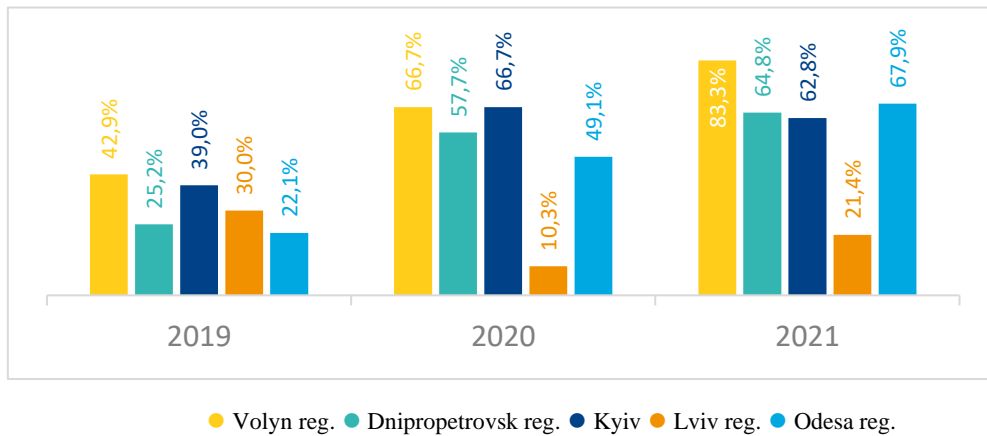


Table 9. Number of patients whose cards were used to calculate percentage of patients who started ART within 7 days of diagnosis in the selected healthcare facilities, 2019-2021

	2019	2020	2021	Total
Volyn region	7	6	6	19
Dniprpetrovsk region	147	182	199	528
Kyiv city	77	81	86	244
Lviv region	30	29	28	87
Odesa region	131	173	218	522
Total	392	471	537	1400

There are no substantial differences in the percentage of patients that started ART early by the administrative level of health care facilities (Figure 12). Overall, the proportion that started ART within 7 days of diagnosis increased in the 2019-2021 period, being the highest in city-level facilities (70%) and the lowest in distric-level facilities (51%).

Figure 12. The proportion of patients who started ART early by administrative level of healthcare facilities, 2019–2021

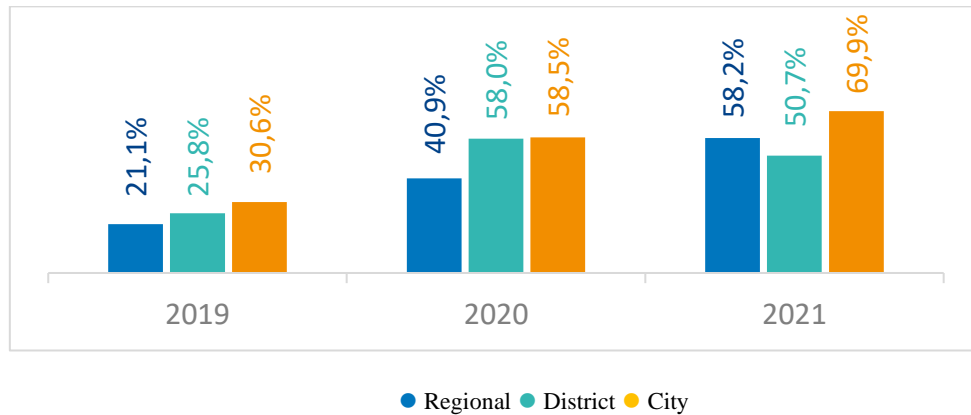


Table 10. Number of patients whose cards were used to calculate percentage of patients who started ART within 7 days of diagnosis in the selected healthcare facilities, 2019-2021

	2019	2020	2021	Total
Regional	95	137	170	402
Disctrict	62	69	71	202
City	235	265	296	796
Total	392	471	537	1400

Prevention of mother-to-child transmission (PMTCT) of HIV is another important component of the HIV program. PMTCT data were collected from the cards of HIV-positive pregnant women and women who had given birth (n=117). Considering such a small sample size, analysis was not done by region or administrative level of healthcare facilities.

As shown in Figure 13, a considerable percentage of pregnant women were diagnosed after the first trimester of pregnancy. In 2019 and 2020, 40% and 52% of pregnant women were diagnosed with HIV late, that is after the 12th week of pregnancy. In 2021, this was the case with 27% of HIV positive pregnant women. Though the proportion of those diagnosed late declined in 2021 compared to the previous year, still approximately 1 in 4 pregnant women were diagnosed late in 2021.

Figure 13. Timing of HIV-positive test in pregnant women diagnosed at selected health care facilities, 2019–2021

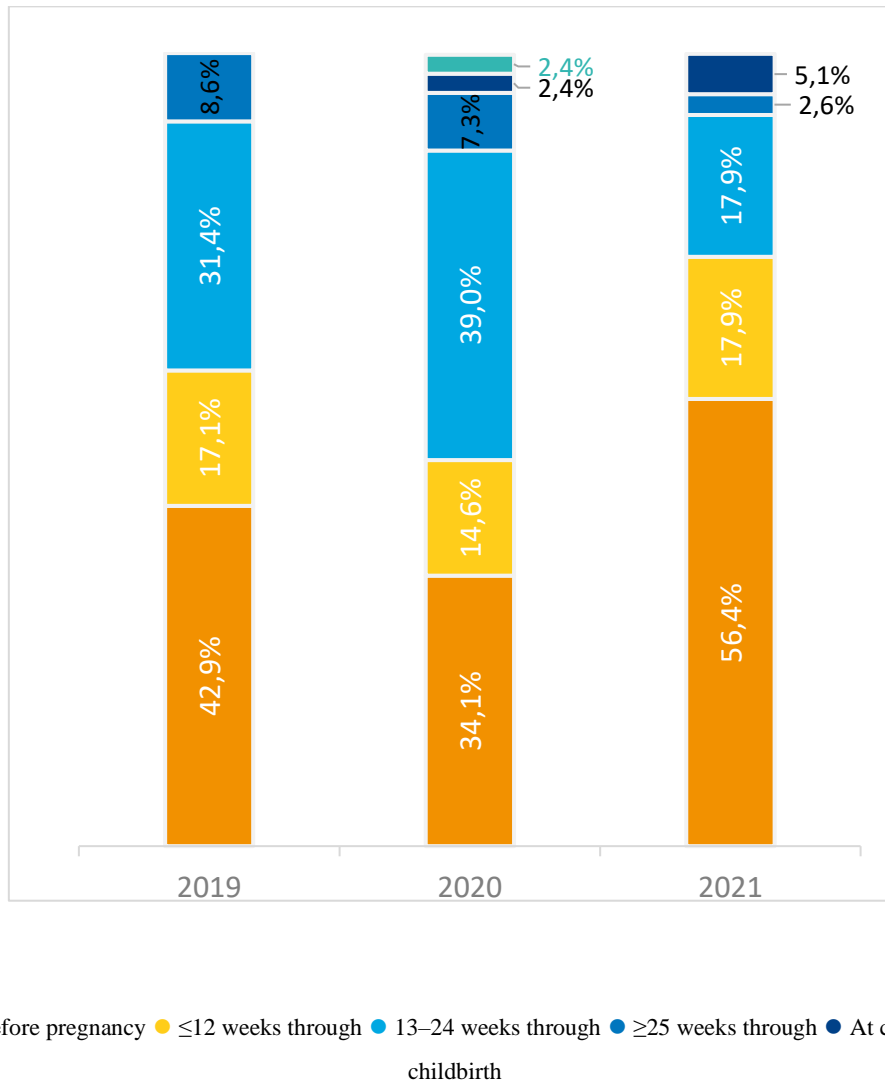
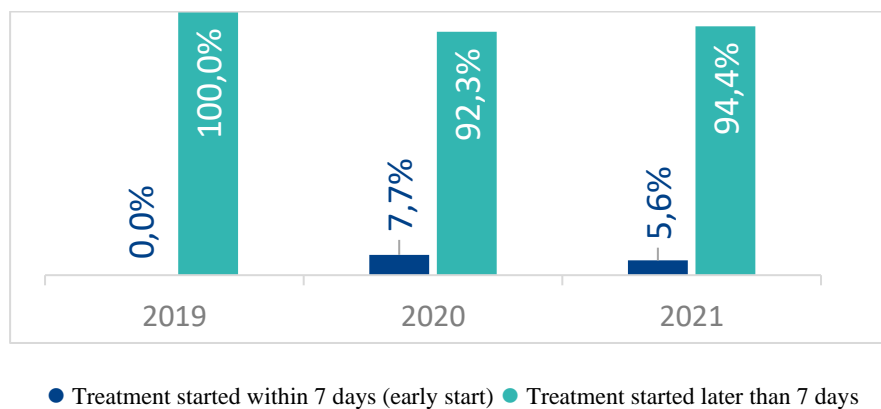


Table 11. Number of pregnant HIV-positive women whose cards were used to calculate the selected indicators, 2019-2021

2019	35
2020	41
2021	35
Total	111

The percentage of newly diagnosed HIV positive pregnant women who started ART early was much lower than for other patients, ranging between 0% in 2019 to 5.6% in 2021 (Figure 14).

Figure 14. Percentage of pregnant women newly diagnosed with HIV who started ART early in selected healthcare facilities, 2019–2021



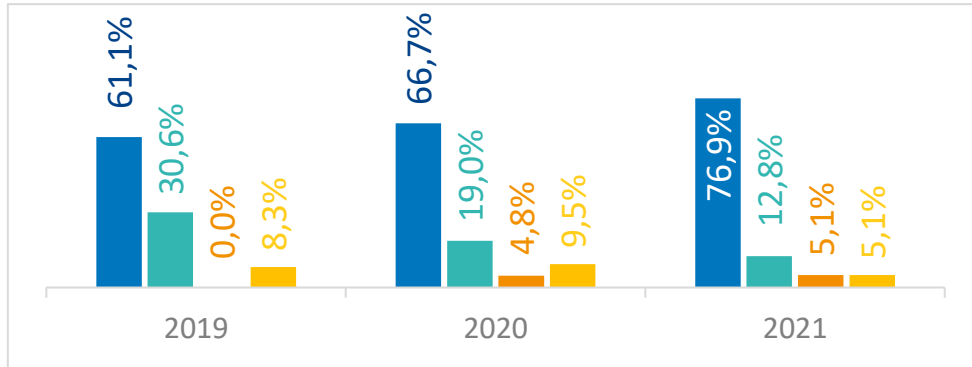
Timely determination of viral load in pregnant women before giving birth determines the mode of delivery with the aim to lower the chances of HIV transmission to the newborn child. Ukrainian standards of medical care recommend that the viral load is determined in weeks 34–36 of pregnancy⁴.

In our sample, a minority of women (10% in 2020 and 5% in 2021) did not have viral load test results in the 34-36 weeks of pregnancy. HIV load data show encouraging findings - the percentage of pregnant women with viral load less than 1000 copies/ ml increased from 2019 to 2021 and reached the level of 89% in 2021 (Figure 15).

⁴ Standards of medical care Prevention of HIV Transmission from Mother to Child, approved by the order of the Ministry of Health of Ukraine dated April 26, 2022 No. 692.



Figure 15. Distribution of HIV diagnosed pregnant women by HIV load levels, 2019–2021



● 0–50 copies/mL ● 50–1000 copies/mL ● >1000 copies/mL ● not determined before delivery



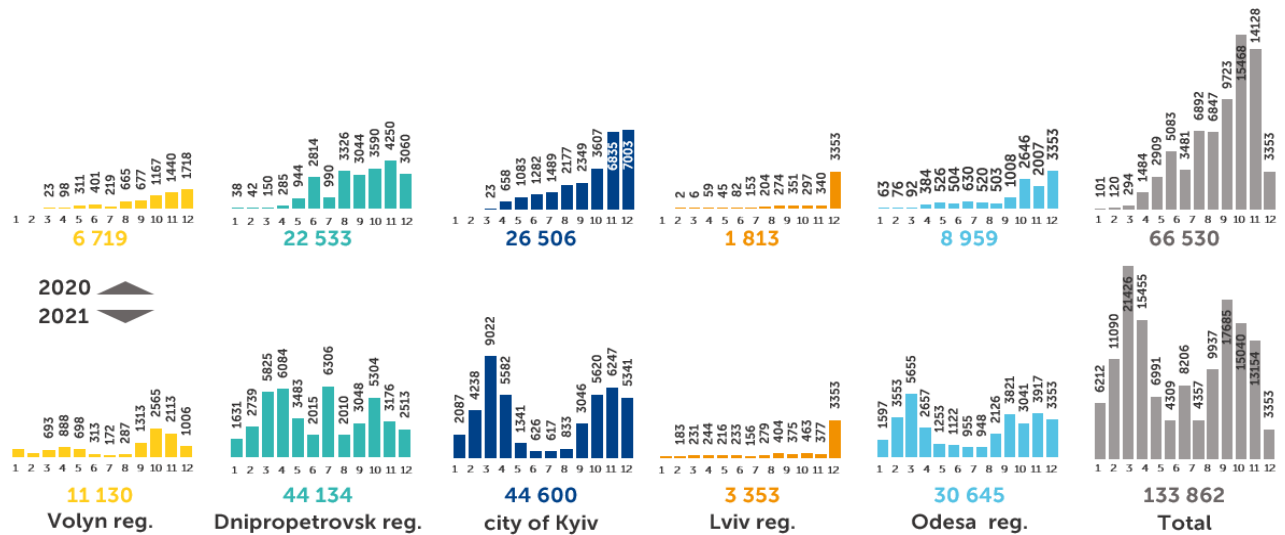
Lutsk Central Hospital, Lutsk, Volyn Region

Facilities providing primary health care

Primary healthcare facilities provide decentralized primary care services for PLHIV, and run rapid tests to detect new HIV cases.

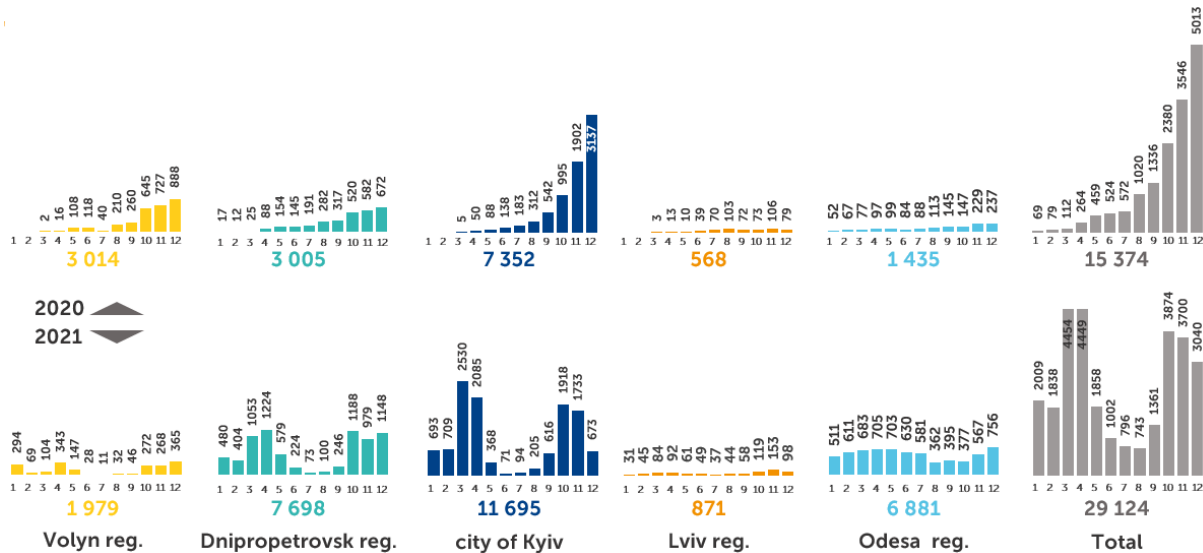
As of 2020, primary health care centres became involved with testing and treatment of COVID-19. As can be seen in Figure 16, the number of people tested for COVID-19 increased substantially from 2020 to 2021.

Figure 16. The number of people tested for COVID-19 at primary healthcare facilities, 2020–2021, by region



Subsequently, the number of patients treated for COVID-19 increased in all the regions from 2020 to 2021 except Volyn (Figure 17).

Figure 17. The number of patients with COVID-19 (regardless of where they were tested) at primary healthcare facilities, 2019–2021, by region



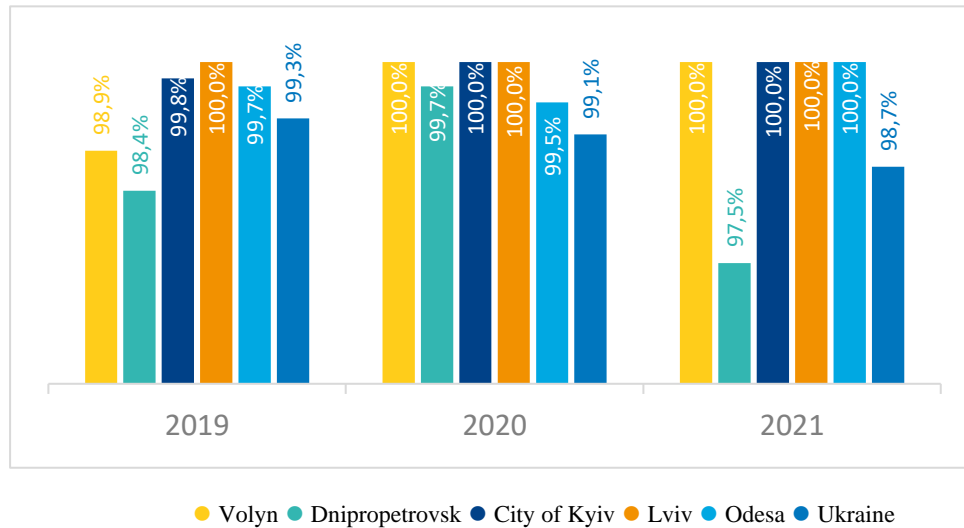
Facilities providing antenatal care

ANC facilities are in charge of testing pregnant women for HIV and jointly manage HIV-positive pregnant women together with healthcare facilities providing ART.

To eliminate mother-to-child HIV transmission, the WHO has issued a global guidance according to which the target coverage of pregnant women with HIV testing should be $\geq 95\%$ ⁵. According to data of the Ukrainian Center for Public Health, this coverage in 2019–2021 ranged from 98.7% to 99.3% nationally, and from 97.5% to 100% by regions (Figure 18). Even in 2020 and 2021, during COVID-19 epidemic and a number of restrictions, the country as well as the selected regions maintained HIV testing coverage in ANC settings higher than 95%.

⁵ Global guidance on criteria and processes for validation: elimination of mother-to-child transmission of HIV, syphilis and hepatitis B virus. Geneva: World Health Organization, 2021.

Figure 18. HIV testing coverage of pregnant women at the national-level in Ukraine and in selected regions, 2019–2021



Data obtained from selected ANC clinics reveal challenges in data recording system. Namely, selected ANC clinics in the Lviv and Odesa region reported HIV testing coverage above 100%. Clinics in Volyn and the City of Kiev reported testing coverage of 99-100% in 2020 and 2021. This is because some women were tested for HIV more than once and reporting includes number of tests and not pregnant women tested. This recording method therefore calls for revision and adjustment to the system recommended by WHO. According to HIV testing protocols for pregnant women, the test may be repeated two or three times.

The percentage of HIV-negative pregnant women whose sexual partners were tested for HIV in ANC centers was recorded only in the Volyn region and the City of Kyiv and it decreased from 2019 to 2021 (Figure 19). It shows very low percentage of tested partners in the selected clinics in the Volyn region (1%), while more in Kiev (43%). The percentage of HIV negative pregnant women whose partners were tested for HIV declined in the City of Kiev, from 62% in 2019 to 43% in 2020. It is unfortunate that data for the other three regions were not available.

Figure 19. The percentage of HIV-negative pregnant women (from all tested pregnant women) whose sexual partners were tested for HIV in ANC centers in the Volyn region and the City of Kyiv, 2019-2021

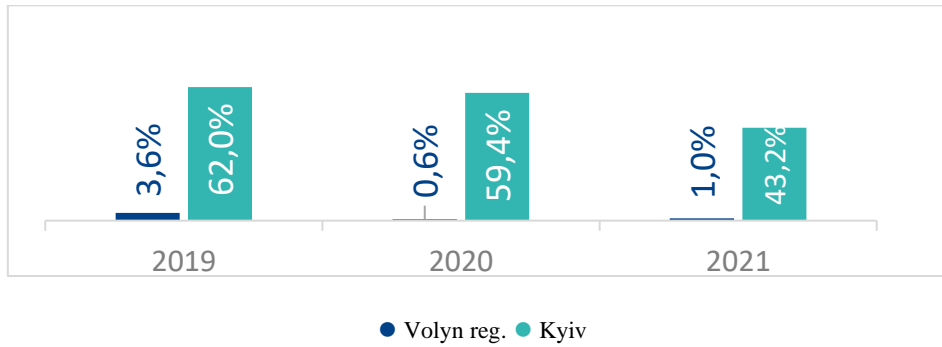
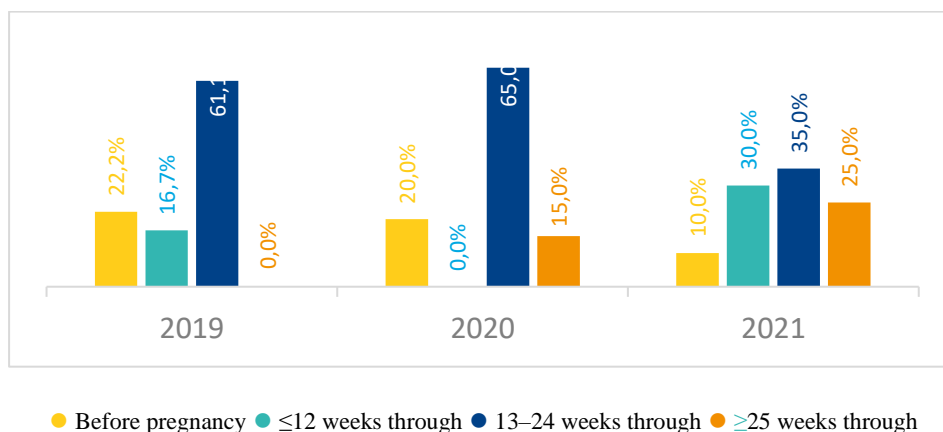


Table 12. Number of pregnant women who were tested for HIV in ANC centers in the Volyn region and the City of Kyiv, 2019-2021

	2019	2020	2021
Volyn region	3523	3545	3466
Kyiv city	2489	2184	1733

In terms of the time of testing for HIV, ANC clinics show poorer results. The percentage of HIV-positive pregnant women who were diagnosed with HIV by week 12th of pregnancy was only 39% in 2020, 20% in 2021 and 40% in 2021 (Figure 20).

Figure 20. Time of the first HIV test in HIV positive pregnant women at selected ANC clinics included in the study, 2019–2021



Early start of ART (within 7 days of diagnosis) in HIV-positive pregnant women treated in ANC centers shows an increase from 2019 to 2021 (Figure 21). However, overall a small percentage of pregnant women started early treatment for HIV in selected clinics.

Figure 21. Percentage of HIV-positive pregnant women receiving early ART, 2019–2021

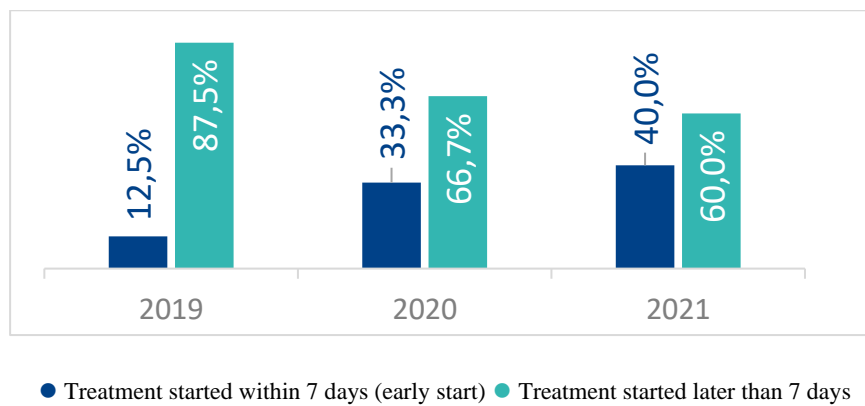


Table 13. Number of pregnant HIV-positive women whose cards were used to calculate the early start of ART, 2019–2021

2019	20
2020	20
2021	20
Total	60

Figure 22 shows the distribution of the number of visits to ANC centers in 2019–2021. In 2021, 45% of pregnant women made no less than the 8 recommended clinical visits during pregnancy and this percentage was on increase during 2019-2021 period.

Figure 22. Percentage of pregnant by the number of visits to ANC centers during pregnancy, 2019–2021



Table 14. Number of pregnant HIV-positive women whose cards were used to calculate the number of visits to ANC centers, 2019–2021

2019	20
2020	19
2021	20
Total	59

Results of analysis of qualitative data



Pulmonology Regional Diagnostic Centre, Lviv city

Characteristics of HIV services in healthcare facilities where interviews with medical doctors were held

The doctors who were interviewed worked in the three types of healthcare facilities described above, namely those providing medical care to PLHIV (in the notes to the quotes are further referred to as HIV services), primary healthcare centers (PHCC) and ANC centers. Accordingly, their inputs concerned different aspects of HIV services.

AIDS centers provide the complete range of HIV medical services, as suggested by one of the interviewed doctors: "We test all patients for the presence of HIV antibodies. Blood samples are sent to the regional infectious diseases hospital laboratory, and when the positive test is verified, we call these patients, we register them, we examine them, and prescribe treatment. Then we continue to provide medical care." [Doctor 13, Volyn region, HIV services, district level].

Medical services provided at the primary health care facilities are mostly limited to HIV rapid testing: "In this institution we only provide services related to rapid testing. We do not provide treatment services." [Doctor 10, Lviv region, CPCH, district level].

Doctors at ANC clinics more often refer to blood testing: "We do not use rapid tests, as we do not have them. Instead, we run blood tests, sometimes twice, and rarely three times." [Doctor 15, Volyn region, ANC clinic, regional level].

If the test result is positive, the patient is referred to an AIDS centers, where she receives a full range of HIV services. One ANC clinic doctor describes it as follows: "For example, we take screening tests, and if we get positive results, we refer the patient to the AIDS center. There the results are confirmed or not. Only when the diagnosis is verified are the patients referred to a psychologist for counselling and then for HIV treatment. We conduct only the first stage; we must carry out HIV testing in time so that the woman can be prescribed ART in time." [Doctor 9, City of Kyiv, ANC clinic, city level].

CD4 lymphocyte count and viral load tests and the prescription of ARV drugs are services provided exclusively by the AIDS centers: "According to the protocol, we prescribe and/or administer ARVs and, if necessary, therapies to prevent opportunistic infections and tuberculosis with isoniazid, and then take care that registered patients take ARVs and are tested regularly." [Doctor 4, Odesa region, HIV services, city level].

One of the experts suggested that ARV drugs may become available at primary healthcare facilities in the near future, after additional medical training: "I don't know on what grounds we can dispense. We will probably need additional training." [Doctor 10, Lviv region, PHCC, district level].

Family doctors (at primary healthcare facilities) and doctors in ANC clinics mostly provide general information about HIV/AIDS and encourage patients to take tests. If they turn out positive, they refer patients to AIDS centers and explain to them what to expect, as put succinctly by two doctors: "I speak to those at risk of HIV and offer them rapid testing or referral to the AIDS center." [Doctor 10, Lviv region, PHCC, district level]; "Each obstetrician-gynecologist who consults a patient gives counsel about HIV prevention)." [Doctor 15, Volyn region, ANC clinic, regional level].

HIV-positive patients receive more detailed and comprehensive counseling from specialists for infectious diseases at AIDS centers: "Many of these women are in contact with

their infectious disease doctor at the AIDS center in case they need treatment adjustment or treatment for the child." [Doctor 15, Volyn region, ANC clinic, regional level].

Patients also request psychological support. This seems to be particularly common at ANC clinics: "Of course, if I see that a pregnant woman is anxious and has a problem coping, then we have psychologists who deal with such women." [Doctor 15, Volyn region, ANC clinic, regional level]. Psychological support for pregnant HIV positive women is provided either immediately at the healthcare facility or they are referred to a psychologist at the AIDS center: "We [doctors at ANC clinics] talk with patients, but the service is most often provided by a psychologist at the AIDS center. We can refer patients to a psychologist at the AIDS center, if needed." [Doctor 9, City of Kyiv, ANC clinic, city level].

At the AIDS centers PLHIV can also get other types of assistance, such as legal support in case of human rights violation or denied medical care.

Some doctors also mention that AIDS centers and "Trust" offices provide assistance in obtaining social benefits to which HIV-positive pregnant women and their children are entitled: "Children receive [financial support] for up to 18 months. If they are sick for up to 18 years." [Doctor 1, Dnipropetrovsk region, HIV services, regional level]. "There is this 'Trust' office to which we refer women. In our country, every infected woman, like any other pregnant woman, receives ANC benefits, and we issue these certificates." [Doctor 15, Volyn region, ANC clinic, regional level].

Judging by the descriptions of interviewed doctors, the range of HIV services fully meets legal requirements, and the widest range of services is provided at AIDS centers, to which patients are usually referred from other healthcare facilities after the first positive HIV test.

Barriers to HIV services arising from the COVID-19 pandemic

Even before the COVID-19 pandemic, doctors noticed certain difficulties and obstacles of organizational nature, most notably shortages of material and human resources or patients being hesitant to test for HIV and receive treatment.

For example, they mention the lack of medical personnel: "Then we had to collect blood. Unfortunately, there are few nurses in the primary care centers who can take blood from the vein of a one-month or three-month-old child." [Doctor 1, Dnipropetrovsk region, HIV services, regional level]; "The infectious disease specialist himself was not at the location [Trust office], as he would come two times a week, and patients could also arrange specialist visit there where he worked." [Doctor 5, Odesa region, PHCC, city level].

Among the material issues, one of the experts noted shortages in rapid HIV tests: "We do the tests, but testing is often prescribed by another doctor. If we do not have enough tests, we ask [patients] to go to a private laboratory." [Doctor 10, Lviv region, PHCC, district level].

Doctors also believe that the AIDS centers are better equipped to diagnose and treat HIV infection and concomitant diseases: "Often, AIDS is accompanied by other viral infections: herpesviruses, cytomegaloviruses, Epstein-Barr viruses and other infections. At the AIDS center they are tested for free. Here, they must pay." [Doctor 14, Volyn region, PHCC, regional level].

At the same time, one AIDS center doctor complained of drug shortages, ARV drugs in particular: "There are issues with the provision of ARV drugs. There are moments when drugs are in short supply, and you are forced to give the patient ART only for short time." [Doctor 7, City of Kyiv, HIV services, city level].

Doctors also point to logistical issues with treatment, especially for PLHIV who do not live in regional centers or large cities with AIDS centers: "We often hear them say that they can't come because they don't have the money for the trip or because the minibus runs once a day, and they can come but can't leave or because they have to take a night or evening train one day ahead." [Doctor 1, Dnipropetrovsk region, HIV services, regional level]. "Speaking of Lviv, people are reluctant to take the trip, especially if they need an operation. It is easier to have it done in private practices." [Doctor 10, Lviv region, PHCC, district level].

But most often, doctors mention personal attitudes of patients as barriers to accessing HIV services. They have to make an additional effort to convince the patient to take the test and examination and to start and continue therapy: "You talk about HIV and tell them that their symptoms or behavior may be associated with it. 'Do you want to take the test?' you ask, and they reply: 'No, I don't want to.' Sometimes it is difficult to persuade the patient." [Doctor 10, Lviv region, PHCC, district level]. According to some experts, it is especially difficult to maintain compliance in patients with alcohol or drug addiction: "As a rule, patients who are usually classified as drug addicts are very difficult to get to take ART. They may be treated for some time, and then they drop off the care, but sometimes they seek health care again." [Doctor 8, City of Kyiv, PHCC, city level]. "It happens with drug addicts; they are not always compliant and can get rude, pack up and leave. Sometimes they come again to seek health care and tell us to do anything we can for them. There are those who get offended, mostly the drug addicts. After completing their ART after a year or two, they come and apologize. Those who abuse alcohol are more difficult to handle. They don't come, don't pick up the phone or simply vanish." [Doctor 14, Volyn region, PHCC, regional level].

One of the doctors also mentioned a case of discrimination of an HIV positive patient: "Sometimes patients are discriminated in other medical institutions because doctors do not know much about HIV. This is not related to either the pandemic or anything else. For example, a patient says 'I need a surgery'. The key indications support surgical intervention, but he may be refused." [Doctor 7, City of Kyiv, HIV services, city level].

With the onset of the COVID-19 pandemic, new obstacles arose, both of organizational nature in response to the new epidemiological situation and personal concerns of the patients.

One of the biggest problems, in doctors' opinion, was a significant increase in the workload: "Everyone was mobilized as much as possible. In addition, we also dispensed drugs and took patients for outpatient registration, tested them for HIV, and provided post-exposure and pre-exposure prophylaxis. And that was difficult." [Doctor 7, City of Kyiv, HIV services, city level]. "Blood testing for CD4 and viral load increased from fifteen to hundred people a day at some points." [Doctor 2, Dnipropetrovsk region, PHCC, district level].

Primary healthcare doctors took much of the brunt in terms of workload, as they also dealt with patients with COVID-19 and with vaccination against COVID-19: "We were affected

a lot. The work schedule was tighter, we had to work more hours, and we had also been involved in vaccination against COVID-19." [Doctor 10, Lviv region, PHCC, district level].

In addition, doctors would also get sick like everyone else, including from COVID-19, which sometimes meant that patients had to wait longer: "Queues were perhaps longer, because many doctors were sick." [Doctor 11, Lviv region, HIV services, district level].

Two primary healthcare doctors, one from a district and the other from a regional facility, pointed out that, during the COVID-19 pandemic, rapid HIV tests were more difficult to come by and it became more difficult to provide this service: "Our institution purchases rapid HIV tests with its own funds. There is no state program that would give us tests. That's why there were other priorities during COVID-19 and that's why the frequency of testing dropped to some degree." [Doctor 10, Lviv region, PHCC, district level]. Some facilities even stopped taking blood and sending it to the laboratory due to the lack of personnel: "This is bad for us, because there was a nurse, there was an office, there was all the equipment for taking blood, and now there is none." [Doctor 14, Volyn region, PHCC, regional level].

Some PHCC doctors tried to overcome these difficulties with HIV tests by consulting and referring patients to AIDS centers.

One AIDS center doctor noticed that the frequency of testing also decreased in hospitals, but he attributed this drop to fewer patients coming to hospitals during the COVID-19 pandemic instead of tests shortage: "The number of patients who were tested for HIV noticeably decreased, because a greater percentage of tests occurred in the hospital, and since the hospitals were closed, the number of HIV tests dropped." [Doctor 13, Volyn region, HIV services, district level].

Another doctor from the capital's AIDS center explains the issue in somewhat different terms: "Before [COVID-19], testing was also carried out in public places. Outpatient teams would go out or social services would test patients and bring the tests to our institution. During the pandemic, all social contacts were limited." [Doctor 7, City of Kyiv, HIV services, city level]. Testing was gradually resumed as restrictions were lifted: "...the social service rents us an office, and we provide additional medical services there. The frequency of testing that dropped at first, now recovered because of mobile clinics. People started to visit public places and get tested more often. Because of that, the number of patients increased." [Doctor 7, City of Kyiv, HIV services, city level].

Some doctors pointed to an unstable supply of ARV drugs as an important problem during the COVID-19 pandemic. "There were periods when the supply of medicines was a bit short. And if we saw that there would not be enough for everyone, we would give a smaller amount. But these shortages lasted for a short time. I noticed that patients were quite understanding about this. [...] Now all supplies are restored, and we can give drugs to the patients for three months or even longer if they need to travel abroad." [Doctor 11, Lviv region, HIV services, district level].

However, most doctors did not consider these issues a direct consequence of the COVID-19 pandemic but rather a coincidence, as they were resolved with time: "Regular delivery was interrupted, but in no case did we change the protocol or stopped dispensing drugs. Orders for the next year, which were made in October a year earlier, were postponed for beyond December, and not all the ordered drugs were delivered. Funding agencies such as PEPFAR and the Global Fund cut supplies." [Doctor 1, Dnipropetrovsk region, HIV services, regional level].

Reception of patients presented a particular challenge under the epidemiological restrictions: "We couldn't ensure a normal distance for patients [indoors]. Only patients with serious complaints and clinical indications could visit doctors. And those who did not have clinical indications or came for ART, they waited outside. They entered the dispensing room one by one and took the drugs." [Doctor 7, City of Kyiv, HIV services, city level]. "During that period, if patients had a fever at home and informed us about it, we tried to talk them out of coming here. Why? Because all them are more or less immunodeficient. If a patient with COVID-19 came here, he would put other patients at risk of being infected. If a patient was already sick, we asked him to self-isolate and inform his family doctor." [Doctor 11, Lviv region, HIV services, district level].

One doctor said that she was confused by the new threat to her patients at the beginning of the pandemic, as information about SARS-CoV-2 was still unverified and unreliable: "This infection was so new that we knew nothing about it or its effects on pregnant women and newborns. There were a lot of questions to be answered. But did we doctors have the answers? Of course not, because it took at least half a year for us to learn more about this infection." [Doctor 15, Volyn region, ANC clinic, regional level].

Most doctors noticed anxiety and concern in patients that they would get infected with COVID-19 at the hospital: "We, medical staff, went to work as usual, but the number of patient visits dropped." [Doctor 8, City of Kyiv, PHCC, city level]. "During COVID-19, especially when there were a lot of infected and hospitalized patients, people were really scared. They scheduled visits much less often, regardless of their HIV diagnosis or other chronic disease. And this was most prominent while the strict quarantine applied and people stayed at home." [Doctor 10, Lviv region, PHCC, district level].

During the pandemic, many patients tended to postpone visits to the hospital in fear of getting infected with COVID-19: "We had people postponing urgencies so as not to get infected. For them, hospitals presented the greatest danger with all these sick people. This is why, I think, there were fewer [visits to the hospital]." [Doctor 11, Lviv region, HIV services, district level].

Even doctors at ANC clinics noticed that visits and examinations were less frequent and postponed beyond the recommended schedule. One AIDS center doctor observed: "A number of women were identified as HIV-positive as late as at the childbirth. They did not go to ANC clinics because they thought they were to stay home and not go out. You could seldom see a pregnant woman in public places. Therefore, there were some negative effects, of course." [Doctor 1, Dnipropetrovsk region, HIV services, regional level].

Factors improving the availability, coverage and quality of HIV services after the onset of the COVID-19 pandemic

Before the pandemic, factors that ensured the availability, coverage and quality of HIV services, according to the interviewed doctors, included better management and organization. All pointed out that consistent and clear coordination helped them do their job: "We were motivated to encourage more and more people to take HIV testing. [...] I personally did not have any problems with organization. I did not have any worries about what, where and how to deliver. That was all organized by our manager." [Doctor 10, Lviv region, PHCC, district level, 198–202]. AIDS centers, provided the complete range of HIV services: "[...] the patient has the opportunity to be tested confidentially, free of charge, anonymously. Plus, the patient has the right and opportunity to be registered and thoroughly examined in our hospital, as well as to receive ART and support." [Doctor 11, Lviv region, HIV services, district level]. "I think that the AIDS center works very well. You know, you expect the patient to be crushed and think this is the end of the world, but it turns out that one can live with HIV until a very old age and die from causes other than complications of AIDS. They [AIDS centers] know how to explain all this to women, and they [women] return after some time, in accordance with our management protocol, with a report from the AIDS center." [Doctor 15, Volyn region, ANC clinic, regional level]. Another doctor further commended the cooperation with a regional AIDS center: "We cooperate with Lviv quite well. It was the former AIDS center and now it is the Public Health Center. There are doctors and workers who are always ready to give advice, to help. I cooperate with them. If I'm in doubt, I can call them for counsel on important issues. There are always people who will give you advice where to refer a patient." [Doctor 11, Lviv region, HIV services, district level].

Our doctors also mention that even before the COVID-19 pandemic, patients could occasionally receive ARVs through channels other than hospital visits, such as social services, relatives, or even a courier service: "There were projects financed by social services allowing healthcare workers to go to make house calls, take blood and dispense medicine. And when patients didn't need to give blood, they could send relatives to fetch drugs at the hospital or have them delivered by 'Nova Poshta'." [Doctor 7, City of Kyiv, HIV services, city level].

Several doctors pointed to constant raising awareness of prevention and early detection and therapy: "Those medical services that were provided, they were high quality. But concerning raising knowledge about HIV, more could be done." [Doctor 5, Odesa region, PHCC, city level]; "Wider prevention [efforts] must be continued. We need to involve not only the risk groups, but also those patients who don't even suspect that they might have HIV and belong to a risk group, because they do not know what the risk is." [Doctor 11, Lviv region, HIV services, district level].

Some doctors pointed to the great importance of constant training: "We can thank for this [training] to our regional center. They manage all of that and get us together. I keep all the folders from all the trainings, starting from rapid tests. My nurse has also received training. Trainings were conducted regionally in Zaporizhzhia or Kyiv. We started with rapid tests, then moved on to the latest updates on ART, HIV infection and the central nervous system, psychiatry, opportunistic infections including TB and their treatment." [Doctor 2, Dnipropetrovsk region, PHCC, district level]. "We don't have a permanent team. Some people leave, and new doctors need training. [...]." [Doctor 8, City of Kyiv, PHCC, city level].

Most of the interviewed doctors underlined the importance of personal initiative for the availability, coverage and quality of HIV services. They often give their personal phone number to their patients, and this practice seems to have continued after the outbreak of the COVID-19 pandemic: "Yes, my phone number is known. If the patient calls, I will always set up a visit." [Doctor 11, Lviv region, HIV services, district level]. Doctors could also arrange additional examinations or be flexible about certain procedures, if they believed this was in patient's interest: Some experts also remembered how they showed initiative and perseverance in convincing patients to start treatment: "Before, we went to houses, sometimes five or six times, or once every six months, until we convinced [the patient] that [s/he] needed to come." [Doctor 13, Volyn region, HIV services, district level].

With the onset of the COVID-19 pandemic, the factors listed above gained additional weight. According to doctors, efficient organization helped to coordinate patients even in the new quarantine conditions: "Patient's records were kept in better order, and patients observed distancing and personal protection recommendations." [Doctor 15, Volyn region, ANC clinic, regional level].

One aspect that gained momentum were consultations via e-mail, phone and social applications: "Their number [of distant consultations] increased many times over. Now people, especially HIV-positive, do not want to wait in the clinic, but they call ahead to see if there is waiting list." [Doctor 5, Odesa region, PHCC, city level]. "In the first months, the number of visits was much lower. We switched to counseling over the phone." [Doctor 15, Volyn region, ANC clinic, regional level]. "We solved many issues over the phone. If we could not resolve them, and I was to examine the patient, we tried to arrange the visit at the end of my working hours, when all patients are gone." [Doctor 11, Lviv region, HIV services, district level]. Now we have the HelpNow HUB 24 program, created specifically for vulnerable groups of patients with hepatitis and HIV... We also keep electronic records." [Doctor 1, Dnipropetrovsk region, HIV services, regional level].

And the delivery of ARV drugs through networks of patients and courier services became more used: "We did not require from a patient who felt well and was examined to visit during this period. He was receiving drugs through the courier services to avoid unnecessary physical contact." [Doctor 11, Lviv region, HIV services, district level]. "One positive thing is that social services started to distribute ARV drugs and cover delivery expenses by 'Nova Poshta'" [Doctor 7, City of Kyiv, HIV services, city level]. One doctor speaks about the quantity to cover six months of treatment for some patients: "Most of patients get ARV drugs for a three months period. We have a certain number of patients who often go to work to Poland. Even before the visa-free regime, the patient would send a written request, and we'd give them [drugs] for six months." [Doctor 11, Lviv region, HIV services, district level].

Personal contacts with patients were done based on a need in these new circumstances, especially counseling out of working hours: "Officially, there is no consultation out of hours. But if the patient called me on my day off, with the high temperature, I would certainly counsel him and coordinate what to do and whether he needs to see me. And if he is a working patient who needs sick leave, and it is, say, Saturday, eight o'clock in the evening, I will refer him to a hospital reception to get registered. This would allow him to open sick leave with the family doctor on Monday." [Doctor 2, Dnipropetrovsk region, PHCC, district level].

In general, most experts agree that all of the above positive factors, good organization and counseling via phone and internet, continued or even improved during the pandemic and helped their healthcare facilities to provide HIV services to all patients without hindrance.

Recommendations of health care professionals regarding improvement of the availability of HIV services

One of the suggestions is to ensure availability of rapid tests to enable early HIV diagnosis: "I need more tests so that I can offer them to more people." [Doctor 10, Lviv region, PHCC, district level]. "But I would like to be able to do rapid testing in the morning and afternoon shifts, if the Ministry of Health should allow us." [Doctor 9, City of Kyiv, ANC clinic, city level].

Several AIDS center doctors believe that additional equipment and tests for concomitant diseases would significantly improve the quality of healthcare services: "The worst that happened was that there was no immediately available magnetic resonance imaging, and the patient was either to travel far or sign up to the waiting list. I think it's like that in many institutions." [Doctor 7, City of Kyiv, HIV services, city level]. "There are private laboratories that can test for toxoplasmosis or cytomegalovirus, but some patients can't afford it." [Doctor 11, Lviv region, HIV services, district level]. Another expert believes that PLHIV should be provided additional medicines: "Perhaps to add some free services or drugs for people who can't afford them, that would be used to treat HIV complications or concomitant pathologies." [Doctor 5, Odesa region, PHCC, city level].

Some experts from regional healthcare facilities believe that it would be more convenient for their patients to receive ART directly from them, instead of having to go to another city: "Decentralization may really help, so that we could provide such services... It would be better for the patients. It would be an additional burden for us, but we are now speaking about patients' interests." [Doctor 10, Lviv region, PHCC, district level]. "To provide such services ourselves, so that people do not have to go to Lviv." [Doctor 12, Lviv region, ANC clinic, district level].

A doctor from the Kyiv AIDS center believes that increasing the volume of ARV drugs to be dispensed at once to the period of up to 1 year (instead of three months) would streamline HIV services in healthcare facilities: "We could easily cover everyone with a one-year supply of drugs and could keep an electronic record." [Doctor 7, City of Kyiv, HIV services, city level].

Another proposal concerned free sale of HIV tests in pharmacies: "Selling these tests in pharmacies would also be good. For people to know their health status it is not necessary to record it. Maybe they will seek further clinical assessment if [they knew] the tests were positive." [Doctor 9, City of Kyiv, ANC clinic, city level].

There is also room for organizational improvements. A doctor from Odesa believes that there are too few specialists in infectious diseases at all levels: "[...] increase the number of infectious disease specialists in the towns, in primary and secondary care, to work directly with such patients. Because now we only have them in the regional facilities, large cities, districts, and the like, but villages and small towns – there are usually too few of the infectious disease doctors." [Doctor 5, Odesa region, PHCC, city level].

Other doctors pointed out that longer work hours, including weekends, would improve the availability of HIV services: "Saturdays and Sundays are good for patients to come. As a rule, people work Mondays to Fridays, and outpatient clinics have the same work hours, so patients cannot [find time to] visit a doctor." [Doctor 7, City of Kyiv, HIV services, city level]. "But I would like to be able to do rapid testing in the morning and afternoon shifts, if the Ministry of Health should allow them." [Doctor 9, City of Kyiv, ANC clinic, city level].

Some experts believe that additional opportunities for training and professional development can improve the quality of services: "Now a new protocol on ART has been released, there is so much new information, and you need time to study it. And now the trainings are held online. Online training will never replace the offline training. It should be done on days off." [Doctor 1, Dnipropetrovsk region, HIV services, regional level]

Some proposals concern the involvement of social services. The doctors emphasize the importance of raising awareness among the general population: "[we need] more awareness raising about HIV testing for those who would like to know their status." [Doctor 8, City of Kyiv, PHCC, city level]. Some also suggest raising awareness among healthcare workers: "It is necessary to keep abreast with the ongoing HIV information campaigns in the country. Many patients are still talking about the stigma, discrimination. I'm sorry [to hear] that there are still doctors who are afraid that they might somehow get infected from the patient." [Doctor 11, Lviv region, HIV services, district level].

Results of analysis of qualitative data obtained from in-depth interviews with PLHIV

Barriers to HIV services arising from the COVID-19 pandemic

Some patients complained about the quality of medical services: "We have an infectious disease specialist. She is very... just like a doctor, she will not tell, will not explain what to do..." [Patient 15, Volyn region, AIDS center, district level]. The same patients, however, speak very positively about the doctors at AIDS centers where they are currently registered, even though it is further away from their place of residence: "My permanent record is now there, everything is there. Never [more] here, [which is in the middle of] nowhere. Everything is there." [Patient 5, Dnipropetrovsk region, PHCC, city level].

Some patients suggest that it is easier to communicate with their more distant AIDS center than the local facility: "Until 2020, they [local facility] didn't have a phone at the registry office. I couldn't find another number, so I went there and asked for the phone number of a doctor or a nurse, not personal one, but the one at work. They would not give it. "No, just call us or come', they said." [Patient 5, Dnipropetrovsk region, PHCC, city level].

One patient complained that the range of services had shrunk at one AIDS center. Earlier, he could get dental services: "For example, there was a dentist at the hospital [AIDS center] where I was treated. Now some services are no longer available." [Patient 11, City of Kyiv, HIV services, city level].

Several patients at AIDS centers complained of temporary shortages of ARVs: "There was one time the drugs were in short supply. They would usually stock up for 2 months in advance, but there was a shortage for a while. Still, they somehow managed to give me enough." [Patient 4, Dnipropetrovsk region, PHCC, district level].

Some informants complained about cases of discrimination and prejudice by doctors outside the AIDS center: "I had to have a pancreas and gall bladder operation when my child was 6 months old, and I was short of three thousand [hryvnia] and the doctor told me: 'I will not operate you. I will not take the risk. I need special equipment for operation [...] you are dysfunctional [...] collect all the money [...] we are not going to take the risk because of you.'" [Patient 9, Odesa region, PHCC, district level]. "If they find out about your status in a regular

clinic, to put it mildly, they'll be the first to bully you. They may even refuse to provide some services." [Patient 10, City of Kyiv, HIV services, city level, HIV status for 14 years].

Patients also reported breaches of confidentiality by district and city healthcare workers: "At the very beginning, when we got sick and lived in the village of Troitske, one doctor stopped me in the street in the center of the village and said loudly so that everyone can hear: 'There was a call from the district hospital, they told you to come to the office of infectious diseases.' We came to the local hospital and told this whole story to the head, and said: 'If this continues like this, we will go to Dnipropetrovsk and we solve all our issues there.'" [Patient 2, Dnipropetrovsk region, HIV services, district level]. "Before the COVID-19 broke out, I went to the regional AIDS center in Lutsk to take all the regular tests. You are asked to write your last name on the test tube, and then they call you out by your last name four times. In Kyiv, things are much easier, because the name is coded, you put the number, your first name and the number, so that nobody in the waiting hall can hear my last name." [Patient 20, Volyn region, PHCC, city level].

Some patients also admitted to cases when their behavior was a barrier to HIV services. Cases in which they did not acknowledge their HIV-positive status and were not taking ART regularly: "At first, I didn't take the disease very seriously. I probably pretended that I was healthy, I didn't want to go to all these doctors, it was just killing me." [Patient 8, Odesa region, HIV services, city level]. "I took [ART] for a week, then thought: why do I need it, there are side effects for the liver; it harms the liver. It already feel sick." [Patient 17, Volyn region, PHCC, regional level]. One of the reasons for such behavior can be misunderstanding of the importance of ART: "After that, they called me to come for something, and I didn't go. I did not understand what they needed me for." [Patient 18, Volyn region, PHCC, regional level]. Some patients mention severe adverse reactions to ARV drugs as a reason to stop taking them: "I had difficulty swallowing the pills. It took me six months to get used to it. And for six months I had very strong bowel problems. It took me a lot of effort to get used to the pills. I wanted to quit..." [Patient 7, Odesa region, HIV services, regional level].

With the beginning of the pandemic, the procedure became a little more complicated. Patients noticed that doctors were much busier: "There was only an infectious disease specialist. I remember a gynecologist for whom I had to wait long, because all staff were involved with COVID-19 patients." [Patient 11, City of Kyiv, HIV services, city level, HIV status for 16

years]. Waiting lists for HIV services got longer: "Of course there were waiting lists. Many were not allowed to come in. But this is probably good not to crowd up the place." [Patient 12, Lviv region, HIV services, regional level, HIV status for 7 years].

Many patients experienced or heard other patients mentioning restrictions in dispensing ARV drugs: "I did not receive the same amount of drugs when there were COVID-19 restrictions." [Informant 12, Lviv region, HIV services, regional level, HIV status for 7 years].

Some patients said that CD4 testing and examinations became less regular with the COVID-19 pandemic: "Earlier they were more frequent. In 2020 and 2021 they became less frequent. One patient complained that the list of free tests for regular check-up got shorter: "All these [tests] were free initially, before COVID-19. Now only CD4 and blood test are free. The others, you have to pay for. I refused to do it." [Patient 11, City of Kyiv, HIV services, city level].

Another problem was getting to the hospital with all the pandemic restrictions: "There were problems with transport and waiting lists for medical check-ups." [Patient 4, Dnipropetrovsk region, PHCC, district level].

One patient complained that the hotline for PLHIV was always busy during the COVID-19 pandemic: "Sometimes you couldn't get through. The hotline for HIV patients was there, there were psychologists, but sometimes only one person was sitting there, the line was busy, and you needed urgent help." [Patient 10, City of Kyiv, HIV services, city level, HIV status for 14 years].

Some patients found the pandemic particularly worrying. They were afraid of getting infected in the hospital or on the way to the hospital: "I don't mind riding a public transport, in general, but in this situation, I had no desire to be in one, to be honest." [Patient 5, Dnipropetrovsk region, PHCC, city level]; "I was afraid of contracting COVID-19 as I was aware that my immunity was weak." [Patient 7, Odesa region, HIV services, regional level]. "We agreed that we wouldn't use the public transport at the peak of COVID-19. When the situation got better, we took the bus rides." [Patient 19, Volyn region, PHCC, regional level].

One patient recalls panic being spread across the media: "The first thing I remember news after news is that vaccine would not be available, being in short supply." [Patient 10, City of Kyiv, HIV services, city level, HIV status for 14 years].

Some patients complained about the masks: "Everything had restrictions. It was a mask regime. They annoyed me, those masks, as I could not breathe. So I avoided such places as much as I could." [Patient 17, Volyn region, PHCC, regional level].

Factors improving the availability, coverage and quality of HIV services after the onset of the COVID-19 pandemic

Patients often praised the clarity of instructions and adjustments to the new circumstances at the healthcare facilities that provided treatment: "I am glad that I am still alive, very glad. It's good that I came here, did the tests. They diagnosed me, I was under a little stress, but then after the hepatitis was cured, I was comfortable, received the medicine, and everything went fine." [Patient 13, Lviv region, HIV services, district level]. "If I had questions – they were answered, if I needed a check-up or a consultation, or tests, everything worked out fine. Before the pandemic there were more medicines available." [Patient 19, Volyn region, PHCC, regional level].

Another improvement was the flexibility in ART delivery: "I did not have the need to take the supply of drugs for six months. It was possible, but three months was enough, so that I could come back and talk to the doctor. But if I had wanted to go abroad, I could just write a request and get a six-month supply." [Patient 7, Odesa region, HIV services, regional level].

Patients highly appreciated distant consultations: "I could write and communicate with the doctor via Viber. When I call, the doctor always picks up the phone." [Patient 16, Volyn region, HIV services, city level].

Many patients say that services improved when they changed the healthcare facility: "I used to go to the regional [facility] every six months and wait in queues. Sometimes they didn't give me anything and the next day I had to wait in a queue again. Then I moved to the district [facility] and now I'm satisfied." [Patient 4, Dnipropetrovsk region, PHCC, district level].

Many also appreciate receiving all or most HIV services in one place: "Clinical management, ART, you get there all. And everything is close at hand." [Patient 1, Dnipropetrovsk region, HIV services, regional level].

Social services sometimes help with support: "Every person was assigned a social worker. Mine called and talked to me very often from the beginning." [Patient 6, Dnipropetrovsk region, PHCC, city level), delivery of ARV drugs "Social workers would call me that my pills have arrived and where and when to pick them." [Patient 5, Dnipropetrovsk region, PHCC, city level]), and psychological support [Patient 6, Dnipropetrovsk Region, PHCC, city level]).

Furthermore, some patients reported that their doctor was always available on the phone, even out of hours: "Even when they are on vacation, they pick up the phone." [Patient 15, Volyn region, AIDS center, district level]. "I got the helpline number and the private phone number of the doctor to call out of hours, and the doctor answered." [Patient 16, Volyn region, HIV services, city level].

Like doctors, many patients refer to extended supply of ARV drugs when the COVID-19 pandemic started: "During COVID-19, we were given more pills to cover a longer period, so that we could visit the clinic less often." [Patient 3, Dnipropetrovsk region, PHCC, district level]; "It's just that when COVID-19 started, we started receiving [drugs] differently. Before, you would pick them up every month and then every 2–3 months, to have fewer contacts." [Patient 4, Dnipropetrovsk region, PHCC, district level].

Some patients confirmed that ARV drugs were delivered by courier service: "You could get drugs by mail. The mailman would leave them at the door, step away 5 meters and call to say that he brought the drugs." [Patient 10, City of Kyiv, HIV services, city level]. This became especially convenient when public transport did not work: "When minibuses didn't run they would send us the ARV medicines. I would call to say that I couldn't come to pick them up, and they asked me to write the delivery address." [Patient 8, Odesa region, HIV services, city level]. Social services also gave a hand in ARV drug delivery during the pandemic: "A social worker would give me a call and arrange delivery to my house. I signed the receipt" [Patient 5, Dnipropetrovsk region, PHCC, city level].

To minimize social contact and the risk of infection in the waiting rooms during the COVID-19 pandemic, healthcare workers often scheduled appointments: "...a nurse called and told me to come tomorrow or the day after tomorrow, when there were fewer people." [Patient 15, Volyn region, HIV services, district level]. This was also true for COVID-19 testing: "We were received on separate hours than the rest, so that you don't come and wait in a queue. They

tested for COVID-19 with a rapid test." [Patient 10, City of Kyiv, HIV services, city level, HIV diagnosed for 14 years].

Consultations using phone and internet became increasingly used: "They would answer the phone fully understanding that I have children in the kindergarten and school and that it was easier for me that way. They took as much time as I needed to answer my questions." [Patient 15, Volyn region, HIV services, district level]. Some questions concerned COVID-19 and the doctor's attitude to vaccination: "I asked the doctor if I should get vaccinated. The doctor said that I should get a vaccine because my immune system needs such protection. I did it." [Patient 1, Dnipropetrovsk region, HIV services, regional level]. "I asked about vaccination. She said: 'You can be vaccinated.'" [Patient 6, Dnipropetrovsk region, PHCC, city level].

Recommendations of PLHIV regarding improvement in HIV services

Regarding the improvements of HIV services, the following suggestions were made by the interviewed patients. Some pointed to the need to better protect confidentiality at healthcare facilities ("I didn't tell [family doctor about my HIV status], but noticed that he had known for a long time. And I noticed that people at the reception also knew." [Patient 6, Dnipropetrovsk region, PHCC, city level]). Some suggested wider coverage with anonymous HIV testing ("It should be offered anonymously, maybe for free. I once saw people who organized 'days' in shopping centers. "When there were AIDS days there, they ran anonymous testing for free." [Patient 1, Dnipropetrovsk region, HIV services, regional level]).

Other patients suggest simplifying the procedure and bringing all necessary HIV services closer to home ("This is not very convenient. We receive therapy in this office. To take CD4 or viral load tests, we have to go the regional level. "[Patient 4, Dnipropetrovsk region, PHCC, district level]) or allowing family doctors to dispense ART ("ART should be received from infectious disease specialists, from social services, or family doctors." [Patient 12, Lviv region, HIV services, regional level] or even dispensing ARV drugs at the nearest pharmacy ("I would like that. I've heard that it was possible to get drugs in a pharmacy by prescription." [Patient 10, City of Kyiv, HIV services, city level]). Some patients also suggest simplifying treatment in the future ("Many people say, why don't we get ARVs via injection. I'd rather get the injection once every six months and not worry about taking pills every day. "[Patient 7, Odesa region, HIV services, regional level]).

Several patients suggest that, besides the ARV drugs, other concomitant drugs and vitamins should be free of charge: "Now I have to buy vitamins myself, they are not cheap, and even the drugs that we receive for the liver, Heptral, seems to be very expensive. When I went to Kyiv for replacement therapy, I received intravenous injections and all these other drugs for a month. Drugs are getting more expensive, and my pension is low." [Patient 16, Volyn region, HIV services, city level].

Another patient suggests that blood tests should be free for PLHIV: "Many people who are HIV-infected do not have a job." [Patient 11, City of Kyiv, HIV services, city level].

The most common suggestion is to raise greater awareness about prevention of HIV transmission among the general population: "Drug dispensaries and healthcare centers should work more on awareness and knowledge raising." [Patient 17, Volyn region, PHCC, regional level]. "There should be more talk about HIV on television, in schools, in hospitals. It seems to me that everything is moving forward in terms of medicine, but as far as HIV is concerned, everything has somehow stalled. I haven't found any information on the Internet, as if they've forgotten about us." [Patient 8, Odesa region, HIV services, city level]. According to one patient, a better informed public would be less prone to prejudice and discrimination of PLHIV ("I don't feel discriminated because I hide my status. If I reveal it, I would be discriminated, I'm sure." [Patient 20, Volyn region, PHCC, city level]).

One patient believes that HIV/AIDS awareness should also be improved among medical workers: "...I've always told people who work in healthcare facilities that they should at least understand what HIV infection is and that when you take ARVs, the risk of infection is virtually zero, so that we do not have to be discriminated, that's all." [Patient 11, City of Kyiv, HIV services, city level].

In summary, PLHIV's proposals to improve HIV services are as follows:

- better protection of patient confidentiality in healthcare facilities
- simplified procedure to obtain services (preferably the full coverage) closer to home and perhaps involve the family doctor or the nearest pharmacy to dispense medicines
- simplified treatment
- free provision of vitamins and other necessary medicines, besides ARV drugs
- better dissemination of information about HIV among the general public and raising awareness among medical professionals

Summary

Barriers to HIV services arising from the COVID-19 pandemic

During qualitative interviews, medical doctors who were interviewed indicated that during the COVID-19 epidemic there was a high workload related to testing and treatment of COVID-19 patients, which created some barriers in accessing HIV care for HIV patients. Patients' statements confirmed this as they mentioned long waiting times in order to receive HIV services and less regular CD4 and viral load testing compared to the time before the pandemic. An additional barrier related to treatment of HIV patients who do not live in regional centers or large cities was logistical difficulty in obtaining ARV drugs. Doctors noticed patients' fears of being infected with COVID-19 in hospitals and patients' requests to postpone clinical appointments. HIV patients indicated lower availability and quality of services at the local level, the reduction of the list of services at AIDS Centers, and cases of confidentiality violations by healthcare workers at district and city healthcare facilities.

Certain problems that affect HIV services had existed before the pandemic, such as, by doctors' account, the lack of healthcare personnel, lack of rapid tests in some primary health care centers and shortages of ARV drugs in the AIDS centers.

PLHIV, in turn, point to lower availability and quality of services at the local level such as local healthcare centers being less organized or less professional in communication compared to AIDS centers. Some patients complained about reduced services and occasional difficulties with ARV drug supplies at AIDS centers.

PLHIV seem to agree with doctors about patients' behavior being an issue and give accounts of situations in which they were in denial of their HIV-positive status or avoided treatment. They attribute this to poor understanding of the importance of taking ART as well as inadequate individual tolerance of ARV drugs. Another issue that had existed before the pandemic is occasional discrimination of HIV positive patients by doctors outside the AIDS centers, breaches of confidentiality by district and city local healthcare staff.

Another barrier to HIV services arising from the pandemic by doctors' account was a decline in HIV testing. Reasons are several and include the lack of rapid tests in primary care, fewer patients in hospitals, and greatly limited availability of testing in public places due to the lockdown. Quantitative data confirm this.

There were also organizational difficulties. The pandemic put great strain on patient reception and adaptation to epidemiological restrictions, which resulted in waiting lists and delays in health care provision. Public transport was less available, causing additional complications to PLHIV who needed to visit their healthcare center. This, in turn, brought increased load on phone hotlines for PLHIV.

Most doctors noticed that their patients chose to postpone visits whenever they could to avoid getting COVID-19. This fear was confirmed in patient statements, who were also exposed to alarming information about COVID-19 in the media. Some patients, on the other hand, complained about the inconvenience of certain epidemiological measures.

Impact of the COVID-19 pandemic on the volume and types of HIV services

Our quantitative data analysis show that the average ART coverage of diagnosed PLHIV in 2020–2021 was around 85%, ranging from the lowest (62%) in the Lviv region to the highest (96%) in Dnipropetrovsk region. Regional healthcare facilities had consistently lower ART coverage in 2019–2021 than the district-level ones and city facilities included in this study. Of particular importance to our study is the fact that in 2020 ART coverage in regional and district healthcare centers dropped as the COVID-19 pandemic was gaining momentum. In contrast, city healthcare facilities managed to improve this indicator in 2020 and maintain it in 2021.

The 95% target for PLHIV who received ART and had undetectable VL (<1,000 copies/mL) was maintained only by the healthcare centers of the Kyiv and Volyn region in 2020 and 2021. In that respect the most successful were district healthcare facilities, which maintained it at 96% in 2020 and 2021. More PLHIV were identified at early stages of HIV infection. In 2021 more than a half (56%) of all patients registered at AIDS centers across the country were diagnosed in the stages 1 and 2 of HIV infection. In line with these data are our findings that early initiation of ART increased to 53% in 2020 and continued to increase to 64% in 2021. This trend was comparable across the regions, except for Lviv, where this rate dropped from 30% to 10% in 2020 to partly recover in 2021. The increase was consistent across regional and city-level AIDS centers, but slightly dropped at district healthcare facilities.

Overall, the total number of people tested for HIV substantially decreased from 2019 to 2021, except in the Odesa region. The most pronounced declines in HIV testing were in the Dnipropetrovsk and Lviv regions. An increasing proportion of newly diagnosed HIV patients were screened for HIV using rapid tests (8% in 2019) to (41% in 2021). This increase in the use of rapid tests coincides with increased involvement of non-governmental organisations (NGOs) in testing for HIV and referring PLHIV to healthcare facilities.

Analysis of PMTCT data revealed that there was a considerable percentage of pregnant women were diagnosed after the first trimester of pregnancy. In 2019 and 2020, 40% and 52%

of pregnant women, respectively, were diagnosed with HIV late, that is after the 12th week of pregnancy. In 2021, this was the case with 27% of HIV positive pregnant women.

Early start of ART among pregnant patients registered at AIDS centers improved since 2019 (when it was nil) to 7.7% and 5.6% in 2020 and 2021, respectively. At ANC centers this increase was steady and more prominent: from 13% in 2019 to 33% in 2020 and 40% in 2021.

Another indicator of quality of HIV care is timely assessment of viral load in pregnant women before giving birth as that determines the mode of delivery and lowers the risk of transmission of HIV to neonates. In our sample, a minority of women (10% in 2020 and 5% in 2021) were not tested for viral load in the 34-36 weeks of pregnancy. HIV viral load data show encouraging findings - the percentage of pregnant women with viral load less than 1000 copies/ ml increased from 2019 to 2021 and reached the level of 95% in 2021.

Key factors influencing the availability, coverage and quality of HIV services

In-depth interviews with doctors and patients singled out good organization and clear coordination at their health care facilities as the most important factor.

Doctors believe that offer of comprehensive HIV services in one place is a key factor that enabled a continuity of a range of services. Antenatal and primary care doctors highly appreciate being able to refer their HIV patients to AIDS centers, where they can receive necessary consultations and support. Furthermore, some services, such as consultations were available remotely.

Some of these factors played an even more important role with the onset of the COVID-19 pandemic. Patients refer to receiving larger ARV drug supplies to cover longer treatment periods, intensified help of social workers, door-to-door delivery of drugs through courier services, well organized scheduling of appointments to minimize the risk of infection with COVID-19 at healthcare facilities, and remote consultations whose scope included information about COVID-19 and psychological support.

Recommendations to improve HIV services

By medical doctors

- Greater availability of rapid HIV tests in the primary and antenatal health care services
- Enlarge the scope of testing and treatment for comorbidities
- Make ARV drugs available at district primary and antenatal health care centers, and increase the volume of dispensed drugs to cover longer treatment periods
- Make rapid tests (HIV self-tests) available at pharmacies for free
- Increase the number of specialists in infectious disease
- Improve training opportunities and forums to share experience

By HIV patients

- Better protection of patient confidentiality in healthcare facilities
- Simplified procedure to services (preferably the full coverage) closer to home and involvement of the family doctor or the nearest pharmacy in drug dispensing
- Simplified treatment
- Free provision of vitamins and other necessary medicines, besides ARV drugs

Both doctors and patients call for intensified HIV awareness raising campaigns and interventions to reduce stigma and discrimination towards PLHIV, both in the general public and among healthcare workers.