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# Screening for sexually and blood-borne infections in Ukrainian war refugees in Slovakia

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# Abstract

**Background:** Sexually transmitted and blood-borne infections (STBBIs) remain a major public health challenge in Europe, with migrant populations facing increased vulnerability due to disrupted healthcare access, social instability, and barriers to early diagnosis. Following the large-scale displacement of Ukrainian war refugees after 2022, targeted surveillance strategies are needed to ensure timely detection and linkage to care.

**Methods:** A cross-sectional observational study implementing active case finding for HIV, syphilis, hepatitis B (HBV), and hepatitis C (HCV) was conducted between September and December 2023 among adult Ukrainian war refugees residing in the Bratislava region, Slovakia. Screening was performed using rapid diagnostic tests in a general practitioner's office and an outpatient gynecology clinic. Testing was voluntary, conducted by trained healthcare personnel, and supported by a psychologist and mediator to facilitate communication, follow-up, and linkage to specialist care. All reactive results were confirmed by standard laboratory diagnostics.

**Results:** Of 776 individuals approached, 505 (65.1%) consented to testing; 77.4% were women, and the largest age group was 40–49 years. Overall reactivity rates were 1.8% for HCV, 1.0% for HBV, 0.8% for syphilis, and 0.6% for HIV. HIV reactivity among men reached 1.8%. All reactive rapid test results were laboratory-confirmed, and all affected individuals were successfully referred for specialist care and treatment planning.

**Conclusions:** This pilot project demonstrated the feasibility and acceptability of active STBBIs screening integrated into routine outpatient care for Ukrainian war refugees. The observed reactivity rates, particularly for viral hepatitis, reflect the epidemiological situation in Ukraine and highlight the risk of underdiagnosis in displaced populations. Systematic, targeted screening strategies that address linguistic, cultural, and organizational barriers and ensure timely linkage to care are essential to improve migrant health outcomes and to reduce the risk of infectious disease transmission in host countries.


### Teaser Key Message

Pilot screening for HIV, syphilis, HBV, and HCV among Ukrainian war refugees in Slovakia showed reactivity rates of 0.6–1.8%, with 100% linkage to confirmatory diagnostics and care. This demonstrates feasibility of integrated rapid testing in routine outpatient settings.

### Key Messages

Epidemiological Burden: Reactivity rates—HCV 1.8% (9/505), HBV 1.0% (5/505), syphilis 0.8% (4/505), HIV 0.6% overall (1.8% in males)—mirror Ukraine's high endemicity, underscoring underdiagnosis risks in displaced populations post-2022 invasion.

Screening Feasibility: Cross-sectional study using high-sensitivity (>99%) rapid tests in GP and gynecology clinics achieved 65.1% uptake (505/776 approached). Psychologist and mediator support ensured voluntary consent and 100% referral to lab confirmation and treatment.

Public Health Impact: Culturally adapted, integrated screening overcomes linguistic/cultural barriers, enhances migrant health outcomes, and curbs transmission risks in host countries like Slovakia. Scalable for EU/EEA routine surveillance.

# INTRODUCTION

Sexually transmitted and blood-borne infections (STBBIs) constitute a major global public health challenge, affecting more than 1 million people worldwide every day. A substantial proportion of STBBIs are asymptomatic, which complicates timely diagnosis and effective control [25]. Among these infections, syphilis, HIV, and viral hepatitis B and C continue to cause considerable morbidity and mortality globally. Syphilis poses a significant burden, including adverse pregnancy outcomes [23]. HIV has affected tens of millions of people globally since the beginning of the global surveillance, with millions currently living with the infection [24]. Chronic hepatitis B and C infections also remain highly prevalent worldwide and are responsible for a considerable number of deaths each year, primarily due to liver-related complications [22, 23].

In the European region, STBBIs continue to represent a substantial public health burden. Syphilis and HIV infections remain widely reported across European countries, with a notable proportion of HIV diagnoses occurring among migrant populations [9]. Advanced HIV stage at diagnosis remains a concern, indicating gaps in early testing and access to care[8]. Viral hepatitis B and C also remain prevalent in Europe, with both acute and chronic infections reported annually, including cases in Slovakia [7].

Vulnerability to sexually transmitted infections (STIs) is influenced by several factors, including migration. Migrant populations may experience higher vulnerability due to increased mobility, socioeconomic disadvantage, legal and administrative barriers, and limited access to preventive and healthcare services, underscoring the need for targeted public health interventions [21].

Following the Russian military aggression against Ukraine in 2022, large-scale population displacement across Europe created additional challenges for the prevention and control of STIs. Slovakia became one of the host countries for a considerable number of temporarily displaced Ukrainian refugees. Disrupted healthcare systems, increased social vulnerability, and barriers to timely diagnosis and treatment may affect STI transmission dynamics among displaced populations [12, 19].

The aim of this study was to develop and implement a targeted strategy to enhance surveillance of selected sexually transmitted and blood-borne infections (STBBIs) among Ukrainian war refugees in the Bratislava region of Slovakia. In addition, the study sought to demonstrate the practical feasibility of the proposed approach and to evaluate the outcomes of its pilot implementation.

# METHODS

Active case finding of selected sexually and blood-borne infections in war refugees from Ukraine was conducted between September 2023 and December 2023 in a healthcare facility providing healthcare to adults of this community. Screening of HIV, syphilis, hepatitis B and C was done in general practitioner's office for adults and in the outpatient gynecology office (Fig. 1).

Visitors to the facility were informed about the possibility of testing through posters and information materials placed at the reception. The possibility of testing was also communicated by healthcare staff directly to patients in both offices. Testing was performed by trained healthcare personnel - a physician and/or a nurse. Each patient was fully informed about the testing procedure, its objectives, and personal data protection. Testing was voluntary and preceded by the signing of informed consent.

In each participant, several drops of capillary blood from finger was drawn and rapid lateral flow immunochromatographic assay tests for the qualitative detection of antibodies to syphilis, HIV, and HCV, as well as for hepatitis B surface antigen (HBsAg) were performed.

The used rapid tests have the following sensitivity levels:

- for VHB > 99.9% (95% CI: 97.7% – 100%),
- for VHC > 99.9% (95% CI: 98.2% – 100%),
- for HIV > 99.9% (95% CI: 97% – 100%),
- for syphilis 95.9% (95% CI: 92.3% – 98.1%).

The specificity levels were as follows:

- for VHB > 99.7% (95% CI: 98.5% – 100%),
- for HCV > 99.7% (95% CI: 98.4% – 100%),
- for HIV > 99.8% (95% CI: 98.6% – 100%),
- for syphilis 99.3% (95% CI: 97.9% – 99.9%).

With negative test result, the participant was informed about possible risks and forms of prevention against STBBIs. In the event of a reactive result, continuous follow-up of tested individuals by specialists was ensured. In the case of a reactive syphilis result, the patient was referred for confirmatory testing at a dermatovenerology clinic. In the case of a reactive rapid test for HIV, HBV, or HCV, the patient was referred to an infectious diseases' clinic (Fig. 1). During outpatient visits, a Slovak-Ukrainian speaking psychologist was available throughout the day to provide psychological support. A mediator was also present. Their role, in addition to ensuring continuous follow-up of reactively tested patients by specialists, included scheduling appointments, communicating examination dates, and, in case of expressed interest, accompanying individuals to specialized clinics, as well as interpreting instructions for health procedures.

# Study Characteristics

This was a cross-sectional observational study that implemented screening of selected sexually and blood-borne infections (HIV, syphilis, hepatitis B and C) in Ukrainian citizens residing temporarily in the Bratislava region, after they fled their home country due to the war conflict starting February 24th, 2022.

## Study Population

Individuals included in the study who meet all of the following inclusion criteria:

- Arrival in the territory of the Slovak Republic from Ukraine as a result of the armed conflict after 24th February 2022.
- Residence in the Bratislava region.
- Signing of informed consent to participate in the study and to the provision of necessary personal data such as age, sex, epidemiological and travel history.
- Minimum age of 18 years.

Subjects were excluded from the study if they met at least one of the following exclusion criteria:

- Arrival in the territory of the Slovak Republic from Ukraine before 24 February 2022.
- Residence outside the area designated for recruitment within the project locality (Bratislava region).
- Refusal to provide informed consent to participate in the study.
- Age less than 18 years.

The study was approved by the ethics committee of the Faculty of Medicine, Comenius University and University Hospital in Bratislava, approval number 98/2022 and conducted according to the protocol registered at ClinicalTrials.gov under the number NCT07236268.

# RESULTS

During 17 calendar weeks, 776 individuals were approached in the selected healthcare facility, of whom 505 (65%) individuals were tested. Of the total number of the tested individuals, 305 were tested in the general practitioner’s office and 200 in the gynecology office. Among the tested, 391 (77.4%) were women and 114 (22.6%) were men. The highest proportion of tested individuals (38%) was in the 40–49 years age group (Chart 1).

In the general practitioner’s office, 522 individuals were approached. Testing was implemented in more than 58% (305 individuals). Of those tested, 103 were men and 202 were women (Chart 2). Fifteen reactive rapid test results were recorded. Two reactive results for HIV infection were detected (a man aged 47 and a woman aged 46), two reactive results for syphilis (a woman aged 41 and a woman aged

46), and eleven reactive results for HBV (men aged 35, 36, 50, and women aged 71, 73, 49, 55, 60, and 63).

In the gynecology office, 254 individuals were approached for testing, and the test was performed in more than 78% (200 respondents). Of those tested, 189 were women and 11 were men. Six reactive rapid test results were recorded. Specifically, one reactive HIV result was detected in a man aged 40, two reactive results for syphilis in women aged 45 and 58, two reactive results for HBV in women aged 35 and 40, and one reactive result for HCV in a woman aged 40.

In total, 776 individuals were approached in both the gynecology clinic and the general practitioner's office. Testing was performed in 65% (505 individuals), and a total of 21 reactive rapid test results were recorded. The highest reactivity rate was observed for VHC, reaching 1.8% (9 reactive results). Five reactive results were recorded for VHB, corresponding to a 1% reactivity rate. Additionally, 4 reactive results were noted for syphilis (0.8% reactivity rate). The lowest reactivity rate, 0.6% was observed for HIV infection; however, the specific reactivity rate for HIV among men approached nearly 2% (Table 1).

Table 1
*Reactivity rates of rapid tests for selected STBBIs by gender*

| | **People in healthcare facility** | **Tested** | | **Reactive tests for HIV** | | **Reactive tests for syphilis** | | **Reactive tests for VHB** | | **Reactive tests for VHC** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **n** | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** | **n** | **%** |
| **Males** | 190 | 114 | 60.0% | 2 | 1.8% | 0 | 0.0% | 1 | 0.9% | 3 | 2.6% |
| **Females** | 586 | 391 | 66.7% | 1 | 0.3% | 4 | 1.0% | 4 | 1.0% | 6 | 1.5% |
| **SUM** | 776 | **505** | 65.1% | 3 | **0.6%** | 4 | **0.8%** | 5 | **1.0%** | 9 | **1.8%** |

## Laboratory diagnostics and specialist care

All participants with reactive results detected by the rapid test were referred to specialists, all (100%) were subsequently confirmed by standard laboratory and diagnostic methods. All received a therapeutic plan.

# DISCUSSION

In this study, we implemented screening for selected sexually and blood-borne infections (HIV, syphilis, hepatitis B and C) among Ukrainian refugees temporarily residing in the Bratislava region of Slovakia, following the outbreak of war in February 2022.

Migrants have historically accounted for a substantial proportion of HIV cases in the European Union/European Economic Area (EU/EEA), with delayed diagnosis remaining a major public health

concern and transmission patterns varying by region of origin [6].

Surveillance of the European Centre for Disease Prevention and Control (ECDC) confirms that while migrants from the third countries are not disproportionately affected by syphilis or gonorrhea overall, heterosexual transmission is more frequent compared to the EU/EEA population, where infections are predominantly reported among men having sex with men (MSM). Chronic hepatitis B represents a particularly significant burden among migrants, with more than half of reported HBV cases in the EU/EEA originating from third countries, while data suggest a higher prevalence of hepatitis C in migrant communities than in the general population [6]. Importantly, the distribution of infectious disease risk within migrant populations is heterogeneous and influenced by multiple factors, including the migration phase [10].

In our pilot screening, HIV reactivity reached 0.6%, HBV was 1% and HCV 1.8%, reflecting the epidemiological situation in Ukraine. The country has one of the largest HIV epidemics in Europe and a substantial burden of viral hepatitis. Older estimates suggest approximately 0.9% of adults is living with HIV in Ukraine, 1% with hepatitis B and 3% with hepatitis C[14 ,16]. Syphilis reactivity in our study was low (0.8%), consistent with national data indicating that syphilis is not a major contributor to morbidity in Ukraine, despite the country's ongoing vulnerability to communicable disease outbreaks [1]. Sexual transmission and intravenous drug use remain the dominant routes of transmission for these infections [26].

From a broader EU/EEA perspective, war-related migration raises concerns regarding continuity of care and access to prevention and treatment services rather than immediate threats to host populations. ECDC has emphasized the need for culturally and linguistically adapted healthcare services and improved access to care for refugees [2].

Although most European countries initially ensured timely access to antiretroviral therapy for Ukrainian refugees, more recent data indicate that ART coverage remains lower than expected, underscoring gaps in long-term HIV care [13, 15].

Targeted screening combined with preventive vaccination for vaccine-preventable diseases in the host countries is therefore essential. Hepatitis B vaccination coverage in Ukraine declined substantially after 2010, likely contributing to the higher HBV burden compared with countries such as Slovakia, where vaccination coverage remains high [11]. A systematic review addressing vaccination strategies in relation to migration recommends targeted interventions, especially in temporary camps, asylum centers, and transit stations, where migrants are highly concentrated [3].

EU/EEA countries employ diverse migrant screening approaches, but sustainability and follow-up remain key challenges. Evidence supports targeted, staged screening strategies focusing on high-risk groups, with rapid testing shown to significantly increase uptake and reduce loss to follow-up[18, 20].

Supplementary tools such as standardized risk questionnaires may further optimize screening, although their use may be constrained by logistical and ethical considerations, as encountered in our project [4].

Identified barriers to screening include limited awareness, cultural and language factors, and organizational capacity, highlighting the importance of language support and attention to mental well-being [17]. Ensuring the continuous availability of a psychologist for tested participants in our study had a positive impact on testing uptake and the overall testing environment. The provision of testing within an established outpatient healthcare setting by experienced, established personnel contributed to increased participant trust. Integrated screening programs have been shown to be acceptable to both migrants and healthcare providers, supporting their broader implementation within migrant health services [5].

# Limitations of the study

The main limitation of this study is the lack of representativeness, as participants were recruited exclusively from a single healthcare facility and testing depended on their interest and availability and capacity of local staff, which may have influenced both participant selection and testing uptake. Another limitation relates to the use of rapid diagnostic tests. Although the tests demonstrated high sensitivity and specificity, false-positive or false-negative results cannot be fully excluded. To mitigate this, all reactive results were confirmed by standard laboratory testing, and all tests were administered and reviewed by trained healthcare professionals; nevertheless, human error remains a potential source of bias.

## CONCLUSION

This pilot project on active case finding for HIV, syphilis, HBV, and HCV among Ukrainian war refugees in the Bratislava region of Slovakia identified a substantial burden of infectious diseases, particularly hepatitis C and hepatitis B while HIV and syphilis reactivity were lower. The findings are consistent with epidemiological data on the screened diseases in Ukraine. These findings underscore the need for systematic and targeted screening strategies among migrant populations, with emphasis on early diagnosis and timely linkage to care. Improving access to healthcare requires addressing linguistic, cultural, and administrative barriers, integrating screening into routine healthcare services, ensuring laboratory confirmation and timely treatment, and strengthening the preparedness of healthcare professionals. Continued implementation of similar initiatives is essential to increase testing uptake and reduce the risk of infectious disease transmission in host countries.

## Declarations

# Funding statement:

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# Disclaimer:

NA

# Competing interests:

The authors declare no conflict of interest that could have influenced the work reported in this study. All funding sources and potential competing interests have been fully disclosed.

# Author Contribution

PG: writing – original draft, data curation. TM: data curation. SR: investigation. AB: supervision, formal validation, and project oversight. All authors reviewed and approved the final manuscript.

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# Data Availability

The datasets generated and analyzed during this study are available from the corresponding author on reasonable request.

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# Figures

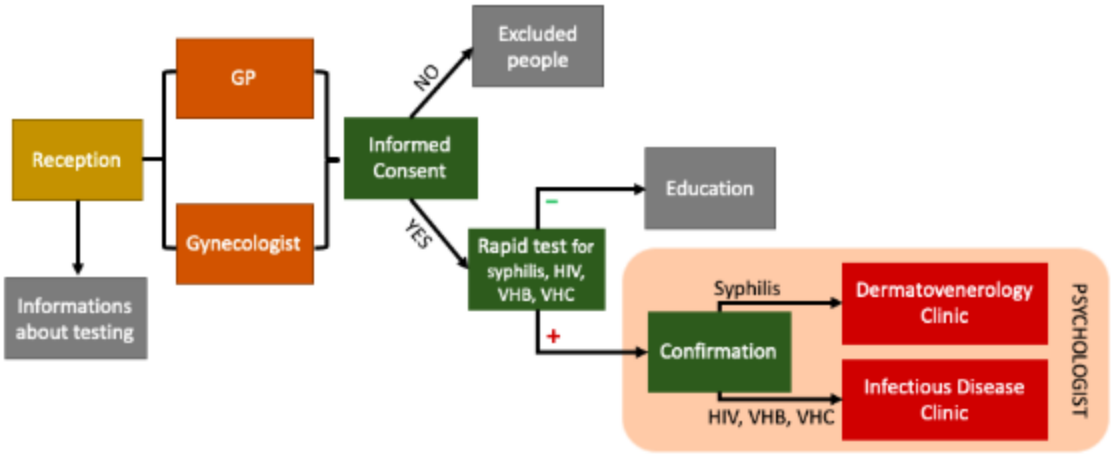



**Figure 1**

Testing scheme