



# Health Risks During Ukrainian Humanitarian Crisis

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**Background:** The unprecedented exodus in the history of the European Union of more than 6 million Ukrainian refugees (May 13, 2022) is a cause for concern and could lead to a new difficult situation in terms of infectious disease control. Following the SARS-CoV-2 pandemic, Europe is facing a new challenge that could lead to a new wave of COVID-19 and an increase in the number of cases of tuberculosis or eradicated diseases, such as polio.

**Aim:** The purpose of this analysis was to provide an overview of lung diseases and health risks that could be encountered in refugees from Ukraine and translated to European Union countries.

**Methods:** A systematic review was conducted in PubMed, World Health Organization, the UN Refugee Agency and the government’s websites. Selected publications investigated the health problems arising from Ukrainian population migration from conflict areas and their impact on the public health system in the adoptive countries. The main potentially contagious diseases in Ukraine have also been reviewed.

**Results:** The population of Ukraine has serious public health problems such as SARS-CoV-2 infection, multidrug-resistant tuberculosis, high levels of drug resistance and difficulties with an effective vaccination program, so there are significant risks of developing epidemics in transit or host countries. The current crisis has major peculiarities because the migrants were not concentrated in the camps but there was a dispersion of them on large territories of European countries.

**Conclusion:** In order to meet the health needs of refugees, it is necessary to adapt health systems culturally and linguistically, to train health workers on the particularities of existing diseases in the countries of refugee origin, and to facilitate collection of medical data on migrants’ health.

**Keywords:** migrants, Ukraine, COVID-19, tuberculosis, polio, public health

## Introduction

The United Nations (UN) reported that 79.5 million people were forced to leave their homes at the end of 2019 an increase of over 10 million people compared to the end of 2017.<sup>1</sup> Out of these, 26 million were refugees and 4.2 million were asylum seekers. The main countries of origin were Syria, Venezuela, Afghanistan, South Sudan and Myanmar. Following the start of the Russian Federation’s war on Ukraine on February 24, 2022, a new humanitarian crisis began, with a massive migration of population mainly women and children to European Union (EU) countries. By May 13, 2022, more than 6 million Ukrainian refugees crossed into neighbouring countries, in the fastest-growing refugee crisis in Europe since the Second World War, while an unknown number of people have been displaced within the country.<sup>2</sup> This unprecedented exodus since the founding of the EU, through its magnitude and circumstances, is a source of concern and may cause new difficulties in terms of disease control.

Despite the fact that the refugee crisis is a global one in terms of both the number of refugees and the diversity of the places to which they migrate, there have been few studies that have investigated the epidemiological concerns raised by these population migrations.<sup>3</sup> The United Nations High Commissioner for Refugees manages the Health Information

System, which analyses and manages public health information from refugee camps in order to offer an epidemiological profile and risks assessment.<sup>4</sup> The coronavirus disease (COVID-19) Solidarity Response Fund was established to help Syrian refugees by funding the development of the UN Refugee Agency's Azraq camp in Jordan, which will host infected people with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Preparations had already begun when the first case of COVID-19 was confirmed in Azraq camp in September 2020.<sup>5</sup> Despite all of the precautions taken, infection transmission in such areas was found to be much higher due to the difficulty in maintaining social distance. Until the outbreak of the war in Ukraine, Italy had struggled most with the control of SARS-CoV-2 infection in migrants. To manage the risks of infection transmission, quarantine ships operated as unofficial migrant detention centres. The specifics of migrant care in these centres have already been published in a study.<sup>6</sup>

In many ways, the European humanitarian crisis differs from the previous refugee crisis of 2015, when 6.6 million people were forced to leave their homes. In contrast to Syrian refugees who entered the EU by land through Turkey, and later through Bulgaria and Serbia, or by sea through Italy, migrants from Ukraine travel by land through Poland, Romania, the Republic of Moldova, Slovakia, and Hungary. The majority of Syrians remained in the neighbouring countries (such as Turkey which currently shelters about 3.6 million refugees also from Lebanon, Jordan, and Egypt), while about 1 million travelled to EU nations (70% reside in Germany and Sweden).<sup>7</sup>

Currently, the entire world is recovering from successive waves of infection with the SARS-CoV-2 virus, which has required extensive airborne disease control measures (isolation, wearing of protective masks, limits on gatherings, etc.). These efforts, combined with the introduction of vaccines, have allowed for a relative control of disease risk, although this has been counterbalanced by the emergence of new SARS-CoV-2 variants with higher contagiousness and immune escape potential.<sup>8</sup> In account of this, some European governments have eased restrictions on combating and monitoring SARS-CoV-2 infection.<sup>9</sup> A study that identified the proportion of vaccinated vulnerable people from the informal settlements of Rome found that vaccination coverage of 14.4–55.5% was much lower than in the Italian population (about 80%). The study concludes that stronger protection is needed for migrants, among other high-risk populations. Establishment of trust, more effective communication, and involvement of local decision-makers in vaccination campaigns are measures that should be implemented.<sup>10</sup>

Another public health problem for European countries is the increased risk of the spread of tuberculosis and other infectious diseases, especially with antibiotic-resistant bacteria. Ukraine ranks 8th in terms of the incidence of multidrug-resistant tuberculosis (MDR-TB).<sup>11</sup>

The aim of this study was to analyse the medical issues created by the exodus of Ukraine's population in the context of the country's war.

## Methods

The authors conducted a systematic comprehensive literature search in the following databases: PubMed, World Health Organization (WHO), UN Refugee Agency and the government's websites (Ukraine, Poland, and Romania). The search objectives were: identification of the main public health issues in Ukraine, and the major problems raised during previous humanitarian crisis.

The main public health concerns that can be caused by the migration of the Ukrainian refugees have been identified. The following health conditions have been regarded as potentially challenges: SARS-CoV-2 infection, tuberculosis, contagious childhood diseases, and antibiotic resistance. Based on these data, the authors analysed, qualitatively and descriptively, the possible medical challenges caused by the migration of Ukrainian citizens to EU countries. The search terms were Ukraine, migrants, conflicting zones, SARS-CoV-2, tuberculosis, children's health, and antibiotic resistance. The keywords were combined as follows: "Ukraine and tuberculosis", "Ukraine and child health", "Ukraine and antibiotic resistance", "Ukraine and SARS-CoV-2", "health and migrants and conflict zones". Two authors reviewed the titles and abstracts of all relevant publications. The authors followed publications on the risks and consequences of population migration from conflict zones such as Ukraine, Syria, Afghanistan, and South Sudan, with an impact on European countries (928 papers). An author read the papers that were selected for the research (364 publications). Data obtained from official sources (WHO, government) were validated for analysis, and where there was more than one source, data concordance was analysed. The selected studies' quality, in terms of population size examined, study design, and generalizability, did not constitute a pertinent concern for current study. A limited number of studies (156) were selected which approached migration concerns EU migrations.

## Results

Realities regarding the health status of the population of Ukraine, before the start of the war, from the perspective of infectious diseases were analysed.

### SARS-CoV-2 Infection in Ukraine

In Ukraine, 43,477 cases of SARS-CoV-2 infection were recorded on February 11, 2022, the greatest number of infections reported in one day since the pandemic began.<sup>12</sup> In this context, the Russian Federation launched an armed attack on Ukraine on February 24, 2022, resulting in the greatest population exodus since the creation of the EU. Reports of infections were soon unavailable. Despite the fact that the increasing number of reported cases is most likely attributable to Omicron variant, which is less severe, the presence of a large proportion of the unvaccinated population suggests the potential of an unavoidable increase in the number of cases.<sup>13</sup> According to existing data, only 34.4% of the population was vaccinated with two doses on February 22, 2022, and only 1.7% received a booster dose. Although the Omicron variant has an increased potential for immune escape, administration of the booster dose allows an improvement in terms of protection from severe forms of the disease.<sup>14</sup> On February 18, 2022 (the last day with available data at the time of paper writing) Ukraine reported 52,561 tests, with 60.3% positivity, which suggests that there is a large number of undiagnosed people in the general population. From the point of view of mortality through COVID-19, we notice a peak of 322 deaths on February 16, 2022, significantly lower compared to the data recorded in the previous wave, during the circulation of the Delta variant.<sup>15</sup>

In conflict zones such as Kyiv, Luhansk, Donetsk, and Donbas, citizens are living in deplorable conditions due to bombardment and supply shortages. The population lacks hygiene supplies and travels in unsanitary conditions, often with extended wait times and in poorly ventilated buses. In the absence of preventive measures such as face masks, forced social distancing, and access to rapid diagnostic tests, this environment is suitable for the spread of viruses such as SARS-CoV-2.<sup>15</sup>

Women and children were the main actors in the migration to EU countries due to the movement restrictions imposed by the onset of war. Only 16.7% of pregnant women surveyed in Ukraine accepted vaccination before medical consultation, according to a study on SARS-CoV-2 vaccination of pregnant women in Poland and Ukraine.<sup>16</sup> According to the same study, the acceptance rate increased to 46% after the consultation, although it remained much lower than in Poland (72.6%). The conclusions of Janousek's study on pregnant women accepting immunization reveal that the migrant population is at additional risks due to a lack of proper vaccination protection, as well as due to attitudes that contradict current medical advice.

### Tuberculosis in Ukraine

Tuberculosis (TB) persists throughout Ukraine, especially in vulnerable communities and among Human Immunodeficiency Virus patients. The incidence of TB among the paediatric population is increasing. In 2015 there was an increase of 8% in the number of paediatric TB cases (826, including 33 infants under 1 year old and 379 toddlers under 4 years old) compared to the previous year.<sup>17</sup> In 2019, the incidence of TB in Ukraine was reported at a level of 77 cases / 100,000 inhabitants.<sup>17</sup> It is estimated that the proportion of MDR-TB cases was 27% for new cases and 43% for relapses. In 2017, the therapeutic success rate for MDR-TB cases was 51%, while the rate for extensively drug-resistant TB (XDR-TB) cases was 34%.<sup>17</sup> The question thus arises regarding the risk of spreading TB and especially MDR-TB to populations in other countries. It is estimated that in Ukraine, the actual incidence of TB is 94 cases per 100 thousand people with about 25.0% of cases remaining undiagnosed.<sup>17</sup>

In contrast to what is happening in Ukraine, the WHO European Region has the lowest tuberculosis rates in the world. In the last ten years, the annual rate of decrease in new TB cases has been 4.3%.<sup>11</sup> Despite these encouraging results, the risk of MDR-TB spreading remains a concern. The successes of the Sustainable Development Goals (target 3.3) and the WHO European policy framework Health 2020 are endangered due to the increasing risks of tuberculosis, especially MDR-TB or XDR-TB.<sup>11</sup>

Given the large number of refugees and migrants, European doctors and pulmonologists will have to consider these conditions when treating such patients, due to the high incidence in their home countries. During previous humanitarian crises, tuberculosis screening was used to identify active refugee cases.<sup>18</sup>

## Other Infectious Diseases

Ukraine was rated a high-risk country for polio in 2010 by the WHO.<sup>19</sup> An outbreak of polio, a completely vaccine-preventable disease, was identified in Ukraine between 2014 and 2017. An outbreak of measles, which began in 2016 and continues to this day in Ukraine, has increased from 78 to 3300 cases in the last 4 years. Ukraine reported 56,802 cases of measles between January 1 and November 5, 2019, according to the WHO.<sup>17</sup>

## Drug Resistance in Ukraine

A study from 2019 investigated the rate of surgical site infections (SSIs) in 49,920 patients who had surgery in 2008 in seven of the 10 surgical hospitals in Kiev. The study revealed that the incidence of SSIs caused by antimicrobial-resistant bacteria is relatively significant. Antimicrobial-resistant hospital strains were detected in both gram-positive and gram-negative bacteria.<sup>20</sup>

The WHO's Antimicrobial Resistance Surveillance in Europe report finds a significant incidence of antibiotic resistance in bacteria such as *Acinetobacter species* and *Klebsiella pneumoniae*.<sup>21</sup> In Ukraine, in 2020, more than 50% of carbapenem-resistant isolates of *Klebsiella pneumoniae* had been reported compared with < 1% reported in Germany and in Sweden. Regarding *Escherichia coli*, over 50% of the isolates in Ukraine were resistant to 3rd generation cephalosporin (as opposed of 10–25% in Germany and 5–10% in Sweden).

## Child Healthcare in Ukraine

Many primary care services were destroyed during the Russian invasion. The children of Ukraine have suffered the most and have had limited access to basic primary prevention. Challenges for primary prevention exploded during the war and forced migration by reducing or eliminating access to primary care sources. This began in Ukraine's eastern areas in 2014, and as a result, many people were not fully vaccinated. Consequently, they are vulnerable to preventable diseases, as evidenced by outbreaks of polio and measles.<sup>15</sup>

There has been a shortage of measles vaccines in Ukraine in recent years. Vaccination rates fell to 31% in 2016, one of the lowest in Europe. As a result, about 12,000 persons in Ukraine were infected with measles in 2017–2018.<sup>17</sup>

A study conducted in Poland used data collected prior to the invasion of February 24, 2022, revealed that in 2019 there were already 212,730 migrants from Ukraine.<sup>22</sup> In this study, more than a third of the participants had not completed the mandatory vaccines for children. The factors that could influence poor vaccination coverage include distrust of authorities and health services. The data provided by the above study revealed that non-compulsory vaccines, which required direct payment, were rarely administered in Ukraine. Vaccines such as those against influenza, Human Papilloma Virus, rotavirus and chickenpox, recommended in the Polish immunization program, are not usually carried out in Ukraine due to costs. Interestingly, although Ukrainian migrants were not vaccinated, more than half of those interviewed were willing to be vaccinated against the flu during their stay in Poland.<sup>22</sup>

In the period 2016–2019, in an effort to reform the health system, the acting Ukrainian Minister of Health adopted a series of mixed reforms in public health and disaster preparedness.<sup>23</sup> The result has been an unpopular reduction in the number of existing epidemiologists in public health care systems.

## Discussion

According to a study based on data collected in migrant centres in Sardinia, Italy, 40.7% of the 81 people investigated had scabies, 49.4% had a positive Mantoux test, 50% had a positive hepatitis B virus serology, 12.3% had anal or genital lesions due to syphilis, and one person died of MDR-TB.<sup>24</sup> Although, as we have shown above, the current circumstances of migration are different, these data point out that there is a great need for coordination of medical surveillance in these situations.

Under the current conditions of Ukrainian national health care, the country was not prepared to quickly identify the spread of COVID-19 and to respond effectively in the early stages of the pandemic.<sup>25</sup> This was partly due to insufficient logistical equipment in hospitals; lack of qualified specialists in infectious diseases, virology, and epidemiology; heterogeneous distribution of services for infectious diseases in the territory of Ukraine; and lack of personal protective equipment. Another difficulty was generated by the implementation of social distance policies, given the tense situation on the eastern border. Much of this has been overcome in the summer and fall of 2020, but implementation of infection control measures has remained uneven throughout 2021.<sup>15</sup> Under these conditions, the collapse of the invasion by the Russian Federation led to a complete disorganization and reorientation of the health system to war conditions. At the same time, a number of neighbouring countries, west of Ukraine, have begun to relax the restrictions imposed by the coronavirus pandemic.<sup>9</sup> The authors consider that there is good reason to maintain surveillance, because further SARS-CoV-2 viral mutations will certainly occur, and authorities will need to keep track of them.

The impact of COVID-19 on stateless people in Europe is currently being investigated. Increases in COVID-19 infection have been observed in many European countries, including reported outbreaks in stateless communities. The disproportionate impact of infectious diseases on the physical and mental health of minority groups was well established even before the current pandemic.<sup>25</sup>

Populations affected by statelessness are hampered in their access to public health information during emergencies such as COVID-19. Many of them live in crowded conditions with substandard hygiene, work in informal sectors (which prevents them from adhering to public health measures such as self-isolation, physical distancing, or hand sanitization), or may be held in immigration detention centres. For example, Roma people, particularly children and women who lack residency status, identification documents, and live in poverty, are particularly exposed to COVID-19's implications (inter-generational statelessness, evictions, homelessness, poverty, gender-based violence, interrupted schooling, and health risks).<sup>26</sup> Many are at risk of exclusion and/or face significant barriers to accessing COVID-19 testing and healthcare.<sup>27</sup> In many EU countries, healthcare for migrants with temporary residence status is limited to emergency care services.<sup>28</sup> During this public health crisis, some stateless people will be barred from accessing health services, and this may increase the risk of contagion and adverse evolution. It is important for transit and host countries to develop protection mechanisms and provide solutions to migrants' health problems. These efforts must break the epidemiological chain of infectious disease transmission, allowing host countries to become a source of stability and health. As a result, it is vital to set up patient registration platforms modelled after national ones, platforms that will be able to communicate with non-Ukrainian ones after the end of the crisis. It is imperative that we understand the distinct experiences and situations of stateless people and communities during the pandemic in order to generate evidence-based measures, responses, and actions to protect and respond specifically to their needs.<sup>29</sup>

During the COVID-19 epidemic, migrant populations encountered a wide range of challenges in accessing healthcare services. In some countries, access to healthcare has depended on the possession of identity documents and / or residence status, which many stateless persons do not have.<sup>29</sup>

The Romanian National Health Insurance Agency has established a number of benefits for Ukrainian migrants, including free access to general practitioners and emergency services, as well as health treatment for COVID-19 and other situations requiring hospitalization. However, public health measures mean significantly more than the provision of one-off free medical services, supported in particular by the efforts of private companies or non-governmental organizations, and their implementation is still unclear. Medication insurance (eg anti-TB) for refugees is not only a matter of free access but also of access to specialized facilities.

It should be noted that in the case of migrants from Ukraine, the refugee camps installed, especially at the borders, have a low impact because they can be used for short periods of time and for a relatively small number of people. After crossing the border, migrants either moved on their own or were supported by civil society, non-governmental associations, being accommodated in boarding houses, hotels, or even private homes. As a result, there has been a wide dispersion of migrants in Romania, nearly all over the country, giving the current migration a global and unsystematised character. In Romania, hosts of migrants are required to report to population registration organizations. It is unclear, however, whether migrants have been included in a follow-up database from the perspective of health care.

Language barriers and lack of information are another significant obstacle. Many migrants may have difficulty accessing information because of their environmental circumstances (for example, lack of internet, media, or healthcare information in some settings).<sup>29</sup> Although in the case of migrants from Ukraine the dysfunctions related to language barriers were obvious, the presence of a significant number of Ukrainian or Russian speakers in Romanian hospital settings has allowed migrants to overcome these difficulties relatively easily.

## Racism and Prejudice

Ukraine belongs to Europe and has its support, so the issue of such manifestations is unlikely. The current humanitarian crisis has emerged amid global expressions of support and compassion for the Ukrainian people. Activities of unconditional support for refugees are unlikely to be countered by racist attitudes. This is clearly a different situation than prior crisis that have looked into similar issues.<sup>30</sup>

For refugees, poor nutrition and health problems are frequent and lead to high risk for illness. Untreated patients will spread rapidly infection to healthy people. Moreover, the treatment for “on-the-move” patients is difficult.

From a medical point of view, the transit countries or the host countries for the more than 3.4 million refugees (especially women and children), must adopt urgent measures both to prevent epidemic outbreaks in refugees and to protect the indigenous population. The main risks include SARS-CoV-2 infection, tuberculosis and especially MDR-TB, increased antibiotic resistance of bacteria, and the resurgence of diseases considered eradicated in Europe (such as polio).

Measures should focus not only on preventing infectious disease transmission and limiting infectious outbreaks among stateless communities but also on developing an efficient and sustainable interconnected system of health services. Facilitating medical interoperability becomes a priority in the context of globalization, the growing number of stateless people, and the emergence of new conflicts. The current situation emphasizes that Ukraine’s medical problems can easily be translated into the whole of the European Union and the reform of public health policies is the basis for the end of the traditional exclusion of stateless persons.<sup>29</sup>

## Limitations

There are few data on the effect of crisis on public health in the EU’s host states. The evolution of SARS-CoV-2 infection in the EU following this exodus is uncertain. The final number of refugees due to this war cannot be estimated. The health status of migrants is unknown.

## Conclusions

As large population’s migrations occur more and more frequently, healthcare systems are under major pressures that require interoperability and a timely response to these challenges.

In this context, differences between countries regarding the compulsory vaccination scheme, as well as non-compulsory but recommended vaccines, can create additional problems. In order to meet the health needs of refugees, it is necessary to adapt health care systems. It is necessary to consider the cultural and linguistic differences, to cover the costs imposed by the new requirements, to train health workers on the particularities of existing diseases in the refugees’ home countries, and to determine the migrants’ medical needs.

## Disclosure

The authors report no conflicts of interest in this work.

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