

Perspective

# Ukrainian war refugees and migrants in Poland: implications for public health

Krzysztof Korzeniewski<sup>1,\*</sup>, MD Professor<sup>1,\*</sup>, Mariia Shkilna, MD Professor<sup>2</sup>, Mariana Huk, MD, PhD<sup>2</sup>, Oksana Shevchuk, MD Professor<sup>3</sup> and Małgorzata Marchelek-Myśliwiec, MD, PhD<sup>4</sup>

<sup>1</sup>Department of Epidemiology and Tropical Medicine, Military Institute of Medicine – National Research Institute, 128 Szaserów St., 04-141 Warsaw, Poland, <sup>2</sup>Department of Infectious Diseases and Epidemiology, Dermatology and Venereology, I. Horbachevsky Ternopil National Medical University, 46001 Ternopil, Ukraine, <sup>3</sup>Department of Pharmacology and Clinical Pharmacology, I. Horbachevsky Ternopil National Medical University, 46001 Ternopil, Ukraine and <sup>4</sup>Clinic of Nephrology, Transplantology and Internal Medicine, Pomeranian Medical University, Szczecin, Poland

\*To whom correspondence should be addressed. Email: [kkorzeniewski@wim.mil.pl](mailto:kkorzeniewski@wim.mil.pl)

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## Background

The armed aggression of the Russian Federation against Ukraine which started on 24 February 2022 resulted in a massive influx of war refugees from Ukraine. Ukrainian citizens crossed the international borders to flee from the war and apply for an asylum either in Poland or in other EU countries. As many as 115 000 Ukrainians crossed the Polish border in the first 3 days of the Russian invasion. The number grew to 2.3 million over the next 5 weeks. Until July 2023, a total of 13.8 million war refugees crossed the Ukrainian–Polish border on foot, by car or by train. The refugees were predominantly women and children (only ~3% of the war refugees in the given period were men). Until July 2023, 12 million Ukrainians returned from Poland to Ukraine.<sup>1</sup> At mid-2023 there are >3 million Ukrainian citizens living in Poland, including at least 1.3 million economic migrants who had arrived before Russian invasion and 1.8 million war refugees who crossed the Polish border after February 2022. The population in Poland, including 37.5 million Polish nationals, has exceeded 40 million people for the first time in history.<sup>1</sup> According to the United Nations Refugee Agency, the estimated number of Ukrainian war refugees in the world is 6.3 million as of June 2023, which is the largest migration flow since World War 2 (by comparison, 1.83 million refugees arrived in Europe, mainly from Africa and Asia, during the European migrant crisis in 2015).<sup>2</sup>

## The epidemiological situation in Ukraine

The epidemiological situation in Ukraine is the worst in Europe. Ukraine is the only country in Europe which has reported cases of circulating vaccine-derived poliovirus in recent years (in 2021 there were 22 such cases, including two cases of acute flaccid paralysis).<sup>3</sup> Between 2017 and 2020 Ukraine had the highest incidence of measles in Europe (>115 000 cases), the second highest incidence and the highest number of newly acquired HIV infections (37.5 cases/100 000 residents vs. 3.5 cases/100 000 residents in the EU countries in 2020; an estimated number of people infected with HIV in Ukraine is 260 000), the fourth highest prevalence of tuberculosis (19 521 cases reported in 2020; 44.6 cases/100 000 residents vs. 9.7 cases/100 000 residents in Poland) It is estimated that 0.5 million Ukrainians live with active TB; 29% of the new TB cases and 46% of the old TB cases are multi-drug resistant.<sup>3,4</sup> Cardiovascular diseases are the leading cause of death in Ukraine (67%); ischemic heart disease causes six times as many deaths in Ukraine as in other EU countries.<sup>5</sup> The incidence of diabetes in Ukraine is 6% amongst adults and 1.3% amongst children.<sup>5</sup> A study carried out before the war demonstrated that as many as 33% of Ukrainians have experienced an episode of a mental disorder during their lifetime (especially individuals who had been forcibly displaced from the southern or eastern parts of the country); Ukraine has also one of the highest suicide rates in the world.<sup>6</sup> Poor

**Table 1.** National vaccination schedule in Ukraine

Disease \ Age	1 day	3–5 days	2 months	4 months	6 months	12 months	18 months	6 years	14 years	16 years
Tuberculosis		BCG								
Hepatitis B	HBV		HBV		HBV					
Diphtheria, Tetanus, Pertussis			DTP	DTP	DTP		DTP	DT		Td
Poliomyelitis			IPV	IPV	OPV		OPV	OPV	OPV	
<i>Haemophilus influenzae</i> type b infections (Hib)			Hib	Hib		Hib				
Measles, Mumps, Rubella						MMR		MMR		

BCG—Bacillus Calmette-Guerin; HBV—Hepatitis B Vaccine; DTP—Diphtheria, Tetanus, Pertussis; Td—Tetanus, diphtheria;

IPV—Inactivated Polio Vaccine; OPV—Oral Polio Vaccine; Hib—*H. influenzae* type b; MMR—Measles, Mumps, Rubella.

Source: Ministry of Health of Ukraine. Available from <https://www.phc.org.ua/kontrol-zakhvoryuvan/immunizaciya/zagalna-informaciya> (Accessed 27 July 2023)

sanitation, malnutrition and a high level of stress associated with the ongoing combat operations are amongst the factors contributing to the exacerbation of chronic diseases, the development of acute gastrointestinal or respiratory infections and ectoparasitoses (scabies, pediculosis).

The anti-vaccine movement supported by Russian trolls spreading misinformation is particularly strong in Ukraine in recent years.<sup>7</sup> It has had a significant impact on parents' opinions and prompted many of them to opt out of mandatory vaccinations. This has resulted in a sharp increase in the number of infectious diseases in Ukraine, e.g. measles.<sup>3</sup> It is believed that some vaccination certificates issued to Ukrainian children are fake. When applying for a place at a day-care centre or a pre-school, Ukrainian parents are obliged to present a certificate confirming that their child had been vaccinated according to the country's vaccination schedule. The national vaccination schedule in Ukraine includes vaccinations against 10 infectious diseases (Table 1).

In 2016, the vaccination coverage against diphtheria, tetanus and pertussis amongst Ukrainian children was only 20%, the coverage against measles and tuberculosis—40% and against poliomyelitis—50%. In the last 3 years, there has been a significant increase in the vaccination coverage in the paediatric population: immunoprophylaxis against diphtheria, tetanus, pertussis and hepatitis B reached 81% in 2020, against measles—82% in 2021, against poliomyelitis 84% (but only 53% of children >12 months old), and against tuberculosis—93% in 2020.<sup>3,8</sup> However, as the war in Ukraine continues causing destruction of the infrastructure and a collapse of healthcare services, vaccination coverage against infectious diseases in Ukraine is likely to fall again. Experts from the European Centre for Disease Prevention and Control (ECDC) have pointed to a growing risk of infections with multi-drug resistant bacteria.<sup>3</sup> Drug resistance is high amongst Ukrainian residents, especially for Gram-negative bacteria. According to the data reported by the Ukrainian healthcare providers to the Central Asian and European Surveillance of Antimicrobial Resistance network, 53% of *Escherichia coli* isolates were resistant to cephalosporins, 54% *Klebsiella pneumoniae* isolates were resistant to carbapenems, 77% *Acinetobacter* spp. isolates were resistant to carbapenems, and 18% *Staphylococcus aureus* isolates were resistant to methicillin (MRSA).<sup>9</sup>

### The epidemiological situation in Poland

According to the official data, >1.3 million Ukrainians lived in Poland before Russia's invasion in Ukraine (mostly men

and women of working age). According to data published by Statistics Poland only a small percentage of Ukrainians residing in Poland required hospital treatment (1303 patients in 2020). The leading causes of hospitalizations amongst Ukrainian patients were injuries, poisoning and other specified effects of external causes (ICD-10 S00—T98) as well as pregnancy, childbirth and postpartum (O00—O99). By comparison, the leading causes of hospitalisations of Polish citizens are neoplasms (C00—D48) and cardiovascular diseases (I00—I99).<sup>10</sup> During the first 5 months of Russia's invasion in Ukraine >23 000 Ukrainians who crossed the Polish border required hospital treatment, mainly in surgery, general medicine, paediatric, maternity and gynaecology wards. One of the biggest problems that physicians in Poland must face when managing patients from Ukraine is the absence of their medical records and medical history. Another problem is the language barrier between Polish medical staff (nurses and physicians) and Ukrainian patients. To deal with those problems the Polish Ministry of Health issued special work permits, which allowed Ukrainian doctors to practice in Poland.

According to the ECDC statement of 2015, refugees do not pose a significant health threat to the EU populations in terms of infectious diseases transmission. However, since they are more susceptible to infectious diseases, they are classified as a priority group in terms of disease control and prevention measures.<sup>4</sup> HIV/AIDS testing and management are offered free of charge in Poland, both for Polish citizens and all foreigners living in Poland (including Ukrainians). Under the applicable Polish act on preventing and combating infections and communicable diseases in humans every foreigner staying in Poland for longer than 3 months is obliged to receive all mandatory vaccinations according to the country's vaccination schedule. This law also applies to children and adolescents who had not received all mandatory vaccinations in line with their country's vaccination schedule or children whose vaccination status is uncertain. The paediatric population of refugees from Ukraine (>500 thousand children crossed the Polish border following Russia's invasion) is covered by a national vaccination programme run by the Polish medical service. Polish and Ukrainian vaccination schedules are the same for 10 communicable diseases (Table 1). There are, however, some differences. The first difference is in the dosing schedule of the poliomyelitis vaccine; Ukrainian children get 6 doses of the polio vaccine—first they receive two doses of an inactivated polio vaccine (IPV), similarly to Polish children, but then (unlike Polish children) they receive four doses of the live oral polio vaccine (OPV); the OPV vaccine has not been used in Poland since 2016. Another difference, the Ukrainian vaccination

**Table 2.** Selected infectious diseases reported in Poland, 2022 versus 2021

Diseases	2022		2021	
	No.	Incidence	No.	Incidence
Shigellosis	41	0.11	18	0.05
Giardiasis	1334	3.50	559	1.46
Rotavirus infections	34 027	89.16	7417	19.44
Scarlet fever	12 628	33.09	2649	6.94
Pertussis	376	0.99	182	0.48
Measles	28	0.07	13	0.03
Mumps	925	2.42	484	1.27
Rubella	153	0.40	50	0.13
Chickenpox	171 480	449.34	57 669	151.12
<i>Streptococcus pyogenes</i> infection, invasive	3426	8.98	2174	5.70
Syphilis	1990	5.21	1127	2.95
Gonorrhoea	601	1.57	287	0.75
Viral hepatitis				
type A	232	0.61	92	0.24
type B—acute	38	0.10	10	0.03
type B—chronic	2457	6.44	1537	4.03
type C—acute	26	0.07	16	0.04
type C—chronic	2492	6.53	1226	3.22
AIDS	131	0.34	57	0.15
Newly diagnosed HIV infections	2380	6.24	1248	3.27
<i>Haemophilus influenzae</i> disease, invasive	150	0.39	52	0.14
Influenza and				
total	4 701 874	12320.75	2 973 793	7792.50
influenza-like illness				
in children 0–14 years	2 235 798	38181.20	1 433 242	24 475 78

Source: Chief Sanitary Inspectorate, Department of Antiepidemic and Sanitary Protection of Borders. Available from <http://wworld.pzh.gov.pl/> (Accessed 30 July 2023)

schedule does not include vaccinations against rotaviruses and pneumococcal infections (which are mandatory in Poland), and against chickenpox (which is recommended in Poland).

Epidemiological services in Poland pay particular attention to the surveillance of tuberculosis and HIV/AIDS amongst Ukrainian refugees (the incidence of TB is four times as high in Ukraine as it is in Poland). In 2021, a total of 68 TB cases were reported in Ukrainian migrants living in Poland; in 2022, the number increased to 175 cases.<sup>10</sup> An estimated number of Ukrainians infected with HIV is ~260 000, only 50% of the patients receive antiretroviral therapy (ART). Polish sanitary services had expected that because of huge migration from Ukraine there might be a sharp increase in the number of HIV-infected patients requiring targeted therapy. Currently, a total of 3300 Ukrainian patients receive ART in Poland.<sup>11</sup> Polish authorities have observed an increase in the incidence of only a few communicable diseases, but this might be attributable to the lifting of the sanitary restrictions which had been in force during the COVID-19 pandemic (Table 2).

The influx of millions of Ukrainian war refugees did not have a negative effect on the epidemiological situation in Poland. This phenomenon might be explained by the results of a study on Ukrainian migration patterns that was carried out by an interdisciplinary team consisting of Ukrainian and Polish experts. The results of the study and the analysis of the most recent data as well as experts' opinions show that a large majority of Ukrainian refugees who entered Poland after 24 February 2022 were a middle-class population; they were people seeking shelter from the war and its negative consequences. Of all the people

surveyed in the study 97% were women and only 3% were men (when martial law was introduced in Ukraine most men were banned from leaving the country). The mean age of those who participated in the study was 36 years; 76% of those surveyed had higher education; 91% had lived in cities before moving to Poland, 52% described their socio-economic status as good or very good. The results of the study also demonstrated that as many as 78% of Ukrainians of the working age living in Poland have entered the Polish labour market (83% economic migrants and 71% war refugees).<sup>12</sup> In fact, Poland turned out to be a safe, friendly, and helpful country, where people may seek shelter from the war and its consequences. It has become clear that Ukrainians are gradually integrating into the Polish society. Most Ukrainian war refugees and migrants arriving in Poland are in good health condition (unlike many Ukrainian citizens who stayed in their country, often because they were unable to finance their travel abroad). However, the continuing war in Ukraine may cause further breakdown of the country's healthcare system, impoverishment of the population and a significant increase in the incidence of infectious and non-infectious diseases. From the epidemiological standpoint, future waves of migrants may turn out to be more problematic as new refugees may be in a much worse health condition than those who had arrived in Poland over the last year. For this reason, the epidemiological surveillance in European countries should be intensified and constantly monitored.

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## Authors' contribution

K.K.—the conception and design, acquisition of information, drafted the article. M.S., M.H., O.S., M.M-M.—acquisition of information, interpretation of data. All the authors gave final approval of the version to be submitted.

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