

Ukraine crisis

Public Health Situation Analysis –
Refugee-hosting countries
17 March 2022

Executive summary

Population: Ukrainian refugees to neighbouring refugee-hosting countries

Start date of crisis: Feb/Mar 2014; Escalation: 24 Feb 2022

Typology of crisis: conflict, displacement, insecurity

Overview of crisis

On 24 February 2022, Russian troops entered Ukraine after weeks of heightened tensions and escalation of the conflict in eastern Ukraine that began in 2014. Major attacks have been reported across Ukraine, including in the capital, Kyiv, and multiple other urban centres of significant size. Meanwhile, the pre-existing hostilities in Donetsk and Luhansk oblasts (regions) have significantly intensified. As of 14 March 2022, at least 1,761 civilian casualties had been confirmed, including 636 deaths (46 children) and 1,125 injured (62 children), but the real toll is likely higher. Up to 15 March, 2022, approximately 2,969,600 million people have left Ukraine, fleeing the ongoing hostilities. UNHCR estimates that over 4 million people could flee from Ukraine and seek protection and support across the Region (1). As of 14 March, 2022, 31 reports of attacks on health care have been verified by WHO, 29 of which have a “confirmed” certainty level, and 2 with a “possible” certainty level; the certainty level is decided based on the level of information available to verify each incident.

Initial reports indicate that most refugees are women and children, with a ban in place on Ukrainian men aged 18-60 leaving the country. Most adult men crossing the border appear to be non-Ukrainian nationals previously residing within Ukraine. By 10 March, 2022, more than one million children (approximately 40% of the refugee population) had left Ukraine (2). There are also reports of vulnerable and marginalised populations among the refugee population, including older people, persons with disabilities, and ethnic minorities.

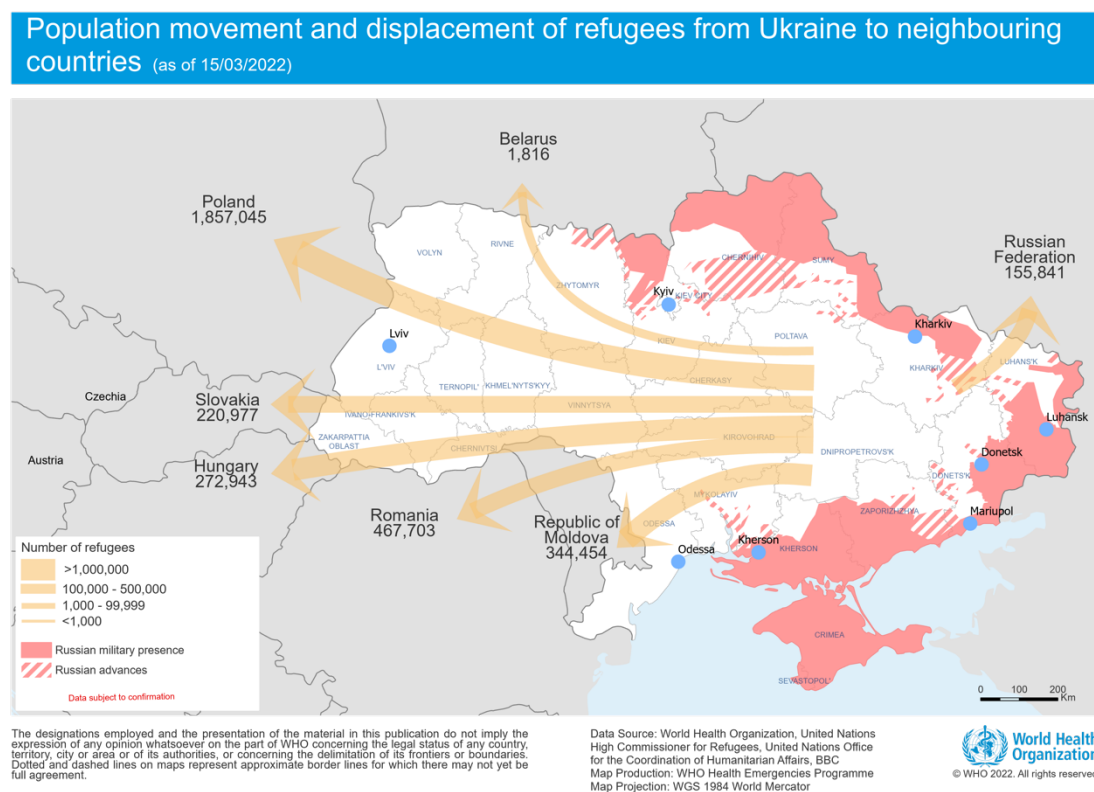


Figure 1. Population movement and displacement of refugees from Ukraine to surrounding countries as of 15 March 2022

Key health risks

The main immediate health risks for the refugee population are summarized in Table 1.

Non-communicable diseases (NCDs) are the leading cause of morbidity and mortality in Ukraine, with the five major NCDs (cardiovascular disease [CVD], diabetes, cancer, chronic respiratory disease, and mental health conditions) accounting for 84% of all mortality. Ukraine also has some of the highest burden of chronic infectious diseases in Europe, particularly HIV and Tuberculosis (TB)/Multi-drug resistant (MDR)-TB. Shortages of medical supplies, challenging access to essential health services, and the interruption of prevention, diagnostic and treatment services pose a severe threat of adverse outcomes from these conditions and to the continuation of treatment.

The burden of psychological stress and trauma on Ukrainian refugees due to their recent experiences should not be underestimated. The population is considered at high risk of adverse mental health outcomes and there is urgent need of (continued) mental health and psychosocial support services (MHPSS).

Refugees from Ukraine are at elevated risk of infectious diseases, as living conditions during transit or upon arrival may increase the risk of transmission and/or susceptibility to disease. They will likely have greater vulnerability due to poor shelter and overcrowded living conditions and exacerbating factors such as nutritional stress and exposure to cold weather. Outbreaks of respiratory and diarrhoeal infections are to be expected. The incidence of COVID-19, although decreasing, remains very high, while vaccination uptake, particularly in vulnerable populations, remains low. This, along with disruption in testing and treatment, puts those most vulnerable at increased risk of severe illness and death. Moreover, given suboptimal routine childhood vaccination coverage, the crisis and displacement will further

increase existing immunity gaps and the risk of outbreaks of vaccine-preventable diseases, particularly measles.

The last nationwide outbreak of measles in Ukraine that started in 2017 and reached a peak 2019 reflects the prolonged and persisting suboptimal vaccination coverage with measles-containing vaccines (3,4).

Another concern is the outbreak of circulating vaccine-derived poliovirus type 2 (cVDVP2) that Ukraine has been experiencing since September 2021. The affected Oblasts are Rivne (in North-West Ukraine) and Zakarpattya (in South-West Ukraine). As of February 25, 2022, there have been two detected paralytic cases and 19 isolations of VDPV2 from asymptomatic contacts.

Table 1. Key health risks over the coming 3 months.

Public health risk	Level of risk		Rationale
	1	2 - 3	
Months starting now	1	2 - 3	
COVID-19			Decreasing trends, but from very high level of incidence and bed occupancy for ICU care. Unsanitary, crowded living conditions with poor ventilation; low vaccination coverage in vulnerable groups both within Ukraine and some neighbouring countries.
Measles			Increased risk of measles transmission given crowded living conditions with poor ventilation, prior endemicity, reduced vaccine coverage in recent years, and cases recently reported in some refugee-hosting countries.
Poliomyelitis			Ongoing outbreak of circulating vaccine-derived poliovirus type 2 (cVDVP2), and low uptake in mass immunization campaign (22%). Risk of spread into surrounding countries, especially with suboptimal vaccination coverage (Romania, Moldova).
Diphtheria			Diphtheria cases, although small in number are still reported in the Region. DTP3 coverage in Ukraine was among the lowest in the Region in recent years (2016-2020) at 19-81%.
Other infectious respiratory diseases, including influenza			Poor hygiene and sanitation, overcrowding, poor shelter, cold. Influenza still circulating in some neighbouring countries e.g. Moldova, Slovakia, with activity rising again since week 4. H3 dominant – with potential for increased vaccine uptake low in priority groups in UKR. Risk of influenza-associated morbidity is expected to decrease as winter abates.
Acute watery diarrhoea, incl. cholera & rotavirus			Lack of access to safe water and appropriate sanitation, poor hygiene, and overcrowding. A cluster of cholera was identified in Ukraine in 2011.
Hepatitis A			Some levels of endemicity have been observed in Ukraine and surrounding countries for hepatitis A, and detection and monitoring of acute jaundice is essential to mitigate the risk of outbreaks.
Vector-borne diseases (CCHF, WNF)			Crimean Congo Haemorrhagic Fever cases have been reported in southern affected areas. Risk of West Nile Fever increases in late spring in the bordering countries.
Chronic infectious diseases (TB/HIV/HBV/HCV)			Interruption of treatment likely – impact on viral load and disease if treatment interrupted for a number of weeks for HIV and hepatitis. Limited access to health care for acute flare ups and opportunistic infections may result in excess deaths for all conditions.

Cardiovascular disease (CVD) (e.g., heart attack, stroke)	Red	Orange	Interruption in supply of medicines and limited access to health care; critical for people with uncontrolled blood pressure and/or people at higher risk of stroke; most mortality expected in immediate term. High risk for renal failure and other life-threatening conditions for NCDs requiring continuity of care.
Chronic respiratory diseases (e.g., COPD, asthma)	Red	Orange	Reduction in chronic medical supplies, limited oxygen availability, and potential stressors from increased risk of respiratory infections due to the living conditions (overcrowding, cold, poor shelter); most mortality expected in immediate term.
Diabetes	Red	Orange	Disruption to essential services and supplies of medicines, particularly insulin; most mortality expected in immediate term.
Cancer	Orange	Orange	Disruption of treatment and health care capacity leading to increased risk of negative outcome for oncology patients. Particularly high risk for individuals under immunosuppressive therapy given increased risk of infection in the context of the crisis.
Mental health	Red	Red	Exacerbation of chronic mental health problems likely and high levels of PTSD, depression, and anxiety among affected population of all ages.
Maternal and neonatal health	Orange	Orange	Caesarean deliveries accounted for roughly one quarter of all deliveries in 2019; access is likely to be limited in Ukraine and demand may overwhelm capacity in some hosting countries. Substantial risk for perinatal health in the immediate term, including of unsafe deliveries.
Sexual and gender-based violence (SGBV)	Orange	Orange	Trauma, unaccompanied children, women travelling alone, interim care arrangements, limited access to protection/treatment/support, and vulnerable populations should be addressed.
STIs	Yellow	Yellow	Lack of access to condoms, interrupted or limited access to treatment, insufficient diagnostic capacity, reluctance to seek services in destination country, social conditions, Sexual and Gender Based Violence.
Injury/trauma and sequelae (wound infections, anti-microbial resistance)	Orange	Orange	Possible widespread medical evacuation of wounded. Risk of trauma much less than in Ukraine. Risk of new injuries expected to decrease dramatically after initial departure.
Technological and environmental health risks	Yellow	Yellow	Chemical and radio-nuclear plants could represent major health risk if damaged during ongoing conflict in Ukraine. The possible consequences of radiation emergencies or chemical incidents inside Ukraine could also have international health consequences. Based on the current extent of the conflict, the risk radiation or chemical incidents inside surrounding countries is moderate to low, however this risk would require constant review in line with the evolving situation.

Red: **Very high risk.** Could result in high levels of excess mortality/morbidity.

Orange: **High risk.** Could result in considerable levels of excess mortality/morbidity.

Yellow: **Moderate risk.** Could make a minor contribution to excess mortality/morbidity.

N.B. Further details on the methods used for this risk assessment are available (5)

ECDC has developed operational guidance for the prevention and control of infectious diseases in the context of increased migrant/refugee flows linked to the Ukraine crisis (6). The main communicable diseases health threats that have been identified by ECDC are vaccine preventable diseases (with Poliomyelitis and measles on the top priorities), COVID-19, and risk of antimicrobial resistance for conflict-related patients.

Key recommendations and priority considerations

Based on the situation assessment, the following key recommendations should be considered:

- Ensure inclusive access to quality health services (preventative and curative).
- Diagnosis and continuity of care and referrals for chronic diseases (NCDs and chronic communicable diseases particularly HIV and TB).
- Vaccination of refugees for key diseases (COVID-19, poliomyelitis, measles, diphtheria) should be considered as a priority (7).
- All countries should have effective disease surveillance and reporting systems, outbreak investigation, case management and response capacities.
- Provision of widespread mental health and psychological support.

Detailed assessment

Health status and threats

COVID-19 vaccination coverage

Estimates of vaccination coverage for COVID-19 are provided below for Ukraine and surrounding countries.

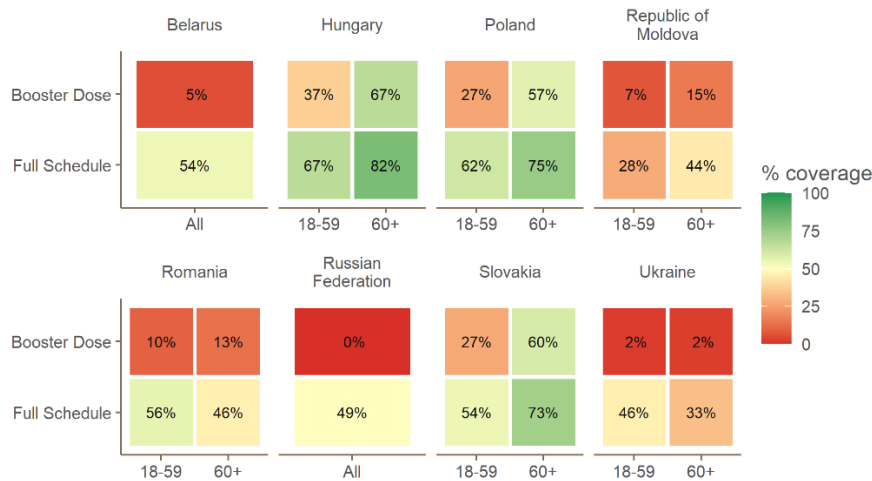
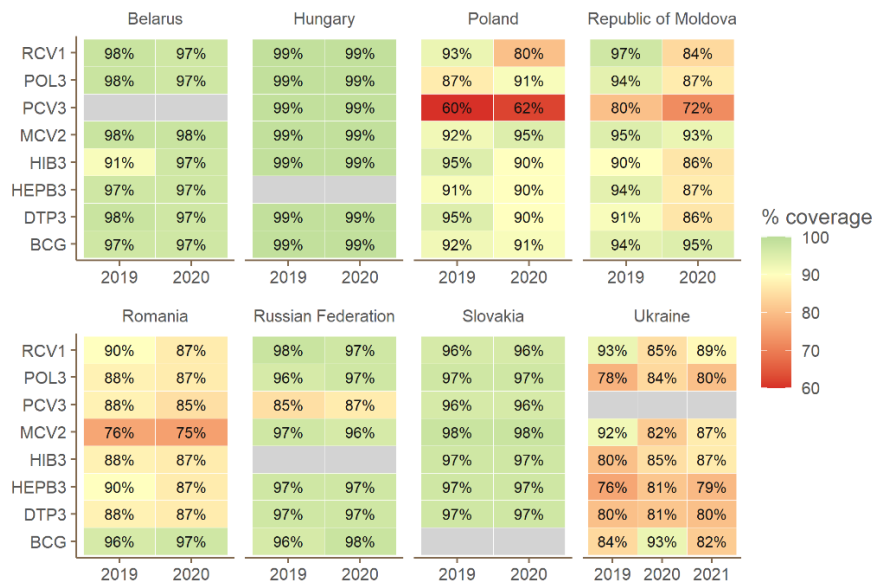


Figure 2 COVID-19 Vaccination coverage estimates for Ukraine and surrounding countries. Data are as of 10 Mar 2022

Childhood vaccination coverage

Estimates of vaccination coverage are provided below for Ukraine and surrounding countries.



Source: WHO/UNICEF and Ukraine MoH

Figure 3 Vaccination coverage estimates for Ukraine and surrounding countries for 2019 to 2020 (2021 for Ukraine). Ukraine estimates for 2021 are derived from Ukraine Ministry of Health, others derived from WHO/UNICEF estimates. Note that individual MoH and WHO estimates may have some discrepancies.

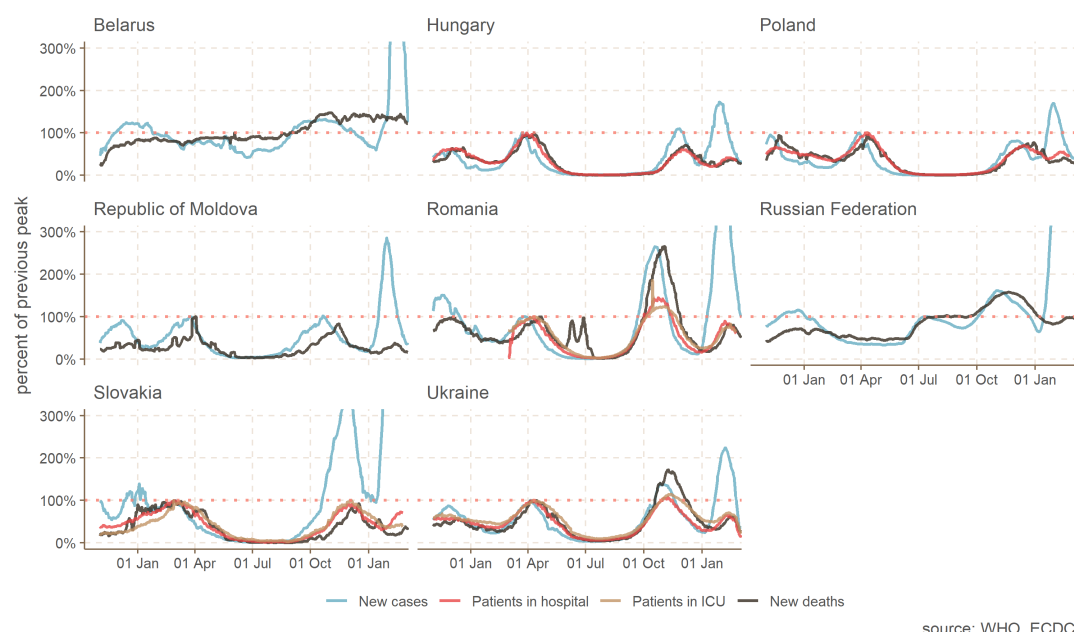
Priority health conditions

Vaccine preventable diseases

COVID-19

While Ukraine and neighbouring countries are observing decreasing trends of COVID-19 infection, hospitalization and deaths, the incidence, morbidity, and mortality levels remain very high. The crowded and poorly ventilated conditions experienced by the population in underground shelters in Ukraine, during transit, and in refugee shelters, combined with a low vaccination rate (34% among those aged 60 years and older), may be expected to lead to a substantial COVID-19 burden within this population in the coming weeks. Based on COVID-19 trends in previous weeks, incidence among refugee populations may be roughly 300-500 cases per 100,000, assuming similar testing practices to pre-conflict Ukraine. Although Ukraine has a relatively high burden of comorbidities that are risk factors for COVID-19 related morbidity and mortality, demographic estimates suggest a high proportion of young people among the refugee population, which may mean that severity of disease in this population will be lower than expected in the general population. There will still be vulnerable groups at higher risk of severe disease such as elderly, pregnant women, and those with underlying clinical risk factors.

Despite a recent reduction in reported cases of COVID-19 in neighbouring countries, case numbers remain high, particularly in Slovakia and the Russian Federation. Furthermore, a number of countries within the European Region are moving away from comprehensive testing, which will influence the interpretation of the epidemiology of case incidence. Spare capacity within hospitals, and specifically intensive care units (ICUs), may be a concern – for example, Cluj-Napoca, Romania, which is less than 200 km from the Ukrainian border, has the highest number of COVID-19 cases and ICU occupancy in Romania with over 50% COVID-19 ICU bed occupancy as of 18 February, 2022 (8,9).



source: WHO, ECDC

Figure 4. COVID-19 metrics for Ukraine and surrounding countries, expressed as a percent of previous peak. Note that in some countries, cases during the omicron wave have exceeded 300% of their previous peak

Poliomyelitis

Since September 2021, Ukraine has been experiencing an outbreak of circulating vaccine-derived poliovirus type 2 (cVDPV2), in Rivne (North-West Ukraine) and Zakarpattia (South-West Ukraine) Oblasts. As of February 25, 2022, there have been two detected paralytic cases and 19 isolations of VDPV2 from asymptomatic contacts, most recently in December 2021. Ukraine responded with intensified clinical and environmental surveillance for poliovirus, and on 1 February, 2022 launched a nationwide catch-up vaccination campaign using inactivated poliovirus vaccine (IPV). Prior to the recent escalation of conflict, the risk of international spread of this virus was assessed as low, due to the relatively high immunization coverage and sanitary infrastructure in most neighbouring countries; however, the current crisis in Ukraine greatly increases the risk for spread of VDPV2 outside of the country, and the risk assessment has been upgraded to moderate. In 2019 in Ukraine, DTP1 and DTP3 coverage was 89% and 80%, respectively. Only 16% of districts had $\geq 90\%$ DTP3 coverage, while 40% of its districts had $< 80\%$ DTP3 coverage. Neighbouring countries with the highest risk of polio spread from Ukraine if importation occurs include: high risk (Poland and Romania, due to sub-optimal surveillance and sub-optimal population immunity); and moderate risk (Hungary, due to suboptimal surveillance and lack of preparedness for outbreaks, but good population immunity) (7).

Measles

Measles has been identified as a major health threat throughout the WHO European Region in recent years. In May 2019, WHO activated a Grade 2 emergency in response to high levels of measles circulation. Over 100,000 measles cases were reported in the WHO European Region for 2019 (10,11). Ukraine experienced a nationwide epidemic between 2017-2020 and for 2018 and 2019 had the highest measles incidence rates in the whole Region, at over 1,200 and 1,300 per million population, respectively (4). This reflects the prolonged suboptimal vaccination coverage (less than the recommended 95% for 2 doses of a measles-containing vaccine) in the country. Vaccination coverage below the recommended 95% threshold is also estimated for Romania (75%) and the Republic of Moldova (93%).

In 2020 and 2021, reported measles cases declined substantially within the European Region, which may have been partly due to the public health and social measures put in place to prevent the spread of SARS-CoV-2.

Population movement and concentration of displaced population in crowded areas at the border crossing may increase the risk of transmission of measles. A large proportion of children are likely to remain susceptible and the risk of outbreaks is considerable given the high proportion of children among the refugee population. As some countries of the Region are still considered endemic for measles, refugees should be vaccinated against these diseases as a priority and in line with national vaccination schedules of the host country (12). An elevated risk should also be assumed for the host population, and WHO supports closure of all immunity gaps, with activities such as national supplementary vaccination campaigns for both refugees and host populations (12).

Table 2. Number of measles cases and deaths, and incidence rate per million population reported in the Ukraine and surrounding countries in 2018 (11).

Country	Incidence Rate (per million pop.)	Total measles cases	Total measles deaths	Vaccination coverage (1 and 2 nd dose)
Belarus	24.97	236	0	98%
Hungary	1.44	14	0	99%
Poland	10.26	391	0	94%
Republic of Moldova	84.14	340	0	92%
Romania	326.75	6 398	22	82%
Russian Federation	15.91	2 290	1	97%
Slovakia	104.96	572	0	97%
Ukraine	1 209.25	53 218	15	69%

Diphtheria

There is a risk of a diphtheria outbreak in Ukraine due to insufficient stock of anatoxin and low rate of vaccination among the population in recent years (13). The number of reported cases increased from 5 in 2012 to 23 in 2019 (14). By the end of 2019, 1,542,650 adults were vaccinated against diphtheria, just 52.3 % of the planned number (14). The last epidemic of diphtheria in Ukraine was reported in 1991-1998, during which there were 5,277 cases reported in 1995 alone (14,15).

Seasonal Influenza

Very limited influenza activity has been seen in the region since the pandemic began and there may therefore be a substantial pool of susceptible individuals which could sustain a large epidemic. With the relaxation of public health and social measures and increase in international travel, influenza activity started to increase in week 49/2021, with different levels of activity observed between the countries and areas of the Region. In epidemiological week 9 2022, several countries including Estonia, Hungary, Republic of Moldova, Slovakia and Slovenia reported widespread influenza activity and/or medium influenza intensity (16).

In Ukraine, vaccines against influenza were available for free for health care workers and at-cost from pharmacies for the general public. As of 20 February 2022, just 164 939 people had been vaccinated against influenza this season. Further, there is has been a steady increase in percent positivity and dominance throughout the European Region of H3 influenza, a subtype that particularly impacts the elderly, who have especially low vaccination coverage in Ukraine.

Influenza should therefore be considered as a significant risk to the refugee population in the immediate and medium term.

Foodborne and waterborne diseases

Foodborne and waterborne diseases are a key health threat for refugees, due to the deteriorated water, sanitation, and hygiene (WASH) situation (unsanitary & crowded conditions, disruption of water supply and sanitation system) among refugee populations. Children under the age of 15 living in countries affected by conflict are almost three times more likely to die from diarrhoeal diseases caused by a lack of safe water, sanitation, and hygiene, than by direct violence (17,18), but the greatest risk is among children aged under 5 years. The greatest risk is from consumption of unsafe food. The risk of foodborne and waterborne diseases is higher in camp-like settings than amongst refugee populations integrated into host communities.

Reinforced surveillance should be established for epidemic-prone foodborne and waterborne diseases, including norovirus, which is the leading cause of foodborne illness in the Region, with close to 15 million cases each year, causing more than 400 deaths (19).

Hepatitis A

Although data for Hepatitis A were not reported every year in Ukraine, the highest prevalence was reported in 2008 with 5 135 cases. In 2020, a high number of cases were reported in Romania (1 010; 5.23 per 100 000), while relatively few cases were reported in Hungary (28; 0.29 per 100 000), Poland (110; 0.29 per 100 000), and Slovakia (11; 0.20 per 100 000). While data are not available in recent years, 4168 cases were reported in Russia in 2018 (2.86 per 100 000) (20). Hepatitis A has been well documented to spread in refugee settings (21–23), and reinforcement of WASH activities should be considered as the key countermeasure.

Acute Watery Diarrhoea including cholera

Diarrhoeal disease is a leading cause of child mortality and morbidity in the world, and mostly results from contaminated food and water sources. Infection is more common when there is a shortage of adequate sanitation and hygiene and safe water for drinking, cooking and cleaning. Food is a major cause of diarrhoea when it is prepared or stored in unhygienic conditions. Diarrhoeal disease can also spread from person-to-person, aggravated by poor personal hygiene. Unsafe domestic water storage and handling is also an important risk factor (24).

The most severe threat posed by diarrhoea is dehydration, but diarrhoea is also a major cause of malnutrition, and malnourished children are more likely to fall ill from diarrhoea. Key measures to prevent diarrhoea include: access to safe drinking-water; use of improved sanitation; hand washing with soap; exclusive breastfeeding for the first six months of life; good personal and food hygiene; health education about how infections spread; and rotavirus vaccination (24).

Ukraine was the most recent European country to declare a cholera epidemic, with 33 cases in 2011 in Mariupol (Donetska oblast), a site of ongoing conflict. While current climatic conditions are not favourable to transmission, the disruption and destruction of water supplies and WASH infrastructure increases the risk of outbreak.

Shigellosis

Since 2006, the highest incidence was reported in the Republic of Moldova (approximately 15 cases per 100,000 population per year), and in Slovakia and Ukraine (>5 per 100,000 per year). In 2020, a high number of cases were reported in Slovakia (103, 1.89 per 100 000) and Hungary (61, 0.62 per 100 000), while relatively few cases were reported in Poland (12, 0.03 per 100 000) and Romania (15; 0.08 per 100 000) (25).

Campylobacteriosis, Salmonellosis and Shiga toxin-producing Escherichia coli (STEC)

Within the European Union, the first and second most reported zoonoses in humans were campylobacteriosis and salmonellosis, respectively (26). In 2019, relatively high notification rates of campylobacteriosis (per 100,000 population) were reported in Slovakia (141.1), while high notification rates of salmonellosis (per 100,000 population) were reported in Hungary (45.6), Poland (22) and Slovakia (91.6) (26,27). Salmonellosis notification rates were above the EU average (20 cases per 100,000 population) in Hungary (45.6), Poland (22) and Slovakia (91.6).

Relatively low notification rates of Shiga toxin-producing Escherichia coli (STEC) infection were reported in Hungary, Poland, Romania, and Slovakia.

These diseases are more likely to be a concern for displaced populations (28). Care should be taken to ensure access to safer foods, especially in refugee settings with poor WASH conditions. Severe disease is more likely among children younger than 5 years and the elderly, which represent a large proportion of the refugees.

Leptospirosis

Between 2006 and 2018, high incidences of Leptospirosis were reported in Ukraine and Romania, with more than 0.5 cases per 100,000 population on average per year (27). Population displacement, with people living in poor shelter, coupled with risk of flooding, are potential risk factors. However, the seasonal peak of leptospirosis in Ukraine is during the summer months(29); and flooding risk is higher in the summer and autumn periods(30).

Vector-borne diseases

West Nile Fever

66 cases of West Nile Fever (WNV) infections have been reported in Ukraine since 2008, most recently in 2015. WNV outbreaks were reported in Romania and Hungary in 2018. West Nile virus (WNV) infections sharply increased in 2018 compared to the previous four years, due largely to the environmental conditions which were conducive to extensive mosquito breeding and propagation.

The risk of WNV may increase in late spring in the bordering countries of Ukraine, and it is important to include WNV in enhanced surveillance activities to promptly detect cases.

Crimean Congo Haemorrhagic Fever (CCHF)

Ticks, the vectors for CCHF, are present in throughout Europe, including in Moldova, Romania, Russia, and Ukraine. Although cases have not been reported in Ukraine in recent years, a recent survey of 966 healthy individuals in the Lviv Oblast, Ukraine, bordering Poland, reported a CCHF seroprevalence of 1.7% (31). Between 2007 and 2018, 1429 CCHF cases were reported in the Russian Federation. Direct contact with livestock in late spring increases the risk for CCHF transmission in the late spring season.

The risk of transmission and outbreaks of CCHF among the displaced population should be considered due to its endemicity and the widespread presence of vectors in the affected countries.

Maternal, newborn, and child health

Estimates of child mortality rates in 2020 were higher in Ukraine than the WHO European region average (Table 6). The infant mortality rate is relatively high in Ukraine compared with other European countries, at around 7 deaths per 1000 live births, which is approximately double that of neighbouring Poland (32). The ongoing conflict is likely to lead to a worsening situation through disruption of essential services and access to health care.

Stunting and wasting rates in Ukraine were reportedly low. Unlike many middle-income countries, Ukraine has no policy on the distribution of micronutrient supplements; there is therefore no distribution of micronutrient supplements for children or iron and folic acid supplementation for pregnant women in Ukraine.

Although the maternal mortality ratio in Ukraine declined from 32 to 19 deaths per 100 000 live births between 2003 and 2017, it remains among the highest levels of neighbouring countries, and was nearly 10 times that of neighbouring Poland (33).

Table 3. Under-5, infant, and neonatal mortality rates (per 1000 live births) for Ukraine and the WHO European Region, 2020

Country	Under-5 mortality rate	Infant mortality rate	Neonatal mortality rate
Ukraine	8.1	6.9	4.8
Europe	4.6	3.8	2.5

Based on the birth rate in Ukraine in 2022 and UNHCR's projections of 4 million refugees by July 2022, approximately 1000 births per week would be anticipated among this population. Based on current numbers of refugees per surrounding country, we estimate the numbers of projected births in the next four weeks at approximately 2,000 (Table 4). However, with numbers of refugees increasing daily, we expect these numbers to rise substantially by the end of the four-week period. In 2014, 100% of births were attended by skilled health personnel, while the caesarean-section rate was 12% (34). Thus, care seeking for maternal health services is expected to be high; prevalence of any method of contraceptive among women aged 15-49 was 53%, with unmet need at 6% (34).

Caesarean deliveries accounted for roughly one quarter of all deliveries in 2019, and there are substantial risks of unsafe deliveries and lack of access to emergency medical care in the immediate term. It is important to remember that refugees are fleeing to countries with functioning health systems, and therefore the risks of unsafe deliveries and lack of access to health care will be much higher while in Ukraine or during transit.

The numbers of deliveries and Caesarean deliveries anticipated may strain the locally provided healthcare capacity as the top causes of maternal mortality are haemorrhage, infection, high blood pressure, unsafe abortion, and obstructed labour. At least 15% of deliveries under any circumstances will require access to emergency obstetric care including the six signal functions for basic EmONC and C-section and safe blood transfusion for Comprehensive EmONC (35). Lack of access to antenatal care due to the conflict and during displacement may lead to complications resulting from lack of continuity of care.

Table 4. Estimation of the births among the displaced population across the surrounding countries in the next 4 weeks (countries listed in accordance with the number of births)

Country	Estimated births among Ukrainian displaced population in the upcoming 4 weeks (as of Mar 11 th)
Poland	1226
Slovakia	144
Hungary	179
Romania	307
Republic of Moldova	229
Russian Federation	97
Belarus	1

In Ukraine, the contraceptive utilisation rate for any method for women aged 15-49 was 53% in 2021, while the unmet need for family planning was 6% (36). Pregnant women and young children represent the most vulnerable population to be affected from limited access to healthcare, delayed vaccination, poor sanitation, and limited dietary diversity (18). It is important to ensure availability of a range of long-acting reversible and short-acting contraceptive methods (including male and female condoms and emergency contraception) at primary health care facilities to meet demand (35). Combined with the fact that the refugee population includes many children and elderly, it is not anticipated that this will be a major requirement.

Nutrition and Infant and Young Child Feeding

Based on available information, wasting (acute malnutrition) prevalence in children aged under five years in Ukraine is low, but the same survey reported low uptake of breastfeeding and sub-optimal complementary feeding practices in children (37).

In terms of Infant and Young Child Feeding (IYCF) there will be a need to address concerns of breastfeeding, mixed feeding and infants who are not breastfed as well as the wellbeing of pregnant and lactating women. Other at-risk infants including low birth weight infants; wasted children, children with disabilities; HIV exposed infants; orphaned infants; mothers who are malnourished or severely ill should also be monitored and supported if indicated.

Priority actions should aim to protect, promote, and support the initiation and continuation of breastfeeding, making mother and baby supportive spaces available in reception, transit or congregate settings, and protect and meet the needs of infants and young children who are not breastfed or who are mixed fed and minimize the risks to which they are exposed. For infants who are exclusively dependent on formula milk, early identification and support to

access code compliant sustained Breast Milk Substitute (BMS)-Infant formula supply and equipment for safe preparation and feeding is key.

Communication in line with the EU regulations to not call for, support, and accept donations of Breast-Milk Substitutes (BMS) and other milk products or feeding equipment (including bottles, teats). Infant or milk formula should not be included in general distributions or baby kits.

Chronic infectious diseases (TB/HIV/HBV/HCV)

Tuberculosis

Affected countries with a TB notification rate above the European Region average of 28 cases per 100,000 population are the Republic of Moldova (80.5), the Russian Federation (71.3), Ukraine (64.9) and Romania (59.9). Tuberculosis (TB) is a serious concern in Ukraine – in 2020, TB was the cause of 2927 deaths (7.0 per 100 000).

Multidrug resistant (MDR)-TB cases account for more than half of all cases in the Russian Federation, 43% of cases in Belarus and about one third of cases in both Republic of Moldova and Ukraine. In 2021, Ukraine was identified by WHO as one of the top 30 countries globally with the highest incidence of drug-resistant cases (38). Over 2,500 TB cases, including 830 MDR-TB, are estimated among the expected numbers of refugees, adding additional burden on health systems and increasing the risk for greater transmission in crowded settings. The level of MDR-TB is particularly worrying as it is more difficult and expensive to treat and is associated with a higher mortality than drug-sensitive TB. Disruptions in services in 2020 due to the COVID-19 pandemic resulted in a drop in the number of newly diagnosed TB cases compared to 2019.

TB treatment coverage was estimated at 81% prior to the current escalation (39). However, population displacement and the associated interruption of TB diagnosis and treatment represent risk factors for elevated morbidity and mortality. This interruption also elevates the risk of TB and MDR-TB generation and transmission in Ukraine and the surrounding countries, which may exacerbate the results of prolonged health service disruptions induced by the COVID-19 pandemic. In such a context, MDR-TB and pre-/Extensively Drug Resistant (XDR)-TB are potential cross-border threats that need monitoring and detection-for early treatment and infection control measures among displaced populations (40).

Table 5. TB and MDR-TB notification rate reported to WHO in 2019 in Ukraine and surrounding countries (41)

Country	Number of TB cases, 2019	Total TB notification rate per 100,000 population	Number of MDR – TB cases	% of TB cases with MDR – TB
Belarus	2 615	27.7	874	43.4
Hungary	552	5.6	12	4.5
Poland	5 321	14	40	1.1
Republic of Moldova	3 255	80.5	559	33.1
Romania	11 623	59.9	302	4
Russian Federation	103 979	71.3	26 445	52.4
Slovakia	214	3.9	5	5
Ukraine	28 539	64.9	5 936	32.2

HIV/AIDS

In 2020, there were over a quarter of a million adults aged 15 and over living with HIV in Ukraine, and ART coverage (adults and children) was just 57% (Table 10). In the same year, the highest rates of newly diagnosed HIV infections in the WHO European region per 100 000 population were observed in the Russian Federation (54.9), Ukraine (39.0), the Republic of Moldova (22.8) and Belarus (22.6), with Ukraine contributing to 15% of diagnoses, and the highest rate of AIDS diagnosis (9.9 per 100 000), within the Region (42). Over half of the new HIV diagnoses were attributed to heterosexual transmission, with a further 38% from intravenous drug use (IDU). Based on our current limited understanding of their demographic breakdown, nearly 25,000 HIV patients are estimated among the anticipated refugee population.

Table 6 UNAIDS Ukraine HIV and AIDS estimates 2020

Adults aged 15 and over living with HIV	260 000
Adult and children newly infected with HIV (2019)	9 300
Adult and child deaths due to AIDS	3 100
Coverage of adults and children receiving ART (%)	57%
Coverage of pregnant women who receive ARV for PMTCT (%)	95%

As with TB, when access to HIV diagnosis and treatment are disrupted, drug resistance can develop, making the disease more difficult and expensive to treat. Access issues created by the hostilities also affect HIV prevention services (including prevention of mother-to-child transmission of HIV and harm-reduction services), laboratory testing, patient care, procurement and distribution of diagnostic materials and treatment. Early infant diagnosis, and patient retention and follow-up are made more difficult by population displacement, movement restrictions and an overburdened health system. An unknown number will seek refuge in surrounding countries and will need consistent access to appropriate OAT regimens. Refugee-hosting countries are advised to support the provision of anti-retroviral (ARV) drugs to continue treatment for people who were enrolled in an anti-retroviral therapy (ART) program prior to the emergency, including women who were enrolled in prevention of mother-to-child transmission (PMTCT) programs.

Hepatitis B & C:

The population coming from Ukraine has low vaccination coverage for HBV, increasing the risk for transmission mainly among the refugees, as the surrounding countries exhibits adequate vaccination. The risk for chronic HBV is higher among children compared to adults, and therefore vaccination is needed from birth to prevent mother-to-child transmission (43). Given the lack of large-scale screening, it is difficult to estimate incidence cases of HBV and HCV in Ukraine due to underreporting. Unlike HBV, HCV can be effectively treated but this treatment is long and therefore the main risk is disruption of treatment among the displaced population.

Non-communicable diseases

Non-communicable diseases (NCDs) are the leading cause of premature death (death occurring before the age of 70 years) in Ukraine, with the five major NCDs (cardiovascular disease (CVD), diabetes, cancer, chronic respiratory disease, and mental health conditions) accounting for 84% of all mortality.

Table 7. 2020 Death rates for selected NCDs in Ukraine

Cause of death	Deaths	% of all deaths	Per 100 000
All deaths	616 835	100	1 620
CVD	408 163	66	1 072
Cancer	77 880	13	204
Diabetes	2 122	<1	6
Mental health disorders	971	<1	3

Access to essential health services, particularly primary health care and medications, are critical for the treatment of NCDs, which are mostly prevalent among older persons (44). Of urgent consideration, without antihypertensive medications, patients are at greater risk of heart attacks and stroke; without insulin, some diabetic patients risk death from diabetic ketoacidosis (DKA); and without bronchodilators and oxygen, patients with chronic respiratory diseases may struggle to breathe or may asphyxiate.

Cardiovascular disease

In 2020, cardiovascular disease (CVD) was the leading cause of death in Ukraine, accounting for two-thirds of all deaths. Prior to the conflict, 14% of the adult population in Ukraine (approximately 6 million) were estimated to have a history of CVD, including heart attack, angina, or stroke. Prevalence increased with age, with 31% of those aged 60-69 years having a history of CVD.

Prior to the conflict, 35% (10.8 million) of the adult population in Ukraine were estimated to have hypertension, with an absence of control reported in 85% (45). Prevalence increased with age, with over 70% of those aged 60-69 reported to be hypertensive.

If an estimated 4 million people are expected to flee Ukraine, of whom half are adults, there are expected to be approximately 300 000 refugees requiring treatment for CVD, and 700 000 refugees requiring ongoing treatment for hypertension (46).

Cancer

In 2020, cancer was responsible for approximately 13% of all deaths in Ukraine. The same year, the incidence of cancer in Ukraine was 371.8 per 100 000 population (n = 162 594), with the most common cancers including colorectal (13.5%), breast (11.2%) and lung (9.8%) (47). The conflict has resulted in disruption to critical treatments such as chemotherapy, radiotherapy, surgery, and analgesia. Media reports have highlighted the number of children who have fled Ukraine and are now in need of urgent treatment in hosting countries. The major risk in the immediate term is treatment interruption for the oncology patients among refugees. It is not clear how the hosting countries would address this health need and what capacity there is to provide diagnosis and treatment continuity. Hosting countries will need to prepare for increased needs, management of different chemotherapy regimens and pressure on radiotherapy facilities

Diabetes

Prior to the escalation of the conflict, 7% of the adult population in Ukraine (approximately 2.3 million) were estimated to be diabetic, with prevalence increasing with age. However, as a quarter of the population have never had their blood glucose checked, this is likely to be an underestimate. While data on the prevalence of diabetes mellitus in children in Ukraine are limited, a study from Poltava region estimated this to be 1.3% in 2017 (48). Therefore, it is estimated that approximately 140 000 adult refugees and 26 000 children will require treatment for diabetes. The number of insulin-dependent individuals is not known.

Chronic respiratory diseases

An estimated one-third of the adult population in Ukraine are smokers, while 7% of adults have been diagnosed with chronic obstructive pulmonary disease (COPD) and 3% with asthma. However, 'wheezing' symptoms are reported in 11%, suggesting under-reporting of both conditions.

An estimated 1.4% of the paediatric population suffer from asthma (49). It is therefore estimated that, among the refugee population, at least 200 000 adults will be suffering from a chronic respiratory disease, and 28 000 children from asthma.

Chronic renal disease

Data from 2017 estimated that nearly one-fifth of the Ukrainian population (nearly 8 million people) were living with chronic kidney disease (50). Information on the numbers of patients receiving dialysis is limited. Although the numbers of refugees in need of renal replacement therapy is difficult to estimate, any interruption to care could result in patients arriving in neighbouring countries in critical condition with complications including pulmonary oedema and hyperkalaemia (51).

Mental Health and Psychosocial Support Services (MHPSS)

The displaced population is at high risk for developing mental health conditions. Displaced populations are likely to have high to very high levels of anxiety, acute stress, and grief reactions. Many of these reactions are transient and adaptive and will subside through stabilization of the living situation and supportive social systems.

Before the current conflict, 12.4% of adults in Ukraine had symptoms consistent with clinical diagnosis of depression. However, there is generally low mental health awareness in Ukraine and stigma associated with mental illness, such that there is a considerable mental health gap, with just 3.2% of depressed individuals having received treatment (52). The prevalence of common mental health conditions, including depression, anxiety disorders, and post-traumatic stress disorder (PTSD) is likely to increase from already high levels. For example, the risk for PTSD before the current conflict was already estimated at over 30% among displaced adults (53) and 22% among children (54,55).

People with severe mental health conditions and dementia are at high risk for exacerbation of their symptoms (due to the breakdown of supportive systems and the risk of disruption of medication and psychiatric care) and are at high to very high risk of neglect and abuse.

Systems for mental health care and psychosocial support in the refugee-hosting countries are unprepared for the influx of high numbers of highly stressed refugee groups, some of whom may need formal mental health care. Unfamiliarity with the health system, linguistic and social barriers are likely major challenges for Ukrainians to access essential mental health services.

Priority areas for consideration are the potential for:

- 1) High levels of emotional distress (including acute stress reactions and grief).
- 2) High levels of PTSD, depression, and anxiety among affected population of all ages.
- 3) Discontinuation of treatment among people with severe and complex mental health issues, which may lead to exacerbation of chronic mental health problems.
- 4) Increase in substance use conditions, including withdrawal of alcohol.

Trauma and injuries

Crisis-attributable casualties

Between 24 February and 14 March, 2022, at least 1,761 civilian casualties had been confirmed, including 636 deaths (46 children) and 1,125 injured (62 children) (56). The Office of the High Commissioner for Human Rights believes that the actual figures are considerably higher. Between 2014 and the current escalation of the conflict, more than 14 000 people have been killed, including 3106 civilian men, women, and children; and approximately 37 000 (7000 civilians) have been injured. Prior to the escalation, most recent casualties were due to mines, unexploded ordnance and other explosive objects.

While the number of refugees who have sustained injuries is unknown, high rates of over-the-counter purchases of antibiotics in Ukraine has resulted in challenges with antimicrobial resistance (57). Multidrug-resistant organisms (MDROs) are frequently connected to war wounds, and cases of multi-drug resistant *Acinetobacter* spp. have been described in patients with infections from wounds acquired during the conflict in Eastern Ukraine (58). Neighbouring countries should therefore be aware of the need to conduct antimicrobial susceptibility testing and adapting their treatment regimens as required.

Sexual- and gender-based violence (SGBV)

Three-quarters of women in Ukraine have experienced some form of violence since the age of 15 years, with 7.6% having experienced physical and/or sexual violence by their intimate partner and 5.9% by a non-partner in 2018 (59).

During conflict, factors such as the lawlessness and insecurity during transit and in refugee settlements can greatly increase the risk of sexual violence (60). Services need to be established to assist victims of SGBV, and safe accommodation provided, particularly for the most vulnerable including unaccompanied women and minors (61).

Sexually Transmitted Infections (STIs)

The incidence of sexually-transmitted infections (STIs) in 2019 in Ukraine were as follows: syphilis (6.01 per 100 000), gonorrhoea (7.97 per 100 000), and chlamydia (32.54 per 100 000) (62). The increased risk of SGBV and limited access condoms during the conflict and in transit, and challenges in navigating a different health care system in the host country, may

further increase the incidence of STIs. It is therefore important to ensure provision of access to condoms, syndromic management supported by testing where available for prompt case management, and counselling on prevention and follow up.

Technological and environmental health risks

Radio-nuclear threats

Ukraine has four operational nuclear power plants (NPPs) containing 15 nuclear reactors, two research reactors, plus Chernobyl NPP that has been decommissioned since the 1986 accident. Only eight out of 15 reactors are operating (the rest are in safe shut-down mode). WHO is monitoring the situation at the three following sites:

- Spent nuclear fuel storage at the decommissioned Chernobyl NPP, that is under control of Russian forces. The facility lost power on 9 March and was run on emergency diesel generators, with Ukraine informing the International Atomic Energy Agency (IAEA) on 15 March that it had been reconnected to the national electricity grid. There is no immediate danger from this facility located within the 30-km of the Exclusion Zone.
- Zaporozhzhia NPP is operating normally. Russian specialists arrived at the site to “provide consultative assistance”.
- Neutron Source facility in Kharkiv was damaged during the week 7-13 March. However, the nuclear reactor is in the safe mode of “deep subcriticality” and there is no immediate danger at the moment.

Even though there are serious concerns about the risk of a nuclear emergency due to direct damage by artillery shelling and fires at nuclear facilities, the reports from the nuclear regulatory authorities and IAEA confirm that radiation levels around operating nuclear installations remain within normal levels.

Extreme winter conditions

Ukraine and its neighbouring countries can experience extreme winter weather conditions lasting from November to March, with temperatures dropping as low as -20°C. The impact of the conflict and displacement is felt even more during winter months; humanitarian needs are exacerbated due to freezing temperatures, frequent disruptions of water, gas, and electricity, and decreased food availability.

Displacement-related drivers of mortality and morbidity

Health risks associated with population displacement

As of 15 March, 2022, over 2.9 million refugees have been displaced from Ukraine to neighbouring countries, with UNHCR estimating that this could rise to 4 million by July 2022 (1). Displaced populations are at greater risk for a wide range of conditions, both

communicable and non-communicable. The risk of communicable diseases is increased (e.g., COVID-19, poliomyelitis, measles, and diarrhoeal disease) primarily due to closer and more intense social mixing, poor quality shelter and WASH (water, sanitation, and hygiene) conditions, greater exposure to the elements including the cold winter weather, and exacerbating factors such as low vaccination coverage, lack of a functioning surveillance system to detect and respond early and continuation of testing and treatment for diseases such as TB and HIV. The risk of exacerbation of noncommunicable disease (NCDs, e.g., hypertension, diabetes) and urgent maternal, new-born and child illnesses is increased by any limitations on access to emergency and essential health services, particularly primary health care, and medications. Health risks upon arrival in surrounding countries will depend on the living conditions and access to healthcare. In addition, an increased risk of Sexual and Gender Based Violence as well as psychological distress needs to be anticipated. It is expected that more vulnerable people will be displaced over the next weeks and months, with higher health needs, no forward destination and further direct conflict related health impacts.

Access and barriers to health in hosting countries

The fluidity of the situation and rapidly rising numbers of people displaced represents a logistical and humanitarian challenge for receiving health systems.

Upon and after arrival in their transit and destination countries, Ukrainian refugees, migrants and other displaced people fleeing the conflict may face barriers to health services. Often compounding and intersecting, these barriers can prevent them from accessing health services. While data are currently lacking, there are a range of potential barriers related to the availability, accessibility (including affordability), and acceptability of services (63) that may emerge, for example:

- **Potential availability-related barriers:** Required health services not available at the scale required in locations with mass movements of refugees, migrants, and displaced people; lack of knowledge or understanding of the health care system and of their health rights, shortages of personnel; delayed availability of health products including medications; long waiting times; services for PTSD/mental health services under-supplied, etc.
- **Potential accessibility-related barriers:** Language and informational barriers; challenges in navigating the administrative and registration processes to use public systems; lack of awareness of where to find services; lack of interpreters and cultural mediators at health care facilities and reception centres; direct financial barriers (co-payments); indirect financial payments (cost of transport to provider); in rural areas and small towns receiving refugee influxes, geographic and distance-related barriers to services, in particular specialized care; and possible discrimination against refugees. Challenges in service delivery and limited access to specialized health care for those in reception centres and camps, with additional geographical challenges to accessing care if clinics are far from reception centres and/or points of entry.
- **Potential acceptability-related barriers:** Pressure to prioritize what are perceived as more urgent survival needs (food, shelter, movement onwards to another location); fear of discrimination or security issues (e.g., fear of denouncement to local authorities if not yet registered with authorities in the local area); opportunity costs (e.g., lack of childcare); social stigma and the integration of refugees in the new host communities, etc.

The result of barriers inhibiting contact with services is **forgone care**, which can have devastating health consequences at any point across the life course. With the demographic

profile of the refugees largely comprised of women, children and older persons, one must consider the potential aggravation of existing health conditions and enhanced risks for morbidity and mortality if they do not get timely access to quality health services (e.g., uncontrolled hypertension in an older person, missed antenatal care visits in a pregnant woman, untreated acute respiratory infections in young children, untreated PTSD in an adolescent). Routine preventive screenings are particularly at risk of being forgone. For example, while the number of Ukrainians developing cancer in 2022 could be similar to that in past years (47), far fewer will be diagnosed. Delayed diagnosis or undetected cancer can result in higher risk of dying from the disease.

Some refugees will navigate the above barriers and be able to access health services. Yet, barriers may prevent the patient from obtaining effective care and coverage, i.e., the receipt of the full treatment plan/set of linked health services of sufficient quality to obtain potential health gains.

Potential **effective care and coverage related barriers** include but are not limited to:

- the inability of a patient to adhere to recommended treatment due to daily living conditions and lack of understanding of the health systems and administrative and language barriers;
- movement of the refugee from one location to another, or transit through multiple countries, causing a rupture in service continuity;
- unaffordable costs of prescribed medications, assistive devices in the case of disability (e.g., for eye health, hearing and other disabilities) and other health products under the current temporary protection and national health policy in the provision of health services to refugees;
- the indirect costs (e.g., transport-related) of adhering to referrals;
- lack of access to complete medical history records, which can influence the appropriateness and quality of services provided and introduce significant delays if diagnostic tests must be redone or person revaccinated;
- waiting times and challenges in navigating referral systems;
- lack of competencies by health workers providing health services to refugees and weak provider-patient communication due to language barriers and fear;
- lack of access to specialized health care, or limitations in the referral systems between primary, secondary, and tertiary health services
- experiences of stigmatization, discrimination by providers, or worries about confidentiality not being kept by providers with regards to diagnoses; and
- treatment continuation/referrals not being prioritized due to trauma and grief.

Multiple barriers can be overcome by the ability of refugees to access financial protection for health services. Likewise, to limit exposure to risk factors for ill-health associated with the adverse social determinants of health, cash transfers/stipends for meeting subsistence needs such as food and water, shelter, buying books for children entering school, etc is also required. Yet, barriers to financial protection and cash transfer modalities can also exist, linked to complexity and administrative requirement of processes for inscription, language barriers, requirements for co-payments even if small, and a range of other factors. In addition, the European Council has adopted a temporary protection directive for Ukrainians fleeing to neighbouring EU Member States (64).

Moving forth, the systematic monitoring of barriers to health and social services experienced by Ukrainian and other refugees fleeing the war is critical. This can be supported through baseline assessments of barriers and the integration of a barriers lens into monitoring and

evaluation frameworks for health sector interventions and coordinated cross-sectoral efforts for refugee inclusion.

A key tenet of a human rights-based approach to health is ensuring the right to participation. In a context in which Ukrainian and other refugees fleeing this war are experiencing trauma and grief, a potential contributor to their resilience is through active engagement in identifying barriers, co-designing solutions, and being enabled to help implement these solutions in their countries of arrival. Attention can be given to engaging, and enabling the appropriate capacities of, refugees to serve as community health volunteers, interpreters, and other contributors to the response to the health dimensions of the crisis.

Recommendations:

Promote refugee- and migrant-sensitive health policies, legal and social protection and programme interventions. This may require modifying or improving regulatory and legal frameworks including in countries not covered under the EU temporary protection, consistent with applicable national and international laws.

Ensure equitable access to quality people centred essential health services, financial risk protection, and access to safe, effective, quality and affordable essential medicines and vaccines for refugees, migrants, displaced people regardless of nationality and legal status. This will require strengthening and building the capacities and resilience of health systems.

Provide continuity and quality of care delivered by public and private institutions and providers, non-State actors and other service providers for refugees, migrants and displaced people, in particular for persons with disabilities, people living with HIV/AIDS, tuberculosis, malaria, mental health and other chronic health conditions as well as those with physical trauma and injury.

Protect and improve the health and well-being of women, children and adolescents living in refugee, migrant and displaced settings. Priority should be given to the provision of essential health services such as: mental health, a minimum initial service package for reproductive health, sexual and reproductive health information and services; maternal health care including emergency obstetric services, pre- and postnatal care; prevention, treatment, care and support for sexually transmitted infections including HIV, and specialized care for survivors of violence, as well as supporting for child health activities.

Enhance capacity to address the social determinants of health and tackle health inequalities to ensure effective health responses, health protection and tackle health inequalities in countries of transit and destination, in line with Health in All Policies (HiAP) (65).

Strengthen health monitoring and health information systems in order to: assess and analyze health trends in, as appropriate; collate and facilitate the exchange of experiences and lessons learned among Member States. Provide appropriate, accurate, timely and user-friendly information on the health services available in countries of transit and destination to these populations.

Strengthen partnerships, intersectoral, intercountry and interagency coordination and collaboration mechanisms to achieve synergies and efficiency, including within the United Nations system, and with other stakeholders working towards improving the health of refugees, migrants and displaced people; enhance coordination between humanitarian and development health actors.

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