



## Global haematology

### Global effort to evacuate Ukrainian children with cancer and blood disorders who have been affected by war

On Feb 24, 2022, Russian military forces began a coordinated invasion of Ukraine. Russian assaults resulted in widespread damage to densely populated residential areas and critical civilian infrastructure, including power stations, transportation hubs, schools, and health care facilities. As a result, more than 10 million refugees have fled Ukraine, approximately 50% fleeing to Poland. Attacks on Ukraine's health system

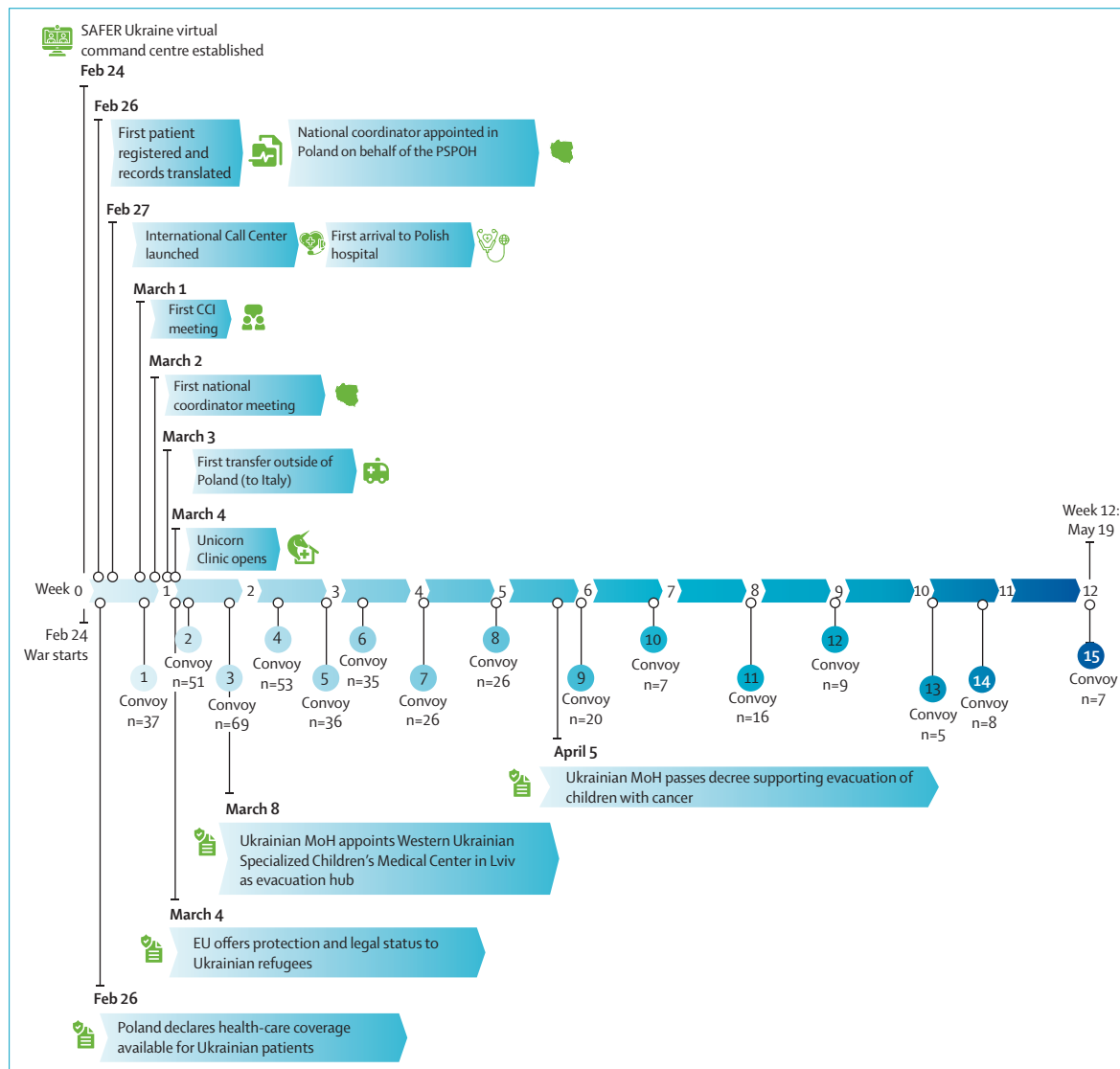
and pharmaceutical supply chains created challenges for the provision of critical services for people with injuries and chronic illnesses. Among the most vulnerable patients are children with cancer and blood disorders, who require timely access to diagnostic, therapeutic, and supportive care for survival. The war has resulted in acute interruption of medical care, threatening the lives of thousands of Ukrainian children.

For the Ukrainian translation see Online for appendix 1

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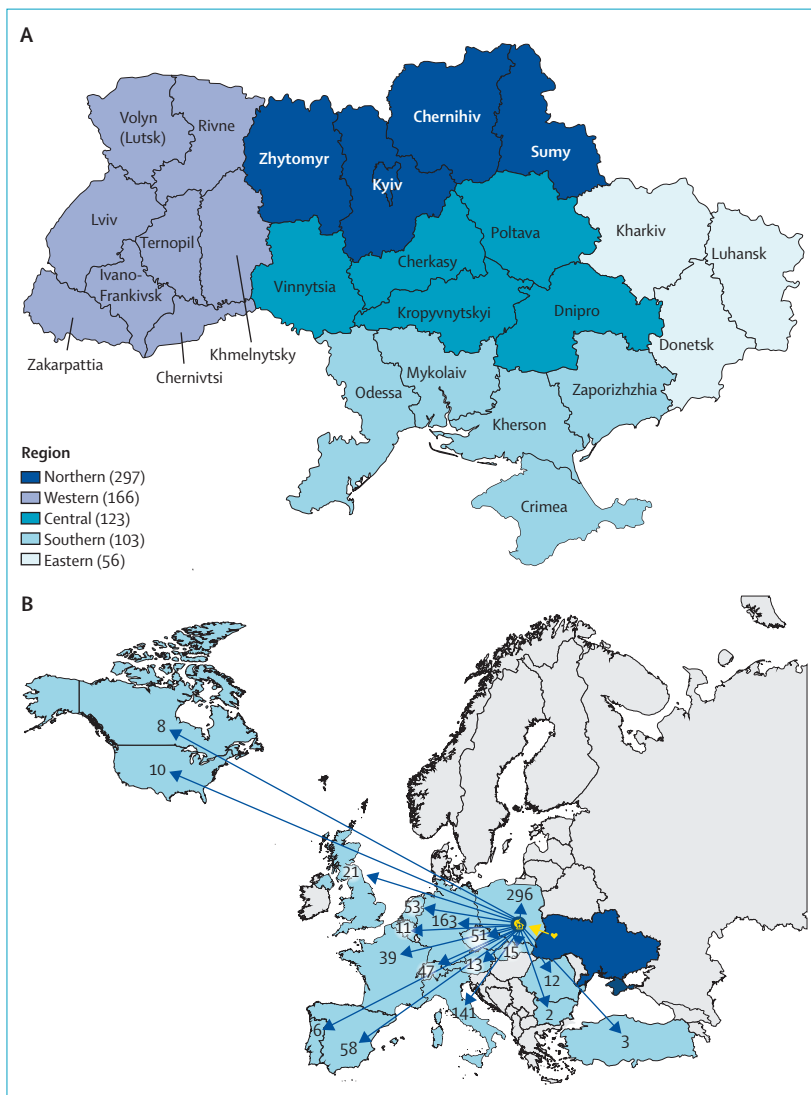
SAFER Ukraine Collaborative group authors are listed in appendix 2 (pp 19–30)

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**Figure 1: SAFER Ukraine timeline, Feb 24 to May 19, 2022**

Activities and relevant geopolitical events in the first 12 weeks following the invasion of Ukraine by Russian military forces. CCI=Childhood Cancer International. MoH=Ministry of Health. PPSOH=Polish Society of Pediatric Oncology and Hematology. SAFER Ukraine=Supporting Action for Emergency Response in Ukraine.



**Figure 2: Origin and referral destinations of patients registered with SAFER Ukraine**

(A) Map of Ukraine showing regions of origin of patients registered with SAFER Ukraine. Numbers of patients from each region are shown in parentheses; 286 patients without a registered region of origin are not included. (B) Map showing the number of patients evacuated to each referral destination, excluding 82 patients pending or missing a final referral destination.

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In response to the urgent needs of Ukrainian children with cancer and blood disorders, the St Jude Children's Research Hospital (St Jude) and American Lebanese Syrian Associated Charities (ALSAC) Global programmes joined non-governmental organisations (NGOs), the Polish Society of Pediatric Oncology and Hematology (PSPOH), the International Society for Pediatric Oncology (SIOP) Europe, Childhood Cancer International (CCI) Europe, and governmental agencies to form Supporting Action for Emergency Response in Ukraine (SAFER Ukraine; appendix 2, pp 2–6), an initiative to facilitate the safe evacuation of patients and families to re-establish medical care abroad. A timeline of the response during the first 12 weeks of the war is shown in figure 1.

Ukrainian patients and families needing evacuation were identified through the Ukrainian Tabletochki Foundation or the PSPOH hotline. Patients were transported to the Western Ukrainian Specialized Children's Medical Center (WUSCMC) in Lviv where they were stabilised for transfer abroad. The WUSCMC team worked with the Ukrainian and Polish governments and NGOs, including the Polish Center for International Aid and the Herosi Foundation, to coordinate the medical evacuation of patients and their families to Poland (appendix 2, pp 7–13).

Within the first week, an increasing number of patients requiring evacuation triggered concerns that the Polish medical system would become overwhelmed, jeopardising medical care for both Ukrainian and Polish children. To mitigate this risk, SAFER Ukraine established the Unicorn Marian Wilemski Clinic, a patient triage centre in southeastern Poland. To evacuate increasingly larger groups of patients efficiently and safely, convoys leaving Ukraine were organised through humanitarian corridors to Poland. After arrival at the Unicorn Clinic, patients were evaluated by the PSPOH medical team; patients at high risk or with acute illness were transferred to local hospitals; those who were stable remained at the Unicorn Clinic for definitive referral abroad. The Unicorn Clinic also provided interpreters, volunteers, and patient liaisons to support the psychosocial needs of patients and their families.

To facilitate international patient referral, SAFER Ukraine partnered with hospitals and foundations organised through SIOP Europe and CCI Europe. Hospitals volunteering to take Ukrainian patients were asked to organise centrally through a national coordinator (a senior clinician familiar with national capacity and expertise) and provide medical transportation, financing of medical care, and full psychosocial services for evacuated Ukrainian patients and their families. To support the logistics of patient evacuation, SAFER Ukraine created a virtual command centre, operational 24 h a day and staffed by St Jude and ALSAC Global employees and more than 400 international volunteers. The command centre maintained a secure electronic patient registry, translated medical records, coordinated transportation logistics, distributed medical records to referral hospitals, and facilitated communication to assure continuity of patient care.

On Feb 27, 2022, the first three Ukrainian patients arrived in Poland. During the following 12 weeks, SAFER Ukraine registered 1031 Ukrainian children with cancer or blood disorders from all regions of Ukraine requesting evacuation for medical care (figure 2A; appendix 2, p 14). The first convoy of 37 patients arrived in Poland on March 1. During the following 12 weeks, SAFER Ukraine organised 15 convoys, ranging in size from six to 73 patients (figure 1). Changes in patient volume during this time are shown in the appendix 2 (pp 15–16).

As of May 19, 2022, 949 patients had arrived at referral hospitals abroad (figure 2B); the other 82 either remained in Ukraine (n=45), were pending referral (n=4), or had an unknown final destination (n=33; appendix 2, p 17). Two patients (0.2% of the 949 evacuated patients and 0.5% of the 405 patients transported via convoy) died within 24 h of transport: one patient with acute myeloid leukaemia and one patient with relapse of acute lymphoblastic leukaemia (appendix 2, p 18). The remaining patients arrived safely at their receiving hospitals abroad.

After the first 12 weeks of the war, the volume of patients requesting evacuation decreased substantially; however, we continue to support an average of one to two evacuation requests per week. In July, 2022, evacuation requests increased again because of escalating attacks in central and eastern Ukraine. While the future needs of Ukrainian children with cancer and blood disorders remain uncertain, SAFER Ukraine remains committed to supporting access to high-quality medical care for these patients both in Ukraine and abroad.

SAFER Ukraine leveraged collaborations between multiple medical, NGO, and government stakeholders to develop an adaptive infrastructure that successfully met the security and medical needs of a highly vulnerable group of seriously ill children during a war. The need for this large-scale, urgent, coordinated response was the result of the destruction of food and water supplies, shelter, and health care due to war. SAFER Ukraine represents a unique humanitarian response to the indirect effects of war, and its strategic and operational elements might not be generalisable to all conflict settings or patient populations. These unique features, however, can inform future emergency responses for patients who have complex medical needs. Notable elements that influenced the success of SAFER Ukraine include the characteristics of the patient population, the geopolitical context, and the existence of well established pre-war collaborations.

Children with cancer and blood disorders are especially vulnerable to the indirect effects of war. With modern treatment and supportive care, overall survival in children with cancer is over 80%; however, interruptions in treatment and insufficient supportive care can result in increased mortality. Because of the high therapeutic efficacy of childhood cancer treatment and the precise timing requirements for its administration, a substantial survival benefit can be expected from the rapid evacuation of patients whose care has been disrupted so that they can resume medical treatment abroad. The long-term medical and psychological outcomes of evacuation on patients and families, however, will need to be assessed in future work.

In addition to the unique characteristics of the patients, the effectiveness of SAFER Ukraine depended on a geopolitical environment that supported the evacuation of Ukrainian citizens abroad. Russia's attacks against civilians and infrastructure galvanised support for Ukraine, including unprecedented international sanctions. Within a week, the EU announced immediate protection and legal status for Ukrainian refugees, creating the legal and financial framework for the referral of patients to hospitals in Europe. This supportive response stands in contrast to the more complex and less welcoming immigration policies impacting other populations fleeing conflict settings.

Finally, SAFER Ukraine was possible because of the rapid repurposing of existing collaborative networks to meet the urgent challenge of evacuating patients and families from an area of violent conflict. Patient convoys began within a week of the onset of fighting, evacuating hundreds of patients within the first few weeks of war. This achievement would not have been possible without pre-existing individual, national, and international collaborations through the PSPOH, SIOP Europe, CCI Europe, and the St Jude and ALSAC Global network of hospitals, NGOs, and governments. In its essence, SAFER Ukraine provides a proof-of-concept for an innovative global health model of multilevel stakeholder engagement and collaboration that can be leveraged in future international emergency responses for a variety of medically complex patients at high risk.

The health and wellbeing of all Ukrainians depend fundamentally on the cessation of the war. Until fighting ends, humanitarian law and norms require the protection of civilians from direct and indirect harm. When this protection fails, there exists an imperative to assist refugees requiring evacuation and medical care. The initiative described in this report represents a successful global collaborative to mitigate the effects of a profound weakening of the health care system on one group of highly vulnerable children exposed to the horrors of war.

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For more on **the effect of Russian assaults on critical infrastructure in Ukraine** see <https://reports.unocha.org/en/country/Ukraine>

For more on **Ukrainian refugees** see <https://data.humdata.org/visualization/ukraine-humanitarian-operations/>

For more on **critical care challenges during the war in Ukraine** see *Nat Rev Nephrol* 2022; **18**: 411–12

For more on the **survival of children with cancer** see *J Clin Oncol* 2015; **33**: 3065–73

See **Online** for appendix 2

For more on **international support to Ukraine** see <https://csreports.congress.gov/product/pdf/IN/IN11869> and [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_1469](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1469)

For more on **policies impacting other populations fleeing conflicts** see

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**Perspectives** *Lancet Oncol* 2021; **22**: 1663–64,

**Perspectives** *Lancet Oncol* 2021; **22**: 1665–66,

and *J Glob Oncol* 2018; **4**: 1–6

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