

Lessons learnt during the war in Ukraine: a report from The Renal Disaster Relief Task force of ERA

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ABSTRACT

People living with kidney disease are among the most vulnerable groups at the time of natural or man-made disasters. In addition to their unpredictable course, armed-conflicts impose a major threat given disruption of infrastructure, sanitation, access to food, water, and medical care. The ongoing war in Ukraine has once more demonstrated the importance of preparedness, organization, coordination and solidarity during disasters. People living with kidney disease face serious challenges given their dependence on life-saving treatment, irrespective of whether they remain in the war zone, or are displaced internally or externally. This affects especially those requiring kidney replacement therapy (KRT), dialysis or transplantation, but also patients with other kidney diseases and the medical staff who take care of them. The European Renal Association (ERA) assigned a Renal Disaster Relief Task Force (RDRTF) dedicated to support the people living with kidney disease and the nephrology community in Ukraine, soon after the war started. This report summarizes the major challenges faced, actions taken, and lessons learnt by this Task Force. We anticipate that the experience will help to increase preparedness and to mitigate the devastating effects of armed conflicts on the kidney community in the future and propose to establish an international collaboration to extend this effort to other parts of the world facing similar challenges.

Keywords: conflicts, dialysis, disasters, kidney patients, war

I. INTRODUCTION

Natural or man-made disasters disrupt the functioning of a society and cause widespread human, material, economic and environmental losses.[1, 2] Vulnerable people, especially elderly, women, children, frail and chronically ill, are more severely affected during disasters. These groups should receive more specific attention to increase their survival chances. Among these, patients in need of kidney replacement therapy (KRT) compose a small but particularly vulnerable group comprising less than 1% of the population. [3-5] Patients on KRT are mostly overlooked by the authorities, who are overwhelmed by extensive needs (i.e. security, housing, nutrition, communication, transportation, water, electricity) of the broader remaining population. Consequently, experts, national and international specialty societies, the World Health Organization (WHO), and non-governmental humanitarian organizations (NGOs) must take up the responsibility for helping these patients. Furthermore, the patients themselves and their families should be prepared for various forms of disasters and at times be prepared even to support each other.

Armed conflicts, wherever they occur, are a major threat to public health, disrupting infrastructure, sanitation, access to food, water, and medical care. One of the major differences between armed conflicts and natural disasters is that in armed conflicts the extent and the duration are not predictable. Conflicts may last for years necessitating a sustainable relief plan.

In this report we aim to evaluate the interventions of the Renal Disaster Relief Task Force (RDRTF) of the European Renal Association (ERA) during the war in Ukraine, and to make proposals for more effective renal relief and rescue strategies for similar future catastrophes.

II. LINK BETWEEN DISASTERS AND KIDNEY DISEASES

The link between disasters and acute kidney injury (AKI) has been well recognized for over a century, [6] when dialysis was not yet available.[7] The RDRTF of the International Society of Nephrology (ISN) [8] was founded following the 1988 Armenian Spitak earthquake when a large number of patients with crush syndrome died due to insufficient dialysis possibilities. Consequently the term “renal disaster” was introduced.[8, 9] The RDRTF, in close collaboration with Médecins sans Frontières (MSF) was instrumental in saving lives of a substantial number of AKI patients in subsequent earthquakes [10, 11].

Since then the World has faced many natural[12-15]and man-made[16] disasters, where threats to life occur across the spectrum of patients with kidney diseases and hence the term “disaster nephrology’ [17] was introduced. Challenges and approaches to such disasters have been highlighted previously and strategies continue to be adapted and improved [16, 18-30]

The recent armed conflict in Ukraine, drew attention once more to the importance of preparedness for such unanticipated disasters. Appropriately, the theme of World Kidney Day 2023 is “Kidney Health for All – Preparing for the unexpected, supporting the vulnerable!” aiming to raise awareness about disastrous events, natural or man-made, international or local, and their impact on people living with kidney disease who depend on appropriate diagnostic services, treatment, and care. [31]

III. ERA IN THE UKRAINIAN CRISIS

The Ukrainian conflict and nephrological consequences

On 24 February 2022, the World was shaken by the attack of Russia on Ukraine which triggered a deep humanitarian crisis. Action on Armed Violence (AOAV) reported that three hospitals were destroyed in the regions of Donetsk (Vuhledar and Mariupol) and Kyiv associated with injuries and deaths (Figure-1).[32] As of November 2022, nearly 7.8 million refugees fleeing Ukraine have been recorded across Europe, while an estimated 8 million people have been displaced within the country. [33]

According to the Ukrainian Renal Registry, in January 2021, 11181 patients (268 pmp) were on KRT: 6017 on hemodialysis, 2700 on hemodiafiltration, 931 on peritoneal dialysis and 1533 living with a functioning kidney transplant. [34]

As the leading Nephrology Society in Europe, ERA was deeply concerned about the possible consequences of this attack and immediately condemned this invasion.[35] The ERA Council appointed a Renal Disaster Relief Task Force (ERA-RDRTF) dedicated to finding ways to provide help to all Ukrainian patients with kidney diseases and healthcare workers. The ERA- RDRTF was started shortly after the invasion (17.03.2022) but unfortunately did not have the chance to meet and prepare for the upcoming war beforehand. The members of ERA-RDRTF consisted of adult and pediatric nephrologists, representatives of European Dialysis and Transplantation Nurses Association/ European Renal Care Association (EDTNA/ERCA) as well as a representative of European Kidney Patients Federation (EKPF).

Preparedness is the key to mitigate disaster -related chaos.[36, 37] Need for coordination has been emphasized previously.[36, 37] ERA-RDRTF applied the appropriate coordination model ensuring rapid communication between the RDRTF coordinator and the key contact people in the affected country, enabling rapid action and pragmatic decisions. The TF decided to use this approach, which had previously proven successful in the cases of natural disasters[36, 37] and at the first TF meeting after the general overview of the situation in Ukraine, tasks were immediately distributed amongst the members mainly regarding communications with:

- Representatives of Ukrainian Society of Nephrology
- The Ukrainian Ministry of Health (MOH)
- European Commission
- Pharmaceutical companies
- Dialysis Industry
- World Health Organization (WHO)
- NGO's in the field - Médecins sans Frontières (MSF),
- Humanitarian Aid Organizations - Caritas and Direct Relief

The main initial aim was to collect information regarding patient numbers in Ukraine and outside, functional therapeutic capacity, urgent needs, possibilities for donations or procurement of supplies, and figuring out how to achieve regular and safe supply delivery.

The information collected was shared with the coordinator/chair of the TF who also briefed the other TF members through frequent mail updates as has been suggested in previous disasters.

The EU temporary protection act [38] was activated in February 2022 ensuring free-of-charge treatment of all patients from Ukraine in EU countries. At the end of the first RDRTF meeting, the members considered as optimal approach to prioritize the evacuation of patients on KRT to EU countries where they could be taken care of. However, soon it became obvious that many patients were reluctant to leave their regions mostly due to feelings of insecurity and a hesitancy to be separated from their families and regular caregivers.

Representatives of the Ukrainian MOH, the WHO, MSF as well as the presidents of the adult and pediatric Ukrainian Societies of Nephrology and representatives from the dialysis

industry were promptly identified and invited to participate in TF meetings. This helped the TF members to better understand the Ukrainian conditions and requests and how the needs in Ukraine could be met. Representatives of dialysis industry included those who operated dialysis units in Ukraine or in the neighboring countries and those providing supplies for those units.

The major conclusions were:

- 1- Most dialysis units except 3 were operational, one of which was disrupted due to bomb attack and the other two were disconnected from water and electricity delivery
- 2- Most patients in the Eastern part of Ukraine were displaced to the cities in Western Ukraine (Lviv, Ivano-Frankivsk, Chernivci, Uzhgorod)
- 3- Medications for CKD management, including heparin, iv iron, erythropoiesis stimulating agents (ESAs) were lacking.
- 4- Immunosuppressive medications including, tacrolimus, mycophenolate mofetil and steroids were urgently needed.
- 5- External human resource assistance was not requested since local and displaced Ukrainian health care workers have continued to work .

Recent article on how the war in Ukraine affected the dialysis provision sheds further light on the human suffering and organizational challenges during times of armed conflict. [29, 34, 39]

Given the unpredictability of this armed conflict, the feasibility of relying on donations to sustainably meet the medical needs was limited, although some early donations were obtained. Furthermore, the WHO, NGOs as well as the European Commission raised funds to purchase dialysis equipment and other supplies as part of humanitarian aid. The TF collected and provided updated information to key organizations such as the WHO, which was used by ERA-RDTF to facilitate its own advocacy on behalf of people living with kidney disease (as well as other complex non-communicable diseases), and to catalyze the provision of medical supplies through networking between the stakeholders. The safe delivery of requested materials to specific destinations proved difficult under the armed conflict conditions. A detailed account of the contributing professional societies, NGOs and humanitarian aid

organizations for humanitarian help to Ukrainian patients with kidney diseases during the war in Ukraine is given in Table 1.

During the initial months of the conflict, the TF had weekly meetings with the participation of colleagues representing the Ukrainian nephrology community. This permitted regular, updating of the needs and requests as well as informing the TF members about the ongoing situation. The Ukrainian Association of Nephrologists and Transplantologists created a Ukrainian Renal Disaster Relief Committee and representatives joined the ERA-RDRTF meetings.

In addition to unavailability of specific medications, other challenges arose related to the inability to measure immunosuppressant blood levels, lack of infrastructure and materials needed for histopathologic examinations and some simple biochemistry tests. The devaluation of the Ukrainian currency resulted in an acute increase in the cost of all medical supplies which have thereby become largely unaffordable.

Access to immunosuppressive medication for transplant patients has generally not been a problem until present, but this needs regular updates based on information about the ongoing situation and the availability of medications. Up till now, transplantation practice has continued in Ukraine, even under war conditions. There has not been a report on increased incidence of infection, acute rejection or other complications among renal transplant recipients.

Following the recent missile and drone attacks to power stations and the distribution grid in Ukraine, the electricity system has been brought to a crisis leading to prolonged restrictions in electricity consumption. Since hemodialysis units rely on electricity supplies, as an alternative dialysis method, some patients were converted to peritoneal dialysis (PD) (personal communication). PD has previously successfully applied in other war conditions as well as during natural disasters. This has been especially emphasized for pediatric patients; but it is certainly a viable option for adult patients as well. [21, 40-42] Energy supply problems also impact the access to medical records, hence access to patient histories and current therapy.

Advocating for patients with kidney diseases

The joint declaration of ISN, American Society of Nephrology (ASN) and ERA at the beginning of the war, continued with further collaboration across the global kidney community. A podcast organized by ASN generated much interest from the nephrology community and a special “Kidney fund” was started by Direct Relief, a US-based NGO, which has ample experience in providing humanitarian aid to disaster zones and armed conflict areas. This initiative enabled the ERA-RDRTF to directly focus and support provision of the necessary medications needed to the people living with kidney disease.

The TF had the opportunity to participate in several meetings of the Directorate General of Health (DG Santé) from the European Commission, with the support of the European Kidney Health Alliance (EKHA). EKHA is an advocacy agency aiming at increasing awareness for kidney disease at EU level, and had already highlighted the need not to forget patients on dialysis in support actions.[43, 44] The WHO non-communicable disease (NCD) Department anticipated the plight of those living with kidney disease, especially those requiring dialysis, and spontaneously reached out early to TF members. The collaboration with the WHO was key in earmarking funds for procurement of supplies through the Ukrainian MOH and catalyzing networking with organizations such as Direct Relief for direction of donations and procurement and delivery of supplies.

Case for Refugee Patients

Although the majority of patients on KRT preferred to stay within Ukraine in the early days, there was an increasing efflux of refugee patients to the neighboring countries over time which seemed to stabilize and was followed by a return to Ukraine as the conflict became chronic. At the beginning of September, 700 Ukrainian refugee patients on dialysis were displaced throughout Europe. Poland received the highest number of refugee dialysis patients (up to 270 patients), while Romania, Moldova, Hungary, Czech Republic and Lithuania also hosted many refugee dialysis patients. For some patients, the displacement continued further from Ukraine mainly to Germany, Slovenia, Italy, Spain and Sweden. Currently RDRTF is trying to map the distribution of dialysis patients to provide insights into

the reasons, challenges and health impact of displacement through a dedicated survey the results of which are still being analyzed

Educational and advisory activities

A special section of the ERA website [45] has been created to offer support to Ukrainian patients as well as health care providers. The website includes information about dialysis centers in individual neighboring countries, the EU protection act and infographics providing information for both the patients and the medical staff to mitigate uncertainties and improve safety. Given that young doctors in Ukraine had to take over responsibilities for managing complex kidney care, a series of case discussions on adult and pediatric patients was launched to provide support to our Ukrainian colleagues. The case discussions covered basic concepts as well as complex clinical challenges. The language challenge was overcome with the help of two Ukrainian expatriate nephrologists. This weekly, virtual interactive 'Clinical Case Discussion' series has proven very popular with up to 70 participants, providing constructive suggestions supporting daily medical practice in the current war conditions.

An all hazards model can be the key

Considering that all disasters share certain commonalities "an all hazards model" (i.e. managing different hazard scenarios with a common plan for hazard mitigation and preparedness) could offer a robust foundation for effective responses. An 'all hazards tool' was published by the WHO, which suggests key actions which need to be considered in responding to any disaster event. This tool proposes the use of a hospital emergency checklist (i.e. communication, safety and security, triage, surge capacity, continuity of essential services, human resources, logistics and supply management), highlighting the importance of a well-functioning command and control system.[46]

For a detailed description of the nephrological actions that can be undertaken in disasters including wars, the interested reader is referred to several review papers in the literature including the recent article published by the ERA-RDRTF [16, 27, 29-31, 36, 37, 43, 47-53]. Possible approaches are detailed *in Figure-2*.

V. LESSONS LEARNED AND IMPLICATIONS FOR THE FUTURE ARMED CONFLICTS:

Lessons learned in other disasters can be largely extrapolated to war situations, and some new lessons were learned. During the war in Ukraine we saw the verification of most in war situations as well.

1. **Preparedness is crucial:** Disasters may occur anywhere; preparation is vital to increase the chance of survival of patients with acute or chronic kidney disease, because of their complex needs. These preparations include medical and logistic planning in a disaster-free period.

2. **The collaboration of national and international nephrology societies is essential:** ERA-RDRTF is a new organization, which provided significant help and support during the recent Ukrainian - Russian conflict. The collaboration of national and international nephrology societies is essential for better preparedness and more effective intervention in renal disasters, in all regions of the world, especially in the developing countries, which are frequently faced with wars, and suffer from major healthcare problems not only during disasters, but also in routine practice.

3. **Individual actions should not be encouraged in situation of armed conflicts/wars:** During the course of the war in Ukraine there has not been a specific request for human resources. During armed conflicts it may not be safe to travel and work on a volunteer basis, there may be language barriers as well as legislation problems even for health care staff. The TF, therefore suggests that individual actions should not be encouraged under such conditions and alternative methods be considered (telehealth, case discussions, WhatsApp groups) to support care of patients locally. On the other hand, volunteers' support in the neighboring countries for the care of refugee patients may prove to be useful when needed.

4. **Help and support of international scientific societies and other NGOs are vital:** Following mass disasters, governments and authorities face many practical problems and patients with kidney diseases do not always receive the necessary attention, leaving the local medical communities with a vast work load and responsibility. Help and support of international scientific societies and other NGOs are vital to support national societies and care providers in their efforts to care for patients with kidney diseases.

5. **Collaboration with the WHO and NGOs is crucial:** Communication and partnership with the WHO, Humanitarian Aid organizations and other NGO's active in the affected country is crucial to bring the attention of these major organizations to the specific needs of patients with kidney diseases. These organizations may also already have, or raise specific funds for patients with kidney diseases

6. **Collaboration with the highest local health authorities aligns efforts to help:** The Ministry of Health (MoH) is the highest authority responsible for the functioning of the healthcare system. Most NGOs as well as the WHO and EU will accept official requests only from the MoH. This is also important for oversight of allocation of limited sources. MoH is also a valuable source of credible information. Good relations must be established with the highest health authority of the affected country, especially with the members responsible for the care of dialysis and transplant patients is important.

7. **Composing local RDRTFs must be encouraged:** The Nephrology community in all countries should be encouraged to create a local RDRTF, which should be in close contact with international nephrology societies. RDRTF should include dialysis nurses and technicians as well as nephrologists. Local organizations should assign key contact people, and substitutes, in a disaster-free period to facilitate efficient intervention if a disaster would occur. These individuals should be easily reachable, prepare and update local disaster preparedness plans and organize local training programs in disaster nephrology, targeting each stakeholder (patients, physicians / nephrologists and dialysis units). Furthermore, under disaster conditions, these local RDRTF coordinators may provide valuable real-time information about the status and functionality of dialysis centers, availability of medications, major needs and requests. If a local RDRTF does not exist, it is worth considering that some countries have multiple nephrology societies and each should be contacted individually.

8. **Patient organizations must be involved in disaster preparedness planning:** It is crucial to include patient organizations in the process of preparing for future disasters. Their active participation would lead to a better understanding of the patient's perspectives and a better response to their needs. Patient education by any means (written, visual and social media, brochures, infographics, websites) is vital to increase survival probability. It would also be very useful for the patients to have a brief medical report including their current treatment in print, in case of displacement. ERA has established a special section for the patients with

kidney diseases in its website. However, despite the efforts of the ERA-RDRTF, we were unable to reach the patients' associations in Ukraine. This issue must be included in the efforts for preparation.

9. *Dialysis and pharmaceutical industries should be included as important stakeholders:*

Dialysis and Pharmaceutical industries are among the stakeholders of health care. The industry may be able to provide information about functionality of supply chains and of dialysis units. They may also be able to provide help and donations of essential medications especially in the early stages of the disaster.

10. *Regular updating of the medical knowledge in disaster nephrology is one of the key*

elements of preparedness: Occurrence of disasters is sporadic, and unapplied medical knowledge is easily forgotten; therefore disaster nephrology courses should be included in medical and nursing curricula and Continuing medical Education activities (CMEs). Preparation and dissemination of short and pragmatic guidelines and/or translating existing guidelines is effective in decreasing the risk of error and providing the most efficient treatment, which in turn increases survival probability of people with acute and chronic kidney disease in disasters [50].

11. *Important legal information must be accessible to patients and medical staff:*

Important information like the legal rights to access healthcare systems in the other countries, lists of dialysis centers in the neighboring countries as well as phone numbers and addresses of the closest dialysis centers in the bordering countries especially for displaced patients on dialysis can be disseminated through RDRTF and national society websites, ideally in the native language of the affected country to overcome language barriers. Disseminating important information through the most popular channels in the affected country may be important.

12. *Adjustment of dialysis requirements to disaster (war) conditions may be needed:*

Adjustments in dialysis frequency or dose, switching from in-center hemodialysis to peritoneal dialysis or home hemodialysis and changes in immunosuppressive regimens should be considered in the case of shortage of medical material and personnel as well as restrictions in power supplies. If problems cannot be coped with once urgent care has been initiated, referral of the patients to distant higher-level hospitals may be life-saving.

However, patient evacuation should be attempted only after careful preparations, and if international, after an administrative agreement between countries has been made.

13. ***Use of telemedicine and tele-education may prove very useful*** : Telemedicine (if possible) may be useful to support inexperienced local physicians in managing medical and logistical challenges. Online consultations and case discussions have been very useful in the recent Ukrainian crisis; this opportunity should also be provided in the future catastrophes, if local circumstances allow. During these virtual meetings, expatriate nephrologists may be helpful to overcome language barriers

14. ***Special attention to ethical dilemmas is required***: Ethical dilemmas may occur under disaster circumstances, especially so during armed conflicts. Corruption at many levels is a risk during all disaster conditions including armed conflict situations. It is important to clarify communication channels preemptively for discussion and identify sources of assistance/advice to address such issues in real time.[54]

15. ***Collection of scientific data is important***: Although collecting scientific data during disaster conditions may be very challenging and not considered as a priority, it is crucial since it may serve to shed light in similar future disaster conditions.

16. ***Depression and war weariness must not be overlooked***: Depression and war weariness remain very important issues and typical for both patients and the medical staff. The desire and motivation of patients to continue treatment as well as the attention and care of the medical personnel towards the patients both decrease over time. The tension in the society increases as the family members of many people are at the front or have already been injured or died. This fatigue and burnout syndrome had been previously described and once more proven during the war in Ukraine.[29]

VI. THE STEPS MOVING FORWARD DURING THE WAR IN UKRAINE

Unfortunately the war in Ukraine has at this moment (beginning of 2023) entered a 'chronic' phase, like many other examples in the world. The end of the hostilities is totally unpredictable. Up till now, the events have proved some of the previous theoretical concerns to be true: burn-out syndrome increasing over time, lack of electricity and water supplies becoming essential and new adjustments being made according to the needs. [16] Modalities of renal replacement therapies seem to be changing to a certain extent from

hemodialysis to peritoneal dialysis out of necessity. On the other hand, in contrast to the earlier periods, supply of consumables and medical products seem to be adequate. However, requests of generators for electricity supply and of batteries to run automated peritoneal dialysis machines are increasing. Generators for electricity production may ultimately not be a solution due to lack of fuel to run those generators. Presence of a functioning health system, infrastructure and competence of health workers before the war is extremely important in finding constructive solutions under the present conditions. Continuing communication and collaboration with all relevant stakeholders and regular updates of the current needs and conditions will be essential also in the period to come.

VII. CONCLUSIONS

People living with kidney disease have complex needs and require continued support and care during disaster circumstances to avoid life-threatening situations. Disaster mitigation and preparedness, which include composing disaster response teams, organizing training courses, preparing and/or translating guidelines and planning of the interventions may be useful to decrease the extent of post-disaster chaos and disorganization, which in turn increase survival probability of patients with acute and chronic kidney disease. Implementation of the action plans, which are prepared in a disaster-free period, and follow up care in the maintenance phase may be life-saving for patients with kidney disease. Post-disaster recovery and rehabilitation activities are necessary to optimize quality of life of the patients who survive the disaster. Debriefing meetings and timely revision of action plans may be useful to avoid mistakes in the future disasters.

No place around the globe is immune to natural or man-made disasters. The ERA-RDRTF is acutely aware that the time and resources spent on supporting the patients and colleagues in Ukraine is in disproportion to the support of patients and colleagues faced with similar (chronic) conflict situations elsewhere. This disproportionate support is not easy to justify but can be attributed to the shock of the invasion of one sovereign country by another, the occurrence of the conflict on the European territory, and the physical ability of the ERA to provide support locally. This in no way means that the ERA values less the lives and challenges faced by others, however it does highlight the necessity for the global renal community to join forces to advocate for and to support patients and colleagues in conflict situations everywhere.

CONFLICT OF INTEREST STATEMENT

The results presented in this paper have not been published previously in whole or part, except in abstract format.

DATA AVAILABILITY STATEMENT

No new data were generated or analysed in support of this research.

ACKNOWLEDGEMENTS

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Table 1.

Humanitarian help to Ukrainian patients with kidney diseases during the war in Ukraine, and scientific societies, humanitarian organizations, and industry that have, to our knowledge, contributed significantly to this mission.

Organization	Type and extent of support
ERA	<ul style="list-style-type: none"> • Appointment of a dedicated RDRTF • Regular meetings with Ukrainian colleagues –Collecting the requests - transmitting the information to the relevant bodies • Establishment of a stable and working relationship with Direct Relief, Caritas, the WHO • Organization of weekly ‘Clinical Case Discussions’ • Creation of a web site dedicated to the Ukrainian Crisis reaching out to patients with kidney diseases and the nephrology community • Free registration for the ERA annual conference for all Nephrologists from Ukraine and free ERA membership for 2023 for all Ukrainian ERA members • A free day of Zoom channel for WKD-2022 and 2023 • Establishing a survey addressing the status of displaced patients on dialysis • Publication of a consensus statement on nephrological intervention during armed conflicts. [29]
ESPN	<ul style="list-style-type: none"> • Regular contact with a key member of the Ukrainian Society of Pediatric Nephrology • Emergency support with medications and pediatric dialysis equipment • Free registration for the ESPN annual conference for all Pediatric Nephrologists from Ukraine • Publication of a position paper on the management of pediatric patients with kidney disease during disasters.[40]
ASN	<ul style="list-style-type: none"> • Creation of a podcast to increase awareness • Fundraising for patients with kidney diseases
WHO	<ul style="list-style-type: none"> • Introduction to relevant stakeholders in MOH and NGOs • Procurement of dialysis materials and medications through MOH
Direct Relief*	<ul style="list-style-type: none"> • Logistic support, including: HD & PD Solutions/supplies/ HD catheters • IV fluids • Medications: phosphate binders, everolimus, IV iron preparations, ESAs • Other: Antibiotics, antineoplastics, anticoagulants, antihypertensives, diuretics, insulin • Cystoscope for a transplant center
Caritas Slovenia, Caritas Spes Ukraine and Dialysis Center Kobarid, Slovenia	<ul style="list-style-type: none"> • Providing delivery of dialysis materials
MSF (DWB)	<ul style="list-style-type: none"> • Logistic support with housing and distribution of supplies
EKHA	<ul style="list-style-type: none"> • Creating awareness of the DG Santé** of the European Commission of the problem of patients with kidney diseases, especially destined for persons taking care of first support and triage of evacuated or displaced people
Dialysis Industry, FMC BBraun Avitum, Baxter Diaverium, Davita	<ul style="list-style-type: none"> • Provided through MOH the supplies for the continuation of dialysis
Pharmaceutical Industry	<ul style="list-style-type: none"> • Donated MOH immunosuppressives, iv iron and heparin

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*Received donations from: ASN, ERA, Swiss Society of Nephrology

** Participation in Webinars organized by General Directorate of Health (DG Santé) of the European Commission, open letter to the European Commission, direct conversations with regulators and administration.

Abbreviations: ERA-RDRTF: European Renal Association-Renal Disaster Relief Task Force; ESPN: European Society of Pediatric Nephrology; ASN: American Society of Nephrology; EKHA: European Kidney Health Alliance; WHO: World Health Organization; MSF (DWB): Medecines sans Frontieres (Doctors without Borders). FMC: Fresenius Medical Care; ESA: erythropoiesis stimulating agent

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Figure 1: The current Ukraine map highlighting the Russian occupied areas (January, 2022)

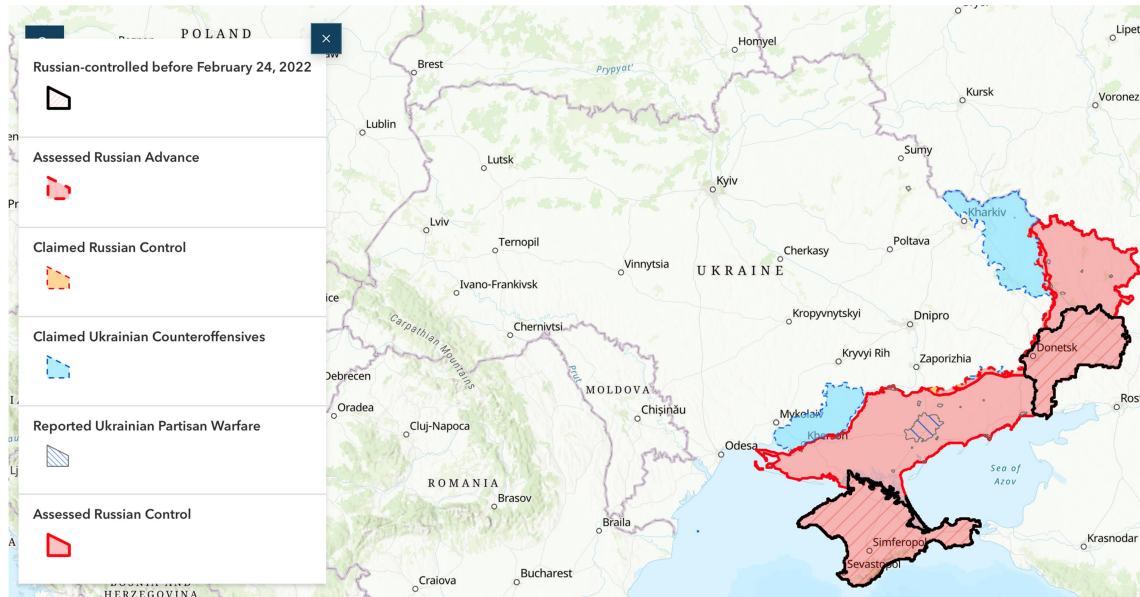


Figure 1: Russia invaded Ukraine on 24 February, but Ukrainian forces retook large areas around Kyiv in early April after Russia abandoned its push towards the capital. Areas in the west of the country, including Lviv, have seen missile attacks but no attempt by Russian forces to take and occupy ground.

Source: Institute for the Study of War and AEI's Critical Threats Project (03:00 PM, 18 January 2023)

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Figure 2:

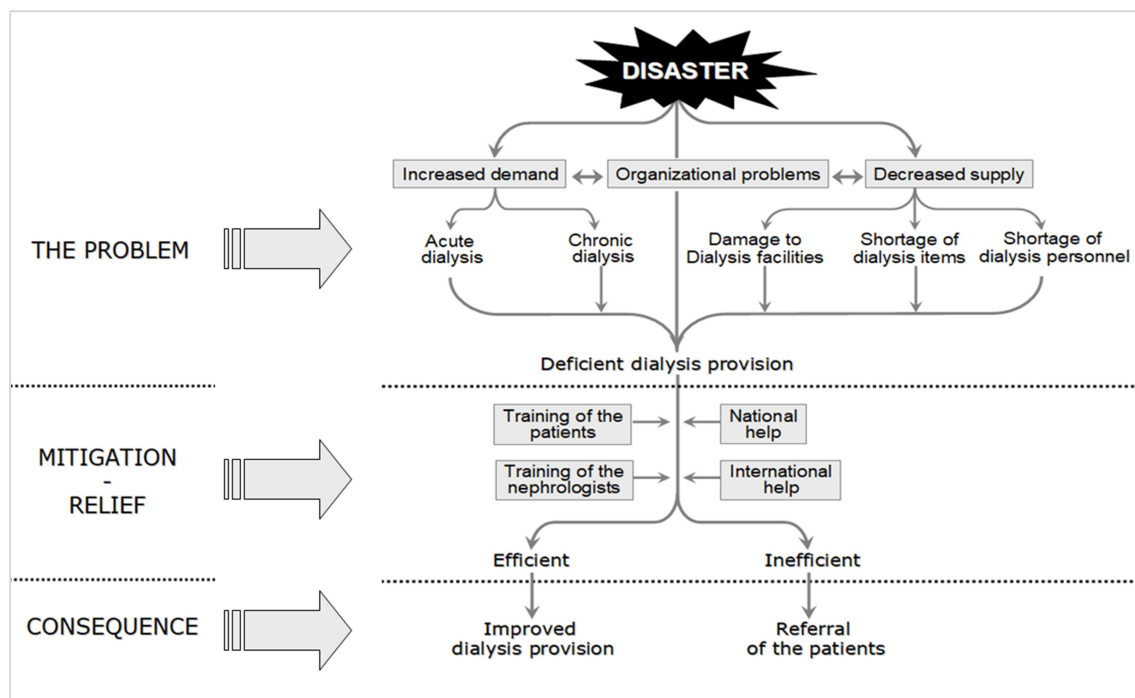


Figure 2: Problems and consequences of mitigation / relief activities during disasters. Dialysis demand may increase mostly due to acute dialysis needs in disaster-related AKI patients. Due to damage to dialysis centers and subsequent redistribution of their patients to the functioning units, dialysis patients may overload these centers. A shortage of dialysis material and personnel in combination with organizational problems cause a disparity between dialysis demand and supply. Training of the patients may teach them on how to adhere strictly to dietary restrictions, thus enabling less frequent dialysis, whereas training of the nephrologists may be useful to decrease dialysis dose, thus increasing dialysis availability for the remaining patients. National and international dialysis material and personnel help may be useful to respond to the need for increased dialysis services. If these interventions are not efficient enough, the only remaining option would be referral of the patients to unaffected regions of the country or to abroad. Interventions and advisory role of the local nephrology societies and international support task forces are instrumental for all of these mitigation and relief efforts

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