



# MAKE IT HAPPEN

## Supporting Ukrainian Radiation Oncology Practitioners in Fight against Two Evils: Cancer and War

### *Introductory remarks:*

### *ESTRO's participation in the ECO ASTRO network, and our role in providing support to Ukraine*

The Boards of the European Cancer Organization (ECO) and the American Society of Clinical Oncology (ASCO) established a Special Network on the Impact of the War in Ukraine on Cancer (Focused Topic Networks ([europeancancer.org](http://europeancancer.org))). The network aims at supporting the oncology community in Ukraine and its neighboring countries as well as the international response to the emergency caused by the conflict. The network gathers representatives of over 300 organisations. ESTRO is one of the Member Organisations of this Network, represented in the Steering Committee by prof. Umberto Ricardi.

The network gathers intelligence to inform our advocacy and policy work on the issue with the World Health Organisation (WHO) and the European Union (EU) Commission, including from cancer centres: healthcare professionals and patient organisations. A dedicated survey to understand the needs of the oncology community in the area was devised and includes a section dedicated to radiotherapy, in collaboration with ESTRO. In addition, several meetings with international stakeholders are organised, including EU DG SANTE and WHO.

The special network creates a community for sharing of intelligence, experience, contacts and putting ESTRO in contact with the Help Ukraine Group (HUG).

In the article below ESTRO interviewed the HUG to find out what more support is needed for the radiation therapy community in Ukraine.

### *Supporting Ukrainian Radiation Oncology Practitioners in Fight against Two Evils: Cancer and War*

Kovalchuk Nataliya, Zelinsky Ruslan, Beznosenko Andriy, Melnitchouk Nelya, Iakovenko Viktor, Kowalchuk Roman, Hanych Aandrii, Severyn Yuliia, Bachynska Bohdana, Duda Oleh, Brovchuk Serhii, Suchowerska Natalka

Contact email of author: [natkoval@stanford.edu](mailto:natkoval@stanford.edu)

#### Affiliation details:

Kovalchuk – PhD, Stanford University, Stanford, CA, USA

Zelinsky – MS, Spizhenko Clinic, Kyiv, Ukraine

Beznosenko – MD, National Cancer Institute, Kyiv, Ukraine

Melnitchouk – MD, Brigham and Women's Hospital, Boston, MA, USA

Iakovenko – PhD, University of Texas Southwestern Medical Center, Dallas, TX, USA

Kowalchuk – MD, Mayo Clinic, Rochester, MN, USA

Hanych – MD, Mariupol Oncological Dispensary, Mariupol, Ukraine

Severyn – MD, National Specialized Children's Hospital OKHMATDYT, Kyiv, Ukraine

Bachynska – RTT, National Specialized Children's Hospital OKHMATDYT, Kyiv, Ukraine

Duda – MD, Lviv Regional Cancer Center, Lviv, Ukraine

Brovchuk – MS, Kyiv Regional Cancer Center, Kyiv, Ukraine

Suchowerska – PhD, University of Sydney, Sydney, Australia

*Conflict of interest: None*

*Funding: None*

## ***Can you tell us more about your group and why you came together to write this article?***

HUG was formed to garner support for Ukrainian cancer centers in response to the full-scale Russian invasion of Ukraine. Oncology practitioners with Ukrainian roots practicing in the United States of America and Australia established connections with oncology leaders in Ukraine to create a feedback loop of establishing a need and providing support for the need, HUG members authored an article in *Advances in Radiation Oncology* describing the situation of radiation therapy in Ukraine and how we can help: [https://www.advancesradonc.org/article/S2452-1094\(22\)00133-6/fulltext](https://www.advancesradonc.org/article/S2452-1094(22)00133-6/fulltext).

## ***How has the war affected healthcare in Ukraine?***

The full-scale Russian invasion of Ukraine began on February 24th 2022, killing tens of thousands of civilians including many innocent children. Many more have been wounded and, as of September 20th, approximately a quarter of the population of Ukraine is displaced: 7.4 million as refugees in Europe and 6.9 million internally displaced due to the war (1). The Russian army is obliterating Ukrainian cities, targeting civilian infrastructure with missiles, deliberately damaging and destroying hospitals and clinics, in violation of Article IV of the Geneva Convention (2). According to Ukraine's Minister of Health, Viktor Liashko, during the first 200 days of war more than 826 healthcare facilities sustained damage, 127 of which were rendered beyond repair (3).

## ***What was the status of radiotherapy (RT) prior to the war?***

Before the Russian invasion, according to unpublished Ukrainian NCI (Tumour Registry) data, out of the 44 million population of Ukraine an estimated 139,000 people were living with newly diagnosed cancer and between 1,000 and 1,200 children were receiving active cancer treatment (AB, unpublished) (4). As to radiotherapy, Ukraine is classified by the Directory of Radiotherapy Centres (DIRAC) of the International Atomic Energy Agency (IAEA) as a low-middle-income country with a level of availability of 2.6 External Beam Radiation Therapy (EBRT) machines per 1 million of the population (5). Prior to the Russian annexation of Crimea and parts of the Donetsk and Luhansk regions in 2014, Ukraine had 52 radiation therapy centres with 86 Co-60 machines (81%) and 20 linear accelerators (19%) (5).

After 2014, Ukraine lost control of 10 cancer centres and over 13 EBRT machines in the occupied part of Donbas and five machines in Crimea (in total, 17% of Ukrainian EBRT machines) (6). To remedy the growing need, 16 linear accelerators were installed by 2022, and the ratio of Co-60 to linear accelerators became 54% to 46% (excluding the EBRT machines in the occupied territories). The Ministry of Health of Ukraine planned to purchase additional 20 linear accelerators, but this plan did not materialise as the Russian invasion struck Ukraine in the early hours of February 24th 2022. After five months of the war, in addition to the 10 cancer centres that have been occupied since 2014, three other cancer centres are now under occupation, three cancer centres have suspended operations and two cancer centres are under constant shelling. Even if the war stopped today, the damage inflicted on the healthcare infrastructure will last for years to come without the world's continuing support.

## ***What are the current pressing needs in oncology and radiotherapy?***

Dr Beznosenko, Chief Medical Officer of the National Cancer Institute in Kyiv and the president of the Ukrainian Society of Medical Oncology (7) told us: 'There is an acute need for chemotherapy medications and disposable medical devices. The supply chains have been disrupted by the war and the hospitals are running out of medication'. Many medical warehouses have been destroyed or are unavailable due to logistical issues, airports are not operational, and many bridges and highways are damaged. Tender agreements are challenging to procure in wartime conditions. Disposable devices are needed in almost every radiotherapy centre. HUG members collected data on the need and requested appropriate corporations for donations. For items that were not donated, HUG members applied to the Union for International Cancer Control (UICC) Solidarity Fund and obtained funding (8). First shipments of immobilisation were delivered to 10 cancer centers in Ukraine. However, more sustained support needs to be established to provide disposable medical supplies and chemotherapy medications.

We appeal to RT vendors to support the aging linear accelerator fleet in Ukraine with enhancing maintenance, providing spare parts, upgrading the software. Cancer centers with newly installed linear accelerators also require support in facilitating their clinical launch in the time of war. Training the personnel, supplying them with the tools they need to treat the patients is critical in these challenging conditions. Automation tools can help simplifying and streamlining the workflow in the environment of increased patient volume and decreased staffing.

Ukraine, a country of 44 million population, has only three positron emission tomography/computed tomography (PET/CT) scanners, all of which are in Kyiv. Only two of them are functioning since the war broke out. Patients from all over Ukraine have to risk their lives and travel to Kyiv for a diagnostic or follow-up CT scan, and many patients just abandon the scan altogether. According to the European Association of Nuclear Medicine, there should be at least 1 PET/CT scanner per 1.5-2 million people,



which would translate into 22 scanners for Ukraine's population of 44 million. In an effort to reduce oncologic morbidity and mortality resulting from the war, HUG members are calling on PET/CT scanner and cyclotron vendors to donate at least one PET/CT and cyclotron to the Lviv Oncology Regional Therapeutic and Diagnostic Centre in western Ukraine.

## ***How can radiation oncology practitioners be assisted?***

At Dr. Beznosenko's request, HUG members are organising a training programme in US/Canada/Australia for Ukrainian female physicians of various specialities (radiation oncologists, medical oncologists, surgeons, anaesthesiologists, pathologists) and medical physicists. The first set of trainees arrived at Stanford in August. Thus far, HUG has secured 11 out of 30 projected training positions: in USA with Stanford University, Mayo Clinic, University of Washington, Brown University, Brigham and Women's Hospital, Harvard Medical School; in Australia with the ICON Group Cancer Centers, Peter McCallum Cancer Centre; in Canada with Princess Margaret Hospital. Each are inviting Ukrainian oncology professionals, usually female, to train for three to six months. We call on more institutions to contribute to the project, secure funding and exhibit professional collegiality and advocacy in practice.

Ukraine needs help in modernising the training for radiation oncologists and medical physicists, as the training in Ukraine is based on Co-60 technology. HUG members are also creating educational materials for transitioning from 3D to intensity-modulated radiotherapy/volumetric arc therapy (IMRT/VMAT). We thank Rayos Contra Cancer for donating training videos for us to translate (9).

We petition professional organisations and vendors to open access to annual meetings, educational resources, training courses and materials to Ukrainians to help them bridge the gap in training during the war.

## ***How is ESTRO helping in the training of Ukrainian RT professionals?***

ESTRO has agreed to provide free registrations to online courses to RT healthcare professionals working in Ukraine. Furthermore, ESTRO is contacting the national societies to explore the possibility of hosting RT residents from Ukraine.

## ***How can Ukrainian cancer patients be helped?***

A team of Stanford medical and computer science students led by Solomiia Savchuk has created a TeleHelp Ukraine initiative to provide remote medical advice and mental health support for Ukrainians with the help of American volunteer doctors and a team of interpreters. This telemedicine effort urgently needs physicians of various specialities (10).

Asya Agulnik director of Global Critical Care Program at St. Jude's, is leading a SAFER Ukraine effort evacuating around >900 pediatric oncology patients from Ukraine. Blue Heron foundation facilitates cancer treatments for Ukrainian patients in Moldova and Romania. Ukrainian NGOs and patient organizations like Tabletochki (11) and Inspiration Family (12) support Ukrainian cancer patients in this challenging time by providing needed chemotherapy drugs, matching patients with opportunities of treatments abroad, and offering patient advocacy and psychological support.

## ***What more can the industry involved in RT do?***

HUG members are grateful to all the vendors for supporting Ukrainian cancer centers during the war:

- CIVCO, Orfit, and QFix donated masks, boluses and immobilization devices to various Ukrainian cancer centers
- MIM Software Inc. provided a free software license to host a MIMcloud Digital Imaging and Communications in Medicine (DICOM) repository for medical images from Ukrainian patients that further inform the video consultations.
- Varian and Elekta conducted the free training courses for Ukrainian radiation oncologists and physicists.
- Siemens Healthineers created a matched €1 mln matched employee fundraiser to help Ukraine with humanitarian needs. Siemens also donated 3 X-ray systems and 4 C-arms to various locations in Ukraine
- Limbus AI Inc. provided free licenses for automatic contouring software
- RADformation donated automatic 3D-planning, automatic contouring, secondary plan check, secondary monitor unit (MU) calculation to Ukrainian cancer centers which will facilitate streamlining the treatment planning workflow.

We continue to appeal to oncology vendors to provide their support, donate equipment and software, enhance support for equipment maintenance and service. We request professional organisations to organise a "Support Ukraine" fundraiser with their membership and the industry to provide much needed help for Ukraine.

Even if the war were to stop today, the long-lasting effect of the decimated healthcare system in Ukraine will last for years to come. The effective cancer recovery plan in Ukraine must have radiotherapy at its heart, with precise coordination between governing bodies, professional organisations, patient organisations, multidisciplinary professionals, and industry (13). But all these efforts start with individuals, and the individual power and will of Ukrainians to fight for their cancer patients is truly inspiring. Let us help these Ukrainian doctor-heroes to win against two evils: cancer and war.



## How can individuals help?

One does not need to be Ukrainian to help Ukraine. It's a matter of compassion.

- If you are interested in helping us provide support for Ukrainian cancer centers, please consider contributing to this fundraiser or share this link with your colleagues: <https://www.gofundme.com/f/ukrainian-cancer-centers-in-the-time-of-war>
- Please contact us ([natkoval@stanford.edu](mailto:natkoval@stanford.edu)) if your institution is willing to provide funding for a visiting scholarship for the Ukrainian female doctors or medical physicists.
- TeleHelp Ukraine initiative needs physicians of various specialties to provide virtual consultations, please sign up to volunteer if you are interested at <https://www.telehelpukraine.com/i-want-to-help-1>

### References:

1. <https://reliefweb.int/report/ukraine/ukraine-response-operational-update-20-26-september-2022>
2. [https://www.un.org/en/genocideprevention/documents/atrocities-crimes/Doc.33\\_GC-IV-EN.pdf](https://www.un.org/en/genocideprevention/documents/atrocities-crimes/Doc.33_GC-IV-EN.pdf)
3. <https://moz.gov.ua/>
4. Kizub, D., Melnitchouk, N., Beznosenko, A., Shabat, G., Semeniv, S., Nogueira, L., Watson, P.J., Berg, K., Trapido, E.J., Espinel, Z., Shultz, J.M. Resilience and perseverance under siege: providing cancer care during the invasion of Ukraine. *Lancet Oncology*. 2022
5. <https://dirac.iaea.org/>
6. Starenkiy, V.P., Petrichenko, O.O., Averyanova, L. External beam radiotherapy facilities in Ukraine. Trends and challenges. *Problems of Atomic Science and Technology*. 2017
7. Kovalchuk N, Beznosenko A, Kowalchuk R, Ryzhkova J, Iakovenko V, Kacharian A. While Ukrainian Soldiers Are Fearlessly Defending Their Country, Ukrainian Oncologists Are Bravely Battling Cancer. *Adv Radiat Oncol*. 2022;7(6):100965. Published 2022 Apr 20. doi:10.1016/j.adro.2022.100965
8. <https://www.uicc.org/news/uicc-solidarity-fund-ukraine-opens-call-grants-qualifying-organisations>
9. <https://www.rayoscontracancer.org/training-programs>
10. <https://www.telehelpukraine.com/i-want-to-help-1>
11. <https://tabletochki.org/en/>
12. <https://inspirationfamily.org/>
13. Price P, Sullivan R, Zubarev M, Zelinskyi R, Radiotherapy in conflict: lessons from Ukraine, *Lancet Oncology*, 2022 DOI:[https://doi.org/10.1016/S1470-2045\(22\)00298-4](https://doi.org/10.1016/S1470-2045(22)00298-4)

