

The fragility and resilience of medical service delivery: lessons learned from Russia's war in Ukraine

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Due to the extremely high number of attacks on healthcare systems, Russia's full-scale war against Ukraine has become infamous. A total of 1,006 attacks have been confirmed, resulting in the loss of 101 lives and the injury of 139 individuals.¹ In total, at least 24,425 civilian casualties have been documented.² The estimated cost of infrastructure damage, losses, critical health service coverage, and rehabilitation amounts to US\$16.4 billion.³

Now the active conflict is primarily limited to the Eastern and Southern regions of Ukraine, but attacks continue to take place throughout the country. This situation significantly hampers the availability of health services, particularly in areas near the frontline. It also imposes restrictions on patient transportation and complicates the distribution of medical supplies. Unfortunately, there is limited information regarding the territories currently under the military control of the Russian Federation.

Nevertheless, the Ministry of Health (MoH), the National Health Service of Ukraine (NHSU), and the Public Health Center remain fully operational. Throughout the war, the NHSU has consistently provided financial support to healthcare providers and pharmacies, thereby reducing out-of-pocket payments for medications. The NHSU continues to fulfill contracts under the Medical Guarantee Program, ensuring the provision of essential state-guaranteed healthcare services.

Considering that 6.3 million people from Ukraine are registered as refugees globally,⁴ while others have been internally displaced, a relatively large workforce still manages to withstand the impact of the war. The number of hospital beds per capita is higher than the European average, and the overall facility capacity³ contributes to the system's adaptability to challenges. However, the outdated medical equipment might compromise complex care.

Currently, in Ukraine, the consistency and continuity of medical care rely not only on healthcare practitioners but also on responsible authorities and civil volunteer movements. International humanitarian and charitable organizations also play a significant role in responding to urgent health needs.

In total, the four major noncommunicable diseases – cardiovascular diseases, cancer, diabetes, and chronic

respiratory diseases – reached a rate of 584 per 100,000 population in 2019, surpassing the European indicators. Communicable diseases are also a concern in Ukraine, as supplementary immunization for measles, polio, and hepatitis has not been implemented on the necessary scale. Due to low vaccination coverage, there remains a high potential for outbreaks of COVID-19 and measles.³

The conflict increases the risk of mental disorders to as high as 1 in 4 individuals. There are even higher estimates suggesting that 15 million people require mental health services. Despite the introduction of the mh-GAP action program at the primary care level, a significant number of people still remain unreached.³

On June 6th, the Kakhovka Dam was severely damaged by explosions, causing over 18 km³ of water to be released from one of the largest reservoirs in Europe over a span of four days.⁵ The breach resulted in extensive flooding of downstream communities, creating an immediate need for evacuation and humanitarian assistance. This situation was further aggravated by adverse weather conditions, shelling, and a significant presence of landmines.

The catastrophe directly affected 46 settlements: 32 in the territory controlled by Ukraine and 14 in the temporarily Russian-occupied territory,⁶ resulting in 6 reported deaths and 31 people reported missing.⁷ Approximately 90% of residents remain within this region, with the elderly and disabled comprising around 36% of the total population.⁸

Due to the disruption or contamination of the water supply, up to one million people are at risk of losing access to drinking water.⁵ The discharge of hazardous chemicals from manufacturing plants, along with biological hazards such as sewage, wastewater, and dead wildlife, poses a significant health risk. The large number of dead fish can be attributed to the presence of chemicals and pathogens that have entered wells and water structures in the flooded areas. This creates a high risk of waterborne diseases, including diarrhea, cholera, and others. The MoH has already prohibited taking water and swimming in flood-affected communities, and has warned against consuming infected fish as it may be a possible source of botulism.⁹ Medications have also been stockpiled to prevent potential outbreaks of intestinal

diseases.¹⁰ Experts regularly analyze water samples to determine the level of pollutants.^{6, 10}

There was also direct damage to medical infrastructure in the Kherson Region, with one healthcare facility being flooded and 35 others designated as at risk of flooding.⁶ There is a potential strain on medical service delivery in Kherson City, as two hospitals are currently accommodating internally displaced people.⁸ The water supply issues may also lead to a temporary closure of medical facilities, disrupting access to care. Currently, healthcare facilities in the Kherson Region are operating using electric generators and depend on water deliveries.¹¹

The destruction of the dam is likely to have a significant long-term impact on Ukraine's environment, economy, and society. As the floodwaters recede and thousands of tons of debris and toxic waste reach the shores of the Black Sea in the Odesa Region,¹² more and more issues will arise. One obvious concern is whether the healthcare systems of the other states bordering the Black Sea, including two EU countries (Bulgaria and Romania), are prepared to respond to potential hazards. The consequences of this war are no longer limited to Ukraine alone but have become a burden for the entire region.

Key words. Health system resilience, Ukraine health system, healthcare in Ukraine, Russia's war in Ukraine, Russia-Ukraine war, Kakhovka dam.

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