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Not peer-reviewed version

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Wendy Carter *

Posted Date: 2 March 2026

doi: 10.20944/preprints202603.0040.v1

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Health System Function During War in Ukraine

Wendy Carter

Independent Researcher, Australia; wendycarter8866@gmail.com

Abstract

The full-scale invasion of Ukraine in February 2022 has subjected the national health system to unprecedented structural, financial, and operational stress. This article examines how Ukraine's health system has functioned under sustained armed conflict, focusing on service delivery, workforce dynamics, health financing, governance, mental health integration, and long-term recovery planning. Drawing on reports from the World Health Organization (WHO), the World Bank, United Nations monitoring mechanisms, and emerging peer-reviewed literature, the analysis explores both system vulnerabilities and adaptive responses. Despite widespread destruction of infrastructure, repeated attacks on health facilities, population displacement, and economic contraction, primary health care services have remained operational in most regions. Pre-war financing reforms—particularly the centralized purchasing model implemented through the National Health Service of Ukraine—contributed to continuity of provider payments and financial protection for patients. At the same time, the conflict has intensified workforce shortages, disrupted supply chains, and generated a substantial burden of mental health conditions and unmanaged noncommunicable diseases. The Ukrainian case illustrates that health system resilience is rooted in pre-existing institutional capacity, protected pooled financing, digital health integration, and coordinated governance under national leadership. Beyond immediate survival, the conflict presents opportunities for transformative reconstruction aligned with equity, community engagement, and universal health coverage goals. The findings offer critical policy lessons for health systems operating in conflict and protracted crisis settings, emphasizing that preparedness, primary health care strengthening, and governance integrity are central determinants of systemic endurance during war.

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The ongoing war in Ukraine, initiated by the large-scale invasion of the Russian Federation in February 2022, has imposed severe stresses on the Ukrainian health system, testing its resilience, adaptive capacity, and long-term sustainability. Before the invasion, Ukraine's health sector had already embarked upon significant reforms aimed at modernizing financing and expanding universal health coverage; however, the sudden onset of full-scale conflict has dramatically altered both demand for services and the structural conditions under which those services are delivered (World Health Organization, 2022). The war has generated both acute and chronic health needs — from emergency trauma care to the management of noncommunicable diseases, mental health support, and the delivery of routine primary care — all in the midst of infrastructure destruction, workforce migration, and economic instability.

Impact of War on Health Infrastructure and Service Delivery

One of the most visible consequences of the war has been the direct impact on healthcare infrastructure. The World Health Organization (WHO) has reported hundreds of verified attacks on health facilities since the conflict began, noting that Ukraine has experienced some of the highest recorded levels of violence against medical infrastructure in any humanitarian crisis (WHO, 2024). The destruction of hospitals, clinics, and medical supply depots not only reduces functional capacity but also imposes psychological barriers for patients who may fear seeking care in exposed areas.

 doi:10.20944/preprints202603.0040.v1

Security concerns and transportation disruptions have further impeded access, especially for rural residents living far from major population centers (World Health Organization, 2025).

Beyond direct attacks, damage to energy and transport infrastructure has had profound ripple effects on healthcare. Electricity outages and interruptions to water and heating have compromised hospital operations, making routine clinical functions far more challenging and costly. In many frontline regions, patients and clinicians must navigate active shelling and persistent insecurity just to reach care facilities — factors that diminish utilization rates and exacerbate disparities in access (Euronews Health, 2024).

Continuity and Adaptation of Health Services

Despite these overwhelming challenges, Ukraine's health system has demonstrated notable resilience. Early assessments by the WHO found that while nearly half of primary health care (PHC) facilities experienced staff absences due to the war, the majority continued to provide essential services by adapting workflows, implementing alternative power supplies, and forming strong collaborative networks with local authorities (World Health Organization, 2023). Moreover, the National Health Service of Ukraine maintained financing streams for service provision, even amid budgetary pressures and an economic downturn, highlighting the importance of stable financing in preserving continuity of care (World Health Organization, 2022).

Primary health care — often the first point of contact for patients — has proven particularly essential during conflict, functioning not only as a site of routine care but also as a hub for addressing mental health conditions, cardiovascular disease, and the specific health needs of internally displaced persons (IDPs). WHO surveys indicate that a significant proportion of PHC providers reported increased demands for mental health support and chronic disease management since the war's outbreak, reflecting both the physical and psychosocial impacts of prolonged conflict (World Health Organization, 2025). Additionally, PHC services have become a critical entry point for displaced individuals seeking to access medications and basic health consultations in new host communities.

Health Workforce Under Conditions of Armed Conflict

No health system can function without its workforce, and in Ukraine the war has profoundly disrupted human resources for health. Even prior to 2022, Ukraine faced workforce imbalances, including an aging physician population and geographic maldistribution between urban and rural areas. The escalation of hostilities intensified these vulnerabilities. Thousands of health professionals were displaced internally, while others fled abroad or joined military medical services. According to the World Health Organization (2023), nearly half of primary health care facilities surveyed during the early months of the full-scale invasion reported staff shortages linked to displacement, insecurity, or family care responsibilities.

Yet the Ukrainian health workforce has shown considerable adaptability. Task shifting, redeployment, and expanded scopes of practice became necessary in frontline and high-influx regions. Nurses assumed greater clinical responsibilities, and telemedicine consultations were used to bridge geographic gaps when specialists were unavailable locally. The Ministry of Health, supported by international partners, also accelerated digital health platforms first introduced during earlier reform phases, enabling continuity of prescription services and reimbursement claims despite population movement (World Health Organization, 2022).

The psychological toll on health workers cannot be overstated. Exposure to mass casualties, long working hours under bombardment, and concerns for personal and family safety have generated high risks of burnout and secondary trauma. WHO assessments have underscored increased demand for mental health and psychosocial support not only among civilians but also among frontline health professionals (World Health Organization, 2025). Maintaining workforce morale, therefore, has required both material support — such as protective equipment and reliable salaries — and psychosocial interventions designed to prevent attrition in an already strained labor market.

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Health Financing and Governance During War

Financing continuity is central to system resilience. Ukraine's pre-war reform agenda had shifted financing toward a purchaser–provider split model through the National Health Service of Ukraine (NHSU), aiming to create performance-based contracts and expand universal health coverage. The war placed extraordinary stress on this system as GDP contracted sharply and fiscal resources were redirected toward defense spending. Nonetheless, international financial assistance and budgetary reallocation allowed the government to sustain payments to contracted providers, preventing the collapse of service provision (World Health Organization, 2022).

Emergency procurement systems were introduced to streamline supply chains for medicines, trauma kits, and energy equipment. However, supply chain disruptions — including damage to transport routes and border bottlenecks — periodically led to shortages of essential medicines, particularly insulin, cardiovascular drugs, and oncology treatments. According to WHO situation reports, ensuring uninterrupted access to medicines for chronic conditions became one of the most pressing challenges in 2022 and 2023 (World Health Organization, 2023).

International coordination has been both indispensable and complex. Humanitarian actors, bilateral donors, and multilateral agencies mobilized rapidly, but coordination mechanisms were necessary to prevent duplication and fragmentation. The Ukrainian government maintained a central coordinating role, integrating humanitarian assistance into national health strategies rather than creating parallel systems — a crucial factor in preserving governance coherence during crisis (World Health Organization, 2024).

Mental Health and Population Health Needs

Modern warfare exerts profound and enduring effects on population health, extending beyond immediate physical injury. Surveys conducted during the conflict indicate widespread psychological distress among civilians, including anxiety, depression, and post-traumatic stress symptoms. WHO estimates suggest that millions of Ukrainians may require mental health and psychosocial support as a direct consequence of the war (World Health Organization, 2025).

Importantly, Ukraine entered the conflict with relatively high burdens of noncommunicable diseases (NCDs), including cardiovascular disease and diabetes. Disruptions in medication supply, delayed screenings, and postponed elective procedures have likely exacerbated morbidity and mortality associated with these conditions. Continuity of NCD care, therefore, became as critical as emergency trauma response. Primary care providers, often supported by telehealth systems and international medication donations, have played a central role in mitigating long-term deterioration in chronic disease outcomes (World Health Organization, 2023).

Immunization programs have also faced interruption risks. Conflict environments historically increase vulnerability to outbreaks of vaccine-preventable diseases. While Ukraine had previously achieved relatively strong immunization coverage in certain areas, war-related displacement and service interruptions created conditions conducive to declining vaccination rates. WHO and UNICEF interventions sought to maintain routine immunization and conduct catch-up campaigns to prevent secondary public health crises (World Health Organization, 2024).

Resilience, Recovery, and System Transformation

Resilience in health systems refers not merely to survival but to adaptive transformation under shock. Ukraine's health system has demonstrated structural resilience through rapid adaptation of financing mechanisms, workforce deployment, digitalization, and international coordination. At the same time, long-term sustainability will depend on reconstruction investments and policy continuity once active hostilities subside.

Rebuilding destroyed infrastructure will require not only capital but strategic planning to ensure equitable distribution of facilities and modernization of service delivery models. The war may paradoxically accelerate certain reforms — including digital health expansion and decentralized

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governance — that were underway before 2022. However, persistent economic strain and demographic shifts, including emigration and declining birth rates, may alter health demand patterns for years to come.

The Ukrainian case underscores several broader lessons for health systems operating in conflict zones: the importance of pre-existing reform structures, centralized yet flexible governance, protected financing channels, and international solidarity grounded in national leadership. The ability to sustain primary care and chronic disease management alongside emergency trauma services represents a defining indicator of systemic resilience.

Strengthening Resilience Through Primary Health Care During Conflict

One of the most important determinants of health system performance in crisis is the degree to which **primary health care (PHC)** remains functional and accessible. In the context of the war in Ukraine, PHC has served not only as the first line of clinical service delivery but also as a stabilizing force for communities under sustained stress. As noted by the World Health Organization (2023), hundreds of PHC facilities across Ukraine have continued to provide essential services despite workforce disruptions, damage to infrastructure, and fluctuating population movements.

In many regions, PHC providers have adapted clinical practices to meet the changing health needs of the population. For example, PHC clinicians have treated growing burdens of **mental health conditions and cardiovascular disease**, as refugees and internally displaced persons (IDPs) increasingly seek care for both war-related trauma and chronic diseases (WHO, 2025). This adaptability underscores the vital role of PHC in mitigating the long-term health consequences of conflict and in supporting progress toward **universal health coverage (UHC)** even under extreme adversity.

Importantly, WHO reports emphasize that teamwork, investment in **digital health solutions**, and flexible staffing patterns have enabled many PHC units to sustain care delivery, compensating for gaps caused by staff absences and damage to facilities. These adaptations reflect a broader trend in conflict-affected health systems: the transformation of service models to prioritize continuity of care and community trust during prolonged instability (WHO, 2023).

Escalating Attacks on Health Care and Humanitarian Protection

Despite these resilient adaptations, the **security environment remains profoundly challenging** for the health sector in Ukraine. A recent United Nations press release documented a **20% rise in attacks on health care in 2025 compared with 2024**, with nearly **2,881 incidents verified since the full-scale war began in February 2022**. These attacks — ranging from strikes on hospitals and ambulances to destruction of medical warehouses — have claimed the lives of health workers and patients, disrupted supply chains, and significantly impeded access to essential services.

The escalation of violence against medical infrastructure constitutes not only a humanitarian crisis but also **a violation of international humanitarian law**, which obligates combatants to protect civilian health services (WHO, 2026). The combined effect of direct attacks and collateral damage to civilian infrastructure, such as electricity and water systems, further complicates care delivery, as hospitals struggle to operate basic utilities required for safe clinical practice.

These dynamics reinforce the need for **robust health protection mechanisms** in conflict settings, including enhanced monitoring, documentation of violations, and international advocacy aimed at safeguarding health workers and facilities from violence. The frequency and severity of such attacks underline the persistent threat that armed conflict poses to health system functionality and population wellbeing.

Health Financing, Governance, and Reform in Wartime

Despite these pressures, Ukraine's health financing reforms have continued to support essential care coverage. A joint report by WHO and the World Bank found that mechanisms such as the

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Program of Medical Guarantees (PMG) and centralized funding through the **National Health Service of Ukraine (NHSU)** have helped sustain financial coverage for health services even in war-affected regions. These reforms have reduced the risk of catastrophic health expenditures for patients and helped maintain continuity of access for populations displaced within or outside Ukraine.

Maintaining financing integrity amidst a shrinking economy and competing budget priorities has not been without difficulty. Yet by **expanding pooled financing and streamlining resource allocation**, Ukraine has been able to prevent systemic collapse and continue progress toward UHC goals (WHO & World Bank, 2024).

Governance structures have also adapted. The central government, in coordination with local authorities and international partners, has fostered participatory planning processes that incorporate **community perspectives on recovery needs** — especially in regions severely affected by conflict (WHO, 2025). This approach reflects a shift toward more inclusive governance, which can strengthen legitimacy and sustainability in post-conflict reconstruction.

Community-Driven Recovery and Long-Term Reconstruction

Reconstruction of the health system will require more than restoring physical infrastructure; it will require investments in human capital, institutional capacity, and community engagement. WHO reports from mid-2025 indicate that **modular primary care clinics**, emergency medical teams, and community feedback mechanisms have started to lay the groundwork for long-term recovery planning. These efforts aim to repair service availability while enhancing community trust and ensuring that reconstruction efforts address **locally defined health priorities**.

Moreover, integration of local voices into recovery planning highlights the importance of **social accountability mechanisms** in rebuilding civic trust and ensuring that future health services are responsive to diverse community needs. This emphasis on participatory recovery contrasts with traditional top-down models and aligns with global best practices in post-conflict health system rebuilding (WHO, 2025).

Conclusion: Policy Lessons for Health Systems in Conflict Settings

The war in Ukraine represents one of the most significant contemporary tests of health system resilience in a middle-income country undergoing reform. The experience demonstrates that health systems operating under sustained armed conflict are neither static victims of destruction nor purely humanitarian appendages; rather, they are adaptive institutional ecosystems whose survival depends on governance coherence, protected financing, workforce flexibility, and community trust. Ukraine's capacity to sustain essential services, even amid widespread infrastructure damage and repeated attacks on medical facilities, underscores the importance of pre-existing reform architecture and strong stewardship by national authorities.

Evidence from the World Health Organization shows that primary health care facilities across Ukraine continued to function in large numbers despite displacement, energy disruptions, and workforce strain (World Health Organization [WHO], 2023). This resilience was not accidental. It was rooted in reforms implemented before the full-scale invasion, particularly the establishment of the National Health Service of Ukraine, which enabled centralized purchasing and sustained provider payments even during fiscal contraction (WHO & World Bank, 2024). The Ukrainian case thus reinforces a central lesson from health systems research: resilience is built in times of stability but tested in times of crisis.

From a policy perspective, several strategic implications emerge. First, **primary health care must remain the backbone of conflict-affected health systems**. PHC's decentralized structure, community orientation, and broad clinical scope make it uniquely suited to address simultaneous trauma, chronic disease, maternal health, and mental health needs. Ukraine's experience aligns with global evidence that PHC-centered systems are better able to absorb shocks while maintaining equity of access (WHO, 2023).

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Second, **protected and pooled financing mechanisms are essential to prevent system collapse**. The continuity of the Program of Medical Guarantees during wartime limited out-of-pocket spending and prevented fragmentation into parallel humanitarian systems. Joint analysis by the World Bank and WHO highlighted how maintaining centralized purchasing arrangements strengthened financial protection even amid macroeconomic strain (WHO & World Bank, 2024). This model offers instructive guidance for other countries vulnerable to conflict: financing reforms that enhance pooling and purchasing efficiency are not luxuries of peacetime but foundations of wartime survival.

Third, **protection of health care under international humanitarian law must remain a global priority**. Repeated documented attacks on health facilities — verified and monitored by WHO surveillance systems — reveal the fragility of normative protections in modern warfare (WHO, 2024). Strengthening global accountability mechanisms, improving verification systems, and enhancing diplomatic advocacy are critical not only for Ukraine but for all conflict-affected settings.

Fourth, **mental health integration is no longer optional in crisis response**. The scale of psychological trauma associated with displacement, bereavement, and prolonged insecurity has transformed mental health from a peripheral service into a central pillar of recovery planning. WHO assessments indicate that millions of Ukrainians may require sustained psychosocial support (WHO, 2025). Embedding mental health services within PHC, training non-specialist providers, and expanding digital platforms are strategies that have proven particularly relevant in this context.

Finally, Ukraine illustrates that **reconstruction should aim not merely to rebuild but to transform**. Post-conflict recovery presents a window for structural modernization, including digital health expansion, infrastructure redesign aligned with energy resilience, and more participatory governance models. WHO's recent reports on community-informed recovery planning emphasize that rebuilding efforts must reflect local priorities to sustain legitimacy and long-term system trust (WHO, 2025). In this sense, resilience evolves from reactive adaptation toward proactive transformation.

In conclusion, the Ukrainian health system's experience during war challenges deterministic narratives of institutional collapse under conflict. While the human and material costs have been immense, the system's continued functionality demonstrates the power of reform continuity, international solidarity grounded in national leadership, and community-based service delivery. For scholars and policymakers in health systems management, Ukraine provides a contemporary case study in resilience theory applied under extreme conditions — a reminder that preparedness, governance integrity, and equitable financing structures form the essential architecture of survival in times of war.

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