

## Resilience With a Price: What Surveys, Stress Hormones and Vulnerability Maps Tell Us About Long Wars

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Long wars do not produce only isolated traumatic events — they turn stress into an everyday environment. People continue to study, work, care for others, and plan for tomorrow, while living with repeated air alarms, attacks, displacement, infrastructure disruption, and prolonged uncertainty. This presentation uses three complementary “lenses” to understand health under long wars: (1) survey data describing lived experience and coping, (2) biological stress markers that reflect longer-term physiological adaptation, and (3) vulnerability maps that show how health risks cluster geographically when conflict intensity intersects with environmental and infrastructural stressors.

**Survey lens (what people report).** Survey evidence from the first months of the full-scale invasion highlights a high burden of mental health symptoms in the general adult population: among 801 valid responses collected March 19–31, 2022 (from 1,400 participants invited; 57.2% response rate), 52.7% reported psychological distress, 54.1% anxiety symptoms, 46.8% depression symptoms, and 12.1% met insomnia symptom criteria, with symptom patterns linked to demographic and war-context factors including living in occupied areas. Additional work among university communities used repeated cross-sectional designs (e.g., pre-war November 2020, n=752; during-war September–October 2022, n=862) to examine trajectories of life satisfaction, stress, anxiety, and depression under different crises and time points, showing adaptation patterns that challenge simplistic “collapse vs coping” narratives.

A dedicated youth-focused program extends this lens by examining how young people living in different Ukrainian regions experience wellbeing, future orientation, coping, and trauma-related symptoms under prolonged threat. The project includes a first-stage student sample (n=593; mean age 18.9) and a second-stage expansion (n=1,798; mean age 19.9), with additional parent reports (n=283) and biological sampling (hair samples, n=221) and ongoing follow-up. In these youth data, resilience-related resources are prominent: 56.3% of participants reported being at least slightly satisfied with life; 60.8% reported average or high optimism; 58.7% reported average or high post-traumatic growth; and 60.5% reported average or high resilience. At the same time, exposure context remains critical: living under occupation and active hostilities was associated with PTSD symptoms, and occupation was related to life satisfaction. Gender differences were observed for life satisfaction and post-traumatic growth, while hope, optimism, resilience, and the prevalence of certain coping strategies did not differ. Together, these findings underline a key long-war pattern: resilience and distress can coexist, and functioning does not automatically imply recovery.

**Biology lens (what bodies show).** The second lens addresses what surveys cannot fully capture: longer-term physiological adjustment to chronic threat. Hair cortisol concentration (HCC) is introduced as a marker that reflects sustained activity of the stress system over weeks to months, providing a stress diary better aligned with long-war exposure. In the youth biomarker sub-sample, objective exposure indicators in the previous 90 days were linked to HCC: each additional hour of air alarms was significantly associated with lower HCC, time between alarms was not significantly related, and each additional explosion was significantly associated with lower HCC. The central message is not that resilience is absent, but that resilience may involve hidden physiological adaptation – potentially consistent with down-regulation of stress-system activity under chronic, repeated activation – and therefore may carry biological costs even when young people appear to be coping.

**Map lens (where risk concentrates).** The third lens scales up from individuals to places, highlighting that health risk has a geography. Vulnerability mapping integrates conflict severity (attack frequency and casualties across weapon types) with environmental and infrastructural vulnerability (for example extreme cold, damp conditions, power outages, inadequate and crowded housing), and then combines these risks with indicators of sleep and mental health (anxiety, depression, sleep deprivation) to identify population-level vulnerability. Additional map-based domains emphasize “war exposure” as a composite of violence, adverse living conditions, service disruptions, insecurity of food and medicines, damage to heating and

water systems, housing damage and unmet repair/insulation needs, limited subsidies, and shortages of heating fuels; sensitivity analyses consider economic vulnerability and mental health factors; and adaptive capacity captures access to response infrastructure (hospitals, pharmacies, ambulance services) and humanitarian aid availability.

**Conclusion and discussion focus.** Across all three lenses, the same conclusion emerges: resilience is real, but it may have a price, and that price is not evenly distributed. Surveys show a complex mix of strength and strain; biology suggests hidden physiological adaptation under chronic threat; and maps show compounded vulnerability where conflict intersects with environmental exposure, infrastructure disruption, and limited access to services. The presentation closes by inviting discussion on how families, educators, universities, health systems, humanitarian actors, and policymakers can reduce the hidden costs of endurance in long wars – shifting from admiration of resilience to practical, data-guided support that protects both mental and physical health during war and supports recovery afterward.