

ISRG Journal of Arts, Humanities and Social Sciences (ISRGJAHSS)



ISRG PUBLISHERS

Abbreviated Key Title: ISRG J Arts Humanit Soc Sci

ISSN: 2583-7672 (Online)

Journal homepage: <https://isrgpublishers.com/isrgjahss>

Volume – IV Issue - V (September-October) 2026

Frequency: Bimonthly



Physical Culture and Sport Development in Ukraine, 2015–2025: Structural Changes and Regional Disparities in Times of Crisis and War

PhD. Adam Popek

University of Physical Education in Krakow

| **Received:** 21.10.2026 | **Accepted:** 26.10.2026 | **Published:** 27.10.2026

***Corresponding author:** PhD. Adam Popek

Abstract

Background: Armed conflict can alter sport systems through damage to venues, disruptions to education, population displacement, changes in public funding, and increased demand for psychosocial support. Ukraine offers an important case for studying these interconnected processes, although administrative time series are not always comparable across years and territories.

Objective: To describe changes in selected officially reported sports-facility inventories for 2015–2023 within the wider 2015–2025 policy period; interpret these patterns in relation to sport-science research and the wartime context; and develop a reproducible framework for assessing regional disparities and institutional resilience.

Methods: A longitudinal secondary analysis used the State Statistics Service of Ukraine's Statistical Yearbook 2023 (sports facilities section) alongside Ministry of Youth and Sports reporting portals, World Health Organization documents, and peer-reviewed studies. Absolute and percentage changes, successive-period rates, index numbers and category-specific comparisons were calculated. No unverified 2024–2025 infrastructure counts or oblast estimates were imputed.

Results: Between 2015 and 2023, recorded large stadiums decreased from 974 to 825 (–15.3%), sports grounds from 36,065 to 31,200 (–13.5%), football grounds from 10,851 to 10,110 (–6.8%), and tennis courts from 1,127 to 1,104 (–2.0%). Declines between 2021 and 2023 were especially marked for sports grounds (–12.7%) and large stadiums (–11.7%). These figures describe registered infrastructure, not direct combat losses or individual physical-activity behaviour.

Conclusions: Ukrainian sports-system development during 2015–2025 should be understood as a multidimensional challenge comprising physical availability, functional access, workforce continuity, population mobility, and participation equity. Available published data document contraction of several facility categories through 2023 but do not support causal estimates or defensible quantitative rankings of oblasts for the entire period. Policy evaluation should combine harmonised facility registers with spatial accessibility and participation indicators.

Keywords: Ukraine; physical culture; sports infrastructure; regional inequality; armed conflict; physical education; sports policy; resilience; administrative statistics.

1. Introduction

Physical culture is more than organised competition. It includes school physical education, recreational exercise, informal movement, fitness programmes, community sporting events, and high-performance sport. These domains share some resources but differ in their users, objectives, and conditions of access. Their development therefore cannot be reduced to the number of stadiums or sports grounds alone. Facility availability remains, however, a critical enabling condition: participation depends partly on whether a safe, affordable and usable setting exists close to where people live, study or work (Bauman et al., 2012; World Health Organization [WHO], 2020).

Physical activity is also central to public health. WHO guidelines recommend regular aerobic and muscle-strengthening activity and emphasize that even modest increments in movement provide benefits (WHO, 2020). The global policy agenda treats opportunities for physical activity as a cross-sector concern involving schools, transport, urban planning, community programmes, and sport organisations (WHO, 2022). Accordingly, the physical-culture sector serves both sport-specific and population-health functions, and any contraction in its physical or organisational capacity warrants careful attention.

Ukraine is a particularly consequential setting because institutional change has intersected with prolonged insecurity, internal displacement, outward migration, and the full-scale invasion launched on 24 February 2022. These processes can affect the system through different mechanisms. A venue may be destroyed, occupied, unavailable due to security restrictions, or used for emergency functions. Coaching staff may relocate, be mobilised or face disrupted employment. Families may move away from traditional sport providers while receiving municipalities face new demands. Simultaneously, sporting activity may provide routine, social connection and psychological resources for people experiencing upheaval. These mechanisms are analytically distinct and should not be treated as interchangeable evidence of war effects.

Research involving displaced Ukrainian children and adults suggests that physical activity can be relevant to resilience and quality of life, but such studies are not substitutes for representative national surveillance. For example, Korcz et al. (2024) examined the relationship between school functioning, physical activity and resilience in 248 refugee children in Poland. Bielikova et al. (2024) investigated physical activity and quality of life among internally displaced persons, while Vorobiova et al. (2024) studied wartime activity and health in a questionnaire sample. These studies underline the importance of people-centred outcomes but differ in design and populations from administrative facility censuses.

A methodological gap follows. National annual counts can document an overall direction of change, yet do not automatically show geographic equity, neighbourhood travel time, facility quality, operating hours, affordability, or actual utilisation. A scientifically defensible analysis must distinguish observations from interpretation, measure trends transparently, and make the absence of comparable regional data visible rather than concealing it in apparently precise claims. This article takes that approach.

2. Conceptual Framework and Literature Review

2.1. Ecological determinants of sport participation

The ecological perspective locates physical activity within interacting individual, social, organisational, environmental and policy environments (Bauman et al., 2012). From this perspective, sports-infrastructure counts are supply-side indicators rather than sufficient measures of effective access. Two localities may have similar facility counts yet differ greatly in transport links, admission costs, inclusive programming, safety and opening hours. Conversely, fewer venues may coexist with higher utilisation if sites are multifunctional and effectively managed.

In assessing sport development, it is therefore helpful to distinguish four dimensions: (1) physical stock (the inventory of venues); (2) operational capacity (staff, funding, maintenance and safe functionality); (3) realised opportunities (sessions, school programmes and clubs); and (4) participation outcomes (who is active, how often, and in what forms). The four dimensions may diverge sharply during an emergency. Declines in formal registrations may reflect institutional disruption as much as changes in residents' desire for activity.

2.2. Armed conflict, mobility and participation

War introduces a spatial mismatch between the location of established resources and the location of people who need them. Out-migration and internal displacement alter the size and composition of the potential participant population, often rapidly. Such shifts complicate comparisons based on sports facilities per resident. The denominator may become as uncertain as the numerator, especially where population estimates rely on pre-war residence or incomplete registration. This is particularly relevant when seeking to interpret apparent regional disparities.

War-related stress also changes the rationale for activity programming. Participation in play, physical education and structured recreation can offer continuity and social contact, but programmes must be trauma-informed and appropriate to security risks. Studies focusing on Ukrainian refugee children (Korcz et al., 2024) and displaced pupils (Bodnar & Sofinsky, 2024) point to educational inclusion as an important component. Moreover, sport should not be romanticised as an automatic solution to psychological distress, inequality or conflict-related disadvantage. Its social benefits depend on programme design, accessibility and safeguarding.

2.3. Resilience in sport institutions

Institutional resilience refers here to the ability of a local or national sport system to sustain, adapt and eventually restore opportunities for safe physical activity when stressed. It is not equivalent to simply preserving the number of facilities. Resilience may entail temporary venues, shared school-community infrastructure, staff redeployment, hybrid instruction, or cooperation between municipalities and voluntary organisations. A Delphi study of Ukraine's Olympic sport needs identified safe training places, maintaining fitness, and improved recovery systems among the key priorities articulated by expert participants (Top 10 needs of Ukraine's Olympic sports in hostile conditions, 2024). Although high-performance settings are distinctive, the broader importance of safety and continuity applies across the sport system.

A resilient system should also be equitable: the adaptation of services should not depend solely on the capacity of affluent or less-affected regions. This article therefore treats regional inequality as a substantive research question while refraining from manufacturing an oblast-level empirical result from national aggregates.

3. Aim, Research Questions and Hypotheses

The principal aim is to assess the documented direction and magnitude of selected infrastructure changes in Ukraine and to interpret their implications for physical culture and sport development during the crisis and war period of 2015–2025. The quantitative evidence presently verified for this manuscript extends through 2023; 2024–2025 are included in the overall contextual and research agenda, not represented as measured infrastructure outcomes.

Research question 1: How did the number of selected categories of officially registered sports facilities change from 2015 to 2023? Research question 2: How do the reported changes in 2021–2023 differ across facility categories? Research question 3: What plausible mechanisms link wartime disruption, mobility and policy conditions to sport-system functionality without establishing unsupported causality? Research question 4: What minimum data structure is required to identify regional disparities rigorously?

H1: Selected categories of registered sports facilities show lower national counts in 2023 than in 2015. H2: The extent and timing of contraction differ among facility types. H3 (to be tested in a

subsequent regional panel): Post-2022 variation in functional sports infrastructure is associated with differential exposure to insecurity and displacement. H4 (also prospective): Regional participation opportunities are related not only to facility stock but also to workforce and organisational continuity. Only H1 and H2 can be assessed directly using the verified facility series here.

4. Materials and Methods

4.1. Study design and data provenance

This study uses secondary statistical analysis and critical documentary review. The main quantitative source is the English-language Statistical Yearbook of Ukraine for 2023, section 7.7, which attributes sports-facility counts to the Ministry of Youth and Sports of Ukraine (State Statistics Service of Ukraine, 2024). It provides benchmark-year national observations for 2015, 2018, 2019, 2020, 2021, 2022 and 2023. The Ministry’s Form No. 2-FK reporting pages and annual Ukraine Sporting information yearbooks were reviewed as official source families that may enable a future extended regional dataset (Ministry of Youth and Sports of Ukraine, n.d.-a, n.d.-b).

These repositories are not assumed to be interchangeable. A specific indicator may differ by collection instrument, publication year, territorial coverage or administrative definition. Accordingly, the values entered into calculations below all come from the same published statistical-yearbook table. No blanks were interpolated for 2016–2017 or 2024–2025. Separate research literature and international reports inform interpretation but not the facility-count computations.

Table 1. Analytical evidence and its role

Evidence	Period	Scale	Use in article
Statistical Yearbook of Ukraine, §7.7	2015; 2018–2023	National	Direct numerical analysis
Annual 2-FK reporting portal	2015–2025 listed	National / potentially oblast	Source map; not extracted as a harmonised panel
Ukraine Sporting annual directories	Multiple annual editions	Potential regional detail	Context and follow-up extraction
WHO STEPS Ukraine factsheet	Pre-war survey, issued 2022	Survey population	Distinct participation context
Peer-reviewed war/displacement studies	2024 publications	Specific research samples	Mechanisms and interpretation

Note. The data types are deliberately separated; survey estimates, administrative inventories and qualitative studies have different inferential scopes.

4.2. Operational definitions and statistical calculations

Four categories were retained: stadiums with stands for at least 1,500 seats, sports grounds, tennis courts (a subset of sports grounds), and football grounds. All represent reported facility stock at the end of the stated year. Since tennis courts are included within sports grounds, adding the two figures together would involve double counting. Football grounds are reported separately by the source, and categories should not be summed into an overall unique-site total unless source definitions explicitly establish mutual exclusivity.

For a facility category with recorded stock X_t in year t , absolute change was $\Delta = X_b - X_a$ and percentage change was $100 \times$

$(X_b / X_a - 1)$. A 2015-based index is $I_t = 100 \times X_t / X_{2015}$. The two-year percentage change from 2021 to 2023 was calculated by the same formula. Period rates are descriptive rather than inferential; no p-values are reported because these observations are compiled administrative totals, not a probabilistic sample of independent survey respondents.

Changes from 2015 to 2023 combine pre-invasion and invasion-period developments. The year 2022 should be understood as a transition year, not an unambiguous treatment start in an experimental design. National end-year counts can be affected by data availability, adjustments in reporting boundaries, and the definition of functioning or registered facilities.

4.3. Prospective protocol for regional analysis

A robust oblast-year panel would include administrative unit identifier, year, category, registered stock, number of operational

venues, number of qualified sport workers, participation by age and sex, population denominator, reporting completeness, and a traceable territorial-coverage code. Raw counts would first be inspected for comparability. Rates per 10,000 people should be calculated only for years and places with defensible denominator estimates; a sensitivity analysis using alternative population estimates would be required during mass displacement.

Possible descriptive inequality statistics include the coefficient of variation and a population-weighted measure of dispersion. Region-level models could subsequently compare pre-2022 trends and post-2022 changes, conditional on available data quality. However, without an appropriately constructed comparison and measures of treatment exposure, descriptive differences cannot be interpreted as causal effects. Given the possibility of missing-not-at-random observations from highly affected territories, missingness itself must be tabulated and explained.

4.4. Reproducibility and quality assurance

Each observation was transcribed from a single identified source table and independently checked against the year labels and category labels. Calculations were reproduced using simple arithmetic on the published values. The decimal results are rounded to one decimal place only at presentation. Data not visible in the verified source are not reported as measured outcomes. The study makes no claim to reconstruct damaged-venue registers or to compare region-specific outcomes without the underlying panel. Public administrative aggregates do not include personally identifiable participant information, so participant consent is not applicable to the present document-based analysis.

5. Results

5.1. Inventory levels across the observed years

Table 2. Sports facilities in Ukraine, selected years (counts)

Year	Stadiums $\geq 1,500$	Sports grounds	Tennis courts	Football grounds
2015	974	36,065	1,127	10,851
2018	956	37,090	1,150	11,097
2019	960	35,028	1,177	10,900
2020	960	34,310	1,173	10,859
2021	934	35,744	1,182	11,345
2022	854	33,284	1,115	10,520
2023	825	31,200	1,104	10,110

Note. Source: State Statistics Service of Ukraine (2024), Statistical Yearbook of Ukraine 2023, section 7.7. Tennis courts are a subset of sports grounds. No observations are supplied here for 2016–2017 or 2024–2025.

The largest inventoried category is sports grounds, ranging from 31,200 in 2023 to 37,090 in 2018 among the reported benchmark years. Football grounds range from 10,110 in 2023 to 11,345 in

2021. In contrast, stadiums with large spectator capacity are comparatively scarce, with reported counts below 1,000 in every observation. It is important to interpret the categories according to their social functions: smaller grounds are generally more relevant to neighbourhood-level everyday activity, while large stadiums often serve organised spectator or competitive sport.

5.2. Magnitude of long-term and recent change

Table 3. Descriptive change in registered facility stocks

Category	2015	2023	Absolute Δ	2015–23	2021–23	2023 index (2015=100)
Large stadiums	974	825	-149	-15.3%	-11.7%	84.7
Sports grounds	36,065	31,200	-4,865	-13.5%	-12.7%	86.5
Tennis courts	1,127	1,104	-23	-2.0%	-6.6%	98.0
Football grounds	10,851	10,110	-741	-6.8%	-10.9%	93.2

Note. Authors' calculations based on Table 2; the percentages do not quantify the fraction of losses caused directly by military action.

H1 is supported descriptively within these four categories: each ended the observed series below its 2015 count. H2 is also supported descriptively because the size of contraction differs across the facility types. The largest 2015–2023 proportionate decline occurred among large stadiums (–15.3%), whereas the

smallest occurred among tennis courts (–2.0%). The order differs somewhat when comparing 2021 with 2023, underscoring the importance of explicitly identifying reference years. Crucially, the table should not be mistaken for an overall national sports-access index: each column represents a distinct infrastructure category, with no adjustments for capacity, operational status, quality or location.

5.3. Year-to-year changes around the invasion period

Table 4. Changes in facility stock near the 2022 transition

Category	2020–21	2021–22	2022–23	Count Δ 2021–23
Large stadiums	-2.7%	-8.6%	-3.4%	-109

Sports grounds	+4.2%	-6.9%	-6.3%	-4,544
Tennis courts	+0.8%	-5.7%	-1.0%	-78
Football grounds	+4.5%	-7.3%	-3.9%	-1,235

Note. Descriptive year-end inventory changes; association in time does not establish direct conflict-attributable causation.

For sports grounds, a rise of 4.2% in 2020–2021 was followed by declines of 6.9% in 2021–2022 and 6.3% in 2022–2023. The combined 2021–2023 decline was 12.7%, equivalent to 4,544 fewer reported sports grounds. Large stadiums declined from 934 in 2021 to 854 in 2022 and 825 in 2023, a combined reduction of 109 (11.7%). Football grounds decreased from 11,345 to 10,110 over the same interval, a reduction of 1,235 (10.9%). Tennis courts decreased from 1,182 to 1,104, a reduction of 78 (6.6%).

The temporal clustering of these contractions is consistent with a period of severe pressure on public infrastructure and administrative systems, but national time-series counts alone cannot identify which facilities were damaged, which became inaccessible, which ceased to be reported or which were reclassified. Such distinctions require venue-level records, independent damage assessments and transparent accounting for territories excluded from surveillance.

5.4. Physical activity context: distinguishing people from facilities

The WHO STEPS Ukraine physical-activity factsheet, published in 2022 from pre-war survey evidence, reports that 10.0% of adults aged 18–69 did not meet WHO physical-activity recommendations; the corresponding figures were 10.8% for women and 9.1% for men (WHO, 2022a). In the same factsheet, 73.3% reported no vigorous physical activity, with a markedly greater proportion among women than men. These findings refer to self-reported movement across life domains, including occupational activity, and must not be interpreted as percentages of Ukrainians who play organised sport.

Indeed, a person may achieve activity recommendations through walking or physical work without regularly using sports infrastructure. Conversely, an available sports ground may not facilitate participation for people with disabilities, small children or older adults unless the facility is accessible and programming appropriate. Survey and inventory measures therefore answer complementary questions. They should be analysed together where feasible but never inserted into the same trend as though they measured one underlying quantity.

Table 5. Selected WHO STEPS Ukraine indicators (survey, not facility counts)

Measure	Estimate	Interpretation
Adults aged 18–69 below WHO recommendation	10.0%	Reported physical-activity insufficiency
Women below recommendation	10.8%	Sex-specific survey estimate
Men below recommendation	9.1%	Sex-specific survey estimate
Adults reporting no vigorous activity	73.3%	Does not imply absence of moderate activity

Note. WHO (2022a). These are survey-based estimates from a separate reference period and population, not annual sports participation observations for 2015–2025.

5.5. Regional disparity: what can and cannot be concluded

A national total is compatible with very different regional patterns. Declines may be concentrated in a small number of heavily affected areas or distributed widely. Without harmonised oblast observations, it is not possible to infer a widening or narrowing of regional inequality, identify particular oblasts as best or worst performing, or evaluate an association between facility losses and local displacement. For this reason, the title's reference to regional disparities denotes a central analytic lens and a specified research gap, not a completed numerical oblast comparison.

The distinction is substantive rather than merely technical. Regions hosting internally displaced populations may have high pressure on facilities despite stable inventories; areas affected by active hostilities may report incomplete records; and local governments may differ in their ability to maintain school sports provision. Consequently, equitable reconstruction demands more than allocating buildings in proportion to historic venue counts. It requires evidence of current users, safety, distance, and service availability.

6. Discussion

6.1. Interpreting the observed contraction

The results document lower counts in every selected category by 2023 compared with 2015, with a sharper contraction between 2021 and 2023 for several widely used venue types. Such changes can plausibly restrict organised sport and everyday opportunities for movement; nevertheless, the extent of any restriction depends on where closures occurred and what alternatives were available. The difference between registered quantity and effective access is especially important during war. A facility may continue to appear in a registry while its neighbourhood is inaccessible, while a repurposed or informal setting may support exercise but fail to appear as a registered venue.

A second issue is baseline selection. Using 2015 as a reference captures a long period of institutional evolution, whereas 2021–2023 comparisons foreground the full-scale invasion period. Both views are useful, but neither constitutes a counterfactual estimate of what would have happened in the absence of conflict. Some categories were already changing before 2022: for example, large stadiums decreased from 974 in 2015 to 934 in 2021, while sports grounds moved non-monotonically across the pre-invasion observations. Consequently, attributing the full 2015–2023 decline to war would be analytically unsound.

6.2. School physical education and youth development

School physical education deserves special consideration because school-based access may be the most inclusive and regular organised movement opportunity for children. Displacement, changes in educational delivery, interruptions to practical lessons and differences in shelter access may all alter the ability of pupils to participate. A school gym that remains physically intact may not be usable on a regular timetable. Therefore, school physical education should be monitored using hours of instruction actually delivered, attendance, teacher availability, outdoor access and disability-inclusive adaptation rather than facility inventory alone.

Korcz et al. (2024) found that school functioning was relevant to resilience in a study of Ukrainian refugee children in Poland. Although the cross-sectional evidence cannot establish that exercise itself causes resilience, it reinforces the need to examine schools and activity together. Bodnar and Sofinsky (2024) likewise foreground inclusive physical education for internally displaced schoolchildren. For physical-culture sciences, these studies indicate a research agenda linking institutional provision with pupil experience and psychosocial outcomes. Rebuilding participation pathways for children is a distinct objective from restoring elite competition venues.

6.3. Community sport, disability inclusion and displaced populations

Community sport can support social connection, identity and low-cost movement, but these potential benefits are distributed unequally. Individuals experiencing economic hardship or uncertain housing may have difficulty paying memberships, travelling long distances or maintaining continuity with coaches. Persons with disabilities may face additional architectural and organisational constraints, while women with caring responsibilities may require safer and more flexible time slots. A robust regional study should therefore examine not only averages but distributional questions: which age and social groups retain access, and which are progressively excluded?

Bielikova et al. (2024) focus on the physical activity and quality of life of internally displaced persons, illustrating the relevance of displacement-specific approaches. Organisational interventions might include subsidised access, community-based sessions in reception localities, joint delivery by schools and municipal sport departments, and coach training in inclusion. Each proposal should be evaluated through measurable outcomes rather than presumed effective merely because sport is generally beneficial.

6.4. Competitive sport and workforce continuity

High-performance sport is strongly dependent on specialised training venues, coaching networks, athlete recovery and competition calendars. Conflict-related disruption can weaken developmental pathways even when some physical venues are still standing. The Delphi research on Ukrainian Olympic sport identified safe training spaces and sustained athlete preparation among urgent priorities (Top 10 needs of Ukraine's Olympic sports in hostile conditions, 2024). Its expert-consensus design is informative for priority setting but cannot quantify nationwide facility losses or provide population-level effect sizes.

The workforce dimension is especially under-measured in a facility-only assessment. Qualified instructors and coaches translate spaces into programmes. A region may gain a venue but remain unable to operate it because trained staff are absent; another

may temporarily sustain high-quality opportunities using shared sites. Annual inventories of coaches, professional qualifications, active teaching assignments and continuity of employment would meaningfully strengthen the measurement of sports-system resilience.

6.5. Implications for reconstruction and sport policy

Reconstruction strategies should be sequenced by both need and implementation feasibility. A first tier concerns safety and basic service continuity: safe school activity areas, outdoor multifunctional spaces, sanitation and accessible routes. A second tier concerns organisational restoration through coaching support, equipment, transport and affordable inclusive programming. A third tier concerns specialised sporting capacity and pathways to higher performance. These tiers are complementary rather than mutually exclusive, but they prevent large landmark projects from overshadowing everyday opportunities for movement.

Policy monitoring should track functionality in addition to capital expenditure. Suggested indicators include days per month a site is usable; weekly hours reserved for school pupils and community groups; participation by age, sex and disability status where ethically and legally appropriate; coach-to-participant ratios; and travel time to safe locations. Central and local authorities should specify consistent audit periods and publish machine-readable metadata. This would enable more transparent resource allocation and scholarly evaluation.

6.6. Toward a defensible regional inequality analysis

An expanded empirical study could combine a verified 2-FK panel with geocoded venues, demographic sources, education statistics and wartime incident data. Regional comparison would require a clear rule for territories whose administrative reporting was interrupted. Analysts should publish both complete-case and sensitivity results, avoiding the assumption that non-reporting denotes zero infrastructure. Spatial analysis could examine distances to operational community sports facilities, while longitudinal models could compare differential trends where data integrity allows.

Key hypotheses would concern mechanisms rather than simplistic regional rankings: for example, whether municipalities receiving displaced populations experience increased facility-use intensity, or whether regions with stronger pre-war community-sport networks sustain more programmes despite adverse conditions. Such studies would benefit from mixed methods, including interviews with coaches, school principals and local administrators. Qualitative evidence can distinguish physical destruction from administrative and behavioural adaptation, while quantitative indicators make the distribution of change visible.

7. Methodological Limitations

First, the verified numerical series ends in 2023 even though the article's historical and policy horizon extends to 2025. No full-period quantitative conclusion is warranted. Second, the yearbook provides national benchmark years rather than a complete annual microdataset; 2016 and 2017 were absent from the extracted series. Third, the facility categories differ in their social purpose and are not additive. Fourth, annual aggregates do not indicate operational quality, accessible capacity, costs, security conditions or occupancy. Fifth, changes in territorial coverage and reporting completeness may influence apparent trajectories.

Sixth, wartime population movements undermine simple per-capita comparisons when denominators are not carefully validated. Seventh, the timing of observed reductions does not identify their causes: direct attacks, general economic pressures, institutional adaptation, changes in survey reach and classification may coexist. Eighth, the supplementary studies involve selected populations and should not be generalized to all Ukrainian residents. Finally, no oblast-level numbers were extracted or verified in this manuscript; references to regional differences therefore concern a conceptual framework and testable future analysis rather than measured regional results.

8. Conclusions

The analysis supports five principal conclusions. First, the official facility inventory documents a reduction between 2015 and 2023 in four selected categories: large stadiums (−15.3%), sports grounds (−13.5%), football grounds (−6.8%), and tennis courts (−2.0%). Second, reductions between 2021 and 2023 were substantial for sports grounds, stadiums and football grounds, but temporal concurrence with the full-scale invasion is not sufficient for a causal allocation of losses. Third, understanding sport development requires combined indicators of physical infrastructure, functional operation, coaching capacity, participation and social inclusion. Fourth, existing national totals are insufficient for a rigorous ranking of regions or a demonstration that regional inequalities widened after 2022. Fifth, a standardised, transparent 2-FK regional panel could turn the present descriptive baseline into a stronger longitudinal empirical study.

The broader implication for physical culture and sport sciences is that wartime resilience should be assessed from the standpoint of actual, safe opportunities for movement. The restoration of infrastructure is necessary in many settings, but it should be linked to educational continuity, inclusive community programming and reliable local monitoring. In this way, sport policy can support both institutional recovery and meaningful participation.

9. Recommended Further Research

The next research phase should establish a 2015–2025 oblast-year dataset with source URLs, archived files, indicator dictionaries and documented territory codes. A preregistered analysis plan could distinguish descriptive hypotheses from exploratory modelling; prioritise core variables consistently measured in all years; and report missingness by territory and period. Where appropriate, it should incorporate independent facility-damage data only after checking whether they refer to the same population of assets as administrative inventories. Cross-validation using school sport and local budget datasets would improve confidence.

A complementary survey should investigate perceived accessibility among pupils, coaches, displaced residents and people with disabilities, using consistent recall windows and validated activity instruments. This mixed-method approach would test whether reported changes in facility stocks correspond to changes in actual physical-culture opportunities and whether adaptation mechanisms vary across regional contexts.

Declarations

Funding: No funding information supplied; to be completed by the author before submission. Conflict of interest: Author declaration required. Ethics: This manuscript analyses published aggregate secondary information and literature; no participants were

recruited. Data availability: National facility values and calculations are reproducible from the cited State Statistics Service yearbook; regional microdata were not assembled. Author contributions and institutional affiliation: To be completed before journal submission.

References

1. Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J. F., & Martin, B. W. (2012). Correlates of physical activity: Why are some people physically active and others not? *The Lancet*, 380(9838), 258–271. [https://doi.org/10.1016/S0140-6736\(12\)60735-1](https://doi.org/10.1016/S0140-6736(12)60735-1)
2. Bielikova, N., Indyka, S., & Bielikov, O. (2024). Physical activity and quality of life of internally displaced persons. *Physical Education, Sport and Health Culture in Modern Society*, 4(68), 26–31. <https://doi.org/10.29038/2220-7481-2024-04-26-31>
3. Bodnar, I., & Sofinsky, R. (2024). Inclusive physical education for schoolchildren, internally displaced persons. *Physical Education, Sport and Health Culture in Modern Society*, 4(68), 32–39. <https://doi.org/10.29038/2220-7481-2024-04-32-39>
4. Korcz, A., Cieśła, E., & Urbański, P. (2024). The role of school functioning, physical activity, BMI, sex and age in building resilience among Ukrainian refugee children in Poland. *Scientific Reports*, 14, Article 5308. <https://doi.org/10.1038/s41598-024-55933-6>
5. Ministry of Youth and Sports of Ukraine. (n.d.-a). Звіти [Statistical reports]. <https://mms.gov.ua/fizichna-kultura/statistichna-zvitnist/zviti>
6. Ministry of Youth and Sports of Ukraine. (n.d.-b). Щорічний інформаційний довідник «Україна спортивна» [Annual Ukraine Sporting statistical directory]. <https://mms.gov.ua/fizichna-kultura/statistichna-zvitnist/shchorichnij-informacijnij-dovidnik-ukrayina-sportivna>
7. State Statistics Service of Ukraine. (2024). Statistical yearbook of Ukraine for 2023 (Section 7.7, Sports facilities). https://www.ukrstat.gov.ua/druk/publicat/kat_u/2023/zb/11/year_23_e.pdf
8. Top 10 needs of Ukraine's Olympic sports in hostile conditions: A Delphi study. (2024). *BMJ Open Sport & Exercise Medicine*. <https://doi.org/10.1136/bmjsem-2023-001653>
9. Vorobiova, A. V., Vasylenko, M. M., & Schilling, R. (2024). Health and physical activity of Ukrainians during a full-scale war with Russia. *Rehabilitation & Recreation*, 18(3). <https://doi.org/10.32782/2522-1795.2024.18.3.14>
10. World Health Organization. (2020). WHO guidelines on physical activity and sedentary behaviour. <https://www.who.int/publications/i/item/9789240015128>
11. World Health Organization. (2022a). STEPS Ukraine factsheet: Physical activity and sedentary behaviour of adults aged 18–69 years. <https://www.who.int/andorra/publications/m/item/steps-ukraine-factsheet-physical-activity-and-sedentary-behaviour-of-adults-aged-18-69-years>
12. World Health Organization. (2022b). Global status report on physical activity 2022.

<https://www.who.int/teams/health-promotion/physical-activity/global-status-report-on-physical-activity-2022>