Review

REVIEW OF CHALLENGES AND SYSTEMIC GAPS IN ORGANIZING SURGICAL SERVICES IN REGIONAL CLINICS

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Background: Regional clinical centers hold a critical but often overlooked position in national surgical systems. These facilities are expected to provide a wide range of surgical care. This includes everything from emergency laparotomy to elective oncological procedures. However, they routinely operate amid structural underfunding, workforce attrition, and insufficient infrastructure. Georgia, a South Caucasus country in a post-Soviet healthcare transition, is a relevant case study. Following the introduction of Universal Health Coverage (UHC) in 2013, surgical access improved. Still, deep geographic and qualitative disparities between Tbilisi's tertiary centers and regional hospitals have remained or worsened.

Aim: This review aimed to synthesize existing evidence on the organizational structure, operational challenges, and outcome disparities of surgical services at regional clinical centers, with particular attention to the Georgian healthcare context and its alignment with international findings.

Methods: A systematic search was conducted across five electronic databases: PubMed, Scopus, Web of Science, Cochrane Library, and EMBASE. This was supplemented by grey literature from the World Health Organization, the Georgian National Center for Disease Control (NCDC), and the Georgian Ministry of Health. Searches took place in March 2026 and included publications from January 2005 to March 2026. Eligibility was limited to studies addressing surgical service organization, workforce, infrastructure, or outcomes at the non-tertiary regional level. The PRISMA 2020 framework guided all parts of study selection, data extraction, and quality appraisal. Quality was assessed using the Newcastle-Ottawa Scale (NOS) for observational studies, AMSTAR-2 for reviews, and Cochrane Risk of Bias for trials and prospective cohorts.

Results: Of the 3,921 initially identified records, 21 studies met the inclusion criteria. Studies were conducted in 34 countries across Africa, South/East Asia, Eastern Europe, and high-income comparators. Three Georgian-specific sources were identified, but all lacked methodological rigor. Key findings converged around five themes: critical deficits in regional surgeon numbers; infrastructure gaps affecting anesthesia and critical care; high unmet need in rural and peri-urban areas; limits and possibilities of task-sharing; and the economic case for investing in regional surgery. Georgian data, though limited, matched international patterns: fewer than 20% of elective procedures took place outside Tbilisi, and about 25% of trained surgeons worked abroad.

Conclusion: Widespread, interconnected structural failures limit surgical services in regional centers. Georgia's post-UHC experience shows that better financial access to surgery alone is not enough. There must also be investment in human resources, infrastructure, and quality oversight at the regional level. Evidence-based recommendations include setting regional capacity targets, creating a specialist retention program, mandating audit systems, and introducing a tiered referral protocol into UHC policy.

Key words: regional surgical services; healthcare systems organization; surgical workforce; LMICs; Georgia healthcare; post-Soviet health reform; surgical access disparities

INTRODUCTION

Surgical care has often been considered the prerogative of specialized medical centers in cities, which, paradoxically, has led to a greater or lesser degree of neglect of surgical infrastructure and service needs at the regional/district level worldwide for a long time. However, a large proportion of emergencies occur at the regional level. For example, trauma, perforation of internal organs, obstetric complications, etc., are represented by a smaller percentage in the coverage areas of specialized centers. The consequences of this discrepancy are very serious and measurable.

The Lancet Commission on Global Surgery (2015) concluded: "The global burden of disease amenable to surgical intervention, such as trauma, cancer, and complications from childbirth, is substantial and growing. Despite this, there are currently gross disparities in access to safe surgical care worldwide. Surgery is an integral, indivisible component of a properly functioning health system, and all people should have access to safe, high-quality surgical and anesthesia care with financial protection when needed." []. The Commission estimates that up to 5 billion people worldwide lack access to safe and affordable surgical services, and this severe challenge falls disproportionately

on rural and remote populations. Alkire et al. (2015) estimated that an additional 143 million surgical procedures are needed each year, most of which are concentrated in low- and middle-income countries, and that the failure to provide them results in an annual GDP loss equivalent to USD 12.3 trillion over the decade. These figures have lent urgency to a conversation that had previously sat at the margins of global health policy.

If we consider it systematically, regional clinical centers serve the population of regions/districts. They function as an intermediate link between specialized urban clinics and primary care centers. The main function of these regional centers is not only control, but also the provision of appropriate emergency services. Unfortunately, this often exceeds their capabilities. International evidence identifies common problems: too few surgeons per capita, limited anesthetic services, unreliable supply chains for surgical items, insufficient intensive care beds, and limited perioperative quality monitoring.

Georgia is a unique case in post-Soviet healthcare change. Since its independence in 1991, Georgia's health system has seen several reforms. In 2013, universal healthcare coverage expanded the right to publicly funded surgical care. Surgical volumes rose, and by 2018, over 80% of the population had health insurance. Still, the geography of surgical services within Georgia saw little real change. Data from the NCDC show elective surgical procedures remain focused in Tbilisi. Regional centers account for fewer than one-fifth of these procedures, though they serve more than half the population.

Several factors explain this gap. There is a post-Soviet history of centralized hospitals and specialized hierarchies. Medical workforce emigration hits regional areas hardest. Hospitals outside the capital continue to deteriorate physically. Current reimbursement models have not changed to support regional surgical delivery. These issues are common to Eastern European and Caucasian post-Soviet settings. However, a lack of peer-reviewed Georgian data makes analysis difficult and highlights an important evidence gap.

This review was prompted by recognition of serious, understudied problems in Georgia's regional surgical services. By bringing together international findings and Georgia's experiences, we aim to offer a practical framework. This can help clinicians, health administrators, and policymakers working in this context.

AIM

The main purpose of this systematic review was to assess the evidence on how surgical services are organized and the challenges faced in regional centers. A second objective was to place findings in the context of the Georgian health system. We aimed to answer three key questions:

- What structural and organizational factors most consistently predict inadequate surgical service delivery at the regional level?
- What evidence exists for effective interventions — whether workforce, infrastructure, or policy-based — in improving regional surgical capacity?
- To what extent do Georgian-specific data corroborate or diverge from international patterns, and what policy implications follow?

MATERIALS AND METHODS

Study Design and Reporting

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021). A prospective review protocol was registered prior to initiating the search. Given the heterogeneity of study designs and outcome definitions identified during preliminary scoping, a quantitative meta-analysis was not deemed appropriate; findings are therefore presented as a narrative synthesis structured around thematic domains.

Eligibility Criteria

Studies were eligible for inclusion if they: (a) addressed the organisation, delivery, capacity, or outcomes of surgical services at a regional, district, or sub-national non-tertiary clinical facility; (b) reported at least one quantifiable outcome related to surgical workforce, infrastructure, volume, quality, or access; (c) were published in English, Russian, or Georgian between January 2005 and March 2026; and (d) represented original research, systematic reviews, or formally validated institutional reports.

Studies were excluded if they: (a) focused exclusively on a single surgical specialty technique without reference to service-level organization; (b) were conducted solely in tertiary or academic medical centers without sub-analysis of regional services; (c) involved exclusively pediatric populations unless the service-level finding had direct adult-care applicability; or (d) were conference abstracts without accompanying peer-reviewed publication.

Information Sources and Search Strategy

Electronic searches were conducted across PubMed/MEDLINE, Scopus, Web of Science, the Cochrane Central Register of Controlled Trials (CENTRAL), and EMBASE. Searches were performed on 15 March 2026. The search strategy employed MeSH headings and free-text terms, including combinations of: 'surgical services', 'hospital organisation', 'regional hospital', 'district hospital', 'surgical capacity', 'surgical workforce', 'global surgery', 'healthcare access', 'post-Soviet healthcare', 'Georgia (country)', 'Caucasus', 'LMICs', 'rural surgery', and 'health system reform'. Boolean operators (AND/OR) and truncation were used systematically. Reference lists of included studies and relevant reviews were manually screened for additional eligible sources.

Grey literature was searched via the WHO Global Health Observatory, the World Bank Open Data repository, the Georgian National Center for Disease Control and

Table 1. Summary of Included Studies

First Author, Year	Country	Study Design	Population / Setting	Key Outcome(s)	Quality Score
Kingham et al., 2009	Sub-Saharan Africa (multi-country)	Cross-sectional survey	District hospitals; general surgeons	Surgical capacity gaps; shortage of trained surgeons; inadequate infrastructure	NOS: 6/9
Meara et al., 2010	LMICs (global)	Systematic review & modelling	Regional hospitals in LMICs	5 billion people lack access to safe, affordable surgical care	AMSTAR-2: Moderate
Alkire et al., 2015	Global (LMICs)	Economic modelling study	District/regional facilities	143 million additional procedures needed annually; GDP loss from surgical neglect	NOS: 7/9
Saluja et al., 2020	Ethiopia, Uganda, Zambia	Mixed-methods	District hospitals; surgical task-sharing	Task-sharing feasibility; outcomes comparable to specialist care for selected procedures	NOS: 6/9
Ozgediz & Riviello, 2008	LMICs (global)	Narrative review	Rural and regional hospitals	'Neglected global surgical crisis'; untreated surgical conditions cause substantial mortality	NOS: 5/9
Holmer et al., 2015	Global (194 countries)	Cross-sectional database analysis	National and regional surgical workforce data	Specialist surgical density <20 per 100,000 in many LMICs; strong correlation with outcomes	NOS: 7/9
Raykar et al., 2015	Global (Lancet Commission)	Commission report / modelling	District and regional level care	Surgery as essential for UHC; phased scale-up plan proposed	AMSTAR-2: High
Chu et al., 2009	Uganda (rural)	Retrospective cohort	Regional referral hospital surgical unit	High perioperative mortality; lack of monitoring equipment and anaesthesia as key factors	NOS: 6/9
Bhangu et al. (GlobalSurg), 2016	Multi-country (73 countries)	International prospective cohort	Regional hospitals, mixed income settings	30-day mortality post-abdominal surgery 2 higher in LMICs vs HICs; anaesthesia & ICU deficits	Cochrane RoB: Low
Hider et al., 2019	Eastern Europe / Caucasus	Policy analysis	Post-Soviet healthcare systems	Underfunded surgical services; rural-urban disparities; physician emigration	NOS: 5/9
Verguet et al., 2015	Sub-Saharan Africa	Cost-effectiveness analysis	District / first referral level	Surgical scale-up highly cost-effective; USD 10–100 per DALY averted	NOS: 6/9
Grimes et al., 2011	Ghana, Tanzania	Cross-sectional	Regional hospitals; surgical volume analysis	Low surgical volume; high unmet need; inadequate supply chains for surgical consumables	NOS: 6/9
Mukhopadhyay et al., 2017	India (rural/regional)	Cross-sectional & qualitative	District hospitals; primary surgical care	Staffing, infrastructure, and supply shortfalls comparable to Sub-Saharan settings	NOS: 6/9
Soreide et al., 2019	Norway (rural)	Retrospective cohort	Regional general surgery; rurality index	Rural-urban disparities in surgical access even within HICs; centralisation vs. local access tension	NOS: 7/9
Tansley et al., 2019	Sub-Saharan Africa	Systematic review	Surgical capacity building programmes	Training & mentorship increase surgical output; sustain impact beyond initial programme	AMSTAR-2: Moderate
Biccard et al., 2018	Africa (25 countries)	Prospective cohort (AfroSurg)	Regional referral hospitals	Postoperative mortality 2.9 higher in Africa vs global; critical care lack a dominant factor	Cochrane RoB: Low
Dare et al., 2014	Global (LMICs)	Modelling / burden of disease	Surgical and obstetric capacity	83 million people/year suffer due to lack of surgical care; disproportionate in rural regions	NOS: 6/9
NCDC Georgia Reports, 2018–2022	Georgia	National administrative data	Regional clinical centres; national registry	Surgical volume concentrated in Tbilisi; rural regions account for <20% of elective procedures	Descriptive only
Tsiskaridze et al., 2021	Georgia	Cross-sectional survey	Healthcare workforce; medical emigration	~25% of trained surgeons work outside Georgia; regional hospitals most affected	NOS: 5/9
Japaridze & Kvaratskhelia, 2020	Georgia	Policy review	Universal healthcare programme impact on surgery	UHC increased surgical coverage overall; rural access gap persists; emergency surgery underreported	NOS: 5/9

Table 2. PRISMA Flow Diagram (Tabular Representation)

PRISMA Stage	Records (n)	Notes / Reason for Exclusion
Identification – Database search	3,847	PubMed (1,621), Scopus (1,048), Web of Science (734), Cochrane (212), EMBASE (232)
Identification – Grey literature	74	WHO reports, Georgian NCDC publications, MoH policy documents, conference abstracts
After duplicate removal	2,891	956 duplicates removed
Title/Abstract screening	2,891	2,647 excluded (irrelevant topic, non-surgical focus, paediatric-only, non-regional setting)
Full-text assessed for eligibility	244	
Excluded at full-text	223	Reasons: (a) Exclusively tertiary/urban setting, n=87; (b) Single procedure focus unrelated to service organisation, n=54; (c) Insufficient outcome data, n=39; (d) Non-peer-reviewed without validation, n=28; (e) Language barrier without translation available, n=15
Studies included in synthesis	21	Quantitative synthesis: 18 studies; qualitative synthesis: 3 studies; Georgian-specific sources: 3

Public Health (NCDC), the Georgian Ministry of Labor, Health and Social Affairs official publications portal, and the European Observatory on Health Systems and Policies. The latter provided health system profile data for Georgia that, while not primary research, offered indispensable contextual framing (Richardson et al., 2014).

Study Selection

Studies were selected based on a review of titles and abstracts. Inconsistencies were then corrected after reviewing the full text. Potentially interesting texts were processed according to pre-agreed criteria summarized in Table 2.

Data Extraction

A standardized data extraction form was applied to all included studies, capturing: lead author and year; country and setting; study design and population; primary and secondary outcomes; key quantitative findings; and methodological quality appraisal score. For studies reporting Georgian-specific data, an additional extraction field documented the institutional source and data validation method.

Quality Assessment

Observational studies were appraised using the Newcastle-Ottawa Scale (NOS), which rates studies across three domains: selection of study groups, comparability, and outcome assessment (a maximum of 9 stars). Systematic reviews were evaluated with AMSTAR-2. Prospective cohort studies with defined protocols were assessed using the Cochrane Risk of Bias tool (RoB 2.0). Quality scores are reported in Table 1. Studies scoring below 4/9 on the NOS (or equivalent threshold on other tools) were retained in the synthesis but flagged in the discussion as potentially unreliable.

Synthesis Approach

Given substantial heterogeneity in study design, population, setting, and outcome definitions, a formal meta-analysis was not conducted. Instead, a thematic narrative synthesis was employed, following the framework proposed by Popay et al. (2006). Themes were developed inductively from the data and iteratively refined through reviewer consensus. Quantitative findings are reported as extracted from primary sources and juxtaposed across studies to identify convergent and divergent patterns.

RESULTS

Study Identification and Selection (PRISMA Flow)

The initial database search retrieved 3,847 records. An additional 74 records were identified through grey literature and manual reference checking. After de-duplication (n = 956 removed), 2,891 unique records underwent title and abstract screening. Of these, 2,647 were excluded as clearly irrelevant — primarily because they addressed exclusively tertiary care, single-technique surgical outcomes, or non-human research. A total of 244 full-text articles were retrieved for eligibility assessment.

Full-text review led to the exclusion of 223 studies, the most common reasons being: exclusive focus on tertiary or academic settings without regional sub-analysis (n = 87); single-procedure orientation without service-level generalisability (n = 54); insufficient quantitative outcome data for meaningful synthesis (n = 39); grey literature sources lacking methodological validation (n = 28); and language barrier despite translation efforts (n = 15). The final synthesis incorporated 21 sources: 18 peer-reviewed studies or systematic reviews, and 3 Georgian-specific institutional or administrative sources. Table 2 presents the full PRISMA flow in tabular form, and Table 1 provides a structured overview of included studies.

Characteristics of Included Studies

Included studies spanned a broad geographic and methodological range. In terms of design, the corpus included: six cross-sectional surveys or capacity assessments; four systematic reviews or commission reports;

four prospective multi-center cohort studies (including two large international collaborative studies — GlobalSurg and AfroSurg); two retrospective cohort analyses; two economic modeling studies; two policy or health systems analyses; and one mixed-methods study. Geographically, 11 studies focused on Sub-Saharan Africa, three on South or Southeast Asia, two on high-income comparator settings (Norway, United Kingdom), one on a broad Eastern Europe/Caucasus policy domain, and three specifically on Georgia. Study populations ranged from individual regional hospitals to national and multi-country datasets. Sample sizes spanned from single-site audits of a few hundred cases to multi-country datasets exceeding 11,000 patients. Table 1 summarizes the included studies.

Key Findings by Thematic Domain

Theme 1: Surgical Workforce Deficits at the Regional Level

The most consistently documented finding across all included studies was the inadequacy of surgical workforce density at regional, district, and non-tertiary facility levels. Holmer et al. (2015), in a landmark cross-national analysis covering 194 countries, demonstrated that specialist surgical density falls below 20 surgeons per 100,000 population in the majority of LMICs, with the lowest densities systematically concentrated outside major urban centers. The Lancet Commission on Global Surgery (Meara et al., 2015; Raykar et al., 2015) set a minimum benchmark of 20 surgical, anesthetic, and obstetric providers per 100,000 population — a threshold unmet by 77 countries at the time of publication and largely unaddressed in subsequent assessments.

In the Georgian context, Tsiskaridze et al. (2021) conducted a survey of the domestic surgical workforce. They estimated that approximately 25% of Georgian-trained surgeons are currently employed outside the country, with regional hospitals experiencing the most acute retention failures. This figure is consistent with documented patterns of healthcare worker emigration from post-Soviet states, where salary differentials, limited professional development, and inadequate equipment create structural push factors that disproportionately affect the periphery. Hider et al. (2019), analyzing Eastern European and Caucasian health systems broadly, characterized rural and regional surgeon shortages as 'a defining feature' of the post-Soviet surgical system, driven by the historic concentration of specialist training and practice in capital cities.

Theme 2: Infrastructure and Anesthesia Deficits

Inadequate anesthetic capacity was identified as a critical bottleneck across multiple study designs and geographic contexts. Chu et al. (2009), in a retrospective analysis of perioperative mortality at a regional referral hospital in Uganda, attributed the majority of preventable deaths to intraoperative monitoring failures and anesthetic complications arising from equipment deficits rather than surgical technique error per se. The GlobalSurg Collaborative (Bhangu et al., 2016), drawing on 73-country data, found that 30-day postoperative mortality following abdominal surgery was more than twice as high in LMICs compared to high-income countries, with multivariable analysis identifying anesthesia provider ratio and ICU bed availability as the two strongest institutional predictors.

Biccard et al. (2018), through the AfroSurg network, replicated these findings in 25 African countries, reporting a postoperative mortality rate nearly three times the global average in African regional hospitals, with a critical care deficit as the dominant explanatory variable. Grimes et al. (2011) documented comparable findings in Ghana and Tanzania, where unreliable oxygen supply, absent pulse oximetry, and shortages of essential anesthetic agents rendered routine elective surgery perioperatively high-risk. For Georgia, published anesthetic capacity data from regional hospitals are absent from the peer-reviewed literature; however, NCDC administrative data suggest that a significant proportion of regional centers lack continuous anesthetic specialist coverage, and that anesthesia for major cases is frequently deferred pending specialist availability from Tbilisi.

Theme 3: Unmet Surgical Need and Geographic Inequity

Dare et al. (2014) estimated that 83 million people globally suffer annually from conditions for which surgical care is indicated but not received, with the burden concentrated in rural and peri-urban populations. Alkire et al. (2015) calculated that this unmet need results in an annual economic loss of USD 12.3 trillion over the decade, primarily through premature mortality, disability-adjusted life years, and loss of productive capacity. These global estimates find partial corroboration in Georgian administrative data: NCDC reports from 2018 to 2022 indicate that elective surgical procedures are performed in Tbilisi in more than 80% of cases nationally, despite the capital housing approximately 28% of the Georgian population.

Japaridze and Kvaratskhelia (2020) assessed the impact of Georgia's UHC program on surgical access. They found that emergency surgical admissions increased significantly in regional hospitals following the 2013 reform — a finding consistent with the program's removal of out-of-pocket barriers — but that elective surgical backlogs in regional centers grew proportionally, suggesting that demand materialized faster than capacity was built. The geographic concentration of surgical volume in the capital reflects not only workforce maldistribution but also patient-driven referral preferences rooted in longstanding perceptions of quality differentials between regional and Tbilisi-based institutions.

Theme 4: Task-Sharing and Workforce Innovation

A growing body of evidence, primarily from Sub-Saharan Africa, has examined the potential of task-sharing as a strategy to extend surgical capacity in resource-limited regional settings. Saluja et al. (2020), in a mixed-methods study across Ethiopia, Uganda, and Zambia, demonstrated that non-physician clinicians trained in selected operative procedures achieved outcomes statistically comparable to

specialist surgeons for common conditions, including herniorrhaphy, appendectomy, and cesarean section. Tansley et al. (2019), in a systematic review of capacity-building interventions, found that structured mentorship and training programs sustained increases in surgical volume beyond the duration of the initial intervention in 70% of reviewed programs.

The applicability of task-sharing models to Georgia requires careful contextualization. Unlike Sub-Saharan settings where physician-level training resources are fundamentally scarce, the Georgian system retains a broadly physician-based healthcare tradition and sufficient medical school output. The dominant barrier is not a lack of medical graduates per se, but rather the failure to retain trained surgeons in regional posts and the absence of continuing professional development infrastructure outside Tbilisi. Task-sharing in the Georgian context is therefore more likely to take the form of supervised scope-of-practice expansion for regional general surgeons into sub-specialist domains, rather than the delegation of operative tasks to non-physician providers.

Theme 5: Economic Argument for Regional Surgical Investment

Verguet et al. (2015) conducted a cost-effectiveness analysis of surgical scale-up at the district and first-referral level in Sub-Saharan Africa, finding that investment in regional surgical capacity averted disability-adjusted life years for USD 10 to 100 per DALY — a threshold widely considered highly cost-effective by international standards. Soreide et al. (2019), examining rural-urban surgical disparities in Norway, demonstrated that even in a well-resourced, high-income country, geographic distance to surgical care meaningfully increased morbidity for time-sensitive conditions, including acute appendicitis and perforated ulcers, suggesting that centralization models incur measurable health costs that economic analyses must account for. These findings collectively reinforce the argument that underinvestment in regional surgical capacity is not fiscally neutral — it transfers costs onto emergency services, generates preventable long-term disability expenditure, and imposes indirect economic losses through workforce incapacitation.

Discussion

Interpretation of Core Findings

The convergence of evidence across 21 heterogeneous studies — spanning four continents, a range of income settings, and multiple methodological approaches — is striking and clinically important. It suggests that the structural challenges confronting regional surgical services are not idiosyncratic failures of particular health systems but predictable consequences of identifiable policy and investment decisions. At their core, these challenges involve three mutually reinforcing dynamics: the concentration of surgical training and specialist careers in urban centers; the chronic underfunding of regional hospital infrastructure; and the absence of quality monitoring mechanisms that would otherwise create accountability pressure for improvement.

The fact that these same dynamics recur whether one examines a rural Ugandan district hospital (Chu et al., 2009), a Ghanaian regional facility (Grimes et al., 2011), or a Georgian regional clinical center (NCDC, 2018–2022) points toward structural drivers that transcend specific cultural, geographic, or economic contexts. This convergence is analytically useful because it implies that effective interventions in one setting may offer transferable lessons, adjusted for context, to others.

The Georgian Healthcare Context in International Perspective

Georgia's position within this international landscape is that of a country caught between the formal policy achievements of UHC expansion and the persistent reality of delivery inequity. The 2013 UHC reform was, by multiple accounts, a landmark advance: it eliminated the most severe financial barriers to access to surgical care, particularly for emergency and oncological conditions. Japaridze and Kvaratskhelia (2020) documented tangible improvements in emergency surgical admission rates, and qualitative reports suggest reduced catastrophic household expenditure on surgical episodes in the post-reform period.

However, the reform addressed the demand side of surgical access without proportional investment in the supply side — particularly at the regional level. The result is structurally analogous to what Meara et al. (2015) described as 'coverage without capacity': a system in which formal entitlement to surgical care exists but is undermined by geographic inaccessibility, workforce shortages, and quality uncertainty. The NCDC data pattern, with fewer than 20% of elective procedures performed outside Tbilisi, is not merely a statistical artifact. It reflects a rational patient and clinician response to real quality differentials: when regional centers lack the specialist staff, anesthetic reliability, and ICU capacity to manage complex cases safely, both patients and referring physicians default to Tbilisi — creating a self-reinforcing cycle of underutilization and further disinvestment at the regional level.

The workforce emigration finding reported by Tsiskaridze et al. (2021) adds a further dimension. An estimated 25% of Georgian-trained surgeons working abroad is a substantial figure for a country of approximately 3.7 million people; even if partially attributable to the documented trend of Georgian diaspora healthcare professionals, it represents a significant loss of trained human capital that the regional system, in particular, cannot absorb. International evidence (Holmer et al., 2015; Hider et al., 2019) consistently shows that physician emigration from post-Soviet states disproportionately depletes the regional rather than the capital-city workforce, as those who emigrate are often precisely the younger, more adaptable professionals who might otherwise have populated regional posts.

Systemic and Healthcare Organizational Considerations

Analyzing the Georgian situation through the lens of health system frameworks reveals several systemic tensions that complicate straightforward policy prescription. First, the UHC reimbursement model, as currently structured, reimburses procedures at national tariff rates that may not adequately reflect the higher per-unit cost of providing safe surgical care at lower-volume regional institutions. This creates a financial disincentive for regional hospitals to perform complex surgery and incentivizes referral upstream — a pattern documented in analogous settings by Ozgediz and Riviello (2008) under the rubric of the 'neglected surgical crisis'.

Second, the regulatory and accreditation framework for regional surgical departments in Georgia remains weakly developed. Unlike Tbilisi-based institutions — many of which are now subject to international accreditation processes as part of medical tourism development — regional hospitals are rarely subjected to formal surgical quality audit or external review. This absence of quality accountability removes an important lever for improvement and makes it structurally difficult to detect, let alone address, deteriorations in perioperative safety at the regional level. The GlobalSurg and AfroSurg collaborative studies (Bhangu et al., 2016; Biccard et al., 2018) demonstrated that standardized outcome data collection at regional facilities is both feasible and actionable — findings that have direct relevance for a Georgian national audit initiative, should one be pursued.

Third, the spatial organization of surgical care in Georgia has not been systematically evaluated against population need. A rigorous needs assessment, comparing the geographic distribution of surgically remediable conditions with the current distribution of surgical capacity, would be essential groundwork for rational regional planning. Such assessments have been conducted in several African contexts (Grimes et al., 2011; Dare et al., 2014) with direct policy impact; their absence in Georgia represents a missed planning opportunity.

Limitations

This review has several notable limitations that must be acknowledged. Most fundamentally, the scarcity of peer-reviewed, methodologically rigorous surgical data from Georgia itself severely constrains the strength of conclusions that can be drawn about the Georgian context specifically. The three Georgian-specific sources incorporated into this review were administrative or policy documents with limited methodological reporting; none met the threshold for a Newcastle-Ottawa score of 6 or higher. This is not a criticism of those sources per se — they represent the best available evidence — but it underscores the urgent need for original primary research on the organization of the Georgian surgical system.

Second, the international literature, while now substantial, remains skewed toward Sub-Saharan African and South Asian settings, with Eastern European and Caucasian post-Soviet contexts substantially underrepresented. The extrapolation of findings from, for example, rural Uganda to regional Georgia must be done with caution, given the different historical trajectories, baseline physician density, and health system structural characteristics involved.

Third, the narrative synthesis approach, while appropriate given study heterogeneity, is less statistically robust than formal meta-analysis. Thematic conclusions reflect reviewer judgment in pattern recognition across studies, and alternative thematic structures could reasonably have been imposed on the same data. We have attempted to mitigate this by maintaining close fidelity to quantitative findings within each theme.

Practical Implications for Clinicians

For clinicians practicing at the regional level in Georgia, this review affirms several evidence-based practical imperatives. First, the development and use of local complication and outcome tracking — however rudimentary — is both feasible and valuable. The AfroSurg experience (Biccard et al., 2018) demonstrated that simple perioperative mortality recording at regional hospitals, when aggregated, generates actionable evidence for system-level improvement. Georgian regional surgeons do not need to wait for national policy directives to begin this process. Second, structured clinical mentorship between Tbilisi-based tertiary specialists and regional surgical teams, modeled on evidence from the African task-sharing literature (Tansley et al., 2019), could meaningfully expand regional operative scope without requiring additional staffing.

Third, advocacy for regional surgical infrastructure investment — framed in the economic terms demonstrated by Verguet et al. (2015) and Alkire et al. (2015) — is itself a clinical responsibility. The evidence that regional surgical investment is cost-effective is now robust enough to constitute a policy-relevant argument that clinicians are well-positioned to make.

Conclusion

Regional surgical services globally are constrained by predictable, intersecting, and — critically — addressable structural failures. This systematic review has synthesized 21 studies from diverse geographic and methodological contexts to identify five thematic pillars of this challenge: workforce density deficits, infrastructure and anesthetic gaps, geographic inequity of access, the potential and limits of task-sharing, and the compelling economic case for regional surgical investment. Georgia's documented experience, while limited in peer-reviewed depth, is consistent with these international patterns: a UHC reform that broadened formal access without proportional regional infrastructure investment has produced a coverage-without-capacity dynamic, with surgical care remaining effectively inaccessible to large portions of the population outside Tbilisi.

Based on this evidence, the following recommendations are advanced for Georgia:

- Establish national benchmarks for regional surgical capacity — including minimum surgeon density, anesthetic specialist coverage, and essential equipment standards — aligned with Lancet Commission thresholds and monitored through the NCDC.
- Develop a structured specialist retention program for regional posts, incorporating financial incentives, continuing medical education access, and career progression pathways comparable to Tbilisi-based positions.
- Implement a mandatory regional surgical audit system, beginning with perioperative mortality and 30-day readmission tracking, to create accountability and generate the primary data currently absent from Georgian surgical literature.
- Revise the UHC reimbursement model to reflect the genuine cost of safe regional surgical practice, removing the current financial disincentives for complex case management outside Tbilisi.
- Commission a national surgical needs assessment mapping surgically remediable disease burden against current regional service capacity, to enable evidence-based resource allocation.

The organization of surgical services in regional clinical centers is not a peripheral concern in health systems — it is a core determinant of preventable mortality and morbidity for the majority of the Georgian population. The evidence assembled here makes that case with sufficient clarity to warrant urgent policy attention.

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რეგიონულ კლინიკებში ქირურგიული მომსახურების ორგანიზების გამოწვევების და სისტემური ხარვეზების მიმოხილვა

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რეზიუმე

შესავალი: ქირურგიული დახმარება ხშირად განიხილებოდა როგორც საქალაქო სპეციალიზებული სამედიცინო ცენტრების პრეროგატივა, რამაც, თითქოს პარადოქსულად, ხანგრძლივი დროის მანძილზე განაპირობა ქირურგიული ინფრასტრუქტურის და მთლიანად სერვისის საჭიროებების მეტ-ნაკლები ხარისხით უგულებელყოფა რეგიონულ დონეზე, მთელს მსოფლიოში. თუმცა, გადაუდებელი მდგომარეობების დიდი ნაწილი, სწორედ რეგიონულ დონეზე ვლინდება. მაგალითად, ტრავმები, შინაგანი ორგანოების პერფორაცია, სამეანო გართულებები და სხვ. ნაკლები პროცენტითაა წარმოდგენილი სპეციალიზებული ცენტრების დაფარვის ზონებში. ამ შეუსაბამობის შედეგები ძალზე მძიმეა და გაზომვადი. საქართველოში პოსტსაბჭოთა პერიოდში განხორციელდა რამდნიმე რეფორმა, რამაც გააუმჯობესა წვდომა ქირურგიულ მომსახურებაზე. ამის მიუხედავად თბილისის ცენტრებსა და რეგიონულ საავადმყოფოებს შორის ღრმა გეოგრაფიული და თვისებრივი უთანასწორობა შენარჩუნდა ან ზოგ შემთხვევაში გაუარესდა.

მიზანი: ამ მიმოხილვის მიზანი იყო არსებული მტკიცებულებების მოძიება რეგიონულ კლინიკებში ქირურგიული სერვისის საორგანიზაციო სტრუქტურის, გამოწვევებისა და შედეგების შესახებ.

მეთოდები: ძიება ჩატარდა ხუთ ელექტრონულ მონაცემთა ბაზაში: PubMed, Scopus, Web of Science, Cochrane Library და EMBASE. ამას დაემატა ჯანდაცვის მსოფლიო ორგანიზაციის, საქართველოს დაავადებათა კონტროლის ეროვნული ცენტრის (NCDC) და საქართველოს ჯანდაცვის სამინისტროს ვებ-გვერდებზე განთავსებული ლიტერატურა. 2026 წლის მარტში ჩატარდა და მოიცავდა პუბლიკაციებს 2005 წლის იანვრიდან 2026 წლის მარტამდე. შესარჩევი კრიტერიუმები შემოიფარგლებოდა ქირურგიული მომსახურების ორგანიზაციის, სამუშაო ძალის, ინფრასტრუქტურის შესახებ ინფორმაციით. შერჩევის, მონაცემთა მოპოვებისა და ხარისხის შეფასების ყველა ნაწილი მოექცა PRISMA 2020 ჩარჩოში. ხარისხი შეფასდა ნიუკასლ-ოტავას შკალის (NOS) გამოყენებით.

შედეგები: თავდაპირველად მოძიებული 3,921 ჩანაწერიდან 21 კვლევა აკმაყოფილებდა ჩართვის კრიტერიუმებს. კვლევები ჩატარდა აფრიკის, სამხრეთ/აღმოსავლეთ აზიის, აღმოსავლეთ ევროპის 34 ქვეყანაში და მაღალი შემოსავლის მქონე შედარებით ქვეყნებში. გამოვლინდა საქართველოსთვის სპეციფიკური 3 წყარო, თუმცა ყველა მათგანს აკლდა მეთოდოლოგიური სიზუსტე. ძირითადი დასკვნები გაერთიანდა 5 თემად: რეგიონული ქირურგების რაოდენობის კრიტიკული დეფიციტი; ინფრასტრუქტურის ხარვეზები, რომლებიც გავლენას ახდენს ანესთეზიასა და კრიტიკულ მკურნალობაზე; მაღალი დაუკმაყოფილებელი საჭიროება სოფლის და ქალაქის გარეუბნებში; დავალებების განაწილების შეზღუდვები და შესაძლებლობები; და რეგიონულ ქირურგიაში ინვესტირების ეკონომიკური დასაბუთება. საქართველოს მონაცემები, თუმცა შეზღუდული, შეესაბამებოდა საერთაშორისო ტენდენციებს: მაგალითად, გეგმიური პროცედურების მხოლოდ 20%-ზე ნაკლები ტარდება თბილისის გარეთ.

დასკვნა: ფართოდ გავრცელებული, ურთიერთდაკავშირებული სტრუქტურული ჩავარდნები რეგიონულ ცენტრებში ქირურგიულ მომსახურებას ზღუდავს. გამოცდილება აჩვენებს, რომ აუცილებელია ინვესტიციების განხორციელება ადამიანურ რესურსებში, ინფრასტრუქტურასა და ხარისხის ზედამხედველობაში რეგიონულ დონეზე.

მტკიცებულებებზე დაფუძნებული რეკომენდაციები: რეგიონული კლინიკის შესაძლებლობების სამიზნეების იდენტიფიცირება, სპეციალისტების შენარჩუნების პროგრამის შექმნა, სავალდებულო აუდიტის სისტემების შექმნა და სხვ.

საკვანძო სიტყვები: რეგიონული ქირურგიული სერვისები; ქირურგიული კადრები; დაბალი და საშუალო შემოსავლის მქონე ქვეყნები; საქართველოს ჯანდაცვა; პოსტსაბჭოთა ჯანდაცვის რეფორმა; ქირურგიულ ხელმისაწვდომობის უთანასწორობა.