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Maintaining perioperative nursing competence in rural and low-volume surgical settings: A Canadian perspective

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Abstract

Background: *Perioperative nurses in rural and low-volume Canadian surgical facilities face a persistent risk that infrequently practised skills may decline over time. This decline can affect technical, cognitive, and team-based performance. Infrequent procedural volumes, professional isolation, and limited access to specialist support, create conditions in which competence may be difficult to sustain. Drawing on Benner's (1984) Novice-to-Expert framework, this paper examines competence maintenance across the perioperative nursing competence continuum.*

Methods: *A narrative review of published literature was conducted across CINAHL, MEDLINE, and SCOPUS (2000–2025), integrating evidence from perioperative nursing, rural health, simulation education, and Canadian health policy. Searches returned approximately 480 records; after screening titles, abstracts, and full texts against predetermined inclusion criteria, 14 sources were included in the final synthesis.*

Results: *Competence maintenance challenges affect preoperative assessment and preparation, scrub, circulating, post-anaesthetic care unit (PACU), and crisis-response nursing roles. Evidence supports simulation-based training, tele-mentoring, structured inter-facility rotation, cognitive aids, and contextualized continuing education, as core maintenance strategies. Sustainable competence requires coordinated investment across the individual nurse, the facility, the regional network, and the provincial or territorial health system.*

Discussion: *A multi-level framework is proposed, with specific actions for individual nurses, facilities, regional networks, and provincial and territorial authorities. Indigenous health equity and cultural safety are identified as integral competency domains.*

Conclusion: *Rural perioperative nursing competence is achievable with deliberate, multi-level investment. Provincial and territorial nursing regulators, health authorities and facilities, individual nurses, and professional associations have distinct and complementary roles. ORNAC contributes through evidence-informed guidelines, educational opportunities, and professional knowledge exchange.*

Keywords: rural perioperative nursing, competence maintenance, low-volume surgery, simulation, Canadian nursing workforce

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Background

Approximately one in six Canadians lives in a rural or remote community, yet access to perioperative nursing services in these regions is persistently inequitable (Statistics Canada, 2022). Rural hospitals frequently serve as the sole source of surgical care across vast geographic catchment areas, relying on a small nursing workforce to provide preoperative assessment and preparation, scrub, circulating, and post-anaesthetic care unit (PACU) functions, and, in some jurisdictions, anaesthetic assist functions. These nurses must maintain competence across the full perioperative spectrum from elective minor surgery to emergency trauma and obstetric care, often with minimal specialist backup and sharply limited opportunity for peer learning.

Drawing on Benner's (1984) Novice-to-Expert model, skilled perioperative nursing practice depends on the accumulation of clinical experience sufficient to move practitioners from competent performance toward proficiency and expertise. Infrequent procedural exposure in rural settings disrupts this trajectory: practitioners may be unable to progress or, critically, to maintain their position along the proficiency continuum in key domains. This is not a failure of individual motivation but

a structural consequence of the environments in which rural perioperative nurses practise. Benner's framework is particularly instructive here because it situates expertise as an ongoing, context-dependent achievement and not as a fixed attribute of the practitioner. Rural practice conditions that interrupt regular procedural engagement effectively reverse the experiential gains that underpin expert performance, independent of years of service or formal qualifications.

The central challenge is a structural incompatibility: communities that depend on local surgical capacity may generate too little procedural volume to provide frequent reinforcement of every perioperative skill. In this paper, skill decay refers to a decline in learned performance after a period without practice (Issenberg et al., 2005). Low procedural volume, documented across rural surgical services (Canadian Institute for Health Information [CIHI], 2020), can limit repeated exposure to technical skills, team coordination, and uncommon adverse events. Although this problem is well described in simulation and nursing education literature, it has received limited direct examination in the Canadian perioperative nursing context.

The Operating Room Nurses Association of Canada (ORNAC) *Guidelines for Perioperative Practice in Canada*, 17th Edition (2025), provide recommended practices that support evidence-informed clinical decision-making across perioperative settings. ORNAC is not a regulatory body, and the Guidelines do not determine site-specific scope of practice or prescribe a single method for maintaining competence in low-volume settings. Competency requirements and maintenance plans must be aligned with provincial or territorial regulatory requirements, organizational policies, local case mix, and the nurse's professional responsibility to maintain competence. Nurses in geographically isolated settings also may have limited access to continuing education and simulation because of travel, staffing, and cost. This paper examines these challenges and proposes a multi-level framework for competence maintenance grounded in the Canadian context.

Methods

A narrative review of the published literature was conducted to synthesize evidence relevant to perioperative nursing competence in rural and low-volume Canadian surgical settings. Databases searched included CINAHL, MEDLINE, and SCOPUS, with a search window of January 2000 to March 2025. Search terms included combinations of perioperative nursing, operating room nursing, PACU nursing, rural surgery, low-volume surgical centre, competence maintenance, skill decay, simulation training, tele-mentoring, and Canadian nursing. Reference lists of retrieved articles were hand-searched to identify additional relevant sources.

Inclusion criteria were (a) published in English or French; (b) directly relevant to perioperative nursing practice, education, or workforce; and (c) applicable to rural, remote, or low-volume surgical contexts. Initial searches returned approximately 480 records. Following title and abstract screening, 68 full-text articles were reviewed; 14 sources met the inclusion criteria and were incorporated into the final synthesis. A narrative approach was adopted, given the breadth of disciplinary synthesis required, spanning perioperative nursing, rural health, simulation science, and health policy and the absence of a prior scoping review addressing perioperative nursing competence specifically in the Canadian rural context.

The narrative synthesis was organized thematically around two primary questions: first, which domains of perioperative nursing competence are most vulnerable when practice opportunities are infrequent; and second, what interventions have demonstrated feasibility, acceptability, or effectiveness in supporting competence maintenance in comparable contexts. Evidence quality varied across the included sources, ranging from systematic reviews and randomized simulation-based trials to qualitative workforce studies and descriptive policy analyses. Findings were interpreted through Benner's (1984) Novice-to-Expert framework, which served as the overarching theoretical lens.

Results

Domains of Perioperative Nursing Competence at Risk

Low-volume environments can challenge competence across the perioperative pathway, including preoperative, intraoperative, and immediate postoperative care. Preoperative competence includes patient assessment and preparation, verification processes, anticipation of clinical risks, and clear communication with the perioperative team. In low-volume settings, structured checklists, case review, and continuing education can reinforce these processes between procedures (ORNAC, 2025). Four intraoperative and postoperative nursing roles are particularly relevant

1. **Scrub nursing:** Instrument anticipation, sterile field maintenance, laparoscopic equipment handling, and accurate counts all require regular procedural exposure to remain automated. Rural scrub nurses who perform a given procedure only a handful of times each year experience progressive skill degradation, with documented patient safety consequences, including retained surgical items and contamination events (Mitchell et al., 2011). Benner's (1984) framework is instructive here. Without repeated exposure, the cognitive shortcuts that allow an expert scrub nurse to anticipate the surgeon's needs cannot consolidate, and the practitioner is functionally returned to a lower proficiency level regardless of years of service. This regression is particularly significant for laparoscopic and minimally invasive

procedures, where instrument handling demands are high, and the haptic feedback that guides expert performance is both subtle and technique-dependent.

2. **Circulating nursing:** In low-volume facilities, the circulating nurse routinely absorbs functions typically distributed across multiple staff. Medication management in the operative field is a nursing-sensitive risk domain that deteriorates without regular reinforcement, as the cognitive demands of simultaneous role responsibilities in resource-constrained environments elevate the risk of error (Riley & Manias, 2006). The circulating nurse in a rural facility may simultaneously manage patient documentation, coordinate instrument counts, communicate with the surgical team, and liaise with PACU—a scope of responsibilities that, in urban facilities, would be shared across a larger team. Maintaining the cognitive performance standards required across these overlapping functions depends on a regular practice regimen that low procedural volume cannot sustain.
3. **PACU nursing:** Rural PACU nurses regularly receive higher-acuity postoperative patients than elective volume statistics suggest, because emergency cases cannot always be transferred to regional centres in time (Kornelsen et al., 2025). Competence in airway management, hemodynamic monitoring, and recognition of post-anaesthetic complications, including hemorrhage, emergence agitation, and respiratory compromise, depends on a regularity of clinical exposure that low-volume settings cannot consistently provide. The consequences of PACU competence gaps are particularly serious because the immediate postoperative period is among the highest-risk intervals in the surgical episode. Rural PACU nurses may also function without in-hospital anaesthesia physician support, placing the burden of early recognition and response to post-anaesthetic deterioration more squarely on nursing judgment.
4. **Intraoperative crisis response:** The management of rare but life-threatening intraoperative events, such as major hemorrhage, anaphylaxis, malignant hyperthermia, and failed airway, demands an immediate, coordinated team response in which nursing roles are specific and interdependent. Human factors research demonstrates that team performance in crises depends on prior shared rehearsal; teams using structured cognitive aids and rehearsed protocols significantly outperform those without them (Arriaga et al., 2013). Rural perioperative nurses who have not recently rehearsed crisis protocols are at heightened risk of delayed recognition and fragmented communication under stress. This vulnerability is compounded by the typically small team size in rural facilities, where staff absences may leave the team with limited backup, and where the infrequency of genuine crises means that real-world rehearsal opportunities are rare.

Evidence-Informed Strategies for Competence Maintenance

Simulation-based Training

Simulation is the most extensively evaluated modality for perioperative competence maintenance outside direct clinical practice (Cook et al., 2013). Full-team crisis resource management (CRM) simulation addresses both individual skill and collective team process simultaneously. Mobile or in-situ simulation units, in which perioperative education teams bring manikins and task-trainer equipment to rural facilities, can reduce geographic barriers to training. Recurring, spaced practice produces more durable learning than a single intensive session (Issenberg et al., 2005). Simulation is most useful when scenarios reflect the rural facility's actual case mix and the situations nurses are realistically likely to encounter.

Tele-mentoring and Remote Clinical Support

The Extension for Community Healthcare Outcomes (ECHO) model provides a validated template for structured case-based peer learning via videoconference, enabling rural perioperative nurses to access specialist knowledge and reduce professional isolation. Tele-mentoring for perioperative nursing may encompass both asynchronous case review and, where permitted and appropriately governed, real-time consultation during complex or unfamiliar situations. Evidence for this modality continues to develop. Implementation should be consistent with provincial or territorial regulatory requirements, organizational policies, privacy obligations, and clear lines of clinical accountability.

Inter-facility Rotation

Regular rotation of rural perioperative nurses to higher-volume urban facilities maintains exposure to technical skills that cannot realistically be sustained locally, builds professional networks, and reduces isolation. Experience from British Columbia's Rural Surgical and Obstetrical Networks demonstrates the value of formally supported network arrangements rather than relying only on voluntary individual participation (Kornelsen et al., 2025; Parajulee et al., 2024). Provincial health authorities should support inter-facility rotation with relief staffing and financial assistance where feasible. The optimal duration and frequency for perioperative nurses remain to be established through prospective evaluation.

Cognitive Aids and Standardized Protocols

Laminated crisis algorithms and electronic decision-support tools can partially compensate for gaps in automated emergency responses by externalizing procedural memory. Teams that rehearse cognitive aids during simulation consistently outperform those who do not (Arriaga et al., 2013). Familiarization with crisis aids should be incorporated into perioperative orientation and recurring competency activities, consistent with local policy and evidence-informed guidance. The design of cognitive aids for rural perioperative settings should account for the multiple responsibilities that a small team may need to perform simultaneously.

Continuing Nursing Education

Continuing nursing education provides structured opportunities to maintain knowledge between clinical exposures. Relevant options may include perioperative specialty education, refresher learning, and advanced life-support courses, such as the Trauma Nursing Core Course (TNCC), Emergency Nursing Paediatric Course (ENPC), and Advanced Cardiac Life Support (ACLS). Digital learning platforms can improve access for rural practitioners who face barriers to attending metropolitan programs. Blended models that combine online foundational content with periodic simulation and clinical exposure may be particularly useful when adapted to local case mix, shift-work patterns, and staffing constraints (Gillespie et al., 2009).

Discussion

The strategies reviewed above are individually evidence-informed, but insufficient on their own. Sustainable perioperative nursing competence in rural Canada requires a coherent, multi-level response distributed across four interdependent levels: the individual nurse, the local health service, the regional network, and the provincial health system. No single intervention can fully address the low procedural volume that contributes significantly to competence risk in rural perioperative nursing. Rather, the strategies described above function as a coordinated portfolio, each addressing a dimension of the problem that the others cannot reach alone.

At the individual level, perioperative nurses remain professionally responsible for maintaining competence within their scope. Practical actions include participating in relevant refresher education, regularly reviewing locally held crisis-management cognitive aids, and using ORNAC educational offerings, such as recorded webinars and national conference content. Nurses should also discuss rotation, simulation, and mentoring needs with managers. These individual efforts require organizational support when geography, staffing, and cost limit access to professional development. Professional isolation remains relevant because nurses who feel unsupported may be less likely to seek education or advocate for structural investment in their practice setting (Stoll et al., 2025).

At the facility level, health services must invest in simulation equipment and protected team training time, implement structured handover and checklist protocols, and foster safety cultures in which perioperative nurses can raise competence concerns without professional stigma. Nurse managers in rural facilities, who frequently hold simultaneous responsibilities across multiple clinical portfolios, require dedicated support from regional clinical leaders and specialist mentors to sustain perioperative nursing quality standards. Facility-level investment should also include dedicated clinical educator time, even on a part-time or shared basis across a regional network, because the lack of internal educational capacity is a structural barrier to maintaining competence that training budgets alone cannot address.

At the regional level, provincial health authorities should develop formal inter-facility rotation agreements, mobile simulation programmes with predictable rural scheduling, and tele-mentoring infrastructure with perioperative nursing expertise. The architecture of existing provincial rural health networks provides a structural platform for coordinating perioperative nursing competence programmes across multiple sites. Regionally coordinated approaches also allow resource pooling that no single rural facility could sustain independently, including access to simulation educators, specialist tele-mentors, and relief staffing for rotation coverage.

Equity considerations are integral, not supplementary, to this framework. Indigenous and remote communities in Canada experience compounding layers of health disadvantage that can be worsened when local surgical services are fragile. Cultural safety, as defined by the Truth and Reconciliation Commission of Canada (2015) and articulated in provincial anti-racism health frameworks, must be recognized as a core perioperative nursing competency domain, rather than an add-on to technical skill maintenance. Simulation scenarios should include culturally responsive communication and care practices, and continuing education programs should integrate Indigenous health content as a structural component rather than an elective module.

At the national professional-association level, ORNAC can support competence maintenance by continuing to develop evidence-informed Guidelines, provide educational opportunities, and facilitate knowledge exchange among perioperative nurses. ORNAC does not regulate nursing practice or determine scope of practice. Site-specific competency expectations and maintenance plans should remain aligned with provincial or territorial regulatory requirements and organizational policies. Future ORNAC guidance could acknowledge the distinctive challenges of low-volume practice and identify evidence-informed options without prescribing local simulation intervals, rotation requirements, or scope-of-practice boundaries.

Limitations

The narrative approach, while suited to the breadth of synthesis required, introduces potential selection bias in the sources included. Published literature addressing perioperative nursing competence, specifically in the Canadian rural context, remains sparse; much of the evidence base is drawn from analogous international contexts or from anaesthesia and surgery literature that may not translate directly to nursing practice. Rapidly evolving telehealth and simulation technologies mean that some of the evidence reviewed may already be superseded. The review did not include grey literature, conference proceedings, or unpublished programme evaluations, some of which may contain directly relevant Canadian evidence. Future research priorities include prospective studies

examining changes in competence over time among rural Canadian perioperative nurses, co-designed simulation curricula adapted to rural nursing case mixes, formal evaluation of ECHO-model tele-mentoring for perioperative nursing, and economic analyses of the costs and benefits of investing in rural perioperative nursing competence. Developing and psychometrically validating a Canadian rural perioperative nursing competence assessment tool would provide a rigorous foundation for both program evaluation and workforce planning.

Conclusion

Perioperative nurses in rural Canada provide essential surgical care amid chronic workforce constraints and intermittent procedural exposure. Maintaining competence across perioperative scrub, circulating, PACU, and crisis-response roles requires both individual engagement and structural support. Evidence supports a multi-level portfolio of strategies, including simulation, tele-mentoring, inter-facility rotation, cognitive aids, and contextualized continuing education, when these approaches are matched to local needs and sustained over time. Provincial and territorial regulators establish professional requirements, health authorities and facilities create the conditions for competence maintenance, and individual nurses have a duty to maintain competence within their scope. ORNAC supports this work through evidence-informed Guidelines, education, and national professional knowledge exchange. A coordinated approach can strengthen patient safety and equitable access to perioperative care in rural communities.

About the Author



Eunice K. Assem-Erhaze is a perioperative nurse at Yorkton Regional Hospital with the Saskatchewan Health Authority and a PhD student in the College of Nursing at the University of Manitoba. Her clinical and scholarly interests centre on perioperative nursing, disability inclusion, and equity in nursing education and practice.

Conflicts of Interest

None declared.

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