McMaster University | HEALTH FORUM

Rapid Synthesis

Role and impacts of perioperative surgical-team assistants

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Appendix 1: Methodological details

Background to the rapid synthesis

This rapid synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid synthesis summarizes evidence drawn from existing evidence syntheses and from single research studies in areas not covered by existing evidence syntheses and/or if existing evidence syntheses are old or the science is moving fast. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select, and appraise research studies, and to synthesize data from the included studies. The rapid synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

The Forum produces timely and demand-driven contextualized evidence syntheses such as this one that address pressing health and social system issues faced by decision-makers (see our website for more details and examples). This includes evidence syntheses produced within:

- days (e.g., rapid evidence profiles or living evidence profiles)
- weeks (e.g., rapid syntheses that at a minimum include a policy analysis of the best-available evidence, which can be requested in a 10-, 30-, 60-, or 90-business-day timeframe)
- months (e.g., full evidence syntheses or living evidence syntheses with updates and enhancements over time).

This rapid synthesis was prepared over a 30-business-day timeframe and involved four steps:

1) submission of a question from a policymaker or stakeholder (in this case, B.C. Ministry of Health)
2) identifying, selecting, appraising, and synthesizing relevant research evidence about the question
3) conducting and synthesizing a jurisdictional scan of experiences about the question from other countries and Canadian provinces and territories
4) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence.

Identifying research evidence

For this rapid synthesis, we searched Health Systems Evidence and PubMed for:

1) evidence syntheses
2) guidelines
3) protocols for evidence syntheses that are underway
4) single studies.

We searched Health Systems Evidence (1;2) and PubMed (1;2;3) using terms related to perioperative care, surgery, and team- or model-related terms that encompassed surgical assistants and multidisciplinary approaches. Links provide access to the full search strategy.

Each source for these documents is assigned to one team member who conducts hand searches (when a source contains a smaller number of documents) or keyword searches to identify potentially relevant documents. A final inclusion assessment is performed both by the person who did the initial screening and the lead author of the rapid

evidence profile, with disagreements resolved by consensus or with the input of a third reviewer on the team. The team uses a dedicated virtual channel to discuss and iteratively refine inclusion/exclusion criteria throughout the process, which provides a running list of considerations that all members can consult during the first stages of assessment.

During this process we include published, pre-print and grey literature. We do not exclude documents based on the language of a document. However, we are not able to extract key findings from documents that are written in languages other than Chinese, English, French, or Spanish. We provide any documents that do not have content available in these languages in an appendix containing documents excluded at the final stages of reviewing. We excluded documents that did not directly address the research questions and the relevant organizing framework.

Assessing relevance and quality of evidence

We assess the relevance of each included evidence document as being of high, moderate, or low relevance to the question.

Two reviewers independently appraised the quality of the guidelines we identified as being highly relevant using AGREE II. We used three domains in the tool (stakeholder involvement, rigour of development, and editorial independence) and classified guidelines as high quality if they were scored as 60% or higher across each of these domains.

Two reviewers independently appraise the methodological quality of evidence syntheses that are deemed to be highly relevant using the first version of the AMSTAR tool. Two reviewers independently appraise each synthesis, and disagreements are resolved by consensus with a third reviewer if needed. AMSTAR rates overall methodological quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. High-quality evidence syntheses are those with scores of eight or higher out of a possible 11, medium-quality evidence syntheses are those with scores between four and seven, and low-quality evidence syntheses are those with scores less than four. It is important to note that the AMSTAR tool was developed to assess evidence syntheses focused on clinical interventions, so not all criteria apply to those pertaining to health-system arrangements or implementation strategies. Furthermore, we apply the AMSTAR criteria to evidence syntheses addressing all types of questions, not just those addressing questions about effectiveness, and some of these evidence syntheses addressing other types of questions are syntheses of qualitative studies. While AMSTAR does not account for some of the key attributes of syntheses of qualitative studies, such as whether and how citizens and subject-matter experts were involved, researchers' competency, and how reflexivity was approached, it remains the best general quality-assessment tool of which we're aware. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, an evidence synthesis that scores 8/8 is generally of comparable quality to another scoring 11/11; both ratings are considered 'high scores.' A high score signals that readers of the evidence synthesis can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the evidence synthesis should be discarded, merely that less confidence can be placed in its findings and that it needs to be examined closely to identify its limitations. (*Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. Health Research Policy and Systems 2009; 7 (Suppl1):S8*).

Identifying experiences from other countries and from Canadian provinces and territories

In rapid synthesis, we conducted jurisdictional scans for four countries (Australia, New Zealand, the U.K., and the U.S. – California and New York). For the scans of these countries, we search relevant government and stakeholder websites including those from government agencies, professional organizations, organizations promoting evidence-based practice and standards, and in some cases specific health provider organizations. While we do not exclude content based on language, where information is not available in English, Chinese, French, or Spanish, we attempt

to use site-specific translation functions or Google Translate. A full list of websites and organizations searched is available upon request.

Preparing the rapid synthesis

Each included document is cited in the reference list at the end of the rapid synthesis. For all included evidence syntheses, guidelines, and single studies, we prepare a small number of bullet points that provide a summary of the key findings, which are used to summarize key messages in the text. Protocols and titles/questions have their titles hyperlinked, given that findings are not yet available. We then draft a summary report that highlights the key findings from all relevant documents and from the jurisdictional scan.

Appendix 2: Key findings from evidence syntheses sorted by relevance

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Living status	Quality (AMSTAR)	Last year literature searched	Availability of GRADE profile	Equity considerations

• Perioperative support staff
  ○ New staff in a dedicated role
• Other required surgical team members
  ○ Nurse(s)
  ○ Other
• Role in perioperative surgical care
  ○ Before surgery
  ○ During surgery
  ▪ Providing surgical instruments and equipment to the surgeon
  ▪ Safety monitoring
  ○ Following surgery
  ▪ Monitoring patients' arrival into the recovery unit
• Outcomes
  ○ Patient experience
  ○ Provider experience
  ○ Costs
	Integrating nurse practitioners and physician assistants into surgical/trauma services may lead to positive outcomes, including reduced patient length of stay, stable morbidity and mortality rates, improved workload for surgical support team members, and high satisfaction rates among patients and healthcare workers (1)
	• Integrating nurse practitioners (NPs) and physician assistants (PAs) can also potentially help maximize surgical residents' exposure to clinical settings by reducing administrative duties and increasing time for educational activities
	• Substantial cost savings were also reported after the integration of NPs and PAs
		Medium	No	4/10 (AMSTAR rating by McMaster Health Forum)	May 2015	No	None identified

Appendix 3: Key findings from single studies sorted by relevance

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Perioperative support staff
  ○ New staff in a dedicated role
  ○ Upskilling existing staff
  ▪ Nurse
• Role in perioperative surgical care
  ○ Before surgery
  ▪ Sterilizing and inspecting the operating room and equipment
  ▪ Cleaning and disinfecting the incision site
  ▪ Other
  ○ During surgery
  ▪ Providing surgical instruments and equipment to the surgeon
  ▪ Other
• Outcomes
  ○ Costs
	Non-Medical Surgical Assistants (NMSA) appeared to decrease theatre preparation and true operating time, allowing for more procedures per session, subsequently enhancing cost-effectiveness (2)
	• This practice audit aimed to identify practitioners in Australia performing the role of the non-medical surgical assistant and to describe their qualifications, surgical specialty, scope of practice and practice settings
	• The study's survey results proved that the NMSA can ease the burden of inadequate staffing by providing an extra pair of hands for changeover as well as additional scrub and scout staff to alleviate skill mix issues
	• Standardizing NMSA education is needed to better align with advanced practice nurse criteria and establish it as an advanced practice role
		High	*Publication date:* December 2016
			
			Jurisdiction studied: Australia
			
			Methods used: Survey
				None identified

• Perioperative support staff
  ○ Upskilling existing staff
  ▪ Nurse
  ▪ Medical (or nursing) assistant
• Other required surgical team members
  ○ Surgeon
  ○ Anesthesiologist
  ○ Nurse(s)
• Role in perioperative surgical care
  ○ Before surgery
  ▪ Sterilizing and inspecting the operating room and equipment
  ▪ Positioning the patient on the operating table
  ○ During surgery
  ▪ Monitoring vital signs
	Nurse practitioners (NPs) with a specialization as registered nurse first assistants (RNFAs) should be prioritized in the perioperative setting as they are uniquely positioned to assist operating room teams with patient care across the surgical continuum and can lead to improved patient outcomes, surgical efficiency, and patient satisfaction (3)
	• NPs/RNFAs are trained to identify disease processes that lead to intraoperative complications and impact postoperative recovery
	• While the responsibilities of an NP/RNFA can vary based on the care phase, they generally support surgeons with handling tissue, ligating vessels, using instruments, suturing, creating a sterile field, positioning the patient after general anesthesia, and monitoring patient progress
	• The role consists of master's level preparation as an NP and RNFA course work (certification requires 2,000 hours of documented practice)
		High	*Publication date:* July 2016
			
			Jurisdiction studied: U.S.
			
			Methods used: Commentary
				• Occupation

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
▪ Providing surgical instruments and equipment to the surgeon ▪ Safety monitoring ○ Following surgery ▪ Monitoring patients' arrival into the recovery unit • Other features of perioperative support staff ○ Where training is obtained ▪ University degree ○ Duration of training required ○ Certification required • Outcomes ○ Health outcomes ○ Patient experience ○ Provider experience ○ Costs				
• Perioperative support staff ○ New staff in a dedicated role • Other required surgical team members ○ Surgeon ○ Nurse(s) • Other features of perioperative support staff ○ Remuneration provided • Outcomes ○ Health outcomes ○ Patient experience ○ Provider experience ○ Costs	The role of non-medical surgical assistants (NMSA) in the private healthcare sector in Australia is currently utilized by 35% of respondents to an online survey of Australian surgeons, with 69% of respondents widely supporting its integration in the private sector; the NMSA role has displayed a positive trend towards cost-effectiveness (4) • In the private sector, NMSAs are most commonly used within orthopaedic and general surgical specialties • In contrast to the private sector and the literature on this subject, 66% of respondents indicated apprehension towards the NMSA role in the public sector (as it may impact the training of junior doctors) • The current payment method for NMSAs is an out-of-pocket expense paid by surgeons or patients	High	*Publication date:* April 2017 *Jurisdiction studied:* Australia *Methods used:* Survey	• Occupation
• Perioperative support staff ○ New staff in a dedicated role • Other required surgical team members ○ Other • Role in perioperative surgical care ○ During surgery	The use of surgical assistants in vitreoretinal surgeries declined significantly from 2000 to 2014, potentially influenced by technological advancements and changes in procedural preferences (5) • The study assessed the utilization of surgical assistants during vitreoretinal surgeries, examining their roles and trends over this timeframe, and using sampled data from U.S. Medicare Part B fee-for-service beneficiaries undergoing vitreoretinal surgeries from 2000 to 2014	High	*Publication date*: August 2017 *Jurisdiction studied*: United States *Methods used*: Database study	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
▪ Providing surgical instruments and equipment to the surgeon • Other features of perioperative support staff o Where training is obtained ▪ Certificate	• Technological advancements (e.g., hands-free viewing systems and small-gauge vitrectomy) were highlighted as contributing to reduced reliance on surgical assistants by enhancing surgeon autonomy • The findings also noted that the decline in scleral buckling procedures, which traditionally require more assistant involvement, further explains the diminishing need for surgical assistants			
• Perioperative support staff o New staff in a dedicated role (e.g., surgical assistant or technician) • Role in perioperative surgical care o During surgery ▪ Providing surgical instruments and equipment to the surgeon ▪ Safety monitoring • Other features of perioperative support staff o Where training is obtained ▪ University degree ▪ Certificate	Based on six clinically relevant patient outcomes, patient outcomes between procedures led by non-medical surgical assistants and medical surgical assistants were observed to be similar, suggesting they are of comparable effectiveness in intraoperative care (6) • This retrospective study assessed the effectiveness of using nurse clinicians as non-medical surgical assistants compared to medical surgical assistants • The findings noted that patient outcome assessments revealed no statistically significant differences based on the type of surgical assistant employed, highlighting the viability of utilizing nurse clinicians in this role • Patient characteristics, such as emergency status and comorbidities, were found to significantly impact outcomes, highlighting that many factors can influence patient care	High	*Publication date*: January 2020 *Jurisdiction studied*: Australia *Methods used*: retrospective observational study	None identified
• Other required surgical team members o Anesthesiologist o Nurse(s) o Other • Role in perioperative surgical care o During surgery • Outcomes o Health outcomes o Patient experience o Costs	Surgical care teams consistently comprised certified surgical assistants, a certified surgical technologist, and a circulating nurse were found to reduce time to first incision, procedure duration, turnover time, and odds of prolonged hospitalization compared to low-consistency teams, highlighting the importance of maintaining high-consistency among surgical support staff teams (7)	Medium	*Publication date:* May 2023 *Jurisdiction studied:* U.S. *Methods used:* retrospective cohort study	None identified
• Perioperative support staff o New staff in a dedicated role o Upskilling existing staff ▪ Nurse • Role in perioperative surgical care o During surgery ▪ Other	Although there were initial concerns over nurses and allied health professionals taking on surgical roles, non-medical surgical assistants have demonstrated an ability to maintain surgical services, provide an additional career route for nurses, and enhance patient care (8) • In order to clarify roles and inform role-specific regulation, practice guidelines, and educational standards, a position statement from the Perioperative Care Collaborative in 2012 specified three levels of non-medical surgical assistance	Medium	*Publication date:* September 2015 *Jurisdiction studied:* U.K. *Methods used:* Commentary	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Outcomes
  ○ Patient experience
  ○ Provider experience
	○ Scrub practitioners work in minor surgery only and perform limited surgical assistance where local protocol supports this
	○ Surgical first assistants provide more involved and dedicated assistance under direct supervision of the surgeon throughout the procedure, while not performing any surgical intervention
	○ Surgical care practitioners work as a member of the surgical team, performing surgical interventions and other elements of care under the supervision and direction of a consultant, though not independently			

• Perioperative support staff
  ○ New staff in a dedicated role
• Other required surgical team members
  ○ Other
• Role in perioperative surgical care
• Outcomes
  ○ Health outcomes
  ○ Patient experience
  ○ Provider experience
  ○ Costs
	The impact of resident training level did not yield significant changes in operation time or surgical outcomes in the treatment of intermittent exotropia; however, a higher immediate postoperative exodeviation was observed in patients whose surgery was assisted by a first-year resident (9)
	• The study assessed the impact of surgical assistants' level of resident training (first-year residents versus second-, third-, or fourth-year residents) on operation times and surgical outcomes in the treatment of intermittent exotropia
	• Generally, the shorter mean operation time was observed in the surgical group assisted by first-year residents
	• Interpersonal differences of residents is a potential factor that could impact surgical outcomes that was not analyzed in the study
		Medium	*Publication date*: January 2018
			
			Jurisdiction studied: Korea
			
			Methods used: Cohort study
				• Occupation

• Perioperative support staff
  ○ New staff in a dedicated role
• Other required surgical team members
  ○ Nurse(s)
• Role in perioperative surgical care
  ○ During surgery
• Other features of perioperative support staff
  ○ Where training is obtained
	Personal qualities (e.g., calmness, courage, and confidence) play a big role in providing quality surgical assistance, alongside technical skills and knowledge (10)
	• Essential attributes and attitudes identified for surgical trainees include common sense, competence, commitment, compassion, and communication, highlighting the need to integrate academic knowledge with practical experience for both surgical trainees and non-medically qualified surgical assistants
		Medium	*Publication date*: September 2016
			
			Jurisdiction studied: U.K.
			
			Methods used: Commentary
				None identified

• Other required surgical team members
  ○ Surgeon
• Role in perioperative surgical care
  ○ During surgery
  ▪ Providing surgical instruments and equipment to surgeon
• Outcomes
  ○ Health outcomes
  ○ Provider experiences
	Certified surgical assistants require training and experience to minimize operating times and build connections with surgeons (11)
	• This case study examined the effects of replacing familiar certified surgical assistants (CSA) with an experienced but new to the surgical team CSA on operation time and blood loss on a laparoscopic pancreatoduodenectomy
	  ○ During this procedure, dedicated CSAs maintain familiarity in operating settings by closely working surgeons
	  ○ CSA are responsible for managing the laparoscope efficiently and clearly to minimize complications and facilitate the role of the surgeon
	• Replacing a CSA did not have a significant effect on blood loss
		Medium	*Publication date*: November 2017
			
			Jurisdiction studied: U.S.
			
			Methods used: case study
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	• On average, the new CSA took 40 minutes longer per case than the familiar CSA • This study provides no suggestions on how the duties of CSA's can be replaced; providing more time and practice for new CSA's could help gain familiarity			

• Perioperative support staff
  ○ Upskilling existing staff
  ▪ Nurse
• Role in perioperative surgical care
  ○ Before surgery
  ▪ Other
  ○ During surgery
  ▪ Monitoring vital signs
  ▪ Safety monitoring
• Outcomes
  ○ Health outcomes
	Nurses can be trained to identify risk factors for surgery and safety monitoring during surgery to improve perioperative health outcomes (12)
	• This case study is written by a nurse describing her role and process as a registered nurse first surgical assistant during a critical patient event managing a patient's intraperitoneal hemorrhage after a total abdominal hysterectomy
	• In this study, the author describes using her advanced responsibilities to identify the condition and risk factors of the patient by analysing test results and performing a physical examination to recommend surgery
	• While this paper does not provide specific information on the roles that are played during surgery, it highlights that nurses can be trained to take additional roles and support the surgical team
		Medium	*Publication date*: July 2014
			
			Jurisdiction studied: New Zealand
			
			Methods used: case study
				None identified

• Perioperative support staff
  ○ New staff in a dedicated role
  ○ Upskilling existing staff
  ▪ Nurse
  ▪ Medical (or nursing) assistant
• Other required surgical team members
  ○ Other
• Role in perioperative surgical care
  ○ During surgery
  ▪ Providing surgical instruments and equipment to the surgeon
  ▪ Other
  ○ Outcomes
  ○ Provider experience
  ○ Costs
	Robotic camera holders for laparoscopic liver resections can help address surgical assistant fatigue and image tremor, and appear to be cost-effective in most cases (13)
	• Compared to robotic camera holders, only the use of nurse assistants with no advanced training and postgraduate year 2 doctors were cheaper than using the device, suggesting that in many situations robotic camera holders may be cost-beneficial and provide broader service and educational benefits
		Medium	*Publication date:* October 2017
			
			Jurisdiction studied: U.K.
			
			Methods used: retrospective cohort study
				None identified

Appendix 4a: Detailed jurisdictional scan of perioperative surgical team models in other countries

Jurisdiction	Dimension of the organizing framework that is the focus of the model	Key features of the model

Australia	• Perioperative support staff
	  ○ New staff in a dedicated role
	  ○ Upskilling existing staff
	  ▪ Nurse
	  ▪ Medical (or nursing) assistant
	  ▪ Patient technician
	• Other required surgical team members
	  ○ Surgeon
	  ○ Anesthesiologist
	  ○ Nurse(s)
	  ○ Other
	• Role in perioperative surgical care
	  ○ Before surgery
	  ○ During surgery
	  ○ Following surgery
		• The New Australian College of Perioperative Nurses (ACORN) Standards for Perioperative Nursing in Australia aims to guide Australian perioperative nurses and interdisciplinary teams to ensure safety and quality care for patients
		• The New ACORN Standards includes Professional Practice Standards for Perioperative Nurses and Standards for Safe and Quality Care in the Perioperative Environment
		  ○ These standards offer specific guidance for both individuals and organizations involved in perioperative care
		  ○ The standards are developed based on the latest evidence and expert input from perioperative practitioners
		• The Framework for Perioperative Care in Australia and New Zealand is designed to prepare medical staff for their roles in perioperative medicine teams and help them work with surgeons and primary care doctors
		  ○ It is meant to serve as a guide for individuals involved in perioperative medical teams in varying degrees (i.e., whether they are starting, managing, or enhancing perioperative medical teams)
		• The Perioperative Toolkit by the New South Wales Government aims to improve the quality of perioperative care for patients undergoing surgery and anesthesia by employing evidence-based practices and clinical reasoning
		  ○ The Toolkit introduces four new elements focused on measuring outcomes for quality improvement, preoperative pre-habilitation, and enhancing care for high-risk patients with chronic multisystem diseases undergoing moderate to major surgeries
		• The Rural Perioperative Team Training Program by Queensland Health is an initiative of the Statewide Anaesthesia and Perioperative Care Clinical Network (SWAPNet), funded by the Healthcare Improvement Unit, Clinical Excellence Division
		  ○ The program aims to support clinicians in rural and remote Queensland to deliver and sustain safe healthcare services
		  ○ Objectives include developing a comprehensive team-focused training program to enhance technical and non-technical skills
		  ○ Expected benefits include improved role understanding, communication, staff satisfaction, patient safety, performance, and healthcare quality

New Zealand	• Role in perioperative surgical care
	  ○ Before surgery
	  ○ During surgery
	  ○ Following surgery
	• Other features of perioperative support staff
	  ○ Where training is obtained
	  ▪ University degree
	  ▪ College degree
	  ▪ Certificate
		• The Safe Surgery NZ program is focused on improving perioperative care by promoting consistent application of evidence-based practices and safety standards, in addition to improving teamwork and communication
		• Some of the interventions and international approaches to reducing patient harm from surgery promoted include:
		  ○ surgical team briefings
		  ○ paperless surgical safety checklist
		  ○ debriefings
		  ○ supporting communication tools like ISBAR (Identify, Situation, Background, Assessment, Recommendation) and closed-loop feedback

Jurisdiction	Dimension of the organizing framework that is the focus of the model	Key features of the model
	▪ Apprenticeship (or other in-work training) ○ Duration of training required ○ Certification required • Outcomes ○ Health outcomes ○ Patient experience ○ Provider experience	• The Revised Definitions for the Practice of Perioperative Practice in Aotearoa New Zealand by the Medical Sciences Council of New Zealand outlines who constitutes a perioperative practitioner, the activities perioperative practitioners undertake, their scope of practice, and qualifications needed to register as a perioperative practitioner
U.K.	• Perioperative support staff ○ Upskilling existing staff ▪ Nurse ▪ Medical (or nursing) assistant ▪ Patient technician • Other required surgical team members ○ Surgeon ○ Anesthesiologist ○ Nurse(s) ○ Other • Role in perioperative surgical care ○ Before surgery ▪ Other ○ During surgery ▪ Providing surgical instruments and equipment to the surgeon ▪ Safety monitoring ▪ Other ○ Following surgery ▪ Monitoring patients' arrival into the recovery unit ▪ Other • Other features of perioperative support staff ○ Where training is obtained ▪ University degree ▪ Certificate ▪ Apprenticeship (or other in-work training) ▪ Certification required • Outcomes ○ Health outcomes ○ Patient experience	• In the U.K., Surgical First Assistants are registered healthcare professionals providing continuous assistance under the direct supervision of the operating surgeon throughout the procedure, while not performing any form of surgical intervention ○ Tasks include enhancing communication between theatre, patient; and ward, assistance with patient positioning, skin preparation, use, and maintenance of specialized surgical equipment, handling tissues and manipulating organs for exposure or access, camera and instrument manipulation, cutting deep sutures and ligatures, assistance with wound closure, application of dressings, and assistance with the transfer of patients to postoperative anesthetic care unit ○ Eligibility for training requires registration as a healthcare professional (e.g., nurse, operating department practitioner, or psychotherapist), one to two years of post-registration experience, and aptitude for clinical and operative practice ○ Training occurs through the completion of a nationally recognized program of study through an accredited program or an in-house training package ○ It is recommended that Surgical First Assistants follow the Association for Perioperative Practice Voluntary Code of Conduct for registered practitioners working in advanced surgical roles • According to the Earlier Screening, Risk Assessment and Health Optimisation in Perioperative pathways: Guide for Providers and Integrated Care Boards the perioperative workforce encompasses everyone supporting patients' journeys from contemplation of surgery to post surgery follow-up, including dieticians, pharmacists, occupational therapists, social workers, physiotherapists, preoperative assessment nurses, anesthetists, surgeons, and non-clinical staff ○ In the context of early screening, risk assessment, and optimization of patients: ▪ Preoperative assessment nurses ensure that patients waiting for inpatient surgery are assessed to be fit for surgery and supported to optimize their health (e.g., through referral to specialist teams or pre-habilitation and self-management support services) before they are given a date for surgery and liaise with surgical and perioperative teams to manage higher-risk patients ▪ Expert clinicians are responsible for developing and/or approving health optimization plans, tailoring perioperative pathways for patients who cannot be managed on standard protocols, discussing with patients, surgeons, and the wider multidisciplinary team about the benefits, risks, and alternatives to surgery when perioperative risk is high, and reviewing progress of patients on optimization pathways ▪ Non-clinical perioperative care coordinators may be introduced to give preoperative assessment nurses more time to focus on their clinical responsibilities, and undertake digital health assistant type tasks, arranging tests for patients under the direction of preoperative assessment nurses, completing preliminary desk-based screening assessments of perioperative risk factors, following up on test results under the direction of a preoperative nurse, supporting signposting patients to local social prescribing

Jurisdiction	Dimension of the organizing framework that is the focus of the model	Key features of the model
	○ Costs	services, following up with patients listed for inpatient surgery, and liaising with clinical validation and booking and scheduling teams under the guidance of the preoperative assessment nurse • The Royal College of Anaesthetists' Guidelines for the Provision of Anaesthesia Services for the Perioperative Care of Elective and Urgent Care Patients 2024 provides recommendations for 1) service organization and administration, 2) staffing requirements before the day of procedure, 3) equipment, services, and facilities before the day of procedure, 4) service organization and administration before the day of procedure, 5) patient information, 6) staffing requirements for the day of procedure, 7) equipment, services, and facilities on the day of procedure, 8) organization on the day of procedure, 9) staffing requirements for the period early after the procedure, 10) equipment, services and facilities for the period early after the procedure, 11) service organization and administration early after the procedure, 12) areas of special requirement, 13) training and education, and 14) financial considerations ○ Training of anesthetists should include attaining the competency to perform medical assessment of patients prior to anesthesia and surgery or other procedures ○ Training and educational resources should also be made available to general practitioners and primary staff instrumental in 'first contact' patient consultations prior to secondary referral ○ Theatre teams should undergo regular multidisciplinary training with a focus on human factors, effective communication, and openness ○ Prior to the procedure, consultant anesthetists should work with staff, specialists, and associate specialist doctors to review results and concerns identified by preoperative staff, conduct consultations with patients identified through triage for optimal delivery of preoperative assessment resources, and engage in shared decision-making about the risks and benefits of anesthesia and surgery in higher-risk patients ○ On the day of the procedure, the anesthetist should allocate time towards both pre- and postoperative care, and all anesthesia departments should have a nominated anesthetist immediately available and free from clinical responsibilities to provide cover in clinical emergencies along with providing advice and support to other anesthetists ○ During the period early after the procedure, the anesthetist is responsible for the transport of patients from theatre to the recovery unit, being available to remove tracheal tubes in situ after the patient is transferred to the recovery unit, oversee patient handover, and be available for consultation until the patient is able to maintain their own airway, regained respiratory and cardiovascular stability, and is able to communicate • The Centre for Perioperative Care's Guidance on Establishing and Delivering Enhanced Perioperative Care Services provides workforce considerations for nurses, allied health professionals, pharmacists, administrators, and other medical providers ○ Allied health professionals include physiotherapists, occupational therapists, speech and language therapists, dieticians, and therapy support workers, who should be skilled up following the Allied Health Professionals: Critical Care Professional Development Framework ○ At least one nurse on each shift should hold or be working towards a postgraduate qualification relevant to enhanced perioperative care ○ Although nurses based in surgical wards, theatre recovery units, or other acute areas of care will have transferable skills that can assist their transition to enhanced care roles, opportunities to work in enhanced perioperative care should be open to anyone with an interest in the service

Jurisdiction	Dimension of the organizing framework that is the focus of the model	Key features of the model
		○ Specialist nurses (e.g., pain nurses, stoma nurses, and enhanced recovery nurses) should have input into postoperative care planning in the enhanced perioperative care unit ○ An onsite clinical nurse educator with appropriate competencies should be available ○ Enhanced perioperative care areas require 0.6 whole time equivalent pharmacist for a five-day service or 0.8 for a seven-day service for an eight-bedded facility to provide direct patient care ○ Medicine management technicians and pharmacy assistants can provide support to release pharmacists to utilize the more skilled aspects of their role ○ The core team working in enhanced perioperative care should possess the National Competency Framework for Registered Practitioners: Level 1 Patients and Enhanced Care Areas (or be working towards achieving it) • The National Institute for Health and Care Excellence produced a guideline for perioperative care in adults that provides recommendations for enhanced recovery programs along with specific recommendations for preoperative, intraoperative, and postoperative care as well as managing pain ○ In terms of providing information and support for people having surgery, the guideline highlights that clinical nurse specialists can be leveraged to be the point of contact in larger hospitals, while in smaller units the point of contact may need to be a team of people
U.S. – California	• Perioperative support staff ○ New staff in a dedicated role ○ Upskilling existing staff ▪ Nurse ▪ Medical (or nursing) assistant • Other required surgical team members ○ Anesthesiologist ○ Surgeon ○ Nurse(s) • Other features of perioperative support ○ Where training is obtained ▪ University degree ▪ College degree ▪ Certificate ▪ Apprenticeship (or other in-work training) ○ Duration of training required ○ Certification required	• The California Board of Registered Nursing defines the role of the registered nurse first assistant (RNFA) as directly assisting the surgeon during surgery by providing wound exposure, suturing and other related tasks, patient positioning, mobilizing tissue, and controlling bleeding ○ The RNFA performs these tasks under the supervision of the surgeon during the perioperative experience and must adhere to standardized procedures ○ While functioning as the RFNA, the nurse cannot perform the function of the scrub nurse • At the Department of Anesthesia and Perioperative Care at the University of California San Francisco (UCSF), an anesthesia care team model (ACT) is used, consisting of an anesthesiologist who supervises either a Registered Nurse Anesthetist or Resident Anesthesiologist in training
U.S – New York	• Perioperative support staff ○ New staff in a dedicated role ○ Upskilling existing staff ▪ Nurse ▪ Medical (or nursing) assistant • Other required surgical team members ○ Surgeon	• Mount Sinai Perioperative Nursing course provides training and education on the standards of the Association of periOperative Registered Nurses' Perioperative program to new graduate nurses or nurses previously employed in non-operating room nursing positions ○ The eight-week course includes online and didactic coursework with hands-on practice and 50 hours of clinical observation

Jurisdiction	Dimension of the organizing framework that is the focus of the model	Key features of the model
	○ Anesthesiologist ○ Nurse(s) • Other features of perioperative support ○ Where training is obtained ▪ University degree ▪ College degree ▪ Certificate ▪ Apprenticeship (or other in-work training) ○ Duration of training required ○ Certification required	• Surgical assistants in the U.S. can be certified through education programs of the National Board of Surgical Technology and Surgical Assisting (NBSTSA), the National Commission for the Certification of Surgical Assistants (NCCSA), and the American Board of Surgical Assistants (ABSA) • To be licensed as a Registered Specialist Assistant in New York state, a person must be at least 21 years old, meet education, examination, and experience requirements, and be of good moral character ○ Registered Specialist Assistants work under the supervision of a licensed physician, currently registered in New York state and qualified to practice in the medical specialty that requires the skills of the Registered Specialist Assistant ○ There are three categories of specialist assistants: urologic specialist assistant, orthopedic specialist assistant, and radiologic specialist assistant ○ The education and examination requirements include completion of a secondary school program that is acceptable in New York State and completion of qualifying examinations for the specific category of specialist assistant • At Hospital for Special Surgery (HSS), the anesthesiologist on the surgical team takes primary responsibility for a patient during the early postoperative period, and specialty nurse practitioners – registered nurses who have been clinically trained in a specific area of care – support patients with perioperative services that are specific to their care needs following surgery

Appendix 4b: Detailed jurisdictional scan of perioperative surgical team models in Canadian provinces and territories

Jurisdiction	Dimension of the organizing framework that is the focus of the model	Key features of the model

Pan-Canada	• Perioperative support staff
	  ○ Upskilling existing staff
	  ▪ Nurse
	• Other required surgical team members
	  ○ Surgeon
	  ○ Anesthesiologist
	• Role in perioperative surgical care
	  ○ Before surgery
	  ▪ Cleaning and disinfecting the incision site
	  ○ During surgery
	  ▪ Monitoring vital signs
	  ▪ Providing surgical instruments and equipment to the surgeon
	  ▪ Safety monitoring
	  ▪ Other
	• Other features of perioperative support staff
	  ○ Duration of training criteria
	  ○ Certification required
		• Operating Room Nurses Association of Canada highlights the roles nurses can play to support perioperative surgical support teams
		  ○ Registered Nurse First Assistants can support during surgery to improve quality of care and relieve surgeons
		  ○ Nurses can participate as Anaesthesia Assistants to monitor vitals and administer anesthetic medication
		  ○ Nurses must have a minimum of 2,000 hours of clinical experience in the OR, ICU, or ER

British Columbia	• Perioperative support staff
	  ○ Upskilling existing staff
	  ▪ Nurse
	  ▪ Medical (or nursing) assistant
	• Other required surgical team members
	  ○ Surgeon
	  ○ Anesthesiologist
	  ○ Nurse(s)
	  ○ Other
	• Other features of perioperative support staff
	  ○ Where training is obtained
	  ▪ University degree
	  ▪ Certificate
	  ▪ Apprenticeship (or other in-work training)
	  ○ Duration of training required
	  ○ Certification required
	• Outcomes
	  ○ Health outcomes
		• On 17 May 2022, it was announced that Vancouver General Hospital will be adding 39 new perioperative patient bays at the facility
		• The province hired 385 perioperative nurses between April 2020 and June 2023 to support the increased volume of patient surgeries
		• The British Columbia Institute of Technology (BCIT) offers an advanced certificate in perioperative nursing (online delivery) and a combined perioperative nursing specialty program (online delivery)
		• The Perioperative Nurses Association of BC (PNABC) is a voluntary, not-for-profit group who aims to provide and advocate for the highest level of perioperative care for its residents
		• The Perioperative Clinical Action Network (PCAN) unites multidisciplinary surgical team members from diverse specialities (e.g., nurses, surgeons, anesthesiologists, and administrators) across the province to engage in supporting local and regional surgical solutions and quality improvement efforts
		  ○ The PCAN Innovation Fund supports licensed physicians in supporting innovation in perioperative services to improve the Institute of Healthcare Improvement Quadruple Aim
		• The Surgical Patient Optimization Collaborative (SPOC) is a prehabilitation program focused on supporting patients for surgery; it utilizes a patient-centred and multidisciplinary approach to improve patient outcomes and supports care providers in implementing change processes
		  ○ Positive per-capita cost outcomes arose from decreased length of stay, morbidity, and cancellations

	○ Patient experience ○ Provider experience ○ Costs	○ The overall experience of care was positively supported, with patient experiences improving by 91% and provider experiences improving by 94% • The University of British Columbia's Faculty of Medicine has an Internal Medicine Perioperative Care Team, whose members work alongside anesthesiologists and cardiologists to implement standardized approaches and region protocols that respond to myocardial injury after non-cardiac surgery ○ Trainees receive exposure to thrombosis, geriatrics, heart failure, and conducting preoperative risk assessments • The Anaesthetic Care Team model leverages Anesthesia Assistants and has been endorsed by the B.C Ministry of Health, British Columbia Anaesthesiologists' Society, and the Canadian Anaesthesiologists' Society's (CAS) as a viable solution to allow for anesthesiologists to respond to the increased clinical demands of the health system ○ An initial analysis of Anesthesia Assistants working in these models demonstrated overwhelmingly positive responses for enhanced safety climate and job satisfaction among anesthesiologists, surgeons, and anesthesia assistants, as well as bringing about cost savings • Operating room teams on Vancouver Island consist of physicians, perioperative nurses, post-aesthetic care unit nurses, anesthesia assistants, medical device reprocessing department staff, and health care assistants • Vancouver Coastal Health (VCH) has an Enhanced Recovery After Surgery (ERAS) service that supports patients, caregivers, and providers throughout the surgery process ○ VCH offers a regional perioperative education program (RPEP) to current eligible graduates/licensed health professionals ▪ The program consists of three components, the first two modules of which are six weeks in length each, and the final preceptorship varies between four to 12 weeks • In June 2011, the British Columbia Medical Association published a policy paper titled Enhancing Surgical Care in BC, with the aim of improving perioperative quality, efficiency, and access; some of the recommendations include: ○ establishing a multi-stakeholder perioperative improvement panel and provincial implementation support ○ identifying clinical champions within hospitals/health authorities (e.g., surgeons, anesthesiologists, or nurses) who will lead the perioperative improvement team ○ measuring perioperative performance indicators, involving patients, and maximizing resources
Alberta	• Perioperative support staff ○ New staff in a dedicated role • Other required surgical team members ○ Surgeon ○ Anesthesiologist ○ Nurse(s) ○ Other • Role in perioperative surgical care ○ During surgery ▪ Monitoring vital signs ▪ Safety monitoring ▪ Other	• In April 2022, Alberta Health Services debuted a new pilot program, Anaesthesia Care Team (ACT) model, which aims to support surgical wait times by leveraging the use of respiratory therapists ○ Under this model, qualified respiratory therapists II will engage in tasks traditionally performed by anesthesiologists in an attempt to allow for more patients to access care ▪ Qualified respiratory therapists II perform patient assessments, obtain medical histories, assist in developing an anesthetic care plan, and administer and monitor light sedations ○ This model enables anesthesiologists to oversee two or three surgeries with the respiratory therapists providing anesthesia service in each of the operating rooms • Enhanced Recovery After Surgery (ERAS), a program that helps to connect physicians and clinical teams together to support surgical care for patients, has been implemented at the majority of acute care hospitals ○ ERAS teams are led by a surgeon, anesthesiologist, operations leader, and a nurse coordinator

	○ Following surgery ○ Monitoring patients' arrival into the recovery unit • Other features of perioperative support staff ○ Where training is obtained ▪ College degree ▪ Certificate ▪ Apprenticeship (or other in-work training) ○ Duration of training required ○ Certification required • Outcomes ○ Health outcomes ○ Patient experience	• Alberta Health Service's Foothills Medical Centre offers a Post-Graduate Perioperative Program that supports registered nurses in obtaining advanced training in perioperative medicine; this 14-week program features a blend of didactic learning and the application of theoretical knowledge through a clinical practicum placement • MacEwan University offers a post-diploma certificate in perioperative nursing through its Faculty of Nursing; this program is composed of five online courses over the course of the fall, winter, and spring/summer terms • Bow Valley College offers a certificate of achievement in perioperative nursing in a blended-format, with online theoretical course work and in-person clinical practicums • The University of Calgary offers a Perioperative Medicine Fellowship to help fellows explore risk stratification and mitigation from surgical planning to the patient's transition back to the community ○ Fellows will train at Foothills Medical Centre, engaging in six core perioperative blocks over the year, and most of their rotations will focus on assessment, optimization, and management of complex patients
Manitoba	• Perioperative support staff • Role in perioperative surgical care ○ Before surgery ▪ Sterilizing and inspecting the operating room and equipment ▪ Cleaning and disinfecting the incision site ▪ Positioning the patient on the operating table ▪ Other ○ During surgery ▪ Providing surgical instruments and equipment to the surgeon ▪ Other ○ Following surgery ▪ Monitoring patients' arrival into the recovery unit ▪ Other • Other required surgical team members ○ Surgeon ○ Anesthesiologist ○ Nurse(s) ○ Other • Other features of perioperative support ○ Where training is obtained ▪ Apprenticeship (or other in-work training)	• Operating Room Assistants in Manitoba can be trained through a comprehensive 12-week paid program to prepare for a full-time role working alongside surgical team members ○ Support provided includes the management of sterile instrumentation and sterile field, assisting with preparation of surgical instruments before a procedure, and supporting the post-procedure transport of instruments to the decontamination areas ○ They also assist with safe positioning and transfer of patients, post-procedure cleaning of operative or procedure room, and handle instruments, supplies, and equipment necessary during the procedure • Shared health Manitoba's Clinical & Preventive Services Plan includes details about dedicated itinerant teams consisting of providers such as specialists, anesthesiologists, operating room nurses, and operating room and managed detection and response educator resources who rotate through Intermediate and District hubs to provide surgical and perioperative care
Saskatchewan	• Perioperative support staff ○ Upskilling existing staff ▪ Nurse • Role in perioperative surgical care	• Saskatchewan Polytechnic's advanced certificate in perioperative nursing programs for registered nurses and licensed practical nurses are 33-week programs that prepare nurses for perioperative care roles • The Saskatchewan Association of Licensed Practical Nurses' practice guideline on specialized areas of practice includes guidance for achieving and maintaining competence in perioperative care

	○ During surgery • Other features of perioperative support staff ○ Certification required	○ Educational requirements for licensed nurse practitioners to obtain the specialty recognition include completing the Perioperative Nursing LPN/ Advanced Certificate from the Saskatchewan Polytechnic, or an equivalent program approved by the Council ○ Perioperative licensed nurse practitioners provide care under the order of an authorized professional, work collaboratively with other team members, and ensure appropriate health professionals are consulted when the required care exceeds the competence of the licensed nurse practitioner
Ontario	• Perioperative support staff ○ New staff in a dedicated role ○ Upskilling existing staff ▪ Nurse ▪ Medical (or nursing) assistant • Other required surgical team members ○ Surgeon ○ Anesthesiologist • Role in perioperative surgical care ○ Before surgery ▪ Sterilizing and inspecting the operating room and equipment ▪ Cleaning and disinfecting the incision site ○ During surgery ▪ Monitoring vital signs ▪ Providing surgical instruments and equipment to the surgeon ▪ Safety monitoring • Other features of perioperative support staff ○ Where training is obtained ▪ University degree ▪ College degree ▪ Certificate ▪ Apprenticeship (or other in-work training) ○ Duration of training required ○ Certification required ○ Remuneration provided • Outcomes ○ Health outcomes ○ Patient experience ○ Provider experience	• The Anesthesia Care Team (ACT) Model has been used in Ontario for more than 15 years and consists of a certified clinical anesthesia assistant (CAA) that assists the anesthesiologist prior to, during, and after surgery ○ The CAA is directed and supervised by the anesthesiologist and helps with a variety of tasks, including preparing anesthesia machines and drugs prior to surgery and monitoring the patient during the surgery • Perioperative nursing programs are offered to registered nurses by Fanshawe College, Durham College, George Brown College, and Centennial College to provide training and education on perioperative care • Perioperative fellows at St. Michael's Hospital spend one day per week providing anesthetic care in the operating room, two half-days performing postoperative consultations, and two half-days per week doing postoperative follow-up on high-risk surgical patients
Quebec	• Perioperative support staff ○ Upskilling existing staff ▪ Nurse • Other required surgical team members ○ Surgeon	• Quebec's nursing professional code states that registered nurses are permitted to support during surgery ○ Nurses may utilize instruments, manipulate and remove tissue, perform certain steps of surgery, and suture deep tissue ○ Nurses must meet the following criteria to perform this role: ▪ have 24 months of nursing experience within the last five years

	○ Anesthesiologist • Role in perioperative surgical care ○ Before surgery ▪ Cleaning and disinfecting the incision site ○ During surgery ▪ Monitoring vital signs ▪ Providing surgical instruments and equipment to the surgeon ▪ Safety monitoring ▪ Other • Other features of perioperative support staff ○ Where training is obtained ▪ University degree ○ Duration of training criteria ○ Certification required • Outcomes ○ Health outcomes ○ Provider experiences	▪ have a certificate of 30 credits or surgical assistance from a Quebec university ▪ have a bachelor's degree in nursing ○ No outcomes were identified
New Brunswick	• Perioperative support staff ○ Upskilling existing staff ▪ Medical	• The New Brunswick Government announced 24 new positions for clinical assistance to assist with elective and emergency surgeries ○ The exact responsibilities and qualifications for this role were not specified
Newfoundland and Labrador	• Perioperative support staff ○ Upskilling existing staff ▪ Nurse	• The Newfoundland and Labrador Centre for Nursing Studies offers a Registered Nurse First Assistant Program that permits nurses to participate in the surgical support team ○ The module involves four self-learning modules and 200 hours of clinical practice that must be completed within one year ○ No outcomes of this program could be identified • St. John's Centre for Nursing Studies offers a perioperative nursing course for licensed practical nurses to promote their inclusion in surgical teams
Nova Scotia	• Perioperative support staff ○ Upskilling existing staff ▪ Nurse • Role in perioperative surgical care ○ Before surgery ▪ Sterilizing and inspecting the operating room and equipment ▪ Cleaning and disinfecting the incision site ▪ Positioning the patient on the operating table ▪ Other ○ During surgery ▪ Monitoring vital signs ▪ Providing surgical instruments and equipment to the surgeon	• Nova Scotia's Collaborative Care Guidelines for Perioperative Nurses has recommendations for the scope of practice of registered and licensed practical nurses on the surgical team ○ Before surgery, nurses can be engaged in the surgical planning and care team and preparing the patient and operating room ○ During surgery, nurses can provide surgical instruments (e.g., tools and lights), assist with keeping the surgical area sterile and organized, assisting with drapes, and maintaining client's dignity ○ Specific outcomes were not reported, but this document states that registered nurses can improve health outcomes, promote safety, and decrease complications in the surgical room

	▪ Safety monitoring ▪ Other • Outcomes ▪ Health outcomes	
Prince Edward Island	• Perioperative support staff o New staff in a dedicated role	• The College of Physicians and Surgeons of Prince Edward Island states that physicians can contribute to surgical assisting, given the following requirements: o have sufficient training and hand eye coordination o meet the department credentials and College standards o receive approval from the Head of Surgery o have a minimum of six months of supervision
Northwest Territories	• Perioperative support staff o Upskilling existing staff ▪ Nurse • Role in perioperative surgical care o Before surgery ▪ Sterilizing and inspecting the operating room and equipment ▪ Cleaning and disinfecting the incision site ▪ Positioning the patient on the operating table ▪ Other o During surgery ▪ Monitoring vital signs ▪ Providing surgical instruments and equipment to the surgeon ▪ Safety monitoring ▪ Other o Following surgery ▪ Monitoring patients' arrival into the recovery unit	• The Department of Northwest Territories Health and Social Services Authority provides guidelines for registered nurses providing operative assistance o Before surgery nurses can position patients and prepare the operating room o During surgery, nurses may manipulate tissues, provide hemostasis (e.g., by clamping), manually control retraction, observe operating field, perform knot typing, perform skin close, administer subcutaneous injection, stabilizing drain, clean surgical cites, and more o After surgery, nurses can evaluate outcomes of the procedure • The Department of Northwest Territories Health and Social Services Authority provides guidelines for Licensed Practical Nurses (LPN) supporting surgical-team assistants: o Before surgery, LPNs can assist with the care plan, advocate for the dignity of surgeons, and assess the needs of patients o Scrub LPNs are responsible for preparing the operating room with proper equipment and preparing the patient o LPNs can assist with handing instruments to surgeons o After surgery, LPNs assist with monitoring vitals and post-surgical outcomes
Yukon	None identified	None identified
Nunavut	• Perioperative support staff o Upskilling existing staff ▪ Nurse • Other features of perioperative support staff o Where training is obtained ▪ University degree ▪ Certificate	• Nunavut operating room nurses require a registered nursing diploma and at least one year of operating room experience

Appendix 5: Documents excluded at the final stages of reviewing

Document type	Hyperlinked title
Systematic review	Systematic review on human resources for health interventions to improve maternal health outcomes: Evidence from developing countries
Systematic review	Perioperative surgical home models and enhanced recovery after surgery
Systematic review	Multidisciplinary care in surgery: Are team-based interventions cost-effective?
Systematic review	Perioperative nursing role in robotic surgery: An integrative review
Systematic review	What do nurses experience in communication when assisting in robotic surgery: an integrative literature review
Systematic review	handoffs and transitions of care: a systematic review, meta-analysis, and practice management guideline from the Eastern Association for the Surgery of Trauma
Systematic review	Systematic review of the effectiveness of nursing interventions in reducing or relieving post-operative pain
Systematic review	Reducing the risk of surgical site infection using a multidisciplinary approach: An integrative review
Systematic review	Physician anaesthetists versus non-physician providers of anaesthesia for surgical patients
Systematic review	The application effects of personalized nursing on the perioperative period of hepatobiliary surgery: A systematic review and meta-analysis
Systematic review	Teamwork, communication, and safety climate: A systematic review of surgical culture
Non-systematic review	Postoperative recovery: The importance of the team
Non-systematic review	Role of value-added care by cardiothoracic anesthesiology and impact on outcomes after cardiac surgery
Non-systematic review	Team Approach: Safety and value in the practice of complex adult spinal surgery
Guidelines	Cardiac enhanced recovery after surgery: A guide to team building and successful implementation
Guidelines	Management of haematoma after thyroid surgery: systematic review and multidisciplinary consensus guidelines from the Difficult Airway Society, the British Association of Endocrine and Thyroid Surgeons and the British Association of Otorhinolaryngology, Head and Neck Surgery
Single study	Does the surgical assistant influence perioperative outcomes surrounding cubital tunnel surgery?
Single study	Robotic total knee arthroplasty: Surgical assistant for a customized normal kinematic knee
Single study	Explanation of the professional development process of general surgery residents in the operating rooms: A situational analysis
Single study	The impact of physician assistants on a breast reconstruction practice: Outcomes and cost analysis
Single study	A new surgical assistance aid for mesiodens extraction based on the ideal approach

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