

ENHANCED RECOVERY AFTER SURGERY: A NEW APPROACH TO OPTIMIZE SURGICAL OUTCOMES AND REDUCE COSTS

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ABSTRACT

Enhanced Recovery After Surgery is an evidence-based approach to surgical care aimed at minimizing the stress of surgery and supporting patients to recover quickly. Its perioperative care pathways aim to promote patient mobilization, reduce complications after surgery, support shorter hospital stays, minimize hospital readmissions, and reduce costs. The program follows patients through all stages of the process, from pre-op to post-op, and has been shown to improve safety outcomes.

In 2017, Enhanced Recovery Canada was formed to support the implementation of surgical best practices for all Canadians. Surgical pathway tools and patient resources are now available to support the most frequent surgeries that touch every operating room across the country, including

colorectal surgeries, gynecologic surgeries, and inpatient/outpatient orthopaedic hip and knee replacements.

INTRODUCTION

Enhanced Recovery After Surgery (ERAS) represents a paradigm shift in how patient care is planned, delivered, and monitored. It is a multidisciplinary team approach, focused on all areas of the patient's journey, that has allowed success in improving patient experience, reducing length of stay, decreasing complication rates, and lowering hospital readmissions.¹ These clinical gains are obtained at the same time as the cost of care is reduced.²

ERAS is a multi-modal approach to recovery that was pioneered in 1995 by Danish surgeon Dr. Henrik Kehlet for colonic resections.³ The first ERAS Symposium was hosted in 2003, and in

2010 the ERAS® Society, based in Stockholm, Sweden, was officially registered.⁴ The ERAS Society currently provides pathways for a number of specialties, including bariatric, breast reconstruction, colorectal, gynecology, head and neck, hip and knee arthroplasty, liver, pancreatic, thoracic, and urological surgeries. Many organizations have also developed pathways not included in this list.

The ERAS approach re-examines traditional practices, replacing them with evidence-based best practices when necessary. For example, ERAS best practices encourage stopping solid food for up to eight hours and enabling clear fluids for two hours before surgery.⁵ This challenges historical surgical practices of nothing by mouth after midnight on the day of surgery.⁵ Traditionally, patients may feel the need to stay in bed to recover from surgery. The best practices

however promote early mobilization, having patients up and moving as soon as possible after surgery.⁵

“ERAS protocols are multimodal perioperative care pathways designed to achieve early recovery after surgical procedures by maintaining preoperative organ function and reducing the profound stress response following surgery.”^{6(p.342)} Evidence indicates that implementing ERAS best practices reduces post-operative readmissions and visits to the emergency department, length of stay, and costs.⁷

Some 50 per cent of harmful events are attributed to surgical site infections or are procedure-related, like bleeding after surgery.⁸ ERAS has the potential to make a significant impact on surgical safety. While ERAS was originally developed exclusively for colorectal surgeries, it serves as a template for standard development in other surgical areas.¹

ENHANCED RECOVERY CANADA

Enhanced Recovery Canada (ERC) is a project of Healthcare Excellence Canada that is supported by a volunteer Board of Directors. A number of national professional interest groups (including the Canadian Nurses Association, Community Health Nurses of Canada, and the Operating Room Nurses Association of Canada) endorse the work of ERC, as acknowledged in the 2018 Position Statement.⁹ Patient engagement is at the core of ERAS. Patients have been actively involved since the inception of ERC and continue to contribute according to their specific surgical experience. ERC builds upon the efforts of the ERAS Society and is committed to disseminating and supporting implementation of these best practices across the country.

The pathways are based on six core principles that can be applied by all surgical teams:¹⁰

1. Patient and family engagement;
2. Nutrition management;

3. Fluid and hydration management;
4. Early mobility and physical activity;
5. Surgical best practices; and
6. Pain management with fewer narcotics (multimodal opioid-sparing analgesia).

ERC recognizes that surgery is part of a continuum of patient care from presentation to primary care, initial diagnosis, surgical treatment, rehabilitative care, and ongoing assessment. It also acknowledges that the care team includes the patient, family, and a variety of health professionals that impact patient experiences and outcomes.

ERC has bundled ERAS resources for colorectal, gynaecological, and inpatient/outpatient orthopaedic hip/knee replacement surgeries. At the time of this writing work was underway to develop similar resources for caesarean sections. Implementation involves the full interdisciplinary team, including patients and caregivers, perioperative nurses, surgeons, anesthesiologists, physiotherapists, nutritionists, nurses, etc.

In Canada, there are several ERAS Clinical Centres of Excellence that have gained significant knowledge and experience to support implementation of the ERAS program in other organizations. They include McGill University Health Centre,¹¹ University of Toronto,¹² Alberta Health Services,¹³ and Vancouver Coastal Health.¹⁴

Quadruple aim

The Triple Aim of healthcare is a framework created by the Institute for Healthcare Improvement (IHI) focused on the patient experience of care, improving population health, and reducing per capita costs of care.¹⁵ An additional aspect has also been adopted by many healthcare providers is focused on a fourth aim – improving the work life of healthcare clinicians and staff, recognizing that care of the healthcare provider is also crucial to the process.¹⁶

ERC meets the Quadruple Aim (see Figure 1) by using the best practices of better outcome, improved patient experience, improved clinician experience, and lower costs by reducing complications and hospital length of stay in ways outlined below.

Better Outcome:

ERC reduces major complications after colorectal surgery by 26 per cent.¹⁷ ERC helps clinicians and patients work as a coordinated team and facilitates patients' recovery. Standardized care improves communication, efficiency, and patient safety by facilitating care planning.¹⁸

Improved Patient Experience:

Patient engagement is the cornerstone of the ERC program. Patient advisors are integral members of multidisciplinary committees and lend their expertise from a patient's perspective. Engagement accelerates improvement by helping to focus on safety issues and solutions that matter the most to patients.

To support engagement throughout the surgical journey, including post discharge, ERC has developed a number of complementary patient resources, including Patient Handbooks¹⁹ and animated videos.²⁰ The short, animated videos were developed by Pre-care to guide patients with information on pre-operative preparation, what to expect from their upcoming surgery, and prompt and safe postoperative recovery. The videos can be accessed for free through any smart phone, tablet, or computer 24/7 and are offered in both official languages, with sub-text available in 17 languages most commonly spoken in Canada.

Improved Clinical Experience:

ERC helps clinicians and patients work as a coordinated team and facilitates patients' recovery. Standardized care improves outcomes, reduces complications and creates a better patient experience. For example, each year, nearly 300,000 surgeries are

performed across Alberta. With more than 55 surgical sites, there can be wide variations in surgical practices and outcomes. Recognizing the opportunity to standardize practices and improve surgical care, and the potential benefits this would bring to patients and care providers, several Strategic Clinical Networks took action to bring Enhanced Recovery after Surgery (ERAS) care to Alberta. Surgical care in Alberta is getting better and patients are going home sooner as a result of this innovative patient-centred approach.²¹

Lower costs by reducing complications and Hospital length of stay (LOS):

In Alberta: A return on investment (ROI) analysis was performed on the implementation of multiple ERAS best practices (for colorectal, pancreas, cystectomy, liver, and gynecologic oncology procedures) across multiple sites in Alberta using 30-, 180-, and 365-day time horizons.²² The effects of ERAS on health services utilization (length of stay of the primary admission, number of readmissions, number of emergency department visits, number of outpatient clinic visits, number of specialist visits, and number of general practitioner visits) were assessed by mixed-effect multilevel multivariate negative binomial regressions. The net health system savings per patient ranged from \$26.35 to \$3,606.44.²² Return on Investment (ROI) ranged from \$1.05 to \$7.31, meaning that every dollar invested in ERAS brought \$1.05 to \$7.31 in return.²²

In Quebec: When an ERAS team in Quebec implemented the ERAS short-stay protocol for hip and knee replacement surgeries, not only did patient care improve, but direct healthcare costs and duration of hospital stay were reduced.²³ The ERAS protocol was very efficient at reducing the frequency of patient complications, including pain, nausea, vomiting, dizziness, headache, constipation, hypotension, anemia, edema, lameness, and urinary retention. In this study, Vendittoli also indicates that the mean hospital length

of stay for the ERAS short-stay group decreased by 2.8 days for total hip arthroplasty (THA) and 3.9 days for total knee arthroplasty (TKA).²³ The estimated reduction in direct healthcare costs with the ERAS short-stay protocol was \$1,489 per THA and \$4,158 per TKA.²³

IMPLEMENTATION OF ERAS

In April 2019, the Canadian Patient Safety Institute (now Healthcare Excellence Canada) launched an 18-month Safety Improvement Project (SIP) focused on improving outcomes and system efficiencies for colorectal surgery

Figure 1.



Courtesy Healthcare Excellence Canada.

This one-page illustration was created by Enhanced Recovery Canada as a communications tool to demonstrate how ERC best practices meet the Quadruple Aim.

patients through the implementation of the ERC Colorectal Clinical Pathway.²⁴ Implementation teams from hospital sites participating in the SIP included one each from Nova Scotia, New Brunswick, Manitoba, Ontario, and Saskatchewan and two teams from Quebec.

A coaching model was used to guide an integrated approach that involved implementation science and knowledge translation, quality improvement, patient safety, and a collaborative learning and networked approach.²⁵ Key knowledge translation and quality improvement strategies were also utilized. Knowledge Translation (KT) and Quality Improvement (QI) draw from different evidence and methods but ultimately aim to achieve the same goal – improving patient outcomes. QI uses methods and processes to improve the quality, safety, and value of healthcare at a local level. KT uses theories, models, and frameworks to move knowledge gained from research evidence into practice for large-scale improvement.

During the 18-month SIP the participating teams:²⁶

- Learned to apply the ERC evidence-based principles to develop a more comprehensive approach to patient safety;
- Worked with expert faculty and coaches to successfully implement ERC principles for colorectal surgeries;
- Shared learnings and network with colleagues across Canada; and
- Accessed, shared, and adapted patient safety knowledge, tools, and resources within a learning network.

The teams used communication tools and multiple methods^{27,28} to assess barriers to and facilitators for change. These tools and methods were augmented with team meetings, chart reviews, data collection and reports, standing orders, and client surveys.

More information on these tools and resources are summarized in the Guide to Patient Safety Improvement,²⁵ a free resource to help get started with any improvement project.

During the initial and subsequent waves of the COVID-19 pandemic, many Safety Improvement Projects were paused or set aside, as staff were redeployed to mitigate the pressures of the pandemic on the healthcare system. Coupled with the cancellation of elective surgeries, some teams were unable to meet the targeted timelines they had originally identified in their implementation plan. Despite this, all teams remained committed to ongoing improvement, sustainability, and spread of their ERAS work.

The seven teams met virtually in October 2020, to share their progress. Several improvements and changes were reported quantitatively and qualitatively. Highlights of their improvement journey are noted below:

- One site reported an increase in pre-operative VTE chemoprophylaxis to 90 per cent and another site increased the use of multimodal pain control to 76 per cent. Collaboration with surgeons and anesthesiologists resulted in a better understanding of drug choices for multimodal antiemetic and pre-intraoperative VTE prophylaxis.
- Three sites reported a reduction in the average length of stay – which originally ranged from 4.8 to 8.9 days and were reduced to 3.0 to 4.8 days. Fewer readmissions were also noted with one site reporting an eight per cent reduction in readmissions over the course of the Safety Improvement Project.
- Three of the seven sites implemented a malnutrition screening tool. All sites implemented enhanced healthcare provider education regarding carbohydrate loading and standardized fasting guidelines. One site reported that 74 per cent of patients now carb-load before

surgery and recover more quickly as a result of implementing this best practice.

- Intraoperative changes were implemented at several sites, including an increased use of TAP blocks by anesthetists, and more awareness of intraoperative fluid management.
- Templates for post-operative standardized order sets were provided, and standardized post-op dietary orders were updated to include the use of high-protein supplements. Protocols supporting early mobilization and early removal of foley catheters were also implemented.

- All teams reported increased patient engagement with the introduction of the Patient Handbook and collaboration of patient advisors throughout the project.

As part of the SIP process, an evaluation was conducted, led by Drs. Ross Baker and Lianne Jeffs from the Institute of Health Policy Management and Evaluation at the University of Toronto. See Table 1 for key learnings.

CONCLUSION

Enhanced Recovery Canada surgical pathways are now best practice and put the quadruple aim for improved healthcare performance well within reach. Enhanced Recovery Canada's

Colorectal Surgical Pathway and complementary patient resources have been implemented in seven sites across Canada. Some centers have been successful in spreading and scaling of their initiatives to other facilities within their region. The clinical pathways had been downloaded more than 1,100 times in the year preceding this writing.

If implemented consistently, the pathways can improve patient outcomes by reducing complications after surgery. They can enhance the patient experience by supporting engagement through the surgical journey and improve the provider experience by helping clinicians and patients work as a coordinated team. The surgical

Table 1. Key learnings from the safety improvement project (SIP) teams.

<p>Overall, the integrated learning design is an effective approach to equipping local and regional SIP teams with QI, patient safety, and implementation science capabilities; improving patient safety culture, teamwork, and satisfaction; and increasing positive patient outcomes and efficiencies.</p>
<p>Key “essential” ingredients of the learning design include the integration of knowledge translation, QI, and patient safety (“the what”); using implementation science (“the how”); the curriculum and structure comprised learning collaborative approach; and the coaching model that included instrumental roles that the expert knowledge transfer consultant and coaches had as sense-makers, catalysts, and advisors to move the local SIPs forward. Collectively, coaches and SIP teams gained a deeper level of understanding about behaviour change required to improve patient safety and quality and selecting new behaviours through this integrated lens. SIP teams were then able to apply valuable knowledge and insights gained to their local projects and beyond.</p>
<p>Key contextual factors to leverage when implementing change intended to be impactful, sustainable, and scalable include having supportive leadership, organizational alignment, and an engaged team. Key contextual factors to mitigate include balancing project activities with competing priorities, and addressing challenges associated with turnover, lack of staff, physician buy-in, and the evolving COVID-19 pandemic.</p>
<p>Key local strategies that emerged associated with participating in the integrated learning design include employing a multi-modal approach (e.g., patient learning tools, use of heuristic tools with staff and physicians, changing practice drawing from QI tools, best practices, and other implementation science tools) with a diverse and cohesive team (some included patients and family members). Key strategies employed to sustain practice change include embedding the practice change into daily practice and work-flow processes, orientation, and ongoing education and sharing data (e.g., audit and feedback).</p>

pathways can also lower costs by reducing complications and hospital length of stay.

In addition to the ERC Colorectal Clinical Pathway, resources are now available for gynecologic, and orthopaedic inpatient and outpatient hip and knee replacement surgeries. Resources for caesarean sections will be coming soon.

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