



# Surgical Technical Evidence Review for Colorectal Surgery Conducted for the AHRQ Safety Program for Improving Surgical Care and Recovery

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Enhanced recovery has sparked excitement in the surgical community primarily because it works, but also because it is an innovative approach to delivering standardized, evidence-based care. Adoption of enhanced recovery pathways (ERPs) has been associated with reducing surgical complications, improving patient experience, and decreasing length of stay (LOS) and associated hospital costs without increasing readmission rates.<sup>1-3</sup> To successfully implement ERPs and achieve improvements, the entire perioperative team must function as a coordinated and collaborative group, breaking down silos among preoperative, operating room, recovery room, and inpatient units, and creating a transdisciplinary collaboration across perioperative disciplines (eg surgery, anesthesiology, nursing, pharmacy, physical therapy, and others).

The AHRQ, in partnership with the American College of Surgeons and the Armstrong Institute for Patient Safety and Quality at Johns Hopkins University, has developed the Safety Program for Improving Surgical Care and Recovery (ISCR), which is a national effort to disseminate best practices in perioperative care to more than 750

hospitals across multiple procedure areas during the next 5 years. The program will integrate evidence-based processes central to enhanced recovery, as well as surgical site infection (SSI), venous thromboembolic events (VTEs), and catheter-associated urinary tract infections (CAUTIs), with socioadaptive interventions to meaningfully improve surgical outcomes, patient experience, and perioperative safety culture. Evidence-based clinical pathways will serve as the foundation for these efforts. To assist hospitals with transforming their perioperative care, the ISCR program will also include a registry for hospitals to track their progress in adhering to the clinical pathway and for benchmarking, patient engagement and education materials, change management and leadership training, as well as tools to facilitate local pathway adaptation, implementation, and program sustainability.

The objective of this article is to provide a comprehensive review of the evidence supporting the surgical components of the ISCR colorectal (CR) pathway. The anesthesiology components were reviewed in parallel and are being reported separately. This review will evaluate the evidence supporting CR pathways and develop an evidence-based CR protocol to help hospitals participating in the ISCR program implement evidence-based practices.

## METHODS

A review protocol was developed with input from stakeholders (eDocument 1). Two researchers reviewed current CR ERPs from several major US health systems and sought expert feedback to identify individual components for the CR ISCR protocol in each perioperative phase of care (preoperative through postoperative) (Table 1).

Individual literature reviews for each protocol component were performed using PubMed for English-language articles published before December 2016. Specific search terms are provided in eTable 1. First, each search targeted CR operations, and if no literature on CR operations was identified, the search was broadened to surgical procedures in general. To be included, studies had to report on the

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**Abbreviations and Acronyms**

CAUTI	= catheter-associated urinary tract infection
CR	= colorectal
ERP	= enhanced recovery pathway
ISCR	= Improving Surgical Care and Recovery
LOS	= length of stay
MA	= meta-analysis
MBP	= mechanical bowel preparation
NGT	= nasogastric tube
PO	= per os
POD	= postoperative day
RCT	= randomized controlled trial
SR	= systematic review
SSI	= surgical site infection
VTE	= venous thromboembolic event

specific protocol components. Studies were excluded if they did not report clinical outcomes, included fewer than 10 patients, were non-English language, or were nonsystematic reviews.

Given the large amount of evidence within this field, we used a hierarchical method of inclusion based on study design. If we identified a well-designed systematic review (SR) or meta-analysis (MA), then we included it along with additional randomized controlled trials (RCTs) or observational studies published after the SR/MA, when possible. Data extraction was completed, including sample size, surgical procedure category, comparator (varied

by component), and main outcomes of interest (varied by component). Results are described narratively.

**RESULTS****Preoperative****Patient education**

**Rationale.** Detailed preoperative patient education is theorized to set expectations for the patient about the operation, which in turn allows the patient to become a partner in their recovery.

**Evidence.** No randomized or observational studies of CR operations have isolated the effect of detailed patient education on outcomes. Two MAs including 11 RCTs evaluated the effect of ERP implementation on outcomes and included patient education as a component of ERPs.<sup>1,2</sup> Both MAs concluded that ERP implementation was associated with a reduction in morbidity and LOS.<sup>1,2</sup> No studies in CR operations have evaluated the optimal medium for education materials. Options used in the RCTs included verbal information provided by the provider, information booklets, and informational videos.

**Summary.** There is no direct evidence to support patient education as a component of the CR ISCR protocol, however, patient education is recommended, as it can only be beneficial and is endorsed by guidelines (Tables 2 and 3).

**Immediate preoperative****Bowel preparation**

**Rationale.** The use of bowel preparations (mechanical alone, per os [PO] antibiotics alone, or a combination of both) has been proposed to reduce the risk of SSI after CR operation, but can also cause physiologic derangements leading to prolonged recovery.

**Evidence.** We identified 5 MAs of bowel preparation for CR operations, including one of combined mechanical and PO antibiotic bowel preparation vs mechanical bowel preparation (MBP) alone or vs IV antibiotics alone.<sup>13-17</sup> This study of 7 RCTs found that patients who received combined PO antibiotic and MBP had lower total SSI and incisional SSI compared with patients who received MBP and systemic antibiotics alone (total: 7.2% vs 16.0%,  $p < 0.001$ ; incisional: 4.6% vs 12.1%,  $p < 0.001$ ).<sup>17</sup> Three MAs of MBP alone vs no MBP showed neither benefit nor harm to the use of MBP with regard to anastomotic leak, SSI, reoperation, or mortality.<sup>14-16</sup> One MA of RCTs found that SSI was lower without MBP, although the number needed to harm was high at 333 patients.<sup>13</sup>

**Table 1.** Colorectal Protocol for the AHRQ Safety Program for Improving Surgical Care and Recovery: Surgical Components

Component
Preoperative
Patient education
Immediate preoperative
Bowel preparation
Preoperative at-home bathing
Preoperative VTE chemoprophylaxis
Intraoperative
Skin preparation
Surgical technique (laparoscopic vs open)
Minimize drains
Postoperative
Early mobilization
Early alimentation
Early urinary bladder catheter removal
Early IV fluid discontinuation
Postoperative VTE prophylaxis
Glucose management

VTE, venous thromboembolic event.

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