

Enhanced Recovery Program Improves Elective Colorectal Surgical Outcomes




HEALTHCARE ORGANIZATION

- Accountable Care Organization
- Integrated Delivery System

PRODUCTS

- Health Catalyst® Analytics Platform, including the Late-Binding™ Data Warehouse and broad suite of analytics applications

SERVICES

- Professional Services

EXECUTIVE SUMMARY

Contemporary colorectal surgery is often associated with long LOS, high costs, and surgical site infections (SSI) approaching 20 percent. Much of the LOS variation is not attributable to patient illness or complications, but most likely represents differences in practice style. Successfully reducing SSI requires a multimodal strategy under the supervision of numerous providers with high compliance across the spectrum.

Allina Health was using established, evidence-based clinical guidelines, yet clinical variation remained high across pre-arrival, preoperative, intraoperative, and postoperative care areas, leading to substantial variation in LOS, cost of care, and the patient experience. To ensure greater consistency, Allina Health developed an enhanced recovery program (ERP) for patients undergoing elective colorectal surgery, which built standard protocols into the EHR to address elements of care from pre-arrival through post-discharge. The ERP improvement team included physician champions, operational leaders, infectious disease clinicians, and RN coordinators who help shepherd patients through the various care pathways, and ensured that ERP interventions were successfully completed.

To facilitate the program and monitor performance, Allina Health developed an ERP analytics application with an administrative dashboard to easily visualize first-year results:

- 78 percent relative reduction in elective colorectal SSI rate.
- 19 percent relative reduction in LOS for patients with elective colorectal surgery.
- 82.4 percent utilization of preoperative and postoperative order sets, increasing the consistency of care and reducing unwarranted variation.

ELECTIVE COLORECTAL SURGERY CREATES OPPORTUNITY FOR IMPROVEMENT

Contemporary colorectal surgery is often associated with long LOS: eight days for open surgery and five days for laparoscopic. Much of the variation in LOS is not attributable to patient illness or



Enhanced recovery has consistently shown it is safe and effective, by selecting the components of the protocol and providing ongoing feedback to nursing and physicians, resulted in improving our patient's outcomes.

Dr. Casandra Anderson, MD
Surgical Oncologist

complications, and most likely represents differences in practice style. Furthermore, colorectal surgery is high-cost, with rates of surgical site infection (SSI) that approach 20 percent.^{1,2} Strategies that successfully decrease SSI are multimodal, occur across a range of settings, and are supervised by numerous providers. Ensuring high compliance with these strategies is crucial to the success of SSI reduction efforts.³

A not-for-profit healthcare system, Allina Health is dedicated to the prevention and treatment of illness and enhancing the greater health of individuals, families, and communities throughout Minnesota and western Wisconsin.

PROBLEMS WITH MISSING STANDARDS, COORDINATION, AND INSIGHTS

Allina Health has always been committed to data-driven process improvement, regularly identifying opportunities to better patient outcomes, reduce variation, and reduce cost. Allina Health was using established, evidence-based clinical guidelines in its care of elective colorectal surgery patients, yet clinical variation remained high across pre-arrival, preoperative, intraoperative, and postoperative areas. As part of its process improvement efforts, Allina Health identified variation in the management of these patients, which was leading to substantial differences in LOS, cost of care, and the patient experience.

Lack of care coordination was contributing to the increased cost, as was a lack of standard practices, particularly in three areas:

- ▶ Patients did not have a clear understanding of dietary restrictions before and after surgery, nor did they have a clear understanding of what to expect for their pre- and postoperative care, and they did not know what to expect following discharge from the hospital.
- ▶ Perioperative management of IV fluids and opioid use were not standardized.
- ▶ Postoperative care, including diet, activity level, and opioid use, varied widely, resulting in unclear expectations and inconsistencies in the care provided.

Although aware of these challenges, and aware that the variation could likely improve, Allina Health lacked specific, timely data for patients undergoing elective colorectal surgery that could be used to identify the sources of variation. The organization lacked data around the process measures contributing to LOS, cost of care, and the patient experience, making it difficult to take a data-driven approach to improvement.



Increased visibility into the data allowed us to make needed changes in the protocol, improving the ability to provide feedback to surgeons on an individual basis, as well as comparison to other providers, which improved adoption of the standard protocols.

Mischa Adams, MSN, RN, CCRN
Clinical Program Manager

Allina Health needed to develop a strategy that would ensure consistent care pathways for patients undergoing elective colorectal surgery, improve outcomes, and decrease LOS.

IMPROVEMENTS REALIZED THROUGH A STANDARD APPROACH

To improve the care pathway for patients undergoing elective colorectal surgery, Allina Health established an enhanced recovery program (ERP) for these patients. The ERP is a multimodal, evidence-based approach using standardized protocols built into the EHR to address pre-arrival, preoperative, intraoperative, and postoperative elements of care.

The right team for the right interventions

Implementing ERP elements is facilitated by a dedicated improvement team, and dedicated registered nurse (RN) coordinators and clinical nurse specialists, who help shepherd patients through the various care pathways, ensuring the successful completion of ERP interventions. Team membership include key physician champions, operational leaders, RNs, and infectious disease clinicians. The improvement team meets regularly to discuss program progress, outliers, and potential improvements to remain current with the latest evidence-based guidelines.

ERP interventions are designed to reduce surgical stress, maintain postoperative physiological function, and enhance mobilization after colon or rectal surgery, resulting in superior postoperative outcomes, including LOS and SSI rates, in the elective colorectal population.

The program included standard evidence-based interventions performed across all four phases of care:

- **Pre-arrival care:** Patients receive consistent, standardized education about pre-procedure care, such as specific showering instructions, linen cleaning, use of antiseptic wipes prior to arrival, and dietary instructions for the carbohydrate-rich drink patients need to take the day before surgery. Patients also receive instructions about the importance of hydration and how to maintain it, and receive a pre-procedure call to reinforce this education.
- **Preoperative care:** The ERP order sets contain specific instructions on the timing and application of antiseptic wipes, goal-directed IV fluid management to maintain euvolemia, (balanced fluid volume), antibiotic administration, warming measures, hair clipping, blood glucose management for diabetic patients, and non-opioid pain management.

- **Intraoperative care:** The intraoperative phase of care includes the use of goal-directed IV fluids, maintaining normal patient temperature, surgical site prep prior to incision, application of wound protector dressing, a clean closure protocol, and prophylactic anti-nausea medicine.
- **Postoperative care:** Patients are assisted out of bed to walk the day of surgery, and are frequently mobilized thereafter. Patients are quickly returned to a normal diet, provided antiemetics to prevent nausea, and provided nutritional supplementation. Patients with diabetes are treated to ensure glucose control. Pain is managed effectively without opioids. Interventions are provided to stimulate the gastrointestinal (GI) system to restore normal GI function. Indwelling urinary catheters are promptly removed, and each patient received standard incision care.

The right tools helped build the program

In addition to implementing ERP and standardizing the care processes for patients undergoing elective colorectal surgery, Allina Health implemented evidence-based SSI prevention bundles. To monitor their effectiveness and to identify opportunities for improvement, Allina Health used the Health Catalyst® Analytics Platform, including the Late-Binding™ Data Warehouse and broad suite of analytics applications. They leveraged professional services from Health Catalyst to develop an ERP analytics application (see Figure 1) giving them easy access to specific information in support of this improvement effort.

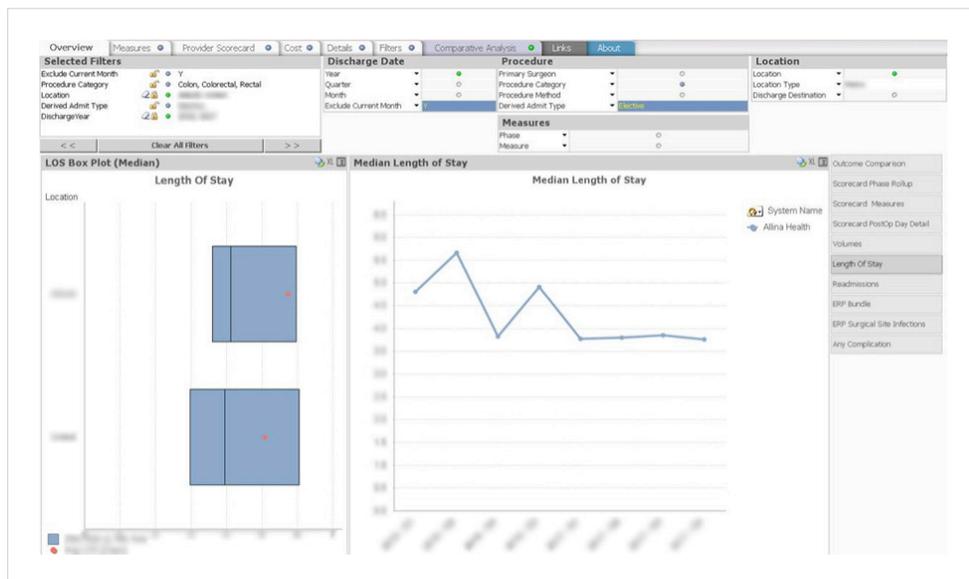


Figure 1: Enhanced Recovery Program dashboard visualization



Onsite registered nurse leaders, both clinical nurse specialists and regional nurse program leaders, have been key to our success. The RN nurse coordinators and clinical nurse specialists have helped lead improved understanding of evidence-based practice and translation of ERP interventions into action.

Connie Fiebiger, RN, BSN, MA
Director of Clinical Programs for
the Allina Health Group

The ERP analytics application provides easy visualization of performance. Allina Health can drill down to individual patient, unit, or provider level performance data, including data for infection prevention activities, order set utilization, bundle compliance, and outcome measures, such as SSI rate, LOS, and readmission rate. The dashboard provides administration, physician leaders, nurse managers, and RN coordinators insight into which elements were consistently utilized, and insights into care gaps, enabling leaders to monitor compliance and provide ongoing coaching and feedback to caregivers.

The analytics application is also used to give physicians their specific performance data and patient outcome data, including a comparison of their performance to other physicians.

RESULTS

The ERP positively impacted patient outcomes and LOS for patients undergoing elective colorectal surgery. In one year, the program achieved significant results:

- ▶ 78 percent relative reduction in elective colorectal SSI rate.
 - ▶ Standard SSI prevention bundles, decreasing surgical stress, and maintaining physiological function and enhancing mobilization after surgery, led to this decrease.
- ▶ 19 percent relative reduction in systemwide LOS, saving \$90,000 in just six months.
- ▶ 82.4 percent utilization of preoperative and postoperative order sets, increasing the consistency of care and reducing unwarranted variation.

WHAT'S NEXT

Allina Health will use the analytics application to evaluate the impact of specific ERP interventions on patient outcomes, enhancing its understanding of which activities are key to achieving the desired outcomes. Additionally, Allina Health plans to expand the ERP for elective colorectal surgery systemwide. Once that is accomplished, the ERP will be applied to other elective surgeries with the goal of improving patient outcomes, reducing SSI rates, and further reducing LOS and cost across the system.

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Health Catalyst is a next-generation data, analytics, and decision support company committed to being a catalyst for massive, sustained improvements in healthcare outcomes. We are the leaders in a new era of advanced predictive analytics for [population health](#) and [value-based care](#). with a suite of machine learning-driven solutions, decades of outcomes-improvement expertise, and an unparalleled ability to integrate data from across the healthcare ecosystem. Our proven data warehousing and analytics platform helps improve quality, add efficiency and lower costs in support of more than 85 million patients and growing, ranging from the largest US health system to forward-thinking physician practices. Our technology and professional services can help you keep patients engaged and healthy in their homes and workplaces, and we can help you optimize care delivery to those patients when it becomes necessary. We are grateful to be recognized by Fortune, Gallup, Glassdoor, Modern Healthcare and a host of others as a Best Place to Work in technology and healthcare.

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