



Physicians Caring for Texans

TexMed 2016 Quality Improvement Abstract

Please complete all of the following sections.

Procedure and Selection Criteria

- Applicants should demonstrate an understanding of QI concepts through the use of quality tools, measures of success and the use and interpretation of data. Judges will use the scoring described in this matrix to identify projects to be presented at the conference, as well as, projects to be considered for the awards.
- Maximum points are delineated with a brief explanation of the content that should be included under each section. Applicants must select one of the following improvement categories into which the project best fits: patient safety, patient centered care, timeliness, efficiency, effectiveness, or equity. Applicants may describe the problem and results in narrative or graphic format.

PROJECT NAME: Effect of an evidence-based Enhanced Recovery Pathway on process and outcomes for elective colorectal surgery in a large, urban academic medical system

Institution or Practice Name: University of Texas Southwestern Medical Center

Setting of Care: Department of Surgery, Clements University Hospital

Primary author: Taylor Roberts MS2

Secondary author: Jennifer Rabaglia MD

Other Members of Project Team: Joselin Anandam MD, Patty Brown RN/MBA, Jerzy Lysikowski PhD, Pavankumar Petluru PhD

Is the Primary Author, Secondary Author or Member of Project Team a TMA member (required)?

Yes

Please provide name(s): Taylor Roberts

Project category: Enhanced Perioperative Recovery/Future of Surgical Care program

For this poster session, TMA is looking for projects that demonstrate the six aspects of Quality Care as defined by the Institute of Medicine.

- Safe - avoids injuries to patients from care that is intended to help them
- Timely - reduces wastes and delays for both those who receive care and those who give care
- Effective - based on scientific knowledge, extended to all likely to benefit, while avoiding underuse and overuse
- Equitable - provides consistent quality, without regard to personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status
- Efficient - avoids waste, including waste of equipment, supplies, ideas, and energy
- Patient centered - respects and responds to individual patient preferences, needs, and values, ensuring that patient values guide all clinical decisions

Quality Improvement (QI)

Overview: *Describe 1) where the work was completed; 2) a description of the issue that includes how long the issue has been going on and the impact the issue has on the organization/facility; 3) what faculty/staff/patient groups were involved, and 4) the alignment to organizational goals.*

Healthcare spending in the United States is rising at an alarming and unsustainable rate, and is projected to reach 20% of the Gross Domestic Product by 2020. As part of an effort to slow this astronomical expenditure, hospitals and providers have been compelled to optimize clinical outcomes while controlling costs. Out of this necessity, the field of Health Services Research has exploded in order to address these issues, giving rise to a wide array of methodology designed to study the underlying drivers of quality, outcomes and cost. Comparative effectiveness is one such approach, informing health care decisions by assessing the effectiveness, risks and benefits of various treatment options. We may study the relative effect of single intervention, or the aggregate effect of a carefully chosen series of management decisions or interventions designed to optimize care delivery.

The need for this approach is especially urgent with respect to surgery of the colon. On average, colon resection accounts for roughly 10% of all general surgical procedures, but is responsible for over 25% of all operative complications. Clinicians and policy makers alike are aware of the overwhelming amount of underlying variability inherent to surgical practice, and many believe that this is at least in part, or perhaps largely to blame for such variability in outcomes. Many attempts have been made to standardize certain components of the surgical process, including the Surgical Care Improvement Project (SCIP) measures instituted by CMS and the Joint Commission. However, this effort has been met with little success with regard to reducing morbidity related to colorectal surgery.

We encounter variation at every level – physician preference both in and out of the operating room, nursing practices, system level issues including infection control, antibiotic policies and discharge patterns, as well as patient level issues including social factors, living environment and support. Some studies have suggested that evidence-based Enhanced Recovery Pathways (ERP) provide predictable algorithms for care, reducing system and practice variability which results in fewer errors and higher quality care. Recent literature supports this notion across a variety of disciplines and settings, and yet pathways have been implemented in fewer than one third of surgical practices here in the US.

The Department of Surgery at University of Texas Southwestern Medical Center created and implemented one such ERP to address these issues of variability and quality in colorectal surgery at Clements University Hospital (CUH). A multidisciplinary panel of experts and direct caregivers within the institution thoroughly reviewed “best practice” literature regarding colorectal surgery and generated the ERP construct by consensus. Implementation of the ERP for patients undergoing elective colorectal surgery at CUH began December of 2014. This project compares a pre- and a post- implementation cohort of patients to assess ERP impact on process and outcomes measures. By standardizing elective colorectal surgical care delivery and optimizing patient outcomes, this project aligns with UT Southwestern organizational goals of providing the highest quality of cost-effective care.

Aim statement (2 points for each portion of SMART, with max points 10): *Describe the goal of the project incorporating SMART.*

Specific – what faculty/staff/patient groups were involved and where the work was completed

Measurable – numerical values that define baseline and goal

Actionable – what solutions/interventions were implemented

Realistic – able to implement solutions and sustain outcomes with given constraints

Time bound – what date established to reach goal by

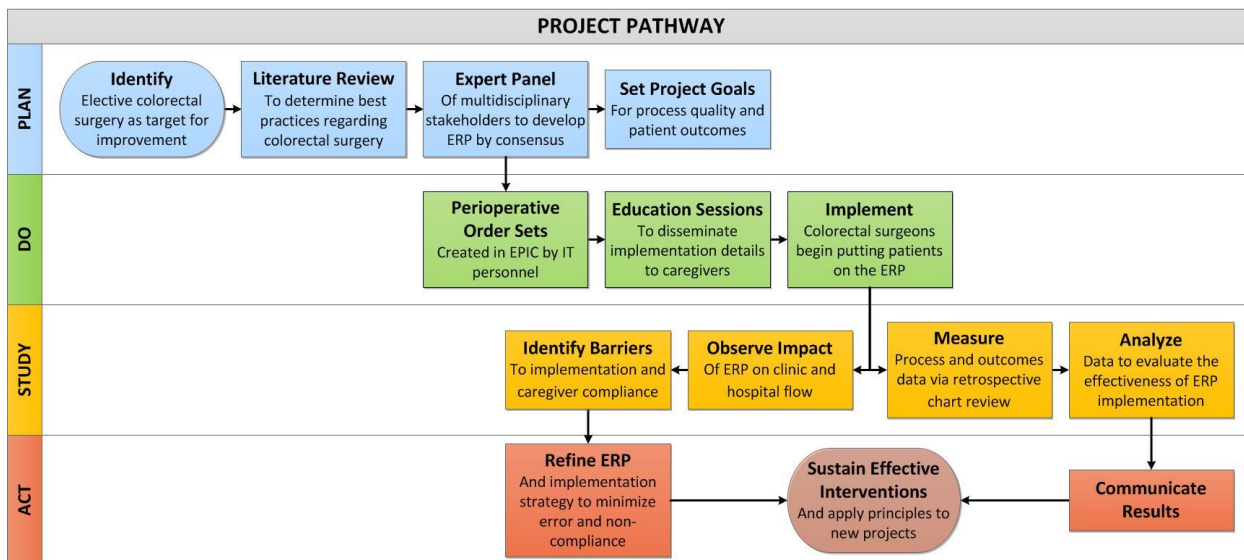
Standardization of perioperative care for elective colorectal surgery via implementation of a comprehensive, evidence-based Enhanced Recovery Pathway will reduce Length of Stay and decrease readmission rate for

patients undergoing elective colorectal surgery at Clements University Hospital by at least 25% by December 2015.

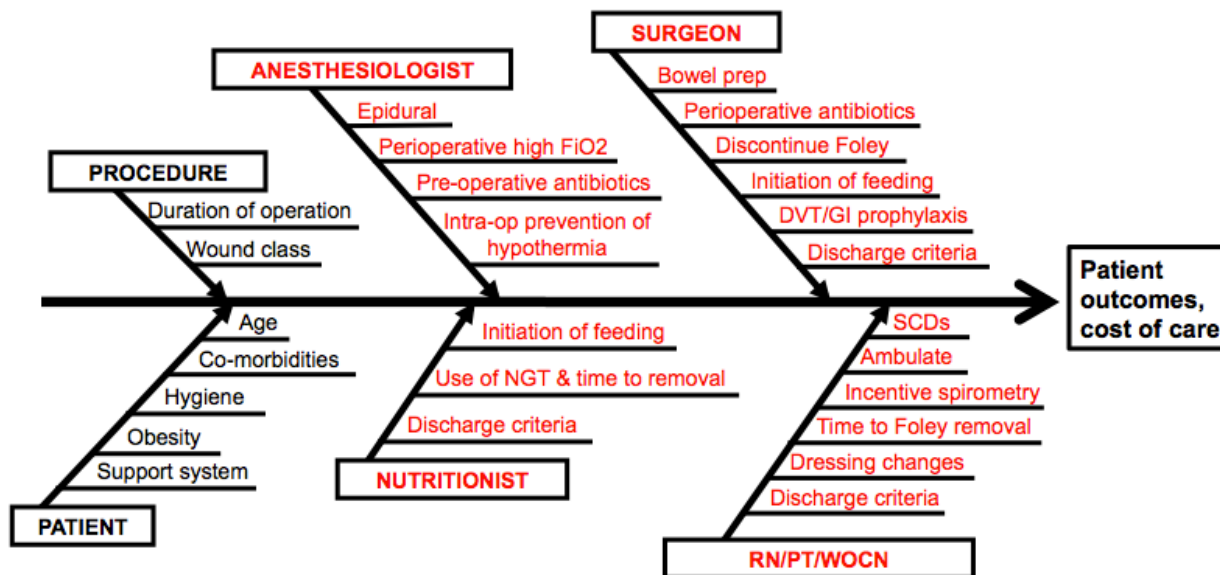
Measures of success (5 points for describing solutions measurement and 5 points for describing outcome measurement, with max points 10): *Describe how you measured your interventions to ensure adherence and describe how you measured your outcome.*

PROCESS QUALITY ENDPOINTS	
<u>Measure</u>	<u>Purpose</u>
Appropriate preoperative subcutaneous heparin administration	Assess compliance with pathway best-practice components
Time to urethral catheter removal	Assess compliance with pathway best-practice components
Time to ambulation	Assess compliance with pathway best-practice components
OUTCOME QUALITY ENDPOINTS	
<u>Measure</u>	<u>Purpose</u>
Overall Length of Stay (LOS)	Shortening LOS reflects increased efficiency and less variability in care delivery.
Readmission rate	Decreased readmission rate reflects improved patient outcomes, as well as cost avoidance
Antiemetic administration past 24 hours post-op	Decreased antiemetic administration reflects decreased post-op nausea/vomiting (PONV), an indicator of post-op ileus
Time to first flatus or bowel movement	Shortening this period reflects decreased post-op ileus

Use of Quality Tools (5 points for appropriate tools utilized during each PDSA phase, with max points 20): *What quality tools did you use to identify and monitor progress and solve the problem? Provide sample QI tools, such as fishbone diagram or process map, and identify which phase of the PDSA cycle each tool was utilized in. Note tools here and send as addendum with abstract form.*

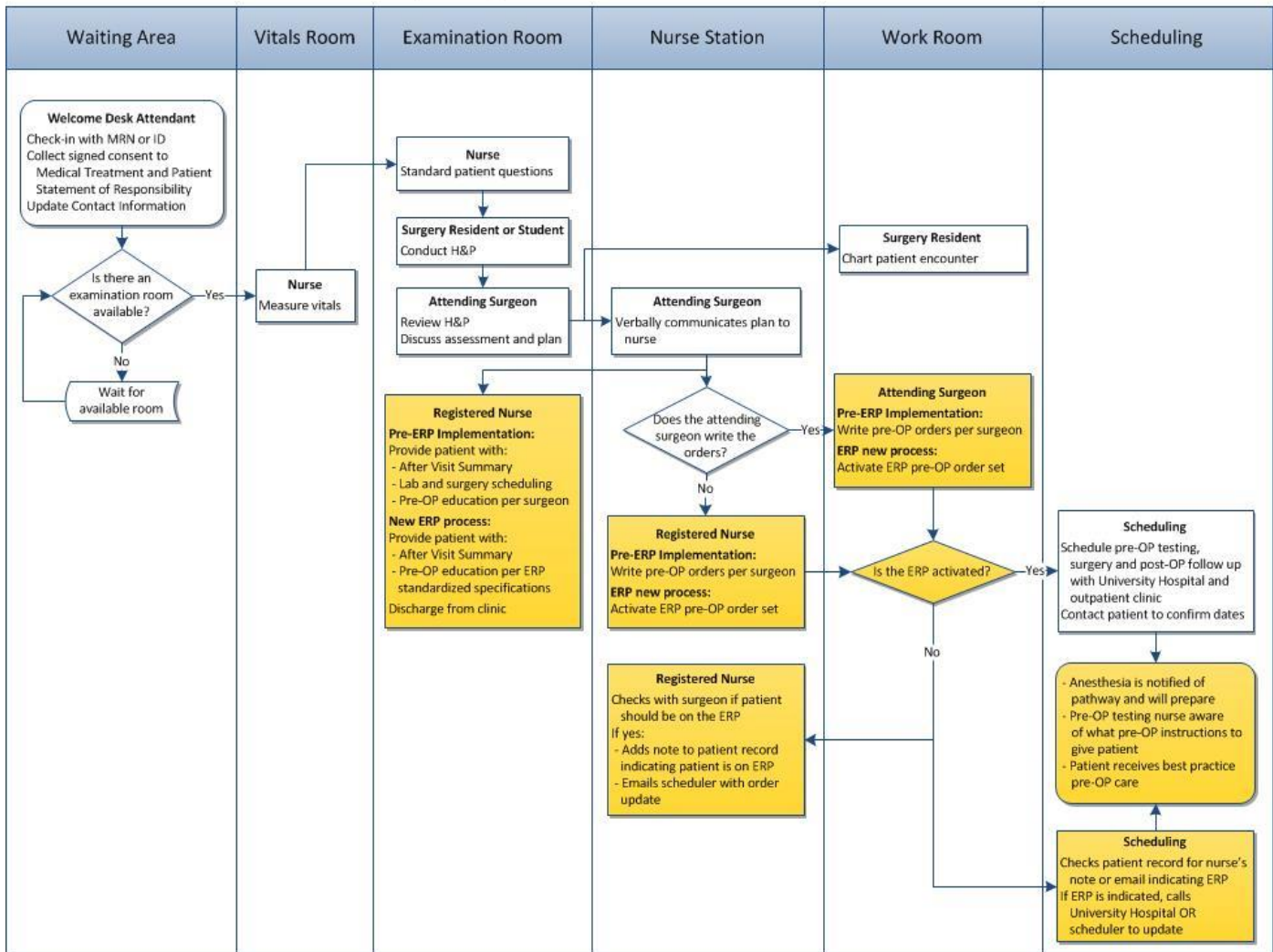


Above. Cross-functional flowchart showing the steps to ERP development, implementation and evaluation using the Plan Do Act Study (PDSA) cycle.



Above. Fishbone diagram used during the Plan phase review to categorize factors contributing to patient outcomes and to identify targets for intervention (red).

University Hospital Colorectal Clinic Patient Flow

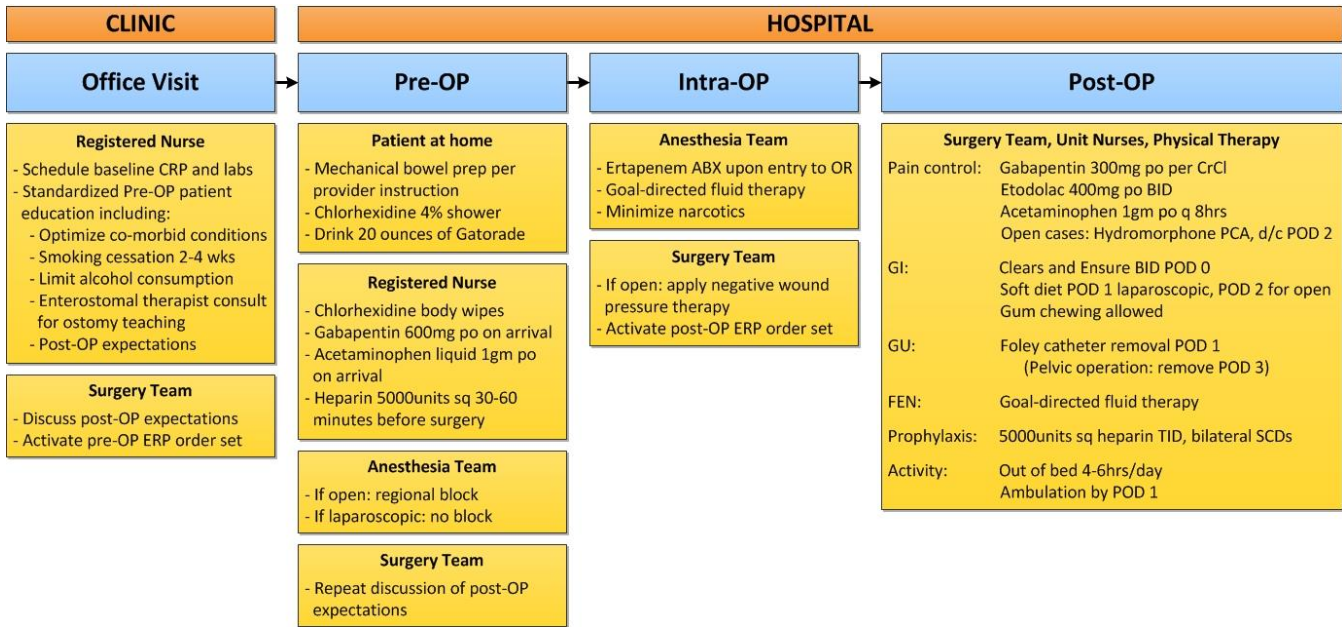


Above. Process map depicting the impact of ERP implementation (shown in yellow) on the pre-operative clinic visit. Delineating this process and the patient's hospital course during the Study phase helped identify barriers to pathway compliance.

Interventions (max points 15 includes points for innovation): What was your overall improvement plan (include interventions and identify quick wins)? How did you implement the proposed change? Who was involved in implementing the change? How did you communicate the change to all key stakeholders? What was the timeline for the change? Describe any features you feel were especially innovative.

A thorough literature search was performed to identify “best practices” related to colorectal surgery. A multidisciplinary panel of experts and direct caregivers from within the institution was convened (including colorectal surgeons, anesthesiologists, infection control, OR nursing, floor nursing, nutrition, physical therapy, enterostomal therapy, social work and electronic medical record /informatics specialists). This group considered the evidence and generated the ERP components using an iterative process until consensus was reached regarding the final pathway construct. IT personnel then created order sets on the electronic medical record (EMR) that standardize perioperative phases of care for elective colorectal surgeries based on identified diagnosis and procedure codes.

Once the ERP was established, the details of the ERP and its implementation were disseminated to caregivers via specific educational sessions for nursing, ancillary staff and physicians. Implementation began January of 2015 at CUH. The pathway and its associated order sets are directly initiated by the surgeon prior to admission. A nursing template within the EMR provides clear and easily accessible documentation of the timeline and milestones related to pathway components. Pathway adherence is periodically assessed via the EMR to ensure successful implementation.



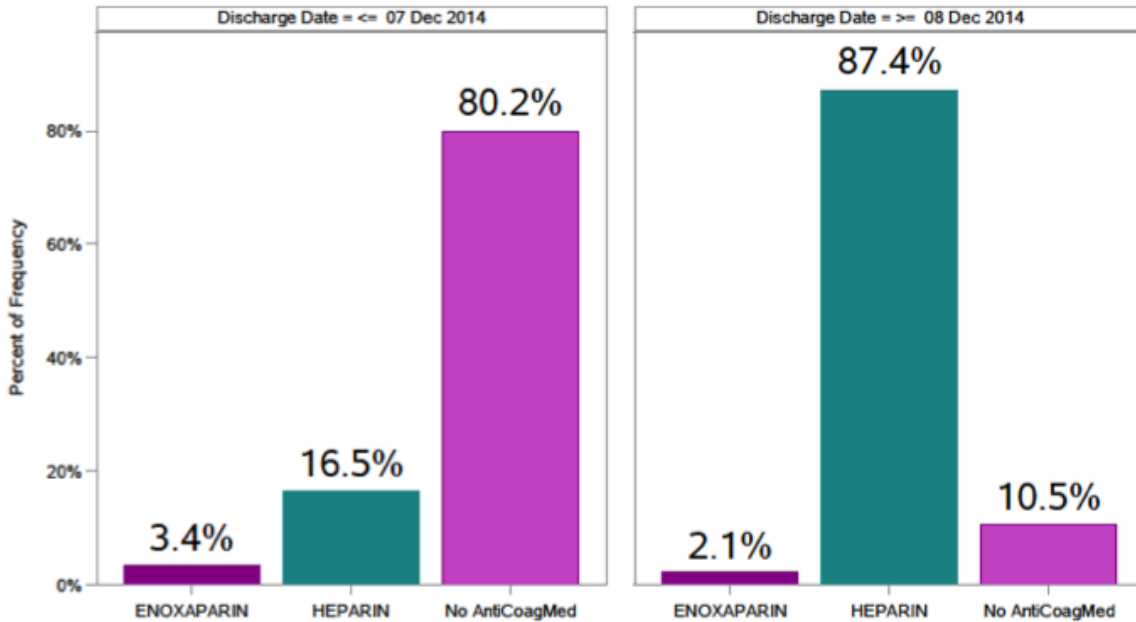
Above. Process map depicting the major ERP components beginning with the pre-operative clinic visit and extending through their hospital stay.

Results (max points 25): Include all results, using control charts, graphs or tables as appropriate. Charts and graphs must be appropriately label or points will be deducted. Note charts, graphs and tables here and send as addendum with abstract form.

Elective colorectal patients have been divided into pre- (1/1/2012 – 12/7/2014) and post-implementation (12/8/2014 – 12/31/2015) cohorts with a total of 358 and 95 patients, respectively. There was no statistically significant difference in the demographic characteristics of pre- and post-implementation cohorts.

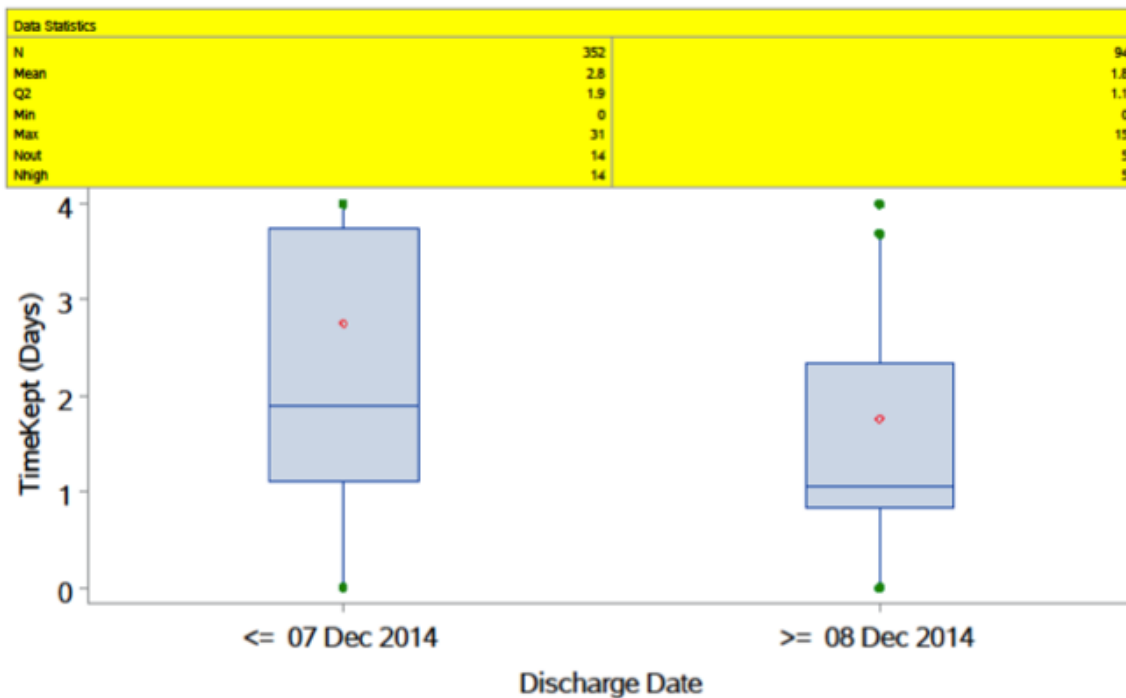
Process quality endpoints:

% Rate of Heparin Administration Before Colectomy Procedure



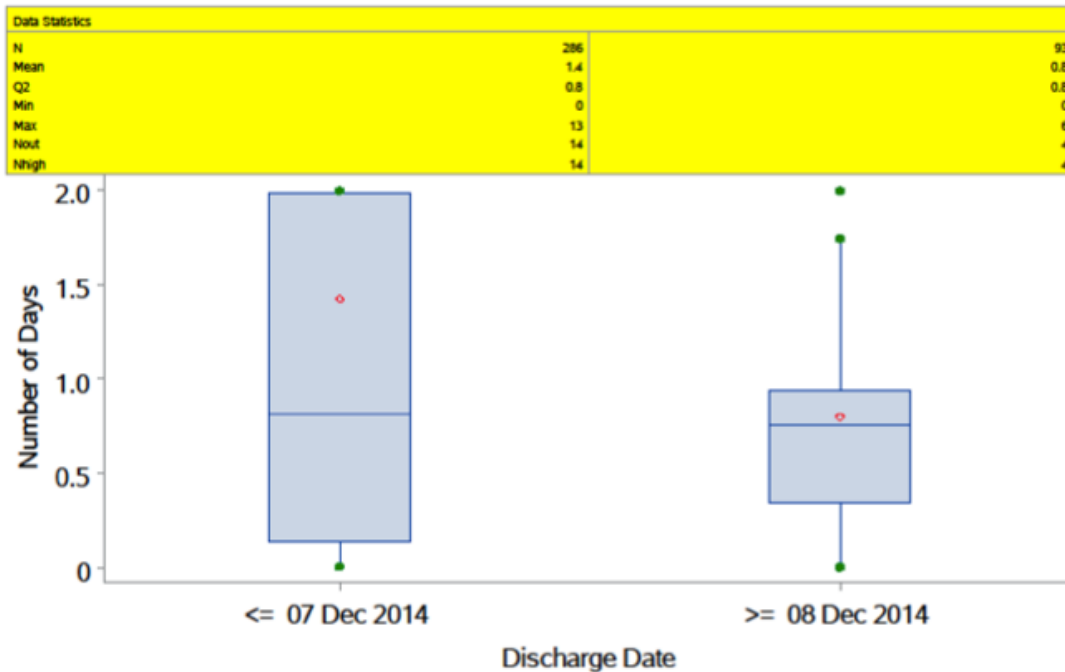
Above. Patient in post- cohort was 5.3 times more likely to receive heparin administration than the patient in pre- cohort. The difference in odds probability was statistically significant ($p < 0.0001$).

How Long (in Days) the Urethral Catheter was Kept (IP_LDA_NOADDSINGLE)



Above. Time to urethral catheter removal was significantly reduced from 2.8 days in the pre- cohort to 1.8 days in the post- cohort ($p = 0.0013$).

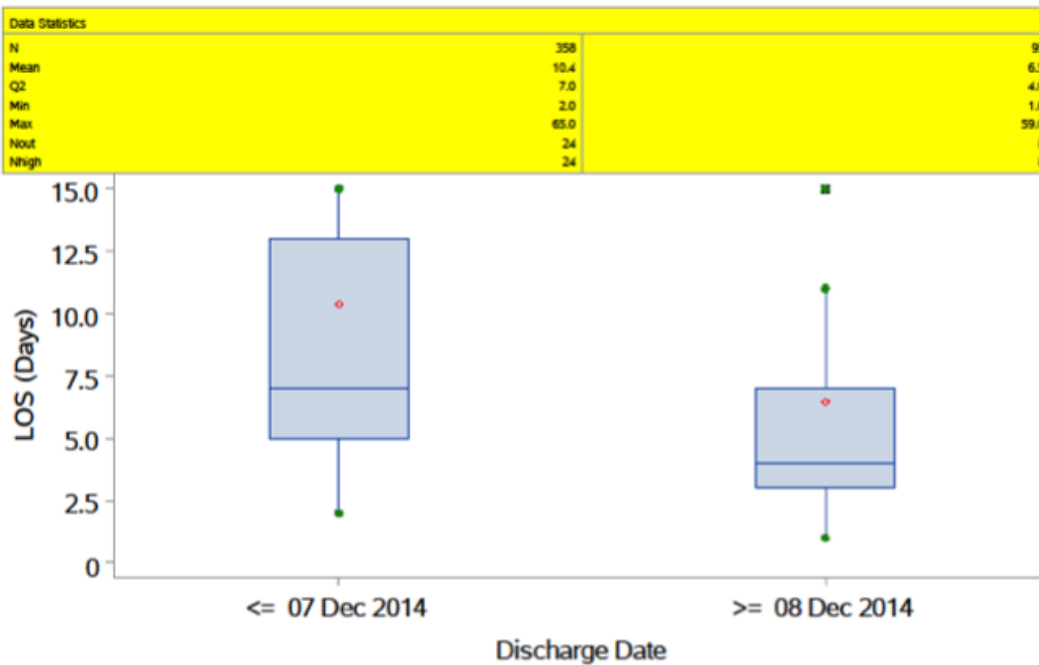
Number of Days Taken Before a Colectomy Patient Took First Ambulation



Above. Average time to ambulation was significantly reduced from 1.4 days in the pre-cohort to 0.8 days in the post-cohort ($p=0.0019$).

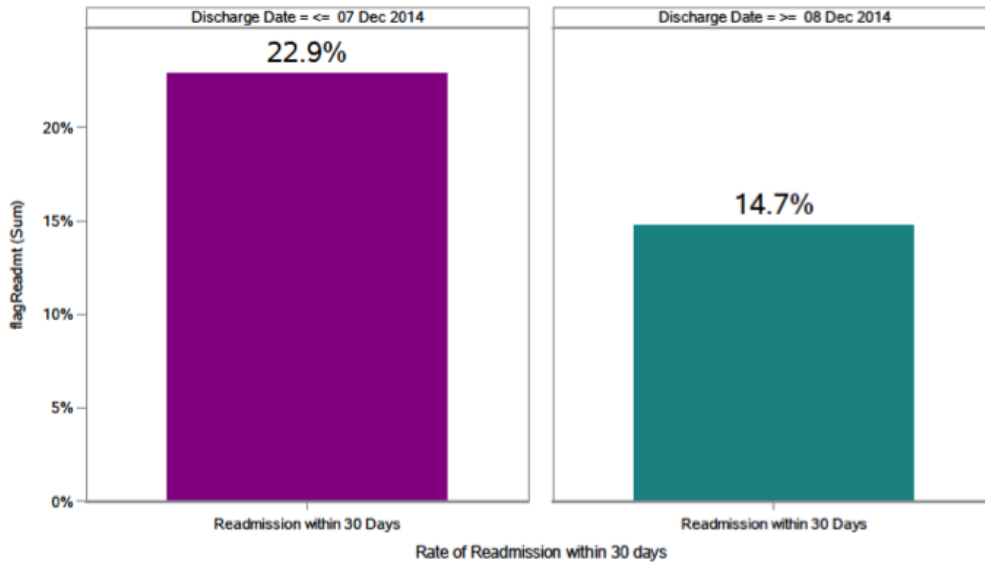
Outcome quality endpoints:

Length of Stay (LOS, in Days) for Colectomy Cohort



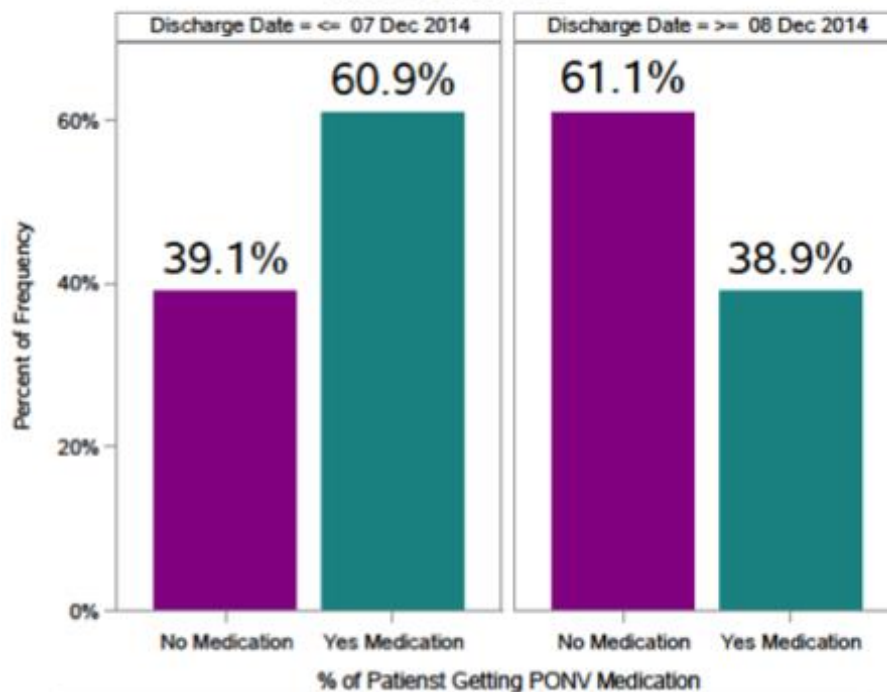
Above. There was a statistically significant ($p = .002$) 37.5% reduction in LOS following ERP implementation (8 December 2014) from 10.4 days in the pre-cohort to 6.5 days in the post-cohort.

% Rate of Patients Readmitted to Hospital within (30-Day All-Cause All-Hospital Readmission) in Colectomy Cohort



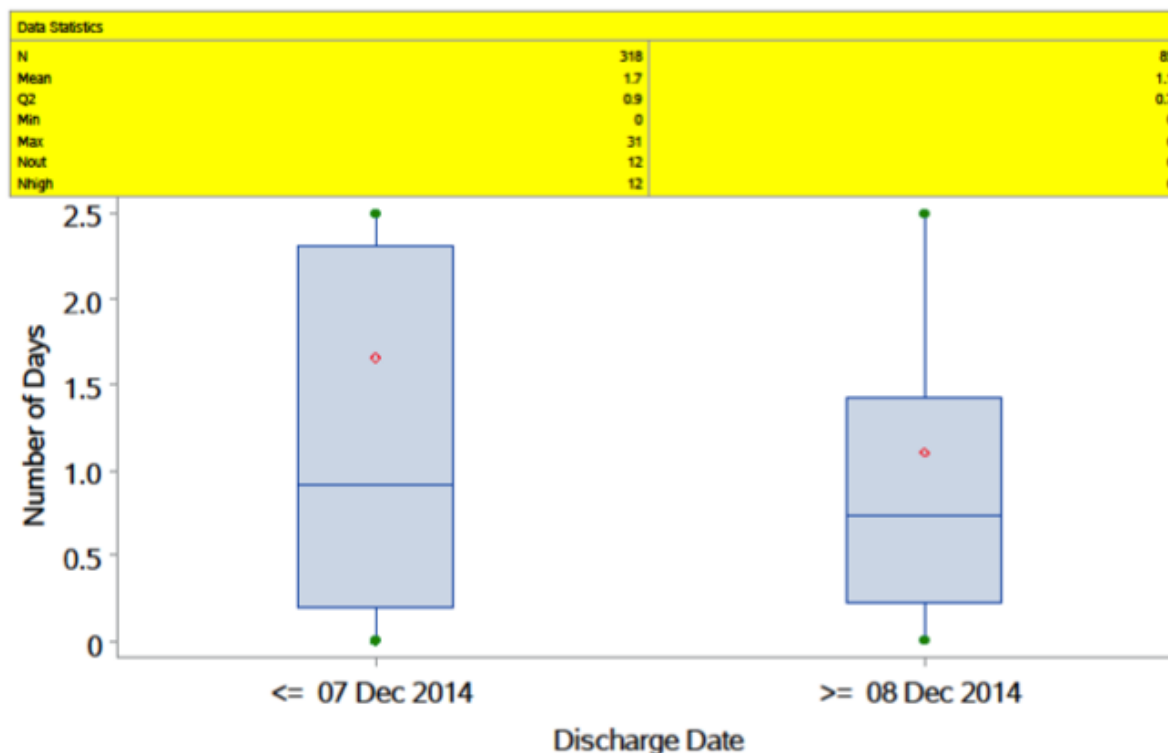
Above. Patient in pre-cohort was 1.7 times more likely to be readmitted than the patient in the post-cohort. The 35.8% reduction in readmission rate trended toward significance, but we have insufficient power in the post-group to date ($p = 0.0833$).

% of Patients Getting PostOp (>24-Hours) Administration of Nausea and Vomiting Medications



Above. Patient in pre-cohort was 2.4 times more likely to get PONV medication than the patient in the post-cohort. The difference in odds probability was statistically significant ($p=0.0001$).

Number of Days Taken Before a Colectomy Patient Experienced First Bowel Movement or Flatus (which ever is First)



Above. The time to first flatus or first bowel movement was significantly reduced from 1.7 days in the pre-cohort to 1.1 days in the post-cohort ($p=0.0393$).

Cost Avoidance:

LOS was significantly reduced in the post-cohort from 10.4 days to 6.5 days, suggesting that ERP implementation saved an average of 3.9 inpatient days per 95 post-cohort patients. The 2014 Kaiser Family Foundation average cost of hospital expenses per inpatient day for a Texas non-profit hospital is \$2,337¹. Thus, within the first year of implementation, ERP use has reduced the cost of colorectal surgery at CUH an estimated \$865,858.

Additionally, according to the pre-cohort readmission rate (22.9%), we would expect to see 28 readmissions in the post-cohort; however, we saw only 14. Previous research approximates the average cost of colorectal surgery readmissions at \$9,000². Thus, within the first year of implementation, ERP use has saved CUH an estimated \$126,000 in readmission costs.

The same ERP construct was implemented at the sister institution of UT Southwestern, Parkland Memorial Hospital, beginning September of 2014. Preliminary results suggest similar patterns of process and outcome improvement; further statistical analysis is currently underway.

Conclusions and Next Steps (max points 20): Describe your conclusions drawn from this project and any recommendations for future work. How does this project align with organizational goals? Describe, as applicable, how you plan to move ahead with this project.

Current literature suggests that ERPs improve quality of patient care by reducing complication rates, readmissions and length of stay. Studies also report decreased total cost per patient as a consequence of such improvements. Our data support these conclusions in the setting of elective colorectal surgery. We met our goal to reduce both LOS and readmission rate by at least 25% by December 2015, demonstrating a 37.5%

reduction in LOS ($p = 0.002$) and a 35.8% reduction in readmission rate ($p = 0.0833$). The effectiveness of ERP in the setting of complex surgeries such as colorectal would suggest similar potential benefit in other surgical subspecialties. We are currently in the process of developing such pathways across a variety of such service lines, including bariatric surgery and joint arthroplasty.

Next steps include assessing ERP impact on surgical site infection rate, the creation of physician dashboards in the electronic medical record that display pathway adherence and outcomes data in real time, and a comparison between ERP effects at Clements University Hospital and Parkland Memorial Hospital.

References:

¹ The Kaiser Family Foundation's State Health Facts: "Hospital Adjusted Expenses per Inpatient Day by Ownership." Data Source: 1999-2014 AHA Annual Survey.

² Wick EC, *et al.* Readmission rates and cost following colorectal surgery. *Dis Colon Rectum* 2011; 54: 1475-1479.