

(Updated 10.27.2022)

PHS Colorectal Collaborative Enhanced Recovery after Surgery & Surgical Site Infections Prevention Bundle

Measure Name: Colorectal Pathway (Colorectal Surgical Site Infection & Enhanced Recovery After Surgery)

Measure category: Hospital Quality Measure

Who is at risk: Hospitals and Physicians

Hospitals Participating: BWH, BWFH, MGH, NSMC, NWH, Emerson, CDH

ANESTHESIA BUNDLE

Elements	Definition	Compliance
Preoperative Management of Blood Pressure Medications	<ul style="list-style-type: none">Hold diuretics and Angiotensin Converting Enzyme (ACE) inhibitors on the day of the procedure	Assessed by: <ul style="list-style-type: none">Instructions given to hold Diuretics/ACE Inhibitors day of procedurePre-op assessment confirms Diuretics/ACE inhibitors held day of procedure Documented by: RNs in Holding area
Pre-Emptive Analgesia	One or more of the following agents should be used. <ol style="list-style-type: none">Acetaminophen 1 gm POGabapentin 600 mg POCelebrex 400 mg PO (avoid if renal dysfunction) Renal function should be audited, at least initially, to determine that patients receiving both Celebrex and Ketorolac are not adversely affected.	Assessed by: <ul style="list-style-type: none">Appropriate use of analgesicsRenal audit performed in appropriate patients Documented by: Anesthesia/RNs

Intra-Operative Anti-Emetic Use	<p>The following agents are acceptable and at least one should be given</p> <ol style="list-style-type: none"> 1. Zofran 4mg IV –30 min before the end of the case 2. Haldol 1mg IV – some use this early and some late in the case 3. Decadron 4-6mg IV –use early in the case 4. Scopolamine patch – applied pre-op 			<p>Assessed by:</p> <ul style="list-style-type: none"> • Appropriate use of anti-emetics <p>Documented by: Anesthesia team in OR</p>
PACU & Inpatient Anti-Emetic Use	<p>The following agents/doses are preferred:</p> <ol style="list-style-type: none"> 1. Zofran 4mg IV is the PACU drug of choice 2. Haldol 1mg IV 3. Decadron 4-6mg IV 4. Phenergan 6.25-12.5 mg IV may be used as a last resort <p>If a drug was given already (pre or intra-op) it should not be the initial agent given in the PACU</p>			<p>Assessed by:</p> <ul style="list-style-type: none"> • Appropriate use of anti-emetics <p>Documented by: Anesthesia team in OR</p>
Measurement of Temperature Intra-Operatively	<p>Temperature will be recorded the following way:</p> <ol style="list-style-type: none"> 1. By esophageal temperature probe 2. Every 5 minutes during the case <ul style="list-style-type: none"> • PACU temperatures should be taken within 5 minutes of patient arrival using a forehead probe 			<p>Assessed by:</p> <ul style="list-style-type: none"> • Appropriate recording of temperature using defined methods <p>Documented by: Anesthesia team in OR and PACU RNs</p>
Use of Paralytics and Narcotic Agents During the Anesthetic	<p>The following agents should be AVOIDED:</p> <ol style="list-style-type: none"> 1. Pancuronium 2. Isoflurane 3. Morphine 4. Hydromorphone 	<p>The following agents are PREFERRED:</p> <ol style="list-style-type: none"> 1. Propofol 2. Rocuronium 3. Cisatracurium 4. Vecuronium 5. Fentanyl (if a narcotic must be used at induction) 	<p>The following agents are ACCEPTABLE:</p> <ol style="list-style-type: none"> 1. Ketamine 2. Dexmedetomidine 3. Lidocaine 4. Total IV Anesthetic (TIVA) 	<p>Assessed by:</p> <ul style="list-style-type: none"> • Appropriate use of paralytics/narcotic agents <p>Documented by: Anesthesia team in OR</p>

Optimized Intra-Operative Fluid Management	Zero Fluid Balance Management	Goal Directed Fluid Therapy	Assessed by: <ul style="list-style-type: none"> • Appropriate adherence to ZFBM/GDFT best practice Documented by: Anesthesia team in OR
	<u>Patient type:</u> Low Risk i.e., ASA I & II patients undergoing laparoscopic or straightforward open surgery <u>Best Practice Defined by:</u> <ul style="list-style-type: none"> - No fluid in holding area - 5-7 ml/kg crystalloid bolus at induction, if hypotensive - Crystalloid up to 2ml/kg/hr for lap, up to 3ml/kg/hr for open cases - May bolus up to 2 times with 250cc of colloid - If unclear fluid status convert to GDFT 	<u>Patient type:</u> High risk i.e., ASA 3 and 4, urgent/emergency, most open cases, and complex surgery (e.g., surgical disease complexity, anticipated long OR time, extreme positioning) <u>Best Practice Defined by:</u> <ul style="list-style-type: none"> - No fluid in holding area - 5-7 ml/kg crystalloid bolus at induction, if hypotensive. - Crystalloid up to 2ml/kg/hr for lap, up to 3ml/kg/hr for open cases - Use esophageal doppler (preferred) or other suitable device for stroke volume optimization - Use crystalloid for maintenance - Suggest colloid to achieve and maintain desired stroke volume, crystalloid is acceptable 	
	<u>Monitoring required:</u> <ul style="list-style-type: none"> - Bladder Catheter - BP cuff - Pulse Oximetry 	<u>Monitoring required:</u> Device based monitoring required. At present esophageal doppler is the only well studied, evidence based, validated option	

	<p><u>Approach to Hypotension:</u></p> <ul style="list-style-type: none"> - If not due to hypovolemia use pressors - If unclear/possibly due to hypovolemia convert to GDFT <p><u>Approach to low UO:</u></p> <ul style="list-style-type: none"> - Accept 0.2 ml/kg/hr <p>Do not treat low UO if other data imply euvoolemia</p>	<p><u>Approach to hypotension:</u></p> <ul style="list-style-type: none"> - Use fluid challenge to ensure SV is optimized - If SV has been optimized use pressors <p><u>Approach to low UO:</u></p> <ul style="list-style-type: none"> - Accept 0.2 ml/kg/hr <p>Do not treat low UO if other data imply euvoolemia</p>	
<p>Post-Operative Analgesia</p>	<ul style="list-style-type: none"> • If possible non-narcotics should be used on a scheduled basis for analgesia with narcotics reserved for breakthrough pain <ol style="list-style-type: none"> 1. IV Ketorolac 30mg q 6 hours (15mg q 6 hours if patient is over 65) unless the patient has renal impairment 2. IV Acetaminophen 1gm q 6 hours (convert to PO acetaminophen as soon as patient has proven they can tolerate liquids) 3. Gabapentin 600 mg PO X 1 if patient did not receive pre-op • Narcotics may be given via PCA pump, IV or SC: <ol style="list-style-type: none"> 1. Dilaudid and Morphine are preferred agents • Patients undergoing open surgery should get either an epidural or TAP blocks unless the incision is very small. Surgeon should discuss with patient in clinic when reviewing ERAS concepts to maximize acceptance and to avoid patients being surprised by Anesthesia wanting to place epidural pre-op. 	<p>Assessed by:</p> <ul style="list-style-type: none"> • Appropriate use of analgesics • Epidural/TAP block discussed with patient in clinic prior to surgery <p>Documented:</p> <p>In Epic order set by Surgeons</p>	

	TAP Block Best-Practice Best Practice	Epidural Best-Practice Best Practice	Assessed by:
	<ol style="list-style-type: none"> 1. TAP could be placed pre-op, but post-op is preferred to avoid case delay 2. Ultrasound guided TAP is preferred 3. Preferred agent is Ropivacaine 0.5% <ul style="list-style-type: none"> • TAP blocks are recommended for “rescue” from refractory pain in the PACU 	<ol style="list-style-type: none"> 1. Epidural is placed pre-op 2. Ideally epidural placed at T7-T8 or T8-T9 for right sided resections, T9-T10 for left sided/rectal resections 3. Preferred agent is Bupivacaine <ul style="list-style-type: none"> - 0.2% at 3cc/hr appears to reduce hypotension and is preferred - 0.1% at 6cc/hr is acceptable as well 4. Epidural is removed on POD #2 – or on POD #1 if patient is tolerating POs. <ul style="list-style-type: none"> - Avoid removing at night if possible - If patient receiving SC Heparin wait at least 6 hours after last dose to remove - Ideally epidural should be removed >3 hours prior to discharge 	<p>Assessed by:</p> <ul style="list-style-type: none"> • Appropriate adherence to TAP/Epidural best practice <p>Documented by:</p> <p>Anesthesia team in OR</p>

SURGERY BUNDLE

Elements	Definition	Compliance
Demarcation and verification as ERAS/SSI patient	<ol style="list-style-type: none"> 1. Selected patient placed on ERAS/SSI pathway 2. Flag placed in Epic that will be visible whenever Epic opened during episode of care that makes it clear to all providers that patient is on ERAS/SSI pathway 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Appropriate demarcation and verification of Patient's ERAS/SSI designation <p>Documented in: Epic by surgeon or scheduler</p>
Patient Education	Educational material provided to patient at time of booking	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Materials provided to patient at time of booking <p>Documented in: Epic by RN or Surgeon</p>
Mechanical Prep	<ol style="list-style-type: none"> 1. Patient given instructions for mechanical prep 2. Mechanical and antibiotic prep should be given for both right and left sided resections 3. Allow only clear liquids AFTER breakfast, on the day before surgery 4. Actual mechanical prep chosen is not critical. Acceptable alternatives include but are not limited to: <ol style="list-style-type: none"> i. 2-4 Dulcolax pills at 2PM followed by 1 bottle of Miralax in 64oz clear liquid taken from 3-5PM ii. 4 liters of Golytely taken from noon – 4pm iii. 2-4 Dulcolax pills at 2 PM followed by 1 bottle of Mg Citrate at 3PM 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Patient given instructions for mechanical prep 2. Pre-op assessment confirms appropriate mechanical prep <p>Documented in: Epic by RNs in holding area Or Paper documentation if Epic documentation not possible</p>

Oral Antibiotic Prep	<p>Acceptable oral antibiotic regimens include:</p> <ol style="list-style-type: none"> 1. A combination of at least 2 antibiotics (e.g., Neomycin/Erythromycin or Neomycin/Metronidazole), for at least 2 doses, should be given one hour after completion of mechanical bowel prep. 2. Suggested regimens include but are not limited to: <ol style="list-style-type: none"> i. 1g Neomycin + 1g Erythromycin at 5-7pm and at 10-11pm ii. 1g Neomycin + 500 mg Metronidazole at 5-7pm and at 10-11pm. iii. 1g Neomycin + 500 mg Metronidazole (or 1g Erythromycin, if allergic to Metronidazole) at 5, 6 and 8-10pm 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Prescriptions or actual medication given during office visit for one of accepted oral antibiotic regimens 2. Pre-op assessment confirm appropriate antibiotic use <p>Documented in: Epic by RNs in holding area Or Paper documentation if Epic documentation not possible</p>
Pre-operative nutritional supplement	<p>Acceptable pre-op nutritional supplement drinks:</p> <ol style="list-style-type: none"> 1. All patients should be directed to the MGH Pharmacy to pick up their ERAS kit supplies with will include a preoperative nutritional supplement drink prior to surgery. <ol style="list-style-type: none"> a. If the above is not provided, up to 20oz of Gatorade (no red) is an acceptable alternative. 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Patients given instructions for one of the accepted carbohydrate drinks to be started 4 hours before induction and fully administered no later than 2 hours prior to induction 2. Pre-op assessment confirms appropriate carbohydrate drink intake <p>Documented in: Epic by RNs in holding area Or Paper documentation if Epic documentation not possible</p>
	<p>Timing for drinking of the supplement:</p> <ol style="list-style-type: none"> 1. Patients should be given instructions to drink the provided carbohydrate drinks starting 4 hours before surgery and complete or stop drinking 2 hours before surgery. 2. If the patient is diabetic, instruct them to follow their recommend diet and do not drink the carbohydrate drink as it may increase their blood sugar. 	

<p>Pre-operative Antibacterial shower</p>	<p>Patient instructions:</p> <ul style="list-style-type: none"> • Shower/bathe with liquid Chlorhexidine wash starting 2 days before, the day before, and on the morning of surgery (i.e., once daily for 3 days) per the special instructions included for bathing with Chlorhexidine, an antimicrobial soap. • The Patient should be directed to the MGH Pharmacy to pick up their ERAS Kit supplies, which will include the Hibiclens. • If Patient was tested for STAPH and is positive, defer to instructions provided by their surgeon's office for the use of Chlorhexidine was and mupirocin nasal ointment. Their doctor will let them know if testing is needed. 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Patient given instructions for Chlorhexidine bath 2. Pre-op assessment confirms appropriate Chlorhexidine bath <p>Documented in: Epic by RNs in holding area Or Paper documentation if Epic documentation not possible</p>
<p>Administer Prophylactic Antibiotics</p>	<p>One of the following CMS approved antibiotic regimens must be used:</p> <ol style="list-style-type: none"> i. Cefoxitin ii. Cefotetan iii. Unasyn iv. Ertapenim v. Cefazolin + Metronidazole vi. Cefuroxime + Metronidazole vii. Ceftriaxone + Metronidazole viii. Aminoglycoside + Clindamycin ix. Aztreonam + Clindamycin x. Quinolone + Clindamycin xi. Aminoglycoside + Metronidazole xii. Quinolone + Metronidazole <hr/> <p>Timing and Dosage:</p> <ol style="list-style-type: none"> 1. Infusion started within 60 minutes of incision and completed before incision 2. Dose should be weight based <p>Intra-op re-dosing should be performed based on pharmacokinetics of antibiotics chosen</p>	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Appropriate adherence to antibiotic regimens <p>Documented in: Epic by RNs in holding area or Anesthesia team in OR Or Paper documentation if Epic documentation not possible</p>

Use of Colorectal OR team	<ul style="list-style-type: none"> Anesthesiologist, CRNA, Circulating RN and Scrub Nurse/Tech are all involved in at least 2 colorectal resection cases per month 	
Maintenance of Normothermia	<p>Actively warm throughout surgery to achieve target temperature of 36° C using one or more of the following:</p> <ol style="list-style-type: none"> Room temperature at >68° F until patient prepped and draped Fluid warming device OR table warming pad Forced warm air under-body or over-body device 	<p>Assessed by:</p> <ol style="list-style-type: none"> Adherence to appropriate warming procedure Temperature record <p>Documented in: EPIC by RNs in OR/ Anesthesia team in OR Or Paper documentation if Epic documentation not possible</p>
Intra-Operative Skin Prep	<p>Acceptable skin preps:</p> <ol style="list-style-type: none"> Chloroprep is the preferred skin prep Duraprep is an acceptable substitute Prep must be allowed to air-dry (minimum 3 minutes) before draping and incision <p>Method to ensure adequate drying time:</p> <ol style="list-style-type: none"> Hospitals may use whatever system they prefer to ensure compliance 	<p>Assessed by:</p> <ol style="list-style-type: none"> Adherence to appropriate usage of skin prep Adherence to appropriate drying time <p>Documented in: Epic by RNs in OR Or Paper documentation if Epic documentation not possible</p>
Instrument Segregation Best Practice (Dirty Tray Best Practice)	<ol style="list-style-type: none"> When bowel is to be opened; a pan, tray or additional mayo stand is brought to the field All instruments used until the bowel is closed are taken from and placed back on this surface 	<p>Assessed by:</p> <ol style="list-style-type: none"> Adherence to dirty tray best practice in the patient record/OR notes <p>Documented in:</p>

	<ol style="list-style-type: none"> 3. The Tech cannot go with his/her hands to retrieve a clean instrument, but must use another clean instrument to retrieve the needed item off the sterile instrument table 4. If drapes are contaminated a sterile towel is placed over the contaminated area 5. When bowel is closed, suction tip and electro-cautery pencil are added to the instruments on this surface and the pan/tray/mayo is passed off or moved away. 6. Light handle covers are removed if they were touched during the dirty portion of the case. 7. Gloves are then changed. 	<p>EPIC by RNs in OR Or Paper documentation if Epic documentation not possible</p>
<p>Use of Wound Protectors During Case</p>	<p>Acceptable types of wound protectors:</p> <ol style="list-style-type: none"> i. Single ring wound protectors ii. double ring wound protectors <p>Standard steps for removing contaminated wound protector:</p> <ol style="list-style-type: none"> 1. A plastic wound protector is placed at the beginning of the surgery (in open cases) and at the time of bowel division (in laparoscopic cases) Single ring and double ring wound protectors are acceptable. The protector is also covered by towels during the time that the bowel is open (see dirty tray best practice above). 2. Once the dirty portion of the procedure is concluded and the dirty pan/tray/mayo has been passed off or moved away, one of the surgeons will remove the wound protector (unless the anastomosis needs to be completed under laparoscopic vision) taking care not to contaminate the subcutaneous tissues. The Tech and the other surgeon(s) will change gloves before touching the field or instruments. The surgeon who discarded the wound protector will change his/her gloves after. 3. Gowns should be changed if there is any possibility that they may have been contaminated during the dirty portion of the procedure – or may be changed after the wound protector is removed as a routine at the discretion of the surgeon. 4. If the wound protector is grossly contaminated during the procedure, it should be removed and replaced using the above procedure prior to reinsufflation of abdomen. 5. If gloves are grossly contaminated during the procedure, they should be changed and then changed again when the manipulation steps are finished, and the towels/wound protectors are removed. 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Use of appropriate wound protector 2. Adherence to appropriate wound protector best practice <p>Documented in: EPIC by RNs in OR Or Paper documentation if Epic documentation not possible</p>

<p>Peri-Operative Glucose Monitoring and Management</p>	<p>Pre-operative Testing of Diabetes</p> <ul style="list-style-type: none"> • A HbA1c should have been drawn within 3 months and if not, one should be ordered • In the event of an abnormal elevated result the primary care MD or endocrinologist should be contacted to <ul style="list-style-type: none"> – Request their assistance in optimizing glucose control before surgery – Discuss whether the operation should be postponed (for cases of extremely elevated HbA1c) <p>Pre-operative management of diabetes medications; Instructions given for Insulin and Oral hypoglycemics given to patients with DM</p> <ol style="list-style-type: none"> 1. Surgeons or their staff will reach out to endocrinologists (or PCPs when there is no endocrinologist involved) and ask them to provide the patient with guidance on medication management on the prep day prior to surgery and the morning of the operation 2. They will specifically communicate that the patient will be receiving a complex carbohydrate supplement 3 hours before surgery <p>Monitoring:</p> <ol style="list-style-type: none"> 1. All patients, diabetic or not, should have a FS or other blood glucose determination in pre-op holding 2. All diabetics and patients treated with insulin should have hourly intra-op glucose monitoring 3. Glucose levels > 180mg/dl should be treated with insulin per hospital best practice (150mg/dl at the physician's discretion) <p>Timing of glucose monitoring:</p> <ol style="list-style-type: none"> 1. In Pre-Op holding 2. Q1hr Intra-Op 3. Post-Op in PACU (unless patient has 2 normal values in row): 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Use of diabetic medications (if diabetic) 2. Adherence to appropriate peri-operative glucose monitoring <p>Documented in: Epic by RNs in holding area, Anesthesia team in OR and PACU RNs Or Paper documentation if Epic documentation not possible</p>
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	<ul style="list-style-type: none"> i. Q6hr for diabetics ii. In the morning on Post-Op day #1 for non-diabetics. Discontinue after this unless hyperglycemic 	
Optimized Post-Operative Fluid Management	<p><u>Initial Post-OP fluid orders:</u></p> <ul style="list-style-type: none"> • Crystalloid @ 1cc/kg(ideal weight)/hr X 6hrs then discontinue • Allow clears PRN • Allow up to 3 boluses of 250cc crystalloid or colloid for hypotension • Call if >2 boluses required • Initially audit: <ul style="list-style-type: none"> 1. BP 2. Number and type of fluid boluses 3. Epidural order changes in orders and narcotic requirements (may be affected if fluid is not an option for low BP) 	<p>Assessed by: Appropriate adherence to Initial post-op fluid orders</p> <p>Documented in: Epic order set by Surgeons, post-op management by Epic chart audit or Paper documentation if Epic documentation not possible</p>
	<p><u>Post-OP fluid response assessment:</u></p> <ul style="list-style-type: none"> • Do not intervene unless; <ul style="list-style-type: none"> 1. SBP is 15% below baseline SBP <u>or</u> 2. MAP is below 65 <u>or</u> 3. UO is below 0.25cc/kg/hr <u>and</u> patient has other signs of hypovolemia) • If any of the above occur, the patient should be examined and causes of hypotension other than inadequate fluid administration excluded (e.g. bleeding, myocardial ischemia etc.) • Then, the initial response may include: <ul style="list-style-type: none"> 1. Crystalloid or colloid 250cc bolus up to 3 times <u>and/or</u> 2. Pressors if patient is in a step-down or ICU setting (consider placing patients in such a setting if you anticipate fluid management challenges) • Failure to respond appropriately should result in: <ul style="list-style-type: none"> 1. A call to the senior resident or attending before administering additional fluid 2. A more objective measure of fluid status. Inferring fluid status is difficult and frequently inaccurate. Ideally, non-invasive monitoring should be made available (e.g., ultrasound machines that allow simple echocardiography). 	<p>Assessed by:</p> <ul style="list-style-type: none"> • Appropriate adherence to Post-op fluid response assessment guide <p>Documented in: by Epic chart audit or Paper documentation if Epic documentation not possible</p>

	<p>Surgical residents should be taught to perform simple bedside echocardiography when they are taught to perform FAST examinations.</p> <p>3.</p>	
Early Post-Operative Diet Advancement	<ol style="list-style-type: none"> 1. IV fluid discontinued: Either 6 hours after surgery, or once patient tolerates 300cc PO, based on physician preference. 2. Allow clears once patient is awake in PACU. 3. Post Op Day #1: Clear liquid breakfast, then advance diet as tolerated (or based on assessment of patient) 4. If nausea or vomiting, delay advance until symptoms have abated 5. Do not order "sips" 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Adherence to appropriate diet advancement <p>Documented in:</p> <p>Epic order set by Surgeons Or Paper documentation if Epic documentation not possible</p>
Early Post-Operative Mobilization	<p>The following activity orders should accompany all colorectal resections whether open or lap:</p> <ol style="list-style-type: none"> 1. 3-6 hours post-op (e.g. Afternoon/Evening, if Morning surgery): Start out of bed to chair. May ambulate as tolerated. 2. On Post-Op day #1 and thereafter: Ambulate in hallway at least 3 times <p>For APR patients:</p> <ol style="list-style-type: none"> 1. No sitting until Post-Op day #2. When sitting, a soft surface, pillow or cushion should be used. 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Adherence to appropriate Post-op mobilization instructions <p>Documented in:</p> <p>Epic order set by surgeon Or Paper documentation if Epic documentation not possible</p>
Early Catheter Removal	<ol style="list-style-type: none"> 1. Catheter removed within 48 hours for colon resections 2. Catheter removed within 72 hours for rectal resections. 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Appropriate removal of catheter <p>Documented in:</p> <p>Epic order set by surgeons</p>
Defined Discharge Criteria	<ol style="list-style-type: none"> 1. Patient must have adequate pain control on oral medications 2. Patient tolerating clear liquid diet 	<p>Assessed by:</p> <ol style="list-style-type: none"> 1. Pain assessment

		<p>2. Toleration of clear liquid diet</p> <p>Documented in: Epic order set by surgeons</p>
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