

Provincial Clinical Knowledge Topic
ERAS Major Head and Neck Cancer Surgery with Free
Flap Reconstruction, Adult – Inpatient
V 1.0

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Revision History

Version	Date of Revision	Description of Revision	Revised By
1.0	November 2019	Clinical Knowledge Topic Complete	See Acknowledgements

Important Information Before You Begin

An Alberta Health Services (AHS) Provincial Clinical Knowledge Topic is the evidence-informed clinical best practice standard for a specific patient population. Enhanced recovery after surgery (ERAS) Topic content is based on recommendations from published international guidelines and other evidence, the AHS Cancer Strategic Clinical Network (SCN) Head and Neck Cancer Perioperative Pathway, and consideration for current practices at ERAS sites and other clinical standards. Topic information strives to adhere to [Institute for Safe Medication Practices \(ISMP\)](#) safety standards, and align with provincial and national Quality and Safety initiatives and standards, e.g. [Health Quality Council Alberta \(HQCA\)](#), [Choosing Wisely](#), [Safer Healthcare Now](#), and [Accreditation Canada](#). The Topic will be reviewed periodically and updated according to best practice evidence and other clinical recommendations and guidelines.

Clinicians using this Topic should, in consultation with the patient, use independent medical judgement in the context of individual clinical circumstances to direct care.

Guidelines

This Topic is based on the following guidance:

- 1) [Optimal Perioperative Care in Major Head and Neck Cancer Surgery With Free Flap Reconstruction: A Consensus Review and Recommendations From the Enhanced Recovery After Surgery Society](#)¹
- 2) [Enhanced Recovery After Surgery \(ERAS\) for gastrointestinal surgery. Part 1: pathophysiological considerations](#)²
- 3) [Enhanced Recovery After Surgery \(ERAS\) for gastrointestinal surgery. Part 2: consensus statement for anaesthesia practice](#)³

Keywords

- ERAS
- Enhanced recovery
- Head and Neck
- Free flap reconstruction
- Surgery
- Adult

ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult – Inpatient

Rationale

International ERAS guidelines were developed to improve patient outcomes, accelerate recovery after surgery, and reduce healthcare costs. ERAS is a multimodal approach, with interventions across all stages of surgical care. Refer to [Enhanced Recovery After Surgery: A Review⁴](#).

The international ERAS guidelines were used in the refinement of provincial care pathways for enhancing recovery after surgery. There are AHS ERAS care pathways developed for Breast Reconstruction (not applicable outside of Foothills Medical Centre and Misericordia Community Hospital), Colorectal, Cystectomy, Gynecologic Oncology (not applicable outside of Foothills Medical Centre, Royal Alexandra Hospital and Grey Nuns Community Hospital), Liver, Major Gynecology, Major Head and Neck (not applicable outside of Foothills Medical Centre and University of Alberta Hospital), and Pancreas surgery. These care pathways are detailed in surgery-specific ERAS Topics.

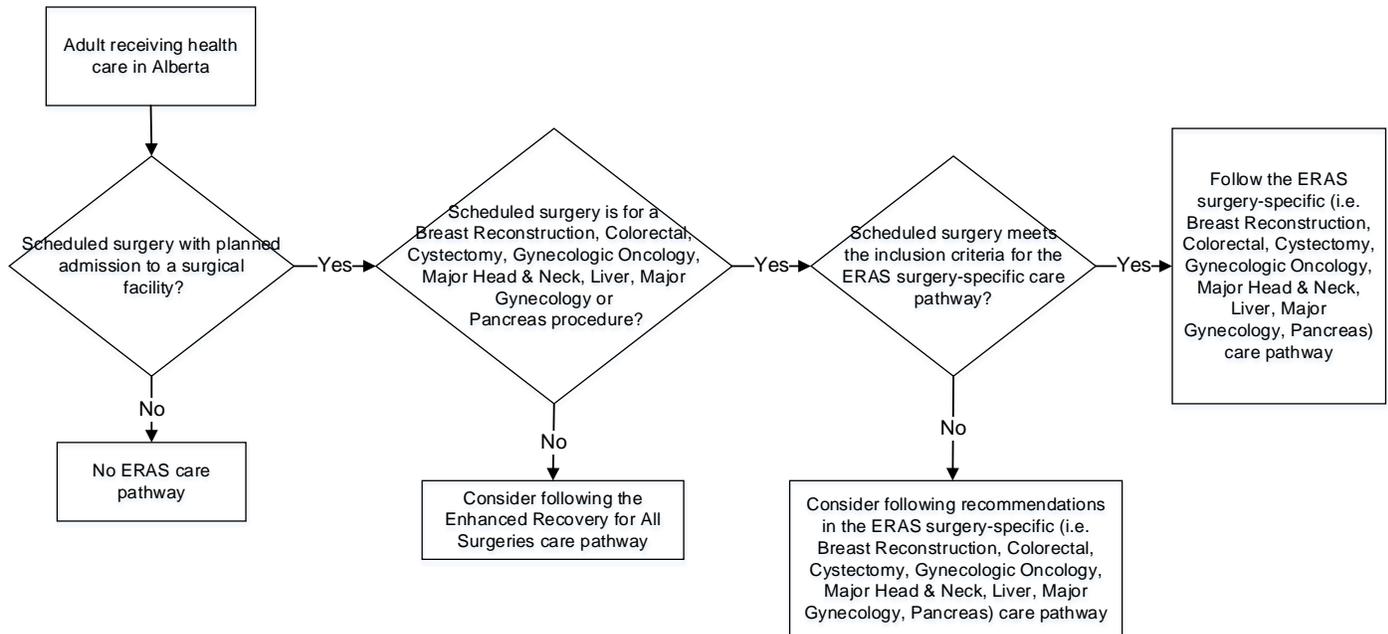
Certain criteria must be met for a patient to be considered for inclusion in an ERAS care pathway. See the Rationale section in each ERAS Topic for specific surgical procedures appropriate for inclusion.

The inclusion criteria (applicable as of December 1, 2017) for the ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult - Inpatient care pathway are

- Adult surgical inpatient undergoing elective planned surgery within Alberta for major head and neck cancer with free flap reconstruction

While all eligible patients should be started on the ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult - Inpatient care pathway, individual patient care plans may need to be modified based on surgical findings or additional procedures. Major Head and Neck surgery patients who do not meet the inclusion criteria (e.g., those undergoing a thyroidectomy, parathyroidectomy, sinus procedure, any acute trauma-related procedure, or surgery that includes rotation flaps) may still be considered for applicable recommendations in the ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult - Inpatient care pathway.

Figure #1 ERASAlberta Care Pathway Inclusion Flowchart



Goals of Management

The goals of clinical management for enhancing the recovery of adult patients after scheduled surgery are to

1. Decrease
 - surgical care length of stay (acute and total) with no increase in readmissions or use of emergency, specialty or primary care related to the post-surgical care
 - surgical complications delaying discharge
 - serious surgical complications including reoperations
2. Increase
 - positive surgical care experiences for patients and families, and providers
 - compliance with ERAS recommendations

This can be achieved by engaging patients and families, clinicians and staff in a multidisciplinary evidence-informed ERAS care pathway focused on

- patient preparation that includes pre-operative optimization, an explanation of the surgical procedure, as well as post-operative expectations and goals to maximize patient participation in their surgical care journey
- pre-operative fasting and carbohydrate loading following national anesthesia guidelines
- appropriate prophylaxis to prevent or reduce surgical complications including venous thromboembolism (VTE), surgical site infections, nausea and vomiting
- multimodal, opioid-sparing analgesic approaches to improve the management of perioperative pain, nausea and vomiting

- management of physiological surgical stress response
- maintenance of normothermia
- balanced fluid management
- surgical site drains may be used but should be removed as early as clinically appropriate
- mobilization soon after surgery
- nutritional optimization through use of early enteral or early oral feeding
- minimizing the intensive care unit (ICU) length of stay to less than 24 hours
- optimal artificial airway management of tracheostomy, early decannulation and early pulmonary therapy
- rigorous reconstructive wound monitoring and management

ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult – Inpatient: Recommendations

ERASAlberta recommendations are based on published international ERAS guidelines and other evidence, with consideration for current practices at ERAS sites and other clinical standards. ERAS[®] Society recommendations are from the Table of Recommendations within [ERAS[®] Society Guidelines](#). The GRADE⁵ methodology was used to determine quality of evidence and strength of recommendation for each ERAS[®] Society recommendation.

Note: Careful consideration should be taken with elderly and/or frail patients, particularly in the area of medication management.

Pre-operative information, education and counselling

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

- **ERAS[®] Society Recommendation:** All patients undergoing major head and neck cancer surgery with free flap reconstruction should receive structured teaching from a qualified health practitioner.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Low
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Pre-operative optimization

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following additions: smoking and alcohol consumption (patients with alcohol dependency) should be stopped four weeks before surgery. Increasing exercise pre-operatively may be of benefit. Anemia should be actively identified, investigated, and corrected pre-operatively.

Note: Patients with alcohol dependency should wean consumption under the care of a qualified healthcare professional.

- **ERAS[®] Society Recommendation:** All patients undergoing major surgery for head and neck cancer should undergo preoperative comprehensive nutritional assessment, with a special focus on dysphagia and risk for refeeding syndrome. Preoperative nutrition intervention is recommended for those identified as malnourished. A standard polymeric enteral nutrition formula should be considered suitable for use in patients requiring preoperative nutrition support.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Assessment and intervention (High), Enteral nutrition formula (Low)

- **ERAS[®] Society Recommendation - Strength of Recommendation:** Assessment and intervention (Strong), Enteral nutrition formula (Weak)

Pre-operative fasting and carbohydrate load treatment

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following clarification: before scheduled procedures, the minimum duration of pre-operative fasting should be 8 hours after a meal that includes meat, fried or fatty foods, 6 hours after a light meal (such as toast and a clear fluid), and 2 hours after clear fluids as per the [Canadian Anesthesiologists' Society Guidelines to the Practice of Anesthesia - Revised Edition 2019⁶](#). Carbohydrate load treatment should occur between 2 and 3 hours prior to the administration of anesthesia.

Note: The AHS Provincial Clinical Knowledge Topic: [Perioperative Management of Patients with Diabetes Mellitus, Adult – Inpatient](#) provides recommendations for patients with diabetes mellitus.

- **ERAS[®] Society Recommendation:** Preoperative fasting should be minimized. In patients suitable for oral intake and with appropriate screening and management for those presenting with dysphagia or risk of refeeding syndrome, clear fluids should be permitted for up to 2 hours and solids for up to 6 hours prior to anesthesia. Preoperative carbohydrate (CHO) treatment may be offered to head and neck cancer patients.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Fluids (High), Solids (Low), CHO (Low)
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Fluids (Strong), Solids (Strong), CHO (Conditional)

Pre-anesthetic medication

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following clarification: preference is for patients to not receive anxiolytics pre-operatively however, short acting anxiolytics may be given if required.

- **ERAS[®] Society Recommendation:** Patients should receive short acting anxiolytics, given intravenously and titrated to required effect. Long acting anxiolytics and opioids should be avoided.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Venous thromboembolism prophylaxis

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following additions: patients should have a sequential compression device applied. Extended prophylaxis with low molecular weight heparin (LMWH) should be given for an additional 28 days post-discharge to patients with cancer or other patients with increased risk of venous thromboembolism (VTE). Risk assessment is required in accordance with the AHS-Wide Policy Suite – Venous Thromboembolism Prophylaxis ([Policy](#) and [Guideline](#)).

Note: Refer to the AHS Provincial Clinical Knowledge Topic: *VTE Prophylaxis, Adult – Inpatient* (*link to be added once available*).

- **ERAS[®] Society Recommendation:** Patients undergoing head and neck cancer surgery with free flap reconstruction are at increased risk of VTE and should undergo pharmacologic prophylaxis; however, the risk of bleeding must be weighed against the benefits on an individualized basis.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Antimicrobial prophylaxis and skin preparation

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with antibiotic provision as per [AHS Recommended Drug Regimens for Surgical Prophylaxis in Adult Patients](#), and with the following additions: additional doses should be given during prolonged operations according to the half-life of the drug used. Surgical site skin preparation with chlorhexidine-alcohol should be used prior to incision.

- **ERAS[®] Society Recommendation:** Perioperative antibiotics are not indicated for short clean head and neck oncologic procedures. In clean-contaminated procedures, perioperative antibiotics should be given 1 hour prior to surgery and continued for 24 hours.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Prevention of post-operative nausea and vomiting (PONV)

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following addition: all patients need to be pre-operatively assessed for risk⁷ and provided with perioperative PONV prophylaxis accordingly⁸.

- **ERAS[®] Society Recommendation:** Patients undergoing head and neck cancer surgery should receive preoperative and intraoperative medications to mitigate postoperative nausea and/or vomiting. A combination of corticosteroid and antiemetic should be considered.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Standard anesthetic protocol

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following addition: patients must be spontaneously breathing at the end of the operative case⁹.

- **ERAS[®] Society Recommendation:** The anesthetic protocol should not only prevent awareness, but also minimize adverse effects and allow patients to awaken and recover rapidly; therefore, avoidance of too deep anesthesia, especially in elderly patients, is recommended.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Low
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Prevention of intra-operative hypothermia

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

Note: Pre-operative warming is recommended with a suitable warming device.

- **ERAS[®] Society Recommendation:** Normothermia should be maintained intraoperatively. Temperature monitoring is necessary to ensure normothermia is maintained.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Perioperative fluid management

ERASAlberta Recommendation: Very restrictive or liberal fluid regimes should be avoided in favor of euolemia. The use of advanced hemodynamic monitoring to facilitate individualized fluid therapy during the perioperative period should be considered, especially for high risk patients and patients for which significant intravascular volume loss is anticipated. Balanced crystalloid solutions are preferred to sodium chloride 0.9%. The enteral route for fluid post-operatively should be used as early as possible, and intravenous fluids should be discontinued as soon as clinically appropriate.

- **ERAS[®] Society Recommendation:** Fluids should be managed in a goal-directed manner, avoiding over and under hydration.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Moderate
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Routine post-operative intensive care admission

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following clarification: all patients should be assessed for the level of monitoring required and admitted to the appropriate care unit.

- **ERAS[®] Society Recommendation:** Routine intensive care unit admission to facilitate an immediate postoperative period of deep sedation and artificial respiration is not necessary. A subset of low-risk uncomplicated patients may be treated safely after recovery from anesthesia in a high dependency unit or specialist ward, provided adequate skilled nursing and medical coverage is provided.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Low
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Weak

Surgical site drains

ERASAlberta Recommendation: Site surgical drains may be clinically indicated but the use of prophylactic surgical site drains should be avoided. All drains should be removed when not clinically indicated to avoid further complications.

- **ERAS[®] Society Recommendation:** None
- **ERAS[®] Society Recommendation - Quality of Evidence:** N/A
- **ERAS[®] Society Recommendation - Strength of Recommendation:** N/A

Urinary drainage

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

- **ERAS[®] Society Recommendation:** Urinary catheters should be removed as soon as the patient is able to void, ideally less than 24 hours after completion of surgery.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High

- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Post-operative analgesia

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

Note: Acetaminophen is used within ERASAlberta.

- **ERAS[®] Society Recommendation:** Opioid-sparing, multimodal analgesia, utilizing nonsteroidal anti-inflammatory drugs (NSAID), cyclooxygenase (COX) inhibitors, and paracetamol, are preferred for patients undergoing head and neck cancer surgery. Patient-controlled analgesia can be considered if multimodal analgesia approaches are insufficient. No recommendation can be made on the role of additional nerve blocks.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Post-operative flap monitoring

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

- **ERAS[®] Society Recommendation:** Free flap monitoring should be performed at least hourly for the first 24 hours post-operatively. Monitoring should be continued for the duration of the patient's stay with tapering of intensity after the first 24 hours. Method of monitoring should include, at a minimum, clinical examination by staff experienced with free flap monitoring. Adjunct monitoring techniques should be considered.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Moderate
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Post-operative glucose control

ERASAlberta Recommendation: ERAS elements that reduce metabolic stress should be employed to reduce insulin resistance and the development of hyperglycemia. Insulin therapy to maintain normoglycemia is recommended, if applicable.

Note: The AHS Provincial Clinical Knowledge Topic: [Perioperative Management of Patients with Diabetes Mellitus, Adult – Inpatient](#) provides recommendations for patients with diabetes mellitus.

- **ERAS[®] Society Recommendation:** None
- **ERAS[®] Society Recommendation - Quality of Evidence:** N/A
- **ERAS[®] Society Recommendation - Strength of Recommendation:** N/A

Post-operative nutritional care

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following addition: when oral intake is tolerated, oral nutritional supplements (ONS) should be used to supplement total caloric and protein intake.

Note: Nutrition intake should be initiated post-operatively as soon as possible.

- **ERAS[®] Society Recommendation:** A standard polymeric enteral nutrition formula should be considered suitable for use in patients requiring postoperative nutrition support. There are insufficient data to provide a recommendation on the use of immunonutrition. Oral diet is the first choice for all patients tolerating it. In patients for whom oral feeding cannot be established postoperative tube feeding should be initiated

within 24 hours. Nutrition interventions should be developed in consultation with the multidisciplinary team and individualized according to nutritional status and surgical procedure.

- **ERAS[®] Society Recommendation - Quality of Evidence:** Enteral nutrition formula (Moderate), Oral diet (Moderate)
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Enteral nutrition formula (Conditional), Oral diet (Strong)

Early mobilization

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

- **ERAS[®] Society Recommendation:** Early mobilization, within the first 24 hours of surgery is recommended for patients undergoing major head and neck cancer surgery.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Moderate
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Post-operative wound care

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

- **ERAS[®] Society Recommendation:** Vacuum assisted closure is recommended for complex cervical wounds. Vacuum assisted closure may be considered for free flap donor site. Polyurethane film or hydrocolloid dressings should be used for skin graft donor site treatment.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Complex cervical wounds (High), Flap donor site (Moderate), Skin graft donor site (High)
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Complex cervical wounds (Strong), Flap donor site (Strong), Skin graft donor site (Strong)

Tracheostomy care

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below.

- **ERAS[®] Society Recommendation:** Decannulation after tracheostomy and stoma closure is recommended. Surgical closure of the tracheostomy site is recommended.
- **ERAS[®] Society Recommendation - Quality of Evidence:** Decannulation (High), Surgical closure (Moderate)
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Decannulation (Strong), Surgical closure (Strong)

Post-operative pulmonary physical therapy

ERASAlberta Recommendation: Same as the ERAS[®] Society recommendation below with the following clarification: pulmonary physical therapy includes assessment and treatment of airways and lungs by a physiotherapist to avoid pulmonary infections after intubation and tracheotomy.

- **ERAS[®] Society Recommendation:** Pulmonary physical therapy should be initiated as early as possible after head and neck reconstructions to avoid pulmonary complications.
- **ERAS[®] Society Recommendation - Quality of Evidence:** High
- **ERAS[®] Society Recommendation - Strength of Recommendation:** Strong

Audit outcomes and compliance

ERAS Alberta Recommendation: A systematic audit is essential to determine clinical outcomes and measure overall compliance with clinical recommendations. Reporting on patient experience and functional recovery using validated tools may also be useful. Using more evidence-based elements of perioperative care from an ERAS guideline are likely to improve outcomes further.

- **ERAS[®] Society Recommendation:** None
- **ERAS[®] Society Recommendation - Quality of Evidence:** N/A
- **ERAS[®] Society Recommendation - Strength of Recommendation:** N/A

Clinical Decision Support

The ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult - Inpatient Topic is intended to guide clinicians in enhancing surgical care for all patients who meet the inclusion criteria for the ERAS care pathway. The ERAS clinical knowledge and patient information contained within this Topic are intended to be used as a comprehensive package applied to a surgical care population. All recommendations should be applied to all eligible patients. The anticipated benefits of care management are reduced if the care pathway is applied selectively.

Clinical decision support tools relevant to the ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult - Inpatient care pathway include the following

[AHS Pre-Operative Fasting and Carbohydrate Loading Prior to Surgical Interventions - Adults Guideline](#)

[AHS Recommended Drug Regimens for Surgical Prophylaxis in Adult Patients](#)

AHS High Observation Guideline: Major Head and Neck Resection and Free Flap Reconstruction – *please see AHS internal website*

[AHS Safe Surgery Checklist](#)

[AHS Use of Aprepitant \(Emend[®]\) for Prevention of Postoperative Nausea and Vomiting \(PONV\) in Adults](#)

[AHS Venous Thromboembolism Prophylaxis Guideline](#)

AHS VTE Prophylaxis Weight-Band Table – *please see AHS internal website*

[Canadian Anesthesiologists' Society Guidelines to the Practice of Anesthesia - Revised Edition 2019⁶](#)

[Canadian Nutrition Screening Tool \(CNST\)](#)

[Choosing Wisely Canada: Drop the Pre-Op Toolkit](#)

[Choosing Wisely Canada: Recommendations and Resources, by Specialty](#)

[Consensus Guidelines for the Management of Postoperative Nausea and Vomiting⁸](#)

[Eating and Drinking Before Surgery: Patient Instructions](#)

Other important clinical information relevant to the ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult - Inpatient care pathway can be found in [References](#) and [Additional Information](#).

ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult – Inpatient Pre-operative Order Set

Order Set Components

Order Set Keywords: ERAS, Head and Neck, Pre-admission, Pre-operative, Surgery

Before Day of Procedure

Patient Teaching

- Teach: provide ERAS material and discuss perioperative patient goals
 - [Your Surgery Journey – Patient Guide](#)

Refer to [AHS Pre-Operative Fasting and Carbohydrate Loading Prior to Surgical Interventions - Adults Guideline](#). Refer to [MyHealth.Alberta.ca](#) for specific patient instructions.

- Teach: Eating and Drinking Before Surgery: Patient Instructions – *Non-Diabetic*

OR

Choose ONE:

- Teach: Eating and Drinking Before Surgery: Patient Instructions – *Non-Diabetic, Fasting Only*
- Teach: Eating and Drinking Before Surgery: Patient Instructions - *Diabetic*
- Instruct patient to hold _____ medication(s) _____ days prior to scheduled surgery

Consults and Referrals

- Clinical Communication: Notify Intensive Care Unit (ICU) with patient's surgery date
- Physician: Anesthesia
- Physician: Internal Medicine
- Clinical Nurse Specialist
- Registered Dietitian
- Social Work
- Speech Language Pathologist
- Multidisciplinary Head and Neck Clinic
- Institute for Reconstructive Science in Medicine (iRSM)

Laboratory Investigations

- Complete Blood Count (CBC) with differential

- PT INR
- PTT

- Creatinine/eGFR
- Electrolytes (Na, K, Cl, CO₂)
- Hemoglobin A1C: if not performed within last 3 months

- Type and Screen
- Red Blood Cells on Standby Request: _____ units Red Blood Cells

Diagnostic Investigations

- GR Chest, 2 Projections (Chest X-Ray PA and Lateral)
- CT Chest
- CT Head
- CT Soft Tissue Neck, Enhanced
- CT Angiogram, Bilateral Lower Extremities
- CT Angiogram, Carotid Study
- MR Head
- MR Soft Tissue Neck
- PET CT
- Electrocardiogram
- Pulmonary Function Test - Spirometry

Day of Procedure

Patient Care

Discuss Goals of Care with patient or alternate decision-maker and complete or update Goals of Care Designation. Refer to AHS Provincial Clinical Knowledge Topic: [Advance Care Planning and Goals of Care Designations, All Ages – All Locations](#).

- Apply sequential compression device (SCD)
- Apply forced-air warming device

Monitoring

- Vital Signs: AM of surgery
- Weight: AM of surgery
- Blood Glucose Monitoring Point of Care Testing (POCT): AM of surgery

Diet and Nutrition

Refer to [AHS Pre-Operative Fasting and Carbohydrate Loading Prior to Surgical Interventions - Adults Guideline](#).

The minimum duration of pre-operative fasting prior to the administration of anesthesia should be 8 hours after a meal that includes meat or fried or fatty foods, 6 hours after a light meal (such as toast and a clear fluid), 2 hours after clear fluids.⁶

Pre-operative eating and drinking

- Clinical Communication: Final snack 8 hours prior to scheduled surgery
- Clinical Communication: Clear fluids until 3 hours prior to scheduled surgery
- NPO 2 hours prior to scheduled surgery

Refer to AHS Provincial Clinical Knowledge Topic: [Perioperative Management of Patients with Diabetes Mellitus, Adult – Inpatient](#). The recommendation is to avoid carbohydrate loading³ patients with diabetes mellitus until prospective trials have been completed.

Clinicians should use independent medical judgement in the context of individual clinical circumstances and delete the following order if required.

Pre-operative carbohydrate loading

- Clear apple juice or cranberry cocktail (refer to [Appendix A](#)) 500 mL PO 3 hours prior to scheduled surgery. Must be consumed by 2 hours prior to scheduled surgery
 - If patient's admission is greater than 3 hours prior to scheduled surgery, provide carbohydrate load

- Assess and document last consumption of food and fluids (including carbohydrate load)

Intravenous Therapy

- Intravenous Cannula: insert intra-operatively

Medications

VTE Prophylaxis

Refer to AHS Provincial Clinical Knowledge Topic: [VTE Prophylaxis, Adult – Inpatient](#) (link to be added once available). For tinzaparin, refer to [AHS VTE Prophylaxis Weight-Band Table](#) (see AHS internal website) if patient has reduced renal function or is less than 40 kg or greater than 100 kg. For heparin, refer to [AHS Venous Thromboembolism Prophylaxis Guideline](#).

Choose ONE (note: tinzaparin is recommended):

- tinzaparin 3500 units SUBCUTANEOUSLY once pre-operatively
- heparin 5000 units SUBCUTANEOUSLY once pre-operatively

Antibiotic Prophylaxis

Antibiotics should be given within 60 minutes prior to incision.

Choose ONE option:

Option 1:

- ceFAZolin 2 g IV once pre-operatively
- AND**
- metroNIDAZOLE 500 mg IV once pre-operatively

Option 2 if patient has ceFAZolin allergy or severe non-IgE mediated reaction to any β -lactam:

- levofloxacin 500 mg IV once pre-operatively
- AND**
- metroNIDAZOLE 500 mg IV once pre-operatively

Analgesics

Consider dose reduction if patient is elderly.

- acetaminophen 975 to 1000 mg PO once pre-operatively, to be given 1 hour prior to surgery. Maximum of 4000 mg acetaminophen in 24 hours from all sources

- gabapentin 300 mg PO once pre-operatively, to be given 1 hour prior to surgery

Use caution if patient has renal impairment or is at high risk of acute kidney injury.

- ibuprofen 400 mg PO once pre-operatively, to be given 1 hour prior to surgery

OR

Use caution if patient has renal impairment or is at high risk of acute kidney injury. If patient has proven history of ulcers or complicated perforation, obstruction, or major bleeding choose celecoxib:

- celecoxib 400 mg PO once pre-operatively, to be given 1 hour prior to surgery

Antiemetics

If patient has 3 or 4 of the following risk factors for post-operative nausea and vomiting (PONV)⁸

- female gender
- non-smoker
- history of PONV or motion sickness
- post-operative use of opioids

AND patient meets one of the following criteria

- High risk of developing PONV within 24 hours after surgery AND history of being refractory to other antiemetic treatments
- Risk of medical sequelae of vomiting (i.e. jaw wiring, neurosurgery, upper gastrointestinal surgery)

Choose aprepitant:

- aprepitant 80 mg PO once pre-operatively, to be given 1 hour prior to surgery

Glycemic Management Medications

Refer to AHS Provincial Clinical Knowledge Topic: [Perioperative Management of Patients with Diabetes Mellitus, Adult – Inpatient](#).

ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult – Inpatient Intra-operative Guidance

Normothermia

- Operating Room temperature at least 20°C
- Monitor patient's temperature intra-operatively
- Use forced-air warming device for all procedures to achieve/maintain a temperature between 36°C to 38°C throughout the perioperative period
- Use fluid warmers for procedures in which greater than 1 litre fluid is expected to be administered

Post-operative Nausea and Vomiting (PONV) Prophylaxis

- Provide multimodal prophylaxis with consideration to patient's PONV risk score and administration of pre-operative PONV prophylaxis⁸

Pain Management

- Use opioids sparingly. If needed, short acting opioids are recommended. Long acting opioids should be avoided. Patients with pre-operative chronic pain may require additional assessment based on their Best Possible Medication History (BPMH). Consider non-opioid analgesia or appropriate opioid-sparing adjuncts

Additional Guidance

- Fluid therapy goal is to maintain euvoemia. If appropriate, use goal-directed fluid management to guide fluid therapy especially for high risk patients and for patients undergoing surgery with significant intravascular volume losses anticipated
- Use surgical site drains judiciously
- Ensure patient is spontaneously breathing at the end of the operative case⁹

ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult – Inpatient Post-operative Order Set

Order Set Components

Order Set Keywords: ERAS, Head and Neck, Intensive Care Unit (ICU), Post-operative, Surgery

Admit, Transfer, Discharge

- Admit to Patient Care Unit _____
- Admit to ICU
 - Anticipated Date of Transfer from ICU to Patient Care Unit on post-operative day (POD) 1: _____. Transfer from ICU to Patient Care Unit as per AHS High Observation Guideline: Major Head and Neck Resection and Free Flap Reconstruction (*see AHS internal website*)
- Anticipated Date of Discharge: _____

Patient Care

Discuss Goals of Care with patient or alternate decision-maker and update Goals of Care Designation, if applicable. Refer to AHS Provincial Clinical Knowledge Topic: [Advance Care Planning and Goals of Care Designations, All Ages – All Locations](#).

- Provide alternate form of communication at bedside if patient unable to speak
- Sequential compression device (SCD): discontinue when ambulating well

Refer to AHS Provincial Clinical Knowledge Topic: [Pressure Injury/Ulcer Prevention, Adult – Inpatient](#) (link to be added once available).

- Pressure Ulcer/Injury Prevention: as per AHS Pressure Injury/Ulcer Prevention Strategies (*see AHS internal website*)

Refer to AHS Provincial Clinical Knowledge Topic: [Alcohol Withdrawal, Adult – Inpatient](#)

- [Alcohol Withdrawal, Adult – Inpatient Orders](#)

Refer to AHS Provincial Clinical Knowledge Topic: [Delirium, Adult – Critical Care](#).

- Patient Delirium Management: as per local institutional practices
- Patient Safety Restraint: as per [AHS Restraint As A Last Resort – Acute Care Inpatient – Adult Procedure](#)

Monitoring

- Routine ICU Monitoring: monitor as per AHS High Observation Guideline: Major Head and Neck Resection and Free Flap Reconstruction (*see AHS internal website*)

- Notify Head and Neck physician if systolic BP less than 90 mmHg or greater than 180 mmHg
- Notify Head and Neck physician if MAP less than 60 mmHg or greater than 120 mmHg
- Vital Signs: assess
 - Every 1 hour x 24 hours post-operatively, **and then**
 - Every 2 hours x 24 hours, **and then**
 - Every 4 hours x 48 hours, **and then**
 - Every 8 hours until discharge
- Opioid Monitoring: monitor as per local institutional practices
- Pain Score and Nausea Score: assess at least every 4 hours x 3 days **and then** every 8 hours
- Neck Assessment: assess for neck edema and symmetry every 8 hours and PRN. Notify most responsible health practitioner if sudden or progressive edema
- Blood Glucose Monitoring Point of Care Testing (POCT): QID

- Surgical Flap Site: assess by two health care providers, at every transfer of patient care
- Surgical Flap Site: assess colour, pulses (Doppler signal), capillary refill
 - Every 1 hour x 48 hours, **and then**
 - Every 2 hours x 48 hours, **and then**
 - Every 4 hours x 48 hours, **and then**
 - Every 8 hours until discharge
 - Notify physician if any decreased circulation and/or Doppler signal changes
- Flap Donor Site: assess colour, pulses, capillary refill, temperature, movement and sensation
 - Every 4 hours until POD 7, **and then**
 - Discontinue on POD 8 unless otherwise indicated

Activity

- Head of Bed: elevate to at least 30 degrees while patient on enteral nutrition and/or opioids
- Patient Positioning: keep head in neutral and midline position to maintain neck alignment
- Range of Motion: perform active ankle dorsi-flexion and plantar flexion (10 times) every hour when awake (not for fibular flaps on flap side)
- Activity as tolerated
 - POD 0: when clinically appropriate, stand at bedside, up in chair; activity goal is to weight-bear
 - POD 1: stand at bedside, up in chair, walk to doorway and back; activity goal is 2 hours
 - POD 2 to discharge: up in chair, ambulate at least 3 times daily; activity goal is 6 hours

Weight-Bearing Status

- Full weight bearing with no restrictions
- Weight-bearing to affected leg as tolerated, no knee flexion greater than 30 degrees
- Weight-bearing to affected leg as tolerated with approved support device
- Non-weight bearing to affected leg

Activity Aids

- Splint: forearm in splint until POD 7
- Brace/Sling: arm in sling until POD 7

Intake and Output

- Intake and Output: include strict oral intake, monitor
 - Every 1 hour x 48 hours post-operatively, **and then**
 - Every 2 hours x 48 hours, **and then**
 - Every 4 hours x 48 hours, **and then**
 - Every 8 hours until discharge
- Notify most responsible health practitioner when urine output less than 30 mL/hour or greater than 300 mL/hour for 2 consecutive hours
- Indwelling Urinary Catheter: connect to urometer
- Indwelling Urinary Catheter: remove on or before POD 2
- In and Out Urinary Catheter: insert PRN for urinary retention once indwelling catheter removed
- Indwelling Urinary Catheter: insert PRN if in and out urinary catheter is required twice. Notify most responsible health practitioner
- Weight: assess daily x 5 days, start on POD 1. Notify most responsible health practitioner if weight gain is greater than 2 kg
- Active Surgical Drain(s): empty and reprime
 - Every 4 hours and PRN x 24 hours, **and then**
 - Every 8 hours and PRN
 - Discontinue in consultation with Head and Neck physician when clinically appropriate

Diet/Nutrition

For patients requiring enteral nutrition:

- NPO: start POD 0
- Enteral Feeding Tube (nasogastric tube) placement confirmed and ready for use
- Enteral Feeding Tube (nasogastric or gastrostomy) Care
 - Ensure tube sutures intact and/or tube secured with tube attachment device every 8 hours

Enteral Nutrition: Continuous Feed

Goal to initiate enteral nutrition within 24 hours post-operatively. Dietitian to manage all activities related to enteral nutrition in consultation with surgeon and speech language pathologist.

- Enteral Nutrition: initiate continuous feed; goal to start as soon as possible on POD 0
- Head of Bed: elevate to at least 30 degrees
- Isosource Fibre 1.0 HP start at 25 ml/hr, increase by 25 ml/hr every 4 hours for a goal rate of 50 ml/hr; to be reassessed by dietitian on morning of POD 1

Enteral Nutrition: Intermittent Bolus Feed

Transition to intermittent bolus feed is expected to occur on or before POD 4 and based on consultation with dietitian and surgeon.

Choose BOTH:

- Enteral Nutrition: initiate intermittent feed as per dietitian
- Head of Bed: elevate to 45 degrees and/or patient upright in chair for all bolus feeds. Patient to remain upright for 60 minutes post feed

Oral Nutrition

Transition to oral nutrition is expected to occur on or before POD 7 based on consultation with surgeon and speech language pathologist.

Choose ALL:

- Oral Nutrition: initiate as per most responsible health practitioner and speech language pathologist
- Clinical Communication: offer patient oral fluids; no caffeine
- Calorie Count: initiate once started on oral nutrition

Protein/Calorie Dense Oral Nutritional Supplements

Appropriate when patient is tolerating thin fluids and is on any type of oral diet including Gluten-free and Diabetic – Adult. Suitable for lactose intolerance but NOT appropriate for dairy allergy. Achieve a supplement intake of 600 kcal/day until discharge.

- Ensure Protein Max: 90 mL PO 5 times daily, until discharge

Diet/Nutrition

For patients tolerating oral nutrition:

Choose ALL:

- Clinical Communication: offer patient oral fluids; intake goal 500 mL on POD 0, no caffeine
- Post-Surgical Transition Diet: start on POD 0, no caffeine

Protein/Calorie Dense Oral Nutritional Supplements

Appropriate when patient is on any type of oral diet including Gluten-free and Diabetic – Adult. Suitable for lactose intolerance but NOT appropriate for dairy allergy. Achieve a supplement intake of 300 kcal/day on POD 0 and 600 kcal/day on POD 1 until discharge.

- Ensure Protein Max: 90 mL PO 3 times daily, start on POD 0 **and then** 90 mL PO 5 times daily, start on POD 1 until discharge

AND

Choose ONE:

- Regular Diet: start on POD 2, no caffeine
- Regular Diabetic - Adult Diet: start on POD 2, no caffeine

Wound Care

- Neck/Facial Incision
 - POD 0: Do not remove initial post-operative dressing, reinforce dressing PRN
 - POD 1: Cleanse with sodium chloride 0.9% and apply topical antibiotic ointment to incisions every 8 hours until sutures removed
 - POD 6: Remove facial sutures and cleanse with sodium chloride 0.9%, apply petrolatum dermatological base cream to incisions daily until discharge
 - POD 8: Remove neck sutures
 - bacitracin-gramicidin-polymyxin B 500 unit-0.25 mg-10 000 unit/g ointment, apply TOPICALLY to incisions every 8 hours until sutures removed, as per wound care order
- Oral Flap Site

- POD 0 to POD 5: Sodium chloride 0.9% oral rinse: 15 mL every 2 hours **and** PRN while awake; gently suction mouth using a soft catheter
- POD 6 to POD 12: Chlorhexidine gluconate 0.12% oral rinse: 15 mL SWISH AND SPIT BID
- POD 6 until discharge: Sodium chloride 0.9% oral rinse: 15 mL SWISH AND SPIT every 4 hours PRN **and** after any oral intake
- sodium chloride 0.9% oral rinse 15 mL every 2 hours **and** PRN while awake, gently suction mouth using a soft catheter; start on POD 0, stop after 6 days (POD 5)
- sodium chloride 0.9% oral rinse 15 mL SWISH AND SPIT every 4 hours PRN **and** after any oral intake, start on POD 6 until discharge
- chlorhexidine gluconate 0.12% oral rinse 15 mL SWISH AND SPIT BID; start on POD 6, stop after 7 days (POD 12)
- Flap Donor Site
 - POD 0 to POD 4: Do not remove initial post-operative dressing, reinforce dressing PRN
 - POD 5: Cleanse with sodium chloride 0.9% and apply non-adherent sterile dressing
 - POD 7: Remove alternating staples
 - POD 8: Remove remaining staples
- Flap Donor Site with negative-pressure wound therapy (NPWT) system
 - POD 0 to POD 6: Do not remove initial post-operative dressing, reinforce dressing PRN. Maintain continuous negative pressure of -75 mmHg
 - POD 7: Remove dressing. Cleanse with sodium chloride 0.9% and apply topical antibiotic ointment to incisions daily until discharge
 - bacitracin-gramicidin-polymyxin B 500 unit-0.25 mg-10 000 unit/g ointment, apply TOPICALLY to incisions daily, start on POD 7 until discharge, as per wound care order
- Skin Graft Donor Site with non-occlusive oil emulsion gauze dressing (Xeroform)
 - POD 0: Do not remove initial post-operative dressing, reinforce dressing PRN
 - POD 1: Remove initial outer dressing to expose non-occlusive dressing, assess and trim if needed
 - POD 3: Remove staples
- Skin Graft Donor Site with absorbent clear acrylic dressing (Tegaderm)
 - POD 0: Do not remove initial post-operative dressing
 - POD 7: Remove dressing and leave open to air
 - Active Surgical Drain(s) Care: assess and change dressing daily and PRN

Respiratory Care

Oxygen Therapy

- Oxygen Therapy: titrate to saturation, maintain SpO₂ greater than 92%
- Deep Breathing: perform every 1 hour while awake
- Incentive Spirometer: perform every 1 hour while awake

Tracheostomy Care

- Tracheostomy Care
 - Sterile procedures for 72 hours post-operative
 - Suture stoma after decannulation and apply occlusive dressing
- No circumferential ties around the neck
- Humidified Air: apply continuous humidified therapy via tracheostomy cradle

- Endobronchial Instillation: instill 2 mL sodium chloride 0.9% BID, start on POD 0

Laryngectomy Care

- Keep suture removal kit, flashlight, tongue depressor and scissors at bedside
- Laryngectomy Tube: respiratory therapist/resident assess and place appropriate size laryngectomy tube on POD 2

Laboratory Investigations

- Complete Blood Count (CBC) with differential, start on POD 1 in AM and repeat daily x 5 days **and then** every Monday, Wednesday, and Friday in AM until discharge
- PT INR, start on POD 1 in AM and repeat daily x 3 days **and then** once on POD 8 in AM
- PTT, start on POD 1 in AM and repeat daily x 3 days **and then** once on POD 8 in AM

- Creatinine, start on POD 1 in AM and repeat daily x 5 days **and then** every Monday, Wednesday, and Friday in AM until discharge
- Electrolytes (Na, K, Cl, CO₂), start on POD 1 in AM and repeat daily x 5 days **and then** every Monday, Wednesday, and Friday in AM until discharge
- Glucose Random, start on POD 1 in AM and repeat daily x 5 days **and then** every Monday, Wednesday, and Friday in AM until discharge
- Magnesium (Mg), start on POD 1 in AM and repeat daily x 5 days **and then** every Monday, Wednesday, and Friday in AM until discharge
- Phosphate, start on POD 1 in AM and repeat daily x 5 days **and then** every Monday, Wednesday, and Friday in AM until discharge

- Blood Gases Arterial (ABG) once on arrival to ICU **and then** every _____ hours until blood gas normalized

If patient has post-operative laryngectomy consider:

- PTH on POD 1 in AM
- Ionized Calcium, start on POD 0 at 1800 hours, repeat on POD 1 and POD 2 at 0600 hours and 1800 hours
- Ionized Calcium, start on POD 3 in AM and repeat daily x 5 days **and then** every Monday, Wednesday, and Friday in AM until discharge

Diagnostic Investigations

- Chest X-ray (CR Chest, 1 Projection): to confirm placement of nasogastric (NG) tube
- Barium Swallow (RF Esophagus, With Fluoroscopy) on: _____

Intravenous Therapy

For patients requiring enteral nutrition:

Choose BOTH:

- sodium chloride 0.9% lock when enteral goal achieved

When calculating total fluid intake (TFI), include ALL IV fluids, enteral nutrition and sterile water flushes.

- TFI (40 mL plus body weight [kg]) _____ mL/hour

AND

Choose ONE:

- PLASMA-LYTE infusion IV at _____ mL/hour (titrate IV fluid infusion as per TFI orders), lock when enteral nutrition goal achieved
- lactated ringer's infusion IV at _____ mL/hour (titrate IV fluid infusion as per TFI orders), lock when enteral nutrition goal achieved

For patients tolerating oral nutrition:

Choose BOTH:

- sodium chloride 0.9% lock when patient tolerating oral fluid intake
- lactated ringer's infusion IV at 50 mL/hour if patient **not** tolerating oral fluid intake, lock when patient tolerating oral fluid intake

Medications

- Notify Head and Neck physician if considering inotropic medications or blood transfusions

VTE Prophylaxis

Refer to AHS Provincial Clinical Knowledge Topic: VTE Prophylaxis, Adult – Inpatient (link to be added once available). Refer to AHS VTE Prophylaxis Weight-Band Table (see AHS internal website) if patient has reduced renal function or is less than 40 kg or greater than 100 kg. If patient is at increased risk of VTE (refer to [AHS Venous Thromboembolism Prophylaxis Guideline](#)) consider extended prophylaxis (up to 4 weeks post-discharge) with low molecular weight heparin (LMWH).

Choose ONE:

- tinzaparin 4500 units SUBCUTANEOUSLY once daily at _____ hours (hh mm), start on POD _____ until discharge
- tinzaparin 4500 units SUBCUTANEOUSLY once daily at _____ hours (hh mm), start on POD _____ and extend therapy for 28 days
 - Teach LMWH self-injection in preparation for discharge

Antibiotic Prophylaxis

Choose ONE option:

Option 1:

- ceFAZolin 1 g IV every 8 hours x 24 hours

AND

- metroNIDAZOLE 500 mg IV every 12 hours x 24 hours

Option 2 if patient has ceFAZolin allergy or severe non-IgE mediated reaction to any β -lactam:

- levofloxacin 500 mg IV once post-operatively

AND

- metroNIDAZOLE 500 mg IV every 12 hours x 24 hours

Antilulcer Agents and Acid Suppressants

- ranitidine 150 mg PO/NG BID, until discharge
- pantoprazole EC tab 40 mg PO daily before breakfast until discharge

Bowel Stimulation

- Notify most responsible health practitioner if no bowel movement for 5 days

Choose ONE:

- magnesium gluconate 1000 mg PO/NG BID, start on POD 1 and discontinue after first bowel movement
- magnesium hydroxide 30 mL PO/NG BID, start on POD 1 and discontinue after first bowel movement
- polyethylene glycol (PEG) 3350 powder 17 g PO/NG daily while on enteral nutrition **and then** polyethylene glycol (PEG) 3350 powder 17 g PO daily PRN if no bowel movement for ____ days

Analgesics

Consider non-opioid analgesia or appropriate opioid-sparing multimodal analgesia. If needed, short acting opioids are recommended. Long acting opioids should be avoided.

- Follow Anesthesia/Acute Pain Service orders for patient controlled analgesia (PCA)
- Follow Surgery orders for patient controlled analgesia (PCA)

Prophylaxis Analgesics

Consider dose reduction if patient is elderly.

- acetaminophen liquid 960 mg PO/NG every 6 hours x 72 hours **and then** acetaminophen liquid 960 mg PO/NG every 6 hours PRN for pain. Maximum of 4000 mg acetaminophen in 24 hours from all sources
- gabapentin liquid 200 mg PO/NG every 8 hours x 48 hours

Use caution if patient has renal impairment or is at high risk of acute kidney injury.

- ibuprofen liquid 400 mg PO/NG every 6 hours x 72 hours **and then** ibuprofen liquid 400 mg PO/NG every 6 hours PRN for pain

OR

Use caution if patient has renal impairment or is at high risk of acute kidney injury. If patient has proven history of ulcers or complicated perforation, obstruction, or major bleeding choose celecoxib:

- celecoxib 200 mg PO/NG every 12 hours for 48 hours **and then** celecoxib 200 mg PO/NG every 12 hours PRN for pain

PRN Oral Opioids (for pain not controlled by non-opioid analgesia)

Consider dose reduction if patient is elderly or opiate-naive.

- oxyCODONE 5 to 10 mg PO/NG every 4 hours PRN for pain not controlled by non-opioid analgesia

PRN Parenteral Opioids (for pain not controlled by oral opioids, or oral analgesia is contraindicated)

Consider dose reduction if patient is elderly or opiate-naive.

Choose ONE:

- morphine 1 to 10 mg IV/SUBCUTANEOUSLY every 4 hours PRN for pain not controlled by oral opioids
- HYDROmorphine 0.5 to 2 mg IV/SUBCUTANEOUSLY every 4 hours PRN for pain not controlled by oral opioids

Antiemetics⁸

Prophylaxis Antiemetics

Consider dose reduction if patient is elderly or has reduced renal function.
Choose ONE option:

Option 1:

Choose BOTH:

- ondansetron 8 mg PO/NG (or ODT if difficulty swallowing or active vomiting with no IV access) every 8 hours x 48 hours **and then** ondansetron 4 mg PO/NG every 8 hours PRN
- ondansetron 4 mg IV every 8 hours x 48 hours **and then** ondansetron 4 mg IV every 8 hours PRN if oral dose is **not** tolerated

Option 2:

- metoclopramide 10 mg PO/NG/IV/IM every 6 hours x 48 hours **and then** metoclopramide 10 mg PO/NG/IV/IM every 6 hours PRN

PRN Antiemetics

Consider dose reduction if patient is elderly or has reduced renal function.

PRN antiemetic agent must be from a different class than prophylaxis agent

- ondansetron 4 mg PO/NG/IV (or ODT if difficulty swallowing or active vomiting with no IV access) every 8 hours PRN. If nausea and vomiting persist after first PRN dose, notify prescriber
- metoclopramide 10 mg PO/NG/IV/IM every 6 hours PRN
- dimenhydrinate 25 to 50 mg PO/IV/IM every 4 hours PRN

Bronchodilator Therapy Medications

Bronchodilator therapy is indicated for patients with reactive airways or known asthma only.

- salbutamol 100 mcg MDI 2 puffs inhaled every 6 hours x 48 hours and every 4 hours PRN for bronchospasm, use with spacer
- ipratropium 20 mcg MDI 2 puffs inhaled every 6 hours x 48 hours and every 4 hours PRN for bronchospasm, use with spacer

Glycemic Management Medications

Refer to AHS Provincial Clinical Knowledge Topic: [Perioperative Management of Patients with Diabetes Mellitus, Adult – Inpatient](#).

Supplementary Medications

- thiamine 100 mg IV daily x 3 days
- folate 5 mg IV daily x 3 days
- multivitamins with minerals 1 tablet crushed PO/NG daily, start on POD 1 until discharge

Post-Laryngectomy Calcium Management Medications

If laryngectomy patient, maintain ionized calcium levels between 0.9 to 1.25 mmol/L. If ionized calcium is less than 0.9 mmol/L choose calcium chloride:

- calcium chloride 1 g IV in 100 mL sodium chloride 0.9% once PRN for ionized calcium level less than 0.9 mmol/L. Recheck ionized calcium level 1 hour after completion of infusion. Notify most responsible health practitioner if ionized calcium level remains less than 0.9 mmol/L
- calcium carbonate 1000 mg NG BID, start on POD 1

Patient Teaching

- Teach: oral hygiene self-care techniques
- Teach: breathing and coughing techniques
- Teach: effective swallowing techniques prior to oral nutrition intake
- Teach: enteral tube management
- Teach: tracheostomy care
- Teach: laryngectomy tube self-care

Consults and Referrals

- Discharge Coordinator
- Internal Medicine
- Occupational Therapy
- Physiotherapy
- Registered Dietitian
- Respiratory Therapy
- Social Work
- Speech Language Pathologist
- Transition Services

Rural Considerations

The ERAS clinical knowledge and patient information contained within each Topic are intended to be used as a comprehensive package to maximize the anticipated benefits of care management. Considerations for application of ERAS care pathways (developed for Breast Reconstruction, Colorectal, Cystectomy, Gynecologic Oncology, Liver, Major Gynecology, Major Head and Neck, and Pancreas surgery) in rural surgical facilities within Alberta include

- Surgical procedure criteria must be met (see the Rationale section in each ERAS Topic).
 - Adult patients scheduled for Breast Reconstruction, Colorectal, Cystectomy, Gynecologic Oncology, Liver, Major Gynecology, Major Head and Neck, or Pancreas surgery who do not meet the inclusion criteria for the ERAS care pathway may still be considered for applicable recommendations of that pathway (see the Recommendations section in each ERAS Topic)
 - Adult patients scheduled for any other type of surgery may be considered for the Enhanced Recovery for All Surgeries, Adult – Inpatient, Ambulatory care pathway
- Clinical expertise (e.g., surgeon, anesthesia and nursing), clinical support services (e.g., nutrition services, pharmacy, physiotherapy, laboratory, diagnostic imaging), and additional resources (e.g., medications, nutritional supplements, sequential compression devices, active warming devices) are available for the duration of clinical care from admission to discharge (see the Recommendations section in each ERAS Topic)
 - There must also be site physician and operations leadership, a site team focused on learning and collaboration, and processes and resources to audit outcomes and compliance

Disposition Planning

Discharge

Prior to patient discharge from the ERAS care pathway, the following should be considered

- Patient is medically stable

- Patient is functioning close to or at pre-operative level for activities of daily living
- Patient is passing gas or stool
- Patient is tolerating oral/enteral nutrition (as determined by physician, speech language pathologist and registered dietitian)
- Patient's pain is well controlled on oral analgesia
- Patient's nausea is well controlled with no vomiting
- Patient's incisions and/or wounds are healing and managed with appropriate wound care products
- Patient is able to manage tubes, drains, and/or self-injection, if appropriate

- Discharge medication list and prescription(s) have been provided to patient
- Nutrition instructions have been provided to patient
- Discharge teaching is complete and a copy has been provided to patient
 - Patient informed to avoid heavy lifting (greater than 10 lbs.) for six weeks
 - Review care of flap donor site/skin donor site/neck incision
 - Review care of negative-pressure wound therapy, if applicable
 - Review care of enteral feeding tube, if applicable
 - Review tracheostomy care, if applicable
- Transition Services/Home Care Services have been arranged, if required
- Wound care/negative-pressure wound therapy supplies arranged, if required
- Home Nutrition Support Program arranged, if required
- Tracheostomy supplies provided or arranged, if required

- Patient has been referred to the following education resources
 - [Your Surgery Journey – Patient Guide](#)
 - MyHealth.Alberta.ca
 - [Patient Care Webpages](#) including After Surgery and [Incision Care After Surgery](#)
 - [Patient Care Handouts](#) including Before and After Surgery - Adult - [What to Expect at Home](#)
 - [Patient Care Videos](#) including Before and After Surgery – [Preventing Problems After Surgery](#)

Outpatient follow-up

- Patient to follow up at the Head and Neck clinic as per surgeon's recommendation
- If applicable, patient to have stoma suture removed on POD 10 to 14

Analytics

Outcome Measure #1

Name of Measure	ERASAlberta coverage rate
Definition	Number of surgeries performed that were verified ERAS surgeries divided by the total surgeries performed that were eligible ERAS surgeries, multiplied by 100. Calculated provincially, by zone, by site.
Rationale	Intended to measure the ability of ERASAlberta to provide enhanced recovery after surgery.

Outcome Measure #2

Name of Measure	ERASAlberta length of stay (LOS) rates
Definition	<p>Number of surgeries performed that were verified ERAS surgeries and resulted in</p> <ul style="list-style-type: none"> • acute LOS less than or equal to acute LOS benchmark • ICU LOS less than or equal to ICU LOS benchmark • readmission LOS less than or equal to readmission LOS benchmark • total LOS less than or equal to total LOS benchmark <p>divided by the total surgeries performed that were verified ERAS surgeries, multiplied by 100. Calculated provincially, by zone, by site.</p>
Rationale	Demonstrates how ERAS impacts patient care by decreasing post-operative complications and accelerating recovery, thereby allowing for earlier discharge.

Outcome Measure #3

Name of Measure	ERASAlberta readmission rate
Definition	<p>Number of surgeries performed that were verified ERAS surgeries and resulted in greater than or equal to 1 unplanned readmission to acute care within 30 days of discharge date divided by the total surgeries performed that were verified ERAS surgeries, multiplied by 100. Calculated provincially, by zone, by site.</p>
Rationale	Demonstrates how ERAS impacts patient care by decreasing post-operative complications and accelerating recovery, thereby reducing the risk of readmission.

Outcome Measure #4

Name of Measure	ERASAlberta compliance rates
Definition	<p>Number of surgeries performed that were verified ERAS surgeries in which specific</p> <ul style="list-style-type: none"> • ERAS pre-operative care • ERAS intra-operative care • ERAS post-operative care <p>was provided in compliance with ERASAlberta recommendations divided by the total surgeries performed that were verified ERAS surgeries, multiplied by 100. Calculated by site.</p>
Rationale	Compliance with ERASAlberta recommendations is an indicator of the appropriateness of the ERAS care pathway in achieving desired patient outcomes.

References

1. Dort J, Farwell, G, Findlay M, et al. Optimal Perioperative Care in Major Head and Neck Cancer Surgery With Free Flap Reconstruction: A Consensus Review and Recommendations From the Enhanced Recovery After Surgery Society. *JAMA Otolaryngology Head Neck Surg.* 2017; 143(3): 292-303. doi: 10.1001/jamaoto.2016.2981
2. Scott MJ, Baldini G, Fearon KC, et al. Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 1: pathophysiological considerations. *Acta Anaesthesiol Scand.* 2015; 59(10):1212-31. doi: 10.1111/aas.12601
3. Feldheiser A, Aziz O, Baldini G, et al. Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 2: consensus statement for anaesthesia practice. *Acta Anaesthesiol Scand.* 2016; 60(3): 289-334. doi: 10.1111/aas.12651
4. Ljungqvist O, Scott M, Fearon KC. Enhanced Recovery After Surgery: A Review. *JAMA Surg.* 2017; 152(3): 292-298. doi: 10.1001/jamasurg.2016.4952
5. Guyatt GH, Oxman AD, Vist GE, et al; for the GRADE Working Group. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ.* 2008; 336(7650):924-926.
6. Dobson G, Chow L, Flexman A, et al. Guidelines to the Practice of Anesthesia – Revised Edition 2019. *Can J Anaesth.* 2019; 66(1): 75-108. doi: 10.1007/s12630-018-1248-2
7. Apfel CC, Greim CA, Haubitz I, et al. A risk score to predict the probability of postoperative vomiting in adults. *Acta Anaesthesiol Scand.* 1998; 42(5): 495-501
8. Gan TJ, Diemunsch P, Habib AS, et al. Consensus Guidelines for the Management of Postoperative Nausea and Vomiting. *Anesth Analg.* 2014; 118(1): 85-113. doi: 10.1213/ANE.0000000000000002
9. Barber B, Harris J, Shillington C, et al. Efficacy of a high-observation protocol in major head and neck cancer surgery: A prospective study. *Head Neck.* 2017; 39(8): 1689-1695. doi: 10.1002/hed.24599

Additional Information

AHS A Provincial Clinical Care Pathway for Major Head and Neck Cancer Surgery with Free Flap Reconstruction
(please see AHS internal website)

AHS Alcohol Withdrawal, Adult – Inpatient Orders
<https://www.albertahealthservices.ca/frm-21050.pdf>

AHS Enhanced Recovery after Surgery (ERAS)
www.ahs.ca/ERAS

ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult – Inpatient

AHS High Observation Guideline: Major Head and Neck Resection and Free Flap Reconstruction
(please see AHS internal website)

AHS Knowledge Resource Service ERAS Subject Guide: Surgery Subject Guide
<https://krs.libguides.com/surgery/eras>

AHS Pre-Operative Fasting and Carbohydrate Loading Prior to Surgical Interventions - Adults Guideline
<https://extranet.ahsnet.ca/teams/policydocuments/1/clp-ahs-preop-fasting-carb-load-hcs-237-01.pdf>

AHS Pressure Injury/Ulcer Prevention
(please see AHS internal website)

AHS Provincial Clinical Knowledge Topic: *Advance Care Planning and Goals of Care Designations, All Ages – All Locations*
<https://extranet.ahsnet.ca/teams/policydocuments/1/klink/et-klink-ckv-advance-care-planning-goals-of-care-designations-all-ages-all-locations.pdf>

AHS Provincial Clinical Knowledge Topic: *Alcohol Withdrawal, Adult – Inpatient*
<https://extranet.ahsnet.ca/teams/policydocuments/1/klink/et-klink-ckv-alcohol-withdrawal-adult-inpatient.pdf>

The AHS Provincial Clinical Knowledge Topic: *Perioperative Management of Patients with Diabetes Mellitus, Adult – Inpatient*
<https://extranet.ahsnet.ca/teams/policydocuments/1/klink/et-klink-ckv-perioperative-diabetes-guidelines-adult-inpatient.pdf>

AHS Provincial Clinical Knowledge Topic: *VTE Prophylaxis, Adult – Inpatient*
(link to be added once available)

AHS Recommended Drug Regimens for Surgical Prophylaxis in Adult Patients
<https://www.albertahealthservices.ca/assets/info/hp/as/if-hp-as-surgical-prophylaxis.pdf>

AHS Restraint As A Last Resort – Acute Care Inpatient – Adult
<https://extranet.ahsnet.ca/teams/policydocuments/1/clp-prov-restraint-ac-adult-176-04.pdf>

AHS Safe Surgery Checklist
<http://www.albertahealthservices.ca/assets/about/scn/ahs-scn-surg-ssc-checklist.pdf>

AHS Safe Surgery Checklist Policy

ERAS Major Head and Neck Cancer Surgery with Free Flap Reconstruction, Adult – Inpatient

<https://extranet.ahsnet.ca/teams/policydocuments/1/clp-safe-surgery-checklist-ps-04-policy.pdf>

AHS Use of Aprepitant (Emend®) for Prevention of Postoperative Nausea and Vomiting (PONV) in Adults

<https://www.albertahealthservices.ca/assets/Infofor/hp/if-hp-phys-aprepitant-emend-ponv-summary-statement.pdf>

AHS Venous Thromboembolism Prophylaxis Guideline

<https://extranet.ahsnet.ca/teams/policydocuments/1/clp-venous-thromboembolism-prophylaxis-ps-09-01-guideline.pdf>

AHS Venous Thromboembolism Prophylaxis Policy

<https://extranet.ahsnet.ca/teams/policydocuments/1/clp-venous-thromboembolism-prophylaxis-ps-09-policy.pdf>

AHS Weight-Band Dosing for Subcutaneous Tinzaparin or Enoxaparin for Venous Thromboembolism (VTE) Prophylaxis in Acute Care Adult Inpatients
(please see AHS VTE Prophylaxis Weight-Band Table on the AHS internal website)

Bugs & Drugs

<http://www.bugsanddrugs.org/>

Canadian Nutrition Screening Tool (CNST)

<http://nutritioncareincanada.ca/sites/default/uploads/files/CNST.pdf>

Choosing Wisely Canada Drop the Pre-Op Toolkit

<https://choosingwiselycanada.org/perspective/preop-toolkit/>

Choosing Wisely Canada Recommendations and Resources, by Specialty

<https://choosingwiselycanada.org/recommendations/>

Eating and Drinking Before Surgery: Patient Instructions

<https://myhealth.alberta.ca/alberta/Pages/Your-Surgery-Resources.aspx>

MyHealth.Alberta.ca Health Information and Tools, Patient Care Handouts

<https://myhealth.alberta.ca/health/aftercareinformation/Pages/default.aspx>

MyHealth.Alberta.ca Health Information and Tools, Surgery – Incision Care After Surgery

<https://myhealth.alberta.ca/health/pages/conditions.aspx?Hwid=tc4128spec>

MyHealth.Alberta.ca Health Information and Tools, Surgery – What to Expect

<https://myhealth.alberta.ca/health/Pages/conditions.aspx?hwid=tw9795>

MyHealth.Alberta.ca Patient Care Videos including Before and After Surgery: ERAS – Your Surgery Journey (videos 1 – 14)

<https://myhealth.alberta.ca/Alberta/Pages/learning-surgery-journey-video-series.aspx>

Safer Healthcare Now! Prevent Surgical Site Infections

<http://www.patientsafetyinstitute.ca/en/toolsResources/Documents/Interventions/Surgical%20Site%20Infection/SSI%20Getting%20Started%20Kit.pdf>

Your Surgery Journey – Patient Guide

<https://myhealth.alberta.ca/YourSurgeryJourney>

Appendix A – ERAS Nutrition Working Group Consensus: Juice as Carbohydrate Loading Products

Drawing from the best practices around the world, ERAS has been implemented in Alberta to enhance perioperative patient care, support patient recovery and reduce health care costs. Carbohydrate (CHO) loading is one of about 24 ERAS protocol elements and is an integral part of the preoperative care process^{1, 2}. The main purpose is to attenuate postoperative insulin resistance, which contributes to negative nitrogen balance, leading to muscle mass loss and reduced muscle strength.¹⁻⁶ In addition, CHO loading hinders preoperative stress, hunger and thirst in surgical patients.^{1, 2, 7, 8} According to ERAS guidelines, CHO loading involves ingestion of clear fluids that contain complex CHOs, mostly of maltodextrins. These products have been extensively researched and are recommended for preoperative use by the ERAS guidelines.⁹⁻¹⁹

ERAS and The European Society of Anaesthesiology Guidelines recommend the ingestion of CHO-rich beverages that are specifically developed for preoperative consumption up to two hours before surgery.^{1, 2, 9-20} No specific guidelines are given regarding the type and/or brand of products to be used; however, it is suggested that not all CHOs are safe.²⁰ Gastric emptying is the major concern preoperatively, therefore beverages with lower osmolality assumed to be safer for preoperative consumption.²¹ In addition, it was suggested that the insulin response to the beverage should reach 60 µIU/mL to achieve appropriate fed state that is believed to improve postoperative insulin resistance.^{2, 21} All research that has been done involve only commercial products. The preoperative CHO loading product most often studied is Nutricia Preop® that contains 12.5% CHO from maltodextrin and has low osmolality (260 mOsm/kg H₂O) to induce faster gastric emptying.²² Nutricia Preop®, is in liquid form and is only available in Europe.²²

PREcovery™ is a new CHO-containing product commercially available in Canada that contains 12.5% CHO from maltodextrin and has low osmolality (114 mOsmol/kgH₂O).²³ Although it is a potential commercial product that can be used for ERAS, more studies are needed to explore the effectiveness of PREcovery™. As well, this product is in powder form and needs to be mixed with 400 mL of water²³, which may lessen the practicality of using this product for ERAS. Decisions will need to be made on access and availability of the product, who will prepare the product, the process of preparing this product for patient safety and who will cover the product's cost.

Because of the limited availability and research of commercial CHO-containing products in Canada, the ERAS Nutrition Working Group (WG) continues to recommend the use of apple juice and cranberry cocktail juice. Although there are no published studies on the safety of juice as a preoperative CHO-loading product, no adverse effects have been reported on using juice for this purpose since ERAS was first implemented in Alberta in 2013. As well, based on an ERAS nutrition and environmental scan, Canadian sites using juice as the ERAS preoperative CHO-loading product reported no adverse effects.

The ERAS Nutrition WG recommendation continues to be based on the following criteria: availability, palatability, clinical considerations, volume needed, ease and process of administration, cost of product, infection control and simplicity (for patient use and nurses and physicians to discuss with and teach patients). Juice meets most of the beverage criteria as it is conveniently available and palatable, can be used at home or in hospital for minimal cost compared to CHO-containing products, is already pre-packaged, simple to consume, and easy for physicians and health professionals to discuss with and teach patient as part of ERAS preoperative teaching. However, this WG's consensus may be updated once new research and products that meet the criteria are available.

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