

# Cancer PERI-OP v2.0: Post-Operative

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### Inclusion Criteria

- Pre-op and post-op patients with *presumed* and confirmed non-hematogenous malignancy requiring inpatient admission (Surgical or Hematology/Oncology service)
  - With or without chemotherapy exposure
  - Any size resection, including biopsy

### Exclusion Criteria

- Neutropenia (ANC <500 cells/mm<sup>3</sup>)
- Outpatient surgical procedures
- Central line insertions only
- Neurosurgery patients
- Confirmed leukemia or lymphoma

!

[Use of NSAIDs post-operatively is not recommended for most patients](#)

!

[Scheduled acetaminophen can be used post-operatively](#)

### Post Operative Management

#### IV Fluids

- Initiate [Maintenance IV Fluids Pathway](#) or other IV Fluid orders, as indicated

#### Labs

- Labs (post-op Day 1): Electrolytes, BUN/Creatinine, CBC
- Other labs as determined by surgical team

#### Nutrition

- Consult Nutrition if likely to be NPO for >7 days

#### Medications

- Anti-emetics
- Home medications, as needed
- Bowel regimen

#### Pain Medications

- [Acetaminophen scheduled](#)
- Other post-op pain management per Pain Service

#### Other

- Vitals & I/Os
- GOC: Venous Thromboembolism (VTE) Prophylaxis (13843) (*for SCH only*)

#### Consults

- Pain Service [if PCA ordered for patient <10 years of age and/or presence of neuroaxial or regional catheter]
- Other services, as needed (e.g. Nutrition, PT/OT, etc.)

#### Equipment

- Wheelchair/walker
- Continuous Passive Motion (CPM)
- Orthotics/prosthetics

!

[Continuation of antibiotic prophylaxis post-operatively is not recommended](#)

### Post Op Procedure?

Examples: chest tube removal, drain removal, dressing changes

—YES—

### Post-Op Procedure Pain Management

- Consult Child Life, if appropriate
- Consider anxiolytics and/or analgesics (e.g. topical anesthetics, non-opioids, and opioids) for patients with a past history of procedural anxiety
- Consult Pain Service if history of pain related anxiety or pain related issue

NO

### Post Op Fever?

—YES—

Go to Fever Management

NO

### Discharge Criteria

- No increased incision redness or pain
- Pain controlled without IV meds >4 hours
- Pain score <3 for last 4 hours
- Maintaining hydration orally/enterally
- Tolerates diet without emesis for 4 hours
- Urine output 1mL/kg/hour if <2 years, output 0.5mL/kg/hour ≥2 years
- Appropriate follow-up arranged
- Prescriptions available for pick-up
- Patient education provided

### Patient Discharge Instructions

- Follow-up with surgical sub-specialty
- Follow-up with HemOnc
- Call or return to ED for
  - Fever
  - Wound issues
  - Pain
- Medications (analgesia, anti-emetics, bowel regimen)
- Outpatient ambulatory follow-up (Pain clinic, PT, OT, Nutrition)
- Activities



# Cancer PERI-OP v2.0:

## Post-Operative Tumor Resection Fever Management

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### Inclusion Criteria

- Pre-op and post-op patients with *presumed* and confirmed non-hematogenous malignancy requiring inpatient admission (Surgical or Hematology/Oncology service)
  - With or without chemotherapy exposure
  - Any size resection, including biopsy

### Exclusion Criteria

- Neutropenia (ANC <200 cells/mm<sup>3</sup>) see [HemOnc BMT Suspected Infection \(HOBSI\) pathway](#)
- Outpatient surgical procedures
- Central line insertions only
- Neurosurgery or liver transplant patients
- Confirmed leukemia or lymphoma

### Fever Definition

- Temp ≥ 38.3° C once
- OR
- Temp ≥ 38° C for > 1 hour

### Treat fever

- Use [acetaminophen](#) for fever management after cultures and temperature have been obtained.
- [Non-steroidal anti-inflammatory drugs \(NSAIDs\) are CONTRAINDICATED.](#)
- No rectal temperatures

Signs of Sepsis?

—YES—

Off Pathway

Put patient on [Septic Shock Pathway](#)

NO

### Workup for infection

- CBC + Diff
- Other diagnostics based on symptoms and physical exam (see blue box to left)
- If central line, add blood cultures

ANC < 200 cells/mm<sup>3</sup>?

—YES—

Off Pathway

Put patient on [HOBSI Pathway](#)

NO

### Recommendations for empiric antibiotics

- For post-op head, neck, or abdominal surgery, use ampicillin/sulbactam (clindamycin if allergic to penicillin)
- Otherwise start cefazolin for empiric coverage
- Do not delay first dose for any diagnostic evaluations with the exception of blood cultures
- Discontinue other perioperative antibiotics

Cultures positive?

NO

—YES—

### Discontinue Antibiotics

- For patients with orthopedic implants/grafts, discuss discontinuation with attending
- Otherwise, discontinue after cultures are negative at 36 hours

### Definitive Antibiotic Treatment

- Consider ID consult
- Tailor antibiotic therapy to the narrowest effective agent for an appropriate duration based on positive cultures identified or other diagnostic evidence of infection
- For CLABSI, see [Central Line Infection Pathway](#)

### Other Diagnostics and Interventions to Consider

- Urinalysis and culture
- Rapid respiratory viral panel if symptoms
- Sputum culture if productive cough
- Wound culture if drainage present
- Chest X-ray if clinical findings suspicious of pneumonia
- Lower extremity doppler if deep venous thrombosis suspected (e.g. swelling, calf tenderness)
- Consider removing foreign bodies (e.g. Foley catheters, epidural catheters) as soon as feasible in the setting of fever

! If antibiotics continued >36 hours consider ID consult

# NSAIDs and Scheduled Acetaminophen

## NSAIDs

The patients included in this pathway will be those having a possible diagnosis of a malignancy and will be undergoing a surgical procedure. The expectation is that these patients will need medications to provide post-operative analgesia.

NSAIDs are not recommended for this patient population as they have anticoagulative properties that may increase bleeding and antipyretic properties that may mask fevers. It is however recognized that some patients may benefit from these medications – such discussions should be made jointly with Hem/Onc, Pain Team, and the Surgical Service.

## Acetaminophen

The patients included in this pathway will be those having a possible diagnosis of a malignancy and will be undergoing a surgical procedure. The expectation is that these patients will need medications to provide post-operative analgesia.

Acetaminophen until recently has been limited in us for patients less than 1 year of age and for only the first 24 hours post procedure to try to reduce the use of narcotics. However, it is recognized that this reduction of narcotics is important and so the use of acetaminophen is now being expanded to include all ages with no set duration. Further, while providing analgesia, it is known to also be an antipyretic medication and so to avoid masking a fever, a temperature needs to be taken prior to administration of this medication. If there is a fever, please initiate the fever phase of this Powerplan.

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# Post-Op Antibiotics Recommendations

## **Recommendations:**

- Antibiotic prophylaxis is not recommended beyond standard pre- and intra-operative dosing for patients undergoing surgical procedures. (Guideline)
- Prolonged antibiotic prophylaxis is not recommended for patients with a surgical drain in place. (Guideline)

## **Evidence Synthesis:**

In a large meta-analysis of 69 RCTs and over 21,000 patients, there was no significant difference in the incidence of post-operative surgical site infections in patients who received a prolonged postoperative antibiotic course versus those who received a single dose of antibiotics [LOE: moderate quality; (National Guideline Clearinghouse, 2016)].

The same guideline panel reviewed 7 RCTs that addressed the role of prolonged antibiotic prophylaxis in patients with surgical drains in place and showed that there was no benefit in terms of reducing surgical site infections when compared to patients who received a single dose pre-operatively [LOE: low quality; (National Guideline Clearinghouse, 2016)].

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# Why is fever management different for patients who have been treated with chemotherapy?

Patients with malignancy and who have surgery are a unique group.

Hematology/Oncology Bloodstream Infection (HOBSSI) Definition:  
Fever (Temp  $\geq 38.3^{\circ}\text{C}$ , or greater than  $38^{\circ}\text{C}$  for more than 1 hour)

It is known that chemotherapy can have an inhibitory effect on antibacterial, antiviral, and antimycotic immune responses. The surgical oncology patient, although not usually neutropenic at the time of surgery, is likely immunosuppressed owing to prior chemotherapies. Pediatric oncology patients therefore may be at a higher risk than the general population to acquire an infection in the postoperative period. This risk is compounded by several factors: a lower baseline performance status, malnourishment, altered gastrointestinal mucosa, lengthy and complicated surgeries, indwelling central venous catheters (CVC), and gastrointestinal tubes. Special consideration needs to be taken when caring for surgical oncology patients. LOE: [E (Expert Opinion), (*Hendershot, et al. 2009*)]

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# Cancer PERI-OP Approval and Citation

Approved by the CSW Cancer PERI- OP team for May 4, 2023

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Retrieval Website: <https://www.seattlechildrens.org/pdf/cancer-peri-op-pathway.pdf>

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Available from: <https://www.seattlechildrens.org/pdf/cancer-peri-op-pathway.pdf>

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## Summary of Version Changes

- **Version 1.0 (6/26/2018):** Created Cancer Pre-Op Phase and Post-Op Plan to algorithm and updated the Post-Op Tumor Resection Fever Management algorithm, including it as a phase of the Cancer PERI-OP Pathway and PowerPlan. Also, implemented a Cancer Pre-Op Checklist Plan to initiate a PowerForm Checklist, which creates a post-op plan for Surgery, Pain, PASS/Anesthesia, HemOnc, and Orthopedics.
- **Version 2.0 (5/4/2023):** Removed "plan" or "phase" from page headers; updated formatting including bullets and indentations; removed reference to preop checklists; reformatted postoperative page so time sequence of steps flows from top to bottom; added link to house-wide VTE prophylaxis guidance; added headers to boxes on postoperative page; simplified workflow on fever page, added reference to other pathways, and updated recommendations for empiric antibiotics.

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## Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor Seattle Children's Healthcare System nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

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## Evidence Ratings

This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children's. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94.):

Quality ratings are *downgraded* if studies:

- Have serious limitations
- Have inconsistent results
- If evidence does not directly address clinical questions
- If estimates are imprecise OR
- If it is felt that there is substantial publication bias

Quality ratings are *upgraded* if it is felt that:

- The effect size is large
- If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
- If a dose-response gradient is evident

Guideline – Recommendation is from a published guideline that used methodology deemed acceptable by the team.

Expert Opinion – Our expert opinion is based on available evidence that does not meet GRADE criteria (for example, case-control studies).

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# Bibliography

## Literature Search Strategy

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian, Susan Groshong. Searches were performed in July, 2017, in the following databases – on the Ovid platform: Medline, Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials; elsewhere: Embase, National Guideline Clearinghouse, TRIP and Cinnati Children’s Evidence-Based Recommendations. Additional searches were completed in CINAHL, Nursing+ and RNAO Best Practice Guidelines for one clinical question. In Medline and Embase, appropriate Medical Subject Headings (MeSH) and Emtree headings were used respectively, along with text words, and the search strategy was adapted for other databases using text words. Concepts searched were antibiotic prophylaxis, postoperative fever etiology and diagnosis, use of antipyretics and NSAIDs for chemotherapy patients, procedural pain analgesic and distraction therapies, and parenteral nutrition. Retrieval was limited to 2007 to current, ages 0-18, English language and to certain evidence categories, such as relevant publication types, index terms for study types and other similar limits. The search was broadened to human (no age limits) for one clinical question. Additional articles were identified by team members and added to results.

### Identification

1123 records identified  
through database searching

2 additional records identified  
through other sources

### Screening

1039 records after duplicates removed

1039 records screened

1003 records excluded

### Eligibility

36 records assessed for eligibility

23 full-text articles excluded,  
8 did not answer clinical question  
15 did not meet quality threshold

### Included

13 studies included in pathway

Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535

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