



## ANTIBIOTIC PROPHYLAXIS FOR SURGERY GUIDELINE

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### BACKGROUND

The goal of antibiotic surgical prophylaxis is to ensure adequate serum and tissue levels of the drug at the time of incision, and for the duration of surgery. Optimal dosing, timing of the first dose, and redosing to maintain adequate level during the procedure are more important than administration after the operation. Consensus guidelines recommend that prophylactic antibiotics should only be used for clean-contaminated procedures and for clean procedures where there is an implantation of a foreign body. In addition, CDC guideline recommends against administration of post-operative antibiotic doses in clean and clean-contaminated procedures, even in the presence of a drain. The American College of Surgeons guidelines to prevent SSIs recommend discontinuing surgical antibiotic prophylaxis after surgical incision closure.

### PROCEDURE

1. Documentation of antimicrobial administration must include date, time of administration, name of medication, dose, and route of administration. Do not abbreviate name of medication and do not use unapproved abbreviations.
2. Patients presented with appendicitis who received either cefoxitin or ceftriaxone in the ED should receive another preop cefoxitin dose prior to incision if 2hr or 12hr has passed since the last dose, respectively.
3. Antibiotic prophylaxis for surgery is given **within one hour prior to surgical incision** except for Vancomycin, which is given **within two hours prior to surgical incision**.
4. Intra-operative re-dosing is necessary during procedures that exceed two half-lives of the drug to maintain adequate serum and tissue concentrations. Redosing interval should be measured from time of administration of preoperative dose.
5. All parenteral antibiotics listed in this guideline may be infused as indicated in Table 1. *Please note, it is strongly recommended that vancomycin be administered over a minimum of 60 minutes and that all pre-operative antibiotics are completely infused before start of procedure.*
6. If a tourniquet is to be used in the procedure, the entire dose of antibiotic must be infused prior to tourniquet inflation.
7. In clean and clean contaminated procedures, high-quality evidence suggests that additional prophylactic antibiotic doses are not needed after the surgical incision is closed in the OR even in the presence of a drain. For all other procedures, antibiotic prophylaxis must be discontinued within 24 hours of surgical end time. Use of antibiotics beyond the recommended post-operative duration requires proper documentation of infection or suspected infection.
8. Vancomycin use requires documentation of the reason for use in the medical record by the prescribing physician or his (her) designee. Reasons for use include:
  - a. Beta-lactam (penicillin or cephalosporin) allergy
  - b. Known Methicillin resistant *Staphylococcus aureus* (MRSA) colonization or infection or high risk for MRSA (i.e. recent inpatient hospitalization, resides in an extended care facility/group home, receives dialysis)

**Table 1. Dosing and Timing of Antibiotic Agents used for Surgical Prophylaxis**

<b>ANTIBIOTIC AGENT</b>	<b>PEDIATRIC INTRAVENOUS DOSE (ADULT DOSE)</b>	<b>INFUSION TIME (MINUTES)</b>	<b>TIMING OF FIRST DOSE</b>	<b>INTRAOPERATIVE REDOSING FOR NORMAL RENAL FUNCTION</b>
<b>Ampicillin/Sulbactam</b>	50 mg/kg (2 gm) of ampicillin component	30	Begin 60 min or less before incision	Every 2 hrs
<b>Cefazolin</b>	30 mg/kg (2 gm, 3 gm for pts ≥ 120 kg)	30	Begin 60 min or less before incision	Every 4 hrs
<b>Cefoxitin</b>	40 mg/kg (2 gm)	30	Begin 60 min or less before incision	Every 2 hrs
<b>Cefepime</b>	50 mg/kg (2 gm)	30	Begin 60 min or less before incision	Every 4 hrs
<b>Clindamycin</b>	10 mg/kg (900 mg)	30	Begin 60 min or less before incision	Every 6 hrs
<b>Gentamicin</b>	2.5 mg/kg [based on dosing weight] (5 mg/kg [based on dosing weight] as a single dose)	30	Begin 60 min or less before incision	Every 8 hrs
<b>Metronidazole</b>	15 mg/kg (500mg)	30	Begin 60 min or less before incision	Every 6 hrs
<b>Vancomycin</b>	15 mg/kg (15 mg/kg)	60	Begin 120 min or less before incision	Every 6 hrs

**Table 2. Recommended Intravenous Antibiotics for Surgical Procedures**

PROCEDURE	COMMON PATHOGENS	RECOMMENDED ANTIBIOTIC PROPHYLAXIS	POST OPERATIVE DURATION
<b>CARDIAC</b> Heart surgery+, PDA (patent ductus arteriosus), ASD/VSD (atrial/ventricular septal defect), Glenn Shunt, valve repair/replacement, Aortic reconstruction, prosthetic graft insertion	<i>S. epidermidis</i> , <i>S. aureus</i>	<b>Cefazolin</b> OR <b>Vancomycin</b> <sup>^</sup>	
<b>GASTROINTESTINAL</b> <b>Esophageal, gastroduodenal</b> PEG placement/revision/ conversion to other feeding tubes OR high-risk conditions	Enteric gram-negative bacilli, gram positive cocci	For high risk+++: <b>Cefazolin</b> If major reaction to beta-lactams++: <b>Clindamycin plus Gentamicin</b>	No additional antibiotic doses are needed for clean, clean-contaminated procedures, even in presence of a drain
<b>Biliary, including lap cholecystectomy</b>	Enteric gram-negative bacilli, gram positive	For high risk*: <b>Cefazolin</b> If major reaction to beta-lactam++: <b>Clindamycin plus Gentamicin</b>	
<b>Colorectal**</b> Appendectomy or ruptured viscus	Enteric gram negative bacilli, anaerobes, enterococci	<b>Cefoxitin</b> OR <b>Ceftriaxone plus Metronidazole</b> If major reaction to beta-lactams++: <b>Clindamycin plus Gentamicin</b>	
<b>HEAD and NECK SURGERY</b> Incision through oral or pharyngeal mucosa, lower jaw fraction, removal of esophagus pouch	Anaerobes, enteric gram-negative bacilli, <i>S. aureus</i>	<b>Cefazolin</b> OR If major reaction to beta-lactams++: <b>Clindamycin plus Gentamicin</b>	
<b>NEUROSURGERY##</b> Craniotomy, shunt placement/revision, insertion of pump/reservoir, spinal procedure (laminectomy, fusion or cord decompression)	<i>S. aureus</i> , <i>S. epidermidis</i>	<b>Cefazolin</b> OR <b>Vancomycin</b> <sup>^</sup>	For other procedures, discontinue within 24 hrs of surgical end time
<b>ORTHOPEDIC</b> Spinal procedures or implantation of hardware. Give dose before tourniquet inflation	<i>S. epidermidis</i> , <i>S. aureus</i>	<b>Cefazolin</b> or <b>Cefepime</b> and <b>Vancomycin</b> <sup>^</sup>	
<b>THORACIC</b> Lung resection, VATS	<i>S. aureus</i> , <i>S. epidermidis</i> , streptococci, enteric gram-negative	<b>Cefazolin</b> OR <b>Vancomycin</b> <sup>^</sup> or <b>Clindamycin</b>	
<b>VASCULAR</b> (see Cardiac) Extremity amputation for ischemia, vascular access for hemodialysis	<i>S. aureus</i> , <i>S. epidermidis</i> , enteric gram-negative bacilli	<b>Cefazolin</b> OR <b>Vancomycin</b> <sup>^</sup> OR <b>Clindamycin</b>	No additional antibiotic doses

<b>GYNECOLOGIC<sup>^</sup></b>	Enteric gram-negative bacilli, anaerobes, Gp B strep, enterococci	<b>Cefazolin OR Ampicillin plus Metronidazole plus Gentamicin</b> If major reaction to beta-lactam++: <b>Clindamycin plus Gentamicin</b>  For high risk only***: <b>Cefazolin OR Ampicillin plus Metronidazole plus Gentamicin</b> If major reaction to beta-lactam++: <b>Clindamycin plus Gentamicin</b>	are needed for clean, clean-contaminated procedures, even in presence of a drain  For other procedures, discontinue within <b>24 hrs</b> of surgical end
<b>GENITOURINARY<sup>^</sup></b> Bladder augmentation, pyeloplasty	Enteric gram-negative bacilli, anaerobes, enterococci		

- <sup>^</sup> for known MRSA or high risk for MRSA, or major reaction to beta- lactams  
+For open-heart surgery only: use maximum cefazolin 2 gm; redose cefazolin when patient is removed from bypass; alternative to cefazolin monotherapy is cefazolin plus vancomycin for patients at high risk for MRSA. (procedure involves insertion of prosthetic valve or vascular graft).  
++Major reactions include anaphylaxis, hives, shortness of breath, wheezing, edema. For minor reactions (nausea, vomiting, diarrhea, mild rash, itching), cephalosporins may still be used.  
+++High risk gastroduodenal: morbid obesity, esophageal obstruction, decreased gastric acidity or decreased gastrointestinal motility  
\*High risk biliary: acute cholecystitis, non-functioning gall bladder, obstructive jaundice or common duct stones  
\*\*Colorectal procedures: Oral prophylaxis prior to surgery - After appropriate diet and catharsis, 1 gram of neomycin plus 1 gram of erythromycin at 1 pm, 2 pm, and 11 pm or 2 grams of neomycin plus 2 grams of metronidazole at 7 pm and 11pm the day before an 8 am day operation  
\*\*\*High risk genitourinary: urine culture positive or unavailable, preoperative catheter, transrectal prosthetic biopsy, placement of prosthetic material  
##Vascular procedures: Clostridia can also be present in lower extremity amputation for ischemia.  
<sup>^</sup> Consider cefoxitin for anaerobic coverage

## REFERENCES

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