Bugs & Drugs
RECOMMENDED DRUG REGIMENS FOR SURGICAL PROPHYLAXIS IN ADULT PATIENTS

GENERAL PRINCIPLES

1. The goal of antimicrobial surgical prophylaxis is to achieve serum and tissue antibiotic concentrations that exceed the minimum inhibitory concentrations (MICs) of the majority of organisms likely to be encountered, at the time of the incision and for the duration of the procedure. To achieve this:
   a. Preoperative doses should be given within 60 minutes before incision. For exceptions and administration details, see Table 1.
   b. Intraoperative repeat dosing is recommended if prolonged surgical procedure (> 2 half-lives of the antimicrobial), or major blood loss (> 1.5L). See Table 2 for redosing interval.

2. Recommended adult doses for patients with normal weight and renal function. Refer to Table 1 for more information.

3. **CEPHALOSPORIN ALLERGY/SEVERE PENICILLIN ALLERGY** – the patient is considered to have a true allergy if they have at least one of: respiratory difficulty, hypotension, or hives. In the absence of these findings, cefazolin can be used as surgical prophylaxis.

4. **Postoperative doses for prophylaxis are not routinely indicated**. If the surgery is contaminated, it should be indicated that the postoperative antibiotic orders are for treatment.

5. The practice of continuing antimicrobials started as prophylaxis until all drains/catheters are removed cannot be supported due to lack of evidence, the development of drug-resistant organisms, superinfections, and drug toxicity.

6. For patients with known methicillin resistant S. aureus (MRSA) colonization or infection, consider adding vancomycin to the surgical prophylaxis regimen for cardiac, spinal, and orthopedic procedures involving implantation: complex fractures / fractures with internal fixation, joint arthroplasties. Vancomycin alone is less effective than cefazolin for preventing surgical site infections due to methicillin susceptible S. aureus (MSSA).

7. The safety and efficacy of topical antimicrobials* (irrigations, pastes, washes) have not been established, except for ophthalmic procedures, therefore routine use of topical antimicrobials is not recommended in any other surgical procedure. * This does not include topical antiseptics, e.g. chlorhexidine, isopropyl alcohol.

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Table 1: Pre-Op Antibiotic Administration

Timely administration (within 60 minutes before initial skin incision) of antibiotic prophylaxis can significantly decrease the incidence of postoperative infections. The goal is to achieve optimal serum and tissue antibiotic concentrations at the time of the initial skin incision and for the duration of the procedure. To best achieve this, antibiotics can be given in the operating room (OR) by the anaesthetist at induction of anaesthesia, but depending on the circumstances of the procedure may also be given in the holding area, or on the patient care unit if prolonged infusion is necessary. Administering antibiotics "on call to the OR" is not recommended as it often results in suboptimal antibiotic concentrations due to surgery schedule changes or transport delays.

Prophylactic Antibiotic	Recommended Adult Dose	Recommended Administration
Cefazolin	2g*	IV push
Cefuroxime	1.5g	IV push
Ceftriaxone	1-2g	IV push
Ciprofloxacin PO	500mg	Administer 1-2 hours pre-op
Clindamycin	600mg	Administer over 30 minutes just prior to procedure
Co-trimoxazole PO	1 DS tablet	Administer 1-2 hours pre-op
Gentamicin	1.5mg/kg** or 5mg/kg**	Administer over 30 minutes just prior to procedure Administer over 60 minutes just prior to procedure
Metronidazole	500mg	Administer over 20 minutes just prior to procedure
Vancomycin	15mg/kg***	Administer ≤1g over at least 60 minutes, > 1g- 1.5g over at least 90 minutes, and > 1.5g over 120 minutes just prior to procedure

* For adult patients with total body weight ≥ 120kg, cefazolin 3g IV is recommended by IDSA guidelines[1] but is based on expert opinion. Available evidence suggests 3g is not necessary regardless of body mass index (BMI).[2]

** Use 5mg/kg single pre-op dose if: post-op doses are indicated to provide ~24 hours of antimicrobial prophylaxis, or anticipated duration of surgery is greater than 5 hours. Gentamicin dose should be based on ideal body weight (IBW), or dosing weight (DW) if patient's actual body weight is > 20% above IBW, rounded to the nearest 20mg.

*** Vancomycin dose should be based on total body weight, rounded to the nearest 250mg and to a maximum of 2g/dose.

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Table 2: Intraoperative Antibiotic Administration

Intraoperative repeat dosing is recommended if:

- prolonged surgical procedure (> 2 half-lives of the antimicrobial), or
- major blood loss (> 1.5L).

Prophylactic Antibiotic	Recommended intraoperative redosing interval (from time of administration of pre-op dose):
Cefazolin	q4h
Cefuroxime	q4h
Clindamycin	q4h
Metronidazole	q8h
Vancomycin	q8h

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GENERAL			
Gastroesophageal endoscopy			
Low risk		**Prophylaxis not routinely indicated**	
High risk: • **esophageal dilatation** • **variceal sclerotherapy**		• cefazolin 2g IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose
Gastroduodenal surgery **Duodenal/gastric resections for ulcers/ cancer** **Percutaneous endoscopic gastrostomy (PEG)** **Perforated ulcer procedures** **Pancreatic duodenectomy** **Bariatric surgical procedures** (gastric bypass, gastric banding, gastroplasty, biliopancreatic diversion) **Gastroplasty** – *high risk only: gastric outlet obstruction, decreased gastric acidity or motility, morbid obesity, hemorrhage*	• Enterobacteriaceae • Gram positive cocci	• cefazolin 2g IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose

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GENERAL			
Hepatobiliary surgery **High risk***: open cholecystectomy, emergency laparoscopic cholecyst-ectomy, insertion of prosthetic device, acute cholecystitis, biliary obstruction, obstructive jaundice or common bile duct stones, non-functioning gallbladder, recent (within 1 month) biliary surgery, > 70 yrs old, diabetes, pregnancy, immunosuppression* **ERCP** *if biliary obstruction or known pancreatic pseudocyst* **Liver resection**	• Enterobacteriaceae • Enterococcus spp • Clostridium spp • Streptococcus spp • Staphylococcus spp	• cefazolin 2g IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose or • gentamicin 1.5mg/kg IV + metronidazole 500mg IV x 1 dose
Low risk: • elective laparoscopic cholecystectomy • liver biopsy		**Prophylaxis not routinely indicated**	
Bowel surgery Small intestine - nonobstructed	• Enterobacteriaceae	• cefazolin 2g IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose

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GENERAL			
Bowel surgery **Elective colorectal surgery** **Appendectomy** **Emergency bowel surgery** **Bowel obstruction** **Fistulas/Discontinuous bowel segments**	• Enterobacteriaceae • Anaerobes	• cefazolin 2g IV + metronidazole 500mg IV x 1 dose or if increased risk of resistance, such as E. coli cefazolin susceptibility < 80%, patient hospitalized ≥ 3 days, antibiotic therapy in last 6 months, recent international travel, consider: • ceftriaxone 2g IV + metronidazole 500mg IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose or • gentamicin 1.5mg/kg IV + metronidazole 500mg IV x 1 dose
Perforated viscus, gangrene, peritonitis, or abscess *Institute treatment rather than prophylaxis (considered contaminated)*	• Enterobacteriaceae • Anaerobes • Enterococcus spp	See Adult Empiric Therapy Recommendations - Peritonitis	

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GENERAL			
Anal surgery **Low risk:** • fissurectomy • fistulectomy/fistulotomy • hemorrhoidectomy-ligation/banding • sphincterotomy	• Enterobacteriaceae • Anaerobes	**Prophylaxis not routinely indicated**	
High risk: • sphincteroplasty • rectovaginal fistula closure/repair • proctocolectomy		• cefazolin 2g IV + metronidazole 500mg IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose or • gentamicin 1.5mg/kg IV + metronidazole 500mg IV x 1 dose
Herniorrhaphy (suture repair) **Hernioplasty (mesh insertion)**	• S. aureus • Coagulase negative staphylococcus (CoNS) • Streptococcus spp	• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose

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OBSTETRICAL/GYNECOLOGICAL			
Therapeutic termination of pregnancy	• Enterobacteriaceae • Anaerobes • Group B Streptococci • Enterococcus spp	• doxycycline 100mg PO 1h pre-op + 200mg PO 1/2 h post-op or • azithromycin 1g PO x 1 dose pre-op	
Caesarean section *elective* *non-elective*	• Enterobacteriaceae • Anaerobes • Group B Streptococci • Enterococcus spp	• cefazolin 2g IV x 1 dose NB: Dosing prior to skin incision more effective than dosing after cord clamping.	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose
Hysterectomy *abdominal* *laparoscopic* *vaginal*	• Enterobacteriaceae • Anaerobes • Group B Streptococci • Enterococcus spp	• cefazolin 2g IV +/- metronidazole 500mg IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose or • gentamicin 1.5mg/kg IV + metronidazole 500mg IV x 1 dose
Endometrial ablation		**Prophylaxis not routinely indicated**	
Dilatation and curettage • postpartum • menorrhagia		**Prophylaxis not routinely indicated**	
Laparoscopic procedures that do not enter uterus and/or vagina		**Prophylaxis not routinely indicated**	

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UROLOGY			
Note: If positive urine culture, institute treatment according to culture and susceptibility results.			
Open or laparoscopic procedures • entry into urinary tract • entry into vagina • percutaneous renal surgery	• Enterobacteriaceae • Enterococcus spp • Staphylococcus spp • Streptococcus spp	• cefazolin 2g IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose
Open or laparoscopic procedures • placement of prosthetic material	• Enterobacteriaceae • Enterococcus spp • Staphylococcus spp • Streptococcus spp	• cefazolin 2g IV ± gentamicin 1.5mg/kg IV x 1 dose	• vancomycin 15mg/kg IV + gentamicin 1.5mg/kg IV x 1 dose
Adrenalectomy **Nephrectomy**	• S. aureus • Streptococcus spp	• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose

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UROLOGY			
Note: If positive urine culture, institute treatment according to culture and susceptibility results.			
Cystoscopy **Urethral dilatation**	• Enterobacteriaceae • Pseudomonas spp • Enterococcus spp		
Low risk		**Prophylaxis not routinely indicated**	
High risk: • prolonged indwelling catheter • neutropenia		Oral regimens: (give 1-2 h pre-op) • ciprofloxacin 500mg PO or • co-trimoxazole 1 DS tablet PO or Parenteral regimens: • cefazolin 2g IV x 1 dose or if increased risk of resistance, such as E. coli cefazolin susceptibility < 80%, patient hospitalized ≥ 3 days, antibiotic therapy in last 6 months, recent international travel, consider: • ceftriaxone 1g IV x 1 dose	Oral regimens: (give 1-2 h pre-op) • ciprofloxacin 500mg PO or • co-trimoxazole 1 DS tablet PO or Parenteral regimen: • gentamicin 1.5mg/kg IV x 1 dose

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UROLOGY			
Note: If positive urine culture, institute treatment according to culture and susceptibility results.			
Shock-wave lithotripsy, no risk factors	• Enterobacteriaceae • Pseudomonas spp • Enterococcus spp	**Prophylaxis not routinely indicated**	
Shock-wave lithotripsy with risk factors: • advanced age • anatomical abnormalities of urinary tract • immunodeficiency/chronic corticosteroid use • prolonged hospitalization • externalized catheter • poor nutritional status • smoking • prolonged indwelling catheter **Ureteroscopy**	• Enterobacteriaceae • Pseudomonas spp • Enterococcus spp	Oral regimens: (give 1-2 h pre-op) • ciprofloxacin 500mg PO or • co-trimoxazole 1 DS tablet PO or Parenteral regimens: • cefazolin 2g IV x 1 dose or if increased risk of resistance, such as E. coli cefazolin susceptibility < 80%, patient hospitalized ≥ 3 days, antibiotic therapy in last 6 months, recent international travel, consider: • ceftriaxone 1g IV x 1 dose	Oral regimens: (give 1-2 h pre-op) • ciprofloxacin 500mg PO or • co-trimoxazole 1 DS tablet PO or Parenteral regimen: • gentamicin 1.5mg/kg IV x 1 dose

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UROLOGY			
Note: If positive urine culture, institute treatment according to culture and susceptibility results.			
Transrectal prostatic biopsy **Prostatectomy:** - transurethral (TURP) - perineal - suprapubic	• Enterobacteriaceae • Pseudomonas spp • Enterococcus spp	Oral regimens: (give 1-2 h pre-op) • ciprofloxacin 500mg PO x 1 dose or • co-trimoxazole 1 DS tablet PO x 1 dose If risk factors (antibiotic therapy in last 6 months, diabetes mellitus, chronic obstructive pulmonary disease, recent international travel, recent hospitalization, healthcare worker, previous sepsis following prostate biopsy), consider adding: • ceftriaxone 1g IV x 1 dose or • gentamicin 1.5mg/kg IV x 1 dose	Oral regimens: (give 1-2 h pre-op) • ciprofloxacin 500mg PO x 1 dose or • co-trimoxazole 1 DS tablet PO x 1 dose If risk factors (antibiotic therapy in last 6 months, diabetes mellitus, chronic obstructive pulmonary disease, recent international travel, recent hospitalization, healthcare worker, previous sepsis following prostate biopsy), consider adding: • gentamicin 1.5mg/kg IV x 1 dose
Ileal conduit/urinary diversion **Cystectomy** **Radical prostatectomy**	• Enterobacteriaceae • Anaerobes • Staphylococcus spp • Streptococcus spp	• cefazolin 2g IV + metronidazole 500mg IV x 1 dose	• gentamicin 1.5mg/kg IV + clindamycin 600mg IV x 1 dose
Vasectomy		**Prophylaxis not routinely indicated**	

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CARDIAC			
- Preoperative assessment of nasal culture for S. aureus carriage should be considered. • If nasal S. aureus (MSSA or MRSA) carrier, suggest intranasal mupirocin 2% bid-tid for 3-5 days prior to surgery. **NB:** No evidence of benefit if not nasal S. aureus carrier. - The safety and efficacy of topical antibiotics applied to the sternum has not been established and is currently not recommended. - For patients with known MRSA colonization or infection, consider adding vancomycin to surgical prophylaxis regimen.			
Open heart surgery **Prosthetic valve** **Coronary artery bypass** **Other open heart surgery**	• S. aureus • Coagulase negative staphylococcus (CoNS) • Corynebacterium spp • Enterobacteriaceae	• cefazolin 2g IV pre-op + 2g IV q8h x 24h post-op	• vancomycin 15mg/kg IV pre-op + 15mg/kg IV q12h x 24h post-op • If patient hospitalized ≥ 3 days prior to surgery, or saphenous vein procedure, add gentamicin 5mg/kg IV pre-op x 1 dose
Placement of electrophysiologic devices (e.g. pacemaker, implantable cardioverter-defibrillator (ICD), ventricular assist devices, ventriculoatrial shunts, arterial patches)	• S. aureus • Coagulase negative staphylococcus (CoNS) • P. acnes	• cefazolin 2g IV x 1 dose	• vancomycin 15mg/kg IV x 1 dose
Cardiac catheterization including angioplasty +/- stenting **Transesophageal echocardiogram**		**Prophylaxis not routinely indicated**	

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THORACIC			
Esophageal resection	• S. aureus • Coagulase negative staphylococcus (CoNS) • Streptococcus spp • Enterobacteriaceae • Oral anaerobes	Pre-op: • cefazolin 2g IV + metronidazole 500mg IV Post-op: • cefazolin 2g IV q8h + metronidazole 500mg IV q12h x 24h	Pre-op: • clindamycin 600mg IV + gentamicin 5mg/kg IV x 1 dose Post-op: • clindamycin 600mg IV q8h x 24h
Pneumonectomy **Lobectomy, complete or partial** **Thoracotomy** **Thorascopy, including video-assisted thorascopic surgery (VATS)**	• S. aureus • Coagulase negative staphylococcus (CoNS) • Streptococcus spp • Enterobacteriaceae • Oral anaerobes	Pre-op: • cefazolin 2g IV or • cefuroxime 1.5g IV Post-op: • cefazolin 2g IV q8h until chest tubes removed to maximum of 24h or • cefuroxime 1.5g IV q8h until chest tubes removed to maximum of 24h	Pre-op: • [vancomycin 15mg/kg IV or clindamycin 600mg IV] +/- gentamicin* 5mg/kg IV x 1 dose Post-op: • vancomycin 15mg/kg IV q12h or clindamycin 600mg IV q8h until chest tubes removed to maximum of 24h * Consider adding gentamicin if: • patient hospitalized ≥ 3 days prior to surgery. • chronic obstructive pulmonary disease with Gram negative colonization.

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THORACIC			
Chest tube insertion for spontaneous pneumothorax **Thoracentesis**		**Prophylaxis not routinely indicated**	
Closed chest tube insertion for chest trauma with hemo/pneumothorax	• S. aureus • Streptococcus spp • Enterobacteriaceae	Pre-op: • cefazolin 2g IV Post-op (OPTIONAL): • cefazolin 2g IV q8h to maximum of 24h	Pre-op: • clindamycin 600mg IV +/- gentamicin 5mg/kg IV x 1 dose Post-op (OPTIONAL): • clindamycin 600mg IV q8h to maximum of 24h

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VASCULAR			
Arterial surgery involving the abdominal aorta or a groin incision	• S. aureus • Coagulase negative staphylococcus (CoNS) • Enterobacteriaceae	Pre-op: • cefazolin 2g IV Post-op (OPTIONAL): • cefazolin 2g IV q8h to maximum of 24h	Pre-op: • clindamycin 600mg IV + gentamicin 5mg/kg IV x 1 dose or • vancomycin 15mg/kg IV + gentamicin 5mg/kg IV x 1 dose Post-op (OPTIONAL): • clindamycin 600mg IV q8h to maximum of 24h or • vancomycin 15mg/kg IV q12h to maximum of 24h
Arterial surgery involving placement of prosthetic material	• S. aureus • Coagulase negative staphylococcus (CoNS) • Enterobacteriaceae	Pre-op: • cefazolin 2g IV Post-op (OPTIONAL): • cefazolin 2g IV q8h to maximum of 24h	Pre-op: • clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose Post-op (OPTIONAL): • clindamycin 600mg IV q8h to maximum of 24h or • vancomycin 15mg/kg IV q12h to maximum of 24h

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VASCULAR			
Carotid endarterectomy **Brachial artery repair** **Endovascular stenting** **Low risk**	• S. aureus • Coagulase negative staphylococcus (CoNS)	**Prophylaxis not routinely indicated**	
High risk: • Placement of prosthetic material		• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose
Renal access procedures • native AV fistula		Optional: • cefazolin 2g IV x 1 dose	Optional: • vancomycin 15mg/kg IV x 1 dose or • clindamycin 600mg IV x 1 dose
• artificial AV graft		Pre-op: • cefazolin 2g IV x 1 dose NB: 1. Post-op dose not required if creatinine clearance <10 mL/min. 2. If on continuous renal replacement therapy give one post-op dose of cefazolin 2g IV 12 hours after pre-op dose. 3. If intermittent hemodialysis planned within 24 hours post procedure, give cefazolin 2g IV post hemodialysis.	Pre-op: • vancomycin 15mg/kg IV x 1 dose NB: Post-op vancomycin dose not required generally. or Pre-op: • clindamycin 600mg IV x 1 dose Post-op: • clindamycin 600mg IV q8h x 2 doses. NB: Clindamycin does not require dose adjustment for renal dysfunction.
Peritoneal dialysis • catheter placement		• cefazolin 2g IV x 1 dose	• vancomycin 15mg/kg IV x 1 dose or • clindamycin 600mg IV x 1 dose

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PLASTICS			
Clean procedures **Low risk:** • dermatologic • facial bone fracture • tumor excision • simple rhinoplasty/ septoplasty • simple lacerations • flexor tendon injury • hand surgery	• S. aureus • Streptococcus spp	**Prophylaxis not routinely indicated**	
High risk: • placement of prosthetic material • skin irradiation • procedures below waist		• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose
Clean-contaminated procedures • involving contaminated skin/mucosa/intertriginous areas (oral cavity, upper respiratory tract, axilla, groin, perineum) • wedge excision lip/ear • flaps on nose/head/neck • grafts	• S. aureus • Streptococcus spp • Enterobacteriaceae • P. aeruginosa	• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose

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PLASTICS			
Breast surgery **Low risk:** • reduction & simple reconstructive (no prosthetic material) mammoplasty	• S. aureus • Coagulase negative staphylococcus (CoNS) • Streptococcus spp	**Prophylaxis not routinely indicated**	
High risk: • placement of prosthetic material • morbid obesity (>100kg) • breast cancer procedures (axillary lymph node dissection, primary nonreconstructive surgery) • skin irradiation		• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose
Autologous breast reconstruction • deep inferior epigastric perforators (DIEP) flap • transverse rectus-abdominus myocutaneous (TRAM) flap	• S. aureus • Coagulase negative staphylococcus (CoNS) • Streptococcus spp	• cefazolin 2g IV pre-op x 1 dose +/- • cefazolin 2g IV q8h to maximum of 24h post-op	• clindamycin 600mg IV pre-op x 1 dose +/- • clindamycin 600mg IV q8h to maximum of 24h post-op or • vancomycin 15mg/kg IV pre-op x 1 dose +/- • vancomycin 15mg/kg IV q12h to maximum of 24h post-op

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PLASTICS			
Reconstructive surgery **Tissue flaps** **Panniculectomy**	• S. aureus • Streptococcus spp	• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose
Reconstructive limb surgery **Traumatic/crush hand injuries**	• S. aureus • Streptococcus spp • Enterobacteriaceae • Anaerobes	• cefazolin 2g IV pre-op x 1 dose +/- • cefazolin 2g IV q8h to maximum of 24h post-op	• clindamycin 600mg IV pre-op x 1 dose +/- • clindamycin 600mg IV q8h to maximum of 24h post-op or • vancomycin 15mg/kg IV pre-op x 1 dose +/- • vancomycin 15mg/kg IV q12h to maximum of 24h post-op If contamination suspected, consider adding: • gentamicin 5mg/kg IV pre-op x 1 dose to above regimens

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PLASTICS			
Carpal tunnel **Low risk**	• S. aureus • Streptococcus spp	**Prophylaxis not routinely indicated**	
High risk: • morbid obesity (> 100kg) • immunocompromised		• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose

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ORTHOPEDIC			
Diagnostic or operative arthroscopy		**Prophylaxis not routinely indicated**	
Fractures with internal fixation (nails, plates, screws, wires)	• S. aureus • Coagulase negative staphylococcus (CoNS) • Streptococcus spp • Enterobacteriaceae	- For patients with <u>known</u> MRSA colonization or infection, <u>add</u> vancomycin to surgical prophylaxis regimen.	
		• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose
Joint replacement - hip - knee - elbow - ankle - shoulder	• S. aureus • Coagulase negative staphylococcus (CoNS)	- Preoperative assessment of nasal culture for S. aureus carriage should be considered. • If nasal S. aureus (MSSA or MRSA) carrier, suggest intranasal mupirocin 2% bid-tid for 3-5 days prior to surgery. **NB:** No evidence of benefit if not nasal S. aureus carrier. - For patients with <u>known</u> MRSA colonization or infection, <u>add</u> vancomycin to surgical prophylaxis regimen. - Insufficient evidence to routinely recommend use of antibiotic-impregnated bone cement in primary arthroplasties.	
		• cefazolin 2g IV pre-op +/- 2g IV q8h to maximum of 24h post-op	• clindamycin 600mg IV pre-op +/- 600mg IV q8h to maximum of 24h post-op or • vancomycin 15mg/kg IV pre-op +/- 15mg/kg IV q12h to maximum of 24h post-op

Bugs & Drugs
RECOMMENDED DRUG REGIMENS FOR SURGICAL PROPHYLAXIS IN ADULT PATIENTS

SURGERY	COMMON PATHOGENS	REGIMEN(S) OF CHOICE (See General Principles)	ALTERNATIVE REGIMENS FOR CEPHALOSPORIN ALLERGY or SEVERE PENICILLIN ALLERGY/ ANAPHYLAXIS (See General Principles)
ORTHOPEDIC			
Fractures, complex (open)	• S. aureus • Coagulase negative staphylococcus (CoNS) • Enterobacteriaceae	- For patients with known MRSA colonization or infection, add vancomycin to surgical prophylaxis regimen.	
		• cefazolin 2g IV pre-op + 2g IV q8h x 24-48h post-op	• clindamycin 600mg IV pre-op + 600mg IV q8h x 24-48h post-op or • vancomycin 15mg/kg IV pre-op + 15mg/kg IV q12h x 24-48h post-op If heavily soiled/contaminated (Grade III), add: • gentamicin 5mg/kg IV pre-op x 1 dose
Amputation of lower limb	• S. aureus • Coagulase negative staphylococcus (CoNS) • Enterobacteriaceae • Clostridium spp	• cefazolin 2g IV +/- metronidazole 500mg IV x 1 dose	• clindamycin 600mg IV + gentamicin 1.5mg/kg IV x 1 dose
Fasciotomy	• S. aureus • Streptococcus spp	• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose or • vancomycin 15mg/kg IV x 1 dose

Bugs & Drugs
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SURGERY	COMMON PATHOGENS	REGIMEN(S) OF CHOICE (See General Principles)	ALTERNATIVE REGIMENS FOR CEPHALOSPORIN ALLERGY or SEVERE PENICILLIN ALLERGY/ ANAPHYLAXIS (See General Principles)
SPINAL SURGERY			
- Preoperative assessment of nasal culture for S. aureus carriage should be considered. • If nasal S. aureus (MSSA or MRSA) carrier, suggest intranasal mupirocin 2% bid-tid for 3-5 days prior to surgery. **NB:** No evidence of benefit if not nasal S. aureus carrier. - For patients with known MRSA colonization or infection, add vancomycin to surgical prophylaxis regimen.			
Laminectomy **Microdiscectomy**	• S. aureus • Coagulase negative staphylococcus (CoNS)	• cefazolin 2g IV x 1 dose	• vancomycin 15mg/kg IV x 1 dose
Spinal fusion **Insertion of foreign material**	• S. aureus • Coagulase negative staphylococcus (CoNS)	• cefazolin 2g IV pre-op +/- 2g IV q8h to maximum of 24h post-op	• vancomycin 15mg/kg IV pre-op +/- vancomycin 15mg/kg IV q12h to maximum of 24h post-op

RECOMMENDED DRUG REGIMENS FOR SURGICAL PROPHYLAXIS IN ADULT PATIENTS

SURGERY	COMMON PATHOGENS	REGIMEN(S) OF CHOICE (See General Principles)	ALTERNATIVE REGIMENS FOR CEPHALOSPORIN ALLERGY or SEVERE PENICILLIN ALLERGY/ ANAPHYLAXIS (See General Principles)
NEUROSURGERY			
Craniotomy **Stereotactic brain biopsy/procedure**	• S. aureus • Coagulase negative staphylococcus (CoNS)	• cefazolin 2g IV x 1 dose	• vancomycin 15mg/kg IV x 1 dose
Cerebrospinal fluid shunting operations NB: Antimicrobial-impregnated devices are not recommended.	• S. aureus • Coagulase negative staphylococcus (CoNS)	• cefazolin 2g IV x 1 dose	• vancomycin 15mg/kg IV x 1 dose
External ventricular drain (EVD) **Intracranial pressure (ICP) monitor** NB: Evidence for antibiotic prophylaxis inconclusive. Antimicrobial-coated EVD catheters not recommended.	• S. aureus • Coagulase negative staphylococcus (CoNS)	• cefazolin 2g IV x 1 dose pre-insertion	• vancomycin 15mg/kg IV x 1 dose pre-insertion
Contaminated procedures • compound skull fractures • open scalp lacerations • CSF fistulae		**Institute treatment rather than prophylaxis**	

RECOMMENDED DRUG REGIMENS FOR SURGICAL PROPHYLAXIS IN ADULT PATIENTS

SURGERY	COMMON PATHOGENS	REGIMEN(S) OF CHOICE (See General Principles)	ALTERNATIVE REGIMENS FOR CEPHALOSPORIN ALLERGY or SEVERE PENICILLIN ALLERGY/ ANAPHYLAXIS (See General Principles)
HEAD AND NECK SURGERY			
Clean procedures (no incision through oral/ nasal/pharyngeal mucosa, no insertion of prosthetic material) e.g. Thyroidectomy, Lymph node excision and/or **Low risk, e.g.** • Septoplasty • Tonsillectomy • Adenoidectomy • Tympanoplasty/ear surgery • Mastoidectomy	• S. aureus • Streptococcus spp • Oral anaerobes	**Prophylaxis not routinely indicated**	
High risk: • Insertion of prosthetic material		• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose

Bugs & Drugs
RECOMMENDED DRUG REGIMENS FOR SURGICAL PROPHYLAXIS IN ADULT PATIENTS

SURGERY	COMMON PATHOGENS	REGIMEN(S) OF CHOICE (See General Principles)	ALTERNATIVE REGIMENS FOR CEPHALOSPORIN ALLERGY or SEVERE PENICILLIN ALLERGY/ ANAPHYLAXIS (See General Principles)
HEAD AND NECK SURGERY			
Clean contaminated procedures with incision through oral/nasal/ pharyngeal mucosa **Low risk**	• S. aureus • Streptococcus spp • Oral anaerobes • Enterobacteriaceae	• cefazolin 2g IV x 1 dose	• clindamycin 600mg IV x 1 dose
High risk: • Head and neck cancer o Radical/bilateral neck dissection o Reconstructive surgery with myocutaneoous flaps or microvascular free flaps • Mandibular surgery if tobacco/alcohol/illicit drug use		• cefazolin 2g IV + metronidazole 500mg IV x 1 dose	• clindamycin 600mg IV + gentamicin 1.5mg/kg IV x 1 dose

Bugs & Drugs
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SURGERY	COMMON PATHOGENS	REGIMEN(S) OF CHOICE (See General Principles)	ALTERNATIVE REGIMENS FOR CEPHALOSPORIN ALLERGY or SEVERE PENICILLIN ALLERGY/ ANAPHYLAXIS (See General Principles)
OPHTHALMOLOGY **NB: Pre-op disinfection with povidone-iodine 5 or 10% solution recommended. Chlorhexidine 0.05% is alternative for iodine-allergic patients. Higher chlorhexidine concentrations are associated with corneal toxicity. Avoid leakage of either povidone-iodine or chlorhexidine into the anterior chamber.**			
Cataract extraction **Corneal transplant** **Retinal detachment** **Vitrectomy** **Dacryocystorhinostomy** **Eyelid Surgery** **Enucleation**	• S. aureus • Coagulase negative staphylococcus (CoNS) • Streptococcus spp • Enterobacteriaceae • Pseudomonas spp	Eye drops every 5-15 minutes for 5 doses within 1 hour of start of procedure*: • moxifloxacin or • polymyxin B - gramicidin +/- At end of procedure: Intracameral injection**: • cefazolin 1-2.5mg or • cefuroxime 1mg or Subconjunctival injection: • cefazolin 100mg or • cefuroxime 50mg * The necessity of continuing topical antimicrobials postoperatively has not been established. **Intracameral antibiotics may be more effective than subconjunctival antibiotics.	