

UCSF SPARK Notes (UCSF Surgery Presents: Aims, Reason, Knowledge)
Surgical Site Infection Prevention: Prophylactic Antibiotics

Perioperative Antibiotic Prophylactics for Clean and Clean Contaminated Surgery 101: Selection, Timing and Duration		
		GOAL 
<p>UCSF Antibiotic Prophylaxis Guidelines to select appropriate antibiotic for procedure before incision</p> <p>E.G. Guideline Abx for Uncomplicated Appendectomy: Cefazolin/Metronidazole</p> <p>Current state (UCSF): 72% of uncomplicated appendectomy patients receive piperacillin/tazobactam</p>	<p>Stop antibiotics at end of procedure</p> <p>Goal: >10% of patients received antibiotics within 24 hours of procedure</p> <p>Current state (UCSF): 26% of uncomplicated appendectomy patients receive 24 hours of antibiotics</p>	<p>Prevent C. difficile Prevent surgical site infections Be a wise steward of antibiotics Reduce unnecessary costs</p>
<p>References: http://medctrpharm.ucsf.edu/system/files/documents/surgical_prophylaxis_guidelines.pdf Berrios-Torres SI, Umscheid CA, et al. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. <i>JAMA Surg</i> 2017;152(8):784-91 Bratzler DW, Dellinger EP, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. <i>Am J Health Syst Pharm</i> 2013;70(3):195-283</p>		

Facts:

- Annual surgical volume continues to rise (97090 hours in 16-17 to 100057 in 17-18)
- Patients have more comorbidities than ever before
- Its estimated that about one half of SSI are preventable by application of consistent evidence based approaches
- Annually, 8.25% of patients at UCSF experience surgical site infections, which puts us in the 10th (or bottom) decile of 700 programs involved.

What is the goal of antibiotic prophylaxis? To ensure that *bactericidal levels of antibiotic are present in the serum and tissue at the time of incision and for the duration of the operation.*

Why are different antibiotics used for different surgeries? Antibiotic prophylaxis **selection** should be based upon the types of organisms most likely encountered during the operation, local susceptibility patterns and patient allergies. New UCSF antibiotic prophylaxis recommendations are available.

When should antibiotics be given? Most antibiotics achieve treatment levels 30-60 minutes after administration and can be administered just prior to incision but, notably, vancomycin and fluoroquinolones should ideally be given 120 minutes before incision. Some antibiotics, depending on half-life and case duration may need to be redosed in the operating room.

When should antibiotics be stopped? For clean and clean-contaminated cases, antibiotics should not continue after skin closure.

What about patients with preexisting infections? Patients with existing infections should continue antibiotics through surgery, AND should receive additional prophylaxis as indicated for the operation if not already covered by their already prescribed antibiotic.

How do know we are selecting the right antibiotics?

The UCSF Antibiotic Stewardship Program reports on antibiotic prescribing at the time of surgery for clean and clean-contaminated cases (contaminated/dirty-infected cases are excluded).

1. Cases are followed by procedure type (appendectomy, colorectal, hernia etc), and are categorized as either appropriate selection (guideline concordant), or not. As an example, for uncomplicated appendectomy (i.e. not perforated), cefazolin + metronidazole is the appropriate antibiotic regimen for prophylaxis, which is only used 24% of the time. More often, piperacillin-tazobactam is used (72% of the time), which is not appropriate for prophylaxis. **See the Table below** for a review of the General Surgery guideline concordant antibiotic(s) based on the case.
2. Another metric is whether or not antibiotics are given within the first 24 hours after surgery for clean or clean-contaminated cases. The goal is < 10%. Happily, general surgery seems to be doing better than other surgical services in this regard. Sadly, about 20-30% of clean/clean-contaminated cases currently get post-operative antibiotics among general surgery and vascular surgery cases so we may have opportunity to improve.

The full recommendations can be found at:

http://medctrpharm.ucsf.edu/system/files/documents/surgical_prophylaxis_guidelines.pdf

The summarized general surgery recommendations can be seen in the table below.

GENERAL SURGERY	Recommended agents	Severe β -lactam allergy
GASTRODUODENAL—No suspected infection		
Entry into lumen of GI tract (bariatric)	Cefazolin	Vancomycin + levofloxacin
Whipple with biliary stent in place	Ceftriaxone + metronidazole	Levofloxacin + metronidazole
Without entry into GI tract (anti-reflux)	Cefazolin	Vancomycin + levofloxacin
BILIARY—No suspected infection		
Open-Biliary (no infection)	Cefazolin	Levofloxacin + metronidazole
Laparoscopic- Biliary		
-Low Risk	None	None
-High Risk (no infection)	Cefazolin	Levofloxacin + metronidazole
INTESTINE—No suspected infection		
Appendectomy (uncomplicated)	Cefazolin + metronidazole	Levofloxacin + metronidazole
Nonobstructed small intestine	Cefazolin	Clindamycin + levofloxacin
Hernia Repair	Cefazolin	Vancomycin
Colorectal	Preop mechanical bowel prep + neomycin/metronidazole PO x 3 doses Periop ceftriaxone + metronidazole	Preop mechanical bowel prep + neomycin/metronidazole PO x 3 doses Periop levofloxacin + metronidazole
GASTROINTESTINAL SURGERIES WITH SUSPECTED PERITONITIS OR SEVERE INFECTION (e.g. cholangitis, cholecystitis, perforated appendicitis, perforated viscus)		
Secondary peritonitis	Piperacillin/tazobactam dosed for Pseudomonal coverage (add vancomycin if severe physiological disturbance or healthcare-associated)	Vancomycin + aztreonam + metronidazole

Special thanks to Sarah Doernberg, MD, MAS of the UCSF antimicrobial stewardship program, for sharing her knowledge and guidelines with us.

For further information on antibiotics and surgery see:

References:

Berrios-Torres SI, Umscheid CA, *et al.* Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. *JAMA Surg* 2017;152(8):784-91.

Bratzler DW, Dellinger EP, *et al.* Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Am J Health Syst Pharm* 2013;70(3):195-283.