

## Surgical Prophylaxis Guideline Updates

Wadley Regional Medical Center

Surgery and Trauma Committee, July 22, 2014

Pharmacy and Therapeutics Committee, August 2014

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**Background:** The *Clinical Practice Guidelines for Antimicrobial Prophylaxis in Surgery* were updated in February 2013. The guideline is jointly published by the Surgical Infection Society (SIS), the Infectious Diseases Society of America (IDSA), the Society for Healthcare Epidemiology of America (SHEA), and the American Society of Health-System Pharmacists (ASHP). The guideline includes two major features: (1) a dosing table that applies to all procedures, and (2) a table of recommended agents and alternatives for  $\beta$ -lactam allergy by type of procedure.

The following major updates included in this guideline impact current practice and order-sets used at WRMC:

1. The dose of **cefazolin** for adult patients is 2 grams for patients weighing < 120 kg, and the dose increases to 3 grams for patients weighing  $\geq$  120 kg. This applies to all surgical procedures.
2. Weight based dosing of 15 mg/kg of actual body weight should be used for **vancomycin**.
3. Weight based dosing of 5 mg/kg of dosing weight (actual body weight or corrected body weight in patients > 120% of ideal body weight) should be used for **gentamicin**.

	Recommended Agent	First alternative for $\beta$ -lactam allergy	Alternative Agents (in order of preference)	Comments
<b>CARDIAC/VASCULAR</b>				
CABG Cardiac device insertion Ventricular assist devices	<b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients <math>\geq</math> 120 kg</b>	<b>Vancomycin 15 mg/kg IVPB</b> (must document $\beta$ -lactam allergy for SCIP)	Cefuroxime 1.5 gm IVPB or Clindamycin 900 mg IVPB (must document $\beta$ -lactam allergy for SCIP)	SCIP allows vancomycin to be used in patients without $\beta$ -lactam allergy in these procedures if other justification is provided such as documented MRSA colonization.
Vascular surgery	<b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients <math>\geq</math> 120 kg</b>	<b>Vancomycin 15 mg/kg IVPB</b> (must document $\beta$ -lactam allergy for SCIP)	Clindamycin 900 mg IVPB (must document $\beta$ -lactam allergy for SCIP)	SCIP allows vancomycin to be used in patients without $\beta$ -lactam allergy in these procedures if other justification is provided such as documented MRSA colonization.
<b>Thoracic</b>				
Noncardiac procedures including lobectomy, pneumonectomy, lung resection, or thoracotomy; Video-assisted thoracoscopic surgery	<b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients <math>\geq</math> 120 kg</b>	<b>Clindamycin 900 mg IVPB</b>	Ampicillin-sulbactam 3 gm IVPB or Vancomycin 15 mg/kg IVPB	
<b>Gastrointestinal</b>				
<b>Gastroduodenal</b> Procedures involving entry into lumen of GI tract (bariatric, pancreaticoduodenectomy) and Procedures without entry into GI tract (antireflux, highly selective vagotomy) for high-risk patients	<b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients <math>\geq</math> 120 kg</b>	<b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b>	Vancomycin 15 mg/kg IVPB + Gentamicin 5 mg/kg IVPB or Vancomycin 15 mg/kg IVPB + Levofloxacin 500 mg IVPB or Vancomycin 15 mg/kg IVPB + Aztreonam 2 gm IVPB or Clindamycin 900 mg IVPB + Levofloxacin 500 mg IVPB or Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB	Levofloxacin should be avoided due to spectrum and resistance. <sup>1</sup>  Aztreonam should be avoided due to spectrum and cost. <sup>2</sup>  Ertapenem is not recommended in the guideline for these procedures.

<p><b>Biliary Tract</b> Open procedure or Laparoscopic  see below for PEG placement</p>	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b></p>	<p>Cefoxitin 2 gm IVPB or Vancomycin 15 mg/kg IVPB + Gentamicin 5 mg/kg IVPB or Ceftriaxone 2 gm IVPB or Metronidazole 500 mg IVPB + Gentamicin 5 mg/kg IVPB or Vancomycin 15 mg/kg IVPB + Levofloxacin 500 mg IVPB or Vancomycin 15 mg/kg IVPB + Aztreonam 2 gm IVPB or Clindamycin 900 mg IVPB + Levofloxacin 500 mg IVPB or Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB or Metronidazole 500 mg IVPB + Levofloxacin 500 mg IVPB or Ampicillin-sulbactam 3 gm IVPB</p>	<p>Patients with low risk as defined in the guideline may not require prophylactic antibiotics for elective laparoscopic procedures.</p> <p>Levofloxacin should be avoided due to spectrum and resistance.<sup>1</sup></p> <p>Aztreonam should be avoided due to spectrum and cost.<sup>2</sup></p> <p>Ampicillin-sulbactam should be avoided due to resistance.<sup>3</sup></p> <p>Ceftriaxone should be limited to patients requiring treatment for acute infections</p> <p>Ertapenem is not recommended in the guideline for these procedures.</p>
<p><b>PEG Placement (SCIP)</b></p>	<p><b>Cefoxitin 2 gm IVPB</b> or <b>Cefazolin 2 gm IVPB for patients &lt; 120 kg ± Metronidazole 500 mg IVPB</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg ± Metronidazole 500 mg IVPB</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b></p>	<p>Vancomycin 15 mg/kg IVPB + Gentamicin 5 mg/kg IVPB or Vancomycin 15 mg/kg IVPB + Levofloxacin 500 mg IVPB or Clindamycin 900 mg IVPB + Levofloxacin 500 mg IVPB or Ampicillin-sulbactam 3 gm IVPB</p>	
<p><b>Appendectomy</b> For uncomplicated appendicitis</p>	<p><b>Cefoxitin 2 gm IVPB</b> or <b>Cefazolin 2 gm IVPB for patients &lt; 120 kg + Metronidazole 500 mg IVPB</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg + Metronidazole 500 mg IVPB</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b></p>	<p>Metronidazole 500 mg IVPB + Gentamicin 5 mg/kg IVPB or Metronidazole 500 mg IVPB + Levofloxacin 500 mg IVPB or Clindamycin 900 mg IVPB + Levofloxacin 500 mg IVPB or Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB</p>	<p>Levofloxacin should be avoided due to spectrum and resistance.<sup>1</sup></p> <p>Aztreonam should be avoided due to spectrum and cost.<sup>2</sup></p> <p>Ertapenem is not recommended in the guideline for these procedures.</p>
<p><b>Small intestine</b> Nonobstructed</p>	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b></p>	<p>Clindamycin 900 mg IVPB + Levofloxacin 500 mg IVPB or Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB</p>	<p>Levofloxacin should be avoided due to spectrum and resistance.<sup>1</sup></p> <p>Aztreonam should be avoided due to spectrum and cost.<sup>2</sup></p> <p>Ertapenem is not recommended in the guideline for these procedures.</p>
<p><b>Small intestine</b> Obstructed</p>	<p><b>Cefoxitin 2 gm IVPB</b> or <b>Cefazolin 2 gm IVPB for patients &lt; 120 kg + Metronidazole 500 mg IVPB</b></p>	<p><b>Metronidazole 500 mg IVPB + Gentamicin 5 mg/kg IVPB</b></p>	<p>Metronidazole 500 mg IVPB + Levofloxacin 500 mg IVPB</p>	<p>Levofloxacin should be avoided due to spectrum and resistance.<sup>1</sup></p> <p>Ertapenem is not recommended in the guideline for these procedures.</p>

	<p>or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg + Metronidazole 500 mg IVPB</b></p>			
<b>Hernia Repair</b> Hemoplasty or Hemiorrhaphy	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<b>Clindamycin 900 mg IVPB</b>	Vancomycin 15 mg/kg IVPB	Ertapenem is not recommended in the guideline for these procedures.
<b>Colorectal</b>	<p><b>Cefoxitin 2 gm IVPB</b> or  <b>Cefazolin 2 gm IVPB for patients &lt; 120 kg + Metronidazole 500 mg IVPB</b> or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg + Metronidazole 500 mg IVPB</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVP</b> or  <b>Metronidazole 500 mg IVPB + Gentamicin 5 mg/kg IVPB</b>  (must document β-lactam allergy for SCIP)</p>	<p>Ceftriaxone 2 gm IVPB + Metronidazole 500 mg IVPB or  Metronidazole 500 mg IVPB + Levofloxacin 500 mg IVPB or  Clindamycin 900 mg IVPB + Levofloxacin 500 mg IVPB or  Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB or  Ampicillin-sulbactam 3 gm IVPB or  Ertapenem 1 gm IVPB (last line)</p>	<p>Levofloxacin should be avoided due to spectrum and resistance.<sup>1</sup></p> <p>Aztreonam should be avoided due to spectrum and cost.<sup>2</sup></p> <p>Ampicillin-sulbactam should be avoided due to resistance.<sup>3</sup></p> <p>At institutions where there is increasing resistance to first and second generation cephalosporins among gram-negative isolates from surgical site infections, ceftriaxone + metronidazole is recommended over routine use of ertapenem.</p> <p>Ertapenem should be avoided due to risk of precipitating carbapenem resistance.</p>
<b>Head and Neck</b>				
Clean with placement of prosthesis (excludes tympanostomy)	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b>	Cefuroxime 1.5 gm IVPB	Clean procedures without placement of prosthesis do not require prophylaxis.
Clean- contaminated cancer surgery or Other clean- contaminated procedures with the exception of tonsillectomy and functional endoscopic sinus procedures	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg + Metronidazole 500 mg IVPB</b> or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg + Metronidazole 500 mg IVPB</b></p>	<b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b>	<p>Cefuroxime 1.5 gm IVPB + Metronidazole 500 mg IVPB or  Ampicillin-sulbactam 3 gm IVPB</p>	
<b>Neurosurgery</b>				
Elective craniotomy and cerebrospinal fluid-shunting procedures, Implantation of intrathecal pumps, and Spinal Procedures with and without instrumentation	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<b>Clindamycin 900 mg IVPB</b>	Vancomycin 15 mg/kg IVPB	
<b>Obstetrics and Gynecology</b>				
Cesarean Delivery	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b>  (must document β-lactam allergy for SCIP)</p>		
<b>Hysterectomy:</b> Vaginal or Abdominal	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or  <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b>  (must document β-lactam allergy for SCIP)</p>	<p>Cefoxitin 2 gm IVPB or  Vancomycin 15 mg/kg IVPB + Gentamicin 5 mg/kg IVPB or  Vancomycin 15 mg/kg IVPB + Levofloxacin 500 mg IVPB or  Vancomycin 15 mg/kg IVPB +</p>	<p>Levofloxacin should be avoided due to spectrum and resistance.<sup>1</sup></p> <p>Aztreonam should be avoided due to spectrum and cost.<sup>2</sup></p> <p>Ampicillin-sulbactam should be avoided due to resistance.<sup>3</sup></p>

			<p>Aztreonam 2 gm IVPB or Clindamycin 900 mg IVPB + Levofloxacin 500 mg IVPB or Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB or Metronidazole 500 mg IVPB + Gentamicin 5 mg/kg IVPB or Metronidazole 500 mg IVPB + Levofloxacin 500 mg IVPB or Ampicillin-sulbactam 3 gm IVPB</p>	
<b>Orthopedic</b>				
Hip Fracture repair, Implantation of internal fixation devices (e.g., nails, screws, plates, wires), and Total joint replacement	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<p><b>Vancomycin 15 mg/kg IVPB</b> (must document β-lactam allergy for SCIP)</p>	Clindamycin 900 mg IVPB	SCIP allows vancomycin to be used in patients without β-lactam allergy in these procedures if other justification is provided such as documented MRSA colonization. Clean operations involving hand, knee, or foot and not involving implantation of foreign materials do not require prophylaxis.
<b>Urologic</b>				
Lower tract instrumentation with risk factors for infection (includes transrectal prostate biopsy)	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<p><b>Gentamicin 5 mg/kg IVPB ± Clindamycin 900 mg IVPB</b></p>	Levofloxacin 500 mg IVPB	
Clean without entry into urinary tract	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	Clindamycin 900 mg IVPB	Vancomycin 15 mg/kg IVPB	
Clean with entry into urinary tract	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg</b></p>	<p><b>Gentamicin 5 mg/kg IVPB ± Clindamycin 900 mg IVPB</b></p>	Levofloxacin 500 mg IVPB	Levofloxacin should be avoided due to local <i>E.coli</i> resistance. <sup>1</sup>
Involving implanted prosthesis	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg + Gentamicin 5 mg/kg IVPB</b> or <b>Cefazolin 3 gm IVPB for patients ≥ 120 kg + Gentamicin 5 mg/kg IVPB</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b></p>	<p>Vancomycin 15 mg/kg IVPB + Gentamicin 5 mg/kg IVPB or Ampicillin-sulbactam 3 gm IVPB or Vancomycin 15 mg/kg IVPB + Aztreonam 2 gm IVPB or Cefazolin 2 gm IVPB for patients &lt; 120 kg + Aztreonam 2 gm IVPB or Cefazolin 3 gm IVPB for patients ≥ 120 kg + Aztreonam 2 gm IVPB or Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB</p>	<p>Aztreonam should be avoided due to spectrum and cost.<sup>2</sup></p> <p>Guidelines do not require addition of gentamicin to clindamycin for penile prosthesis insertion/removal/revision, but core measures do require combination.</p>
Pubovaginal Sling (SCIP)	<p><b>Cefazolin 2 gm IVPB for patients &lt; 120 kg</b> or <b>Cefazolin 3 gm IVPB</b></p>	<p><b>Clindamycin 900 mg IVPB + Gentamicin 5 mg/kg IVPB</b></p>	<p>Levofloxacin 500 mg IVPB or Metronidazole 500 mg IVPB + Gentamicin 5 mg/kg IVPB</p>	

	for patients $\geq$ 120 kg		or Ampicillin-sulbactam 3 gm IVPB or Clindamycin 900 mg IVPB + Aztreonam 2 gm IVPB	
Clean-contaminated	Cefazolin 2 gm IVPB for patients < 120 kg + Metronidazole 500 mg IVPB or Cefazolin 3 gm IVPB for patients $\geq$ 120 kg + Metronidazole 500 mg IVPB	Gentamicin 5 mg/kg IVPB + Metronidazole 500 mg IVPB	Cefoxitin 2 gm IVPB or Gentamicin 5 mg/kg IVPB + Clindamycin 900 mg IVPB or Levofloxacin 500 mg IVPB	Levofloxacin should be avoided due to local <i>E.coli</i> resistance. <sup>1</sup>
<b>Plastic Surgery</b>				
Clean with risk factors or clean-contaminated	Cefazolin 2 gm IVPB for patients < 120 kg or Cefazolin 3 gm IVPB for patients $\geq$ 120 kg	Clindamycin 900 mg IVPB	Vancomycin 15 mg/kg IVPB or Ampicillin-sulbactam 3 gm IVPB	

1. It is preferable to avoid broad spectrum agents like levofloxacin because they serve as our workhorses for pneumonia and we already have considerable resistance (*E.coli* is only 72% susceptible and *Pseudomonas* is only 68% susceptible to levofloxacin)
2. It is preferable to avoid broad spectrum agents like aztreonam in surgical prophylaxis to prevent the development of resistance. Additionally, aztreonam is considerably more expensive than other agents.
3. Ampicillin-sulbactam should be avoiding in GI procedures due to poor local susceptibility of *E.coli* at 52%

Prophylaxis Cost Comparison	
Antimicrobial	Cost
Ampicillin-sulbactam 3 gm	\$3.00
Ampicillin 2 gm	\$3.00
Aztreonam 2 gm	\$49.00
Cefazolin 2 gm	\$1.00
Cefazolin 3 gm	\$2.00
Cefuroxime 1.5 gm	\$4.00
Cefoxitin 2 gm	\$6.00
Ceftriaxone 2 gm	\$3.00
Clindamycin 900 mg	\$3.00
Ertapenem 1 gm	\$70.00
Fluconazole 400 mg	\$5.00
Gentamicin 5 mg/kg	~\$5.00
Levofloxacin 500 mg	\$6.00
Metronidazole 500 mg	\$1.00
Piperacillin-tazobactam 3.375 gm	\$5.00
Vancomycin 15 mg/kg	~\$3.00