

Type of injury:

- I. [Cavitary Penetration \(Chest/Abdomen\)](#)
- II. [Soft Tissue Disruption](#)
- III. [Bite Wounds](#)
- IV. [Burns and Road Rash](#)
- V. [Bone Fractures](#)
 1. [Facial Bones](#)
 2. [Skull, Temporal bone, and Skull-base bones](#)
 3. [Extremity bones \(orthopedic surgery\): Gustilo-Anderson Classification](#)

Northwestern Medicine

TRAUMA INJURY: SUGGESTED EMPIRIC ANTIMICROBIAL THERAPY

This guidance includes empiric antimicrobial recommendations, based on the most likely organisms responsible for infection, NMH susceptibilities, and prevalence of resistant organisms.

- Patient specific factors including hemodynamic stability, previous culture information, prior antibiotic use, and medication allergies should also be taken into consideration.
- Once culture and susceptibility results are available, definitive therapy including narrow-spectrum agents with activity against identified pathogen, when appropriate, is recommended.
- In many cases, obtaining the appropriate specimen(s) before antibiotics are started is critical to identify appropriate antimicrobial therapy and ensure successful patient outcomes.
- Additional Resources:
 - Antimicrobial and Diagnostic Stewardship Program (ADSP) <https://asp.nm.org/>
 - Northwestern Medicine ADSP: Antibiotic Allergy Resource Page <https://asp.nm.org/allergy.html>

INJURY	INITIAL SURGICAL INTERVENTION	COMMON PATHOGENS	PREFERRED THERAPY	**SEVERE ALLERGY TO PREFERRED THERAPY	FREQUENCY/DURATION	COMMENTS
I. Cavity penetration (Chest/Abdomen)						
Penetrating thoracic injury	Chest tube ¹⁻³	Skin flora including <i>S. aureus</i>	Cefazolin	Vancomycin	One-time dose Pre-procedural	
Penetrating injury to abdomen <i>Note: blunt trauma without hollow viscous injury does not require antimicrobial therapy</i>	Exploratory laparotomy +/- hollow viscus injury ^{4,5,6}	Skin flora including <i>S. aureus</i> +/- Gram-negatives, anaerobes	Cefazolin + Metronidazole ** For delayed presentation or patient presenting in septic shock consider piperacillin-tazobactam	Vancomycin + Aztreonam + Metronidazole	One-time dose Pre-operative *	* Duration dependent on surgical findings: <ul style="list-style-type: none"> If clean, no post-op antibiotics necessary If spillage found, consider 24 hours only **Consider 4-day course post source control of Piperacillin-tazobactam (Vancomycin + Aztreonam + Metronidazole if severe allergy)
II. Soft tissue disruption						
Gunshot wound	Debride & irrigate using antiseptic (e.g., povidone-iodine solution) then pack ^{6,7,8,9,10}	Skin flora including <i>S. aureus</i> , beta-hemolytic <i>Streptococcus</i>	No antibiotics needed unless contaminated, then give Cefazolin	No antibiotics needed unless contaminated, then give vancomycin	Once only if contaminated	Do not close wound, ok to pack.
Stab wounds	Debride & irrigate using antiseptic (e.g., povidone-iodine solution) then pack ^{6,7}	Skin flora including <i>S. aureus</i> , beta-hemolytic <i>Streptococcus</i>	No antibiotics needed unless contaminated, then give Cefazolin	No antibiotics needed unless contaminated, then give vancomycin	Once only if contaminated	Ok to close the wound loosely.

** Severe allergy to Preferred Therapy only - Cefazolin should be considered in setting of PCN allergy for reactions other than IgE-mediated (e.g., anaphylaxis)

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III. Bite Wounds						
Human bite	Deep debride & irrigate using antiseptic (e.g., povidone-iodine solution) then pack ⁶⁻¹⁰	<i>Strep viridans</i> group, <i>S. epidermidis</i> , <i>Corynebacterium</i> , <i>S. aureus</i> , <i>Eikenella</i> , <i>Bacteroides</i> , <i>Peptostreptococcus</i> , <i>Fusobacterium</i> , <i>Prevotella</i>	No surgical intervention and no risk factors present, no antibiotics required If surgical intervention: Ampicillin-sulbactam (IV) If no surgical intervention but risk factors present: Amoxicillin-clavulanate (PO)	(Doxycycline OR Levofloxacin) + Metronidazole	One time dose pre-procedure If risk factors, complete 3 days	Do not close wound *Risk Factors: Bites of hands, face, genitals; crush injury; injuries that may have penetrated the periosteum or joint capsule; immunocompromised host (including diabetes, asplenia, and advanced liver disease) Additional info for animal bites: Evaluate the need for tetanus and/or rabies vaccination, Rabies Immune Globulin therapy Rabies Postexposure Prophylaxis (PEP) Medical Care Rabies CDC
Animal bite	Deep debride & irrigate using antiseptic (e.g., povidone-iodine solution) then pack ⁶⁻¹⁰	<i>Pasteurella multocida</i> , <i>Fusobacterium</i> spp., <i>Capnocytophaga</i> spp. (dog bite)	No surgical intervention and no risk factors present, no antibiotics required If surgical intervention: Ampicillin-sulbactam (IV) No surgical intervention but risk factors present: Amoxicillin-clavulanate (PO)	(Doxycycline OR Levofloxacin) + Metronidazole	One time dose pre-procedure If risk factors, complete 3 days	More specific therapy depends upon animal involved Could consider doxycycline as alternative to levofloxacin + metronidazole for oral therapy

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IV. Burns & Road Rash⁹⁻¹³						
First degree (redness + pain)	None		No antibiotics			May use aloe vera cream, pain medications & wrap with dry gauze. Patient to follow up with PCP.
Second degree (blisters + severe pain)	None	Skin flora including <i>S. aureus</i>	No antibiotics			IF < 10% TBSA: <ol style="list-style-type: none"> Do not puncture blisters, cover & wrap with dry gauze. If blisters puncture, apply neomycin or triple antibiotic cream and dress with Tefla gauze. Patient to follow up with burn center outpatient. IF > 10% TBSA: <ol style="list-style-type: none"> Start fluid resuscitation. Give pain medications & wrap with dry gauze Transfer to burn center
Third degree (White, black, deep red or charred skin + less pain)	Decision at Burn Center	Skin flora including <i>S. aureus</i>	No antibiotics			Start fluid resuscitation. Give pain medications & wrap with dry gauze Transfer to burn center
Electrocution	None	Skin flora including <i>S. aureus</i>	No antibiotics			Continuous monitoring. Obtain ECG, basic labs + electrolytes + Lactic Acid + Creatinine Kinase (CK). Transfer to burn center

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Inhalational ¹³	Consider early intubation if carbonaceous sputum	Skin flora including <i>S. aureus</i>	No evidence for antibiotics without mechanical ventilation If intubating: Cefazolin	No evidence for antibiotics without mechanical ventilation If intubating: vancomycin	Once peri-intubation	Consider early intubation + 100% FiO2 + bronchodilators. Continuous monitoring. Obtain ECG, basic labs + electrolytes + Lactic Acid + Creatinine Kinase (CK) + carboxyhemoglobin level Transfer to burn center
V. Bone Fractures						
Facial bones: ^{14,15}						
Non-operative management of upper, middle and mandible fractures	Per face service (ENT/ Plastics/ OMFS)	None	None			
Operative management of open mandible, sinus, or facial bone fractures, with contamination	Per face service (ENT/ Plastics/ OMFS)	<i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , and <i>Moraxella catarrhalis</i>	Ampicillin-sulbactam	Levofloxacin	Stop within 24 hours of surgery	
Skull, Temporal Bone, and Skull-base bones: ¹⁶⁻¹⁷						
Basilar skull fractures	None		None			
Open penetrating or depressed fractures	None	<i>Streptococcus pneumoniae</i> and <i>Haemophilus influenzae</i>	Ceftriaxone	Vancomycin + Aztreonam	7 days	Discuss with neurosurgery

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CSF leak rhinorrhea / Otorrhea	None	<i>Streptococcus pneumoniae</i> and <i>Haemophilus influenzae</i>	Ceftriaxone	Vancomycin + Aztreonam	No antibiotics required but may choose to give one time dose	Discuss with neurosurgery Prenar 20 vaccination if not previously immunized
EVD & ICP catheter	None	<i>Staphylococcus</i> spp.	Cefazolin	Vancomycin	No antibiotics required but may choose to give one time	Discuss with neurosurgery
Extremity Bones (Orthopedic Surgery) – Gustilo-Anderson Classification¹⁸⁻²²						
Grade I	Skin wound < 1 cm in length and clean	Skin flora including <i>S. aureus</i>	Cefazolin	Vancomycin	Once	Irrigate using antiseptic (e.g., povidone-iodine solution) then pack (6-8)
Grade II	Skin wound >1 cm in length without extensive tissue damage, flaps, or avulsions	Skin flora including <i>S. aureus</i>	Cefazolin	Vancomycin	24hr after debridement & wound coverage. 72hr if debridement but no coverage.	
Grade III	> 10 cm wound with extensive soft tissue injury or traumatic amputation	Skin flora including <i>S. aureus</i> , Gram-negatives	Ceftriaxone	Vancomycin + Aztreonam		
Open Fracture with farm soil, fecal, or freshwater[^] contamination, crush injury, compartment syndrome or vascular injury	Any size skin wound	[^] Additional pathogens: Anaerobes, <i>Clostridium</i> (soil), <i>P. aeruginosa</i> , <i>Aeromonas hydrophilia</i> (freshwater), <i>Vibrio vulnificus</i> (saltwater)	Piperacillin-tazobactam ** if saltwater contamination: add doxycycline	Vancomycin + Aztreonam + Metronidazole ** if saltwater contamination: add doxycycline		

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