Northwestern Medicine—West Region
Skin/Skin Structure Infection Guideline Treatment Summary

Background

- The number of ED visits for skin infections almost tripled from the late 1990s until 2005, and continues to increase at an alarming rate.[1]
- The incidence of MRSA infections is rising; between 2001 and 2005, the prevalence of MRSA infections among acute bacterial skin and skin structure infections (ABSSSI) cases increased from 29% to 64% in a single Los Angeles ED.[1]

Risk Stratification in the ED[1]—Determine if patient requires admission or not

- Assess for hemodynamic instability—Unstable patients should receive resuscitation immediately, and patients who are stable but acutely ill should be screened for sepsis per protocol. Necrotizing infection should be considered in unstable patients, especially.
- Assess for possible necrotizing fasciitis—Signs include signs of severe sepsis, disproportionate pain, rapidity of advancement, and evidence of soft tissue gas, compartment syndrome, or muscle necrosis. (See Table 1 for risk index score) If necrotizing fasciitis suspected, the guidelines suggest use of bedside ultrasound may help appreciate signs of necrotizing infection without the delay associated with CT or MRI scans.

Table 1: Laboratory Risk Index for Necrotizing Fasciitis (LRINEC)[1]

	1 point	2 points	4 points
WBC	15-25,000/mm^3	>25,000/mm^3	
Hb	11-13.5g/dL	<11g/dL	
Na		<135 mEq/L	
Glucose	>180mg/dL		
Scr		>1.6mg/dL	
CRP			>150mg/L

Score of ≥6 points indicates possible necrotizing fasciitis, need for careful evaluation of serial observations, and potential need for emergent surgery.

- Evaluate for unstable comorbidities—Assess for other medical issues that might require admission despite status of skin infection.
- Assess for high-risk locations and lesions that require extensive surgery—Orbital cellulitis, hand infections, deep abscesses
- Identify factors that might interfere with outpatient care—Social issues such as lack of social support, psychological instability, unreliability, IV-drug use

Presentation/Likely Pathogens[2]

- Stasis dermatitis—usually bilateral/symmetrical, chronic/subacute, no systemic symptoms—not an infection
- Nonpurulent—likely *Streptococcus* species
- Purulent, focal ulcer, exudate—likely *Staphylococcus* species
- Animal bites—likely *Pasteurella*
- Diabetic foot ulcers—acute presentation—likely *Staphylococcus* species
  —chronic presentation—likely multi-organism

Treatment Options[2,3,4]—Recommended duration is 5 days if symptoms resolved by then, but may go longer if not

Type of Infection	Purulent	Non-Purulent
Mild (no systemic signs of infection)	-Incision and drainage (I&D); no antibiotics needed if small, simple lesion	-Penicillin VK 500mg PO QID -Cephalexin 500mg PO QID -Severe PCN allergy: Clindamycin 300-450mg PO QID
Moderate (systemic signs of infection present)	-I&D and culture PO: Bactrim DS 1-2 tab PO BID (1 tab if <80kg) OR -Doxycycline 100mg PO BID IV: Nafcillin 2g IV q4h OR -Cefazolin 2g IV q8h -IF MRSA suspected or severe PCN allergy—Vancomycin 15mg/kg IV q12h (pharm to dose)	PO: Cephalexin 500mg PO QID -If severe PCN allergy—Clindamycin 300-450mg PO QID IV: Cefazolin 1-2g IV q8h -If severe PCN allergy—Clindamycin 600mg IV q8h

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Severe (Failed initial treatment [I&D and/or PO antibiotics] with systemic signs of infection such as T>38^{o}C, HR > 90 BPM, RR > 24 breaths per min, abnormal WBC [> 12k or < 400 cells/µL])	-Vancomycin 15mg/kg IV q12h (pharmacy to dose)—narrow when culture data are available -Other possible options include daptomycin or linezolid, ID c/s may be required -Consider emergent surgical inspection/I&D; rule out necrotizing process	Empiric or suspected polymicrobial: -Vancomycin 15mg/kg IV q12h (pharmacy to dose) PLUS -Zosyn 3.375g IV q8h (over 4 hours) Organism-specific necrotizing infection: -Strep pyogenes: PCN G plus clindamycin -Clostridial: PCN G plus clindamycin -Vibrio: Doxycycline plus ceftriaxone -Aeromonas: Doxycycline plus ciprofloxacin -Consider emergent surgical inspection/I&D; rule out necrotizing process
Diabetic Foot Infection[4] (Duration for DFI is usually 1-2 weeks [when no underlying bone involvement], but antibiotics should be discontinued once clinical signs/symptoms of infection have resolved) ****Guideline highlights importance of avoiding antibiotic treatment in wounds that are not clinically infected****	**Mild to Moderate infection with no antibiotic treatment in past month** PO: Dicloxacillin 500mg PO QID -Cephalexin 500mg PO QID -Augmentin 875mg PO BID (if anaerobic coverage desired) -If history of MRSA—Doxycycline 100mg PO bid OR Bactrim DS 1-2 tab po BID (2 tabs if > 80kg) IV: Nafcillin 2g IV q4h -Cefazolin 2g IV q8h -If MRSA suspected or severe PCN allergy—Vancomycin 15mg/kg IV q12h (pharmacy to dose)	**Recent antibiotic treatment or severe infection** -Unasyn 3g IV q6h -If anti-pseudomonal coverage desired—Zosyn 3.375g IV q8h (over 4 hours) -If severe PCN allergy—Clindamycin 900mg IV q8h plus aztreonam 2g IV q8h -If MRSA suspected, ADD Vancomycin 15mg/kg IV q12h (pharmacy to dose) or Bactrim DS 2 tab PO BID
Bite Wound[2] Can be polymicrobial (especially if purulent or abscess) or just staph or strep (nonpurulent). *Pasteurella* common in both types. Likely organisms for human bites additionally can include *Eikenella corrodans*, strep, staph, *Fusobacterium, Peptostreptococcus, Prevotella*, and *Porphyromonas* sp. Preemptive antibiotics for 3-5 days may be warranted without signs/symptoms of infection in patients who have the following conditions: 1) Immunocompromise 2) Asplenia 3) Advanced liver disease 4) Preexisting or resultant edema of the affected area 5) Moderate to severe injury, especially to the hand or face 6) Injury that may have penetrated the periosteum or joint capsule	**Animal** -Consider need for rabies postexposure prophylaxis per local guidelines -Tdap (if pt hasn't previously received) or Td vaccine if no tetanus vaccination within past 10 years PO: Augmentin 875mg PO BID -Cefuroxime 500mg PO BID plus metronidazole 500mg PO TID -Doxycycline 100mg PO BID plus metronidazole 500mg PO TID -Bactrim DS 1 tab PO BID plus metronidazole 500mg PO TID -Ciprofloxacin 500mg PO BID plus clindamycin 450mg PO QID (high risk of C.diff with this combination) IV: Unasyn 3g IV q6h -Ciprofloxacin 400mg IV q12h plus clindamycin 600mg IV q8h (high risk of C.diff with this combination) -Doxycycline 100mg IV q12h plus metronidazole 500mg IV q8h	**Human** *Eikenella* resistant to first-generation cephalosporins, macrolides, clindamycin, and aminoglycosides. PO: Augmentin 875mg PO BID -Doxycycline 100mg PO BID plus metronidazole 500mg PO TID -Ciprofloxacin 500mg PO BID plus clindamycin 450mg PO QID (high risk of C.diff with this combination) IV: Unasyn 3g IV q6h -Ciprofloxacin 400mg IV q8h plus clindamycin 600mg IV q8h (high risk of C.diff with this combination)

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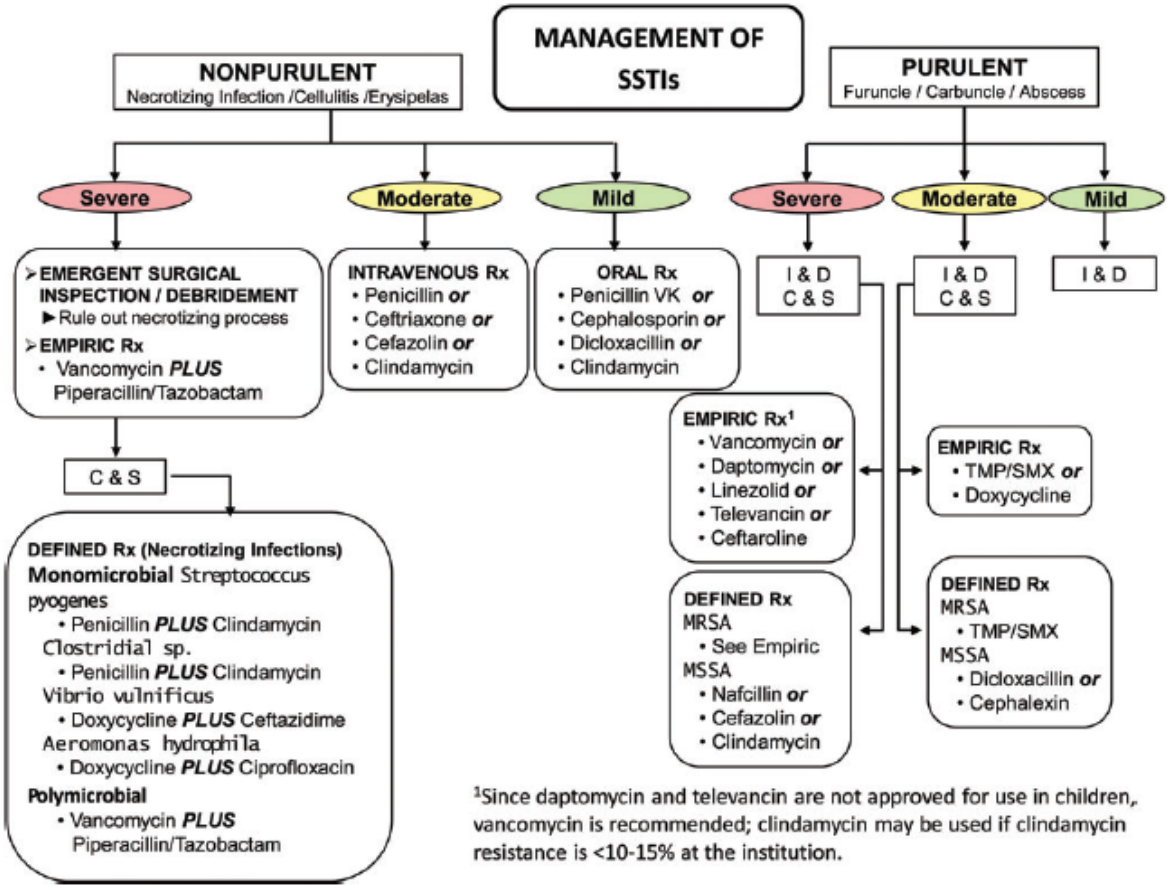

Figure 1. Purulent skin and soft tissue infections (SSTIs). Mild infection: for purulent SSTI, incision and drainage is indicated. Moderate infection: patients with purulent infection with systemic signs of infection. Severe infection: patients who have failed incision and drainage plus oral antibiotics or those with systemic signs of infection such as temperature >38°C, tachycardia (heart rate >90 beats per minute), tachypnea (respiratory rate >24 breaths per minute) or abnormal white blood cell count (<12 000 or <400 cells/μL), or immunocompromised patients. Nonpurulent SSTIs. Mild infection: typical cellulitis/erysipelas with no focus of purulence. Moderate infection: typical cellulitis/erysipelas with systemic signs of infection. Severe infection: patients who have failed oral antibiotic treatment or those with systemic signs of infection (as defined above under purulent infection), or those who are immunocompromised, or those with clinical signs of deeper infection such as bullae, skin sloughing, hypotension, or evidence of organ dysfunction. Two newer agents, tedizolid and dalbavancin, are also effective agents in SSTIs, including those caused by methicillin-resistant *Staphylococcus aureus*, and may be approved for this indication by June 2014. Abbreviations: C & S, culture and sensitivity; I & D, incision and drainage; MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-susceptible *Staphylococcus aureus*; Rx, treatment; TMP/SMX, trimethoprim-sulfamethoxazole.

References:

1) Pollack CV, et al. Acute bacterial skin and skin structure infections (ABSSSI): Practice guidelines for management and care transitions in the emergency department and hospital. *J Emerg Med* 2014. (Article in press) http://dx.doi.org/10.1016/j.jemermed.2014.12.001.
2) Stevens DL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis* 2014; 59(2):147-59.
3) Lexicomp Online, Hudson, Ohio: Lexi-Comp, Inc.; 2015. Accessed June 30, 2015.
4) Lipsky BA, et al. 2012 Infectious Diseases Society of America Clinical Practice Guideline for the diagnosis and treatment of diabetic foot infections. *Clin Infect Dis* 2012; 54(12):e132-e173.