

Treatment of Skin and Soft Tissue Infections in Adults

Intermountain Canyons, Desert, and Peaks Regions

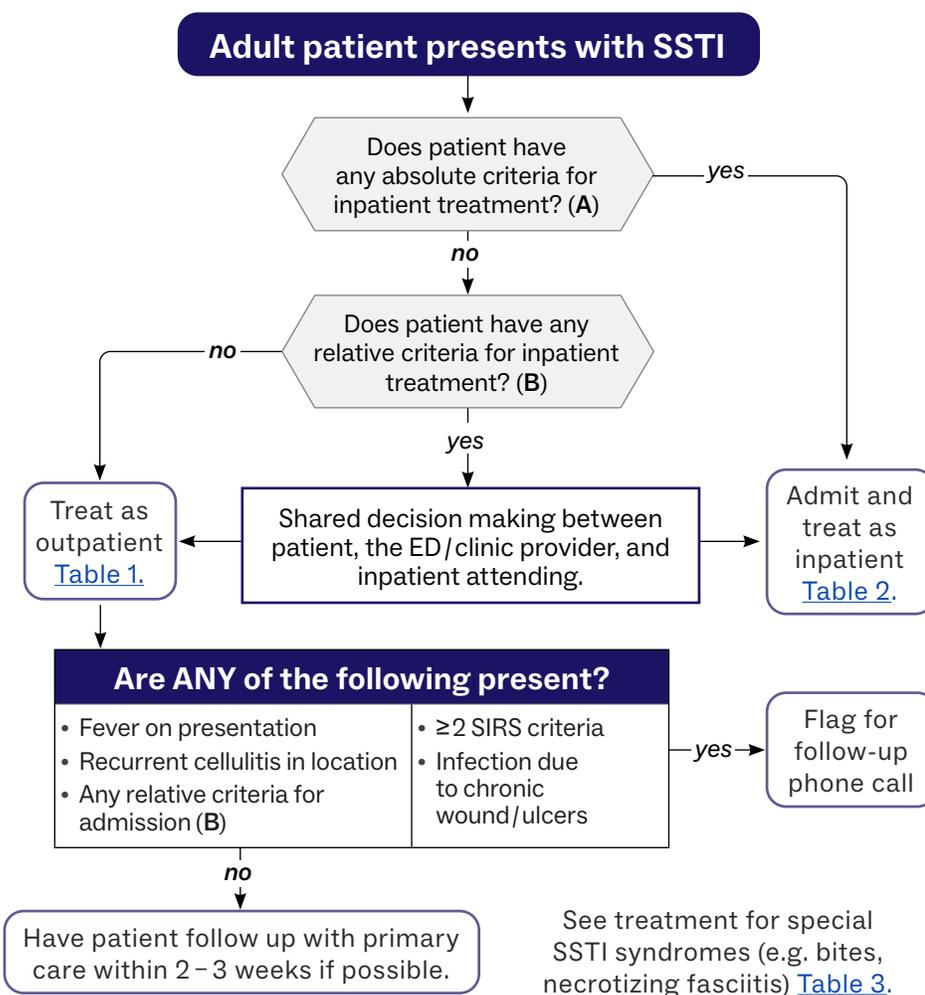
2025 Update

This guideline was created by the Antimicrobial Stewardship Program at Intermountain Health. It guides the assessment and treatment of adult patients with purulent and non-purulent cellulitis presenting to emergency departments or urgent care and primary care clinics.

What's New?

- The standard antibiotic duration for outpatient cellulitis has been reduced to 5 days.
- If linezolid is used in necrotizing fasciitis, there is no need to add clindamycin.
- Updated dosing recommendations for cephalexin and clindamycin can be found in [Tables 1. and 2.](#)
- Meropenem is no longer recommended.

Skin and Soft Tissue Infections (SSTI) Initial Assessment



(A) Absolute Criteria for Inpatient Treatment of SSTI

- Hemodynamic instability (hypotension)
- Possible necrotizing infection and rapid disease progression
- Unstable comorbidities (e.g. decompensated heart failure, acute or chronic kidney injury) with ≥ 2 SIRS criteria*
- Neutropenia or severe immunosuppression** with ≥ 2 SIRS criteria*

(B) Relative Criteria for Inpatient Treatment of SSTI

- Failed outpatient therapy
- Neutropenia or severe immunosuppression** with a mild/localized infection
- Extensive cellulitis and/or large abscess
- Lymphedema with extensive panniculitis
- Infection risk in high-risk locations which often required surgery (e.g. orbital, hand, perineal)
- Abscess in hard-to-drain location (e.g. groin/face)
- ≥ 2 SIRS criteria unresolved with ED management
- Social or personal factors that interfere with outpatient care
- Mild to moderate immunosuppression† with ≥ 2 SIRS criteria

*SIRS Criteria

- Temperature: $> 38.3^{\circ}\text{C}$ or $< 36^{\circ}\text{C}$
- Heart rate: > 90 bpm
- Respiratory rate: > 20 breaths per minute
- WBC: $> 12,000 / \text{mm}^3$ or $< 4,000 / \text{mm}^3$
- WBC: $> 10\%$ band forms

**Organ transplant, daily prednisone ≥ 20 mg, HIV infection with blood CD4 count $< 200 / \text{mm}^3$, or untreated HIV. † End-stage organ dysfunction, diabetes, TNF inhibitor therapy, recent chemotherapy without neutropenia, prolonged daily prednisone ≤ 20 mg.

Table 1. OUTPATIENT SSTI Treatment Regimens

Infection type	Action	Antibiotic and Dose (Preferred in Bold)
0–1 SIRS criteria met (pg 1)		
Purulent cellulitis, abscess, or wound infection [§]	<ul style="list-style-type: none"> Incision and drainage, if applicable. This may be a reasonable stand-alone treatment (70–85% cure rate) for patients at high risk for antibiotic-related adverse events such as <i>C. diff</i> infection. If surgical site infection, suture removal at the surgeon's discretion Consider obtaining routine culture of purulence Elevate affected body part 	TMP/SMX 1 DS PO BID x 5 days (2 DS if > 80 kg) OR Doxycycline 100 mg PO BID x 5 days OR Clindamycin* 450 mg PO QID x 5 days
Non-purulent cellulitis [§]	<ul style="list-style-type: none"> Consider soft tissue ultrasound to rule out occult abscesses Elevate affected body part Consider ibuprofen 400 mg PO Q6 hours x 5 days if no contraindications 	Cephalexin 500 mg PO QID x 5 days (1 g if >80 kg) OR Clindamycin* 450 mg PO QID x 5 days
≥2 SIRS criteria met (pg 1)		
Purulent cellulitis, abscess, or wound infection [§]	<ul style="list-style-type: none"> Incision and drainage, if applicable If surgical site infection, suture removal at the surgeon's discretion Obtain routine culture of purulence Elevate affected body part 	TMP/SMX 1 DS PO BID x 5 days (2 DS if >80 kg) OR Linezolid ** 600 mg PO BID x 5 days OR Doxycycline 100 mg PO BID x 5 days
Non-purulent cellulitis [§]	<ul style="list-style-type: none"> Consider soft tissue ultrasound to rule out occult abscesses Elevate affected body part Prescribe ibuprofen 400 mg PO Q6 hours x 5 days if no contraindications 	Cephalexin 1g PO QID x 5 days OR Linezolid ** 600 mg PO BID x 5 days OR Clindamycin* 450 mg PO QID x 5 days

Table 2. INPATIENT SSTI Treatment Regimens

Infection type	Action	Antibiotic and Dose (Preferred in Bold)	Notes
Purulent cellulitis, abscess, or wound infection [§]	<ul style="list-style-type: none"> Incision and drainage or surgical debridement, if applicable If surgical site infection, suture removal at the discretion of the surgeon Obtain routine culture of purulence 	Vancomycin (pharmacy to manage) OR Linezolid** 600 mg PO/IV BID	Change to targeted therapy when culture results return [†]
Non-purulent cellulitis [§]	<ul style="list-style-type: none"> Empiric antibiotic therapy Consider soft tissue ultrasound to rule out occult abscess 	Cefazolin 2 g IV Q8 hrs OR (only for severe cephalosporin allergies) Vancomycin (pharmacy to manage)	If suspect necrotizing infection, treat as if severe infection (below)
Severe acute infection in addition to chronic wound or known colonization with gram negative organisms	<ul style="list-style-type: none"> Incision and drainage or surgical debridement, if applicable 	Vancomycin (pharmacy to manage) AND Cefepime 2 g IV Q8 hrs <ul style="list-style-type: none"> Linezolid** 600 mg PO/IV BID may be substituted for vancomycin Piperacillin/tazobactam 4.5 g IV Q8 hrs may be substituted for cefepime if severe allergy 	Change to targeted therapy when culture results return [†]

* Approximately 25% MRSA and 20% of MSSA is resistant to clindamycin. ** Administering linezolid concomitantly with other serotonergic drugs may cause serotonin syndrome. This occurrence is rare, contact ID pharmacy for recommendations. † If MRSA, continue vancomycin or linezolid. If MSSA, change to cefazolin 2 g IV Q8 hrs. § For purulent cellulitis and abscesses, it is recommended to provide coverage for *Staphylococcus aureus*, including MRSA. For non-purulent cellulitis, coverage should be directed toward *Streptococcus pyogenes* (group A strep), as it is the most common organism.

Inpatient duration

- For most patients, 5-day antibiotic treatment is sufficient.
- Duration and type of antibiotics depend on source control, patient improvement, and the presence of bacteremia.
- Antibiotics can often be stopped before complete visual resolution of infection.
- Cellulitis may appear to worsen within the first 48 hrs of antibiotics, but this does NOT always indicate treatment failure.
- Consult with the ID pharmacy or consult service for complicated cases.

BID- twice per day; DS- double strength; PO- orally; QID- four times per day; SIRS- systemic inflammatory response syndrome; TMP/SMX- trimethoprim/sulfamethoxazole

Table 3. Special SSTI Syndromes

Infection type	Actions	Antibiotic Treatment (Preferred in Bold)		Notes
Animal bites (cat/dog)	<ul style="list-style-type: none"> Consider x-ray to evaluate bony structures Aggressive wound care Evaluate for tetanus and rabies vaccinations 	Shallow/Mild infections (oral antibiotics)	Amoxicillin / Clavulanate 875 mg PO BID OR Doxycycline 100 mg PO BID OR TMP/SMX 1 DS BID (2 DS if > 80 kg) and Metronidazole 500 mg PO BID-TID	Prophylactic antibiotics x 3 – 5 days recommended in immunocompromised or asplenic patients or those who have: <ul style="list-style-type: none"> Advanced liver disease Pre-existing or resultant edema of the affected area Injuries that may have penetrated the periosteum or joint capsule Moderate-to-severe injuries (especially of hand/face) including wounds that: <ul style="list-style-type: none"> Are deep Require surgical repair Are close to a bone or joint
		Deep/Severe infections (IV antibiotics)	Ampicillin/Sulbactam 3 g IV Q6 hrs OR Ceftriaxone 2 g IV daily and Metronidazole 500 mg IV/PO Q8–12 hrs	
Human bites and clenched fist injuries		Same as above		Prophylactic antibiotics x 3 – 5 days should be given for all bites or injuries if dermis is compromised
Necrotizing Fasciitis	<ul style="list-style-type: none"> Urgent surgical consultation Obtain blood cultures before starting IV antibiotics Antibiotic therapy 		Piperacillin/Tazobactam 4.5 g IV Q8 hrs OR Cefepime: 2 g IV Q8 hours PLUS Vancomycin (pharmacy to manage) and Clindamycin 900 mg IV Q 8 hrs OR Linezolid** 600 mg IV/PO Q12 hrs	<ul style="list-style-type: none"> CT or MRI can be performed to demonstrate gas and necrosis only if patient is stable Do NOT use linezolid monotherapy IVIG has not been shown to have an impact on mortality or length of stay and is not routinely recommended¹⁵ Clindamycin should continue for at least 3 days or until no further surgical intervention is planned

** Administering linezolid concomitantly with other serotonergic drugs may cause serotonin syndrome. This occurrence is rare, contact ID pharmacy for recommendations. BID- 2 x per day; DS- double strength; PO- orally; TID- 3 x per day; TMP/SMX- trimethoprim/sulfamethoxazole

Bibliography

- Kamath RS, et al. Guidelines vs Actual Management of Skin and Soft Tissue Infections in the Emergency Department. *Open Forum Infect Dis.* 2018;5(1):ofx188
- Duane TM, et al. Surgical Infection Society 2020 Updated Guidelines on the Management of Complicated Skin and Soft Tissue Infections. *Surg Infect (Larchmt).* 2021;22(4):383-399
- Daum RS, et al. A placebo-controlled trial of antibiotics for smaller skin abscesses. *N Engl J Med.* 2017;376(26):2545-2555.
- Falagas ME et al. Narrative review: Diseases that masquerade as infectious cellulitis. *Ann Intern Med.* 2005;142(1):47-55.
- Jain SR et al. Infectious diseases specialist management improves outcomes for outpatients diagnosed with cellulitis in the emergency department: A double cohort study. *Diagn Microbiol Infect Dis.* 2017;87(4):371-375.
- Kilburn SA et al. Interventions for cellulitis and erysipelas. *Cochrane Database Syst Rev.* 2010;2010(6):CD004299.
- Miller LG, et al. Clindamycin versus trimethoprim-sulfamethoxazole for uncomplicated skin infections. *N Engl J Med.* 2015;372(12):1093-1103.
- Moran GJ, et al. Effect of cephalexin plus trimethoprim- sulfamethoxazole vs cephalexin alone on clinical cure of uncomplicated cellulitis: A randomized clinical trial. *JAMA.* 2017;317(20):2088-2096.
- Pallin DJ, et al. Clinical trial: Comparative effectiveness of cephalexin plus trimethoprim-sulfamethoxazole versus cephalexin alone for treatment of uncomplicated cellulitis: A randomized controlled trial. *Clin Infect Dis.* 2013;56(12):1754-1762.
- Ramsey TD, et al. Serotonergic and adrenergic drug interactions associated with linezolid: A critical review and practical management approach. *Ann Pharmacother.* 2013;47(4):543-560.
- Talan DA, et al. Trimethoprim-sulfamethoxazole versus placebo for uncomplicated skin abscess. *N Engl J Med.* 2016;374(9):823-832.
- Talan DA, et al. A randomized trial of clindamycin versus trimethoprim-sulfamethoxazole for uncomplicated wound infection. *Clin Infect Dis.* 2016;62(12):1505-1513.
- Weng QY, et al. Costs and Consequences Associated With Misdiagnosed Lower Extremity Cellulitis. *JAMA Dermatol.* 2017;153(2):141-146.
- Yue J, et al. Linezolid versus vancomycin for skin and soft tissue infections. *Evid Based Child Health.* 2014;9(1):103-166.
- Kadri SS, et al. Impact of Intravenous Immunoglobulin on Survival in Necrotizing Fasciitis With Vasopressor-Dependent Shock: A Propensity Score-Matched Analysis From 130 US Hospitals. *Clin Infect Dis.* 2017;64(7):877-885
- Bruun T, et al. Early Response in Cellulitis: A Prospective Study of Dynamics and Predictors. *Clin Infect Dis.* 2016;63(8):1034-1041.

This CPM presents a model of best care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Whitney Buckel, PharmD; Antimicrobial Stewardship Manager; whitney.buckel@imail.org

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