

Guideline/Protocol Title:	UCSF Medical Center Guideline for the Management of Suspected Skin and Soft Tissue Infections in Adults
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P&T Approval Date:	
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PURPOSE/SCOPE:	<ul style="list-style-type: none"> • This guideline establishes evidence-based consensus standards for management of suspected skin and soft tissue infections (SSTI) among adult outpatients and hospitalized inpatients at UCSF Medical Center. • This guideline is based on review of national guidelines, primary literature, and the multi-disciplinary perspectives of experienced providers at UCSF Medical Center. • Practice guidelines are intended to assist with clinical decision-making for common situations but cannot replace personalized evaluation and management decisions based on individual patient factors. • Guidelines will be updated every 2 years
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EXECUTIVE SUMMARY
The SSTI Guideline is presented in four parts as shown in the flowsheets on pages 6-9: management of purulent SSTI, management of non-purulent SSTI, management of lower extremity ulcerative SSTI, and management of recurrent/refractory SSTI.

BACKGROUND / INTRODUCTION
The SSTI Guideline represents a multi-departmental effort to establish best-practices in the treatment of SSTI, reduce practice variation, and provide a framework to help providers address challenges in the treatment of SSTI. This guideline focuses on antibiotic selection and treatment duration for purulent SSTI, non-purulent SSTI, and ulcerative SSTI. In addition, guidance on the management of recurrent/refractory SSTI is also provided.

Intended Population:

- **Inclusion:** Outpatients or hospitalized inpatients with suspected SSTI, including non-purulent SSTI, purulent SSTI, necrotizing SSTI, and ulcerative SSTI.
- **Exclusion:** SSTI with underlying hardware, bone/joint infections, bite-associated infections, infections associated with immersion, infections associated with penetrating trauma, orbital/periorbital cellulitis, perianal/perineal/perirectal infections, sacral decubitus ulcer infections, neutropenic patients (ANC < 500), and surgical site infections (superficial, deep, organ space).

Definitions:

- Non-purulent SSTI: Cellulitis or erysipelas in the absence of abscess or purulent drainage
- Purulent SSTI: Abscess or cellulitis with pustules
- Ulcerative SSTI: Chronic skin ulceration of the lower limb, including those ulcers associated with diabetes or vascular insufficiency (e.g., peripheral arterial disease, venous insufficiency)
- Recurrent/refractory SSTI: More than 3 occurrences per year of either non-purulent or purulent SSTI

Diagnosis and Microbiologic Testing:

Purulent and Non-Purulent SSTI:

- Bacterial Gram-stain and culture are recommended for patients who undergo incision and drainage or surgical debridement.
 - Cultures should be obtained, where appropriate, prior to starting empiric antimicrobial therapy in stable patients.
 - Wound swabs do not correlate well with deep cultures and should be avoided
- In the absence of systemic signs of infection, blood cultures are not recommended.
- Consult ID and/or Dermatology if patient is not clinically responding to recommended treatment.
- Imaging is only indicated if a patient is failing therapy (to evaluate for deep abscess) or if there is concern for necrotizing infection. In the latter case, surgery should not be delayed by imaging studies if suspicion is high.

Ulcerative SSTI:

- Clinical diagnosis involves at least 2 signs or symptoms of infection (see **Table 1**)
- Classify infection severity based on IDSA/Society for Vascular Surgery (SVS) Wound, Ischemia, and Foot Infection (WIFI) criteria (see **Table 1**)
- Common pathogens:
 - Gram positive cocci (GPCs), especially staphylococci, are the most common pathogens
 - Gram negative rods (*Escherichia coli*, *Klebsiella pneumoniae*, *Proteus* spp.) are common co-pathogens in chronic infections or infections following prior antibiotic treatment
 - Anaerobes are not major pathogens in mild to moderate infections; may be co-pathogens in ischemic or necrotic wounds
 - Common pathogens in diabetic foot osteomyelitis:
 - *Staphylococcus aureus*, *Escherichia coli*, Group B *Streptococcus* (frequent co-pathogen with *Staph aureus*), *Klebsiella pneumoniae*, *Proteus* spp. and less commonly *Pseudomonas aeruginosa*
- Obtaining cultures:
 - Cultures should not be sent for clinically uninfected wounds
 - For infected wounds, obtain a deep tissue culture (in the operating room) for aerobic and anaerobic culture. If debridement is not an option, consider obtaining a superficial wound

culture. If *Staph aureus* or Group A *Streptococcus* is isolated, treat these as pathogens (other bacteria cultured superficially are likely contaminants).

- Obtain cultures prior to starting empiric antibiotics, if possible
- Decisions about remaining infected tissue after debridement should be based on both intra-operative appearance of bone as well as margins on path

Reference #	Citation
1	Acquisto NM, Bodkin RP, Brown JE, et al. MRSA nares swab is a more accurate predictor of MRSA wound infection compared with clinical risk factors in emergency department patients with skin and soft tissue infections. <i>Emerg Med J</i> . 2018 Jun;35(6):357-360.
2	Callejo-Torre F, Eiros Bouza JM, Olaechea Astigarraga P, et al. Risk factors for methicillin-resistant <i>Staphylococcus aureus</i> colonisation or infection in intensive care units and their reliability for predicting MRSA on ICU admission. <i>Infez Med</i> . 2016 Sep 1;24(3):201-9.
3	Daum RS, Miller LG, Immergluck L, et al. A Placebo-Controlled Trial of Antibiotics for Smaller Skin Abscesses. <i>N Engl J Med</i> . 2017 Jun 29;376(26):2545-2555.
4	Fritz SA, Camins BC, Eisenstein KA, et al. Effectiveness of measures to eradicate <i>Staphylococcus aureus</i> carriage in patients with community-associated skin and soft-tissue infections: a randomized trial. <i>Infect Control Hosp Epidemiol</i> . 2011 Sep;32(9):872-80.
5	Gottlieb M, DeMott JM, Hallock M, Peksa GD. Systemic Antibiotics for the Treatment of Skin and Soft Tissue Abscesses: A Systematic Review and Meta-Analysis. <i>Ann Emerg Med</i> . 2019 Jan;73(1):8-16.
6	Guideline for Diabetic Foot Problems: Prevention and Management. National Institute for Health and Care Excellence (NICE), 2015.
7	Hepburn MJ, Dooley DP, Skidmore PJ, et al. Comparison of short-course (5 days) and standard (10 days) treatment for uncomplicated cellulitis. <i>Arch Intern Med</i> . 2004 Aug 9-23;164(15):1669-74.
8	Jenkins TC, Knepper BC, McCollister BD, et al. Failure of outpatient antibiotics among patients hospitalized for acute bacterial skin infections: What is the clinical relevance? <i>Am J Emerg Med</i> . 2016 Jun;34(6):957-62.
9	Karanika S, Zervou FN, Zacharioudakis IM, Paudel S, Mylonakis E. Risk factors for methicillin-resistant <i>Staphylococcus aureus</i> colonization in dialysis patients: a meta-analysis. <i>J Hosp Infect</i> . 2015 Nov;91(3):257-63.
10	Lee SJ, et al. Risk Factors of Methicillin-Resistant <i>Staphylococcus Aureus</i> and <i>Pseudomonas</i> Infection in Diabetic Foot Ulcers in Korea. <i>Journal of Wound Management and Research</i> . 2017; 13(2): 29-34.
11	Lipsky BA, Berendt AR, Cornia PB, et al. 2012 Infectious Diseases Society of America clinical practice guideline for the diagnosis and treatment of diabetic foot infections. <i>Clin Infect Dis</i> . 2012 Jun;54(12):e132-73.
12	Liu C, Bayer A, Cosgrove SE, et al. Clinical practice guidelines by the infectious diseases society of america for the treatment of methicillin-resistant <i>Staphylococcus aureus</i> infections in adults and children. <i>Clin Infect Dis</i> . 2011 Feb 1;52(3):e18-55.
13	Miller LG, Daum RS, Creech CB, et al. Clindamycin versus trimethoprim-sulfamethoxazole for uncomplicated skin infections. <i>N Engl J Med</i> . 2015 Mar 19;372(12):1093-103.
14	Mills JL, Conte MS, Armstrong DG, et al. The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: Risk stratification based on Wound, Ischemia, and foot Infection (WIFI). <i>J Vasc Surg</i> . 2014 Jan;59(1):220-34.e1-2.

	Parsa H, Samani S. Microbiological Features and Risk Factors in Patients With Diabetic Foot Ulcers. <i>Wounds</i> . 2015 Nov;27(11):308-12.
15	Paydar KZ, Hansen SL, Charlebois ED, Harris HW, Young DM. Inappropriate antibiotic use in soft tissue infections. <i>Arch Surg</i> . 2006 Sep;141(9):850-4; discussion 855-6.
16	Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. <i>Clin Infect Dis</i> . 2014 Jul 15;59(2):e10-52.
17	Talan DA, Mower WR, Krishnadasan A, et al. Trimethoprim-Sulfamethoxazole versus Placebo for Uncomplicated Skin Abscess. <i>N Engl J Med</i> . 2016 Mar 3;374(9):823-32.
18	Thomas KS, Crook AM, Nunn AJ, et al. Penicillin to prevent recurrent leg cellulitis. <i>N Engl J Med</i> . 2013 May 2;368(18):1695-703.

Revision History	
Revision Date	Update(s)
9.2024	Ertapenem recommendations for ZSFG removed due to changes in hospital restriction policy

Table I: IDSA/SVS Wifi Wound Severity Classification

Clinical manifestation of infection	SVS Wifi	IDSA Infection Severity
No symptoms or signs of infection	0	Uninfected
Infection present, as defined by the presence of at least 2 of the following: <ul style="list-style-type: none"> • Local swelling or induration • Erythema >0.5 to ≤2 cm around the ulcer • Local tenderness or pain • Local warmth • Purulent discharge (thick, opaque to white, or sanguineous secretion) Local infection involving only the skin and the subcutaneous tissue (without involvement of deeper tissues and without systemic signs as described below) Exclude other causes of an inflammatory response of the skin (e.g., trauma, gout, acute Charcot neuro-osteoarthropathy, fracture, thrombosis, venous stasis)	1	Mild
Local infection (as described above) with erythema >2 cm, or involving structures deeper than skin and subcutaneous tissues (e.g., abscess, osteomyelitis) and No systemic inflammatory response signs (as described below)	2	Moderate
Local infection (as described above) with signs of SIRS, as manifested by 2 or more of the following: <ul style="list-style-type: none"> • Temperature >38° or <36°C • Heart rate >90 bpm • Respiratory rate >20 breaths/min or PaCO₂ <32 mm Hg • WBC >12,000 or <4,000 or 10% bands 	3	Severe

Exclusions:
 SSTI Location:
 - Underlying hardware, bone/joint infection, surgical site infection, orbital/periorbital cellulitis, perianal/perineal/perirectal infection
 Injury Context:
 - Bite-associated infection, infection associated with immersion or penetrating trauma
 Patient Factors:
 - Neutropenia (ANC < 500)

Separate oral antibiotic coverage for MRSA and Strep spp is not recommended for purulent SSTI

Management of Purulent SSTI (abscess/pustule)
 *For ulcerative SSTI, refer to separate Ulcerative SSTI guideline

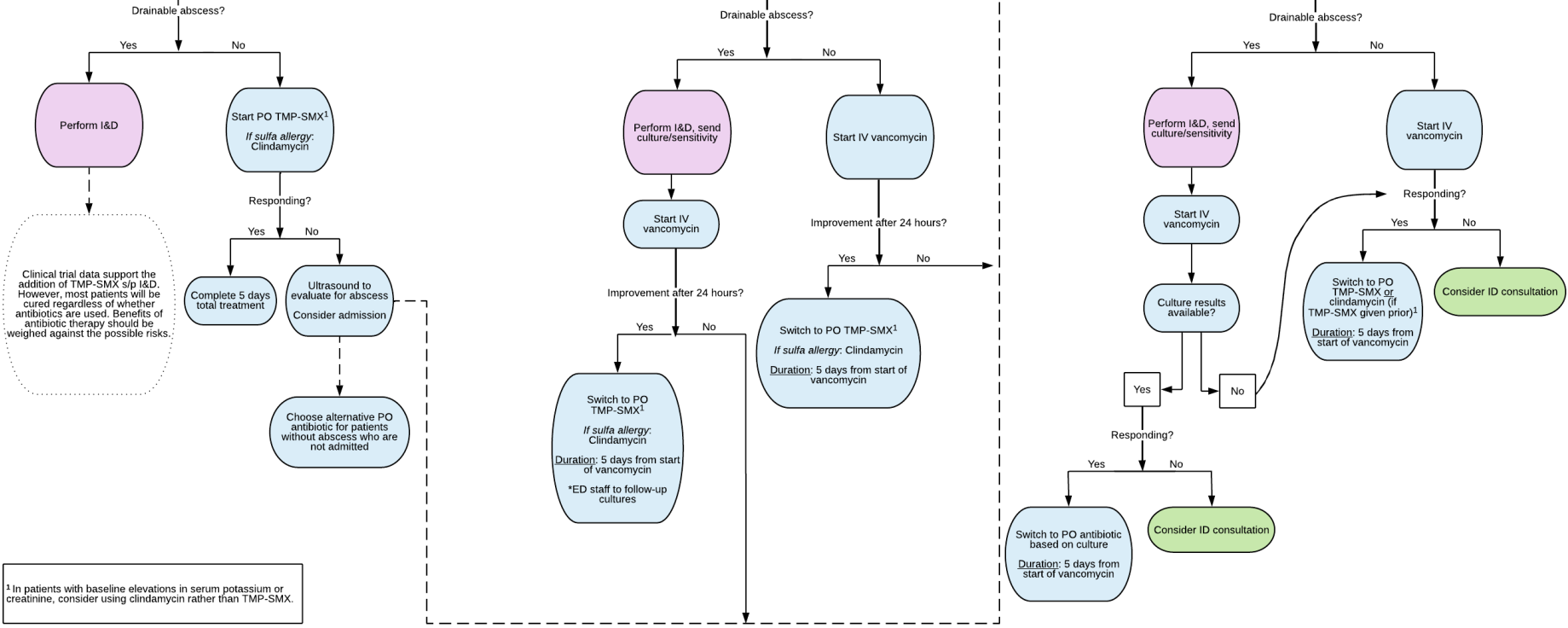
Concern for necrotizing infection?
 STOP! Call appropriate surgical service and consult ID

Start IV vancomycin + Piperacillin-tazobactam (UCSF/SFVA/ZSFG) + Clindamycin

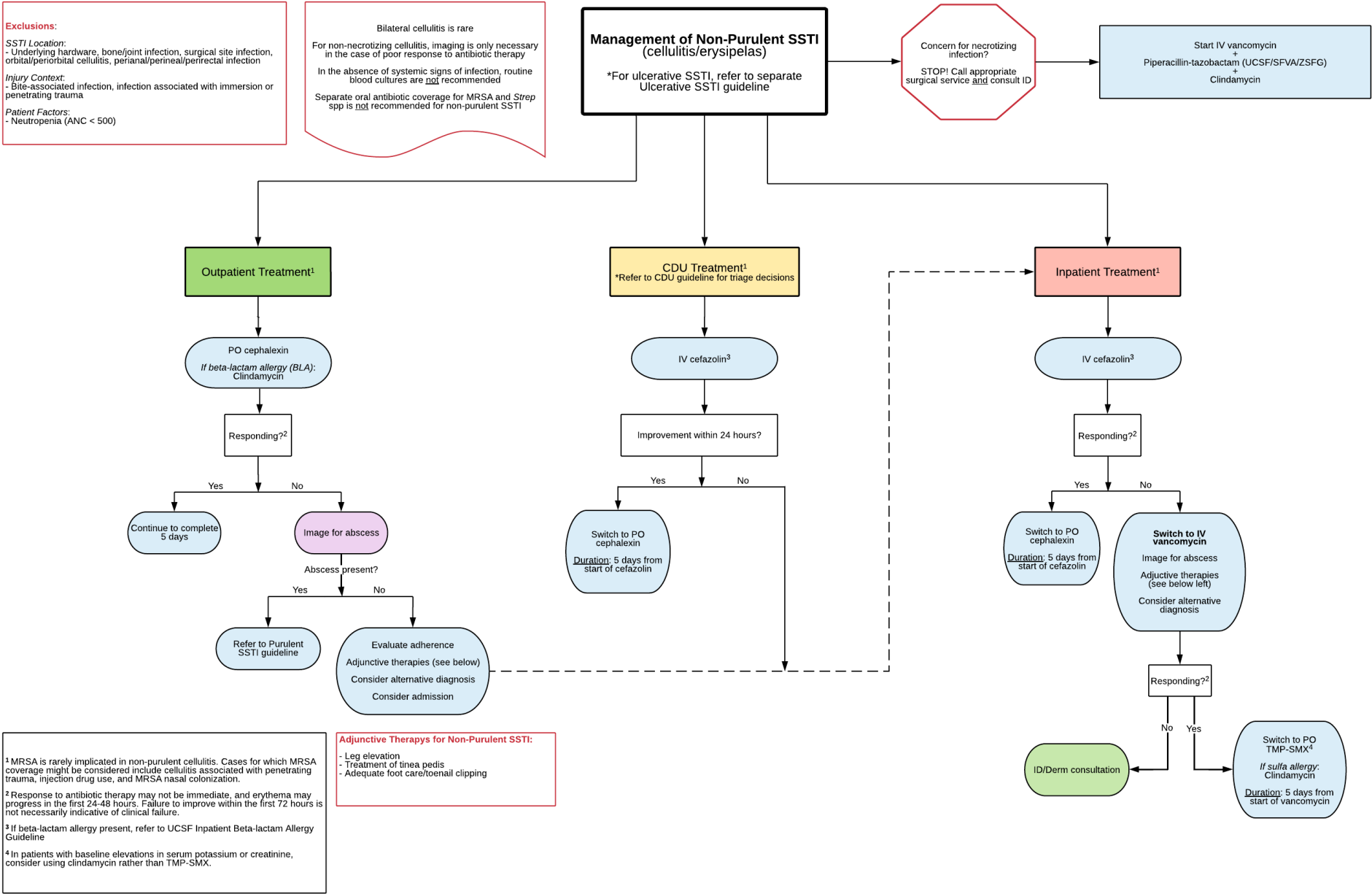
Outpatient Treatment

CDU Treatment
 *Refer to CDU guideline for triage decisions

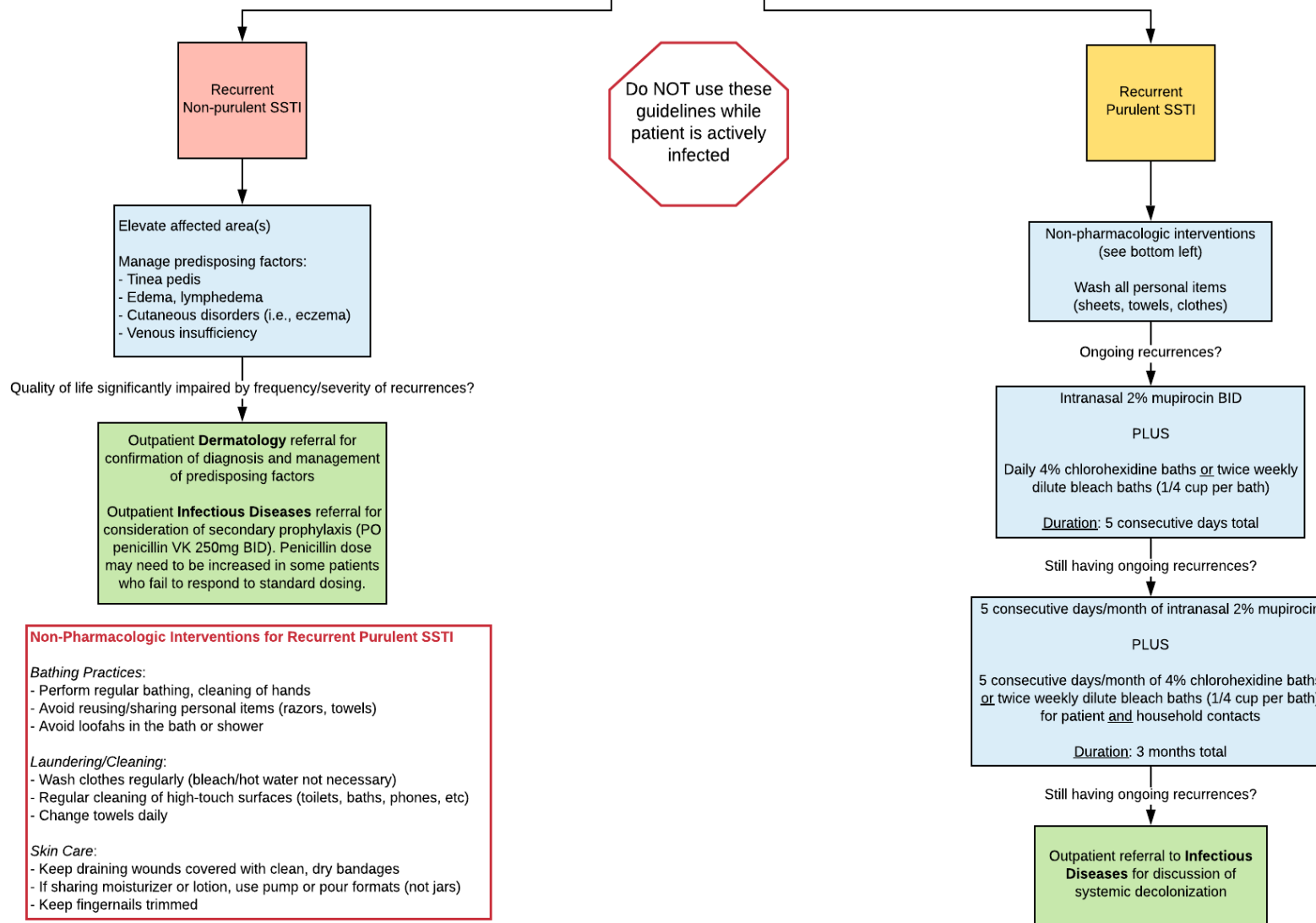
Inpatient Treatment



¹ In patients with baseline elevations in serum potassium or creatinine, consider using clindamycin rather than TMP-SMX.



Management of Recurrent SSTI (3 or more episodes/year)



Exclusions:

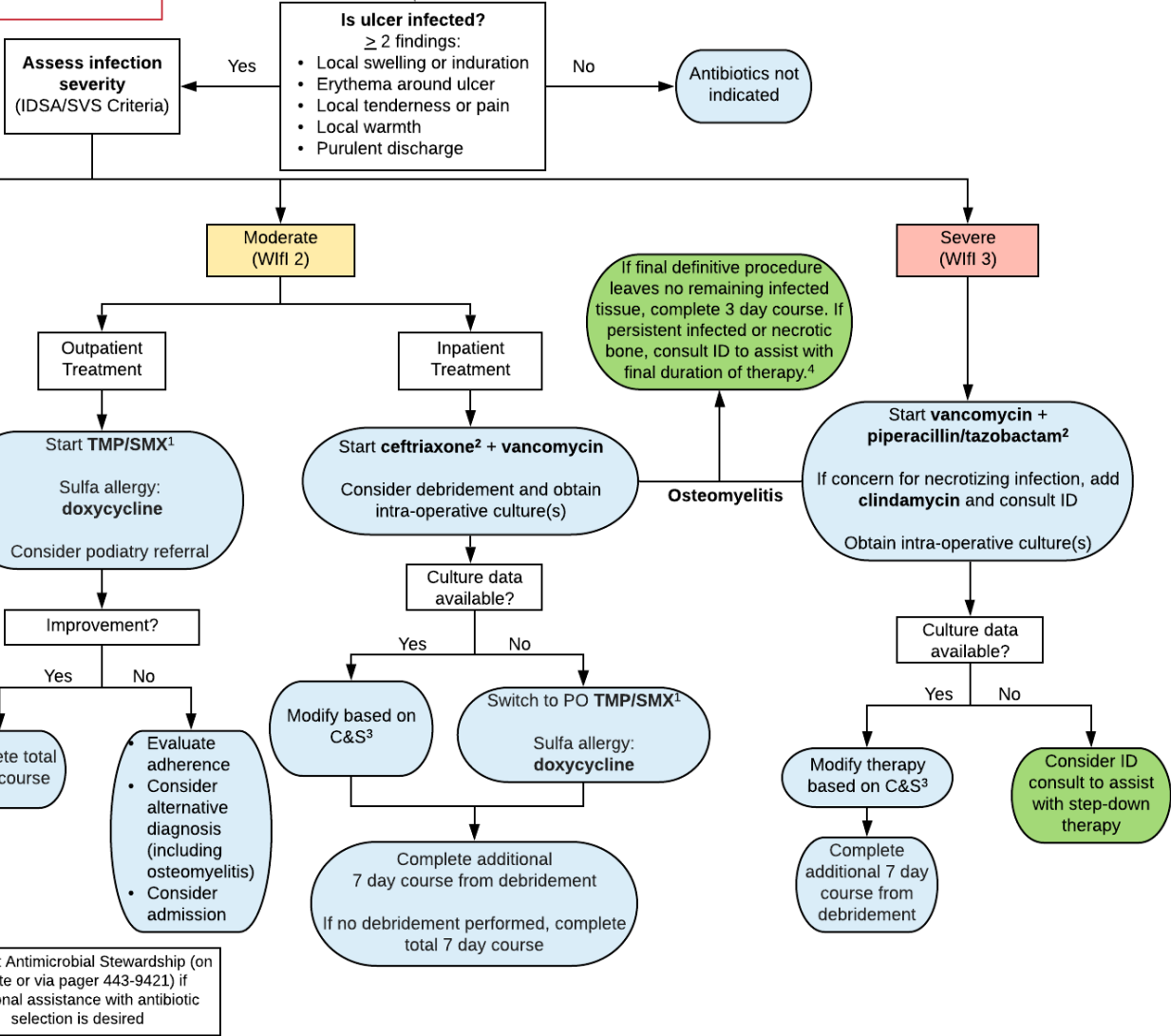
SSTI Location:

- Underlying hardware, bone/joint infection, surgical site infection, sacral debucitus ulcer infection, perianal/perineal/perirectal infection

Patient Factors:

- Neutropenia (ANC < 500)

Management of Lower Extremity Ulcerative SSTI



¹In patients with baseline elevations in serum potassium or creatinine, consider doxycycline rather than TMP-SMX.

²If beta-lactam allergy present, refer to UCSF Inpatient Beta-lactam Allergy Guideline

³C&S: culture & sensitivities

⁴Decisions about remaining infected tissue should be informed by intra-operative appearance + margins on path

Superficial wound cultures do not correlate with deep tissue cultures and are not recommended

Contact Antimicrobial Stewardship (on Voalte or via pager 443-9421) if additional assistance with antibiotic selection is desired

Appendix

SSTI Dosing, Non-dialysis			
Drug	CrCl > 50 mL/min	CrCl 15-50 mL/min	CrCl < 15 mL/min
Cephalexin	500mg PO TID	250mg PO TID	250mg PO daily
Clindamycin	300-450mg PO TID	300-450mg PO TID	300-450mg PO TID
Doxycycline	100mg PO BID	100 mg PO BID	100mg PO BID
TMP/SMX DS 800/160 mg	40-59kg: 1 DS tab PO BID 60-70kg: 1 DS tab PO TID >80kg: 2 DS tab PO BID	40-59kg: 1 DS tab PO daily 60-79kg: 1 DS tab PO BID >80kg: 1 DS tab PO TID	Use alternative antibiotic

SSTI Dosing in Intermittent and Continuous Hemodialysis		
Drug	Intermittent Hemodialysis	Continuous Renal Replacement Therapy
Cephalexin	500mg PO daily (post-HD on HD days)	Use dosage for CrCl>50
Clindamycin	300mg PO TID	300mg PO TID
Doxycycline	100mg PO BID	100mg PO BID
TMP/SMX DS 800/160 mg	2.5-5mg/kg/day TMP component*	5mg/kg/day TMP component*

*Use adjusted body weight