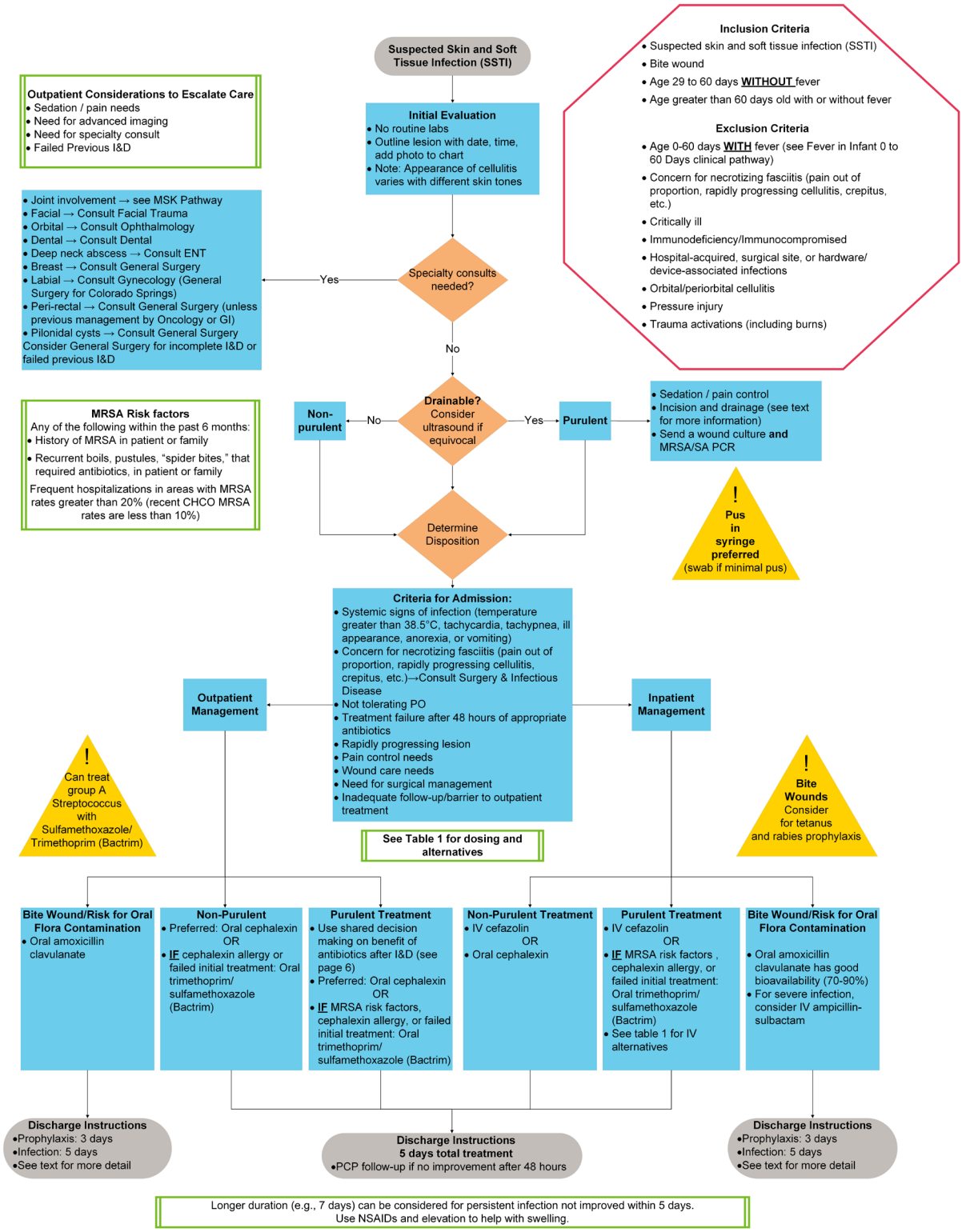
SKIN AND SOFT TISSUE INFECTION (SSTI)

ALGORITHM



QUICK LINKS: Table 1: Antibiotic Dosing/Alternatives Figure 1: Tetanus Antibiotics after I&D

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TARGET POPULATION

Inclusion Criteria[1]

- Suspected skin and soft tissue infection (SSTI)
- Bite wound
- Age 29 to 60 days old **WITHOUT** fever
- Age greater than 60 days old with or without fever

Exclusion Criteria

- Age 0 to 60 days **WITH** fever (see Fever in Infant 0 to 60 Days clinical pathway)
- Concern for necrotizing fasciitis (pain out of proportion, rapidly progressing cellulitis, crepitus, etc.)
- Critically ill
- Immunodeficiency/immunocompromised
- Hospital-acquired, surgical site, or hardware/device-associated infections
- Orbital/periorbital cellulitis
- Pressure injury
- Trauma activations (including burns)

BACKGROUND | DEFINITIONS

Cellulitis

A skin and soft tissue infection (SSTI) involving the dermis and subcutaneous fat[2].

Cutaneous Abscess

A SSTI characterized by a collection of pus within the dermis or subcutaneous space[2]. Cutaneous abscesses may or may not be associated with cellulitis[2].

Purulent

- Actively draining pus or history of draining pus

- Abscess present

INITIAL EVALUATION

Take special note of:

Location(s) of reported lesions necessitating specialty surgical consultation

- Concern for joint involvement → see Musculoskeletal (MSK) Pathway
- Facial → Consult Facial Trauma
- Orbital → Consult Ophthalmology
  - Pre-septal cellulitis does not require ophthalmology consult unless other concerning exam findings present
- Dental → Consult Dental
- Deep neck abscess → Consult ENT
- Breast → Consult General Surgery
- Labial → Consult Gynecology
- Peri-rectal → Consult General Surgery (unless previous management by Oncology or GI)
- Pilonidal cysts → Consult General Surgery

Consider General Surgery consult for incomplete I&D, or recurrent abscess after previous I&D

Bite wounds:

- History of tetanus vaccination and need for booster (see Figure 1 below)
- Indication for rabies prophylaxis (see special circumstances below)

MRSA Risk Factors[3]:

- Treatment failure or worsening on appropriate antibiotic without MRSA coverage
- Any of the following within the past 6 months:
  - History of MRSA in the patient or family
  - Recurrent boils, pustules, "spider bites," etc. that required antibiotics, in patient or family
  - Frequent hospitalizations in areas with MRSA epidemiology rates greater than 20%
    - At Children's Hospital Colorado, our recent MRSA rates are <10%

Outpatient Considerations to Escalate Care:

- Sedation or pain control needs (e.g., intravenous or intranasal sedation or pain medication)
- Need for advanced imaging (e.g., ultrasound)
- Need for specialty surgical consultation based on location of SSTI
- Recurrent abscess after previous I&D

LABORATORY STUDIES | IMAGING

Laboratory Studies

- Routine labs (CBC with differential, inflammatory markers, etc.) are **NOT** typically indicated in uncomplicated SSTIs
- Blood cultures are **NOT** typically needed in uncomplicated SSTIs
- See guidance below on when I&D is recommended
- **Aerobic Bacterial Culture** and **MRSA/SA SSTI PCR** should be sent on any patient with purulent drainage or with an abscess undergoing I&D
    - Sending a sample of pus in a syringe is preferred, but a swab can be sent if there is minimal pus (PCR **can** be run from a swab sample)

Imaging[4]

- If there is question about whether there is a drainable fluid collection, consider imaging with bedside ultrasound (e.g., POCUS).
- If there is concern for a foreign body or deep abscess, consider ultrasound from radiology or bedside ultrasound if comfortable.
- Ultrasound findings:
    - **Cellulitis**: Subcutaneous tissue edema, also referred to as "cobble-stoning."
    - **Abscess**: Irregularly shaped, anechoic or hypoechoic fluid collection in subcutaneous area, swirling/movement of echogenic debris ("squish sign"), compressible, lack of central blood flow, and posterior acoustic enhancement (brightness seen deep into abscess).
    - If collection is found, image in 2 planes.

I&D CLINICAL MANAGEMENT

Linear Incision and Drainage:

- Using an 11-blade scalpel, make a single linear incision (approximately 1-2 cm in length) into the most fluctuant region in the center of the abscess cavity.
- Obtain pus in a syringe (**preferred**) or swab (IF minimal/no pus present) for culture and MRSA/SA PCR.
- Perform blunt dissection with forceps to break up internal loculations and evacuate purulent fluid.
- Irrigate wound with normal saline.
- Insert a wick made from sterile packing strip directly into the wound (length equivalent to the depth of the abscess cavity).
- Optional: apply triple antibiotic ointment directly to wound.
- Apply an absorbent dressing over the wound and secure with tape.
    - Note: a draining abscess should not be covered with an airtight dressing (e.g., Tegaderm) to allow the abscess to continue to drain

Loop Incision and Drainage:

- Using an 11-blade scalpel, make a single linear incision (approximately 1-2 cm in length) into the most fluctuant

region in the center of the abscess cavity.

- Obtain pus in a syringe (**preferred**) or swab (IF minimal/no pus present) for culture and MRSA/SA PCR.
- Perform blunt dissection with forceps to break up internal loculations and evacuate purulent fluid.
- Use the forceps to tent the skin near the farthest edge or the border of the abscess cavity.
- Make a second small vertical incision with an 11-blade scalpel over the tented skin.
- Push the forceps through the second incision site and grab the end of the vessel loop. Pull the loop through the cavity and out of the primary incision site. Tie the ends together securely (with at least 5 knots), creating a loop without tension that moves easily back and forth. (Tip - tie the loop over a saline flush to create the loop shape without tension, then remove flush).
- Irrigate wound with normal saline.
- Optional: apply triple antibiotic ointment directly to wound.
- Apply an absorbent dressing over wound and secure with tape
  - Note: a draining abscess should not be covered with an airtight dressing (e.g., Tegaderm) to allow the abscess to continue to drain

Routine use of wound packing is not necessary for minor or uncomplicated abscesses

DISPOSITION

Criteria for Admission

- Systemic signs of infection (temperature greater than 38.5°C, tachycardia, tachypnea, ill appearance, anorexia, or vomiting)
- Concern for necrotizing fasciitis (pain out of proportion, rapidly progressing cellulitis, crepitus, etc.) → **Consult Surgery and Infectious Diseases**
- Not tolerating PO
- Treatment failure after 48 hours of appropriate antibiotics
- Rapidly progressing lesion
- Pain control needs
- Wound care needs
- Need for surgical management
- Inadequate follow-up/barrier to outpatient treatment

THERAPEUTICS

Pain Management

- Incision and drainage is a painful procedure, consider the use of intranasal (IN) or intravenous (IV) medications for pain control, or the use of procedural sedation (refer to the ED Sedation order-set for procedural sedation).
- Injectable lidocaine can be used with caution as it may not provide adequate pain control
- Acetaminophen and/or ibuprofen are sufficient for pain management AFTER incision and drainage, if needed

It is important to treat pain (anxiolysis alone is NOT sufficient)

Antibiotics[5,6]

When to consider antibiotics for an abscess:

- Cellulitis extending significantly beyond boundaries of fluctuance
- Complex abscess (potentially involving deep soft tissues, multiple lesions, etc.)
- Inadequate I&D or recurrence of same abscess
- High fever or other systemic symptoms

Antibiotics provide a modest reduction in the risk of treatment failure (5%), recurrence (8%), hospitalization (2%), similar infections among household contacts (2%), and reduce pain during treatment.[6]

Antibiotics increase the risk of antibiotic resistance and gastrointestinal side effects, such as nausea and diarrhea.[6]

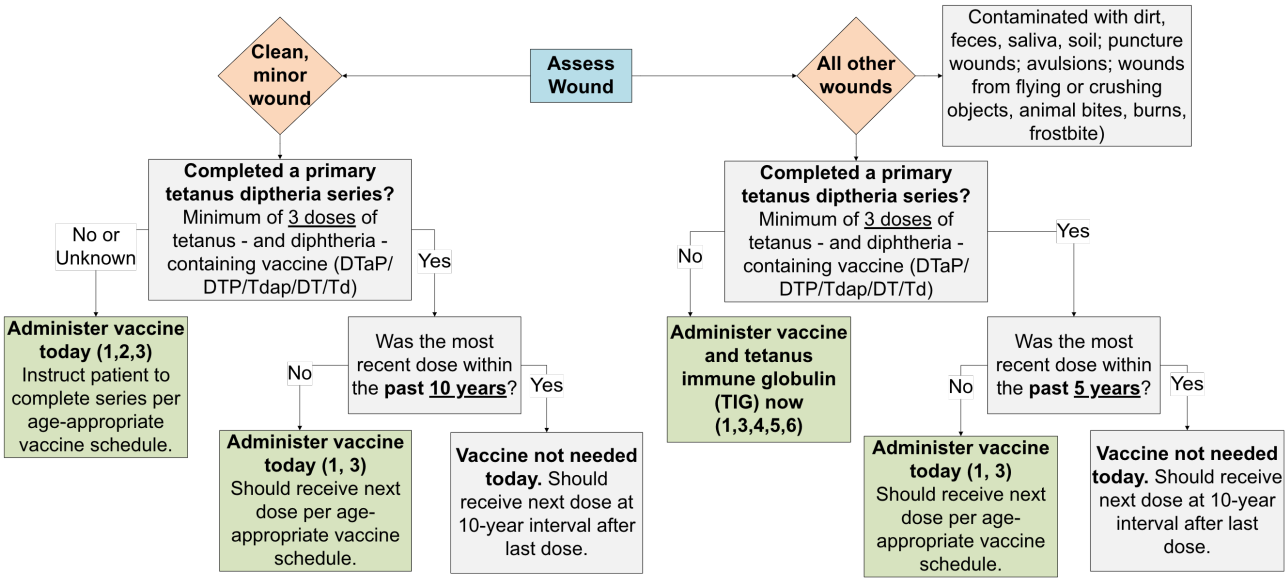
Shared decision making with families should be utilized to determine whether to treat with antibiotics for mild abscesses, considering individual values and preferences (e.g., preferences about antibiotic use, reasons to avoid adverse side effects, medication allergies, etc.).[6]

Special circumstances to consider:

- Indications for tetanus prophylaxis (see Figure 1)
- Indications for rabies prophylaxis:
  - Discuss with CDPHE Rabies Division (303-692-2700) or consult Infectious Diseases
  - Rabies risk assessment following a dog or cat bite
  - Rabies risk assessment following a wild animal bite
- Risk of oral flora contamination (e.g., human or animal bite, puncture wound with toothpick)
  - Antibiotic of choice: Amoxicillin-Clavulanate (outpatient) or Ampicillin-Sulbactam (inpatient)
- Indications for antibiotic prophylaxis after bite wound (when infection is not present):
  - Moderate or severe bite wounds (especially if edema or crush injury is present)
  - Puncture wounds (especially penetrating bone, tendon sheath, or joint)
  - Bite wounds involving the face, hand, foot, or genital area
  - Wounds in immunocompromised and asplenic patients
  - Cat bite wounds
- Puncture wound in foot through rubber sole
  - Consider need for Pseudomonal coverage, review guidance in Red Book or discuss with Infectious Diseases
- MRSA Risk Factors

Tetanus Prophylaxis

Figure 1: Tetanus Prophylaxis in Routine Wound Management



Adapted from Red Book: 2024–2027 Report of the Committee on Infectious Diseases (33rd Edition), page 851.

1) Age-appropriate vaccine:
- DTaP for infants and children 6 weeks up to 7 years of age
- Tetanus-diphtheria (Td) toxoid for persons 7 through 9 years of age and 65 years of age and older
- Tdap for persons 11 through 64 years of age if using Adacel* or 10 years of age and older if using Boostrix*, unless the person has received a prior dose of Tdap*

2) No vaccine or TIG is recommended for infants younger than 6 weeks of age with clean, minor wounds. (No vaccine is licensed for infants younger than 6 weeks of age).
3) Tdap* is preferred for persons 11 through 64 years of age if using Adacel* or 10 years of age and older if using Boostrix* who have never received Tdap. Td is preferred to tetanus toxoid (TT) for persons 7 through 9 years, 65 years and older, or who have received a Tdap previously.
4) Give TIG 250 U IM for all ages. It can and should be given simultaneously with the tetanus-containing vaccine.
5) For infants younger than 6 weeks of age, TIG (without vaccine) is recommended for ”dirty” wounds.
6) Persons who are HIV positive should receive TIG regardless of tetanus immunization history.
*Tdap vaccines:
- Boostrix (GSK) is licensed for persons 10 years of age and older.
- Adacel (sanofi) is licensed for persons 11 through 64 years of age.

Table 1: Antibiotic Treatment Table

Treatment	Cellulitis (non-purulent)	Abscess or Purulent Cellulitis	Bite Wound/Oral Flora Contamination
Oral Choice	Cephalexin 25 mg/kg/dose TID (max 1000 mg/dose)	Cephalexin 25 mg/kg/dose TID (max 1000 mg/dose) **IF MRSA risk factors, cephalexin allergy, or failed initial treatment:** Trimethoprim / Sulfamethoxazole (Bactrim) 5 mg TMP/kg/dose BID • Weight less than 80 kg max 160 mg TMP/dose • Weight 80 kg or greater, max 320 mg TMP/dose	Amoxicillin-clavulanate 30 mg/kg/dose TID • Max suspension = 1000 mg/dose • Max tablet = 875 mg/dose
Oral Alternative	**IF cephalexin allergy OR failed initial treatment:** *Trimethoprim / Sulfamethoxazole (Bactrim) 5 mg TMP/kg/dose BID • Weight less than 80 kg max 160 mg TMP/dose • Weight 80 kg or greater, max 320 mg TMP/dose **Clindamycin 10 mg/kg/dose TID (max 450 mg/dose)	Linezolid • Less than 12 years: 10 mg/kg/dose TID (max 600 mg/dose) • 12 years or greater: 10 mg/kg/dose BID (max 600 mg/dose) Doxycycline 2.2 mg/kg/dose BID (max 100 mg/dose) **Clindamycin 10 mg/kg/dose TID (max 450 mg/dose)	**IF true penicillin allergy:** Trimethoprim / Sulfamethoxazole (Bactrim) 5 mg TMP/kg/dose BID • Weight less than 80 kg max 160 mg TMP/dose • Weight 80 kg or greater, max 320 mg TMP/dose **PLUS** Clindamycin 10 mg/kg/dose TID (max 450 mg/dose) **For other alternatives, discuss with Infectious Diseases**
IV Choice	Cefazolin 30 mg/kg Q8H (max 2000 mg/dose)	Cefazolin 30 mg/kg Q8H (max 2000 mg/dose) **IF MRSA risk factors:** • Trimethoprim/Sulfamethoxazole (Bactrim), Linezolid, Doxycycline, and **Clindamycin have excellent oral bioavailability; oral formulations are recommended for inpatient • **If unable to tolerate PO:** IV Linezolid (dose as above) or IV Vancomycin - target trough 10-15 mcg/mL (for dosing, see Firstline, Lexi-Comp, or use Pharmacy to dose vancomycin consult for inpatients)	Amoxicillin-clavulanate has good oral bioavailability (70-90%) **For severe infections or if unable to tolerate PO:** Consider IV Ampicillin-Sulbactam 50 mg/kg/dose Q6H (max 2000 mg ampicillin/dose)
IV Alternative	**Discuss with Infectious Diseases**		
Duration[7]	**5 days**		• Animal bite prophylaxis: **3 days** • Infection associated with animal bite: **5 days**
	Treatment should be extended (e.g., 7 days) for severe infections or if infection has not improved within 5 days		
* = TMP/SMX covers group A Streptococcus; ** = Clindamycin resistance in 20% of S. aureus (**BOTH** MSSA and MRSA) at CHCO			

PARENT | CAREGIVER EDUCATION

See DC SmartSet

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REVIEW | REVISION SCHEDULE

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