This guideline is designed to provide guidance in pediatric patients with a primary skin and soft tissue infection (SSTI). Management of skin and soft tissue infections in patients <2 months of age, or presenting with sepsis or septic shock not related to necrotizing fasciitis is beyond the scope of these guidelines. For sepsis or septic shock, refer to the [Pediatric Sepsis Guidelines](#).

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<tr>
<td>Minor Skin Infections</td>
<td><strong>Topical Therapy</strong>&lt;br&gt; Mupirocin 2% topical ointment applied BID</td>
<td>Duration: 5 days&lt;br&gt;S. aureus isolates from impetigo are commonly methicillin susceptible (MSSA).&lt;br&gt;Michigan Medicine S. aureus resistance rates are lowest for TMP-SMX 2% (2%) and doxycycline (3%), compared to clindamycin (28% in 2018). Methicillin-susceptible S. aureus (MSSA) and methicillin-resistant S. aureus (MRSA) exhibit similar rates of clindamycin resistance. If worsening or not improving after 48 hours of oral antibiotic therapy, consider adding or changing to an agent with anti-MRSA activity (i.e., TMP-SMX 2 or doxycycline).</td>
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<td><strong>Oral Therapy</strong>&lt;br&gt; 1&lt;sup&gt;st&lt;/sup&gt; line:&lt;br&gt; Cephalexin* 25 mg/kg/DOSE PO TID (max: 1 g/DOSE)&lt;br&gt; If MRSA coverage needed‡ ADD TMP-SMX* 6 mg of TMP/kg/DOSE PO BID (max: 320 mg TMP/DOSE)&lt;br&gt; Alternative to TMP-SMX if sulfa allergy&lt;br&gt; Doxycycline‡ 2.2 mg/kg/DOSE PO BID (max: 100 mg/DOSE)&lt;br&gt; Alternative for low/medium-risk allergy‡ to cephalexin§, OR high-risk allergy‡/contraindication‡ to beta-lactams:&lt;br&gt; Clindamycin 10 mg/kg/DOSE PO TID (max: 450 mg/DOSE)</td>
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<td>Topical therapy: Generally preferred over oral therapy&lt;br&gt;Oral therapy: Indicated instead of topical therapy for patients with numerous impetigo lesions or in outbreak settings to reduce transmission&lt;br&gt;Target Pathogens: <em>Staphylococcus aureus, group A Streptococcus</em></td>
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<tr>
<td>Non-Purulent Cellulitis</td>
<td>Outpatient or Step-down (from IV to PO) Therapy:&lt;br&gt; 1&lt;sup&gt;st&lt;/sup&gt; Line:&lt;br&gt; Cephalexin* 25 mg/kg/DOSE PO TID (max: 1 g/DOSE)&lt;br&gt; If MRSA coverage needed‡ ADD TMP-SMX* 6 mg of TMP/kg/DOSE PO BID (max: 320 mg TMP/DOSE)&lt;br&gt; Alternative to TMP-SMX if sulfa allergy&lt;br&gt; Doxycycline‡ 2.2 mg/kg/DOSE PO BID (max: 100 mg/DOSE)&lt;br&gt; Alternative for low/medium-risk allergy‡ to cephalexin§, OR high-risk allergy‡/contraindication‡ to beta-lactams:&lt;br&gt; Clindamycin 10 mg/kg/DOSE PO TID (max: 450 mg/DOSE)</td>
<td>Duration: 5 days&lt;br&gt;May extend therapy up to 7-10 days if lack of symptom resolution at 5 days. Cephalexin and cefazolin provide coverage for group A Streptococcus and MSSA. If lack of improvement or clinical worsening on &gt;48 hours of initial antibiotic therapy, consider adding or changing to an agent with anti-MRSA activity (i.e., TMP-SMX 2 or doxycycline).</td>
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<td>Inpatient (IV) Therapy&lt;br&gt; 1&lt;sup&gt;st&lt;/sup&gt; Line:&lt;br&gt; Cefazolin* 33 mg/kg/DOSE IV q8h (max: 2 g/DOSE)&lt;br&gt; Alternative for low/medium-risk allergy‡ to cefazolin, OR high-risk allergy‡/contraindication‡ to beta-lactams (in patients without risk for MRSA):&lt;br&gt; Clindamycin 10 mg/kg/DOSE IV q8h (max: 600 mg/DOSE)&lt;br&gt; Alternative if need for MRSA coverage‡:&lt;br&gt; Vancomycin IV*</td>
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*Localized impetigo (non-bullous or bullous)<br>• Secondarily infected skin lesions such as eczema, ulcers, or lacerations<br>• Folliculitis (small follicular abscess in epidermis)<br>**Note:** Mupirocin treatment should not exceed 10 days in order to reduce the risk of resistance development.

**Pathogens:**
- S. aureus isolates from impetigo are commonly methicillin susceptible (MSSA).
- Michigan Medicine S. aureus resistance rates are lowest for TMP-SMX 2% (2%) and doxycycline (3%), compared to clindamycin (28% in 2018). Methicillin-susceptible S. aureus (MSSA) and methicillin-resistant S. aureus (MRSA) exhibit similar rates of clindamycin resistance.

**Symptoms:**
- May extend therapy up to 7-10 days if lack of symptom resolution at 5 days.

**Clinical Worsening:**
- If lack of improvement or clinical worsening on >48 hours of initial antibiotic therapy, consider adding or changing to an agent with anti-MRSA activity (i.e., TMP-SMX 2 or doxycycline).
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<th>Setting</th>
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| Purulent Cellulitis or Abscesses including Folliculitis, Furuncles, Carbuncles | **Incision and drainage (I&D) is recommended as primary management for abscesses. Antibiotics** are (at a minimum) recommended if patient meets one of the following criteria:  
- Substantial surrounding cellulitis  
- Abscess >2 cm in diameter; >1 cm in infants and young children  
- Inability to adequately drain the abscess  
- Signs or symptoms of systemic illness (e.g., fever ≥38° C)  
- Immunodeficiency  
- Multiple sites | Duration:  
5 days  
- May extend therapy up to 7-10 days if lack of symptom resolution at 5 days.  
Cultures and susceptibilities are recommended when I&D is performed. Blood cultures are also recommended for patients with fever, rapidly progressive cellulitis, and systemic illness.  
Michigan Medicine *S. aureus* resistance rates are lowest for TMP-SMX (2%) and doxycycline (3%), compared to clindamycin (28% in 2018). Methicillin-susceptible *S. aureus* (MSSA) and methicillin-resistant *S. aureus* (MRSA) exhibit similar rates of clindamycin resistance.  
**Tailor antibiotic therapy to results of Gram stain, culture and sensitivities.**  
**Although ~70% of abscesses may resolve with I&D alone, an additional 10% are more likely to resolve with the addition of antibiotics. Clinical context should be taken into account when deciding if antibiotics are appropriate. |
| Abscess: Collection of pus within the dermis and deeper skin tissues | *Outpatient Therapy or Step-down (from IV to PO) Therapy*  
1st Line:  
**TMP-SMX**  
6 mg of TMP/kg/DOSE PO BID  
(max: 320 mg TMP/DOSE)  
**Alternative for Sulfa Allergy:**  
**Doxycycline**  
2.2 mg/kg/DOSE PO BID (max: 100 mg/DOSE) |  
| Furuncle: Infection of the hair follicle with suppuration extending through the dermis into subcutaneous tissue |  
| Carbuncle: Confluence of furuncles with wider infiltration |  
| Target Pathogen: *Staphylococcus aureus* (including MRSA) |  

**Inpatient (IV) Therapy**  
1st Line:  
**Vancomycin IV**  
**Alternative for vancomycin allergy (no Red Man Syndrome):**  
**Linezolid** PO/IV (PO preferred):  
<12 years: 10 mg/kg/DOSE TID (max: 600 mg/DOSE)  
≥12 years: 10 mg/kg/DOSE BID (max: 600 mg/DOSE) |
### Setting

**Staphylococcal Scalded Skin Syndrome (SSSS)**

Results in loss of keratinocyte cell adhesion and leads to blistering of upper layer of the skin.

**Common pathogens:** *Staphylococcus aureus* (MSSA predominantly reported in the literature)

### Empiric Therapy

**Common pathogens:**
- Peptostreptococcus
- Clostridia
- Bacteroides
- Proteus
- Enterobacter spp., Klebsiella spp., Pseudomonas spp.,
- *S. aureus*, *E. coli*, *Streptococcus*, *Group A β-hemolytic Streptococcus*,
- Pseudomonas spp., Enterobacter spp., Klebsiella spp., Proteus spp., Bacteroides spp., Clostridia spp.,
- Peptostreptococcus spp.

**1st Line:**

- **Cefazolin** 33 mg/kg/DOSE IV q8h (max: 2 g/DOSE)
  + **Clindamycin** 13 mg/kg/DOSE IV q8h (max: 900 mg/DOSE)

**Alternative for low/medium-risk allergy** to cefazolin, OR high-risk allergy/contraindication to beta-lactams:

- **Vancomycin IV**
  + **Clindamycin** 13 mg/kg/DOSE IV q8h (max: 900 mg/DOSE)

**Step-down (from IV to PO) Therapy**

**1st Line:**

- **Cephalexin** 25 mg/kg/DOSE PO TID (max: 1 g/DOSE)

**Alternative if need for MRSA coverage** or for low/medium-risk allergy** to cephalexin, OR high-risk allergy/contraindication to beta-lactams:

- **Cefepime** 50 mg/kg/DOSE IV q8h (max: 2 g/DOSE)
  + **Vancomycin IV (click for dosing)**
  + **Clindamycin** 13 mg/kg/DOSE IV q8h (max: 900 mg/DOSE)

*ADD Metronidazole* 10 mg/kg/DOSE PO/IV (PO preferred) TID (max: 500 mg/DOSE) if perineum or groin involved

**Alternative for low/medium-risk allergy** to cefepime, ceftriaxone, cefotaxime, cefpodoxime, OR high-risk allergy/contraindication to beta-lactams:

- REPLACE cefepime with **Aztreonam** 30 mg/kg/DOSE IV q8h (max: 2 g/DOSE)

**Alternative for vancomycin allergy** (not Red Man Syndrome)

- **Piperacillin-tazobactam** 100 mg of piperacillin/kg/DOSE IV q6h (max: 4 g piperacillin/DOSE)
  + **Clindamycin** 13 mg/kg/DOSE IV q8h (max: 900 mg/DOSE)

**Duration/Comments**

**Duration:**

- 10 days
  - Consider discontinuing clindamycin when patient is clinically stable (e.g., vital signs within normal limits, no vasopressor requirements) for 24-48 hours and rash no longer progressing (usual duration of 3-5 days).

Staphylococcal Scalded Skin Syndrome (SSSS) is usually diagnosed in children <5 years of age.

Clindamycin is recommended as adjunct therapy in the setting of toxin production associated with SSSS.

### Setting

**Necrotizing Fasciitis**

Early and aggressive surgical exploration and debridement is critical. Emergent surgical consultation and ID consult are strongly recommended.

**Common pathogens:**
- Group A β-hemolytic Streptococcus,
- *S. aureus*,
- *E. coli*,
- *Pseudomonas* spp.,
- Enterobacter spp.,
- Klebsiella spp.,
- Proteus spp.,
- Bacteroides spp.,
- Clostridia spp.,
- Peptostreptococcus spp.

**1st Line:**

- **Piperacillin-tazobactam** 100 mg of piperacillin/kg/DOSE IV q6h (max: 4 g piperacillin/DOSE)
  + **Vancomycin IV**
  + **Clindamycin** 13 mg/kg/DOSE IV q8h (max: 900 mg/DOSE)

**Duration:**

Empiric antibiotics should be continued until the following criteria are met:

- Debridement no longer needed,
- Clinical improvement, and
- Minimum of 48-72 hours after completion of surgical debridement

Clindamycin is initiated for anti-toxin activity for *Streptococcal* and *Staphylococcal* infections, and can be stopped after 24-72 hours if infection has improved and patient is stable.

**Tailor antibiotic therapy** to results of deep tissue Gram stain, culture and sensitivities.

Linezolid has in-vitro data that demonstrates suppression of toxin production with *S. aureus* and group A streptococcus. Clinical success against toxic shock syndrome is reported in case reports.
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| Traumatic Wound Infections WITHOUT water exposure | Traumatic wounds without evidence of local infection or systemic signs of infection typically do not need antimicrobial therapy.  
Outpatient (PO) Therapy  
1st Line:  
**Amoxicillin-clavulanate**² 25 mg amoxicillin/kg/DOSE PO BID (max: 875 mg amoxicillin/DOSE)  
If MRSA coverage needed³ ADD **TMP-SMX**² 6 mg of TMP/kg/DOSE PO BID (max: 320 mg TMP/DOSE)  
Alternative for low/medium risk allergy³ to penicillins:  
**Cephalexin**² 25 mg/kg/DOSE PO TID (max: 1 g/DOSE)  
+ **Metronidazole** 10 mg/kg/DOSE PO TID (max: 500 mg/DOSE)  
Alternative for low/medium risk allergy³ to penicillins plus need for MRSA coverage³, for low/medium-risk allergy³ to cephalexin³, OR for high-risk allergy³/contraindication³ to beta-lactams:  
  **TMP-SMX**² 6 mg of TMP/kg/DOSE PO BID (max: 320 mg TMP/DOSE)  
  + **Metronidazole** 10 mg/kg/DOSE PO TID (max: 500 mg/DOSE)  
Inpatient (IV) Therapy  
1st Line:  
**Ampicillin-sulbactam*** 50 mg of ampicillin/kg/DOSE IV q6h (max: 2 g ampicillin/DOSE)  
Alternative for low/medium-risk allergy³ to penicillins:  
**Cefazolin**³ 33 mg/kg/DOSE IV q8h (max: 2 g/DOSE)  
  + **Metronidazole** 10 mg/kg/DOSE PO/IV (PO preferred) TID (max: 500 mg/DOSE)  
Alternative if need for MRSA coverage³, for low/medium-risk allergy³ to cefazolin, OR for high-risk allergy³/contraindication³ to beta-lactams:  
**Vancomycin IV***  
  + **Metronidazole** 10 mg/kg/DOSE PO/IV (PO preferred) q8h (max: 500 mg/DOSE) | **Duration:**  
  7 days  
  • May extend to 10-14 days if lack of symptom resolution at 7 days  
  Debridement of devitalized tissues and contaminating debris is critical to source control and successful healing.  
  Empiric therapy should take into account site of wound and prior cultures and colonization.  
  Tailor antibiotic therapy to results of deep tissue Gram stain, culture and sensitivities. |

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7 days  
• May extend to 10-14 days if lack of symptom resolution at 7 days  
Debridement of devitalized tissues and contaminating debris is critical to source control and successful healing.  
Empiric therapy should take into account site of wound and prior cultures and colonization.  
Tailor antibiotic therapy to results of deep tissue Gram stain, culture and sensitivities.
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<tr>
<td><strong>Traumatic Wound Infections WITH water exposure</strong></td>
<td>Usually polymicrobial from environmental contamination.</td>
<td>Duration: 10 days • May extend to 14 days if lack of symptom resolution at 10 days</td>
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<tr>
<td><strong>See section above if concern for necrotizing fasciitis.</strong></td>
<td>Debridement of devitalized tissues and contaminating debris is critical to source control and successful healing.</td>
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<tr>
<td>For animal/human bites, refer to Animal Bite Guidelines on antimicrobial stewardship webpage.</td>
<td>Empiric therapy should take into account site of wound and prior cultures and colonization.</td>
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<tr>
<td><strong>Evaluate tetanus immunization status, and if indicated, administer tetanus immunization ± tetanus immune globulin.</strong></td>
<td><strong>Vibrio vulnificus</strong> wound infections require extensive debridement and mortality can be high. Consider combination therapy with ceftazidime and doxycycline.</td>
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<tr>
<td><strong>Target pathogens:</strong></td>
<td><strong>Tailor antibiotic therapy</strong> to results of deep tissue Gram stain, culture and sensitivities.</td>
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<td>Consider Aeromonas and Pseudomonas spp., other gram negatives if significant water exposure</td>
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<td><strong>Outpatient (PO) Therapy for Patients:</strong></td>
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<tr>
<td>Levofloxacin* PO:</td>
<td>Duration:</td>
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<tr>
<td>≤4 years: 10 mg/kg/DOSE PO BID (max: 375 mg/DOSE)</td>
<td>• May extend to 14 days if lack of symptom resolution at 10 days</td>
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<tr>
<td>≥5 years: 10 mg/kg/DOSE PO daily (max: 750 mg/DOSE) + Metronidazole 10 mg/kg/DOSE PO TID (max: 500 mg/dose)</td>
<td>Debridement of devitalized tissues and contaminating debris is critical to source control and successful healing.</td>
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<tr>
<td>If MRSA coverage needed: ADD TMP-SMX* 6 mg of TMP/kg/DOSE PO BID (max: 320 mg TMP/DOSE)</td>
<td>Empiric therapy should take into account site of wound and prior cultures and colonization.</td>
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<tr>
<td><strong>Inpatient (IV) Therapy for Patients:</strong></td>
<td><strong>Vibrio vulnificus</strong> wound infections require extensive debridement and mortality can be high. Consider combination therapy with ceftazidime and doxycycline.</td>
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<tr>
<td>1st Line:</td>
<td><strong>Tailor antibiotic therapy</strong> to results of deep tissue Gram stain, culture and sensitivities.</td>
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<tr>
<td>Cefepime* 50 mg/kg/DOSE IV q8h (max: 2 g/DOSE) + Metronidazole 10 mg/kg/DOSE PO/IV (PO preferred) q8h (max: 500 mg/DOSE)</td>
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<tr>
<td>If MRSA coverage needed: ADD Vancomycin IV*</td>
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<tr>
<td><strong>Alternative for low/medium-risk allergy</strong> to cefepime, ceftriaxone, cefotaxime, or cefpodoxime OR high-risk allergy/contraindication** to beta-lactams: Levofloxacin IV/PO (PO preferred):</td>
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<tr>
<td>≤4 years: 10 mg/kg/DOSE PO BID (max: 375 mg/DOSE) ≥5 years: 10 mg/kg/DOSE PO daily (max: 750 mg/DOSE) + Metronidazole 10 mg/kg/DOSE PO/IV TID (PO preferred) (max: 500 mg/DOSE)</td>
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<tr>
<td>If MRSA coverage needed: ADD Vancomycin IV*</td>
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*Note: *PO = oral, IV = intravenous, TID = three times daily, BID = twice daily, ± = addition, q8h = every 8 hours, *IV = intravenous, PO = oral, *SMX = trimethoprim-sulfamethoxazole, *MRSA = methicillin-resistant Staphylococcus aureus.
Footnotes:

* Renal adjustment may be necessary. See Pediatric Antimicrobial Dosing Guidelines.
1 Consider MRSA coverage if any of the following are present: severe sepsis or septic shock, immunocompromised status, personal or household contact with MRSA infection or colonization in the past 12 months
2 TMP-SMX = trimethoprim-sulfamethoxazole
3 CDC and Indian Health Service (IHS) study demonstrated short courses (7-10 days) of doxycycline can be used in children without causing tooth staining or weakening of tooth enamel. Todd SR et al. J Pediatr. 2015;166(5):1246-1251.
4 Low-risk allergies include: pruritus without rash, remote (>10 years) unknown reaction, patient denies allergy but is on record, mild rash with no other symptoms (mild rash: non-urticarial rash that resolves without medical intervention). Medium-risk allergies include: urticaria/hives with no other symptoms, severe rash with no other symptoms (severe rash: requires medical intervention [corticosteroids, anti-histamines] and/or ER visit or hospitalization). See β-lactam allergy evaluation and empiric guidance for further information.
5 This also includes allergy to cephalosporins with a similar side-chain to cephalxin, which includes cefaclor, cefadroxil, or cefprozil. See β-lactam allergy evaluation and empiric guidance for further information.
6 High-risk allergies include: respiratory symptoms (chest tightness, bronchospasm, wheezing, cough), angioedema (swelling, throat tightness), cardiovascular symptoms (hypotension, dizzy/lightheadedness, syncope/passing out, arrhythmia), anaphylaxis. If a patient has a high-risk allergy to penicillins, cephalosporins, or carbenapenems, the only beta-lactam antibiotic that can be safely used without Allergy consult is aztreonam (if the allergy is to ceftazidime or aztreonam, aztreonam should be avoided as well). See β-lactam allergy evaluation and empiric guidance for further information.
7 Previous reactions that are contraindications to further beta-lactam use (except aztreonam, which can be used unless the reaction was to ceftazidime or aztreonam) unless approved by Allergy: organ damage (kidney, liver), drug-induced immune-mediated anemia/thrombocytopenia/leukopenia, rash with mucosal lesions (Stevens Johnson Syndrome/Toxic Epidermal Necrosis), rash with pustules (acute generalized exanthematous pustulosis), rash with eosinophilia and organ injury (DRESS – drug rash eosinophilia and systemic symptoms), rash with joint pain, fever, and myalgia (Serum Sickness). See β-lactam allergy evaluation and empiric guidance for further information.
8 Serotonin Syndrome and Linezolid: Education and Recommendations

References:


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CW Operations Subcommittee Approval: 06/2019
P&T Approval: 07/2019
CW Executive Committee Approval: 07/2019

Revision History:
April 2020: Reduced some clindamycin doses to align with adult SSTI and animal bite guideline dosing; updated allergy wording
The recommendations in this guide are meant to serve as treatment guidelines for use at Michigan Medicine facilities. If you are an individual experiencing a medical emergency, call 911 immediately. These guidelines should not replace a provider’s professional medical advice based on clinical judgment, or be used in lieu of an Infectious Diseases consultation when necessary. As a result of ongoing research, practice guidelines may from time to time change. The authors of these guidelines have made all attempts to ensure the accuracy based on current information, however, due to ongoing research, users of these guidelines are strongly encouraged to confirm the information contained within them through an independent source.

If obtained from a source other than med.umich.edu/asp, please visit the webpage for the most up-to-date document.