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Rationale

This clinical pathway was developed by a consensus group of JHACH physicians, advanced practice providers, nurses and pharmacists to standardize the management of children in the outpatient and inpatient setting.

Background

Cellulitis and abscess are among the most common skin and soft tissue infections. Cellulitis is defined as an area of skin erythema, edema and warmth. Abscess is defined as a collection of pus within dermis or subcutaneous space. Skin and soft tissue infections in children account for a large portion of Emergency Center visits annually as well as inpatient admissions. While Staphylococcus aureus is the most common cause of suppurative skin and soft tissue infections in otherwise healthy children, this guideline will discuss the microbiology and treatment of less common etiologies as well.

Definitions

- **Empiric therapy**: the initial antibiotic regimen selected in the absence of definitive microbiological pathogen identification and susceptibility
- **Targeted or definitive therapy**: the antibiotic regimen selected after pathogen identification and susceptibility testing is completed
- **Prophylaxis therapy**: the antibiotic regimen to prevent an infection
- **MSSA**: Methicillin-sensitive Staphylococcus aureus
- **MRSA**: Methicillin-resistant Staphylococcus aureus
- **Patients with beta-lactam antimicrobial allergies**:
  - **Severe Allergy** (airway involvement, bronchospasm, wheezing, anaphylaxis, angioedema, extensive urticarial, arrhythmia, cardiovascular, collapse, hypotension): Avoid beta-lactam antibiotics and use non-Beta-lactam antibiotic. Beta-lactam antibiotics include: penicillin, ampicillin, piperacillin, cephalosporins.
  - **Non-severe allergy** (isolated urticaria, mild rash): Safe to use a non-cross-reactive cephalosporin. Important to note that ceFAZolin does not share a side chain with any beta-lactam agent.
  - **Not allergic documentation** such as intolerances (eg, nausea, headache) or family history only: safe to use all B-lactams.
Non-Suppurative Cellulitis

A) Definitions
- Cellulitis with intact skin and no evidence of purulent drainage
- **Mild to moderate disease:** Typical appearance, hemodynamically stable
- **Severe disease:** Immunocompromised, signs of deep/necrotizing infection, hemodynamically unstable, sepsis

B) Diagnosis

Lab tests:
- Blood and tissue cultures are generally unnecessary for typical cases of non-suppurative cellulitis
- Consider blood and tissue cultures and MRSA-SA PCR of skin/soft tissues in those with immune compromising conditions, hemodynamic instability, unusual predisposing factors (immersion injury, animal bites, foreign material in place), or failure of first-line antibiotic therapy
- For the MRSA-SA PCR use a red-capped swab for all patients

C) Consult recommendations for severe cellulitis
- Infectious Disease: All patients

D) Pathogenesis
- Cellulitis may worsen in the first 24 hours after initiating appropriate antibiotic therapy as sudden destruction of pathogens releases potent enzymes that increase local inflammation

E) Common Pathogens
- Majority of cases are caused by beta-hemolytic Streptococci, often Group A Streptococcus (*S. pyogenes*, GAS), but can also be caused by Groups B (GBS), C, F, or G Streptococci

F) Antimicrobial Therapy
- Beta-hemolytic streptococci uniformly susceptible to penicillin
- Clindamycin resistance remains low (<10%) for group A streptococci
- Sulfamethoxazole/trimethoprim (SMX/TMP) and doxycycline do not provide reliable coverage against Group A *Streptococcus*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Empiric First Line Therapy</th>
<th>Allergy to first line agent (allergy as defined below)1</th>
<th>Total Duration</th>
<th>Comments/considerations</th>
</tr>
</thead>
</table>
| Mild to Moderate Non-suppurative Cellulitis | **First-line Therapy:** Empiric PO  
Cephalexin 50mg/kg/DAY PO divided every 8 hours (max dose: 500mg)  
**Empiric IV**  
Cefazolin 33mg/kg/dose IV q8h (max dose: 1000mg) | **Empiric PO:** Clindamycin 10mg/kg/dose PO q8h (max dose: 450mg)  
**Empiric IV:** Clindamycin 10mg/kg/dose IV q8h (max dose: 600mg) | 5 days | Cellulitis may worsen in the first 24 hours after starting appropriate antibiotic |
### Treatment failure >48 hours of first-line therapy:

**PO:** Clindamycin 10mg/kg/dose
PO q8h (max dose: 450mg)

**IV:** Clindamycin 10mg/kg/dose
IV q8h (max dose: 600mg)

**For inpatients not improving >48 hours:**
Reconsider and broaden differential diagnosis
Consider possibility of abscess
Consider empiric antimicrobial modification

**For inpatients rapidly progressive or ill-appearing or not responding to recommended therapy:**
Consider ID consult

---

### Severe Non-suppurative Cellulitis

<table>
<thead>
<tr>
<th>If no personal/household history of MRSA and low suspicion for MRSA and clinically stable and not ill-appearing and not immunocompromised:</th>
<th>If no personal/household history of MRSA and low suspicion for MRSA and clinically stable and not immunocompromised:</th>
<th>7 days from clinical improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefazolin 33mg/kg/dose IV q8h (max dose: 2000mg)</td>
<td>Clindamycin 13mg/kg/dose IV q8h (max dose: 900mg)</td>
<td>ID consult recommended. Call ID immediately if guidance needed for empiric antibiotic therapy.</td>
</tr>
<tr>
<td>If personal/household history of MRSA or suspicion for MRSA or clinically unstable or immunocompromised:</td>
<td>If personal/household history of MRSA or suspicion for MRSA or clinically unstable or immunocompromised:</td>
<td>Initial therapy with IV route recommended</td>
</tr>
<tr>
<td>Vancomycin (see “Vancomycin IV Order Set” in Epic for dosing)</td>
<td>Vancomycin (see “Vancomycin IV Order Set” in Epic for dosing)</td>
<td></td>
</tr>
</tbody>
</table>

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*Patients with beta-lactam antimicrobial allergies:*

- **Severe Allergy** (airway involvement, bronchospasm, wheezing, anaphylaxis, angioedema, extensive urticarial, arrhythmia, cardiovascular, collapse, hypotension): Avoid beta-lactam antibiotics and use non-Beta-lactam antibiotic. Beta-lactam antibiotics include: penicillin, ampicillin, piperacillin, cephalosporins.

- **Non-severe allergy** (isolated urticaria, mild rash): Safe to use a non-cross-reactive cephalosporin. Important to note that ceFAZolin does not share a side chain with any beta-lactam agent.

- **Not allergic documentation** such as intolerances (eg, nausea, headache) or family history only: safe to use all B-lactams.

---

G) Algorithmic Pathway
**Non-Suppurative Skin & Soft Tissue Infection Clinical Pathway**

**Special Considerations:**
See companion guidelines for special clinical scenarios, including infections related to:
- Cat and dog bites
- Human bites
- Water exposure
- Odontogenic origin
- Preseptal/Orbital origin

Please review companion guideline for antibiotic dosing information and alternative therapy.

**Non-Suppurative Skin & Soft Tissue Infections**
Cellulitis/Erysipelas/Impetigo

**Are any of the following conditions present?**
- Hemodynamically unstable
- Ill or Toxic-Appearing
- Immunocompromised
- Concern for necrotizing infection
- Circumferential infection
- Poor compliance or social concerns
- Failed appropriate outpatient treatment

**YES**
Consider tissue cultures, MRSA-SA PCR
IV antibiotics

**Severe Infection?**
- Immunocompromised
- Signs of deep/necrotizing infection
- Hemodynamically unstable
- Sepsis
Admit Inpatient Status

Consider cultures
IV Cefazolin if no concern of MRSA and not immunocompromised and not ill-appearing
**OR**
IV Vancomycin if concern of MRSA and/or immunocompromised and/or ill appearing
Consult ID for additional recommendations

**Mild to Moderate Infection?**
Typical appearance
Hemodynamically stable
Admit Observation Status

First line therapy: IV Cefazolin
Allergy to first line or failure >48 hours to first line: IV Clindamycin

**NO**
Outpatient therapy
Oral antibiotics for 5 days
Consider adding topical antibiotics for impetigo BID x 5 days

First line therapy: PO Cephalexin
Allergy to first line or failure >48 hours to first line: PO Clindamycin

**Severe Infection?**
Admit Inpatient Status

**Mild to Moderate Infection?**
Admit Observation Status

**Johns Hopkins All Children’s**
Non-Suppurative Skin & Soft Tissue Infection Clinical Pathway
Suppurative (Purulent) Cellulitis and Cutaneous Abscesses

A) Definitions

Suppurative cellulitis:
- Cellulitis with purulent drainage

Cutaneous abscess:
- Collection of pus in the dermis and deeper tissues
- Often surmounted with a pustule encircled by rim of erythematous swelling

Mild disease: <5 cm (cellulitis and abscess total), no systemic symptoms
Moderate disease: >5 cm (cellulitis and abscess total) and/or systemic symptoms
Severe disease or complicated: hemodynamically unstable, ill or toxic-appearing, immunocompromised, concern for necrotizing infection, poor compliance or social concerns, failed simple I&O, failed appropriate outpatient treatment

B) Diagnosis

Lab tests:
- Suppurative cellulitis
  - Blood and tissue cultures are generally unnecessary, however, purulent drainage can be sent for culture and susceptibility testing, as well as MRSA-SA PCR from skin/soft tissues
  - Blood culture may be necessary if patient has severe infection and/or ill-appearing.
  - For the MRSA-SA PCR use a red-capped swab for all patients
- Cutaneous Abscesses
  - At the time of incision and drainage (I&D), cultures and MRSA-SA PCR are strongly recommended

C) Procedural Recommendations

- For cutaneous abscesses I&D is the primary treatment
- Refer to algorithmic pathway below for specific information based on severity classification

D) Consult Recommendations

- Refer to algorithmic pathway below

E) Common pathogens

- Staphylococcus aureus (MSSA or MRSA)

F) Antimicrobial Therapy

- SMX/TMP and doxycycline remain active against the majority (>90%) MRSA and MSSA isolates. Clindamycin is active against ~77% of S.aureus skin and soft tissue isolates (74% of MSSA and 89% of MRSA). Cephalexin is susceptible to 100% of MSSA isolates and 0% of MRSA isolates.
- Fluoroquinolones are NOT recommended for the treatment of S.aureus infections, even if found to be susceptible in vitro

- For cutaneous abscesses:
For previously healthy patients and if not systemically ill and abscess < 5 cm (cellulitis and abscess total) and adequately drained, no systemic antibiotic therapy is needed. Of note, almost all abscess requiring I&D will receive antibiotics unless very minor.

- Systemic antibiotics can be considered for the following conditions:
  - Severe or rapidly progressive infection
  - Presence of extensive associated cellulitis (> 5 cm in diameter)
  - Associated septic phlebitis
  - Location of abscess in an area where drainage is difficult (e.g., face, genitalia, hands, feet)
  - Immunocompromised
  - Hemodynamically unstable

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Empiric First Line Therapy</th>
<th>Allergy to first line agent (allergy as defined below)¹</th>
<th>Total Duration</th>
<th>Comments/considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppurative (Purulent) Cellulitis and Cutaneous Abscesses, Mild or moderate disease</td>
<td>Empiric oral SMX/TMP 8mg/kg/dose of TMP component PO q12h (max dose: 320mg of TMP component) OR Doxycycline 2.2mg/kg/dose PO q12h (max dose: 100mg) OR If MRSA clindamycin susceptible: Clindamycin 10mg/kg/dose PO q8h (max dose: 450mg) <strong>If low suspicion for MRSA or MRSA PCR negative or MSSA PCR positive:</strong> Cephalexin 50mg/kg/DAY divided q6-8h (max dose: 500mg)</td>
<td></td>
<td>5 days</td>
<td>Cellulitis may worsen in the first 24 hours after starting appropriate antibiotic For inpatients not improving &gt;48 hours: Reconsider and broaden differential diagnosis Consider possibility of abscess and indication for incision and drainage Consider empiric antimicrobial modification For inpatients rapidly progressive or ill-appearing: ID consult recommended. Call ID immediately if guidance needed for empiric antibiotic therapy. Consider change to vancomycin</td>
</tr>
<tr>
<td>Suppurative (Purulent)</td>
<td>Empiric IV for patients that are clinically stable and not</td>
<td></td>
<td></td>
<td>Cellulitis may worsen in the first</td>
</tr>
<tr>
<td>Cellulitis and Cutaneous Abscesses, Severe Disease</td>
<td>ill-appearing and not immunocompromised: SMX/TMP 5mg/kg/dose IV q8h</td>
<td>7 days from clinical improvement</td>
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</tr>
<tr>
<td>OR If MRSA clindamycin susceptible: Clindamycin 10mg/kg/dose IV q8h (max dose: 900mg)</td>
<td></td>
<td>24 hours after starting appropriate antibiotic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empiric IV for patients that are clinically unstable or immunocompromised or concern for necrotizing infection: Vancomycin (see “Vancomycin IV Order Set” in Epic for dosing)</td>
<td></td>
<td>Initial therapy with IV is recommended</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Convert to PO therapy after favorable clinical response observed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Suppurative Skin & Soft Tissue Infections
Abscess/Boil/Carbuncle/Furuncle

Mild Infection
< 5 cm
No systemic symptoms
Simple I&D
Antibiotics unless very minor
Discharge home

Moderate Infection
≥ 5 cm
and/or
Systemic symptoms
High Risk Location?
Face, Hand, Foot, Peri-anal

Simple I&D
Antibiotics unless very minor
Discharge home

Severe Infection
• Hemodynamically unstable
• Ill or Toxic-Appearing
• Immunocompromised
• Concern for necrotizing infection
• Poor compliance or social concerns

OR
• Failed simple I&D
• Failed appropriate outpatient treatment
• Social concerns

High Risk Location?
Face, Hand, Foot, Peri-anal

Consult appropriate surgical service

N O
I&D with Vessel Loop
Send culture & MRSA-SA
PCR
(use a red-capped swab for
PCR)
If history, exposure, risk, or
PCR + MRSA:
PO SMX/TMP or
Doxycycline or Clindamycin
if MRSA susceptible,
If low suspicion for MRSA
or MRSA PCR negative or
MSSA PCR positive:
PO Cephalexin
5 days of antibiotic therapy
Discharge home
Follow-up in Wound Clinic

Y E S
Consult appropriate surgical service

Hemodynamically unstable
Ill or Toxic-Appearing?
Immunocompromised?
Concern for necrotizing infection?
Consult Appropriate Surgical Service and ID
Admit
Inpatient Status
IV Vancomycin

Well-appearing
Social/compliance issues?
Failed simple I&D?
I&D with Vessel Loop in ED
Send culture & MRSA-SA
PCR
Admit
Observation Status
IV TMP-SMX or IV Clindamycin if MRSA susceptible
7 days total antibiotic therapy
Cat and Dog Bites

A) Scope of guideline
- Reminder, these guidelines are for infections associated with recent cat and dog bites, not for prophylaxis from infection following an acute bite (refer to Red Book for prophylaxis guidance)
- Refer to the Red Book for post-exposure prophylaxis guidelines including rabies, tetanus, etc.
- Refer to Red Book for additional recommendations on other animal or reptile bites

B) Common Pathogens
- *S. aureus, Streptococci* spp., oral anaerobes, *Pasteurella multocida, Capnocytophaga canimorsus*

C) Antimicrobial Recommendations
- **First line, preferred therapy:**
  - Amoxicillin/clavulanate 25 mg/kg/dose of amoxicillin component PO q12h (max dose: 875mg of amoxicillin component) using the 400mg/57mg per 5mL suspension or 875mg/125mg tablet
  - OR
  - If patient cannot take enteral therapy: Ampicillin/sulbactam 50 mg/kg/dose of ampicillin component IV q6h (max dose: 2000 mg of ampicillin component)
- **Alternative therapy for patients with allergy to first line agent:**
  - SMX/TMP 5 mg/kg/dose of the TMP component PO/IV q12h (max dose: 320mg of TMP component) PLUS clindamycin 10 mg/kg/dose PO/IV q8h (max dose: 450mg for PO or 600mg for IV)

D) Duration of Therapy
- 5 days

Human Bites

A) Common Pathogens
- *Streptococci* spp., *S. aureus*, oral anaerobes and *Eikenella corrodens*

B) Antimicrobial Recommendations
- **First line, preferred therapy:**
  - Amoxicillin/clavulanate 25 mg/kg/dose of amoxicillin component PO q12h (max dose: 875mg of amoxicillin component) using the 400mg/57mg per 5mL suspension or 875mg/125mg tablet
  - OR
  - If patient cannot take enteral therapy: Ampicillin/sulbactam 50 mg/kg/dose of ampicillin component IV q6h (max dose: 2000 mg of ampicillin component)
- **Alternative therapy for patients with allergy to first line agent:**
  - Ciprofloxacin 15mg/kg/dose PO q12h (max dose: 500mg) or 10mg/kg/dose IV q12h (max dose: 400mg) PLUS clindamycin 10 mg/kg/dose PO/IV q8h (max dose: 450mg for PO or 600mg for IV)

C) Duration of Therapy
- 5 days
Water-related Injuries

A) Scope of Guideline
- The following are guidelines for treatment of skin and soft tissue infections associated with water-related injuries, not to prevent infection after an injury. Please refer to the Red Book for prophylaxis recommendations.

B) Consult Recommendations
- For saltwater injuries, based on severity, consider:
  - Infectious Diseases
  - General surgery, for potential debridement

C) Common Pathogens
- **Fresh or brackish water:**
  - *Aeromonas hydrophila, Vibrio vulnificus, and Plesiomonas shigelloides*
- **Saltwater:**
  - *Vibrio spp.* (primarily *Vibriovulnificus*) should be suspected in patients ill-appearing or with bullae, vesicles, and ulcers after exposure to seawater or raw oysters.

D) Antimicrobial Recommendations
- **Fresh or brackish water:**
  - Clindamycin 10 mg/kg/dose PO/IV q8h (max PO dose: 450 mg, max IV dose: 600 mg)  
    PLUS Ciprofloxacin 15 mg/kg/dose PO q12h (max dose: 500mg) or 10 mg/kg/dose IV q12h (max dose: 400 mg IV q12h)
- **Saltwater:**
  - **Empiric IV therapy**
    - Ceftriaxone 50 mg/kg/dose IV q24h (max dose: 2000mg)  
      PLUS Doxycycline 2.2 mg/kg/dose IV q12h (max dose: 100mg)
  - **Empiric oral therapy**
    - Ciprofloxacin 15 mg/kg/dose PO q12h (max dose: 500mg)  
      PLUS Doxycycline 2.2 mg/kg/dose IV q12h (max dose: 100mg)

E) Duration of Therapy
- **Fresh or brackish water:** 5 days for injuries without evidence of cellulitis
- **Saltwater:** overall duration determined by clinical course
Odontogenic Infections

A) Common Pathogens
- Polymicrobial; *Streptococci* spp., oral anaerobes, *Eikenella* spp.

B) Antimicrobial Recommendations

**Mild to moderate infections:**
- First line, preferred therapy:
  - Amoxicillin/clavulanate 25 mg/kg/dose of amoxicillin component PO q12h (max dose: 875mg of amoxicillin component) using the 400mg/57mg per 5mL suspension or 875mg/125mg tablet
  - **OR**
  - If patient cannot take enteral therapy: Ampicillin/sulbactam 50 mg/kg/dose of ampicillin component IV q6h (max dose: 2000 mg of ampicillin component)
- Alternative therapy for patients with allergy to first line agent:
  - Clindamycin 10 mg/kg/dose PO/IV q8h (max dose: 450mg for PO or 600mg for IV)

**Severe infections:**
- Consider initial IV therapy. Convert to PO therapy after favorable clinical response observed.
- First line, preferred therapy:
  - Ampicillin/sulbactam 50 mg/kg/dose of ampicillin component IV q6h (max dose: 2000 mg of ampicillin component)
- Alternative therapy for patients with allergy to first line agent:
  - Clindamycin 10 mg/kg/dose IV q8h (max dose: 600mg)

C) Non-pharmacologic Therapy Recommendations
- Consider moist heat application and/or mouth rinses

D) Duration of Therapy
- 14 days
Necrotizing Fasciitis

A) Definition
- Aggressive infection that tracks along the superficial fascia and compromises the tissue between the skin and underlying muscles

B) Key Features Suggestive of Necrotizing Fasciitis
- severe pain disproportional to the clinical findings
- failure to respond to initial antibiotic therapy
- systemic toxicity
- edema or tenderness extending beyond the cutaneous erythema
- crepitus, indicating gas in the tissues
- bullous lesions
- skin necrosis or ecchymoses
- copious non-purulent discharge

C) Diagnosis
- Imaging:
  - CT or MRI can help with diagnosis, however if moderate to high suspicion, surgical exploration is the preferred diagnostic method
  - DO NOT delay surgical intervention to obtain imaging
- Lab tests:
  - Blood cultures
  - Deep tissue cultures should be obtained in the OR

D) Consultation Recommendations
- These are surgical emergencies and debridement is essential; Pediatric surgery should therefore be consulted STAT
- Infectious disease should be consulted, with urgent physician-to-physician communication strongly encouraged

E) Common Pathogens
- Monomicrobial form usually caused by *S.pyogenes*, *S.aureus*, *Vibrio vulnificus*, or Clostridial spp.
- Polymicrobial form can be caused by anaerobes, *Streptococci* spp., and gram-negative rods

F) Antimicrobial Recommendations
- Vancomycin IV (see “Vancomycin IV Order Set” in Epic for dosing recommendations) PLUS Ciprofloxacin 10 mg/kg/dose IV q8h (max 400 mg IV q8h) PLUS Clindamycin 13 mg/kg/dose IV q8h (max 900 mg IV q8h)

G) Duration of Therapy
- IV antibiotics should be continued until further debridement is no longer necessary, patient has improved clinically AND afebrile for 48-72 hours
- Duration to be determined in collaboration with ID
Preseptal or Orbital Cellulitis

A) Definitions

Preseptal Cellulitis:
- Involves tissues anterior to the orbital septum
- Presents with fever, acute onset and rapid progression of eyelid swelling, and periorbital tissues are swollen and erythematous

Orbital Cellulitis:
- Involves tissues posterior to the orbital septum
- May present with fever, eye pain, swelling, proptosis, impairment of extraocular eye movements, and loss of visual acuity or chemosis
- Cavernous sinus thrombosis is a rare but potential complication of orbital cellulitis

B) Imaging Recommendations

- Timely orbital CT with IV contrast is indicated if orbital or concerns for orbital signs are present to evaluate for subperiosteal abscesses, which if present, may require surgical drainage
- Imaging is generally not necessary for preseptal cellulitis

C) Consult Recommendations for patients with orbital cellulitis

- Ophthalmology: All patients
- Infectious Disease: All patients
- ENT: In presence of significant sinus disease
- Neurosurgery: When there is concern for intracranial extension
- Specialty consultation is typically not needed for patients with preseptal cellulitis

D) Common Pathogens

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Pathogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preseptal cellulitis</td>
<td><em>Streptococcus pyogenes</em> (GAS)</td>
</tr>
<tr>
<td></td>
<td><em>S. aureus</em> (if purulent)</td>
</tr>
<tr>
<td></td>
<td><em>Haemophilus influenzae</em> type B and <em>Streptococcus pneumoniae</em> rarely cause preseptal cellulitis in the post-conjugate vaccine era.</td>
</tr>
<tr>
<td>Orbital cellulitis</td>
<td><em>Anginosus group Streptococci</em> (<em>S.anginosus, constellatus, &amp; intermedius</em>)</td>
</tr>
<tr>
<td></td>
<td><em>S. pneumoniae</em></td>
</tr>
<tr>
<td></td>
<td><em>S. pyogenes</em> (GAS)</td>
</tr>
<tr>
<td></td>
<td><em>S. aureus</em></td>
</tr>
<tr>
<td></td>
<td><em>Haemophilus influenzae</em></td>
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<tr>
<td></td>
<td>Anaerobes</td>
</tr>
</tbody>
</table>
### E) Antimicrobial Recommendations

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Empiric First Line Therapy</th>
<th>Allergy to first line agent (allergy as defined below)¹</th>
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</tr>
</thead>
</table>
| Pre-septal Cellulitis, with clear skin source (insect bite, trauma, acne, etc.) | **Empiric IV**  
Cefazolin 33mg/kg/dose IV every 8 hours (max dose: 2000mg)  
**Empiric PO or PO Step down**  
Cephalexin 25mg/kg/dose PO every 6 hours (max dose: 500mg)  
If personal or household history of MRSA:  
• If Clindamycin susceptible: Clindamycin 10 mg/kg/dose IV/PO q8h (max dose: 600mg)  
• If clindamycin susceptibility is unknown or for clindamycin resistance:  
Empiric IV  
Vancomycin (see “Vancomycin IV Order Set” in Epic for dosing; goal trough 10-15mcg/mL)  
**Empiric PO or PO Step down**  
Amoxicillin 20mg/kg/dose PO q8h (max dose: 500mg)  
PLUS  
Sulfamethoxazole/trimethoprim 8mg/kg/dose TMP component PO q12h (max dose: 320mg TMP component)  
OR  
Doxycycline 2.2mg/kg/dose PO q12h (max dose: 100mg) | **Empiric IV**  
Vancomycin (see “Vancomycin IV Order Set” in Epic for dosing) (goal trough 10-15mcg/mL)  
**Empiric PO or PO Step down**  
Amoxicillin 20mg/kg/dose PO q8h (max dose: 500mg)  
PLUS  
Sulfamethoxazole/trimethoprim 8mg/kg/dose TMP component PO q12h (max dose: 320mg TMP component)  
OR  
Doxycycline 2.2mg/kg/dose PO q12h (max dose: 100mg) | 7 days |                                                                                       |
<table>
<thead>
<tr>
<th>Diagnosis</th>
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<th>Total Duration</th>
<th>Comments/considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preseptal Cellulitis, due to sinusitis, dental, or otherwise unclear source</td>
<td><strong>Empiric IV</strong>&lt;br&gt;Ampicillin/sulbactam 50 mg/kg/dose of ampicillin component IV q6h (max 2000 mg of ampicillin component IV q6h)&lt;br&gt;&lt;br&gt;<strong>Empiric PO or PO Step down</strong>&lt;br&gt;Amoxicillin/clavulanate ES Suspension: 30 mg/kg/dose of amoxicillin component PO q8h (max dose: 1200 mg)&lt;br&gt;For ≥40kg, XR Tablets: 2000mg of amoxicillin component PO BID</td>
<td><strong>Empiric IV</strong>&lt;br&gt;Ceftriaxone 50 mg/kg/dose IV q24h (max dose: 2000 mg IV q24h)&lt;br&gt;&lt;br&gt;OR&lt;br&gt;&lt;br&gt;Levofloxacin 10 mg/kg/dose IV q12h if &lt; 5 y/o and 10 mg/kg/dose IV q24h if ≥ 5 y/o (max 750 mg/day)&lt;br&gt;&lt;br&gt;+/−&lt;br&gt;&lt;br&gt;*Clindamycin 10 mg/kg/dose IV q8h (max 600 mg IV q8h)</td>
<td>7 days</td>
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<tr>
<td>Orbital Cellulitis, without evidence of intracranial extension</td>
<td><strong>Empiric IV</strong>&lt;br&gt;Ampicillin/sulbactam 50 mg/kg/dose of ampicillin component IV q6h (max 2000 mg of ampicillin component IV q6h)&lt;br&gt;&lt;br&gt;+/−&lt;br&gt;&lt;br&gt;Vancomycin (see “Vancomycin IV Order Set” in Epic for dosing) (goal trough 15-17mcg/mL)&lt;br&gt;Add vancomycin if reasonable concern for MRSA</td>
<td><strong>Empiric IV</strong>&lt;br&gt;Levofloxacin 10mg/kg/dose PO q12h if &lt; 5 y/o and 10 mg/kg/dose IV q24h if ≥ 5 y/o (max 750 mg/day)&lt;br&gt;&lt;br&gt;+/−&lt;br&gt;&lt;br&gt;Vancomycin (see “Vancomycin IV Order Set” in Epic for dosing) (goal trough 15-17 mcg/mL)&lt;br&gt;Add vancomycin if reasonable concern for MRSA.</td>
<td></td>
<td>Duration in consultation with ID</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Empiric First Line Therapy</td>
<td>Allergy to first line agent (allergy as defined below)¹</td>
<td>Total Duration</td>
<td>Comments/considerations</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Orbital Cellulitis, with evidence of intracranial extension/involvement</td>
<td>Vancomycin (see &quot;Vancomycin IV Order Set&quot; in Epic for dosing) (goal trough 15-17mcg/mL)</td>
<td>Vancomycin (see &quot;Vancomycin IV Order Set&quot; in Epic for dosing) (goal trough 15-17 mcg/mL)</td>
<td>Duration in consultation with ID</td>
<td>Always start with IV therapy. Discuss possibility of PO step down in consultation with ID.</td>
</tr>
<tr>
<td></td>
<td>PLUS</td>
<td>PLUS</td>
<td></td>
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<tr>
<td></td>
<td>Ceftriaxone 50mg/kg/dose IV q12h (max 2000mg/dose)</td>
<td>Levofloxacin 10 mg/kg/dose IV q12h if &lt; 5 y/o and 10 mg/kg/dose IV q24h if ≥ 5 y/o (max daily dose: 750 mg/day)</td>
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<td>PLUS</td>
<td>PLUS</td>
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<tr>
<td></td>
<td>Metronidazole 7.5 mg/kg/dose IV q6h (max dose: 500mg)</td>
<td>Metronidazole 7.5 mg/kg/dose q6h IV (max dose: 500mg)</td>
<td></td>
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</tr>
<tr>
<td>Call ID urgently for additional recommendations</td>
<td>Call ID urgently for additional recommendations</td>
<td></td>
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</tr>
</tbody>
</table>

¹Patients with beta-lactam antimicrobial allergies:

- **Severe Allergy** (airway involvement, bronchospasm, wheezing, anaphylaxis, angioedema, extensive urticarial, arrhythmia, cardiovascular, collapse, hypotension): Avoid beta-lactam antibiotics and use non-beta-lactam antibiotic. Beta-lactam antibiotics include: penicillin, ampicillin, piperacillin, cephalosporins.
- **Non-severe allergy** (isolated urticaria, mild rash): Safe to use a non-cross-reactive cephalosporin. Important to note that ceFAZolin does not share a side chain with any beta-lactam agent.
- **Not allergic documentation** such as intolerances (eg, nausea, headache) or family history only: safe to use all β-lactams.
References

1. AAP Red Book

Disclaimer

Clinical Pathways are intended to assist physicians, physician assistants, nurse practitioners and other health care providers in clinical decision-making by describing a range of generally acceptable approaches for the diagnosis, management, or prevention of specific diseases or conditions. The ultimate judgment regarding care of a particular patient must be made by the physician in light of the individual circumstances presented by the patient.

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Skin and Soft Tissue Infections Clinical Pathway

Johns Hopkins All Children’s Hospital

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Date Approved by JHACH Clinical Practice Council: Initial 5/10/2016

Date Available on Webpage: Initial 5/1/2018 ; Update 10/9/2023

Updated: October 2023

Last Revised: October 2023