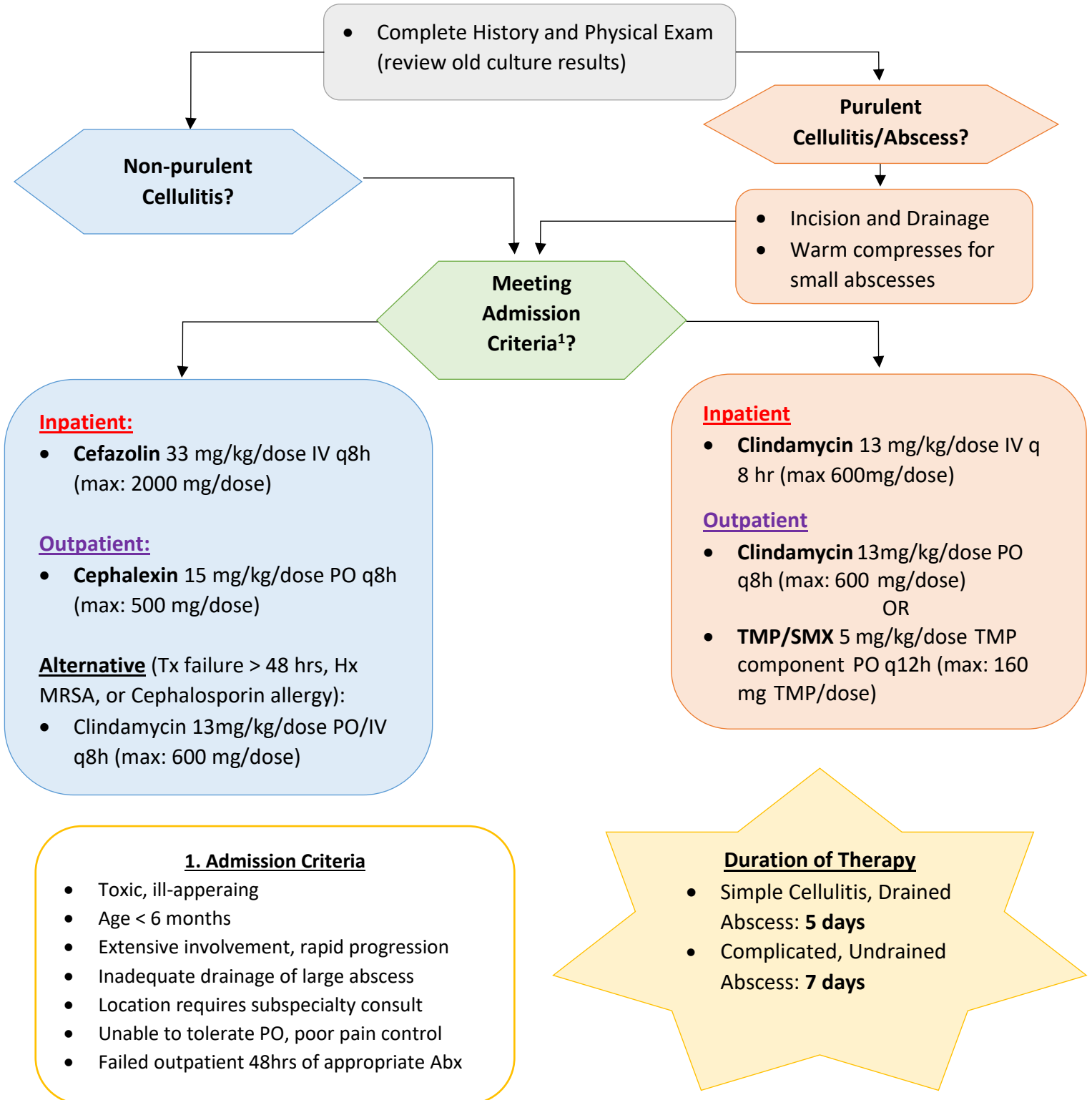


Pediatric Skin and Soft Tissue Infection Pathway, Age 2 months to 17 years

EXCLUSION CRITERIA: Burns • Immunocompromised • Facial or perineal • Bite • Foreign body • Surgical/indwelling device site • Hospital-acquired • Septic/toxic • Suspected necrotizing fasciitis/pyomyositis • Pressure ulcer



• Laboratory Evaluation: Routine laboratory studies are NOT recommended in healthy children with uncomplicated cellulitis or abscess.
 • If no improvement in 48 hours: CBC with differential, CRP, blood culture
 See SIU SOM Ped Empiric Abx Rec's: www.siumed.edu/sites/default/files/u1091/final_siu_empiric_antibiotics_for_select_infections.pdf
 Approved 8/26/2021 by Dr. Carlson, SIU Department of Pediatrics, and Pediatric Emergency Medicine, Exp 8/26/2022.

SIU Clinical Guidance for Management of Skin and Soft Tissue Infections in Children

PURPOSE

This pathway should be used to guide the care of healthy children ≥ 2 months of age with suspected skin and soft tissue infections (SSTI).

GOALS

- To standardize first line antibiotics for uncomplicated SSTI
- To reduce length of antibiotic therapy for uncomplicated SSTI

INCLUSION CRITERIA

- Children ≥ 2 months of age with suspected skin and soft tissue infection

EXCLUSION CRITERIA

- Infants less than 2 months of age
- Immunodeficiency
- Surgical site infection
- Facial infection including orbital, periorbital, and dental
- Infection associated with indwelling device
- Hospital-acquired SSTI
- Pressure ulcer
- Suspected necrotizing fasciitis or pyomyositis
- Suspected sepsis, toxic or critically ill
- Animal or human bite
- Burns
- Foreign body suspected
- Perineal abscess

DEFINITIONS/MICROBIOLOGY

Cellulitis

- An infection of the skin and underlying soft tissue characterized by pain, erythema, edema and warmth
- Erysipelas is an infection of the dermis and upper subcutaneous tissues
- Cellulitis is an infection involving the subcutaneous tissues
- Organisms
 - o Beta-hemolytic streptococci (Group A *Streptococcus* or *Streptococcus pyogenes*)
 - o *Staphylococcus aureus*

Abscess

- Large (≥ 1 cm in diameter) spherical collection of pus, usually walled off by a capsule
- Abscesses involve the epidermis, dermis, and deeper skin tissue
- Furuncle (or boil) is a small abscess of a deep hair follicle
- Carbuncle is a larger/deeper abscess formed by coalescence of multiple furuncle

- Organisms:
 - *S. aureus*: methicillin resistance is 38% in pediatrics in 2019-2020
 - Streptococcus species
 - Coagulase negative *Staphylococcus*
 - Gram negative and anaerobic organisms (< 10%)

Distinguishing Cellulitis from Abscess:

The term cellulitis should not be used to describe cutaneous inflammation associated with underlying collections of pus, which characterizes an abscess. Subcutaneous abscesses frequently have a central papule or pustule that is surrounded by an erythematous swelling. This distinction is important because the treatment for cellulitis is antibiotics, and the treatment for abscess is incision and drainage. Most abscesses do not have overlying cellulitis; however, if an abscess has marked erythema that extends beyond the area of induration, the diagnosis of cellulitis is appropriate.

Concern for Underlying Abscess

- Significant induration ≥ 3 cm
- Lesion present > 2-3 days
- History of previous drainage
- Often has non-uniform induration

Definite Abscess

- Fluctuant tender red nodule, can be associated with swelling, warmth
- Often have pustule surrounded by a rim of erythematous swelling (not to be confused with cellulitis)

CLASSIFICATION

Abscess

- **Simple:**
 - Diameter up to 5 cm (≤ 3 cm in patients 6-11 months, ≤ 4 cm in patient 1-8 years of age)
 - No systemic symptoms
- **Complicated:**
 - Abscesses more than 5 cm in diameter (and proportionally smaller in younger children)
 - Patients with ≥ 2 sites of skin infection
 - Patients with recurrent abscess
 - Systemic symptoms

Other classification

- Drained
- Undrained

Cellulitis

- **Moderate/severe:**
 - Rapidly spreading redness (from history)

- Significant swelling/redness/pain
- Systemic symptoms/signs (fever and lethargy)
- Failed oral antibiotic therapy (24-48 hours)
- **Simple:** all other patients

Other classification

- **Complicated**
 - Cellulitis associated with abscess requiring surgical drainage
 - Lymphadenitis
 - Bite or penetrating injury
 - Foreign body
 - Fracture
 - Lymphedema
 - Medical comorbidities
 - Immunosuppression
- **Uncomplicated:** all other cellulitis that don't meet criteria for complicated

DIAGNOSIS

Cultures

- Cultures of debrided material and blood cultures (prior to addition of antibiotic therapy) are warranted in the following circumstances
 - Severe local infection (eg, extensive cellulitis)
 - Systemic signs of infection (eg, fever)
 - History of recurrent or multiple abscesses
 - Failure of initial antibiotic therapy
 - Extremes of age (young infants or older adults)
 - Presence of underlying comorbidities (lymphedema, malignancy, neutropenia, immunodeficiency, splenectomy, diabetes)
 - Special exposures (animal bite, water-associated injury)
 - Presence of indication for prophylaxis against infective endocarditis
- Cultures of swabs from intact skin are not helpful and should not be performed.

Imaging

- Radiographic examination can be useful to determine whether a skin abscess is present (via ultrasonography) and distinguishing cellulitis from osteomyelitis (via magnetic resonance imaging).
- Radiographic evaluation may be warranted in patients with underlying immunosuppression, diabetes, venous insufficiency, or lymphedema and in patients with persistent systemic symptoms after 48 hours of antibiotic therapy
- Radiographic examination cannot reliably distinguish cellulitis from necrotizing fasciitis or gas gangrene; if there is clinical suspicion for these entities, radiographic imaging should not delay surgical intervention.

Laboratory Studies

- Routine laboratory studies are NOT recommended in healthy children with uncomplicated cellulitis or abscess.
- If not improvement in 48 hours: CBC with differential, CRP, blood culture

ADMISSION CONSIDERATIONS

- Systemic symptoms
 - o Concerns for SIRS
 - o Toxic, very ill appearing
 - o Fever alone does not necessitate admission
- Extensive involvement (consider hands, feet, face, groin, overlying joints)
- Rapid progression
- Consider if age < 6 months
- Concern for inadequate drainage of large abscess
- Abscess location that requires subspecialty consultation
- Unable to tolerate PO antibiotics
- Inadequate pain control
- Failed initial treatment w/48 hours appropriate antibiotics
- Follow-up concerns

MEDICAL MANAGEMENT

Condition	Definition	Organism(s)	Treatment
Impetigo bullous, non-bullous	Erythematous papules that rapidly evolve into vesicles/pustules that rupture forming a honey colored crust; or an erythematous erosion surrounded by a collar of the roof's remnant	<i>S. aureus</i> Beta-hemolytic <i>Streptococcus</i>	Topical : Mupirocin — BID for 5 days Oral: if multiple lesions or in outbreaks affecting several people or outbreaks of PSGN: PO Cephalexin 7 day course PCN Allergy — Clindamycin
Ecthyma	Superficial dermal infection, circular, erythematous ulcers with adherent crust, often with surrounding erythematous edema		PO Cephalexin 7 day course PCN Allergy — Clindamycin
Folliculitis (Purulent)	Superficial infection of the hair follicle, limited to the epidermis	<i>S. aureus</i> (often MRSA)	<ul style="list-style-type: none"> - I&D is the recommended treatment. - Warm compresses suffice for small abscesses. - Consider antibiotics as adjunct in patients with significant systemic symptoms (SIRS), concern for inadequate drainage following I&D, multiple sites, immunodeficiency, or young age - Clindamycin IV/PO or TMP/SMX PO - Duration: 5-7 days Tailor antibiotics according to culture results
Furuncle (Purulent)	<ul style="list-style-type: none"> - Deeper infection of hair follicle - Usually caused by <i>S. aureus</i> - Suppuration extends through the dermis into the subcutaneous tissues, small abscess forms 		
Carbuncle (Purulent)	<ul style="list-style-type: none"> - Infection of several adjacent hair follicles - Pus from multiple follicle sites - Most common on back, neck 		
Cutaneous Abscess (Purulent)	Collection of pus in the dermis and deeper tissues, often surmounted with a pustule encircled by rim of erythematous swelling, (not to be confused with cellulitis)		
Erysipelas (Non-purulent)	<ul style="list-style-type: none"> - Limited to epidermis including superficial lymphatics - Tender, intensely erythematous, sharply demarcated border 	Streptococci (Group A most common, other groups include B, C, F, or G)	
Cellulitis (Non-purulent)	Infection involving the deep dermis and subcutaneous fat	Infrequently caused by <i>S. aureus</i> except in cases of penetrating wounds	If no significant systemic symptoms can treat with oral therapy - Outpatient: Cephalexin PO for 5-7 days - Inpatient: cefazolin IV - If failed appropriate antibiotic after 48-72 hours, or MRSA history consider changing to Clindamycin - Duration: 5-7 days PCN Allergy — Clindamycin
Necrotizing Fasciitis	Aggressive subcutaneous infection that tracks along the superficial fascia, often extending from the skin lesion producing "wooden-hard induration" of the subcutaneous tissue	<i>S. pyogenes</i> Other pathogens include MSSA/MRSA <i>B. vulnificus</i> <i>A. hydrophila</i> Anaerobic streptococci	<ul style="list-style-type: none"> - Immediate surgical consultation for debriding - ID consult - Vancomycin + Cefepime + Metronidazole + Clindamycin

Adapted from CHOP Clinical Pathway 2020

ANTIBIOTIC RECOMMENDATIONS

Treatment Setting	Non-purulent Cellulitis Pathogen: <i>S. pyogenes</i> (most likely)	Purulent Cellulitis/Abscess Pathogen: <i>S. aureus</i> (most likely)	Duration of Tx/Comments
ED/Outpatient Transition from IV ¹	<p>First-line Therapy: Cephalexin 15 mg/kg/dose PO q8h (max: 500 mg/dose)</p> <p>Treatment failure > 48 hrs or prior history of MRSA: Clindamycin 13 mg/kg/dose PO q8h (max: 600 mg/dose)</p> <p>Cephalosporin allergy: Clindamycin 13 mg/kg/dose PO q8h (max: 600 mg/dose)</p>	<p>First-line Therapy: Clindamycin 13mg/kg/dose PO q8h (max: 600 mg/dose)</p> <p>OR TMP/SMX 5 mg/kg/dose trimethoprim component PO q12h (max: 160 mg trimethoprim/dose)</p> <p>ALLERGY: Doxycycline 2 mg/kg/dose PO q12h dose (max: 100 mg/dose)</p>	<p>Simple or uncomplicated Cellulitis: 5-7 days</p> <p>Abscess: 5-7 days</p> <ul style="list-style-type: none"> - Simple/Drained: 5 days - Complicated/Undrained: 7 days <p>If previous culture information for patient available, tailor antibiotics to past sensitivity</p> <p>PCP follow-up in 1-2 days after discharge</p>
Inpatient	<p>First-line Therapy: Cefazolin 33mg/kg/dose IV q8h (max: 2000 mg/dose)</p> <p>ALLERGY: Clindamycin 13mg/kg/dose IV/PO q8h (max: 600 mg/dose)</p>	<p>First-line Therapy: Clindamycin 13mg/kg/dose IV/PO q8h (max: 600 mg/dose)</p> <p>IF TOXIC: Vancomycin (see dosing guide)</p>	<p>Simple or uncomplicated Cellulitis: 5-7 days</p> <p>Abscess:</p> <ul style="list-style-type: none"> - Simple/Drained: 5 days - Complicated/Undrained: 7 days <p>IF prior history of MRSA, consider Clindamycin as 1st line therapy for cellulitis</p>

Pathogen Susceptibility at St Johns Children's Hospital- 2019/2020

	% Susceptibility		
	MSSA	MRSA	<i>Streptococcus pyogenes</i>
Cefazolin/Cephalexin	100	0	100
Clindamycin	86	83	100
TMP-SMX	98	97	-
Vancomycin	100	100	100
Doxycycline	97	98	-

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