Skin and Soft Tissue Infection (SSTI)

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What is a Clinical Pathway?

An evidence-based guideline that decreases unnecessary variation and helps promote safe, effective, and consistent patient care.

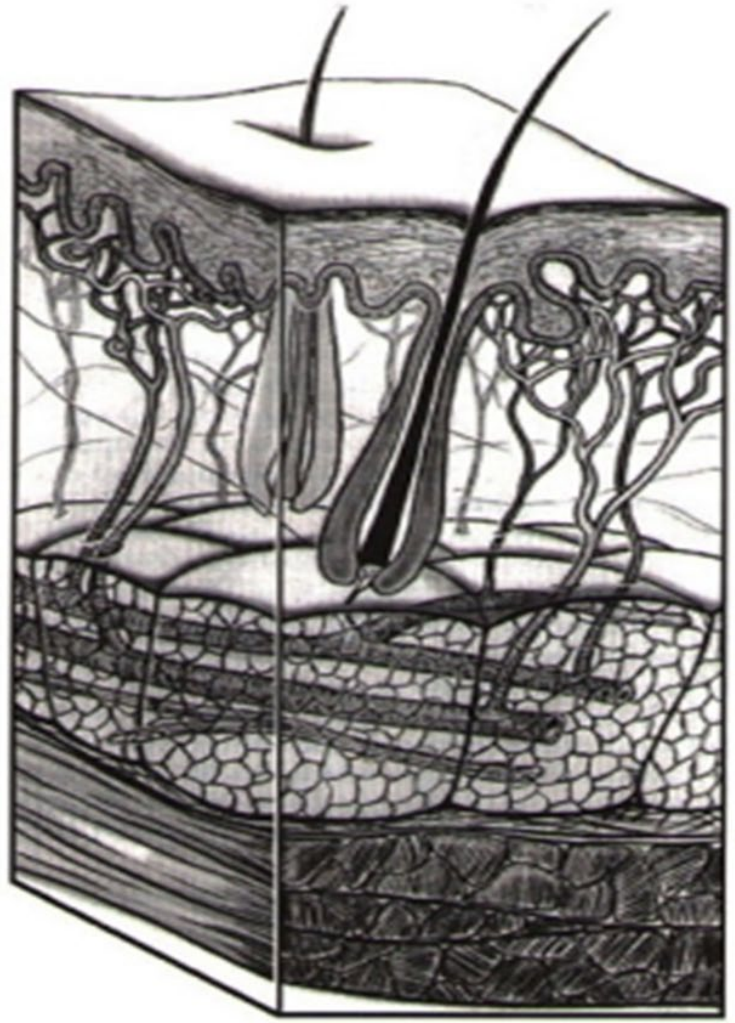
Objectives

- Improve standardization of therapy for skin and soft tissue infections in children
- Outline the management of SSTIs depending on severity of infection
- Recommend narrowest effective empiric antibiotic therapy based on most likely bacterial etiology
- Recommend tailored antibiotic therapy based on culture results
- Recommend oral options for intravenous antibiotics
- Recommend shortest effective duration of therapy

Why is Pathway Necessary?

- SSTI is a common diagnosis and includes cellulitis, impetigo, skin abscess, as well as more severe infections
- Treatment greatly varies
- Practice guidelines released by the Infectious Diseases Society of America in 2014
  - Endorsed by Pediatric Infectious Diseases Society

Skin Anatomy



ANATOMY		SYNDROME
Epidermis	Skin	Erysipelas Impetigo Folliculitis Ecthyma Furunculosis Carbunculosis
Dermis		
		Cellulitis
Superficial fascia	Subcutaneous tissue	Necrotizing fasciitis
Subcutaneous fat, nerves, arteries, veins		
Deep fascia		
Muscle		Myonecrosis (clostridial and non-clostridial)

These are the most common organisms to cause infection.

S. aureus **and Group A streptococci**

Group A streptococci and mixed aerobic and anaerobic organisms

Updates for 2025

- Exclusion Criteria: Those born premature are now included in the pathway as management should not differ
- Definitions for mild, moderate and severe infections have been updated
- Antibiotic selection and dosages have been updated throughout the pathway
  - Includes antibiotic allergy types and most appropriate options for adequate coverage
- Testing for MRSA has been clarified
- Necrotizing fasciitis management has been added under “severe infections”
- Simplified ongoing antibiotics and transition to PO antibiotics

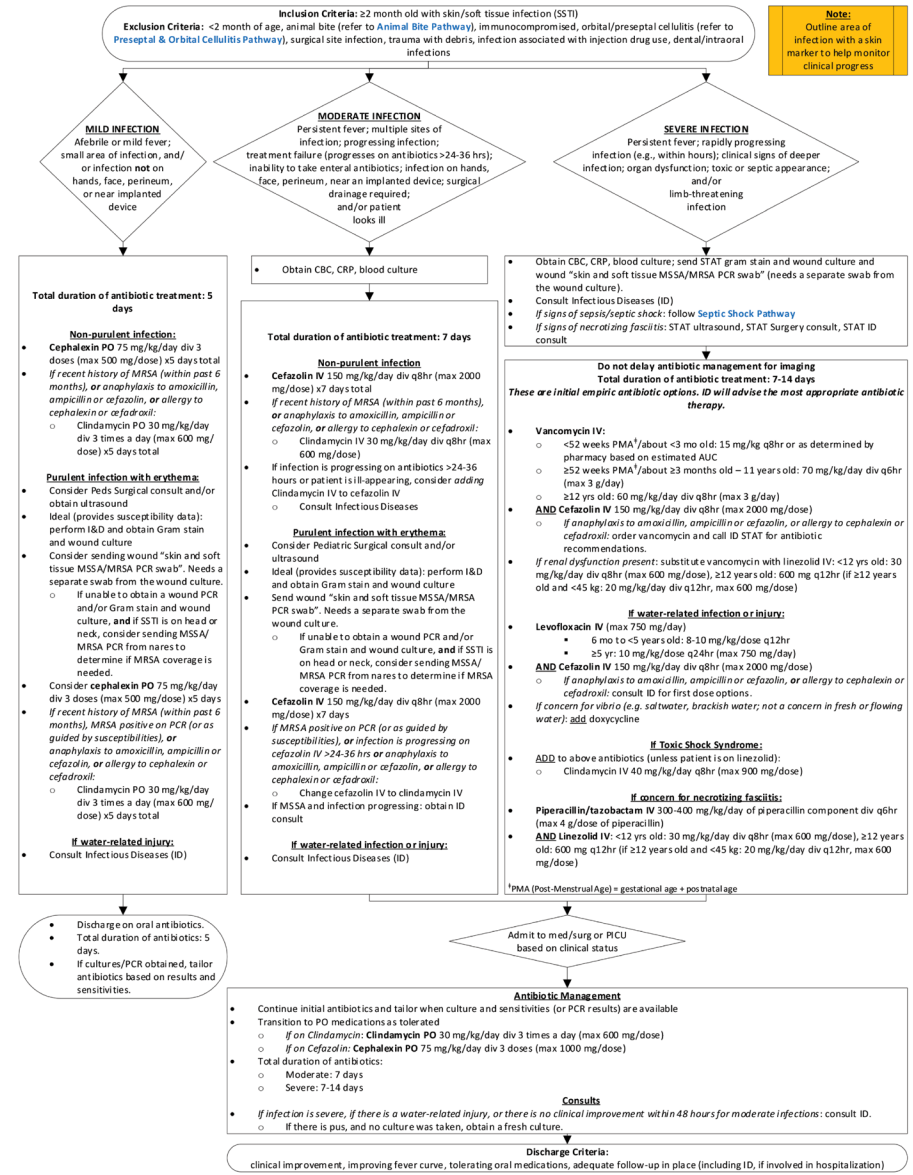
This is the Skin and Soft Tissue Infection Clinical Pathway.

We will be reviewing each component in the following slides.

CLINICAL PATHWAY:

Skin and Soft Tissue Infections (SSTI)

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.



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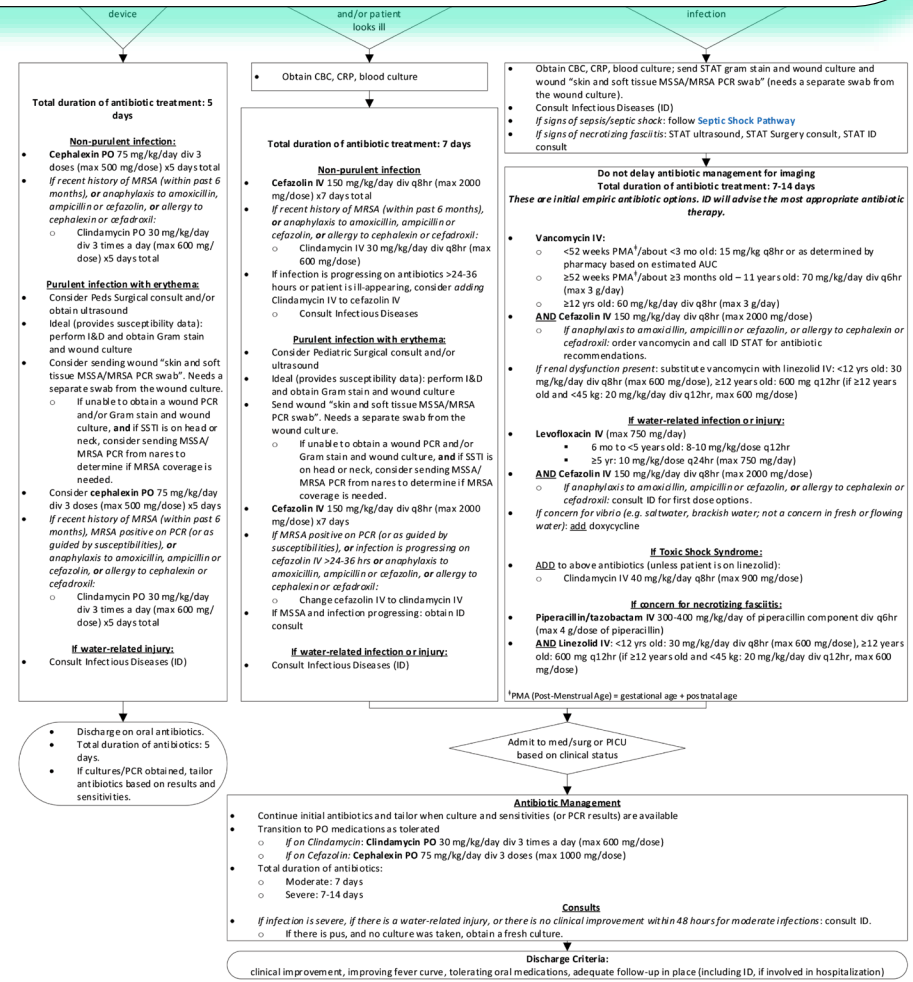
Inclusion Criteria: ≥2 month old with skin/soft tissue infection (SSTI)

Exclusion Criteria: <2 month of age, animal bite (refer to **Animal Bite Pathway**), immunocompromised, orbital/preseptal cellulitis (refer to **Preseptal & Orbital Cellulitis Pathway**), surgical site infection, trauma with debris, infection associated with injection drug use, dental/intraoral infections

Patients with certain underlying medical conditions should be treated off pathway.

In addition, there are separate pathways for Animal Bites and Pre-septal & Orbital Cellulitis. Please refer to those pathways when indicated.

Update for 2025:
Premature infants are no longer excluded from the pathway as they will follow the same management.



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MILD INFECTION

Afebrile or mild fever; small area of infection, and/or infection **not** on hands, face, perineum, or near implanted device

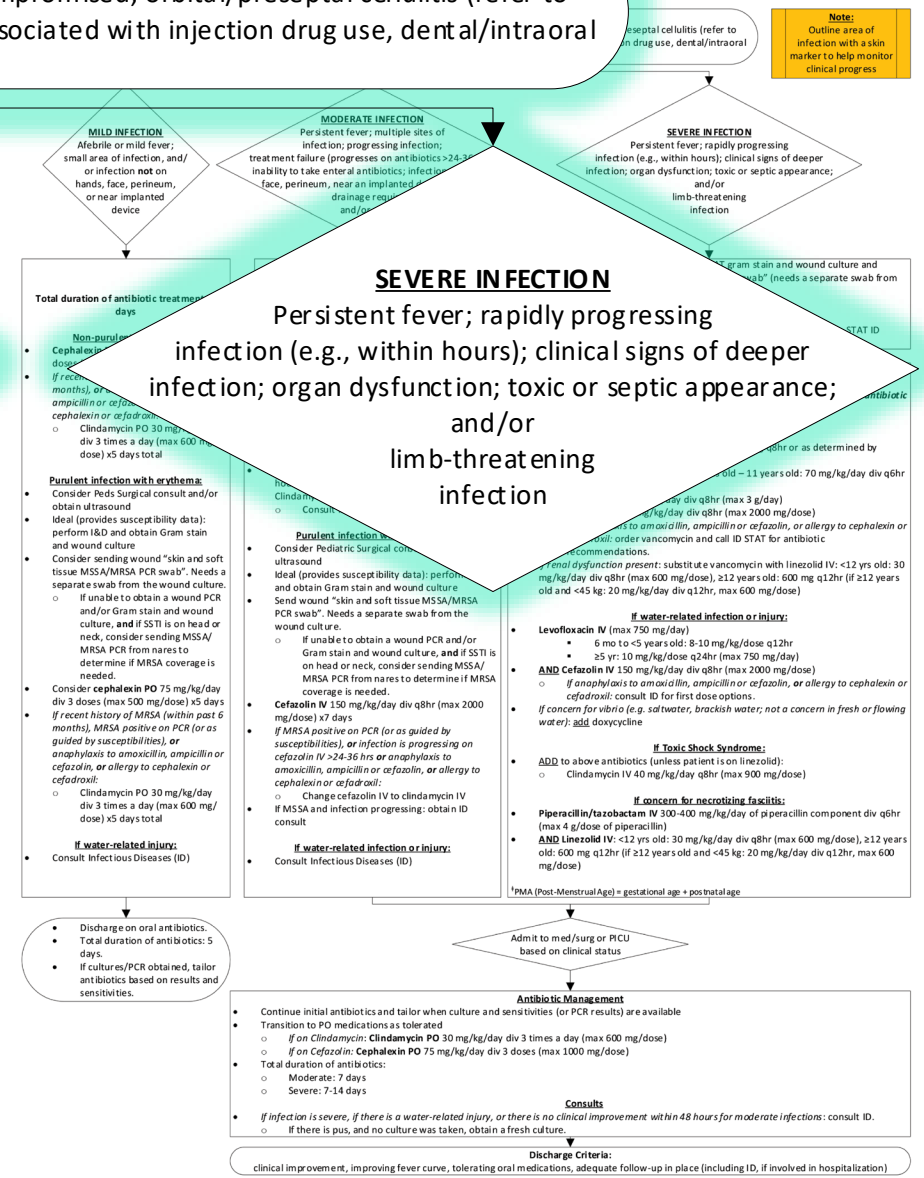
MODERATE INFECTION

Persistent fever; multiple sites of infection; progressing infection; treatment failure (progresses on antibiotics >24-36 hrs); inability to take enteral antibiotics; infection on hands, face, perineum, near an implanted device; surgical drainage required; and/or patient looks ill

SEVERE INFECTION

Persistent fever; rapidly progressing infection (e.g., within hours); clinical signs of deeper infection; organ dysfunction; toxic or septic appearance; and/or limb-threatening infection

Severity of the infection is determined by clinical presentation and guides initial management.



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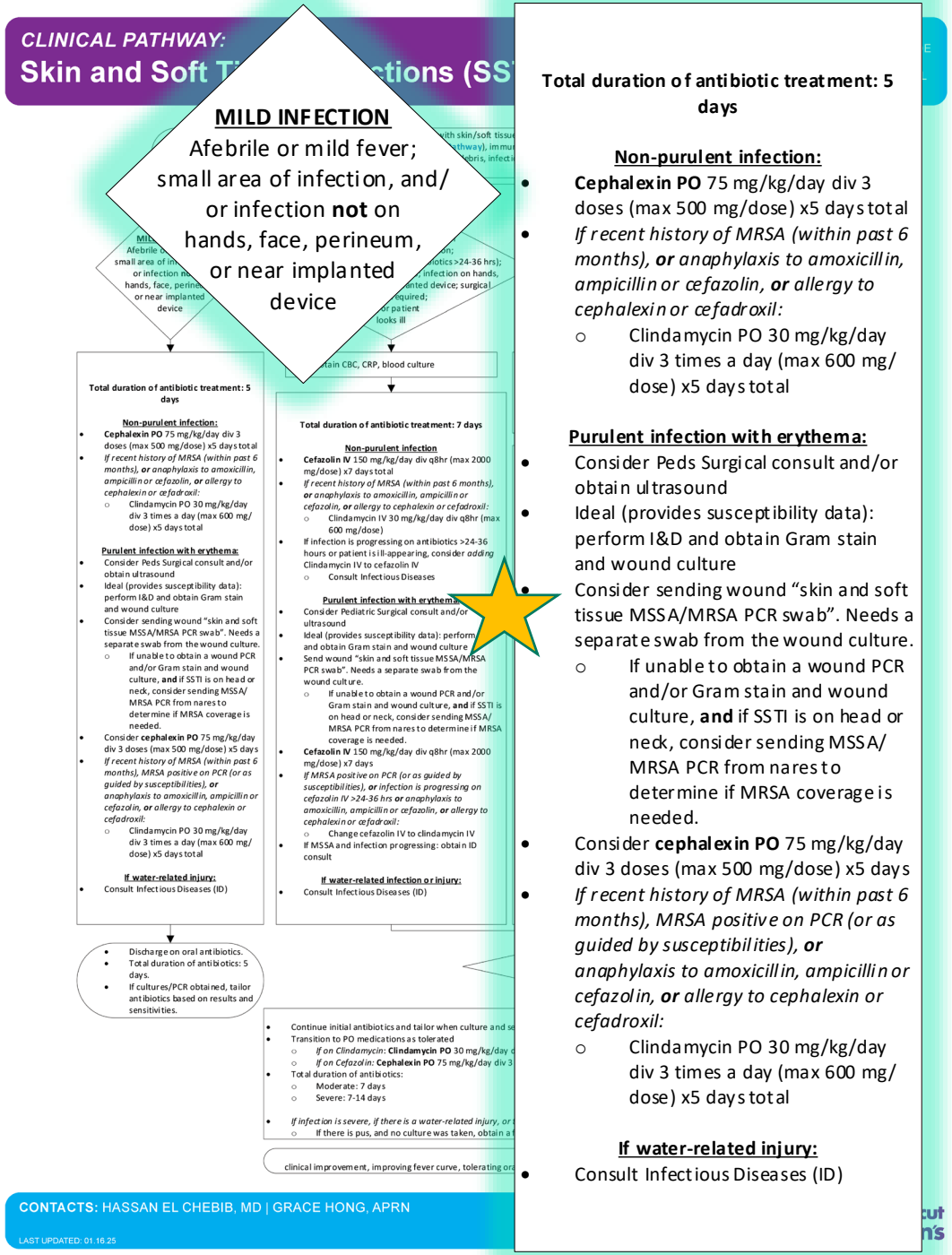
Mild Infection:

- These are well appearing patients with no fever (or mild fevers), and only a small area of infection
- Management is based on whether there is purulence or not
  - Cephalexin is the drug of choice if MRSA is not a concern, as it has better MSSA and strep coverage
  - For purulent infections, can consider sending studies for MRSA to determine if MRSA coverage is needed
  - If there is a concern for MRSA, then will need to cover with clindamycin.



Mild Infection:

- These patients can typically be discharged from the Emergency Department

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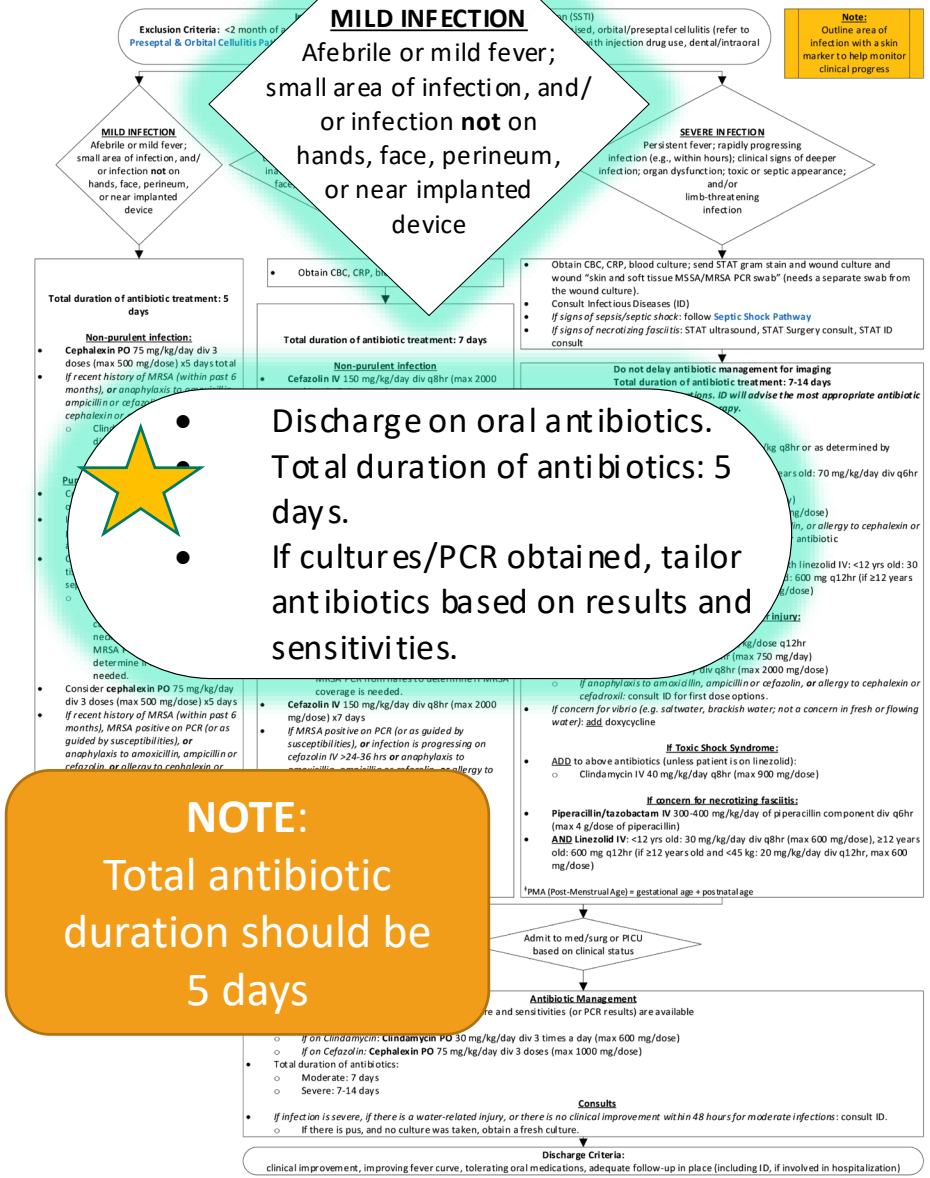

- Discharge on oral antibiotics.
- Total duration of antibiotics: 5 days.
- If cultures/PCR obtained, tailor antibiotics based on results and sensitivities.

NOTE:
Total antibiotic duration should be 5 days

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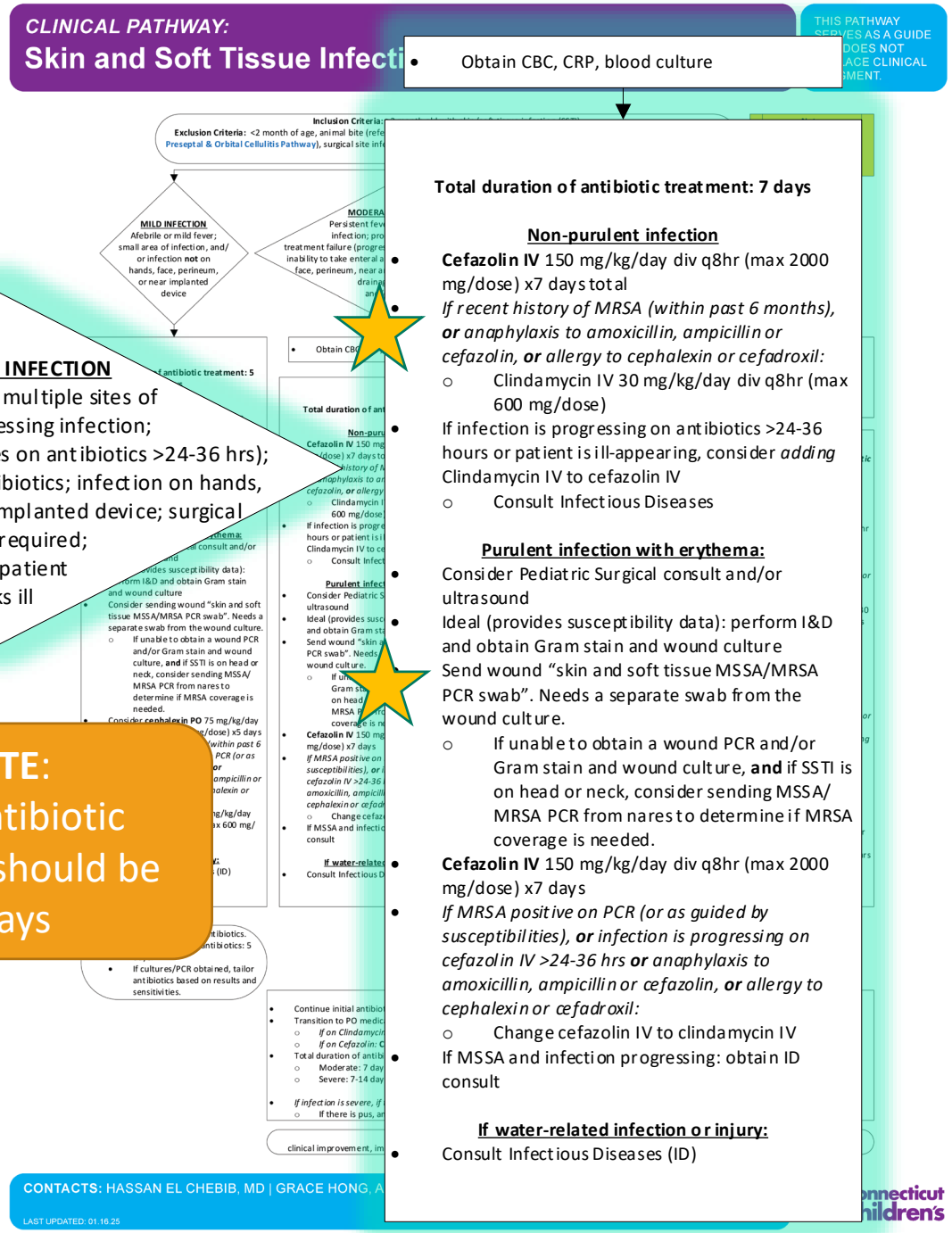
Moderate Infection:

- Obtain CBC, CRP and blood cultures to help identify pathogen and extent of illness
  - Often have systemic signs of infection including persistent fever, high WBC, and elevated CRP
- Patients are typically admitted to Med/Surg unit for IV antibiotics
- Management is based on whether there is purulence or not
  - Cefazolin is the drug of choice
  - If infection is progressing despite cefazolin, adding clindamycin will provide additional coverage
  - If MRSA is of concern, clindamycin alone is indicated.
  - If purulence, can consider sending MRSA studies



Severe Infection:

- SSTIs can become severe, with persisting fevers, rapidly progressing infections, toxic/septic appearance, etc.
- If signs of sepsis, should follow the septic shock pathway
- Labs should include STAT gram stain, wound culture, and MSSA/MRSA swab

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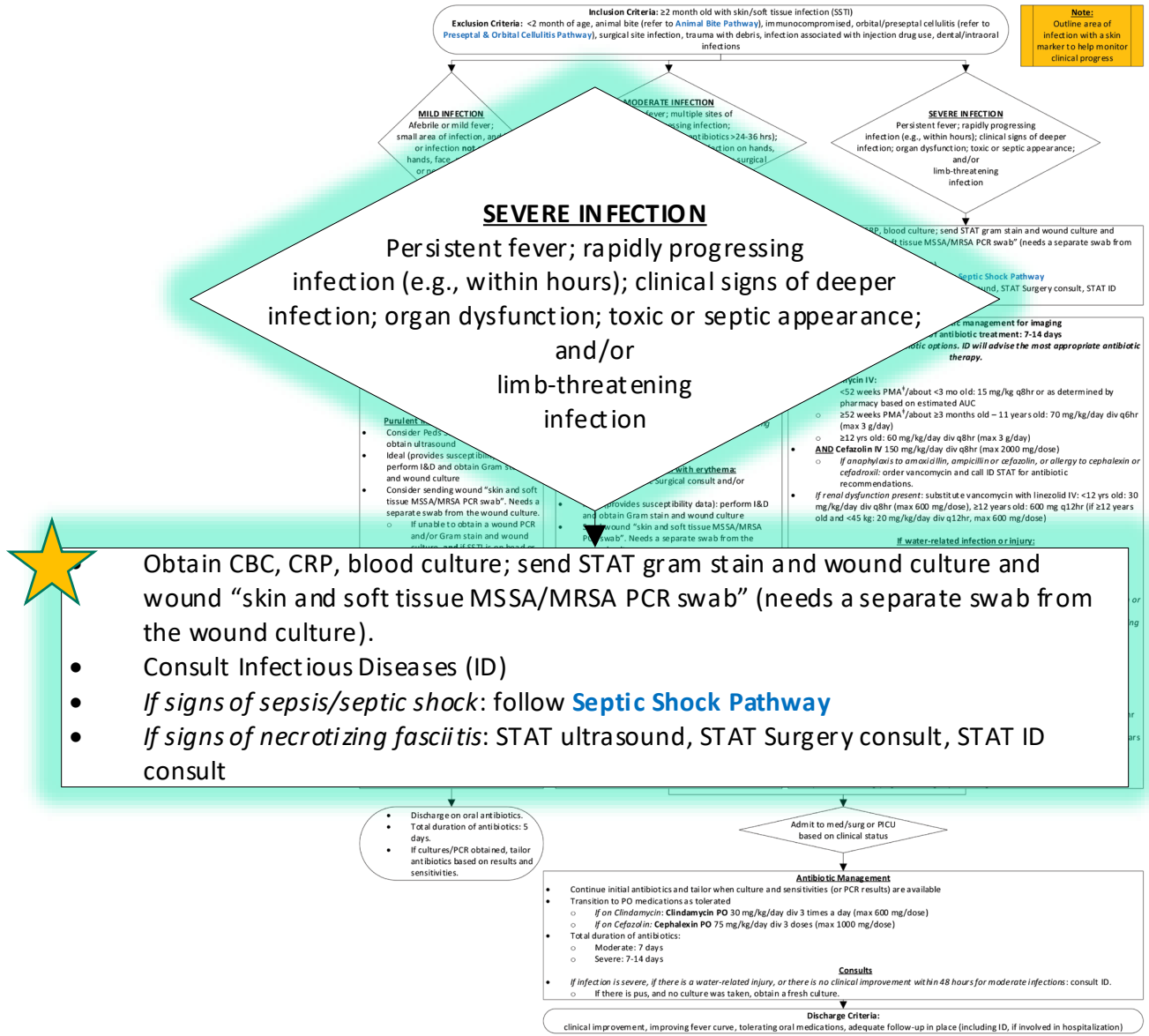

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Necrotizing Fasciitis

- Necrotizing fasciitis is an infection within the deep soft tissues that can rapidly destroy muscle fascia and subcutaneous fat, leading to toxicity, limb loss and/or death
- If there are signs of necrotizing fasciitis, a STAT ultrasound and STAT consults to surgery and ID should be placed
- Early surgical intervention and antimicrobial coverage is indicated

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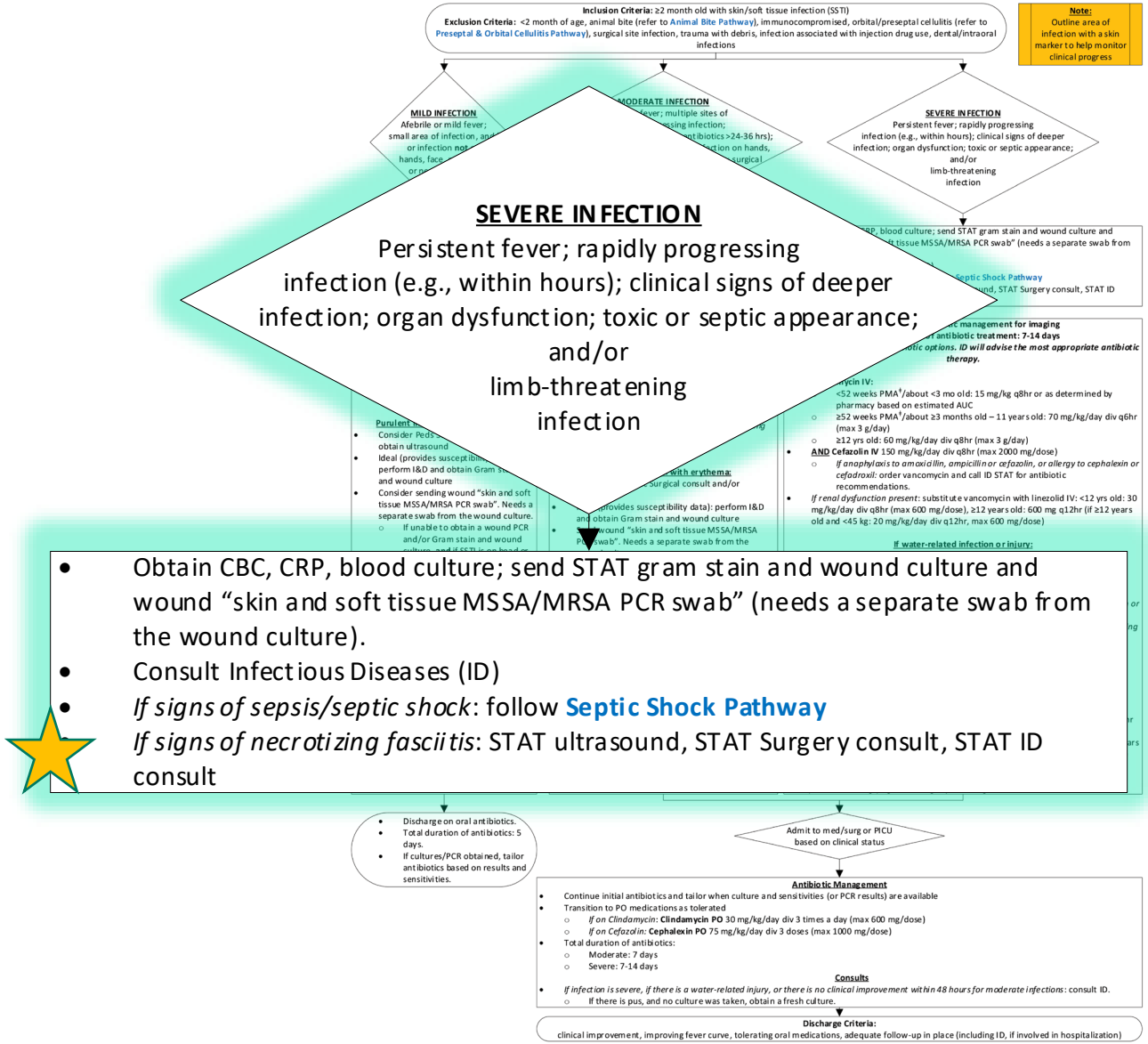

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Severe Infection:

- Antibiotics should NOT be delayed.
- ID will help direct the most appropriate therapy if it is different from what is listed on the pathway
- Vancomycin and cefazolin are standard empiric options

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Do not delay antibiotic management for imaging
Total duration of antibiotic treatment: 7-14 days
These are initial empiric antibiotic options. ID will advise the most appropriate antibiotic therapy.

Vancomycin IV:
- <52 weeks PMA‡/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC
- ≥52 weeks PMA‡/about ≥3 months old – 11 years old: 70 mg/kg/day div q6hr (max 3 g/day)
- ≥12 yrs old: 60 mg/kg/day div q8hr (max 3 g/day)

- **AND Cefazolin IV** 150 mg/kg/day div q8hr (max 2000 mg/dose)
  - *If anaphylaxis to amoxicillin, ampicillin or cefazolin, or allergy to cephalexin or cefadroxil:* order vancomycin and call ID STAT for antibiotic recommendations.
- *If renal dysfunction present*: substitute vancomycin with linezolid IV: <12 yrs old: 30 mg/kg/day div q8hr (max 600 mg/dose), ≥12 years old: 600 mg q12hr (if ≥12 years old and <45 kg: 20 mg/kg/day div q12hr, max 600 mg/dose)

If water-related infection or injury:
- **Levofloxacin IV** (max 750 mg/day)
  - 6 mo to <5 years old: 8-10 mg/kg/dose q12hr
  - ≥5 yr: 10 mg/kg/dose q24hr (max 750 mg/day)
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- *If concern for vibrio (e.g. saltwater, brackish water; not a concern in fresh or flowing water)*: add doxycycline

If Toxic Shock Syndrome:
- ADD to above antibiotics (unless patient is on linezolid):
  - Clindamycin IV 40 mg/kg/day q8hr (max 900 mg/dose)

If concern for necrotizing fasciitis:
- **Piperacillin/tazobactam IV** 300-400 mg/kg/day of piperacillin component div q6hr (max 4 g/dose of piperacillin)
- **AND Linezolid IV**: <12 yrs old: 30 mg/kg/day div q8hr (max 600 mg/dose), ≥12 years old: 600 mg q12hr (if ≥12 years old and <45 kg: 20 mg/kg/day div q12hr, max 600 mg/dose)

‡PMA (Post-Menstrual Age) = gestational age + postnatal age

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Water-Related Infections and Injury

- The major pathogens of concern are aeromonas (fresh water) and vibrio (saltwater, brakish water)
- Start levofloxacin and cefazolin.
  - Doxycycline should be added if there is concern for vibrio.

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Toxic Shock Syndrome (TSS):

- Signs of TSS can include:
  - fever
  - hypotension
  - diffuse macular erythroderma
  - desquamation

    AND
  - 3 or more organ system impairments

- ADD Clindamycin to antibiotic regimen for antitoxin effects

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Necrotizing Fasciitis

- Necrotizing fasciitis may be polymicrobial, so broad antibiotic coverage is indicated.
- This includes starting piperacillin/tazobactam and linezolid

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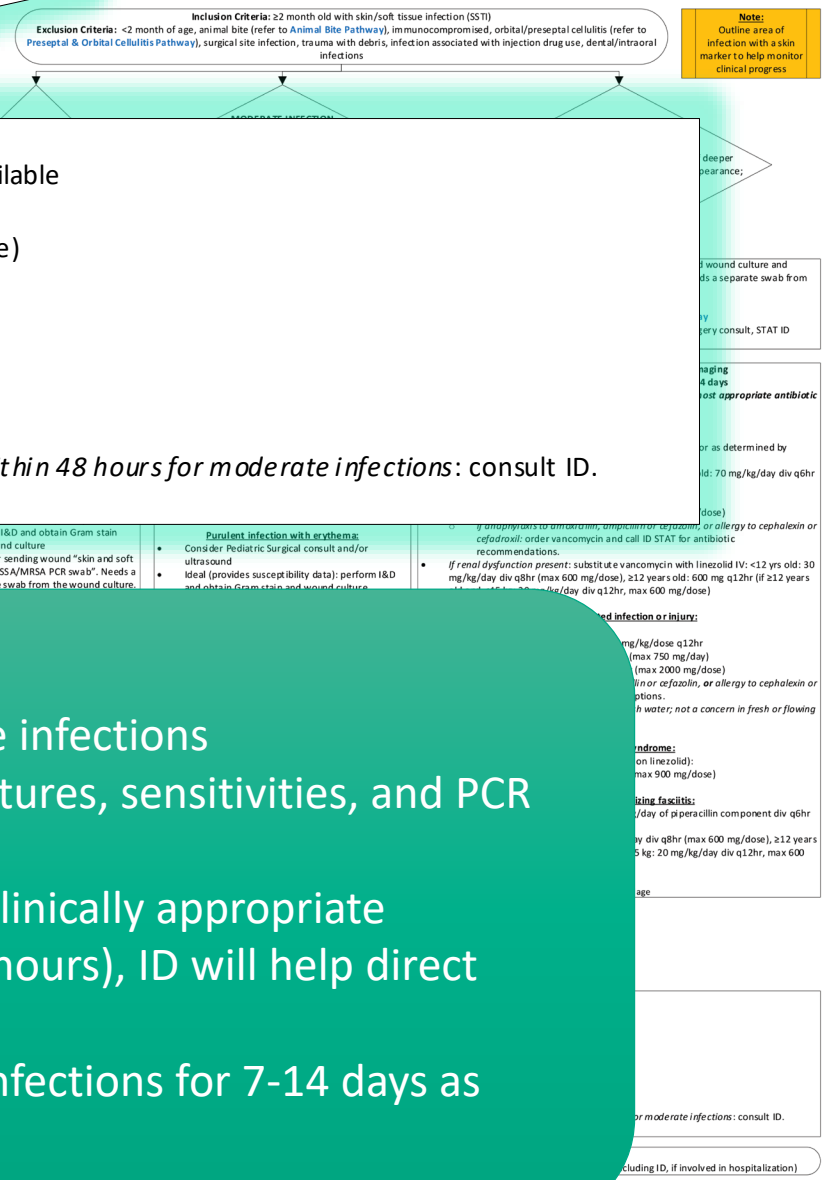
Admit to med/surg or PICU based on clinical status



Antibiotic Management

- Continue initial antibiotics and tailor when culture and sensitivities (or PCR results) are available
- Transition to PO medications as tolerated
  - *If on Clindamycin*: **Clindamycin PO** 30 mg/kg/day div 3 times a day (max 600 mg/dose)
  - *If on Cefazolin:* **Cephalexin PO** 75 mg/kg/day div 3 doses (max 1000 mg/dose)
- Total duration of antibiotics:
  - Moderate: 7 days
  - Severe: 7-14 days

Consults

- *If infection is severe, if there is a water-related injury, or there is no clinical improvement within 48 hours for moderate infections*: consult ID.
  - If there is pus, and no culture was taken, obtain a fresh culture.

- Moderate and severe SSTIs are typically admitted
- Clinical improvement is expected by 48 hours for moderate infections
- Antibiotics should be continued and then tailored once cultures, sensitivities, and PCR results are available.
  - Change from IV to PO antibiotics should occur when clinically appropriate
- For severe infections (or with failure to improve within 48 hours), ID will help direct further care.
- Moderate infections should be treated for 7 days. Severe infections for 7-14 days as directed by ID.

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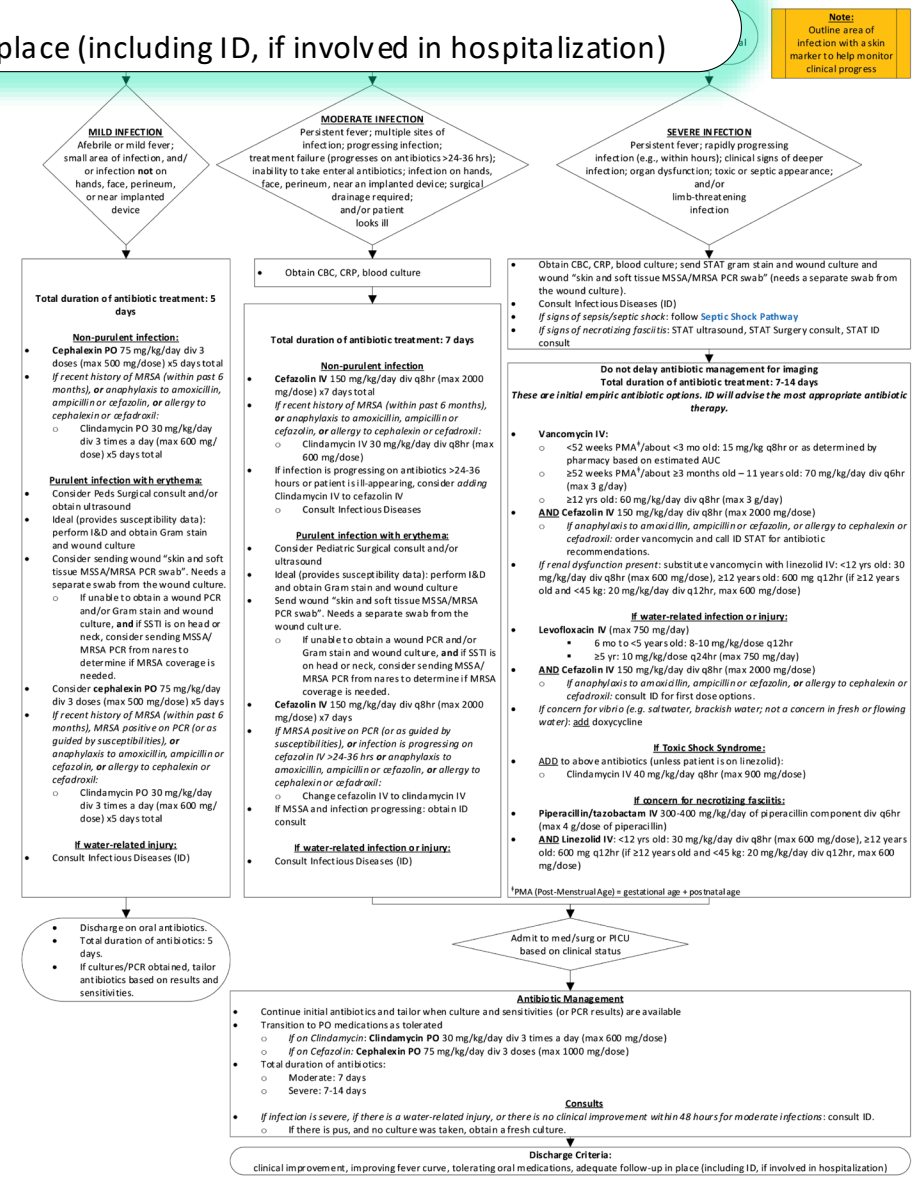
Discharge Criteria:
clinical improvement, improving fever curve, tolerating oral medications, adequate follow-up in place (including ID, if involved in hospitalization)

Discharge

- Patients can be discharged once they meet criteria.



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Quality Metrics

- % Patients with pathway order set (admitted pts only)
- % Patients who receive the recommended antibiotics per pathway
- % Patients prescribed appropriate duration of antibiotics based on severity level: Mild Infection, Moderate Infection, Severe Infection
- % Patients who receive the appropriate dosage of antibiotics per pathway
- ALOS (ED, Minutes)
- ALOS (IP, Hours)
- Readmissions within 7 days
- Pathway bundle: % Patients with appropriate antibiotic, duration of antibiotic and dosage of antibiotic

References

- Hamilton S, Taylor M, Schneider, JG, et al. Assessing the Diagnostic Performance and Clinical utility of Nasal Methicillin-Resistant *Staphylococcus aureus* PCR Testing in Pediatric Orbital Cellulitis. *Journal of Pediatric Infectious Diseases Society*. 2024 Aug; 13(8):430-433.
- 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. *Clin Infect Dis,* 2014 Jul;59(2):e10-52.

Pathway Contacts

- Hassan El Chebib, MD
  - Department of Pediatric Infectious Diseases and Immunology
- Grace Hong, APRN
  - Department of Pediatric Infectious Diseases and Immunology

Thank You!

About Connecticut Children's Pathways Program

Clinical pathways guide the management of patients to optimize consistent use of evidence-based practice. Clinical pathways have been shown to improve guideline adherence and quality outcomes, while decreasing length of stay and cost. Here at Connecticut Children's, our Clinical Pathways Program aims to deliver evidence-based, high value care to the greatest number of children in a diversity of patient settings. These pathways serve as a guide for providers and do not replace clinical judgment.