# Clinical Pathways

## Skin and Soft Tissue Infection (SSTI)

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Connecticut Children's

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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.

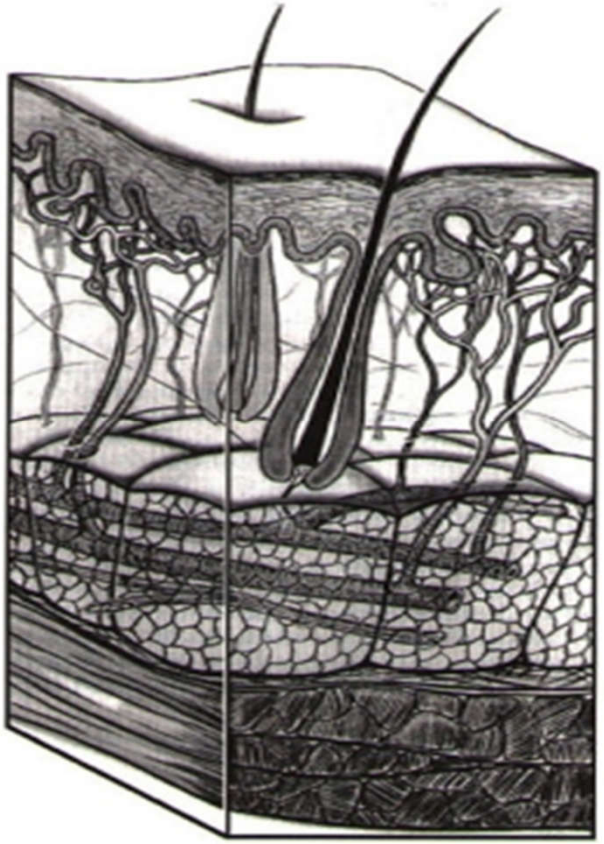
# Objectives of Pathway

- Outline the management of SSTIs depending on severity of infection
- Recommend tailored antibiotic therapy based on culture results
- Recommend PO options for IV antibiotics

# 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
- Rates of MRSA have been decreasing in recent years (are more likely for abscess related infections)

# Skin Anatomy



| ANATOMY | | SYNDROME |
|---|---|---|
| Epidermis | Skin | Erysipelas<br>Impetigo<br>Folliculitis<br>Ecthyma<br>Furunculosis<br>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**

# 2019 Updates to the Pathway

- Rates of MRSA have been decreasing in recent years (are more likely for abscess related infections)
- MRSA:
  - MRSA now makes up about 1/3 of all S. Aureus
  - MRSA is 90% clindamycin susceptible
- MSSA:
  - 100% sensitive to cefazolin
  - 80% sensitive to clindamycin
- Recommend utilizing cefazolin/cephalexin as 1st line for SSTIs without abscesses
  - It is rare to have S. aureus resistant to BOTH clindamycin and 1st generation cephalosporin – if there is inadequate clinical improvement (and patient continues to be stable), switch to the alternate therapy rather than jumping to vancomycin
- Removed nafcillin from the pathway as there is recent evidence showing significant increased rates of toxicity
- For water borne infections: we no longer recommend vancomycin and piperacillin/tazobactam due to a 4x increased rate of AKI when using both agents.

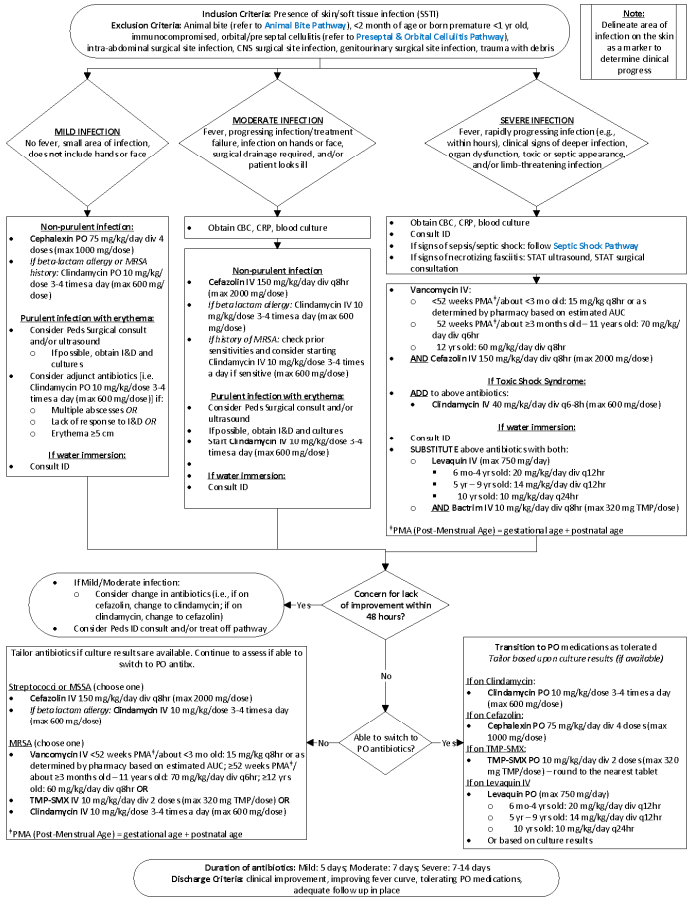
This is the Skin and Soft Tissue Infection Clinical Pathway.

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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LAST UPDATED: 02.01.21

*CLINICAL PATHWAY:*

# Skin and Soft Tissue Infections (SSTI)

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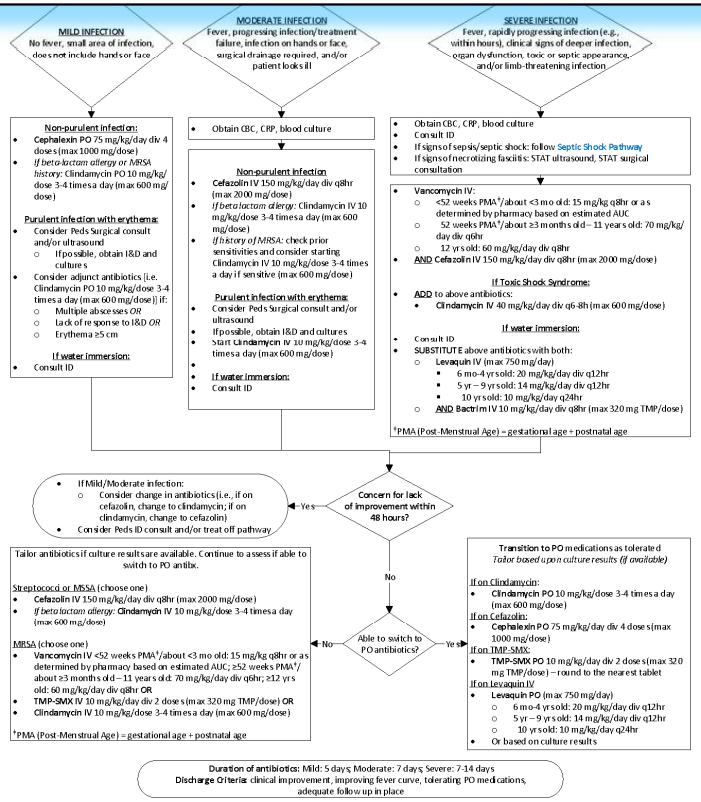
**Inclusion Criteria:** Presence of skin/soft tissue infection (SSTI)
**Exclusion Criteria:** Animal bite (refer to **Animal Bite Pathway**), <2 month of age or born premature <1 yr old, immunocompromised, orbital/preseptal cellulitis (refer to **Preseptal & Orbital Cellulitis Pathway**), intra-abdominal surgical site infection, CNS surgical site infection, genitourinary surgical site infection, trauma with debris

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.

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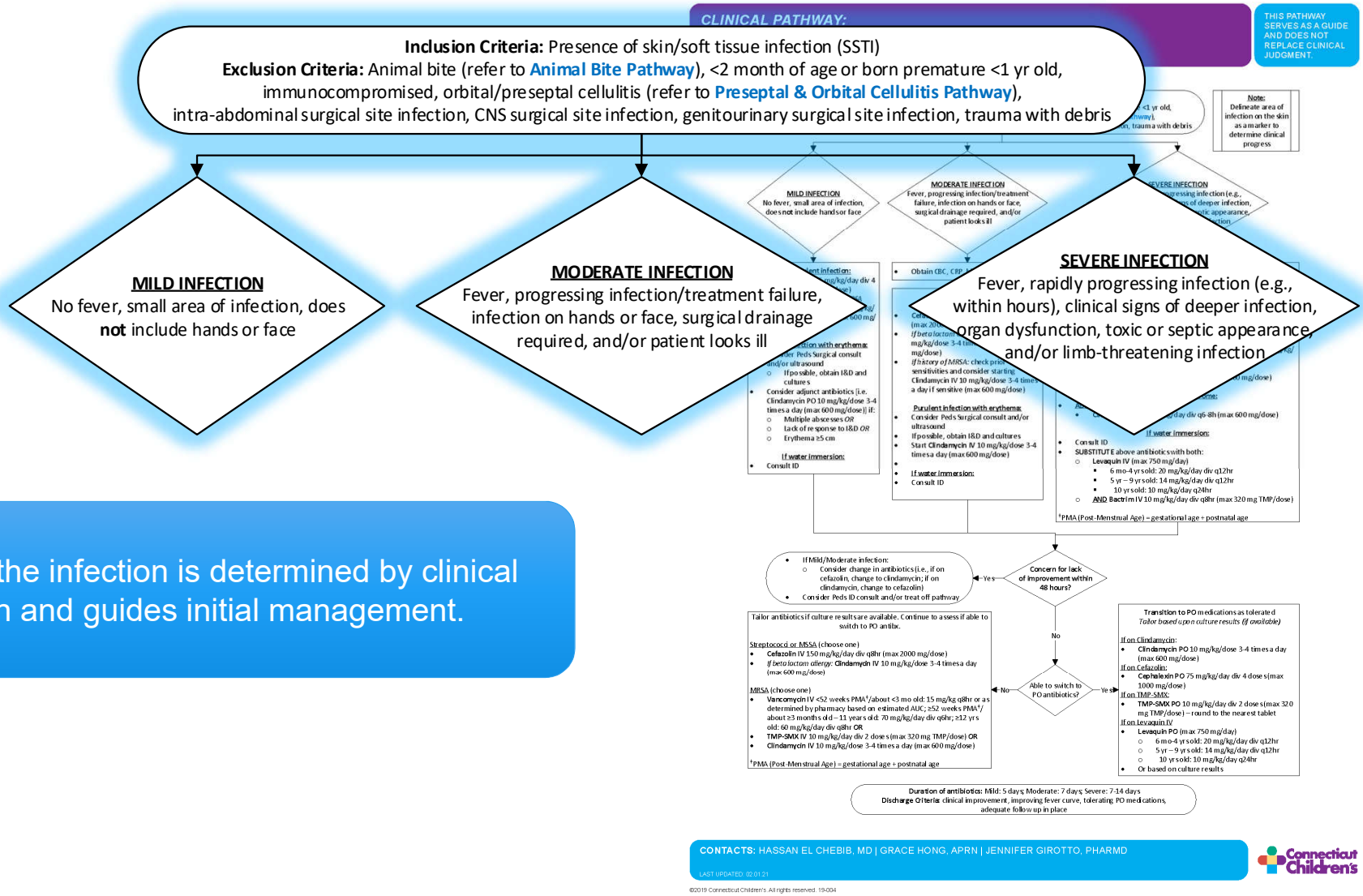
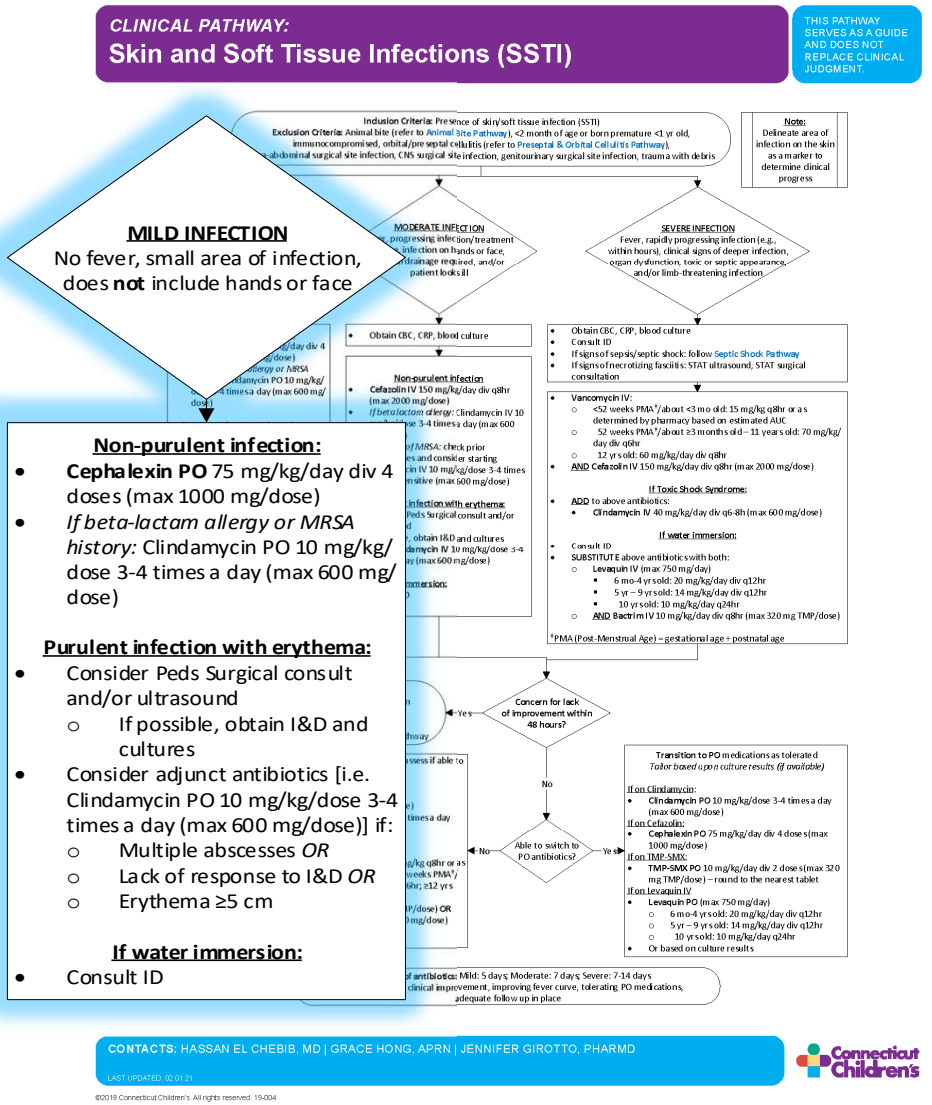



Severity of the infection is determined by clinical presentation and guides initial management.

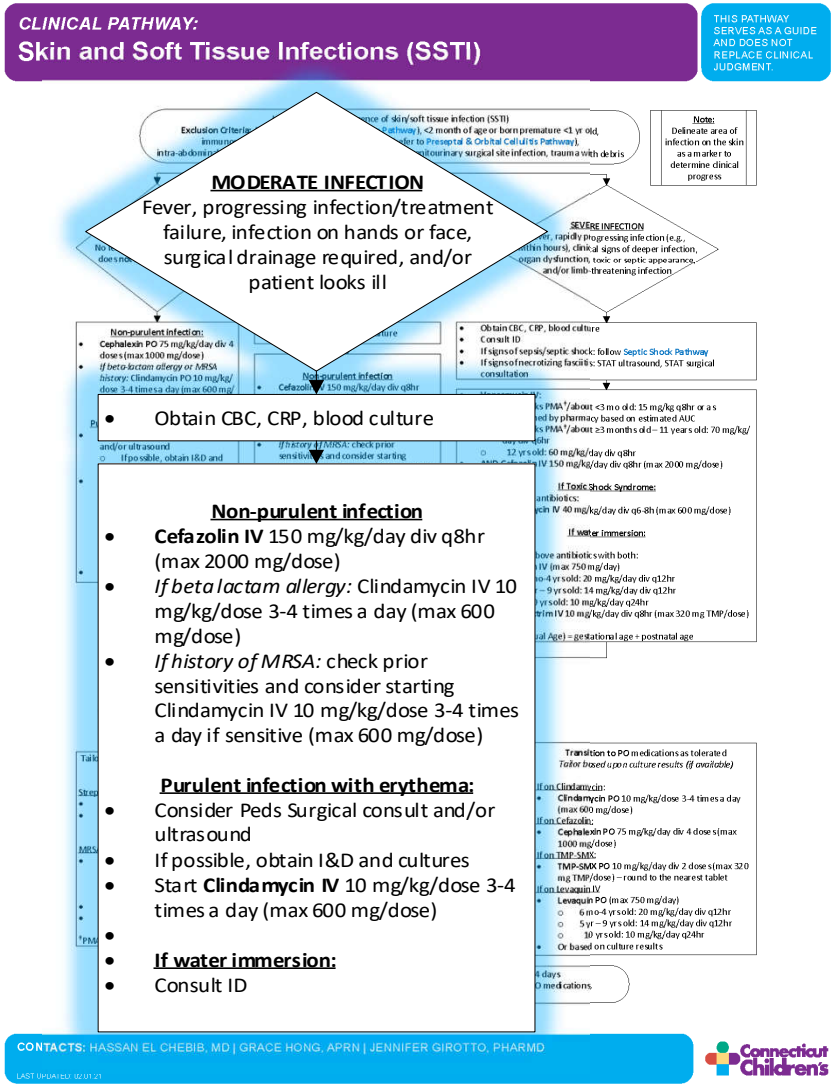
## Mild Infection:

- These are well appearing patients with no fever, and only a small area of infection
- Management is based on whether there is purulence or not
  - Remember that rates of MRSA are decreasing in those infections without abscesses
  - Cefazolin is the drug of choice if MRSA is not a concern, as it has better MSSA and strep coverage
- These patients can typically be discharged from the Emergency Department



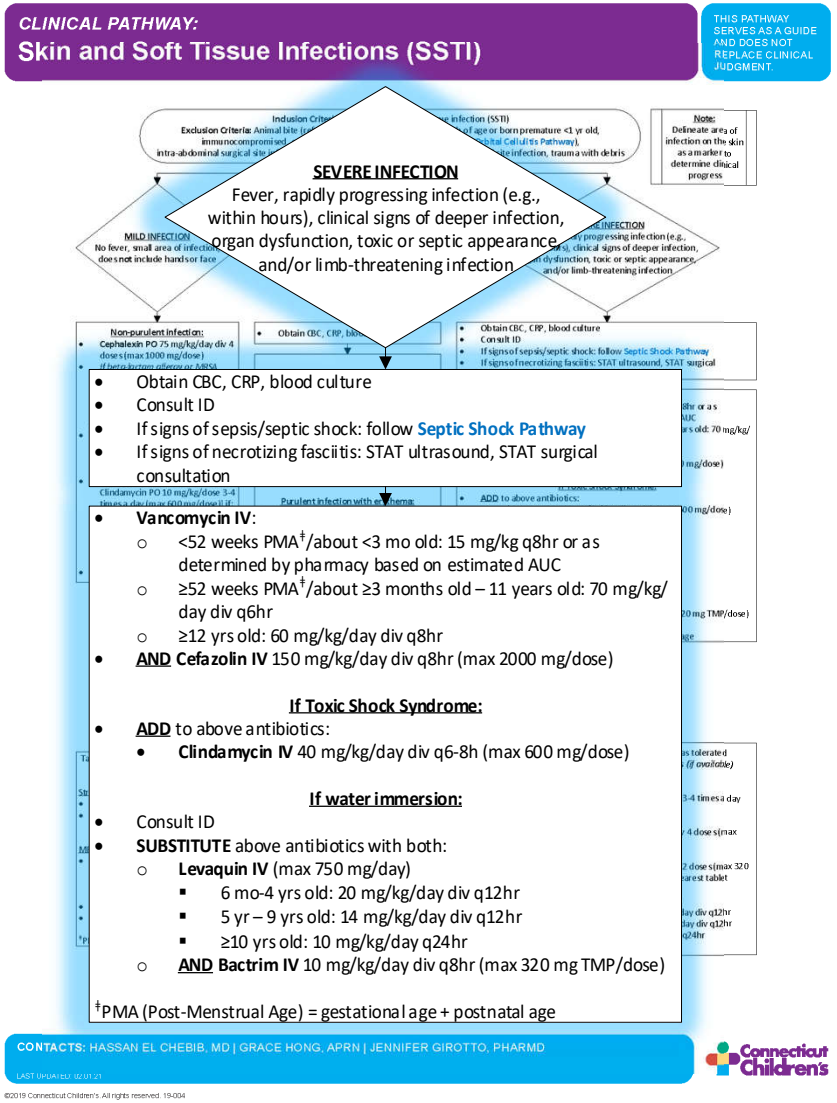
## Moderate Infection:

- Obtain CBC, CRP and blood cultures to help identify pathogen and extent of illness
  - Often have systemic signs of infection including fever, high WBC, and elevated CRP
- Patients are typically admitted to Med/Surg unit for IV antibiotics
- Antibiotic choice depends on whether there is purulence or not
  - Remember that rates of MRSA are decreasing in those infections without abscesses
  - Cefazolin is the drug of choice if MRSA is not a concern, as it has better MSSA and strep coverage



## Severe Infection:

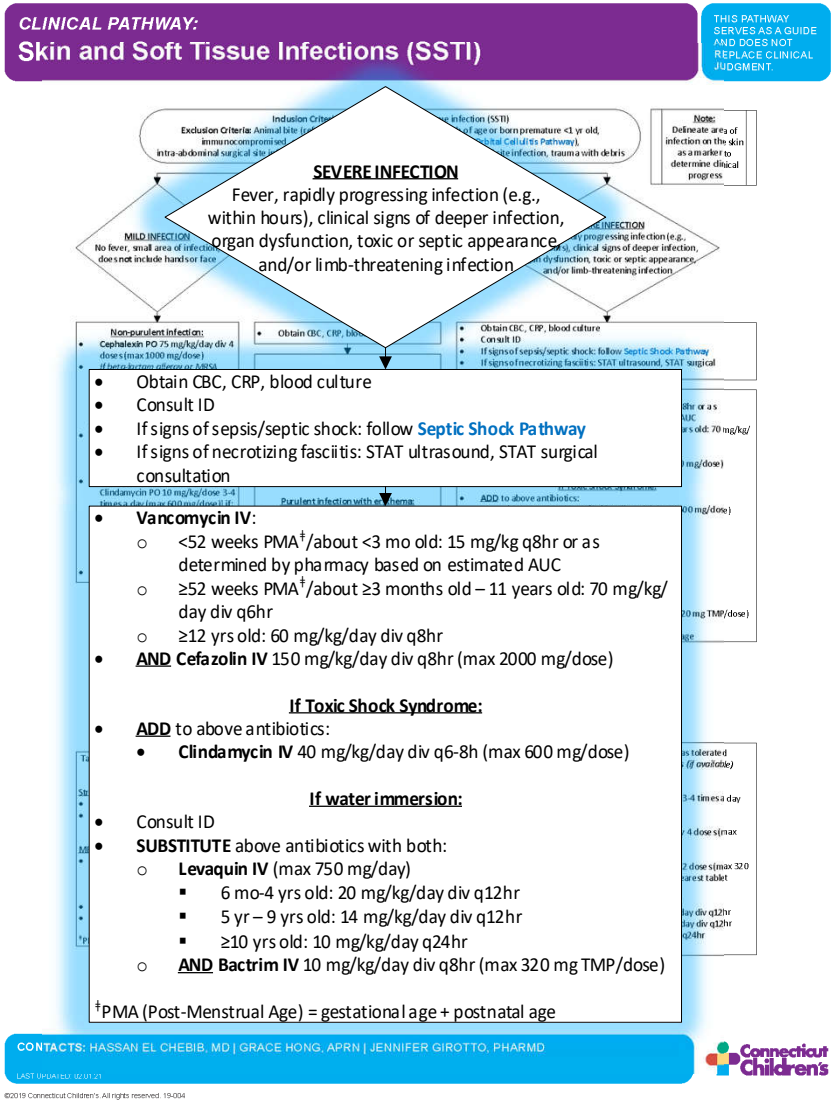
- Patients may be admitted to the PICU due to septic appearance
- After initial lab work is sent, they should be started on Vancomycin AND Cefazolin
- Other antibiotics may be indicated based on special circumstances – Toxic Shock Syndrome or water immersion



## Toxic Shock Syndrome (TSS):

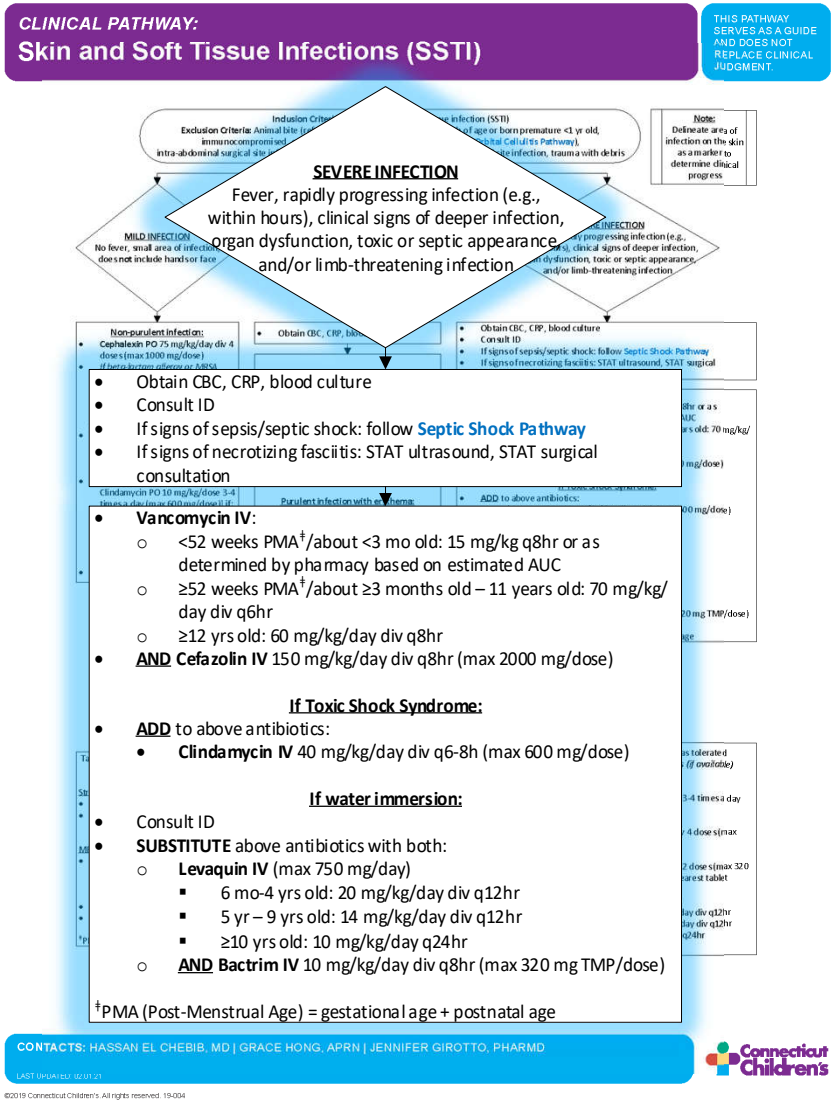
- Signs of TSS can include:
  - fever
  - hypotension
  - diffuse macular erythroderma
  - desquamation
    AND
  - 3 or more organ system impairments

- ADD Clindamycin to antibiotic regimen

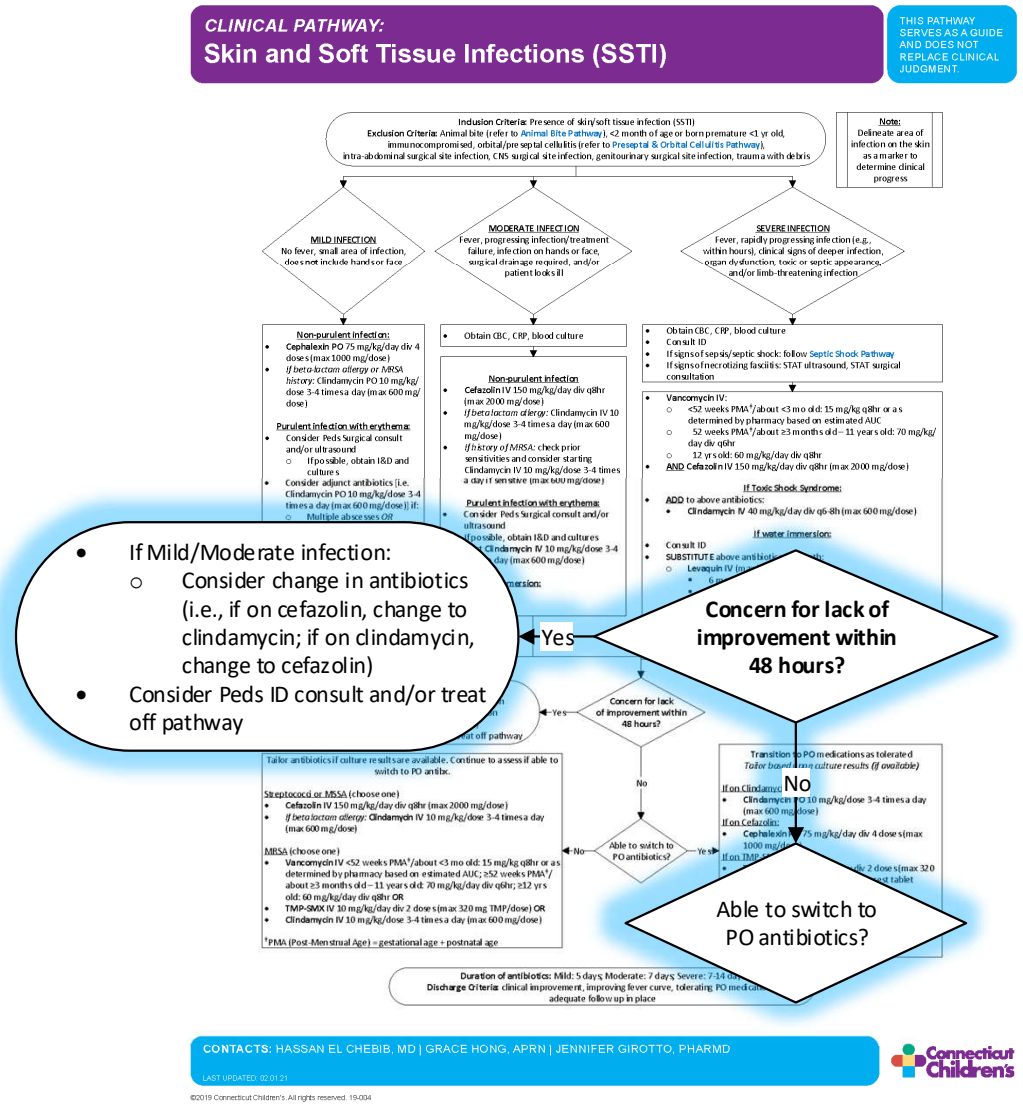


## Water Immersion History:

- The major pathogens of concerns are aeromonas (fresh water), and vibrio (warm salt water)
  - Aeromonas treatment includes a fluoroquinolone, or Bactrim
  - Vibrio treatment includes fluoroquinolone
  - Both Levaquin and Bactrim therapy will provide empiric therapy for aeromonas and vibrio, as well as the more typical organisms
- Recommend an ID consult, especially because there can be changes in resistance patterns and severity of infection



- Clinical improvement is expected by 48 hours
- If there is no improvement by 48 hours, consider changing antibiotics or Peds ID consult
  - Remember, for mild/moderate SSTIs, S. aureus resistance to both cefazolin and clindamycin is rare – if appropriate, choose the alternate therapy
- If there is improvement by 48 hours, then should consider changing to enteral (PO) antibiotics if appropriate.



Recommendations for when IV to PO antimicrobial therapy should be considered.

Patients who have shown clinical improvement of a non-severe infection who have normal absorption and are taking some medications PO are often candidates for oral antimicrobial therapy. The antimicrobial stewardship program (ASP) recommends switching from IV to PO antimicrobial therapy, whenever it is clinically appropriate. The following provides a general summary of considerations that should be used to help determine if IV to PO therapy may be appropriate.

| Criteria for Considering IV to PO | Yes | No |
|---|---|---|
| **Inclusion Criteria (Consider the Following)** | | |
| IV therapy for at least 24 hours | ☐ | ☐ |
| Signs and symptoms of clinical improvement | ☐ | ☐ |
| Taking at least some medications and/or food PO | ☐ | ☐ |
| Temperature <100.4°F for at least 24 hours | ☐ | ☐ |
| White blood cell count normal or normalizing | ☐ | ☐ |
| Heart rate and respiratory rate normal for age in past 24 hours | ☐ | ☐ |
| No episode of hypotension in prior 24 hours | ☐ | ☐ |
| Patient >28 days old and has a post menstrual age is >45 weeks and patient's weight is >10kg | ☐ | ☐ |
| **Exclusion Criteria (ANY of the following)** | | |
| Patient is neutropenic (ANC<1000) | ☐ | ☐ |
| Patient is receiving continuous nasogastric suctioning | ☐ | ☐ |
| Patient has a GI condition associated with absorption concerns | ☐ | ☐ |
| Patient is a neonate / young infant who is not taking at least ½ of their nutritional requirements by mouth | ☐ | ☐ |
| Patient has a severe infection where longer IV therapy is recommended (meningitis, endocarditis, complex osteomyelitis, pancreatitis) | ☐ | ☐ |
| Patient has an infection with an organism where there are not oral options | ☐ | ☐ |
| Patient has an infection with an organism where the oral options are not considered first line or have significant adverse effects | ☐ | ☐ |
| Patient has cystic fibrosis and has been admitted for IV therapy (usually due to failure of outpatient oral therapy options) | ☐ | ☐ |

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Connecticut Children's Antimicrobial Stewardship Program

*CLINICAL PATHWAY:*

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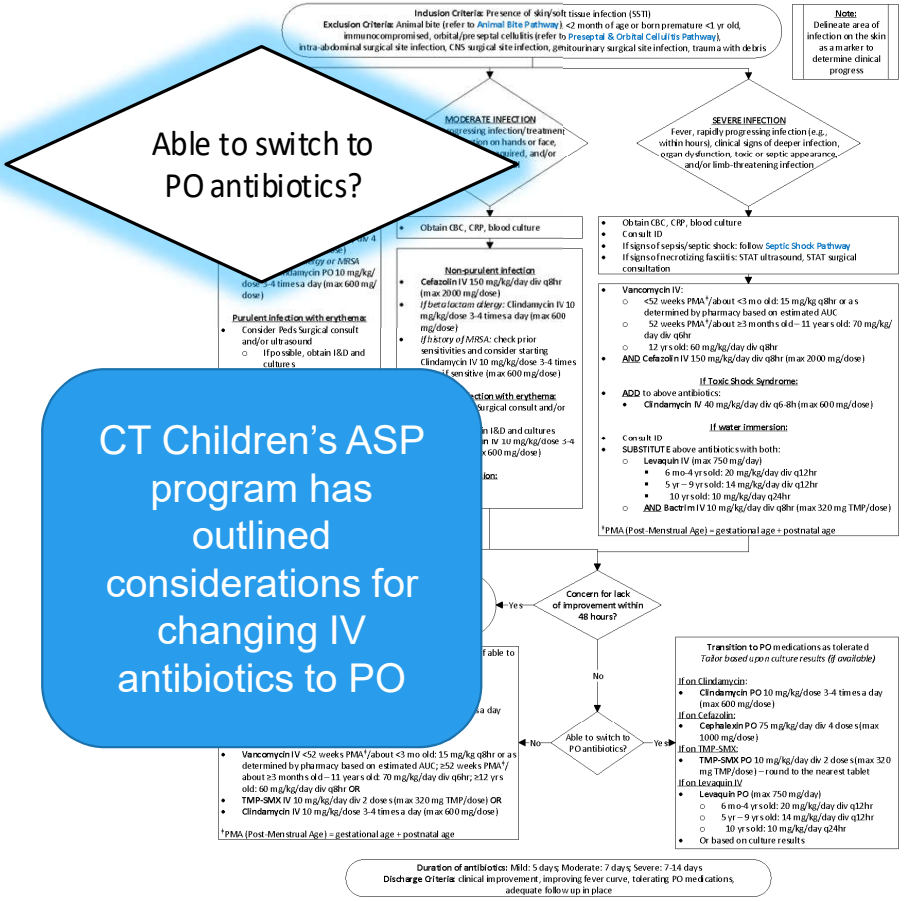


CT Children's ASP program has outlined considerations for changing IV antibiotics to PO

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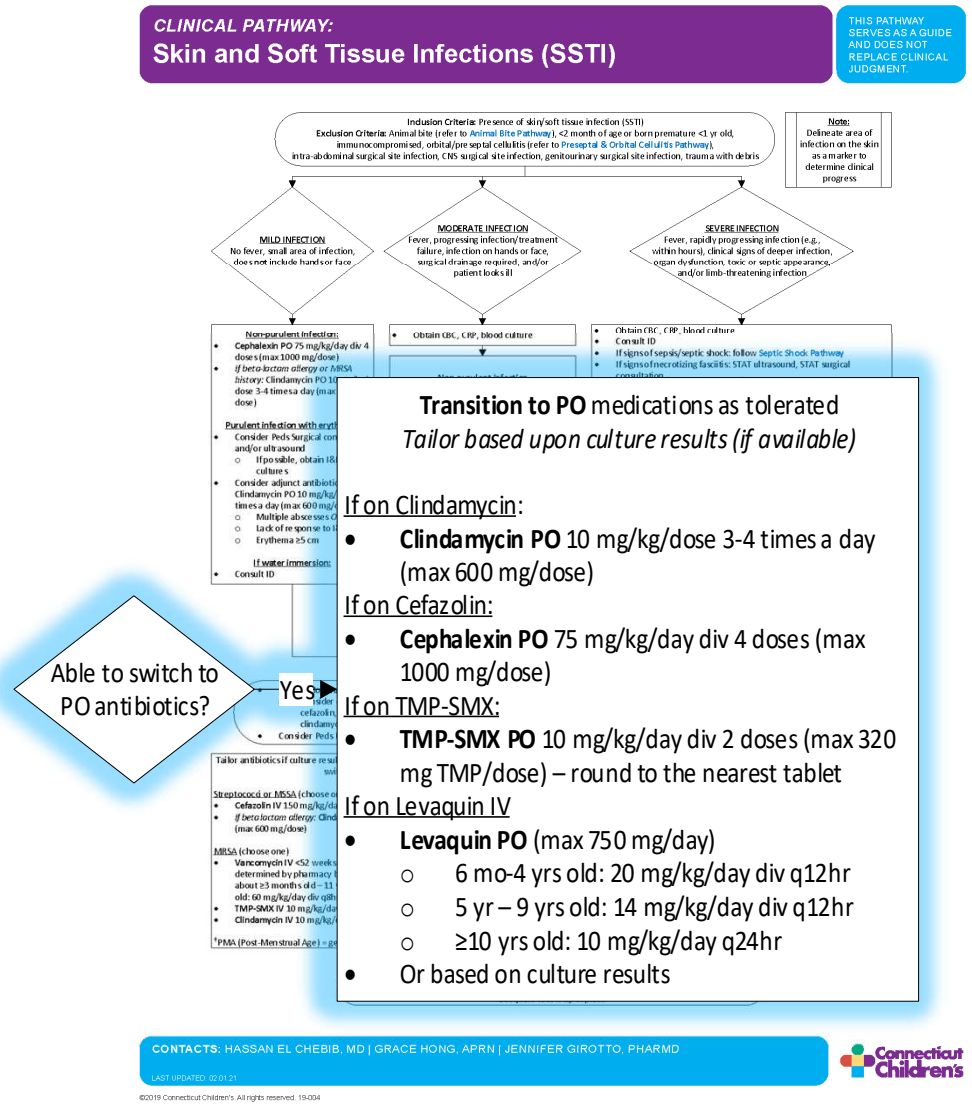
## If the patient is able to switch to PO antibiotics:

- Choice of PO antibiotic is based on culture results if they are available – to ensure that the narrowest, most effective, therapy is being used
- If the patient is improving but no culture results are available, the choice of PO antibiotic is based on which IV antibiotic they are improving on



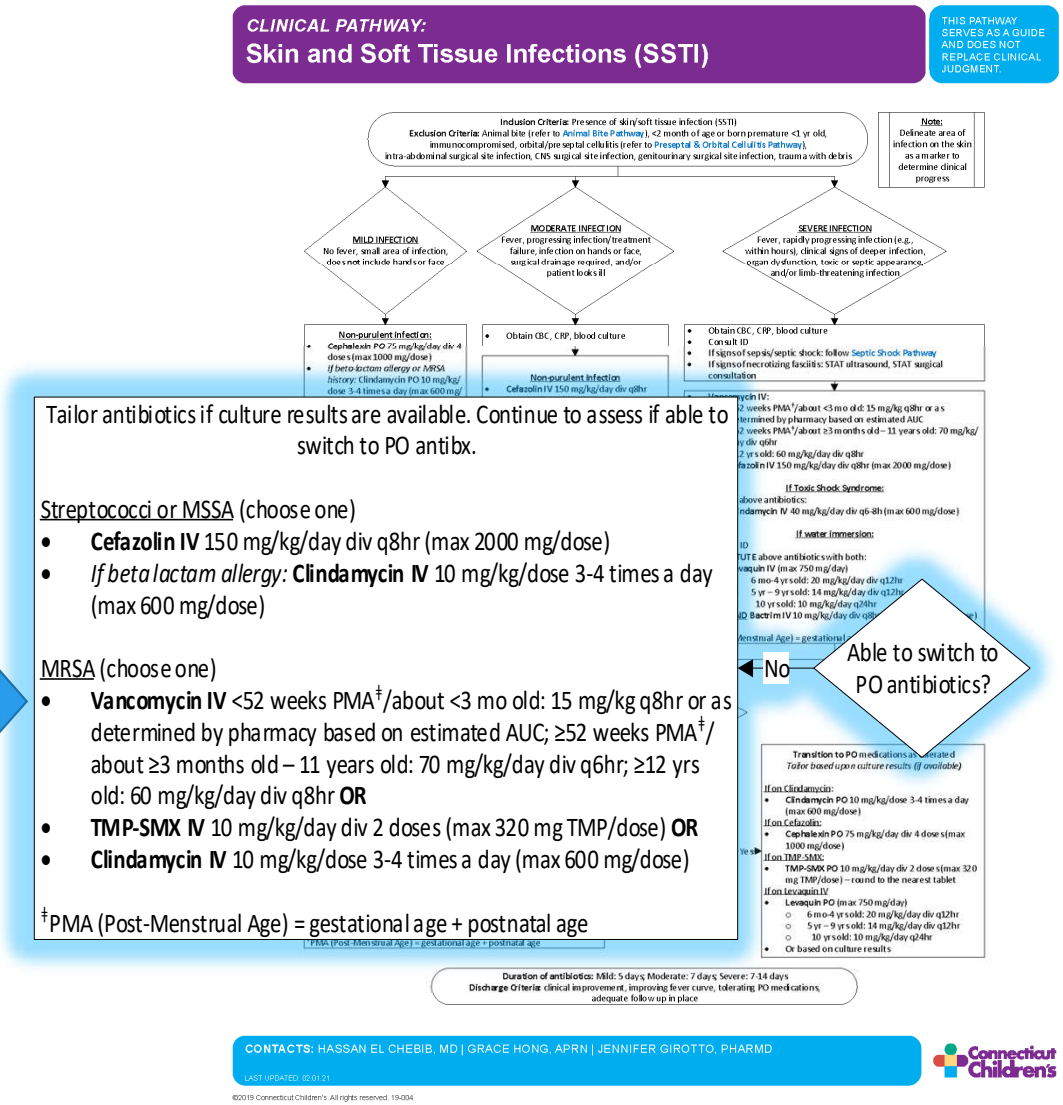
IV antibiotics should continue to be adjusted based on culture results if they are available.

- Remember that cefazolin has excellent strep and MSSA coverage.

Continue to assess for readiness to switch to PO antibiotics.

**The pharmacy's vancomycin protocol was updated in Feb 2021.**

- All patients who have vancomycin IV ordered will be followed by the clinical pharmacist to help determine appropriate dosing parameters.
- Providers will order initial doses per pathway/order set and provide indication within the order.
- IV vancomycin dosing and recommended labs will be managed by pharmacy in conjunction with primary teams.



- Duration of therapy depends on severity of the infection
  - It is important not to treat for longer periods than necessary
- Patients should have follow up in place prior to discharge

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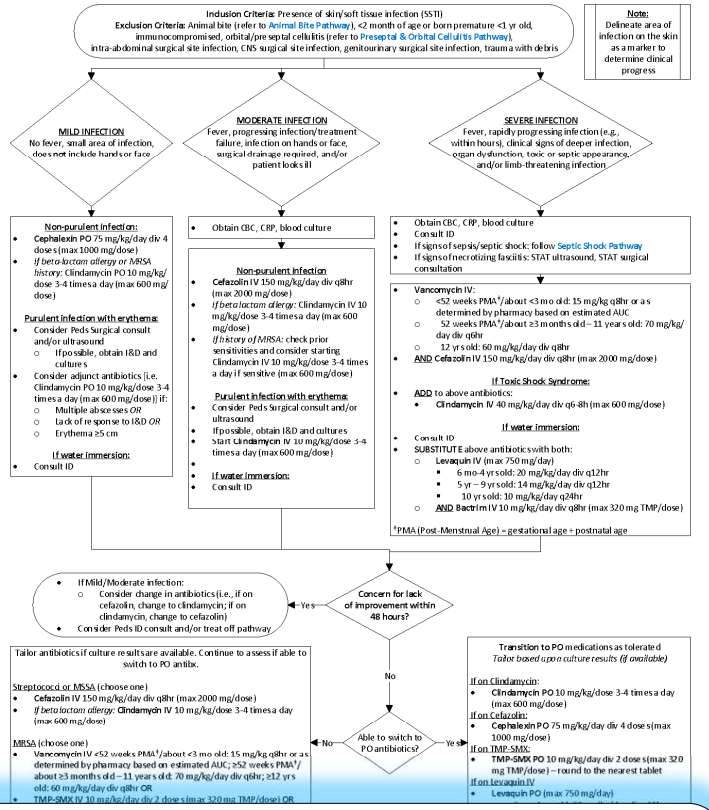


**Duration of antibiotics:** Mild: 5 days; Moderate: 7 days; Severe: 7-14 days

**Discharge Criteria:** clinical improvement, improving fever curve, tolerating PO medications, adequate follow up in place

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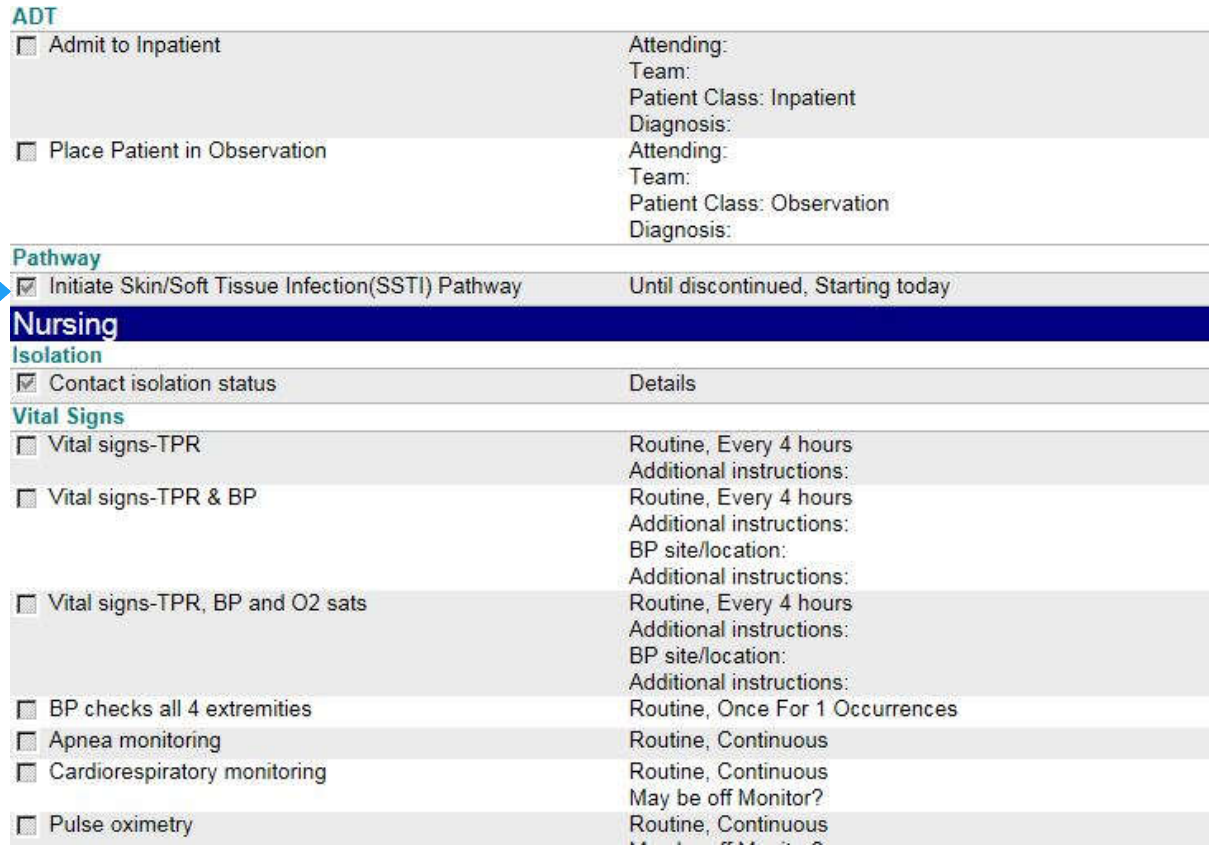
# Use of Order Set

Please utilize the order set under “SSTI”.
The “Initiate Skin/Soft Tissue Infection (SSTI) Pathway” is pre-selected. This helps us track our quality metrics!



**ADT**

| | |
|---|---|
| ☐ Admit to Inpatient | Attending:<br>Team:<br>Patient Class: Inpatient<br>Diagnosis: |
| ☐ Place Patient in Observation | Attending:<br>Team:<br>Patient Class: Observation<br>Diagnosis: |

**Pathway**

| | |
|---|---|
| ☑ Initiate Skin/Soft Tissue Infection(SSTI) Pathway | Until discontinued, Starting today |

**Nursing**

**Isolation**

| | |
|---|---|
| ☑ Contact isolation status | Details |

**Vital Signs**

| | |
|---|---|
| ☐ Vital signs-TPR | Routine, Every 4 hours<br>Additional instructions: |
| ☐ Vital signs-TPR & BP | Routine, Every 4 hours<br>Additional instructions:<br>BP site/location:<br>Additional instructions: |
| ☐ Vital signs-TPR, BP and O2 sats | Routine, Every 4 hours<br>Additional instructions:<br>BP site/location:<br>Additional instructions: |
| ☐ BP checks all 4 extremities | Routine, Once For 1 Occurrences |
| ☐ Apnea monitoring | Routine, Continuous |
| ☐ Cardiorespiratory monitoring | Routine, Continuous<br>May be off Monitor? |
| ☐ Pulse oximetry | Routine, Continuous |

# Quality Metrics

- Percentage of eligible patients with SSTI order set usage (for admitted patients only)
- Percentage of patients who receive the recommended antibiotics per pathway
- Percentage of patients who receive the appropriate dosage of antibiotics per pathway
- Percentage of patients prescribed 5-10 total course of antibiotic therapy
- Average length of stay (days) for patients admitted with SSTI
- Percentage of patients readmitted within 7 days of discharge

# Pathway Contacts

- Hassan El Chebib, MD
  - Department of Pediatric Infectious Diseases and Immunology
- Grace Hong, APRN
  - Department of Pediatric Infectious Diseases and Immunology
- Jennifer Girotto, PharmD
  - Antimicrobial Stewardship Program

# References


- 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.

# Thank You!

**About Connecticut Children's Clinical Pathways Program**

The Clinical Pathways Program at Connecticut Children's aims to improve the quality of care our patients receive, across both ambulatory and acute care settings. We have implemented a standardized process for clinical pathway development and maintenance to ensure meaningful improvements to patient care as well as systematic continual improvement. Development of a clinical pathway includes a multidisciplinary team, which may include doctors, advanced practitioners, nurses, pharmacists, other specialists, and even patients/families. Each clinical pathway has a flow algorithm, an educational module for end-user education, associated order set(s) in the electronic medical record, and quality metrics that are evaluated regularly to measure the pathway's effectiveness. Additionally, clinical pathways are reviewed annually and updated to ensure alignment with the most up to date evidence. These pathways serve as a guide for providers and do not replace clinical judgment.