This CPM presents a model of care based on scientific evidence available at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative.

Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base.

If you have questions or concerns regarding this information, contact:

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This CPM is part of Presbyterian’s Clinical Care Model, a broad, enterprise-wide body of documentation covering PHS’ functions, programs, and care pathways, intended to build organizational acumen, facilitate cross-system collaboration, and accelerate our implementation of clinical initiatives.

Find all of PHS’ Care Model at www.PHSCareModel.org.

This Clinical Practice Model (CPM) recommends evidence-based guidelines to facilitate evaluation, diagnosis, and treatment of:

- Adults age of 18 and older
- With skin and soft tissue infections (SSTIs)
- Being seen in a PHS ambulatory setting (primary care, urgent care, ED)

These recommendations emanate from PHS’ Infectious Disease, Infection Control, and Patient Safety departments.

**Why Focus on SSTIs?**

An estimated 6.3 million physician’s office visits per year are attributable to SSTIs. In addition, there has been a 29% increase in the total hospital admissions due to SSTIs (between 2000 and 2004). Similarly, between 1993 and 2005, annual emergency department visits for SSTIs increased from 1.2 million to 3.4 million patients. Some of this increased frequency is related to the emergence of community-associated methicillin resistant *Staphylococcus aureus* (MRSA). SSTIs are among the top 3-5 infection-related diagnoses seen in PMG outpatients.

**Care Pathway Roles and Responsibilities**

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Clinician</th>
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<tbody>
<tr>
<td>Diagnose SSTI</td>
<td>Primary Care Physician, Advanced Practice</td>
</tr>
<tr>
<td>Treat mild and moderate SSTI</td>
<td>Cliniican</td>
</tr>
<tr>
<td>Treat severe SSTI</td>
<td>Attending Physician</td>
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<tr>
<td>Consultation for antibiotic selection and possible</td>
<td>Infectious Disease Physician</td>
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<td>infection</td>
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<tr>
<td>Monitor and recommend appropriate antibiotic</td>
<td>Infectious Disease Pharmacist</td>
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<td>selection and duration</td>
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</table>

**Evidence/Resources**

Diagnosis and Treatment: SSTI

Clinical response may not be immediate for skin and soft tissue infections even when on appropriate initial antimicrobial therapy.

Coverage for gram-negative organisms is not needed except in specific patient populations (diabetics, immunocompromised, and injection drug use). Consider expanding coverage in this population.

*Systemic signs of infection:
- temperature >38°C
- tachycardia (heart rate >90 beats per minute)
- tachypnea (respiratory rate >24 breaths per minute)

OR
- abnormal white blood cell count (>12,000 or <4000 cells/μL)

**PHS | CPM: Skin and Soft Tissue Infections (SSTI)**

- Outpatient parenteral antibiotic therapy may be considered in selected patients.
- These recommendations are not intended for treating animal bites or clenched fist injuries. Consult other resources for such injuries.
Diagnosis and Testing

The diagnosis of cellulitis, erysipelas, and skin abscess is usually based upon clinical manifestations:

- Cellulitis and erysipelas manifest as areas of skin erythema, edema, and warmth; they develop as a result of bacterial entry via breaches in the skin barrier. Fever may be present.
- Erysipelas lesions are raised above the level of surrounding skin with clear demarcation between involved and uninvolved tissue.
- Cellulitis may present with or without purulence; erysipelas is nonpurulent.
- A skin abscess manifests as a painful, fluctuant, erythematous nodule, with or without surrounding cellulitis.
- Cellulitis and erysipelas are nearly always unilateral, and the lower extremities are the most common site of involvement; bilateral involvement should prompt consideration of alternative causes.
- Complications of cellulitis and abscess include bacteremia, endocarditis, osteomyelitis, metastatic infection, sepsis, and toxic shock syndrome.

Since SSTIs have diverse etiologies that depend, in part, on different epidemiological settings, along with physical examination, obtain a careful history that includes information about the patient’s immune status, geographic locale, travel history, recent trauma or surgery, previous antimicrobial therapy, lifestyle, hobbies, and animal exposure or bites.

Blood cultures may be warranted for patients in certain circumstances and should be obtained prior to the initiation of antibiotic therapy:

- Systemic toxicity
- Extensive skin or soft tissue involvement
- Underlying comorbidities (lymphedema, malignancy, neutropenia, immunodeficiency, splenectomy, diabetes)
- Special exposures (animal bite, water-associated injury)
- Persistent cellulitis

In some cases, biopsy or aspiration of tissue may be necessary. Radiographic procedures may be critical in a small subset of patients to determine the level of infection and the presence of gas, abscess, or a necrotizing process. Surgical exploration or debridement is an important diagnostic, as well as therapeutic, procedure in patients with necrotizing infections or myonecrosis and may be important for selected immunocompromised hosts.

Intervention (Acute)

Patients with nonpurulent infection (i.e., cellulitis or erysipelas in the absence of abscess or purulent drainage) should be managed with empiric antibiotic therapy (see algorithm, page 2).

Patients with drainable abscess should undergo incision and drainage with culture and susceptibility testing of debrided material.

Patients with purulent cellulitis (i.e., cellulitis associated with purulent drainage in the absence of drainable abscess) should be managed with antibiotic therapy.

Patients with skin and soft tissue infections known or suspected to be due to methicillin-resistant S. aureus (MRSA) may present with cellulitis, abscess, or both. Patients with cellulitis should be managed with antibiotic therapy. Patients with abscess should undergo incision and drainage and warrant antibiotic therapy in some circumstances. Coverage for MRSA may be prudent in cellulitis associated with penetrating trauma, especially from illicit drug use, purulent drainage, or with concurrent evidence of MRSA infection elsewhere.

For Providers in ambulatory settings, Epic will suggest a care pathway (smart sets) for general Cellulitis [538].

For Inpatient Providers, Epic will suggest a care pathway (smart sets) for IP Skin and Soft Tissue Infection [1333] aligned with the differential diagnosis outlined here (see algorithm on page 2 and table on page 4).
### Diagnosis | Drug | Dosage*
--- | --- | ---
**Non-purulent, Mild cellulitis/erysipelas**
- **cephALEXin** (KEFLEX) capsule 500 mg, Oral, 4 TIMES DAILY, for 5 Days
- **penicillin v potassium** (VEETID) tablet 500 mg, Oral, 4 TIMES DAILY, for 5 Days
- **clindamycin** (CLEOCIN) capsule 300 mg, Oral, 4 TIMES DAILY, for 5 Days

**Non-purulent, Moderate cellulitis/erysipelas**
- **Cefazolin** (ANCEF, KEFZOL) IVPB 1 g, Intravenous, for 30 Minutes, EVERY 8 HOURS
- **Ceftiraxone** (ROCEPHIN) IVPB 1 g, Intravenous, for 30 Minutes, EVERY 24 HOURS
- **Clindamycin** (CLEOCIN) IVPB 600-900 mg, Intravenous, for 60 Minutes, EVERY 8 HOURS

**Non-purulent, Severe cellulitis/erysipelas**
- **Clindamycin** (CLEOCIN) IVPB 900 mg, Intravenous, for 60 Minutes, EVERY 8 HOURS
- **piperacillin-tazobactam** (ZOSYN) IVPB 3.375 g, Intravenous, EVERY 8 HOURS
- **Vancomycin** (VANCOCIN) IV (ADULT) 15 mg/kg, Intravenous, EVERY 12 HOURS

**Purulent, Moderate cellulitis/erysipelas**
- **sulfamethoxazole-trimethoprim** (BACTREM DS) 800-160 mg per tablet 1 tablet, Oral, 2 TIMES DAILY, for 7 days
- **doxycycline** (VIBRA-TABS/ADOXA) tablet/capsule for oral use 100 mg, Oral, 2 TIMES DAILY, for 7 days
- **Clindamycin** (CLEOCIN) capsule 300 mg, Oral, 4 TIMES DAILY, for 7 days

**Purulent, Severe cellulitis/erysipelas**
- **vancomycin** (VANCOCIN) IV (ADULT) 15 mg/kg, Intravenous, EVERY 12 HOURS

*Duration is based on clinical response and may be extended if initial response is inadequate. Higher dosage may be appropriate in obese patients.

### Patient Education and Support

### Patient Education: SSTI

**Patient Goal**
- Understand skin infections.
  - Cellulitis and erysipelas are both infections of the skin. These infections can cause redness, pain, and swelling. The difference between them is that erysipelas tends to affect the upper layers of skin, and cellulitis tends to affect deep layers of skin and sometimes the fat under the skin.
  - Cellulitis and erysipelas can happen when germs get into the skin. Normally, different types of germs live on a person’s skin. Most of the time, these germs do not cause any problems. But if a person gets a cut or a break in the skin, the germs can get into the skin and cause an infection.
  - Certain conditions can increase a person’s chance of getting cellulitis or erysipelas. These include:
    - Having a cut (even a tiny one)
    - Having another type of skin infection or a long-term skin condition
    - Having swelling of the skin or swelling in the body
    - Being overweight
# Patient Education: SSTI

## Key Messages for the Patient

<table>
<thead>
<tr>
<th>Patient Goal</th>
<th>Key Messages for the Patient</th>
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<tbody>
<tr>
<td>Both types of infection cause very similar symptoms. Either infection can cause the infected area to be painful, red, swollen, or warm. Some people with cellulitis or erysipelas can sometimes also have fever or chills. And sometimes, people with these infections have no symptoms or only some of these symptoms.</td>
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<tr>
<td>Most of the time, cellulitis and erysipelas happen on the legs or arms. But people can get these infections in other places, such as the belly, the face, in the mouth, or around the anus.</td>
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<tr>
<td>Take the medication as prescribed, even after you feel better. Take all of the pills you are given, even if you feel better before you finish them. If you do not take all the pills, the infection can come back worse.</td>
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<tr>
<td>People who have severe infections might be treated in the hospital and given antibiotics through a thin tube that goes into the vein, called an IV.</td>
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<td>Tell your provider if you develop any side effects.</td>
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<td>Tell your provider if you have any allergies or existing health conditions.</td>
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<td>Tell your provider about all the prescription and over the counter medications you are taking (including vitamin and dietary supplements).</td>
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<tr>
<td>You should call your doctor or nurse if your symptoms do not get better within 3 days of starting treatment. You should also call if the red area gets:</td>
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<tr>
<td>Bigger</td>
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<tr>
<td>More swollen</td>
<td></td>
</tr>
<tr>
<td>More painful</td>
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</tbody>
</table>

## Additional References

### Related Care Model Topics
- Antimicrobial Stewardship

### Clinical Practice Guidelines [PHS login required]
- IP Skin and Soft Tissue Order Set
- Presbyterian's Antimicrobial Stewardship Program on PresNet
- Skin and Soft Tissue Infections Adult Treatment Pathway: Ambulatory Care  PHS Anti-Infective Subcommittee. 2014.

### Other Resources
- Diabetic Skin Care and Infections  [PHS login required]
- Spelman D and Baddour LM. Cellulitis and skin abscess in adults: Treatment. UpToDate. 2019 Feb 7; Web.
- Spelman D and Baddour LM. Cellulitis and skin abscess: Clinical manifestations and diagnosis. UpToDate. 2018 Aug 14; Web.