Skin and Soft Tissue Infections in Patients with Injection Drug Use

Amy Beth Kressel, MD, MS, FIDSA, FSHEA

Professor of Clinical Medicine
Division of Infectious Diseases
Department of Medicine

SCHOOL OF MEDICINE

Disclosures

- None

Objectives

- Understand how injection drug use (IDU) causes skin and soft tissue infections (SSTI)
- Evaluate which patients need hospitalization
- Recognize common types of SSTI specific to IDU
- Understand oral antibiotic treatment for ambulatory patients: right drug, right dose, and right duration
- Explain harm reduction strategies

Scope

- SSTI is most common reason for people with IDU to be hospitalized

- Occurs in at least half of people with IDU

Clin Infect Dis 2000 30: 579-81

How IDU Causes SSTI

- Break in skin from injection
- Non-sterile technique or equipment
- Oral contamination
- Drug properties
  - Vasoconstriction (methamphetamine, cocaine, diluents)
  - Immunosuppression (opiates, ethanol)
- Local tissue injury from repeated injection
- Microbial contamination of drugs

Specific Risk Factors for Skin Abscess

- Female gender
- Recent incarceration
- Sex trade involvement
- Cocaine use
- HIV (conflicting data)

Clinical Infectious Diseases, Volume 33, Issue 1, 1 July 2001, Pages 35–40, https://doi.org/10.1086/320879

J Clin Epidemiol. 1996, 49: 1149-1154. 10.1016/0895-4356(96)00180-1.

Harm Reduction Journal **volume 2,** Article number: 24 (2005) https://doi.org/10.1186/1477-7517-2-24

Injection Sites

- Antecubital fossa → Forearms → Hand →
  Neck, feet, legs → Groin and digits

- SSTI may occur distal to injection sites (e.g., vascular thrombus) or be unrelated to injection site (e.g., skin picking with methamphetamine use)

Ambulatory vs Hospital *CREST*

Class I	Class II	Class III	Class IV
Patients have no signs of systemic toxicity, have no uncontrolled co-morbidities and can usually be managed with oral antimicrobials on an outpatient basis	Patients are either systemically ill or systemically well but with a co-morbidity such as peripheral vascular disease, chronic venous insufficiency or morbid obesity which may complicate or delay resolution of their infection	Patients may have a significant systemic upset such as acute confusion, tachycardia, tachypnoea, hypotension, or may have unstable co-morbidities that may interfere with a response to therapy or have a limb threatening infection due to vascular compromise	Patients have sepsis syndrome or severe life threatening infections such as necrotizing fasciitis

Clinical Resource Efficiency Support Team (CREST) 2005 www.crestni.org.uk ISBN 1-903982-12-X

Ambulatory vs Hospital

Multivariable analysis for death within 30 days of start of treatment for SSTI

	Adjusted odds ratio	95% CI	P value
CREST Severity class			
I	1		
II	6.51	0.51–83.12	0.149
III	32.39	2.80–374.49	0.005
IV	167.88	5.30–5319.54	0.004

Journal of Antimicrobial Chemotherapy, Volume 66, Issue 2, February 2011, Pages 387–397, https://doi.org/10.1093/jac/dkq362

Ambulatory vs Hospital
Dundee Criteria

- An attempt to "simplify" CREST, combining vitals and co-morbidities.
  - RR, HR, SaO2, SBP, temperature, arousability
  - peripheral vascular disease, chronic venous insufficiency, or morbid obesity
- How well does this distinguish high vs low risk patients?

Journal of Antimicrobial Chemotherapy, Volume 74, Issue 1, January 2019, Pages 200–206, https://doi.org/10.1093/jac/dky400

Ambulatory vs Hospital

Variable	30 day mortality OR (95% CI)	30 day mortality
Dundee Class 1		1% (10/806)
Dundee Class 2		2% (6/271)
Dundee Class 3		3% (10/353)
Dundee Class 4		9% (3/32)
Heart failure	6.16 (2.73–14.23)	
Age >65 years	9.37 (3.00–41.30)	
Diabetes	0.63 (0.23–1.53)	
Immune suppression	1.52 (0.08–8.53)	

Journal of Antimicrobial Chemotherapy, Volume 74, Issue 1, January 2019, Pages 200–206, https://doi.org/10.1093/jac/dky400

Ambulatory vs Hospital

CREST

Class I	Class II	Class III	Class IV
Patients have no signs of systemic toxicity, have no uncontrolled co-morbidities and can usually be managed with oral antimicrobials on an outpatient basis	Patients are either systemically ill or systemically well but with a co-morbidity such as peripheral vascular disease, chronic venous insufficiency or morbid obesity which may complicate or delay resolution of their infection	Patients may have a significant systemic upset such as acute confusion, tachycardia, tachypnoea, hypotension, or may have unstable co-morbidities that may interfere with a response to therapy or have a limb threatening infection due to vascular compromise	Patients have sepsis syndrome or severe life threatening infections such as necrotizing fasciitis

Ambulatory

Hospitalize

Clinical Resource Efficiency Support Team (CREST) 2005 www.crestni.org.uk ISBN 1-903982-12-X

How To Define and What To Do With Class II Patients?

- This is the most difficult group to stratify and identify
- Pay attention to co-morbidities
- Consider an observation stay
- How to distinguish Class I and II?
  - Close attention to vitals and alertness
  - If getting labs, check BMP
    - AKI, even mild, very sensitive indicator for sepsis

Common SSTIs in IDU

- Purulent SSTIs (cutaneous abscess, furuncles, carbuncles, inflamed epidermoid cysts)
- Cellulitis
- Skin ulcers

Less Common But Serious SSTIs

- Necrotizing fasciitis
- Pyomyositis
- Gas Gangrene or Myonecrosis

Purulent Infections

- Cutaneous abscess is the most common SSTI in IDU
- *S aureus* (MRSA>MSSA) > streptococci > other oral flora
  - Rarely unusual bacteria (e.g., *Bacillus* or *Clostridia*) from direct contamination of drugs

Purulent Infections

- Cutaneous abscess can spread beyond the skin
  - Thrombosis and phlebitis
  - Pyomyositis
  - Osteomyelitis
  - Mediastinitis
  - Bacteremia

Purulent Infections

- I+D mainstay of treatment
  - Often curative even without antibiotics
  - Hastens and increases cure rates
  - Identifies specific organisms
    - Especially important in treatment failure
- Aspiration alone not effective

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America https://doi.org/10.1093/cid/ciu296

Purulent Infections
When To Use Antibiotics?

"The decision to administer antibiotics … should be made based on the presence or absence of systemic inflammatory response syndrome (SIRS) such as temperature >38° C or <36° C, tachypnea >24 breaths per minute, tachycardia >90 beats per minute, or white blood cell count >12,000 or <400 cells/μL …. An antibiotic active against MRSA is recommended for patients with carbuncles or abscesses who have markedly impaired host defenses and in patients with SIRS…."

Strong recommendation, low quality evidence

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America
https://doi.org/10.1093/cid/ciu296

Purulent SSTI*

Oral Treatment

Drug, dose, duration

Weight	TMP/SMX, oral	Duration
<60 kg	1 SS QID (1 DS BID)	5 days
60-80 kg	1 DS TID (1.5 DS BID)	5 days
>80 kg	1DS QID (2 DS BID)	5 days
TMP/SMX allergy	Doxycycline 100 mg BID	5 days

*Typically *S aureus*.

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America
https://doi.org/10.1093/cid/ciu296

Purulent SSTI
Treatment failure

- **I+D**
- Confirm antibiotic (drug + dose)
- Check original cultures
  - Obtain cultures if none prior

- Is ambulatory treatment still appropriate?

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America
https://doi.org/10.1093/cid/ciu296

Purulent SSTI

Oral Treatment

Pathogen-directed

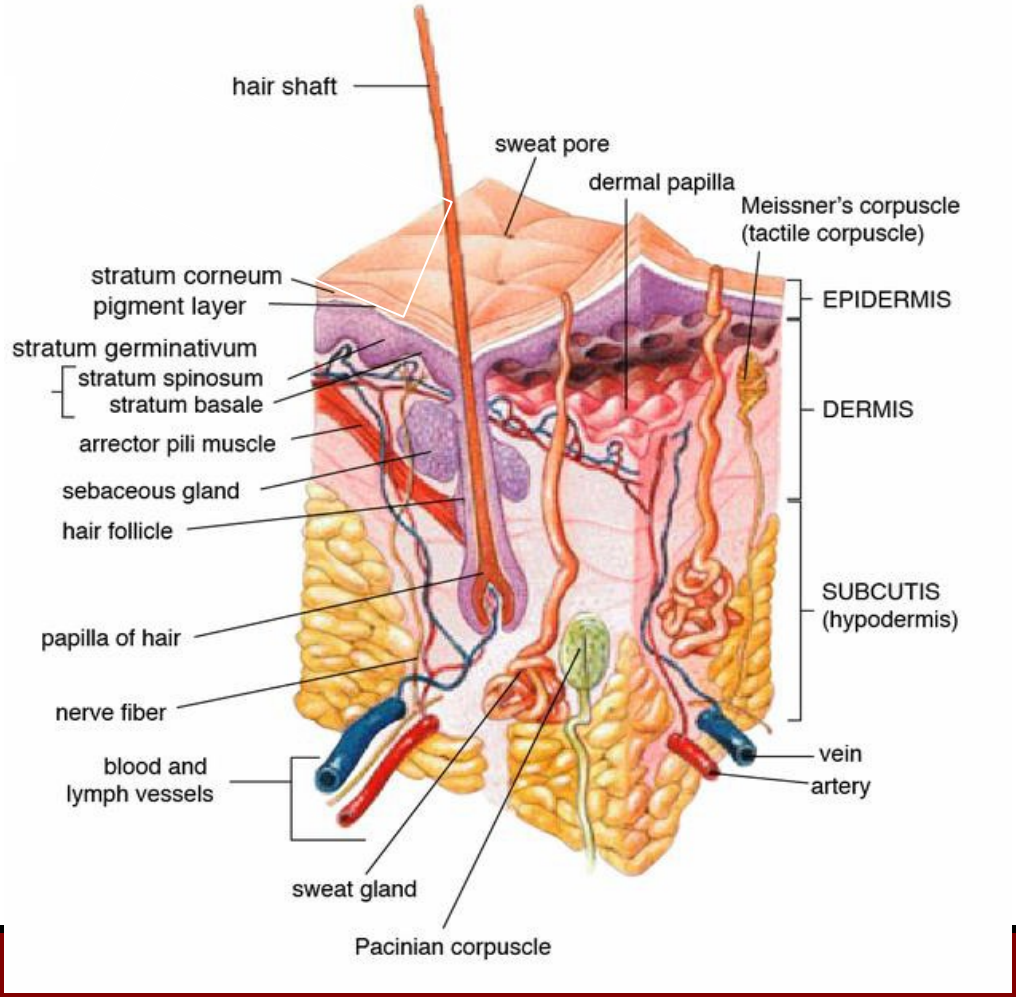
Organism	Drug + Dose	Duration
Streptococcus	See Erysipelas and Cellulitis	5 days
MSSA	See Erysipelas and Cellulitis	5 days
MRSA	TMP/SMX, weight-based Doxycycline 100 mg BID Clindamycin 300-450 mg TID	5 days 5 days 5 days
Oral flora	Amoxicillin-clavulanate 875-125 mg BID	5 days

Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America
https://doi.org/10.1093/cid/ciu296

Non Purulent SSTI
Erysipelas and Cellulitis

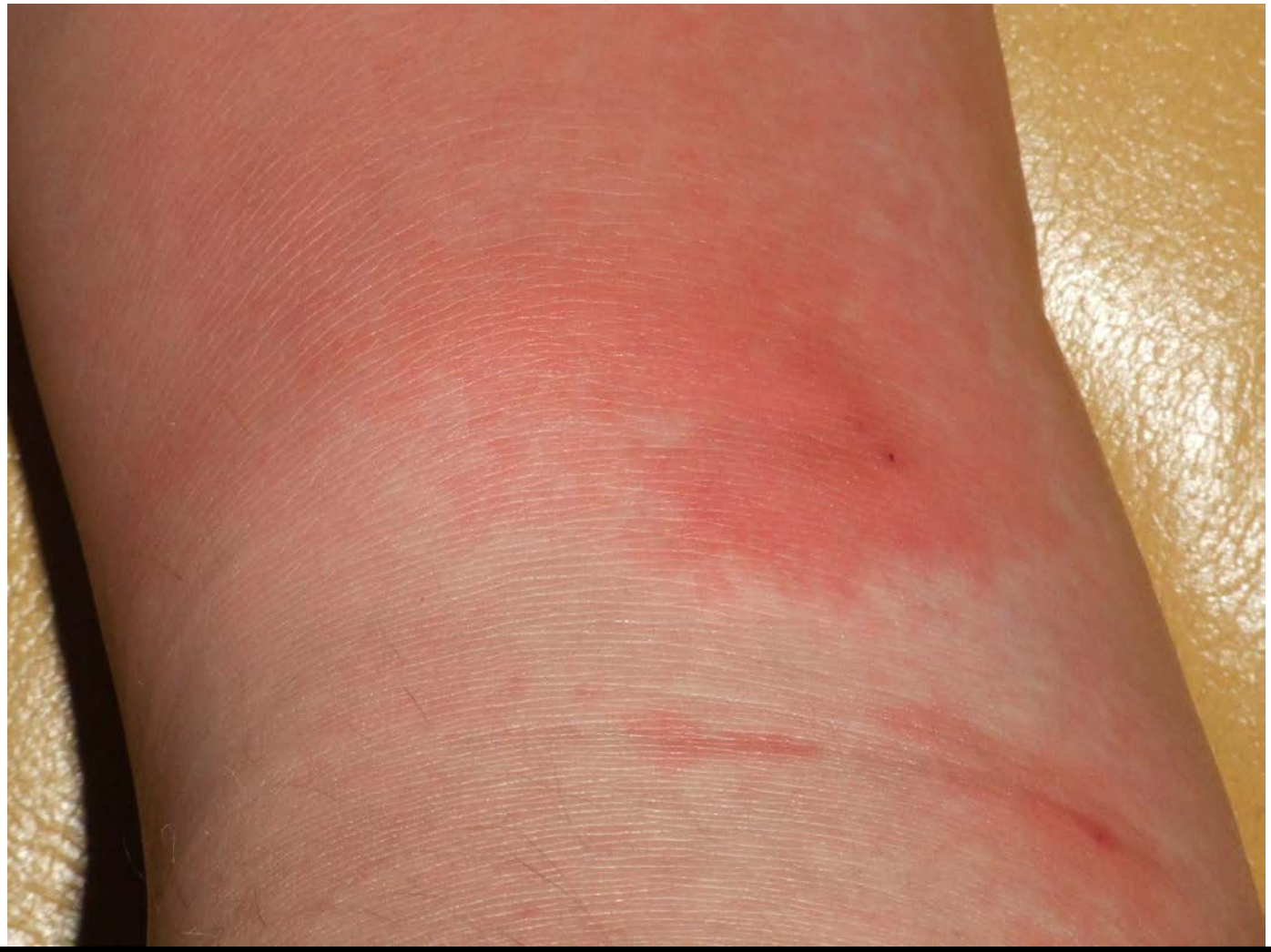
Erysipelas: involves superficial epidermis

Cellulitis: involves subcutaneous tissue (i.e., epidermis and dermis)

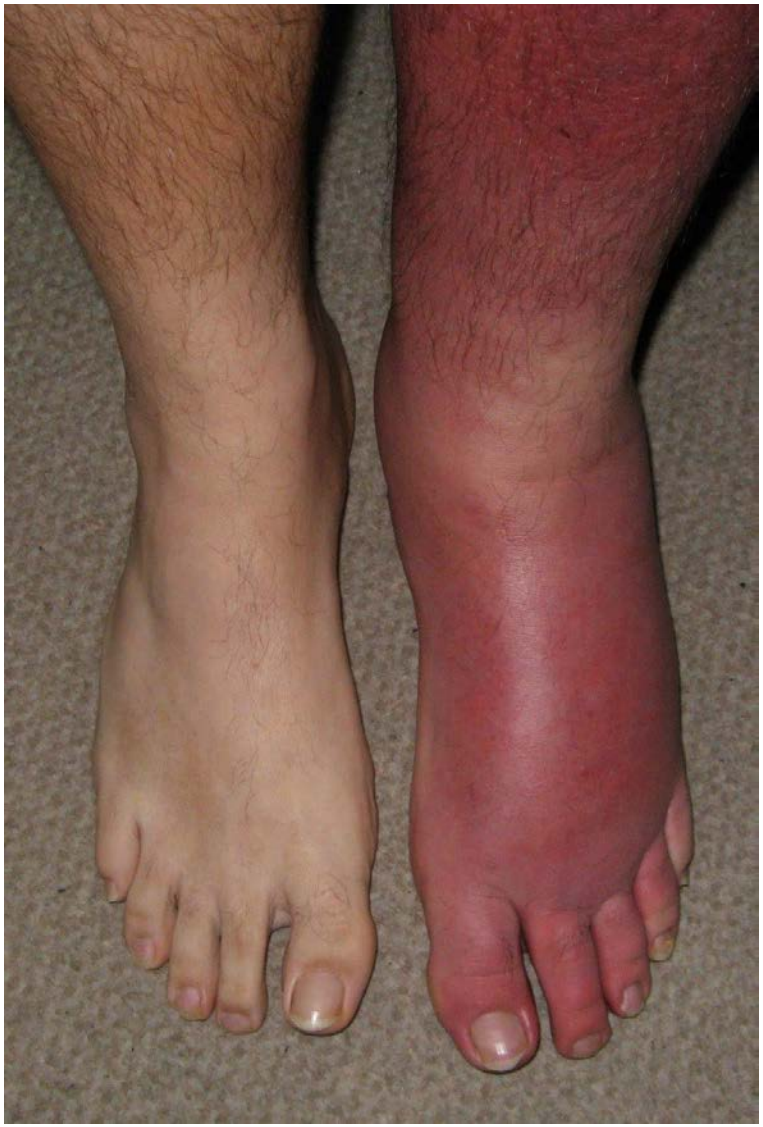


http://en.wikipedia.org/wiki/Skin#/media/File:Skin.png

Erysipelas



https://commons.wikimedia.org/w/index.php?curid=1105527



Cellulitis

Remember non-medication intervention.

Elevation +/- compression are useful adjuncts to antibiotics.

http://cellulitispictures.org/large/25/Leg-Cellulitis-Pictures-3.jpg

Erysipelas/Cellulitis*

Oral Treatment

Drug, dose, duration

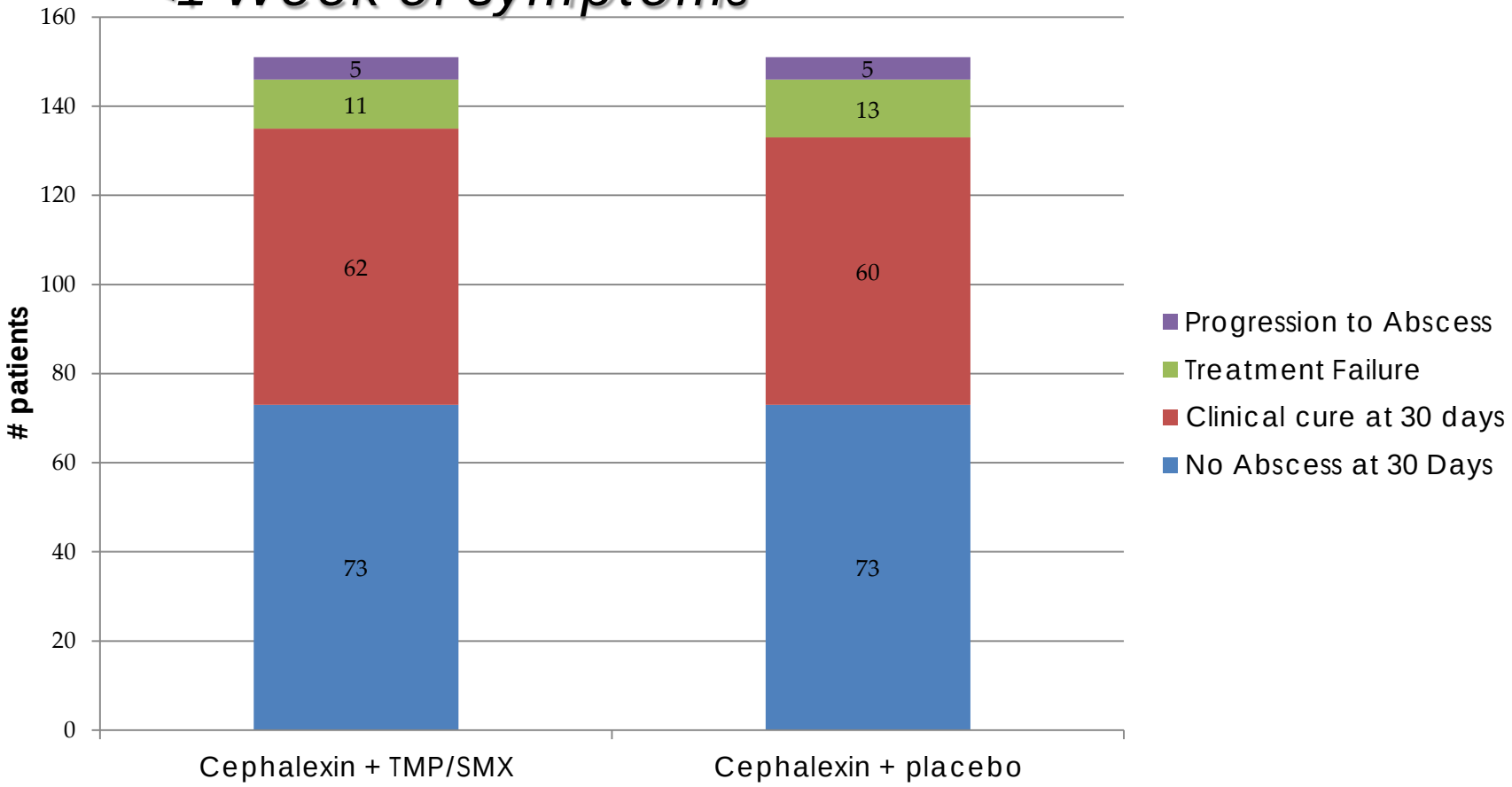
Weight	Cephalexin, oral	Duration
<60 kg	500mg QID	Clinical cure + 3 days (7-14 days)
60-80 kg	1000mg TID	Clinical cure + 3 days (7-14 days)
>80 kg	1000mg QID	Clinical cure + 3 days (7-14 days)

*Typically beta-hemolytic streptococci (A, B, C, G).

Pallin DJ. *Clin Infect Dis* 2013:56(12);1754-62.

Cellulitis: TMP/SMX or NOT

Without Purulent Drainage (<1CC) & Abscess; <1 Week of Symptoms



Pallin DJ. *Clin Infect Dis* 2013:56(12);1754-62.

Cellulitis Treatment Failure

- Make sure patient obtained and took the antibiotic
- Make sure the correct dose was prescribed
- Is ambulatory treatment still appropriate?

Necrotizing Fasciitis

- *Difficult to diagnose*
  - Classical findings often absent
  - Imaging can be misleading
- Progression despite appropriate antibiotics
- High fever
- Disproportionate pain +/- hypoesthesia
- Bullae
- Crepitance
- Hemodynamic instability

Skin Ulcers

- Secondary to tissue damage
  - Most common below the knee
- Painful, ragged edges, seropurulent drainage +/- cellulitis
- **Refer to wound care**
  - Elevation
  - Local wound care
  - Compression wraps

Skin Ulcers

- May need antibiotics as adjunct to wound care
- Organisms similar to purulent cellulitis
  - *S aureus* > streptococci > GNRs
  - May have polymicrobial infections
- Can lead to osteomyelitis

Harm Reduction

- Clean needles alone do not eliminate risk
  - Clients of the Vancouver needle exchange had >20% risk of abscess in prior 6 months
- Cleaning the skin with alcohol does reduce risk

Clinical Infectious Diseases, Volume 33, Issue 1, 1 July 2001, Pages 35–40, https://doi.org/10.1086/320879

Harm Reduction Journal **volume 2**, Article number: 24 (2005) https://doi.org/10.1186/1477-7517-2-24

Harm Reduction

- Wound care can be integrated within a needle exchange program
  - Marion County, Indiana program does offer minor wound care
- Needle exchange programs increase enrollment in drug treatment

American Journal of Public Health 104, 2057_2059, https://doi.org/10.2105/AJPH.2014.302111

J Urban Health. 1999 Dec;76(4):448-60. doi: 10.1007/BF02351502

Harm Reduction

- Test for and treat HIV
  - Discordant results of studies on HIV impact on SSTI risk likely reflect HIV treatment effect