AMBULATORY GUIDELINE | SKIN AND SOFT TISSUE INFECTION (> 2 MONTHS)

Children's MINNESOTA

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

Ambulatory Care Purulent?

No → **Non-Purulent**[c] Cellulitis, Erysipelas, Atopic Dermatitis with superinfection[g]

Yes → **Purulent** Actively draining pus, history of drainage, abscess present

Impetigo: *use definitive skin culture data if available*

- Isolated lesions not widespread? → Topical: Mupirocin BID x 5 days
- Numerous lesions, widespread, or household outbreaks? → **Cephalexin 25mg/kg/dose PO TID (max:500 mg/dose)

Responsive? Yes → Total duration: 5 days

No → Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose) *{preferred if atopic dermatitis[g]}* OR TMP-SMX 5 mg TMP/kg/dose PO BID (max 160 mg/dose) → Total duration: 5 days

Consider ED/Admission if:

Via ED:

- Systemic illness/signs of sepsis
- Rapid progression
- Barrier to outpt I+D

Consider Direct Admit (call 612-343-2121):

- Treatment failure on > 48 hours of appropriate antibiotics
- Further surgical eval needed
- Barrier to outpt treatment

NO packing! Consider a wound stent/wick[f]

Incision and drainage (aspiration not recommended)[e]

- Consider ultrasound if indeterminate
- Warm compresses and soaks 3–4x/day
- Elevate if extremity

- ☐ Treat with Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose), *or*
- ☐ May consider no antibiotics based on clinical assessment together with provider discretion
- Shared Decision Making[h]

Meta-analysis revealed that antibiotics targeted to MRSA coverage demonstrated modest improved rates of cure and recurrence versus no antibiotics regardless of abscess size.

Total duration: 5 days

Laboratory Studies

Wound:

Culture if antibiotics will be started for abscess OR if recurrent abscess If vesicles: Consider concurrent HSV or VZV infection—pcr testing(g)

Blood:

Routine lab studies and cultures are not recommended in well-appearing patients.(a)

Discharge: Follow up with PCP in 2–4 days

**Recurrent Abscesses: Consider ID outpt referral for MSSA/MRSA Decolonization education*

**For PCN/Cephalosporin allergy: Use Clindamycin

EXCLUSION GUIDELINES:

Patients **excluded** from this guideline:

- Bites, surgical site infections, foreign body(e.g. drain/line)
- Immunodeficiency
- Hand, groin, perianal, head/neck or significant lymphedema
- Necrotizing infection or critically ill

ED GUIDELINE

SKIN AND SOFT TISSUE INFECTION
(> 2 MONTHS)

Children's MINNESOTA

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

ED care
Purulent?

No → **Non-Purulent**[c]
Cellulitis, Erysipelas, Atopic Dermatitis with superinfection[g]

Yes → **Purulent**
Actively draining pus, history of drainage, abscess present

Non-Purulent pathway

Impetigo:
use definitive skin culture data if available

- Isolated lesions not widespread? → Topical: Mupirocin BID x 5 days
- Numerous lesions, widespread, or household outbreaks? → **Cephalexin 25mg/kg/dose PO TID (max:500 mg/dose)

Responsive?
- Yes → Total duration: 5 days
- No → Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose) *{preferred if atopic dermatitis[g]}* OR TMP-SMX 5 mg TMP/kg/dose PO BID (max 160 mg/dose) → Total duration: 5 days

**For PCN/Cephalosporin allergy: Use Clindamycin

Consider Admission if:
- Systemic illness/signs of sepsis
- Rapid progression
- Treatment failure on 48 hours of appropriate antibiotics
- Further surgical eval needed
- Barrier to outpt treatment

See inpatient guideline for work up and management if admitting

NO packing! Consider a wound stent/wick[f]

Purulent pathway

Incision and drainage (aspiration not recommended)[e]
- Consider ultrasound if indeterminate
- Warm compresses and soaks 3–4x/day
- Elevate if extremity

- ☐ Treat with Clindamycin 10 mg/kg/dose PO TID (max 600 mg/dose), *or*
- ☐ May consider no antibiotics based on clinical assessment together with provider discretion
- Shared Decision Making[h]
  Meta-analysis revealed that antibiotics targeted to MRSA coverage demonstrated modest improved rates of cure and recurrence versus no antibiotics regardless of abscess size.

Total duration: 5 days

Laboratory Studies

Wound:
Culture if antibiotics will be started for abscess OR if recurrent abscess If vesicles: Consider concurrent HSV or VZV infection—pcr testing(g)

Blood:
Routine lab studies and cultures are not recommended in well-appearing patients.(a)

EXCLUSION GUIDELINES:
Patients **excluded** from this guideline:
- Bites, surgical site infections, foreign body(e.g. drain/line)
- Immunodeficiency
- Hand, groin, perianal, head/neck or significant lymphedema
- Necrotizing infection or critically ill

Discharge: Follow up with PCP in 2–4 days
**Recurrent Abscesses: Consider ID outpt referral for MSSA/MRSA Decolonization education*

INPATIENT GUIDELINE

SKIN AND SOFT TISSUE INFECTION

(> 2 MONTHS)

Children's MINNESOTA

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

Inpatient Purulent?

No → **Non-purulent**[c] *Cellulitis, Erysipelas*

- **Cefazolin 33 mg/kg/dose IV q8h (max 2000 mg/dose)
- Responsive?*
  - No → *Lack of improvement or with significant disease progression after 48 hours of appropriate therapy[d]
  - Yes → Cephalexin 25 mg/kg/dose PO TID (max 500 mg/dose)
- Total duration: +5 days from clinical improvement

Yes → **Purulent** *Actively draining pus, history of drainage, abscess present*

NO packing! Consider a wound stent/wick[f]

Incision and drainage (aspiration not recommended)[e]
- Consider ultrasound if indeterminate
- Warm compresses and soaks 3–4x/day
- Elevate if extremity
- Consider surgery consult (Consider NPO status)

Clindamycin
IV: 13 mg/kg/dose IV (max 900 mg/dose); or
PO: 10 mg/kg/dose PO TID (max 600 mg/dose)

- Responsive?*
  - No → *Lack of improvement or with significant disease progression after 48 hours of appropriate therapy[d]
  - Yes → Total duration: +5 days from clinical improvement *Narrow antibiotics according to culture results as able*

*Lack of improvement or with significant disease progression after 48 hours of appropriate therapy[d]

- **Assess source control.** Consider further imaging (e.g. repeat US). Revisit differential diagnosis.[b]
- **Consult ID** to collaborate on antibiotic adjustment, broadening differential diagnosis +/- work-up.
- **Adjust antibiotics** if treatment failure is suspected. Use culture results as able. [Vancomycin 20 mg/kg/dose IV Q8h; *Age 18+*: 15–20 mg/kg/dose q12h]
- **Consult surgery** if possible abscess. Suggest keeping NPO prior to their anticipated evaluation time.

Laboratory Studies

Wound:
Culture *if antibiotics will be started for abscess OR if recurrent abscess*
If vesicles: Consider concurrent HSV or VZV infection — pcr testing[g]
Blood: Routine lab studies and cultures are not recommended in well-appearing patients.[a]

EXCLUSION GUIDELINES:

Patients **excluded** from this guideline:
- Bites, surgical site infections, foreign body(e.g. drain/line)
- Immunodeficiency
- Hand, groin, perianal, head/neck or significant lymphedema
- Necrotizing infection or critically ill

**For PCN/Cephalosporin allergy: Use Clindamycin

Discharge: Follow up with PCP in 2–4 days
**Recurrent Ab scesses: Consider ID outpt referral for MSSA/MRSA Decolonization education*

CLINICAL GUIDELINE

SKIN AND SOFT TISSUE INFECTION

(>2 MONTHS)

Children's MINNESOTA

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

ANTIBIOTICS AND LOCAL DATA

TABLE 1: Preferred antibiotic choices for suspected pathogens — Empiric Treatment

	Group A Strep pyogenes	MSSA	MRSA
1st line choice	Cephalexin or Cefazolin	Cephalexin or Cefazolin	*Clindamycin
2nd line choice (failed treatment- *narrow with culture sensitivities*)	Clindamycin	*Clindamycin or TMP-SMX	Vancomycin
*Based on Children's MN skin/wound culture sensitivities → recommend Clindamycin for presumptive MRSA			

TABLE 2: Children's Minnesota Data: Minneapolis and St. Paul ED's 2019–2022 SSTI (wound, abscess, and skin cultures) Attn: MSSA and MRSA

2023 - 2024	# tested	Clindamycin % susceptible	TMP-SMX % susceptible	Doxycycline % susceptible
MSSA	369	80	82	92
MRSA	140	85	92	74
All Staph aureus	509	82	85	87
2021-2022				
MSSA	337	88	85	93
MRSA	113	91	96	87
All Staph aureus	450	89	88	91

TABLE 3: Skin & Soft Tissue Infection Antibiotics

Age: < 18 yo	**Antibiotic**	**Single dosing**	**Route**	**Interval**	**Max dose (mg)**
ED Non-purulent					
	Cephalexin (Keflex)	25 mg/kg	PO	TID	500
	Clindamycin	10 mg/kg	PO	TID	600
	TMP-SMX (Bactrim)	5 mg/kg	PO	BID	160
ED Purulent					
	Clindamycin	10 mg/kg	PO	TID	600
Inpatient Non-purulent					
	Cefazolin	33 mg/kg	IV	Every 8 hours	2,000
Inpatient Purulent					
	Clindamycin	10 mg/kg	PO	TID	600
	Clindamycin	13 mg/kg	IV	Every 8 hours	900
	TMP-SMX (Bactrim)	5 mg/kg	PO	BID	160
Age: 18+					
	Cephalexin (Keflex)	500 mg	PO	4x/day	500
	Clindamycin	450 mg; or 600 mg	PO	4x/day; or TID	600 (TID dosing)

CLINICAL GUIDELINE

SKIN AND SOFT TISSUE INFECTION (SSTI)

(> 2 MONTHS)

Children's MINNESOTA

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

OVERVIEW

The burden of SSTIs on US healthcare has continued to rise over the past several decades. In 2016, there were ~490,000 ED visits and ~23,000 associated inpatient admissions for the < 18 years age group. Aggregate costs associated with this care was approx. $460 million.* Continued work on optimizing care delivery across the continuum, including epidemiological and public health spectra, drives motivation to own clinical outcomes at Children's Minnesota. Since the publication of the 2014 consensus guidelines from the Infectious Disease Society of America (IDSA), an array of published studies including meta- analyses have promoted revisionary processes associated with the identification, assessment, and treatment of SSTIs.

The **goal** of this revision is to provide the most updated recommendations surrounding:

1. Diagnostic studies
2. Procedural processes
3. Appropriate empiric therapy with local data considerations
4. Definitive therapy
5. Care delivery across the continuum

A team drafted from across the continuum of care at Children's MN took part in the revisionary processes of these guidelines.

- Interdisciplinary Stakeholders
  - Emergency Medicine: Kelly Bergmann
  - General Surgery: Joshua Short
  - Hospital Medicine: Jodi O'Neill, Andrew Rose, Gloria Swanson
  - Infectious Disease: Bill Pomputius
  - Pharmacy/ASP: Mary Ullman
  - Primary Care: Kent Wegmann
- Organizational Stakeholders
  - Medical-Surgical: Courtney Herring
  - Quality Improvement: Katie Brunsberg
- Previous workgroup members contributing to original content: Christina Koutsari, Gabi Hester

Key Outcome Measures

- ❑ Lab reduction: Blood culture, CBC/diff, CRP
- ❑ Empiric antibiotic stewardship: reduce Vancomycin first 48h use

Key Balancing Measures

- ❑ Length of Stay
- ❑ Unplanned revisits/readmissions in first 14 days

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

SUPPLEMENTAL NOTES

NOTE 1

a) Blood cultures — Multiple studies have demonstrated that blood cultures rarely demonstrate true pathogenic bacterial growth, and even positive cultures do not change clinical management.

a) Positive in 12.5% of immunocompetent children hospitalized with complicated SSTI[11]

b) Positive in 0–2.9% of uncomplicated SSTIs[23]

b) Cellulitis may be a *descriptor or symptom* rather than a primary diagnosis in some cases. Consider a broad differential including osteomyelitis, septic joint, cutaneous lymphoma, tularemia, etc. Low threshold to consult with specialty services such as ID.

c) Considerations for empiric treatment:

a) Non-purulent: Streptococci, often group A, but also groups B, C, F, or G are most common pathogens. *Staphylococcus aureus* less frequently causes non-purulent SSTI. Recommended concurrent MRSA coverage if: Penetrating trauma, evidence of MRSA infection elsewhere, MRSA nasal colonization, or injection drug use.

b) Purulent: *Staphylococcus aureus* (including MRSA) is most common pathogen.

d) Considerations re: failure of treatment — With cellulitis, particularly *Streptococcal* pathogens, there may be an increase in erythema with extension beyond margins from ~ 24–36 hours after initiating appropriate antibiotics. This does not represent treatment failure.

e) Incision and Drainage: For small (< 1–2 cm), more superficial abscesses, application of heat may lead to spontaneous drainage. However, primary treatment for skin abscesses *generally* includes drainage. I&D is superior to US-guided needle aspiration with increased successful resolution at 7 days.[4]

f) Packing: Wound packing is associated with increased pain and equivocal outcomes; therefore, it is not recommended. For larger abscesses, wick placement or loop drainage may be considered for abscesses > 5 cm.[9,14]

g) Atopic Dermatitis (Eczema) considerations:[1,21]

- **Bacterial Infections:** Approximately 80% to 90% of patients with AD are carriers for *S. aureus* → *treatment should include coverage for both S. aureus and Strep pyogenes.*
- **Viral Infections:**
  - Patients with AD are at a higher risk for **eczema herpeticum (EH)**, an acute, potentially life-threatening viral infection caused by the herpes simplex virus→*consider HSV DNA pcr if vesicles or papules present.*
  - Molluscum contagiosum (MC) is a benign viral skin infection that presents as flesh-colored, pink, or pearly white papules.
- ***Fungal Infections:*** These may also invade compromised skin, leading to colonization with tinea or yeast. Appropriate cultures may be needed in those patients who have risk factors for tinea or yeast colonization or who remain unresponsive to treatment.

h) **Provider-guided Shared Decision Making (SDM):** A shared-decision making process with caregivers is reasonable for using antibiotics for adequately drained, small abscesses without systemic signs of illness.
While antibiotics have been shown to reduce rate of treatment failure and recurrence in small abscesses, antibiotics have risk for adverse side effects.[5,20]

Consideration of the young infant:
While young infants < 2 months age are beyond the scope of this current guideline, previous studies in this population — diagnosed with SSTI — have shown that the rate of *invasive* bacterial infection (bacteremia, meningitis, osteomyelitis) is low.[2,6,12]

SKIN AND SOFT TISSUE INFECTION

(>2 MONTHS)

Children's MINNESOTA

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

POST I&D ANTIBIOTICS (AGE > 6 MONTHS)

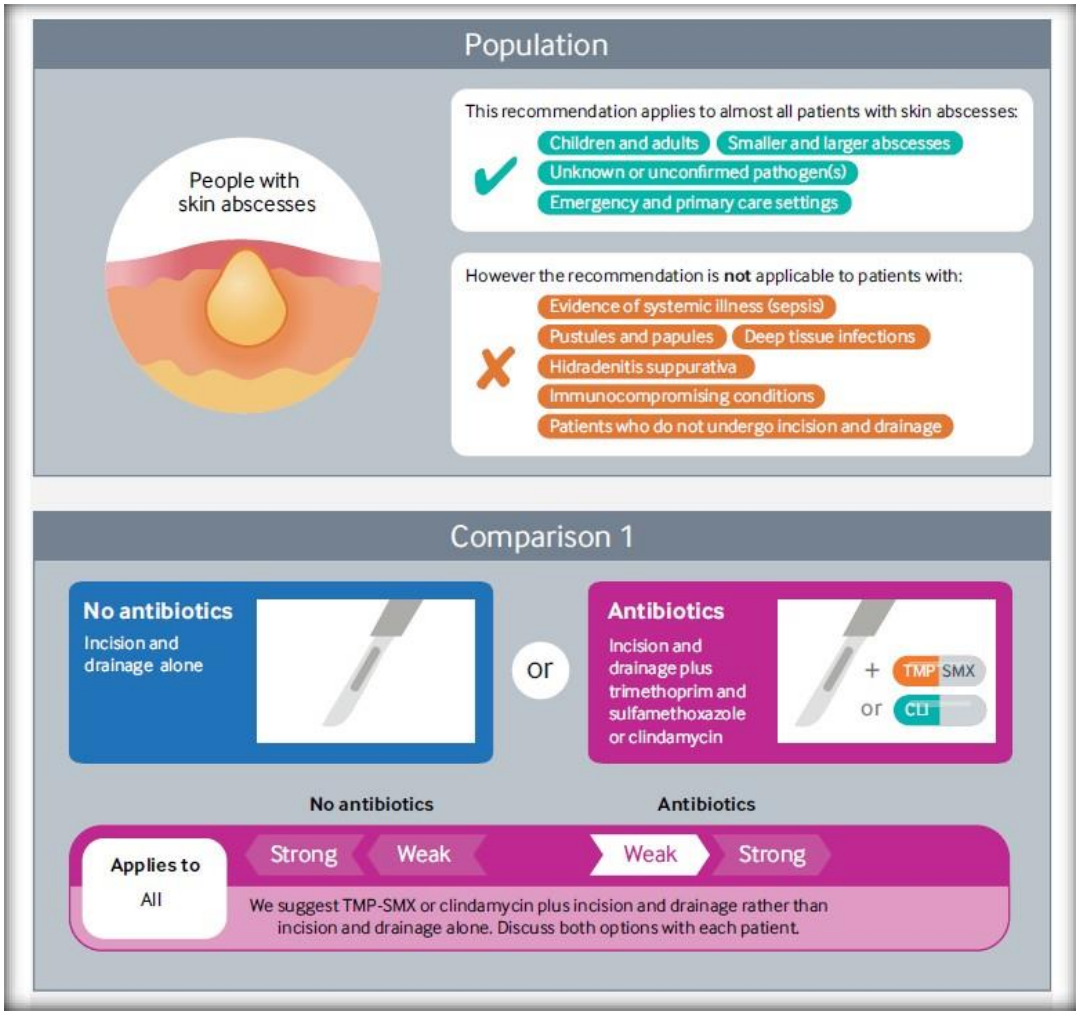

Figure source: Vermandere M, Aertgeerts B, Agoritsas T, et al. Antibiotics after incision and drainage for uncomplicated skin abscesses: a clinical practice guideline. *BMJ* 2018;360:k243

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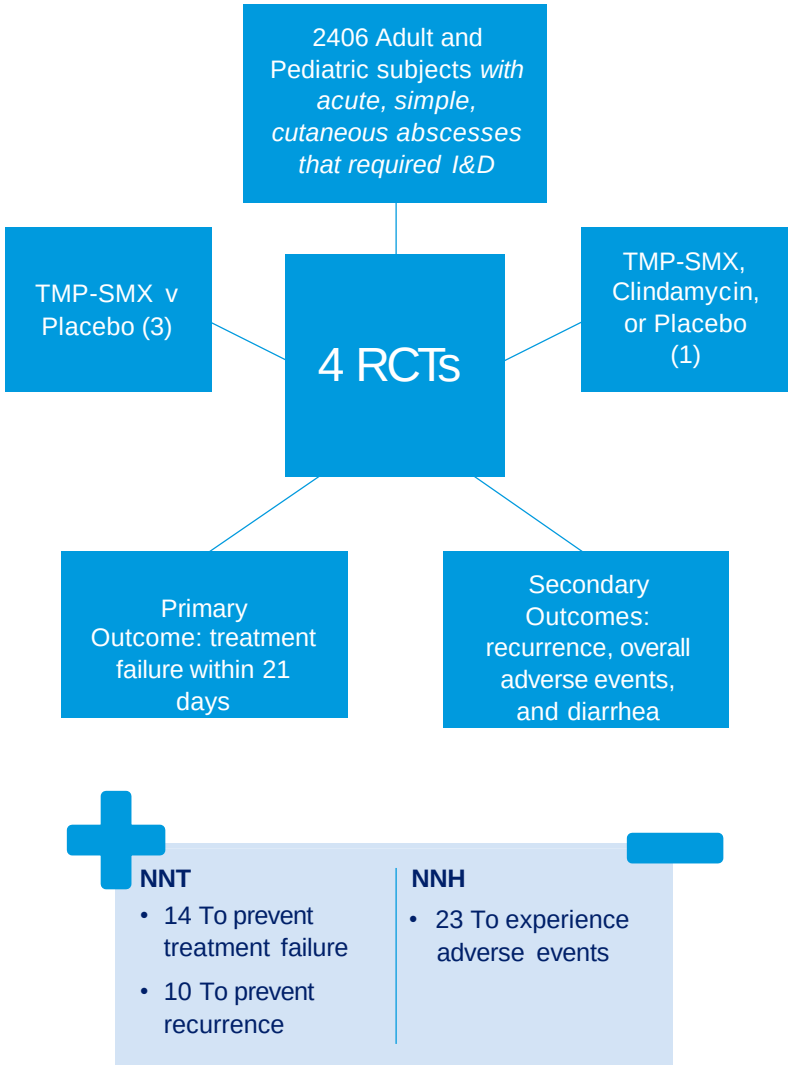

Source: Gottlieb M, Demott JM, Hallock M, Peksa GD. Systemic Antibiotics for the Treatment of Skin and Soft Tissue Abscesses: A Systematic Review and Meta-Analysis. *Annals of Emergency Medicine* 2019;73(1):8–16.

Aim: To improve patient outcomes and reduce unwarranted resource use in patients with SSTI.

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