Cellulitis and Abscess v6.0: Initial ED Phase

Approval & Citation | Summary of Version Changes | Explanation of Evidence Ratings

!
Management if Necrotizing Soft Tissue Infection (NSTI) suspected

Urgently consult the General Surgery team. Page the surgery fellow.

Inclusion Criteria
- Suspected skin/soft tissue infection in children >44 weeks CGA

Exclusion Criteria
- Hospital-acquired, surgical site & device-associated infections
- Presumed necrotizing fasciitis
- Orbital/periorbital cellulitis
- Immunodeficiency
- Pressure injuries

!
Consider tetanus immunization status as necessary (Tetanus Table)

Initial Evaluation
- Note that the appearance of cellulitis may vary with different skin tones
- Outline lesion with date and time
- Make patient NPO

Risk for Inequity (*for SCH only*)

Determine if special situation present

Concern for:
- Deep extremity infection (e.g. septic arthritis, osteomyelitis)

Yes → **See Musculoskeletal Infections pathway**

No ↓

Concern for:
- Peri-anal abscess (within 1cm of anal verge)
- Breast abscess
- Perineal abscess
- Pilonidal cyst
- Large or complex abscess

Yes → **Consult General Surgery**

No ↓

Concern for:
- Deep neck abscess
- Congenital neck cyst/sinus/duct infection

Yes → **Consult ENT**

No ↓

Concern for:
- Facial cellulitis of dental origin

Yes → **Consult Dental**

Determine with consultant if suitable for pathway

No → **Simple Cellulitis / Abscess Phase**

Yes → **Simple Cellulitis / Abscess Phase**

No → **Off Pathway**

Last Updated: April 2024
Next Expected Review: September 2024

Cellulitis and Abscess v6.0: ED Simple Cellulitis/Abscess

Approval & Citation | Summary of Version Changes | Explanation of Evidence Ratings

Inclusion Criteria
- Suspected skin/soft tissue infection in children >44 weeks CGA
- Completed Initial Phase screening for special situation / consults

Exclusion Criteria
- Hospital-acquired, surgical site & device-associated infections
- Presumed necrotizing fasciitis
- Orbital/periorbital cellulitis
- Immunodeficiency
- Pressure injuries

! Management if Necrotizing Soft Tissue Infection (NSTI) suspected

→ **Urgently consult the General Surgery team. Page the surgery fellow.**

Simple cellulitis / abscess
- No routine labs
- Perform bedside ultrasound if uncertain of need for drainage

Purulent → **Clinical decision to drain abscess**
- Sedation / pain control
- Incision and drainage; consider loop drainage technique
- Wound culture

Non-purulent → **Determine disposition**

Purulent Definition
- Actively draining pus
- History of drainage
- Abscess present

Relevant MRSA Risk Factors
History in the last 6 months of:
- MRSA in the patient
- MRSA in the family
- Recurrent boils, pustules, "spider bites," etc. that required antibiotics, in patient or family

Inpatient Admit Criteria (any one of the following)
- SIRS
- Not tolerating PO
- Treatment failure on >48 hours of appropriate antibiotics
- Rapidly progressive lesion
- Pain control / wound care needs
- Inadequate follow-up

Discharged patients

Non-purulent:
Medical Treatment
- Oral cephalexin
- Clindamycin if failed outpatient treatment >24-48 hours or cephalexin allergic
- Consider TMP-SMX or clindamycin if MRSA risk factors

Purulent:
Medical Treatment
- Consider oral TMP-SMX or clindamycin
- Antibiotics decrease risk of recurrence and treatment failure but may cause adverse effects
- Shared Decision Making

! Antibiotic selection by condition

Admitted patients

Non-purulent:
Medical Treatment
- PO cephalexin or IV cefazolin
- Clindamycin if failed outpatient treatment or cephalexin allergic
- Consider TMP-SMX or clindamycin if MRSA risk factors
- Consider Linezolid if SIRS or rapid progression

Purulent:
Medical Treatment
- PO or IV TMP-SMX or clindamycin
- Consider Linezolid if SIRS, rapid progression, suspected clindamycin resistance

→ **Inpatient Phase**

Discharge Instructions
- 5 days total treatment preferred for uncomplicated skin and soft tissue infection. Longer duration can be considered for severe or persistent infection
- PCP follow-up within 24-48 hours
- If recurrent abscesses, consider household decolonization (PE844)
- ED Comm RN follows up all cultures

For questions concerning this pathway, contact: CellulitisAndAbscess@seattlechildrens.org

Last Updated: April 2024
Next Expected Review: September 2024

Cellulitis and Abscess v6.0: Inpatient Phase

Approval & Citation | Summary of Version Changes | Explanation of Evidence Ratings

Inclusion Criteria
- Suspected skin/soft tissue infection in children >44 weeks CGA
- Completed Initial Phase screening for special situation / consults

Exclusion Criteria
- Hospital-acquired, surgical site & device-associated infections
- Presumed necrotizing fasciitis
- Orbital/periorbital cellulitis
- Immunodeficiency
- Pressure injuries

! **Management if Necrotizing Soft Tissue Infection (NSTI) suspected**

Call RRT. Urgently consult the General Surgery fellow.

! Antibiotic selection by condition

Frequent re-evaluation
- Clinical exam
- Outline lesion with date and time
- Culture data

Improving

- Tailor antibiotics if culture results are available
- Use narrowest-spectrum agent possible
- Change to PO antibiotics as soon as clinically indicated

Not Improving

- Tailor antibiotics if culture results are available
- If rapid progression at any time, consider NSTI
- If significant expansion >1-2 cm beyond margins OR no improvement on antibiotics at 48 hours, consider change in antibiotics and image (U/S preferred) to rule out abscess
- If fluctuance develops or abscess on imaging, consult general surgery
- Consult ID as necessary

Discharge Criteria (meets all)
- Lesion(s) significantly improved
- Abscess drained if present
- Tolerating PO
- Pain controlled
- Follow-up assured within 48 hours

Discharge Instructions
- 5 days total treatment preferred for uncomplicated skin and soft tissue infection. Longer duration can be considered for severe or persistent infection
- PCP follow-up within 48 hours
- If recurrent abscesses, consider household decolonization (PE844)
- For MRSA, provide handouts
  - MRSA at Children's (PE485)
  - Managing Your Child's MRSA (PE844)

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Last Updated: April 2024
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Tetanus Table

Tetanus prophylaxis in routine wound management
(Adapted from the Red Book: 2018 report of the Committee on Infectious Diseases, p. 796)

History of tetanus toxoid (doses)	Clean, minor wounds		All other wounds	
	DTaP, Tdap, or Td	TIG	DTaP, Tdap, or Td	TIG
Fewer than 3 or unknown	Yes	No	Yes	Yes
3 or more	**No - if < 10 years** since last tetanus- containing vaccine dose.	No	**No if < 5 years** since last tetanus- containing vaccine dose.	No
	Yes if ≥ 10 years since last tetanus- containing vaccine dose	No	**Yes if ≥ 5 years** since last tetanus- containing vaccine dose.	No

TIG = Tetanus immune globulin. Immune globulin IV should be used if TIG not available.
Other wounds = Such as, but not limited to, wounds contaminated with dirt, feces, soil, and saliva; puncture wounds; avulsions; and wounds resulting from missiles, crushing, burns, and frostbite

Note: DTAP is used for children <7 years of age. Tdap is preferred to Td for underimmunized children 7 years of age or older who have not received Tdap previously.

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Return to ED Simple Cellulitis / Abscess Phase
Return to Inpatient Phase

Antibiotic Table

Oral antibiotics are preferred.
TMP-SMX, clindamycin, and amox-clav
all have comparable bio-availability to IV.

	Condition		
	Non-Purulent Cellulitis	**Purulent SSTI / Abscess**	**Bite Wound**
PO Choice	Cephalexin Consider TMP-SMX or clindamycin if MRSA history	TMP-SMX or clindamycin if antibiotics are elected by Shared Decision Making	Amoxicillin/clavulanate
PO Alternatives	Clindamycin if cephalexin allergic (see Beta-Lactam Antibiotic Allergy Reference)	Call ID	Reference Red Book
IV Choice	Cefazolin Consider TMP-SMX or clindamycin if MRSA history	TMP-SMX or clindamycin	Ampicillin/sulbactam
IV Alternatives	Clindamycin if cefazolin allergic (see Beta-Lactam Antibiotic Allergy Reference) Consider Linezolid if SIRS, rapid progression, suspected clindamycin resistance, and no concern for necrotizing fasciitis	Consider Linezolid if SIRS, rapid progression, suspected clindamycin resistance, and no concern for necrotizing fasciitis	Reference Red Book

Return Initial ED Phase

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Antibiotic Duration

Evidence from Guidelines

The recommended duration of antimicrobial therapy is 5 days, but treatment should be extended if the infection has not improved within this time period. Of note, the only cited reference for this recommendation was a study comparing 5 vs 10 days of Levaquin for adult military patients. [LOE: Guideline (Stevens 2016)]

Treat mild cellulitis empirically with an oral first-generation cephalosporin (i.e. cephalexin) for 7 to 10 days (or until complete resolution) when the local MRSA incidence is <10%. If the local MRSA incidence is >10% and the local TMP-SMX resistance rate is <10%, then oral TMP-SMX or clindamycin for 7 to 10 days is recommended. [LOE: +3 Moderate certainty (Galli 2016)]

In cases of a low incidence of MRSA in the community, children with uncomplicated moderate/ severe cellulitis could be empirically treated with intravenous antistaphylococcal penicillin or first-generation cephalosporin (i.e., cefazolin, cefalotin) for at least 48 hours before switching to oral therapy. The length of treatment should overall be 10 to 14 days (or until complete resolution). [LOE: +1 Very low certainty (Galli 2016)]

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Shared Decision Making

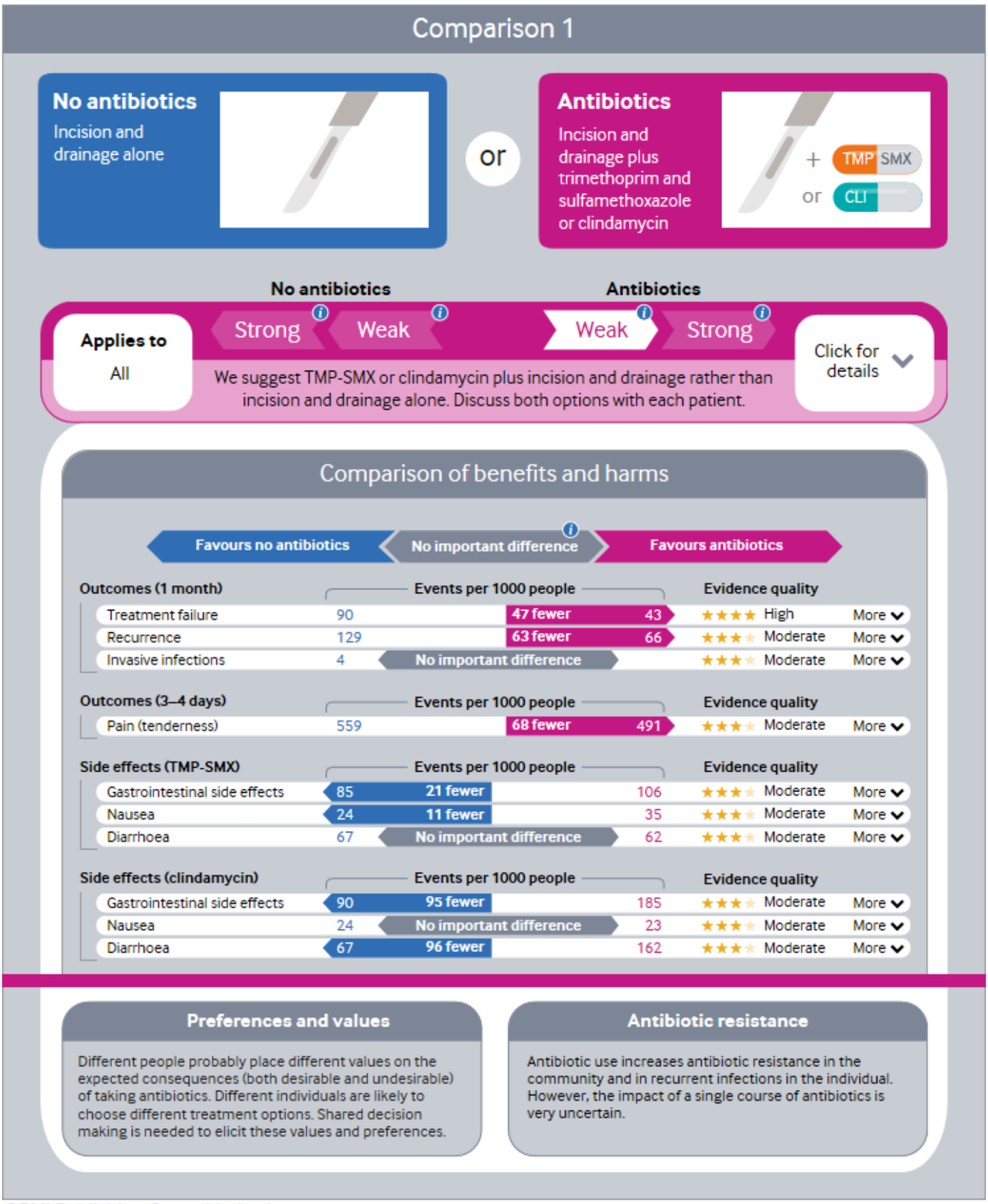
Shared Decision Making for Antibiotics after Drainage

Antibiotics provide a modest reduction in the risk of treatment failure, recurrence, additional surgical procedures and hospitalization, and reduce pain during treatment.

Antibiotics increase the risk of resistance and gastrointestinal side effects, such as nausea (TMP-SMX) and diarrhea (clindamycin). The decision whether or not to use antibiotics should take into account clinical factors (age, size, severity, systemic symptoms, recurrences) and individual values and preferences (reasons to avoid diarrhea, medication allergies, preferences about antibiotic use).

Example Tool

https://www.bmj.com/content/360/bmj.k243



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CSW Cellulitis and Abscess Pathway Approval & Citation

Approved by the CSW Cellulitis and Abscess Pathway team for September 25, 2019, go-live

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Retrieval Website: https://www.seattlechildrens.org/pdf/cellulitis-and-abscess-pathway.pdf

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Evidence Ratings

This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children's. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94, Hultcrantz M et al. J Clin Epidemiol. 2017;87:4-13.):

Quality ratings are *downgraded* if studies:

- Have serious limitations
- Have inconsistent results
- If evidence does not directly address clinical questions
- If estimates are imprecise OR
- If it is felt that there is substantial publication bias

Quality ratings are *upgraded* if it is felt that:

- The effect size is large
- If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
- If a dose-response gradient is evident

Certainty of Evidence:

✪✪✪✪ High: The authors have a lot of confidence that the true effect is similar to the estimated effect
✪✪✪○ Moderate: The authors believe that the true effect is probably close to the estimated effect
✪✪○○ Low: The true effect might be markedly different from the estimated effect
✪○○○ Very low: The true effect is probably markedly different from the estimated effect
Guideline: Recommendation is from a published guideline that used methodology deemed acceptable by the team
Expert Opinion: Based on available evidence that does not meet GRADE criteria (for example, case-control studies).

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Summary of Version Changes

- **Version 1.0 (8/15/2013):** Go live.
- **Version 1.1 (11/6/2013):** Clarified which patients should receive Orthopedic consultation in the ED. Recommended laboratory studies to be performed prior to Orthopedic consultation. Excluded patients with solitary dental abscess from the ED phase.
- **Version 1.2 (7/3/2018):** Clarified management for Necrotizing Soft Tissue Infections (NSTI) and emphasized importance of surgical urgency.
- **Version 2.0 (9/25/2019):** Periodic review go live. Overhauled entire document: removed all references to dental abscesses as they are not SSTI; revised suspected NSTI plan; edited special situations for consultations; removed size restriction for drainage; removed ages from admit criteria; updated medical treatment (noted preference for oral antibiotics, added TMP-SMX option, added shared decision making for antibiotic treatment after I&D, removed confusing list of alternative antibiotics, and widened total treatment duration depending on severity); edited discharge criteria; and added consideration of household decolonization.
- **Version 3.0 (1/31/2020):** Added details to Version 2.0 summary of version changes. Added link to new NSTI ED GOC 11996. Changed inpatient escalation if NSTI suspected.
- **Version 4.0 (3/22/2023):** Changed antibiotic duration in ED and Inpatient Discharge Guidelines from broad range to 5 days and outlined reasons for a longer duration. Added Antibiotic Duration information page with evidence synthesis statements. Added additional guidance to ED Initial Evaluation box on skin tone variation and its impact on presentation of cellulitis.
- **Version 4.1 (8/10/2023):** Removed outdated red warning message at the top of Initial ED, ED Simple Cellulitis/Abscess, and Inpatient phases.
- **Version 5.0 (11/2/2023):** An equity pause was incorporated into the Initial ED Phase, including a link to guidelines around Inclusive Language for Skin Symptoms.
- **Version 6.0 (04/26/2024):** Removed Vancomycin recommendation and replaced it with Linezolid per Antimicrobial Stewardship new GOC.

Medical Disclaimer

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor Seattle Children's Healthcare System nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

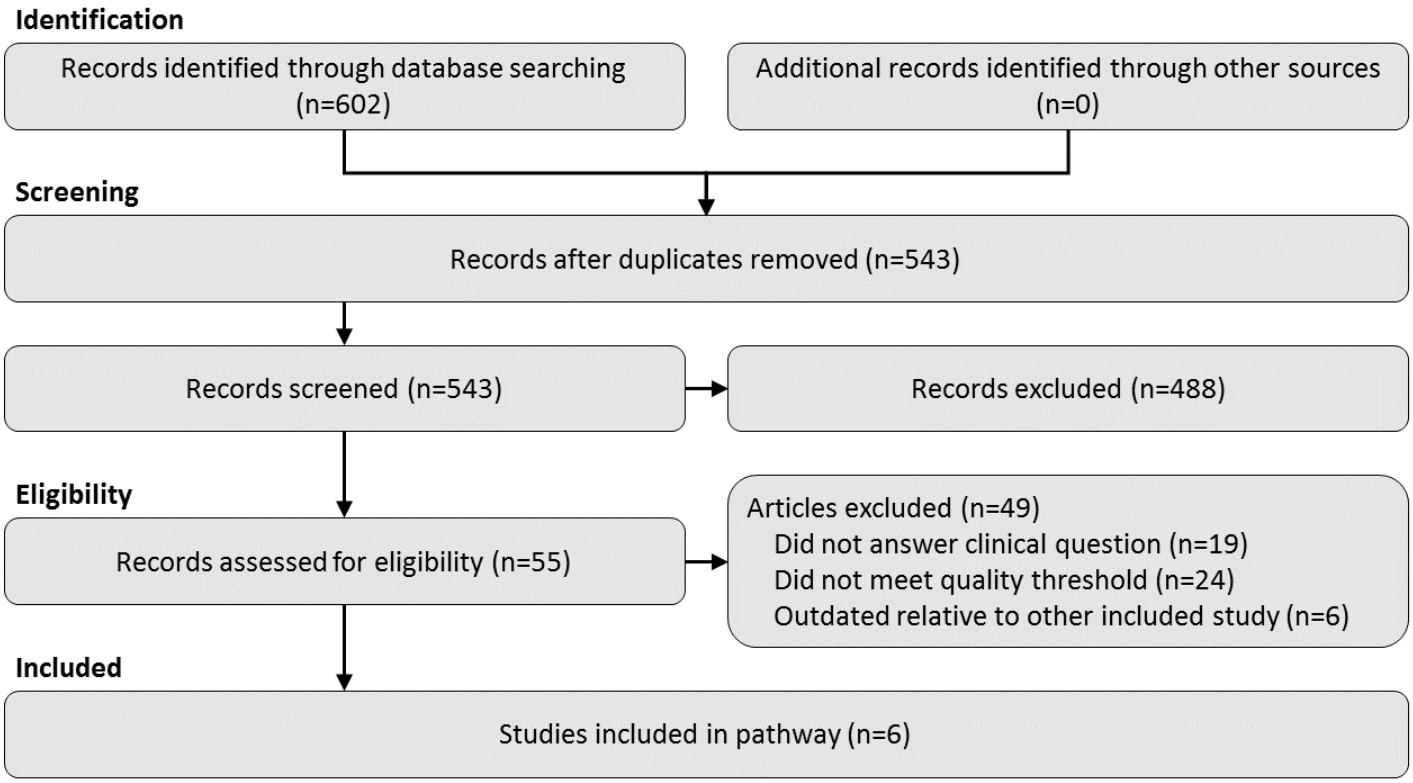
Readers should confirm the information contained herein with other sources and are encouraged to consult with their health care provider before making any health care decision.

Bibliography

Methods

For this update, we revised the search strategies in line with current Library practices. A literature search was conducted in February 2019 to target synthesized literature on skin and soft tissue infections, cellulitis and skin abscess from January 2014 to current and limited to English and humans. The search was executed in Ovid Medline, Embase, Cochrane Database of Systematic Reviews (CDSR) and Turning Research into Practice (TRIP) databases.

Two reviewers independently screened abstracts and included guidelines and systematic reviews that addressed optimal diagnosis, treatment, and prognosis of patients who meet pathway inclusion/ exclusion criteria. One reviewer extracted data and a second reviewer quality checked the results. Differences were resolved by consensus.



Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535

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