

# Association between First Line Antibiotic Treatment of Abscesses and Persistence of Infection



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## Abstract

**Background:** Skin and soft tissue infections (SSTIs) are often abscesses, treated with incision and drainage (I&D), followed by an antibiotic course. A number of SSTIs will fail to improve on this approach. Trimethoprim-sulfamethoxazole (TMP-SMX) or clindamycin are commonly prescribed antibiotics to treat abscesses. Little is known on cause for persistent SSTIs. We identified factors contributing to persistent infections among children seeking re-evaluation of a previously treated SSTI. We hypothesized that TMP-SMX as a primary antibiotic for treatment of abscesses leads to significant rates of persistent infections, particularly those located below the waist.

**Methods:** Retrospective analysis of a large prospective pediatric SSTI study conducted in 3 pediatric EDs. We analyzed data on patients who were re-evaluated for previously treated SSTI. Persistent infection is defined as SSTI presenting >48 hours after previous treatment. Patients were excluded if they had immune deficiency, multiple abscesses, or presented >14 days after initial treatment. Demographic information, past medical history, and details of SSTI were obtained. Details of (1) time between start of prior antimicrobial therapy and SSTI re-evaluation; (2) antibiotics prescribed; (3) body location of SSTI; and (5) I&D culture results. Bivariate and multiple logistic regression analyses were conducted based on covariates of interest determined *a priori*.

**Results:** From June 2013 to January 2015, 378 of 1,013 SSTI were re-evaluated for persistent infection. The average age was 6.59 years. 48.41% (183/378) were White, and 31.22% (118/378) Black. 57.67% (218/378) were female. 31.22% (118/378) were on TMP-SMX therapy at time of re-evaluation, 21.96% (83/378) on clindamycin, and 16.67% (63/378) on multiple antibiotics. Patients with abscesses located below the waist (60.85%, 230/378) were more likely to be < 5 years of age (OR 3.60, 95% CI: 2.13-6.10, p value < 0.0001) and on TMP-SMX (OR 3.75, 95% CI: 1.94-7.22, p value < 0.0001) at initial treatment, compared to patients on other antibiotics.

**Conclusions:** Majority of SSTI children were re-evaluated while on TMP-SMX or clindamycin. Patients needing SSTI re-evaluation were more likely to be on TMP-SMX, have SSTI located below the waist, and < 5 years of age.

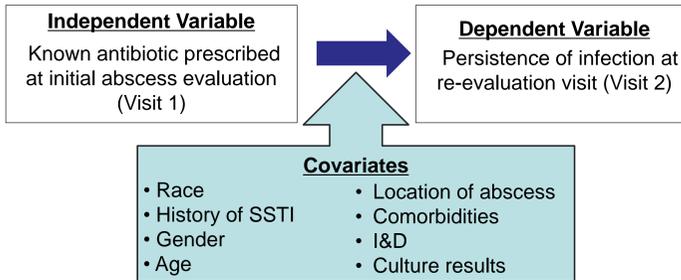
## Background

- Hospitalizations due to *S. aureus* SSTIs increased 123% from 2001 to 2009
  - Children (0-17 years) showed the highest increase in incidence, with hospitalizations increasing by 305% A study of two Emergency Departments found 28% of the 193 patients treated for an SSTI with incision and drainage (I&D) and/or an antibiotic course had a recurrent infection within 3 months<sup>9</sup>
- The current standard of care for purulent, moderate to severe SSTIs does not specify one preferred antibiotic for treatment
- Studies of efficacy of trimethoprim-sulfamethoxazole (TMP-SMX) versus clindamycin have varying results
  - A 2011 pediatric study found that TMP-SMX was associated with increased risks of treatment failure and recurrence<sup>2</sup>
  - A 2015 study found no difference in the efficacy of TMP-SMX and clindamycin<sup>8</sup>
- Purpose of this study:** to compare outcomes tied to persistence between TMP-SMX and clindamycin as a first line treatment for abscesses in children

## Methods

- Study Design**
  - Retrospective analysis of patients prospectively enrolled in a multi-center RCT
  - September 2012 – January 2015
- Study Definitions**
  - Persistence of infection:** Enrolled patient presented to the ED with the chief complaint of an SSTI, after being prescribed an antibiotic for the same SSTI at least 48 hours prior to ED admission
  - Visit 1:** evaluation of SSTI by healthcare provider
  - Visit 2:** re-evaluation of healthcare provider of visit 1's SSTI
- Inclusion Criteria**
  - Time interval between the patient's visit for initial SSTI evaluation (Visit 1) and ED visit for re-evaluation (Visit 2) was at least 48 hours and less than 14 days
  - Patient was actively taking either TMP-SMX or clindamycin at the time of 're-evaluation' ED visit (Visit 2)

## Statistical Analyses

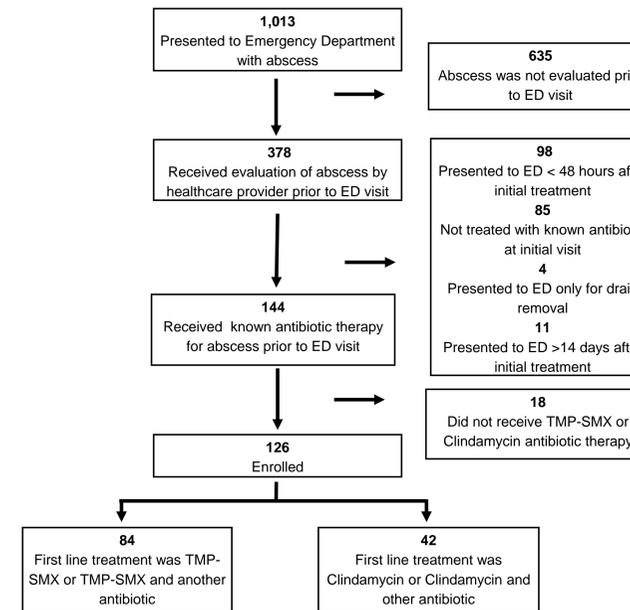


## Results

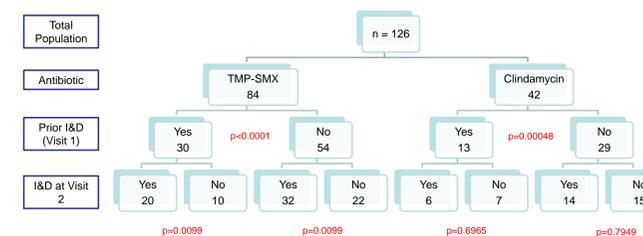
### Descriptive Statistics

Variables	All n=126 (%)	TMP-SMX n=84 (%)	Clindamycin n=42 (%)	p-value
<b>Age</b>				0.1059
< 4 years	65 (51.6)	46 (54.8)	19 (45.2)	
4-9 years	22 (17.5)	17 (20.0)	5 (11.9)	
9-18 years	39 (31.0)	21 (25.0)	18 (42.9)	
<b>Gender</b>				0.9000
Male	59 (46.8)	39 (46.4)	20 (47.6)	
Female	67 (53.2)	45 (53.6)	22 (52.4)	
<b>Race</b>				0.0940
White	82 (65.1)	60 (71.4)	22 (52.4)	
Black	34 (27.0)	18 (14.3)	16 (38.1)	
Other	7 (5.6)	4 (4.8)	3 (7.1)	
<b>Abscess Location</b>				0.0121
Above waist	36 (28.6)	18 (21.4)	18 (42.9)	
Below waist	90 (71.4)	66 (78.6)	24 (57.1)	
<b>Comorbidities</b>				0.6303
No	102 (81.0)	67 (79.8)	35 (83.3)	
Yes	24 (19.0)	17 (20.2)	7 (16.7)	
<b>BMI</b>				0.9507
<30	57 (45.2)	35 (41.7)	22 (52.4)	
≥30	4 (3.2)	3 (3.6)	2 (7.8)	

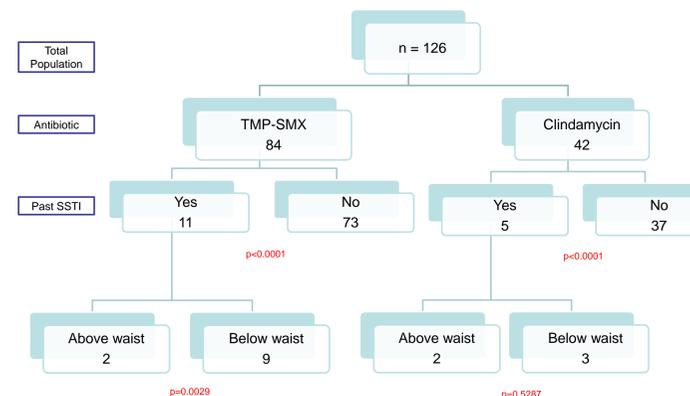
## Patients Approached and Enrolled



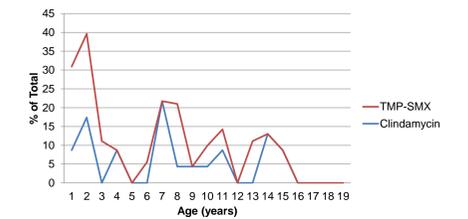
## Risk for I&D at Visit 2 (Re-evaluation for Persistent SSTI)



## Relationship of Past SSTI and Outcome if Treated with TMP-SMX Compared with Clindamycin



## Relationship of Age to I&D at Re-evaluation Visit 2



- Persistence of SSTI after initial treatment occurs at significant rates, regardless of whether prescribing antibiotic is TMP-SMX or clindamycin
- Most persistent SSTIs are from children with no past medical history of SSTI
- Most persistent SSTIs occur in locations with a greater likelihood of *S. aureus* colonization (inguinal, buttock areas) [p < 0.0001]
- For children < 4 years of age, regardless of severity of SSTI, as measured by I&D rates, TMP-SMX is more frequently prescribed than clindamycin [p < 0.0001]
- Children who required re-evaluation for persistent SSTIs 48-96 hours after initial evaluation were more likely to be initially prescribed TMP-SMX, regardless of whether or not I&D was performed. (At > 96 hours for re-evaluation, there is no difference between TMP-SMX and clindamycin, p=0.1389)

## Conclusions

- Given significant risk for persistence of SSTI to occur in children, clindamycin needs to be considered as the first line of treatment over TMP-SMX when SSTI is from a child < 4 years, with the abscess located in buttock/inguinal area, and who has a history of prior SSTI.
- Limitations: small sample size, patient antibiotic compliance, did not control for severity

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## Acknowledgments

•NIH-NIAID-DMID  
 •Children's Healthcare of Atlanta: clinical ED Staff  
 •Morehouse School of Medicine: Victoria Churchill, MPH and Anya Bazzell, MS, MPH  
 •RCMI: G12MD007602  
 •ACTS: UL1TR000454