



<https://doi.org/10.1016/j.jemermed.2018.06.036>

## Selected Topics: Wound Care

### EFFECTIVENESS OF OUTPATIENT ANTIBIOTICS AFTER SURGICAL DRAINAGE OF ABSCESSES IN REDUCING TREATMENT FAILURE

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**Abstract—Background:** The optimal approach to outpatient antibiotic use after surgical drainage of abscesses is unclear given conflicting clinical trial results. **Objective:** Our primary objective was to evaluate the real-world effectiveness of outpatient antibiotic prescribing after surgical drainage of cutaneous abscesses on reducing treatment failure. **Methods:** We performed a retrospective observational study using data extracted from the electronic health record of a single academic health care system. All emergency department (ED) visits that resulted in discharge with a surgical drainage of a cutaneous abscess procedure code were included in the sample. All visits were categorized into having received or not having received an antibiotic prescription at the index visit. **Outcome frequencies** were compared using Pearson's chi-squared test. A multivariable logistic regression model was used to estimate the odds of treatment failure among those who did and did not receive an antibiotic prescription at their index ED visit. **Results:** The final sample consisted of 421 index ED visits, of which 303 (72%) received an antibiotic prescription. Treatment with antibiotics after drainage did not significantly reduce the odds of composite treatment failure within 30 days when controlling for sociodemographic and clinical encounter variables (odds ratio 0.52, 95% confidence interval 0.23–1.21). **Conclusions:** This real-world, comparative effectiveness analysis did not demonstrate any significant reduction in treatment failure with the use of antibiotics after drainage of abscesses in the ED. It is unclear if the clinical benefit observed under controlled trial conditions will

carry over to routine clinical practice where varied antibiotic regimens are the norm and local bacterial resistance patterns vary. © 2018 Elsevier Inc. All rights reserved.

**Keywords—**antimicrobial stewardship; antibiotics; abscess; emergency department; incision and drainage

#### INTRODUCTION

Skin and soft tissue infections (SSTI) are frequently managed in the emergency department (ED) and have been identified by emergency physicians as one of the most frequent reasons they prescribe antibiotics (1,2). Although the Infectious Diseases Society of America has published guidelines for the management of SSTIs, observed antibiotic usage in the ED for these infections remains highly variable and poorly targeted to the most common causative organisms (2–7). More specifically, antibiotics are frequently used after surgical drainage of abscesses despite multiple clinical trials demonstrating no clinical benefit (8). This led the American College of Emergency Physicians to select avoiding routine antibiotic use for abscesses as one of its initial Choosing Wisely® recommendations (9). However, two large randomized controlled trials (RCT) recently demonstrated a

statistically significant improvement in clinical cure rates with discharge antibiotics after surgical drainage for abscesses. Observed cure rates in the placebo groups were high in both studies, approximately 70%, and therefore the clinical significance and implications of these results are unknown (10,11). These findings indicate the need for effectiveness research to facilitate a clear consensus on the optimal approach to antibiotic utilization in the real-world management of abscesses.

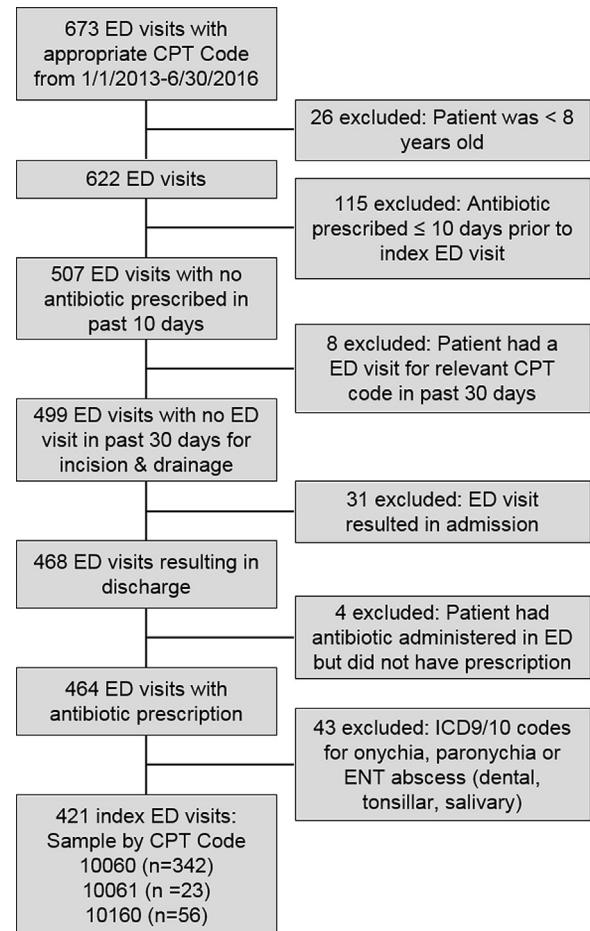
The implications of a new standard of care that emphasizes antibiotic therapy for all abscesses, regardless of size or presence of established high-risk clinical features, should not be underestimated. Based on 2014 National Hospital Ambulatory Medical Care Survey data on incision and drainage procedures performed in the ED, such a recommendation would expose approximately 1 million patients annually to antibiotics that are unnecessary to resolve their infection (12). This is particularly concerning given the fact that outpatient prescribing trends are directly linked to local bacterial resistance (13). This could ultimately accelerate a reduction in efficacy for the few remaining antibiotics with reliable activity against methicillin-resistant *Staphylococcus aureus* (MRSA), the most common causative organism for abscesses (7,14).

The primary purpose of this observational study was to investigate the impact of antibiotic prescribing after surgical drainage on repeat ED visits, rescue antibiotic prescribing, and repeat drainage procedures in a real-world setting. The secondary purpose was to demonstrate the potential of data extracted from the electronic health record (EHR) to conduct comparative effectiveness research related to the management of bacterial infections in the ED.

## MATERIALS AND METHODS

### Study Design and Setting

We performed a retrospective observational study using data extracted from patient EHRs at a Level I trauma, academic medical center ED with over 60,000 visits per year. This tertiary care, urban ED is a regional referral center located in a metropolitan area with a total population of approximately 260,000. All ED visits between January 1, 2013 and June 30, 2016 with a Current Procedural Terminology (CPT) code for incision and drainage of abscess (e.g., carbuncle, suppurative hidradenitis, cutaneous or subcutaneous abscess, cyst, furuncle, or paronychia); simple or single (10060), complex or multiple (10061); or puncture aspiration of abscess, hematoma, bulla, or cyst (10160) that resulted in discharge were included in the sample of index ED visits (Figure 1). A CPT case identification strategy was selected based on



**Figure 1. Case selection flow diagram. ED = emergency department; CPT = Current Procedural Terminology; ICD = International Classification of Diseases; ENT = ear, nose, and throat.**

a known flaw in the International Classification of Diseases, Ninth Revision, Clinical Modification, which combines abscess and cellulitis in the same diagnostic codes (681 and 682) (15). Patients < 8 years old were excluded, as the majority of published trials did not include young children and this is the recommended age limit for prescribing doxycycline. Patients for whom an antibiotic was prescribed < 10 days prior to the ED visit, who had an ED visit for cutaneous abscess in the past 30 days, had an antibiotic administered during the ED visit but were not discharged on an antibiotic, or had a diagnosis of noncutaneous abscess (onychia, paronychia, dental, tonsillar/peritonsillar, salivary gland) were excluded. The Institutional Review Board approved all study activities and approved a waiver of informed consent. None of the funding agencies played any role in the design and conduct of the study; the collection, management, analysis, or interpretation of the data; or the preparation, review, or approval of the manuscript.

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