

# Predictive factors to direct empirical antibiotic therapy for patients with chronic, post-operative, sacral decubitus, and diabetic extremity wounds: a retrospective observational study

Nathan Mai, PharmD; Leena Hamadeh, PharmD; Joseph Levato, PharmD  
Department of Pharmacy, Advocate Christ Medical Center, Oak Lawn, IL

## BACKGROUND

- There is an estimated 2 million emergency department visits each year due to skin and soft tissue infections (SSTIs) in the United States
- Majority of these infections are caused by Gram-positive organisms particularly *Staphylococcus* and *Streptococcus* spp.
- There is a higher incidence of Gram-negative pathogens in post-operative infections, wounds, sacral decubitus ulcers, and diabetic foot infections
- In these particular types of infections, *Pseudomonas* spp. are the pathogens in about 10% of cases
- Infectious Diseases of Society of America guidelines suggest several different antibiotic regimens based on severity, however there is minimal guidance regarding the indication for empiric antipseudomonal coverage
- Overutilization of antipseudomonal agents have led to a decrease in susceptibilities based on recent antibiograms
- By putting an institutional restriction of cefepime, empiric broad-spectrum antibiotics heavily depended on the use of vancomycin and piperacillin/tazobactam
- Institutional monitoring revealed higher incidences of acute renal failure associated with vancomycin and piperacillin/tazobactam which led to the lift of restriction of cefepime use
- Due to the lack of evidence to direct antipseudomonal therapy in SSTIs, the goal is to shift the use towards ceftriaxone for empiric Gram-negative coverage when necessary

## STUDY OBJECTIVES

Identify predictive factors to direct antipseudomonal agents in patients who present with a documented skin and soft tissue infection (defined as post-operative infections, wound infections, sacral decubitus ulcers and diabetic foot infections) in order to preserve their antimicrobial susceptibilities

## Methods

- Daily antimicrobial reports were used to identify patients who met inclusion criteria
- Each patient was evaluated based on patient-specific characteristics and stratified based on empiric antimicrobial therapy
- Seven predictive factors were considered as most pertinent by antimicrobial stewardship commitment and to be further evaluated as potential predictive factors
- Descriptive statistics for all continuous and categorical data will be calculated on all patient characteristics

## DISCLOSURES

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.  
Nathan Mai: Nothing to disclose; Leena Hamadeh: Nothing to disclose; Joseph Levato: Nothing to disclose

Author Contact Information: Nathan.Mai@advocatehealth.com

## Study Design

Enrollment

- 123 adult presenting to Advocate Christ Medical Center between October 2018 and August 2019 with skin and soft tissue infections were initiated with either ceftriaxone or antipseudomonal agent

Inclusions

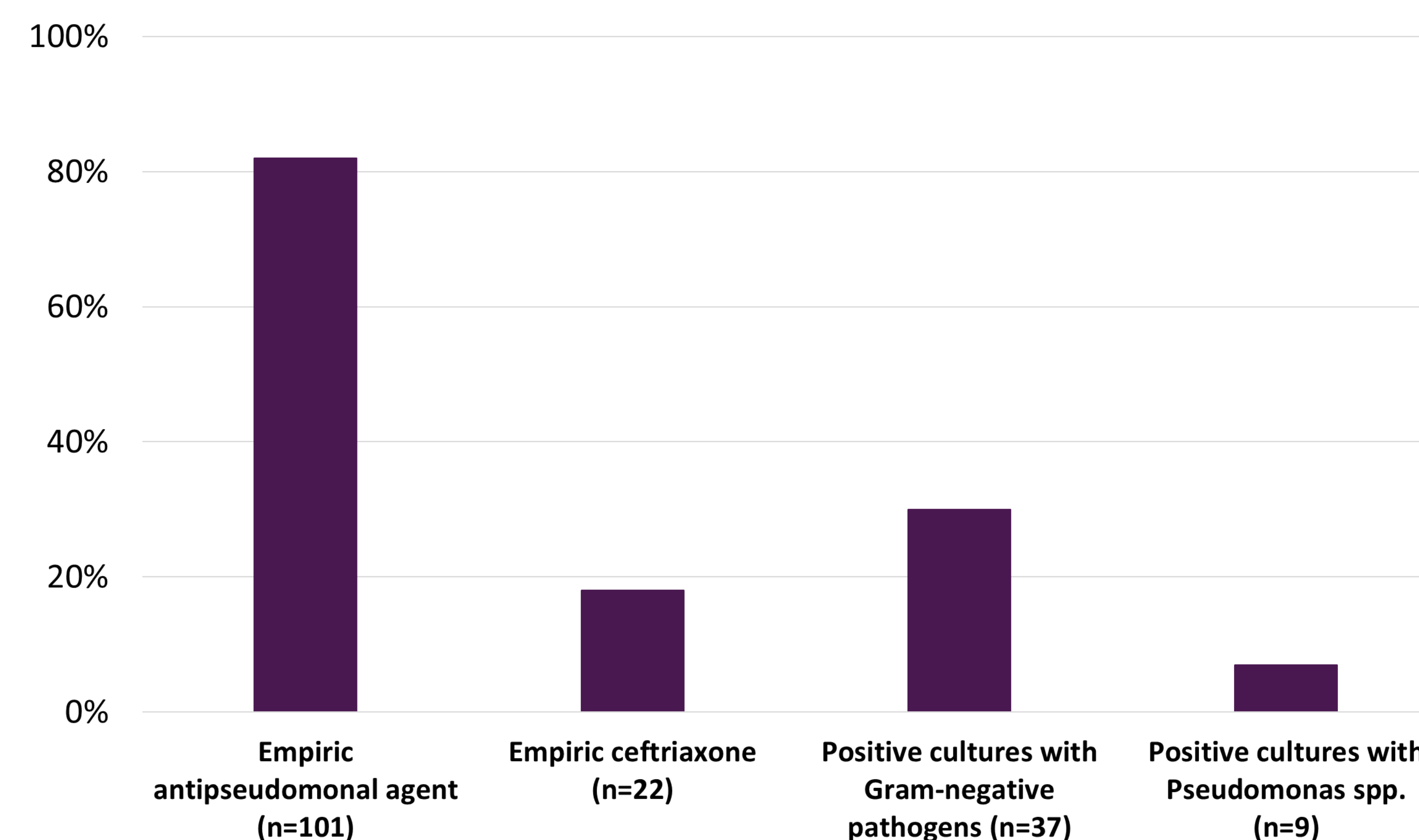
- Patients who were 18 years or older
- Patients who were diagnosed with a documented skin and soft tissue infection (defined as chronic wounds, post-operative infections, diabetic foot infections, and sacral decubitus ulcers)
- Patients who did not receive ceftriaxone or antipseudomonal agent
- Patients who received antibiotics for less than 24 hours during the time of admission for a documented skin and soft tissue infection
- Patients who were diagnosed with necrotizing fasciitis or osteomyelitis
- Patients who presented directly to the intensive medical care unit

Exclusions

Predictive Factors		
Type of SSTIs	History of ceftriaxone exposure	De-escalation in antibiotic therapy
Types of post-operation infections	History of <i>Pseudomonas</i> in wound cultures	WBC ≥ 10.1
Recent hospitalization	Immunosuppression	Febrile upon admission
Recent antibiotic use ≥ 48 hours	Nursing or long-term acute care residence	Transfer to ICU
Empiric Gram-negative therapy	Presence of wound cultures	History of MDROs in wound cultures
History of antipseudomonal exposure	Identification of pathogens	History of cardiovascular disease

## Results

% Summary (N=123)



## Number of Predictive Factors

History of antipseudomonal exposure	Immunosuppression
Recent exposure to antibiotics	WBC ≥ 10.1
Recent hospitalization	Febrile upon admission
Nursing or long-term acute care resident	

Number of Predictive Factors	Ceftriaxone (n=22)	Antipseudomonal (n=101)
0	6 (27.2%)	28 (27.7%)
1	8 (36.4%)	14 (13.9%)
2	7 (31.9%)	22 (21.8%)
3	0 (0%)	15 (14.9%)
4	1 (4.5%)	15 (14.9%)
5	0 (0%)	5 (5.0%)
6	0 (0%)	2 (2.0%)
7	0 (0%)	0 (0%)

Number of Predictive Factors	<i>Pseudomonas</i> spp. (n=9)
0	1 (11.1%)
1	3 (33.3%)
2	1 (11.1%)
3	0 (0%)
4	1 (11.1%)
5	2 (22.2%)
6	1 (11.1%)
7	0 (0%)

## Conclusions

- The use of predictive factors were inconclusive in predicting the likelihood of Gram-negative pathogens particularly *Pseudomonas* spp. in soft tissue and skin infections
- Inconclusive results possibly due to inclusion of non-specific predictive factors: temperature and leukocytosis
- Due to lack of standardized guidance, Gram-negative antimicrobial therapy was strongly clinician-driven

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