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# Evaluation of Antimicrobial Prophylaxis in Spine Surgery within an Enhanced Recovery Program at a Large Community Teaching Hospital

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## Background

- The risk of surgical site infections post spine surgery is 0% to 18%.<sup>1</sup>
- American Society of Health System Pharmacists (ASHP) and Enhanced Recovery After Surgery (ERAS) Society guidelines recommend using an agent with activity against the most common surgical site pathogens including *Staphylococcus aureus*.<sup>2,3</sup>
- The preferred agent is cefazolin 2 grams intravenous (IV) (3 grams if patient weighs ≥120 kilograms [kg]) administered 30 minutes prior to skin incision and re-dosed every four hours intraoperatively.<sup>2,3</sup>
- In the case of a cephalosporin allergy, clindamycin 900 milligrams (mg) IV or vancomycin 15 mg/kg IV are recommended alternatives.<sup>2,3</sup>
- Due to lack of appropriate documentation of allergies in the electronic medical record (EMR), alternative antimicrobials are often prescribed.

## Objectives

- The primary objective is to determine the number of patients who received the appropriate antibiotic prophylaxis recommended by ASHP and ERAS Society guidelines.
- The secondary objectives are to evaluate incidence of patients with surgical site infections (SSI) within 30 days of surgery, number of patients reported allergies/intolerance to penicillin or cephalosporins, characterization of alternative preoperative antibiotic selection, and time to discharge.

## Methods

- Institutional Review Board approval granted prior to conducting study.
- All patients were identified through the EMR.
- Inclusion Criteria:
  - Patients ≥ 18 years old who underwent spine fusion surgery via Enhanced Recovery Program at Beaumont Hospital, Troy, MI between January 1 through June 30, 2022
- Exclusion Criteria:
  - Prior infection requiring intravenous antibiotics prior to surgery
  - Intraoperative death
  - Undergoing simultaneous surgery on other major organs

## Results

Table 1. Patient Baseline Characteristics

Demographics	N=400
Sex, n (%)	
Female	206 (51.4%)
Male	194 (48.5%)
Age, (years)	
Mean ± SD	65.4 ± 11.8
Race, n (%)	
American Indian or Alaska Native	4 (1.0%)
Asian	2 (0.5%)
Black or African American	8 (2.0%)
Other	7 (1.8%)
White	379 (94.8%)
Ethnicity, n (%)	
Arab or Middle Eastern Descent	6 (1.5%)
Hispanic/Latino	5 (1.3%)
Non-Hispanic/Latino	360 (90.0%)
Other	28 (7.0%)
Unavailable	1 (0.3%)

Table 2. Compliance to Surgical Prophylaxis Guidelines

Compliant	N=400
Yes, n (%)	295 (73.8%)
No, n (%)	105 (26.2%)

Table 3. Surgical Information

Type of Surgery, n (%)	
Cervical	96 (24.0%)
Thoracic/Lumbar/Sacral	121 (30.3%)
Revisions	183 (45.7%)
Antibiotic Given within 30 Minutes of Incision Time, N (%)	
Yes	224 (56.0%)
No	165 (41.3%)
Other*	11 (2.7%)
Average Time of Surgery (hours)	1.99

\*Not given or not documented.

Table 4. Number of Readmissions

	N=400
Total Number of Admissions within 30 Days after Surgery, n (%)	43 (10.8%)
ICU Admissions within 30 Days after Surgery, n (%)	7 (1.8%)
SSI Throughout Readmission, n (%)	8 (2.0%)

Table 5. Microorganisms Identified During Readmissions

	n=7
Bacteria Identified, n (%)	
<i>Enterobacter cloacae</i>	1 (14.3%)
<i>Staphylococcus aureus</i>	5 (71.4%)
<i>Serratia marcescens</i>	1 (14.3%)

Figure 1. Dosage of Cefazolin Used

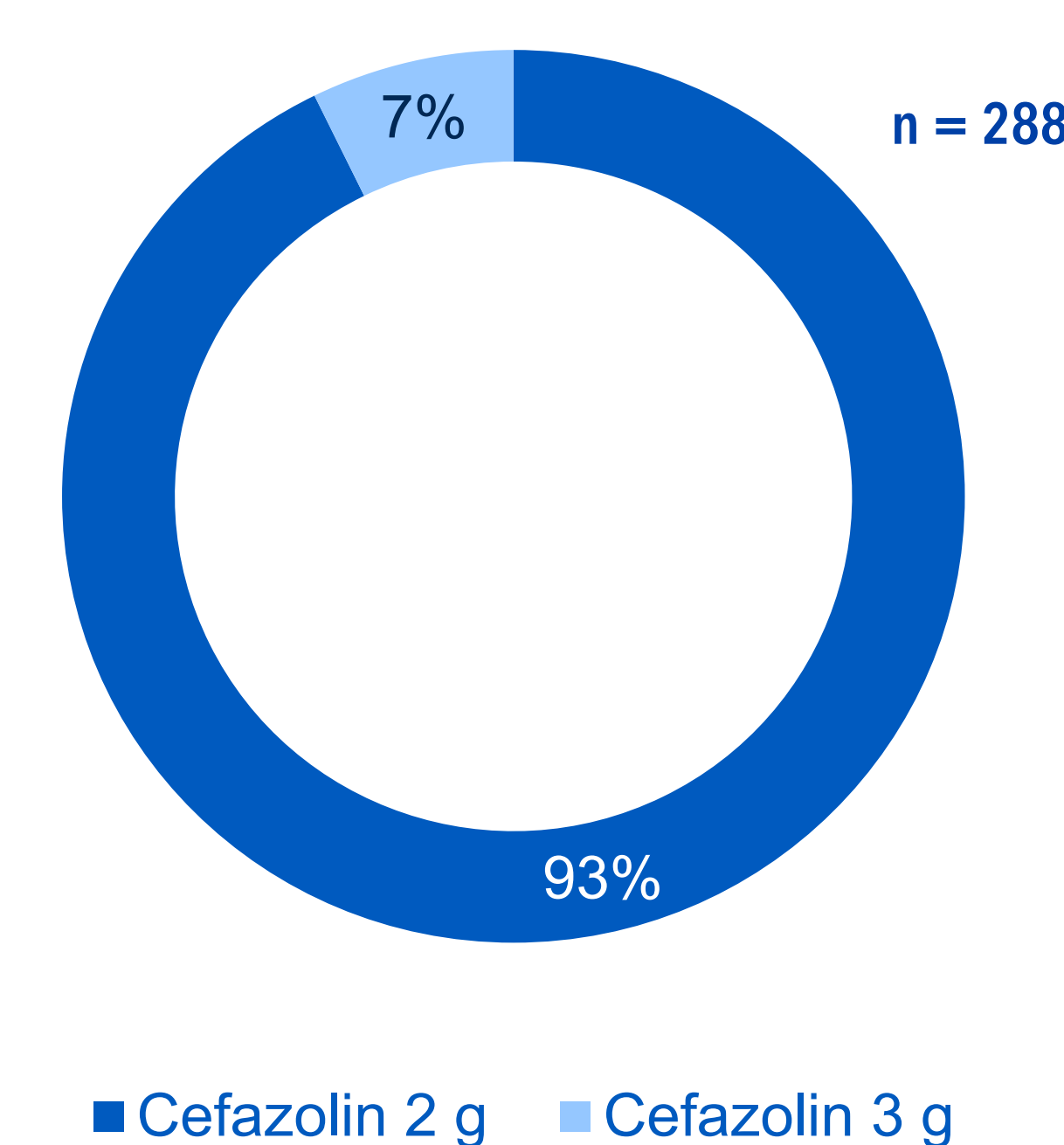


Figure 2. Alternative Agents Used

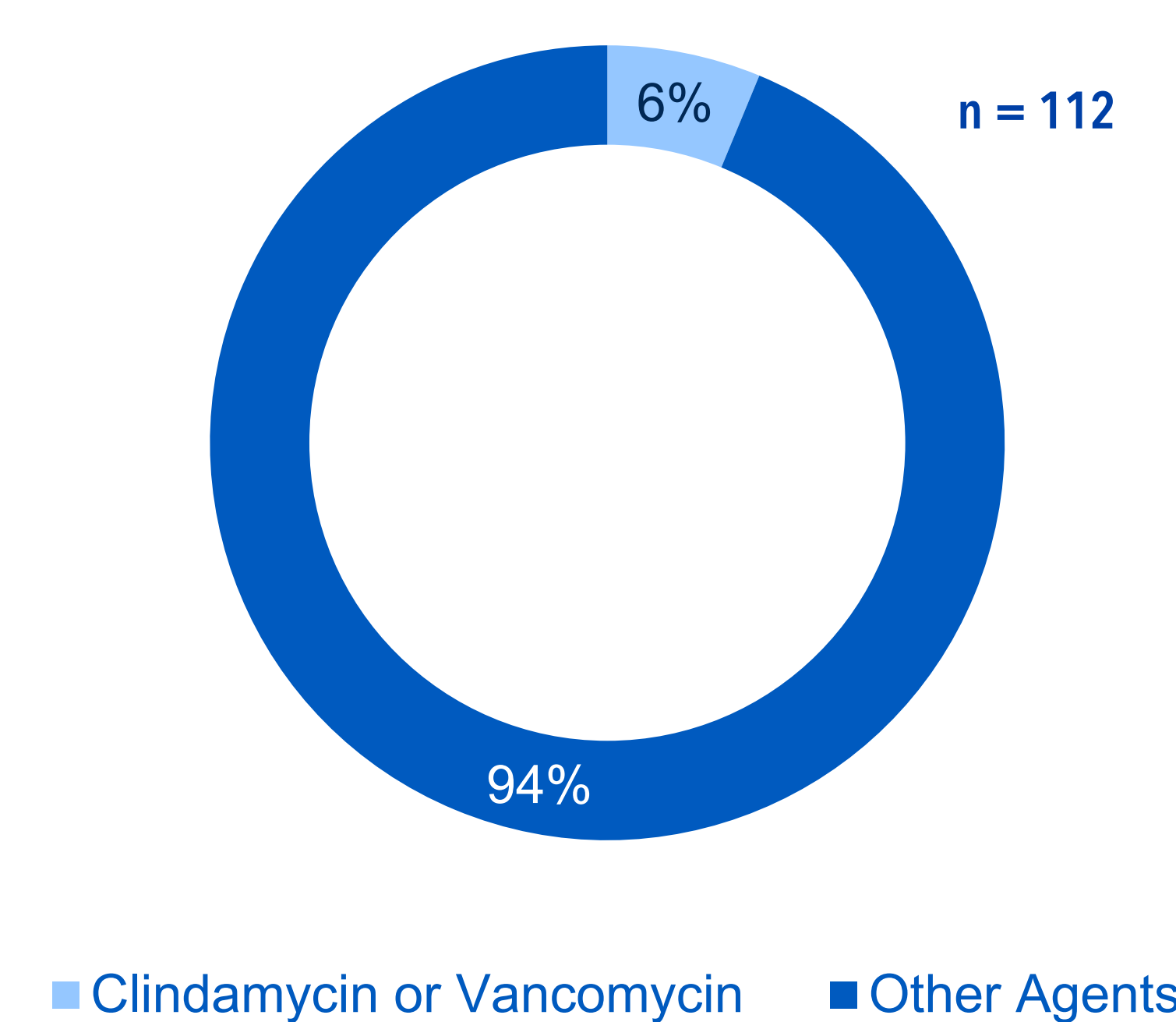
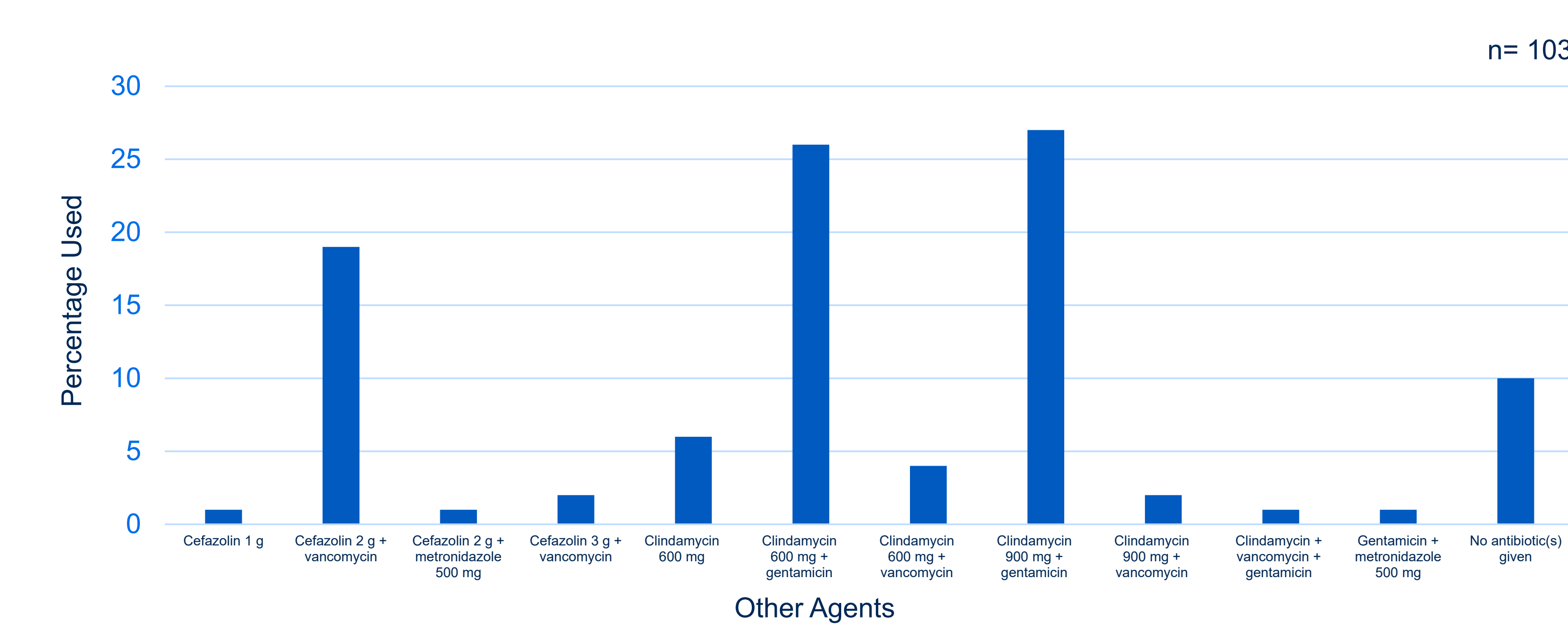


Figure 3. Other Agents Used as Alternative Therapy



## Discussion

- Of the 400 patients included, there were 123 (30.8%) patients that received alternative therapy and 11 patients who were not given therapy or therapy was not documented.
- In patients with documented cephalosporin allergies with no prior history of using a cephalosporin, the alternative therapy was considered to be following the guidelines.
- Of the 123 patients that received an alternative therapy there were seven (5.7%) patients where the alternative therapy was considered to be following the guidelines.
- During the study time frame, the EMR surgical prophylaxis order set clindamycin dose was adjusted from 600 mg to 900 mg.
  - Clindamycin 600 mg was given to six patients.
- Antimicrobial prophylaxis was given 30 minutes prior to surgery in 55.9% (n= 224) of the patients.
- Out of the total number of patients (N=400) there were 43 (10.8%) patients that were readmitted.
  - This study found an SSI rate of 2%, which is within previously reported literature.

## Conclusion

- A majority of patients (73.8%) received the recommended surgical prophylaxis or recommended alternative based on the ASHP and ERAS Society guidelines.
- Of the sample population, 2% of the total number of patients were found to have a SSI.
- The findings from the study will be presented at a multidisciplinary spine surgery monthly meeting to improve guideline adherence.

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