

Jada Ohene-Agyei, MS<sup>1</sup>, An-Lin Cheng, PhD<sup>1</sup>, Suman Sahil<sup>1</sup>, MBA Xi Wang<sup>1</sup>, Jonathan Shepherd, MD<sup>2</sup>, Gary Sutkin, MD<sup>1</sup>

<sup>1</sup> University of Missouri Kansas City School of Medicine, Kansas City, MO  
<sup>2</sup> University of Connecticut Health Center, Farmington, CT

## Introduction

- Problem:** 3-11% of patients with a sacral neuromodulation device have an infectious complication that requires device removal.
- Gap:** It remains unclear whether variability in perioperative antibiotic selection can account for differing rates of implant removal in SNM patients.
- Objective:** The aim of this case control study is to retrospectively examine the occurrence of implant removal in patients who received a sacral nerve stimulator based on the perioperative antibiotic they received.

Table 1. Patient Demographics (n = 1433)

	Removal Cohort (n = 170)	Non-Removal Cohort (n = 1263)	p-value
Age (mean, SD)	63.0 (15.7)	70.0 (14.8)	1.0
Race			0.9
Caucasian	153 (90.0)	1136 (89.9)	
Black/African American	9 (5.3)	49 (3.9)	
Other	3 (1.8)	34 (2.7)	
Unknown	3 (1.8)	18 (1.4)	
Native American	2 (1.2)	17 (1.4)	
Asian	0 (0.0)	5 (0.4)	
Hispanic	0 (0.0)	2 (0.2)	
Biracial	0 (0.0)	2 (0.2)	
Region Type			0.2
Urban	164 (96.5)	1185 (93.8)	
Rural	6 (3.5)	78 (6.2)	
Steroid Use	0 (0.0)	4 (0.3)	1.0
Obesity	15 (8.8)	154 (12.2)	0.3
Diabetes	37 (21.8)	241 (19.1)	0.4
Smoking Status	27 (15.9)	231 (18.3)	0.5

Demographics represented as n (%) format unless otherwise specified.

All patients included in our study were female.

Differences between study groups determined using Fisher's exact tests (categorical) and t-tests (numerical)

SD = standard deviation

## Methods

### Inclusion Criteria

- Interstim<sup>®</sup> device implanted between January 1 2010 and November 30 2018
- Captured within the Health Facts<sup>®</sup> Database

### Exclusion Criteria

- If stage 2 or removal was present without initial stage I implantation or without antibiotics used
- Documented antibiotic received was unlikely to be for infection prophylaxis
- Incomplete procedure course
- Administration of a combination of antibiotics

For the primary outcome of designation to either the removal or non-removal group, univariate logistic regression was performed.

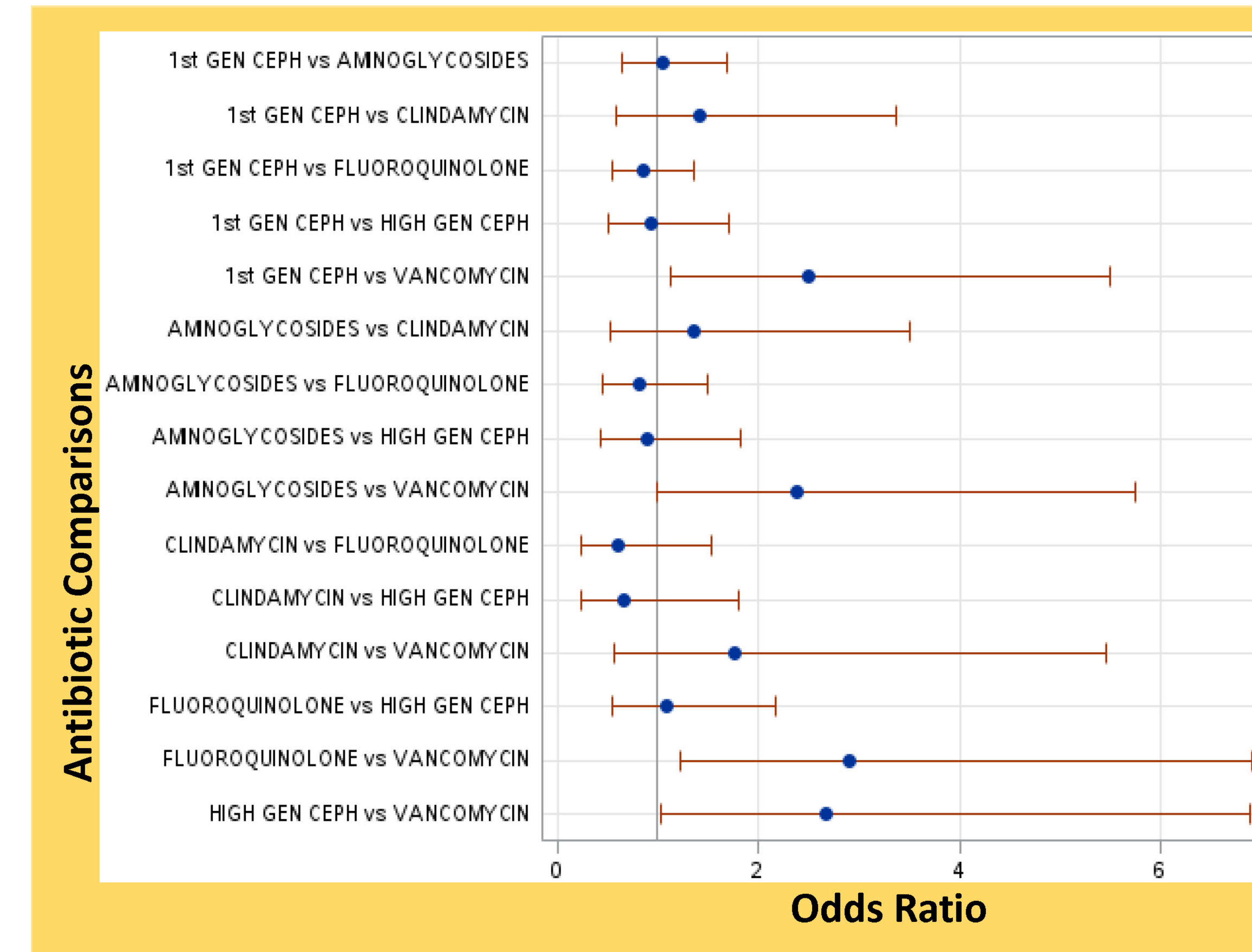
## Results

Univariate logistic regression analysis revealed:

- Vancomycin was the only antibiotic that showed any significant difference in explantation with noted reduction in explantation compared to multiple other antibiotics.**
- Patients who received a **first-generation cephalosporin** were **2.4 times more likely** to have a subsequent **removal** compared to those who received **vancomycin** (95% CI [1.1,6.5], p = 0.02)
- Patients who received a **fluoroquinolone** were **2.9 times more likely** to have a subsequent **removal** compared to those who received **vancomycin** [95% CI [1.2, 6.9] p = 0.01)
- Patients who received a **second or third-generation cephalosporin** were **2.7 times more likely** to have subsequent removal compared to those who received **vancomycin** (95% CI [1.0, 6.9], p = 0.04).

## Results (cont.)

### Odds Ratios with 95% Wald's Confidence Intervals



### Removal Rates by Antibiotic Group

	First-Generation Cephalosporin (n = 749)	Second or Third Generation Cephalosporin (n = 106)	Aminoglycosides (n = 192)	Clindamycin (n = 66)	Fluoroquinolone (n = 190)	Vancomycin (n = 130)
Removal Rate	12.4% (93)	13.2% (14)	12.0% (23)	9.1% (6)	14.2% (27)	5.4% (7)

Values represented as % (n)

## Clinical Significance

The results of this study suggest that **vancomycin** may be a superior antibiotic compared to other commonly used antibiotic prior to sacral neuromodulation device implantation. Further understanding of the pathways to prevent infectious complications of this procedure will improve the patient and healthcare team experience.