

# Urinary Tract Infections in the Very Old, To Treat or Not to Treat?

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## Introduction

Urinary tract infections (UTIs) are one of the most commonly treated infections among nursing home residents. Previous research has shown the benefits and harms of treatment with antibiotics in UTIs, but research has not been specific to the very old population, which we define as patients  $\geq 80$  years of age. Antibiotics are frequently used inappropriately in the elderly based on symptoms not exclusively associated with UTIs, such as altered mental status. Our study examined positive urine cultures in subjects  $\geq 80$  years old in The Los Angeles Jewish Home for the Aging (JHA), a skilled nursing facility. We assessed antibiotic use for the following primary outcomes: recurrent abnormal cultures, hospitalization and death.

## Objectives

- Assess if treatment with antibiotics has an impact on further complications such as recurrent abnormal cultures, hospitalization and death
- Analyze the appropriateness of antibiotic use, especially in recurrent abnormal cultures, hospitalizations and death

## Methods

- All positive urine cultures were obtained from Trident USA Health Services laboratory database for July 2014 to December 2014
- 62 of a total 103 subjects met inclusion criteria

	Inclusion	Exclusion
Urine Culture	Abnormal	Normal
Age	$\geq 80$ years	$< 80$ years
Resident within JHA	Yes	No

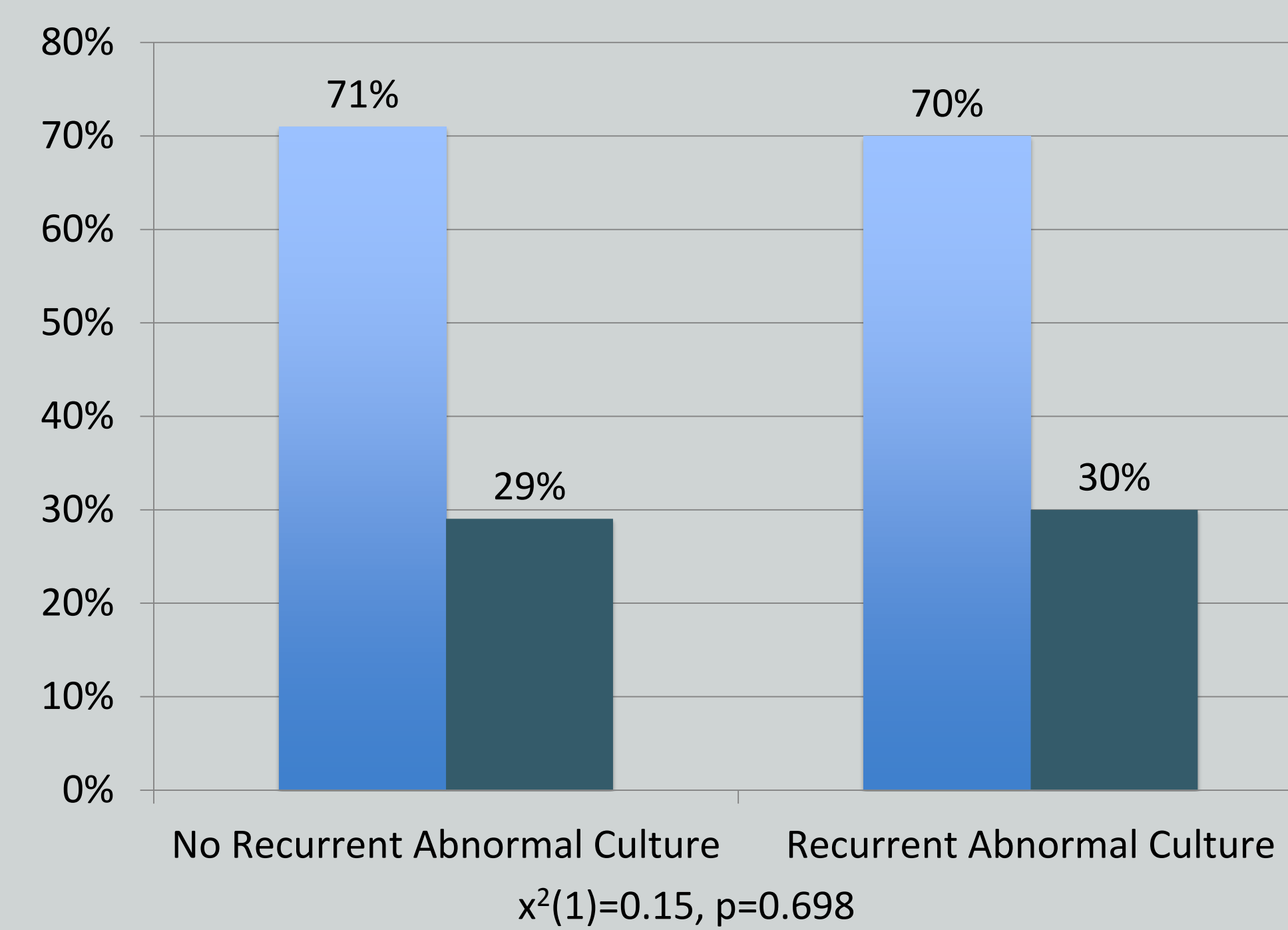
- A retrospective chart review was conducted for all subjects
- The medication administration record was used to evaluate antibiotic use, while progress notes by nurses and providers were used for any documented signs and symptoms of UTIs
- Data collection was done with concealment of identity
- Outcome measures include recurrent abnormal cultures, hospitalization and death within the 6-month study period
- Statistical analysis included descriptive statistics, as well as chi-square calculations

Table 1	
Items	% (N)
Sample Size	62
Gender	
Male	40.32 (25)
Female	59.68 (37)
Age	
80-90	56.45 (35)
91-100	41.94 (26)
101 +	1.61 (1)
Average	90.07
Ethnicity	
White, Non-Hispanic	98.39 (61)
Hispanic	1.61 (1)
Total Number of Abnormal Cultures	82
Symptom Presentation	
Leukocytosis	12.20 (10)
Fever	14.63 (12)
Altered Mental Status	31.71 (26)
Local Urinary Symptoms	24.39 (20)
Other Symptoms	32.93 (27)
Outcomes	
Recurrent Abnormal Culture	24.39 (20)
Hospitalization Total	15.85 (13)
UTI Related	6.10 (5)
Other Cause	9.76 (8)
Death	8.54 (7)
Meets McGeer Criteria <sup>§</sup>	
Yes	9.76 (8)
No	90.24 (74)
Antibiotic Used	
Yes	70.73 (58)
No	29.27 (24)
Antibiotic Appropriateness	
Appropriate	55.17 (32)
Inappropriate	44.83 (26)
Wrong Drug	27.59 (16)
Wrong Dose	15.52 (9)
Wrong Duration	1.72 (1)
Antibiotic Order Source & Inappropriate Use*	
JHA Prescriber	15 (4)
Non-JHA Prescriber	85 (22)
* $\chi^2(2)=13.9077, p=0.001$	

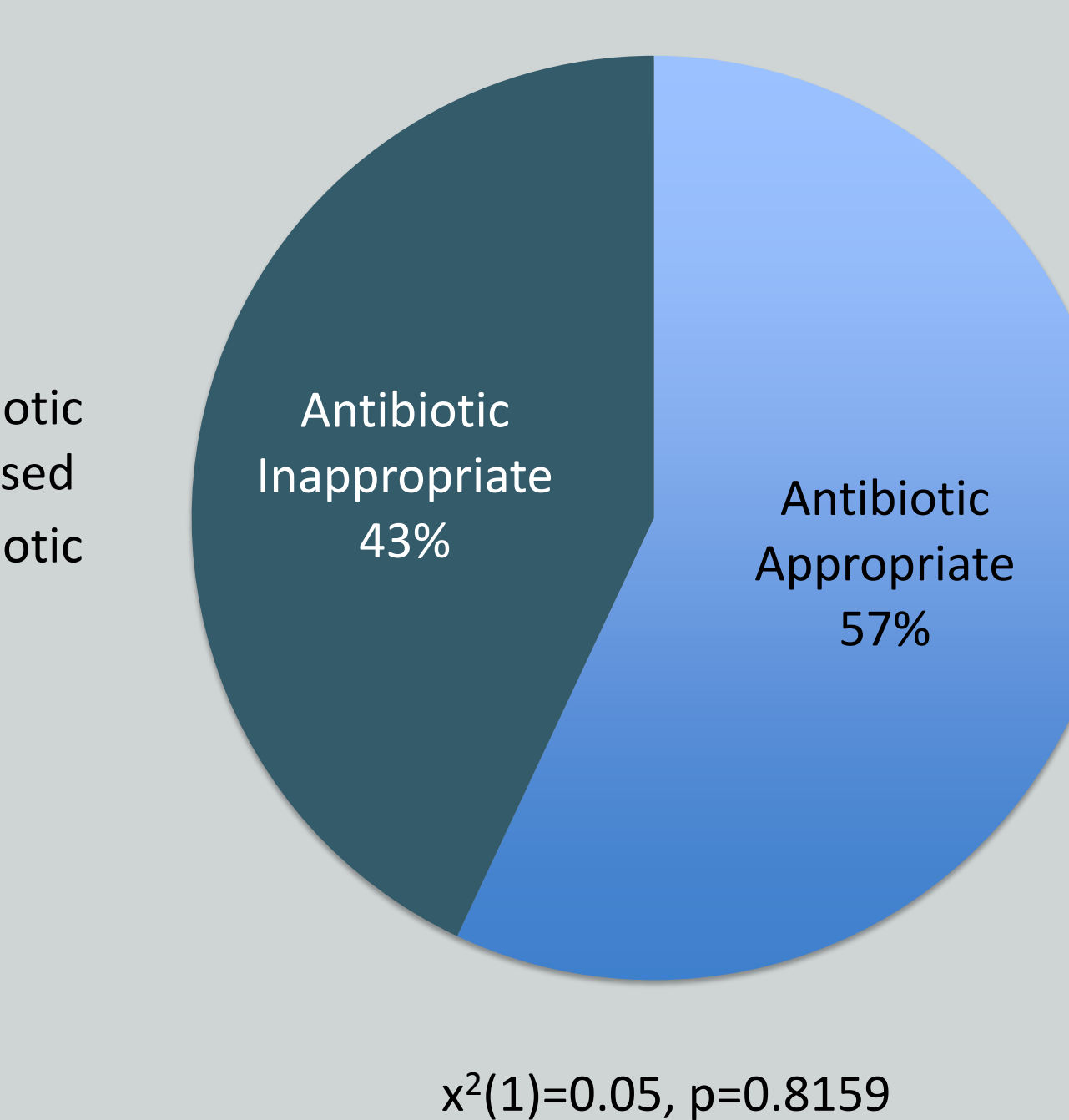
<sup>§</sup> Stone ND, Ashraf MS, Calder J, et al. Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria. *Infection control and hospital epidemiology: the official journal of the Society of Hospital Epidemiologists of America*. 2012;33(10):965-977. doi:10.1086/667743.

## Results

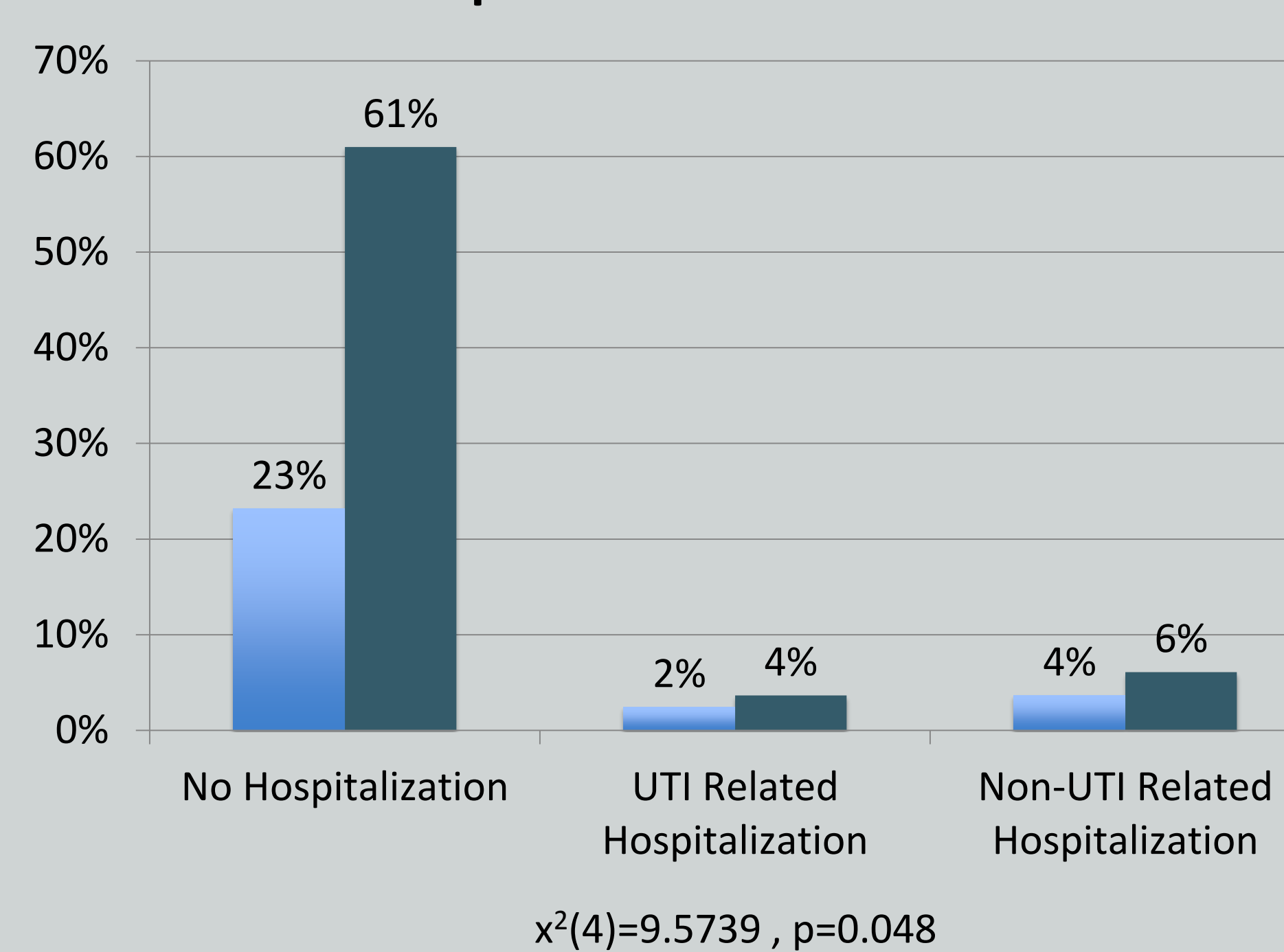
Recurrent Abnormal Culture and Antibiotic Use



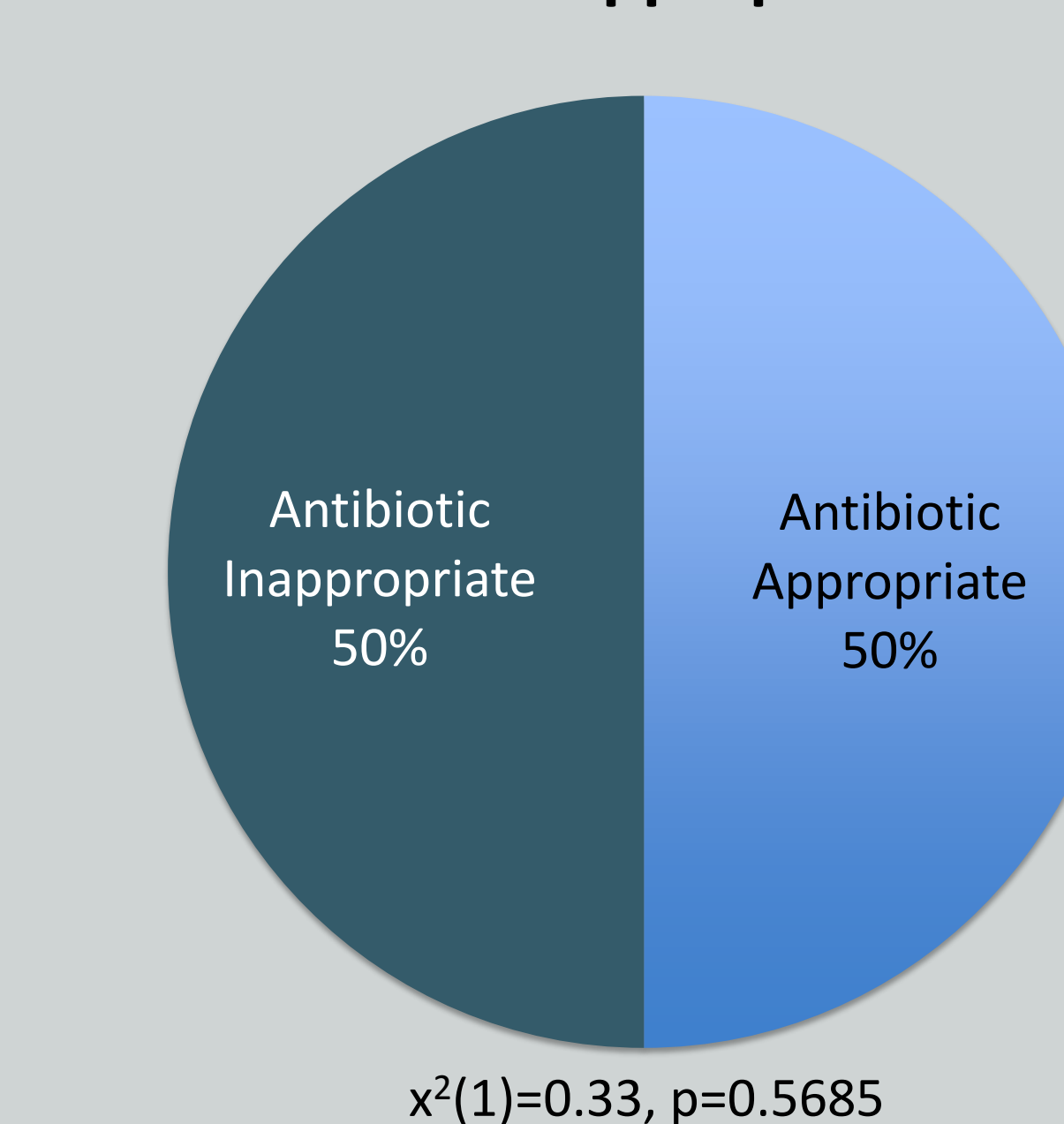
All Outcomes of Recurrent Abnormal Culture and Antibiotic Appropriateness



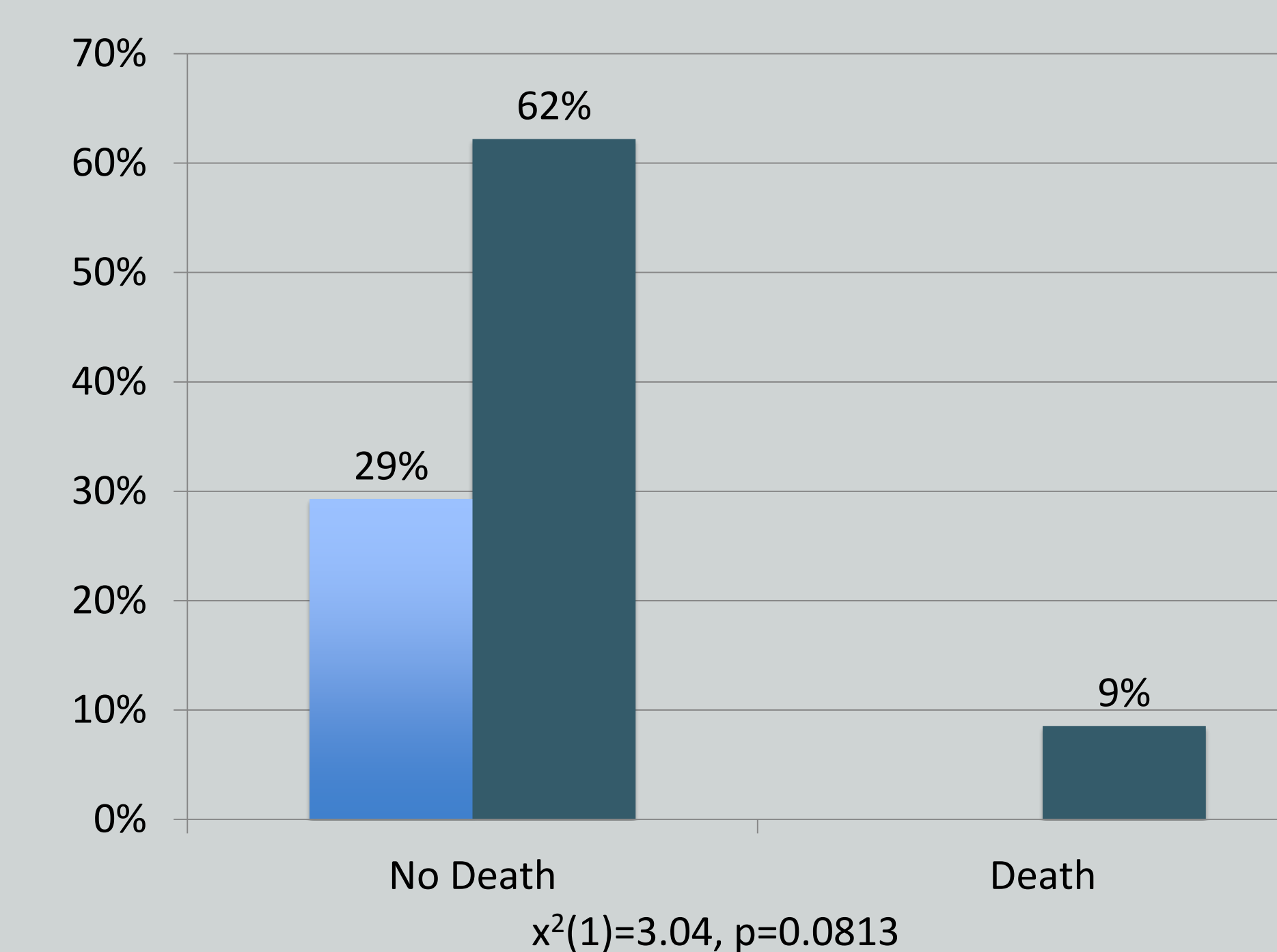
Hospitalizations and Antibiotic Use



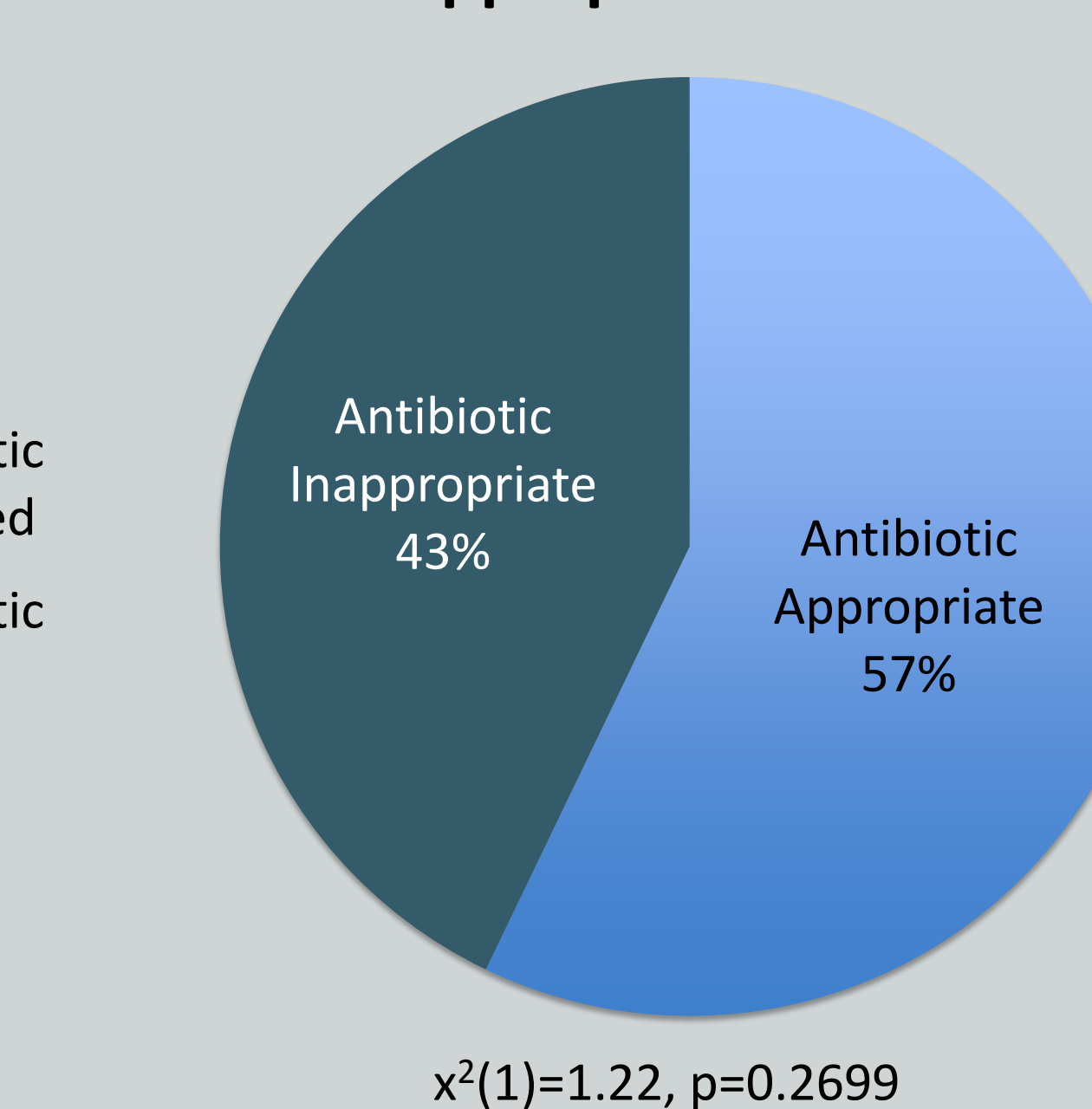
All Outcomes of Hospitalization and Antibiotic Appropriateness



Death and Antibiotic Use



All Outcomes of Death and Antibiotic Appropriateness



## Discussion

- Only 9.76% of subjects met McGeer Surveillance Criteria for UTIs. This result questions how applicable this criteria is to the very old population
- Antibiotics were used in 70.73% of abnormal cultures, of which only 55.17% were used appropriately (Table 1)
- Of the antibiotics ordered, JHA prescribers, who are trained geriatricians, had the least amount of inappropriate antibiotic use compared to outside prescribers,  $\chi^2(2)=13.9077, p=0.001$  (Table 1)
- Chi-square analysis showed statistical significance in hospitalization and antibiotic use,  $\chi^2(4)=9.5739, p=0.048$ 
  - This finding sheds light on the importance of promptly treating an infection to prevent further complications and the need for hospitalization
- All other endpoints showed no difference in the case of antibiotic use as well as antibiotic appropriateness
  - The rates in inappropriate antibiotic use may have contributed to the no difference observed in these groups

## Limitations

Our study was limited by several factors:

- Lack of power: small sample size of only 62 patient charts
- Only one facility was included
- Important information such as source of urine collection were not documented in every patients' chart
- Provider judgment whether to diagnose and treat UTIs or not

## Conclusion

- In conclusion, there were two statistically significant findings: the relationship between antibiotic use and hospitalization, and the lower rates of inappropriate antibiotic use by geriatric specialists
- Our study showed that antibiotic use resulted in less hospitalization considering the overall low hospitalization rates, and the importance of geriatric specialists in treating this frail population appropriately
- Although the other outcomes did not show statistical significance the findings showed interesting trends:
  - Antibiotic appropriateness in this very old and frail population was found to be appropriate only 50% of the time
  - Antibiotic appropriateness and death showed all patients who died were on antibiotics and only 57% were used appropriately
  - In regards to recurrent abnormal cultures, the rates were similar whether antibiotics were used or not used
- Future research may need to focus on:
  - The application of the McGeer criteria in the very old population
  - The role of the pharmacist and antimicrobial stewardship within a SNF, particularly in regards to recurrent infections
  - The impact of education for physicians about empiric antibiotic selection and de-escalation, as well as, patient care hygiene throughout all staff of a facility on UTI rates and recurrences
- The results of this small-scale study support the need for further research in the treatment of UTIs in the very old population