The background features a photograph of a building entrance with a large, arched doorway. The entrance is framed by a stone archway, and the words "DODD CHAUX HALL" are visible above the door. A large, dark silhouette of a tree is overlaid on the left side of the image, partially obscuring the building. The right side of the image is a solid dark green color with a subtle grid pattern.

# Evaluating the use of a Checklist to Improve Antibiotic Stewardship for Urodynamics Studies

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# Introduction

- ▶ Urodynamics studies (UDS) are considered a low-risk urological procedure for developing an infection
- ▶ While data are not available related to UDS, bacteriuria has been estimated to occur in 1 to 5% of patients after catheterization one time
- ▶ It is estimated the risk for post-procedure infections without antibiotic prophylaxis ranges from 3% to 20%
- ▶ Antibiotics are often not necessary, but some studies have demonstrated that some subgroups have a higher risk for developing an adverse event, as defined as UTI and bacteriuria
- ▶ Antibiotic prophylaxis for urodynamics studies can help prevent adverse events, however unnecessary use can increase the risk for resistant organisms.

# Introduction

- ▶ The Society of Urodynamics, Female Pelvic Medicine, and Urogenital Reconstruction (SUFU) has set forth a best practice policy statement (BPPS) of recommendations for antibiotic use during urological procedures
- ▶ Currently they recommend the following patient populations receive antibiotic prophylaxis
  - Neurogenic bladder
  - Bladder outlet obstruction
  - Elevated post-void residual
  - Advanced age (>70)
  - Asymptomatic bacteriuria
  - Immunosuppression, corticoid steroid use, or inherent immune deficiency
  - Chronic catheter or intermittent catheterization
  - Orthopedic implant

# Problem Statement

- ▶ Currently antibiotic prophylaxis during a UDS is at the discretion of the provider performing the procedure
- ▶ When high-risk patients do not receive antibiotic prophylaxis, they are at a higher risk for developing an infection
- ▶ When otherwise healthy patients are given antibiotics unnecessarily, they are placed at risk for developing resistant organisms
- ▶ The clinical problem was identified through direct observation of current practices at the clinic
- ▶ A chart review of over a two-week period in February 2021 identified that 45% of patients were not appropriately administered antibiotic prophylaxis based on the BPPS

# Purpose

- ▶ The purpose of this project is to improve antibiotic stewardship for patients undergoing UDS, based on the BPPS published by SUFU.
- ▶ The primary aim is to improve provider adherence of antibiotic administration at an outpatient urology practice by using a checklist

# Objectives

## ► Objectives

1. Educate providers about the SUFU BPPS
2. Develop education and implement a checklist to assist providers in identifying appropriate individuals who should receive antibiotics (Appendix C).
3. Collect pre-implementation and post-implementation data.
4. Analyze data to determine if adherence to the BPPS has improved.
5. Present results to staff and discuss next steps.

# Background

- ▶ Inova Medical Group outpatient urology practice in Fairfax, Virginia
  - Multidisciplinary team of providers (MDs, NPs) perform the UDS
- ▶ Goal is to provide education and then implement a checklist based on SUFU BPPS
  - Literature identifies antibiotics are not necessary for everyone, but some subgroups have a higher risk for developing an adverse event

# Concepts

- ▶ Urology Providers
  - MD and NPs
- ▶ Urodynamics Studies
  - Include uroflowmetry, cystometrogram, electromyogram, and pressure flow study
- ▶ Antibiotic Administration
  - sulfamethoxazole/trimethoprim or ciprofloxacin
- ▶ Antibiotics Stewardship
  - the effort to optimize the use of antibiotics appropriately, reduce unnecessary antibiotic use and prevent antibiotic resistance
- ▶ Best Practice Policy Statement
  - As set forth by SUFU and includes recommendations specifically for UDS
- ▶ High-Risk Patients
  - relevant neurogenic lower urinary tract dysfunction, bladder outlet obstruction or elevated post void residual, advanced age (older than 70 years), asymptomatic bacteriuria, immunosuppression, corticosteroid use, or inherent immune deficiency, chronic catheters, and orthopedic implant
- ▶ Checklist
  - An identification tool used as a reminder
- ▶ Post-Procedure Infections
  - symptomatic individuals with a urine culture that has >100k cfu/ml



# Framework



- ▶ The Centers for Disease Control and Prevention (CDC) framework for program evaluation
  - **Engage Stakeholders**
    - Engage the individuals involved and affected by the program evaluation
  - **Describe the Program**
    - Describe the activities involved with the program, context, and resources available
  - **Focus the Evaluation Design**
    - Focuses on the purpose and methods that will be utilized in the evaluation design
  - **Gather Credible Evidence**
    - Collect information that will communicate an understanding of the program
  - **Justify Conclusions**
    - Analysis and interpretation of the findings will occur to justify the conclusions made of the program evaluation
  - **Share Lessons Learned**
    - Deliberate effort should be made to disseminate lessons learned from the program evaluation

# Synthesis of the Evidence: Evidence Search

- ▶ PICOT: In patients undergoing urodynamics studies, how does administration of antibiotic prophylaxis compared to none influence infection rates?
- ▶ Search terms: Urodynamics, uds, udt, anti-bacterial agents, antibiotics, prophylaxis, pre-exposure prophylaxis, post-exposure prophylaxis, antibiotic prophylaxis
- ▶ Pubmed/Medline, CINAHL, Cochrane, Embase, and Google Scholar
- ▶ Inclusion criteria: data specific to humans, study evaluated adverse events (i.e., bacteriuria or UTI, published within the past 10 years)
- ▶ Total number of articles: 12

# Synthesis of the Evidence

## ► Population Studied

- Five studies only evaluating women found an increased risk for postmenopausal women and multiparous women (>3 births)
- Seven studies evaluating men and women found a higher risk in individuals with a history of urological surgery, post-void residuals >100 ml, and individuals possessing >3 risk factors
- Two studies specifically focusing on spinal cord injuries found individuals who had a UTI within four weeks, previous autonomic dysreflexia, and reflex voiding

## ► Adverse Events

- The rates of post-procedure bacteriuria without antibiotics ranged from 2.3% to 9.5%
- The rate of symptomatic UTIs ranged from 3.6% to 12%

## ► Methods

- Six studies evaluated the use of antibiotics in preventing post-procedural adverse events, as defined as UTIs and asymptomatic bacteriuria
  - 5 studies were not able to demonstrate statistical significance
- Six studies did not evaluate antibiotic use and concluded that antibiotics are not always necessary for the general population

# Synthesis of Evidence

## ▶ Strengths

- Multiple studies demonstrated that antibiotic prophylaxis is not always necessary and special attention can be placed on specific subgroups

## ▶ Limitations

- Adverse events, described as UTIs vs asymptomatic bacteriuria, varied among studies and were not consistent across the literature

## ▶ Conclusion

- The current evidence demonstrates that antibiotic prophylaxis is not indicated for all patients undergoing UDS
- The rates of post-procedure UTIs vary, but remain low for all populations, further establishing that it is a low-risk procedure
- Further research is still needed to establish clinical significance for use of antibiotic prophylaxis for specific high-risk groups.

# Methods

- ▶ Project Design
  - Program Evaluation
- ▶ Setting
  - Inova Medical Group outpatient urology practice in Fairfax, VA
  - Typical week consists of about 7-10 UDS
- ▶ Participants
  - One MD and three NPs
- ▶ Study Population
  - Inclusion: individuals 18 years or older undergoing a UDS
  - Exclusion: active UTI, currently receiving antibiotics at the time of study

# Methods

## ► Plan for Implementation

- Engage Stakeholders
  - Providers review the SUFU BPPS together
- Describe the Program
  - Education
    - Provide a formal in-service education based on SUFU BPPS
    - Create a checklist to identify high-risk individuals who should receive antibiotic prophylaxis
- Focus the Evaluation Design
  - Implement the checklist by providing it to each provider performing a UDS

# Methods

## ► Plan for Implementation

- Gather Credible Evidence
  - Collect data via chart review
- Justify Conclusions
  - Analyze the data to determine if the goal of improving appropriate antibiotic administration was achieved
- Share Lessons Learned
  - Review results to determine if the change should be adopted, abandoned, or modified

# Checklist

## Urodynamics Antibiotic Prophylaxis Identification Form

### Check-in

Check the box if the patient meets any of the following:

- Positive urine dipstick
- Neurogenic bladder
- Bladder outlet obstruction or elevated post void residual
- Advanced age (>70)
- Asymptomatic bacteriuria
- Immunosuppression, corticoid steroid use, or inherent immune deficiency such as a history of renal transplant
- Chronic catheter or intermittent catheterization
- Orthopedic implant

### Provider

If any of the above boxes are checked, consider oral antibiotic prophylaxis

- 1<sup>st</sup> Choice: sulfamethoxazole/trimethoprim 800mg/160mg
- Alternative: ciprofloxacin 500mg
- Alternative: Other \_\_\_\_\_

Checklist based on SUFU's Best Practice Policy Statement on Urodynamic Antibiotic Prophylaxis in the Non-Index Patient (Cameron, et al., 2017)



# Data Collection Tool

Confidential

UDS Antibiotics  
Page 1

## Demographics

Study ID

Date of procedure

(YYYY-MM-DD)

Age (years)

Ethnicity

Hispanic or Latino  NOT Hispanic or Latino  Unknown / Not Reported

Race

- American Indian/Alaska Native
- Asian
- Native Hawaiian or Other Pacific Islander
- Black or African American
- White
- More Than One Race
- Unknown / Not Reported

Gender

- Female
- Male
- Other
- Prefer not to say

High-risk factors

- positive urine dipsticks
- neurogenic bladder
- bladder outlet obstruction
- elevated post void residual
- advanced age
- asymptomatic bacteriuria
- immunosuppression
- corticoid steroid use
- inherent immune deficiency
- history of renal transplant
- chronic catheters
- orthopedic implant
- none

Low-risk factors

- presumed normal genitourinary anatomy
- diabetes mellitus
- recent prolonged hospitalization
- dietary or nutritional deficiencies
- post-menopausal status
- recurrent UTIs
- gender
- prior urological surgery
- cardiac valvular disease
- none

Antibiotic prophylaxis

- Bactrim DS
- cipro
- other
- none

# Analysis

- ▶ Descriptive statistics
  - Demographic data includes patient age, sex, and race/ethnicity.
- ▶ Provider adherence to antibiotic administration will be determined by comparing the change from the rates calculated in pre-implementation to the rates calculated immediately following the implementation

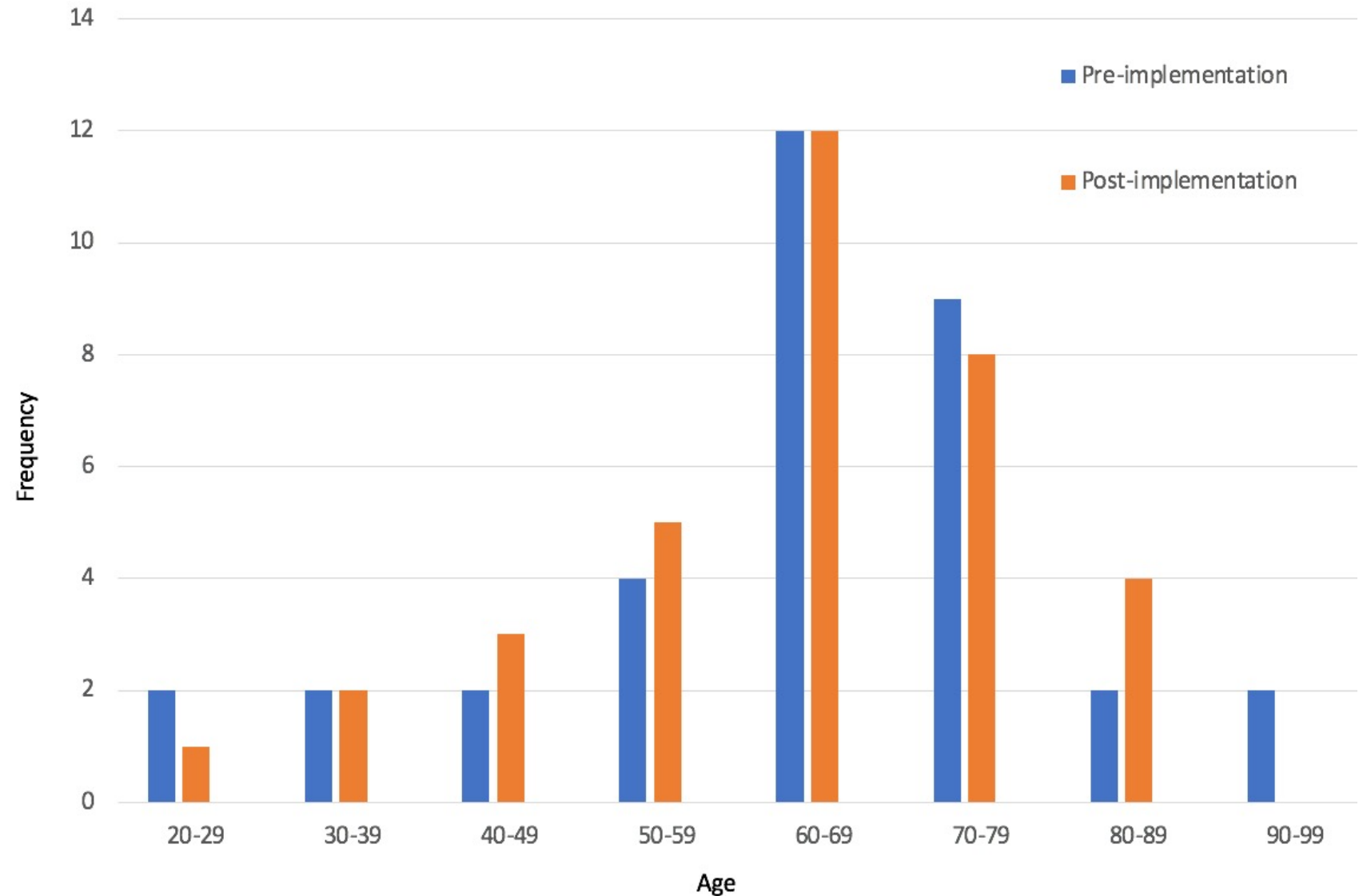
# Results

## ► Demographics

	<u>Pre-Intervention Group</u>	<u>Post-Intervention Group</u>
Number of patients	35	35
Mean ( $\pm$ SD) age	63.5 $\pm$ 16.9	62.9 $\pm$ 14.7
<b>% Gender</b>		
Female	28.6%	42.9%
Male	71.4%	57.1%
Unknown / Not reported	0.0%	0.0%
<b>% Ethnicity</b>		
Hispanic or Latino	8.6%	5.7%
Not Hispanic or Latino	88.6%	94.3%
Unknown / Not reported	0	0
<b>% Race</b>		
American Indian/Alaskan Native	0.0%	0.0%
Asian	5.7%	11.4%
Native Hawaiian or other Pacific Islander	0.0%	0.0%
Black or African American	14.3%	17.1%
White	80.0%	71.4%
More than one race	0.0%	0.0%
Unknown / Not reported	0.0%	0.0%
<b>% High Risk Factors</b>		
Positive urine dipstick	2.9%	8.6%
Neurogenic bladder	22.9%	25.7%
Bladder outlet obstruction or elevated post void residual	51.4%	45.7%
Advanced age (>70)	28.6%	28.6%
Asymptomatic bacteriuria	0.0%	0.0%
Immunosuppression, corticoid steroid use, or inherent immune deficiency such as a history of renal transplant	0.0%	2.9%
Chronic catheter or intermittent catheterization	28.6%	22.9%
Orthopedic implant	0.0%	0.0%
None	20.0%	20.0%

# Results

## ▶ Study Population Age Range

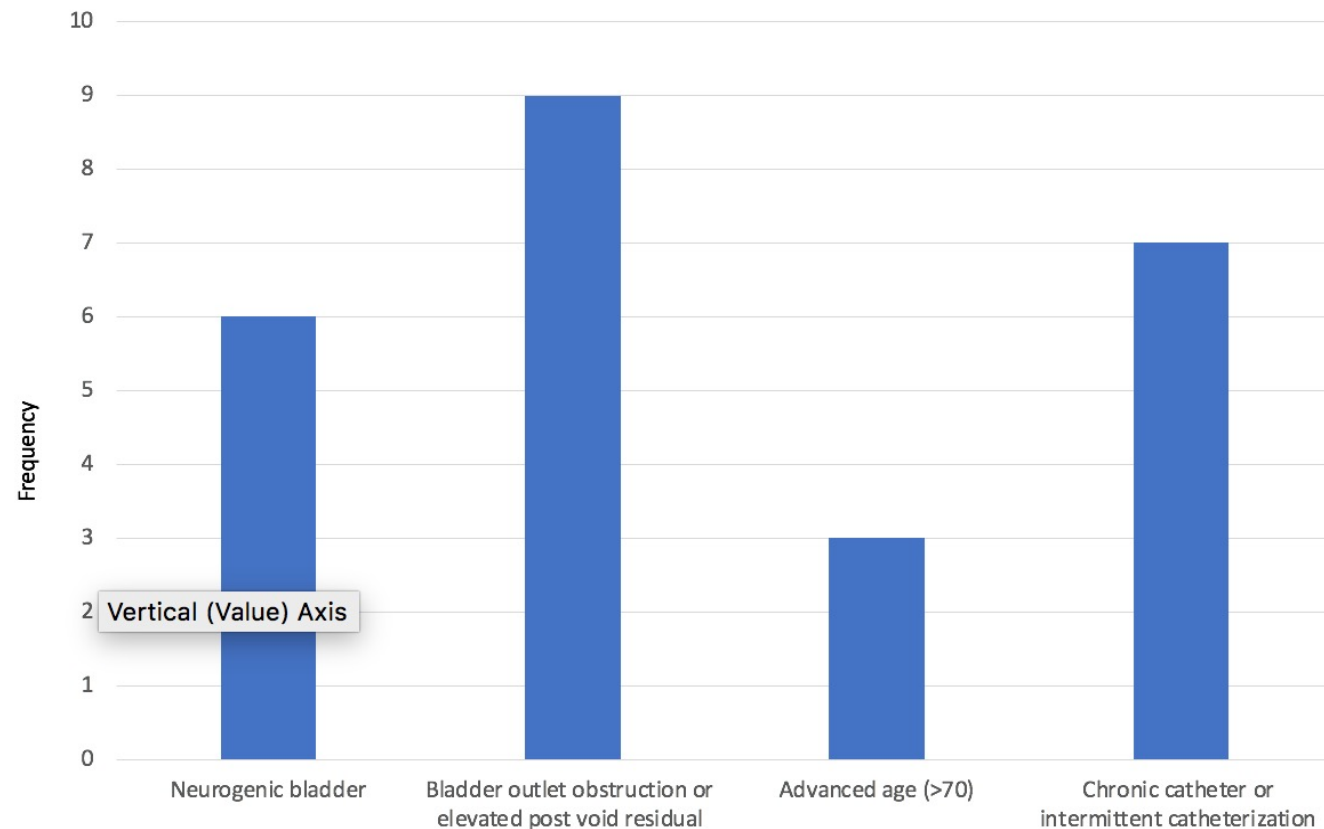


# Results

- ▶ Pre-implementation group
  - 28 of 35 patients (80%) undergoing UDS were considered high risk and should have been administered antibiotics
    - Antibiotics were only administered to 13 of the 28 patients (46.4%)
    - Of the 15 patients with high-risk factors where antibiotics were inappropriately withheld, 8 patients (53.3%) had two or more risk factors
      - The majority of those 15 patients were classified as having bladder outlet obstruction or elevated post-void residual (60%)
  - The overall antibiotic guideline adherence was 57.1%

# Results

## ► Patient Characteristics When Antibiotics Were Inappropriately Withheld



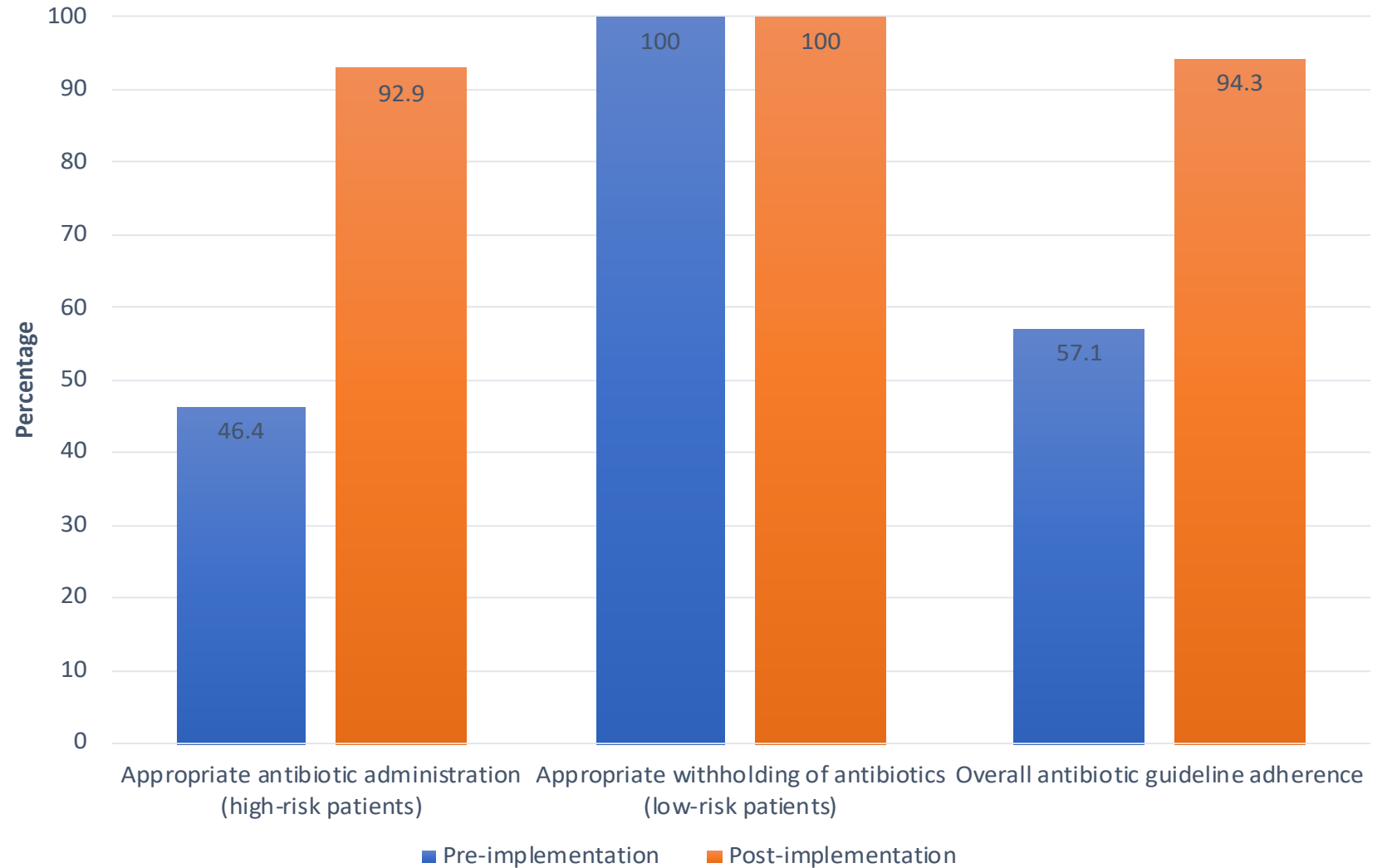
# Results

## ► Post-implementation group

- 28 of 35 patients (80%) undergoing UDS were considered high risk and should have been administered antibiotics
  - The actual rate of administration for this high-risk group was found to be 92.9% (26 patients), which is a 46.5% improvement rate of appropriate antibiotic administration compared to pre-implementation data
  - Antibiotics were inappropriately withheld from 2 of 28 patients (5.7%) with high-risk factors
- The overall antibiotic guideline adherence was 94.3%, which is a 37.2% improvement rate compared to pre-implementation data

# Results

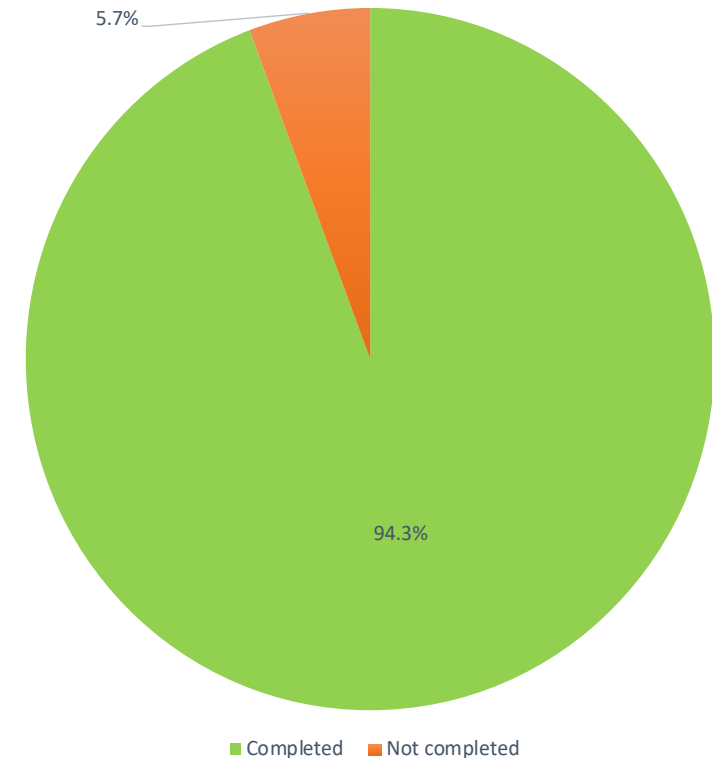
## ► Pre-Procedural Antibiotic Administration





# Results

- ▶ In both pre-implementation and post-implementation groups, no patients were given antibiotics inappropriately
- ▶ All patients were administered the appropriate antibiotic choice in accordance with SUFU's BPPS
- ▶ The provider compliance with completing the checklist was 94.3%





# Discussion

- ▶ This project demonstrates that the use of education and a checklist can help improve the rate of provider adherence of antibiotic administration at an outpatient urology practice
- ▶ The formal in-service education provided helped improve provider buy-in and assist providers with understanding the recommendations
- ▶ The checklist was simple, convenient, easy to use, and reiterated the education that was given prior to implementation
- ▶ With its use, the results demonstrate that the primary aim was achieved, and provider adherence notably improved

# Discussion

- ▶ SUFU BPPS recommendations were not being followed and antibiotics were being inappropriately withheld from high-risk patients greater than 50% of the time pre-implementation
- ▶ Most notably, antibiotics were inappropriately withheld from individuals that were classified as having bladder outlet obstruction or elevated post-void residual
- ▶ The literature has shown that individuals with this characteristic had a higher risk of developing an adverse even

# Discussion

## ► Strengths

- Ease of use, added minimal time, and did not increase costs
- Easily accessible

## ► Limitations

- Small sample size
- Intervention bias

# Discussion

- ▶ Project Implications
  - Formal order in the electronic medical record
  - Staff documentation of antibiotic administration
  - Adjustments based on future changes to the SUFU BPPS
- ▶ Future projects
  - Evaluation of rates of post-procedure UTIs

# Conclusion

- ▶ The decision to administer antibiotic prophylaxis takes into consideration the individual, their patient specific risk factors, and the risk for morbidity of infection
- ▶ This program evaluation illustrates the benefits of provider education and clinical decision tools, such as a checklist, in aiding providers' clinical judgment
- ▶ By utilizing a BPPS, providers can make informed decisions in an effort to promote antibiotic stewardship

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