

Optimizing Clinical Outcomes in Geriatric Patients through a Multidisciplinary Hospital Antimicrobial Stewardship Program

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ABSTRACT

Background: Antimicrobial Stewardship Programs (ASP) aim to ensure the appropriate use of antibiotics. There is limited literature evaluating ASP outcomes in hospitalized geriatric patients who are at higher risk for developing *Clostridium difficile* infection (CDI) or other adverse outcomes. The primary objective of this study was to determine if ASP efforts in this population decreases the rate of 30-day hospital readmissions because of reinfection or development of CDI, LOS, mortality, and cost.

Methods: A retrospective chart review was performed to compare the rates of 30-day readmissions in patients 65 years and older who received ASP interventions between January and June 2017 with a control sample who received antibiotics between January and June 2015 (pre-ASP). Patients were included if they received antibiotics for pneumonia (PNA), urinary tract infection (UTI), acute bacterial skin and skin structure infection (ABSSSI) and complicated intra-abdominal infection (cIAI). The ASP team met daily to review patients identified by the clinical pharmacist. ASP interventions consisted of de-escalation of empiric or definitive therapy, change in duration of therapy or discontinuation of therapy. Treatment failure was defined as readmission due to re-infection or a new infection (e.g. *Clostridium difficile*).

Results: Overall, 841 patients (544 control; 297 intervention) were included. The 30-day hospital readmission rate for all infection types decreased during the intervention period (24.9% vs 9.30%, P=0.0001) and in the PNA (28.9% vs 8.5%, P<0.001) and ABSSSI (22.8% vs 3.8%, P=0.03) arms. There was no statistically significant decrease in 30-day hospital readmission rate in the UTI (20.3% vs. 12.9%, P=0.15) or cIAI (10.4% vs 7.1%, P=0.14) arms. The 30-day hospital readmission rate because of CDI decreased during the intervention period (2.4% vs 0.30%, P=0.025). Mortality decreased during the intervention period (9.6% vs 5.4%, P=0.03). There was no statistically significant change in LOS (7.5 days vs 7.26 days, P=0.21). Total adjusted patient days (APD) was 16,267 (control) and 15,487 (intervention). Total antimicrobial expenditure during the control period was \$379,643 (\$23.33/APD) vs. \$67,721 (\$4.37/APD) during the intervention period.

Conclusion: Multidisciplinary ASP efforts significantly reduced 30-day hospital readmission rates, development of CDI, and mortality in hospitalized patients 65 years of age and older. Antibiotic treatment failures were not identified and a large decrease in antimicrobial expenditure per APD was noted.

BACKGROUND

- Limited literature exists evaluating ASP outcomes in adult patients ≥ 65 years old¹
- Antimicrobial overuse in geriatric patients puts them at risk for:
 - Increased adverse drug events
 - Colonization and/or infection with multi drug-resistant organisms (MDROs)^{2,3}
 - CDI
- CDI in geriatric patients can be more severe and difficult to treat, leading to increased hospitalizations and deaths³

OBJECTIVES

Primary Objective

- Determine if ASP efforts in this age group decreases the rate of 30-day hospital readmissions because of reinfection or development of CDI, LOS, mortality, and cost

Secondary Objective

- Determine if patient-specific diagnosis (i.e., PNA) changes the effectiveness of ASP in preventing hospital readmissions

METHODS

Study Design:

- Single center, retrospective chart review
- ASP team consists of a clinical pharmacist and infectious diseases physician who meet daily to review patients identified by the clinical pharmacist
- Intervention Group: adult patients ≥ 65 years old who received ASP interventions between January and June 2017
- Control Group: adult patients ≥ 65 years old who received antimicrobial therapy between January and June 2015 (pre-ASP)
- ASP interventions:
 - De-escalation or escalation of empiric or definitive therapy
 - Change in duration of therapy
 - Discontinuation of therapy

Primary Outcome:

- 30-day hospital readmission rates that can be attributed to an antimicrobial treatment failure, including: re-infection or a new infection (i.e. CDI)

Inclusion Criteria:

- Adult patients ≥ 65 years old who received antibiotics during inpatient hospital admission
- Diagnosis of PNA, UTI, ABSSSI, or cIAI

Exclusion Criteria:

- Intervention group: ASP recommendations not accepted

Statistical Analysis:

- T-test
- Chi-square; compare rate of 30-day readmissions between intervention and control periods with corresponding p-values
- Two-tailed p-values less than 0.05 considered statistically significant

RESULTS

Table 1. Patient characteristics

Demographics	Control (n=544)	Intervention (n=297)	P-value
Age, mean	79.5	80.2	0.26
Male gender, n (%)	239 (44.0%)	138 (46.6%)	
Infection type, n (%)			
• PNA	268 (49.4%)	135 (45.5%)	0.27
• UTI	132 (24.4%)	100 (33.7%)	0.005
• ABSSSI	83 (15.3%)	29 (9.8%)	0.026
• cIAI	61 (11.3%)	14 (4.7%)	0.001

Figure 3. 30-day readmission by infection type

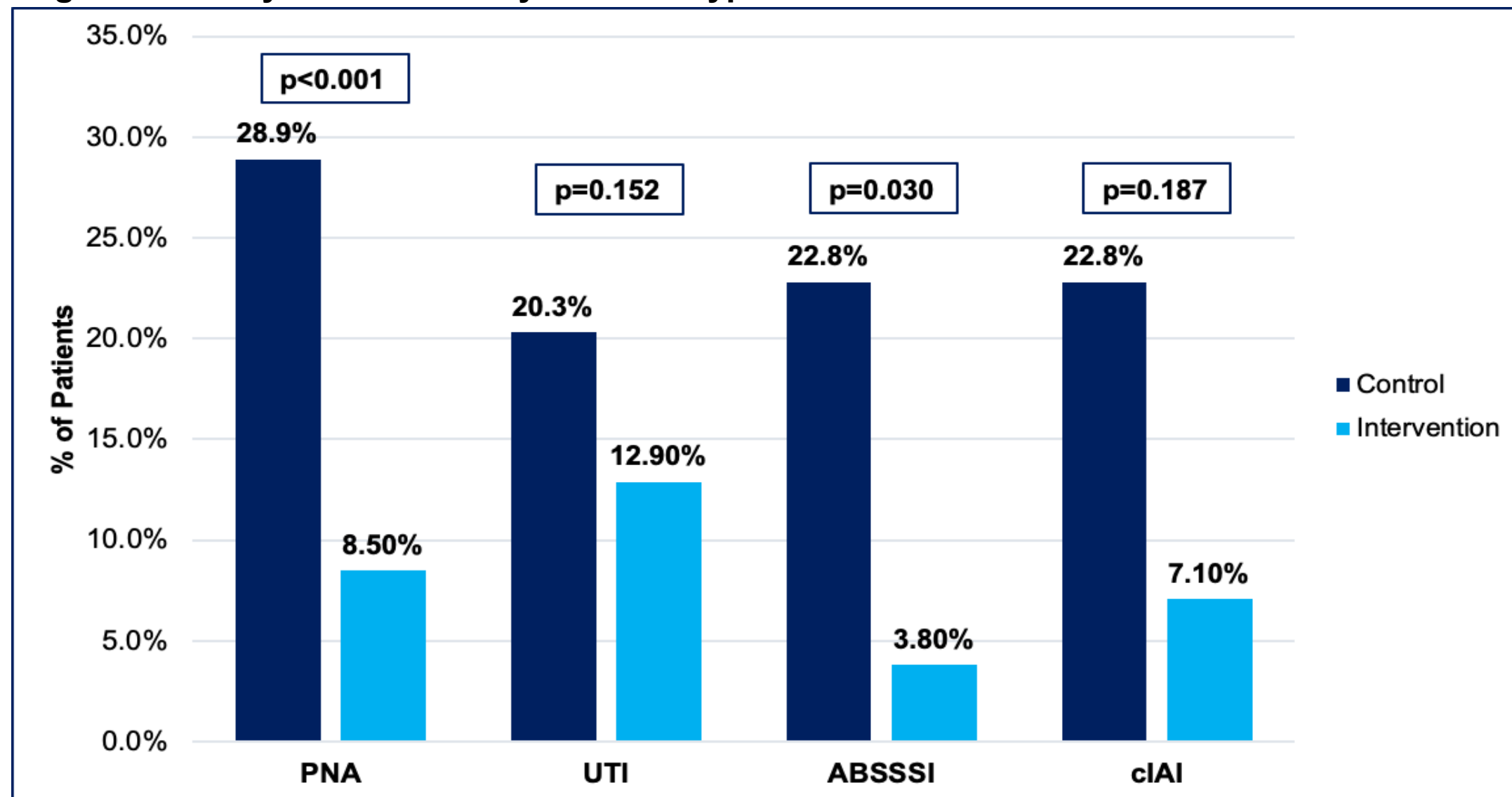


Figure 5. LOS

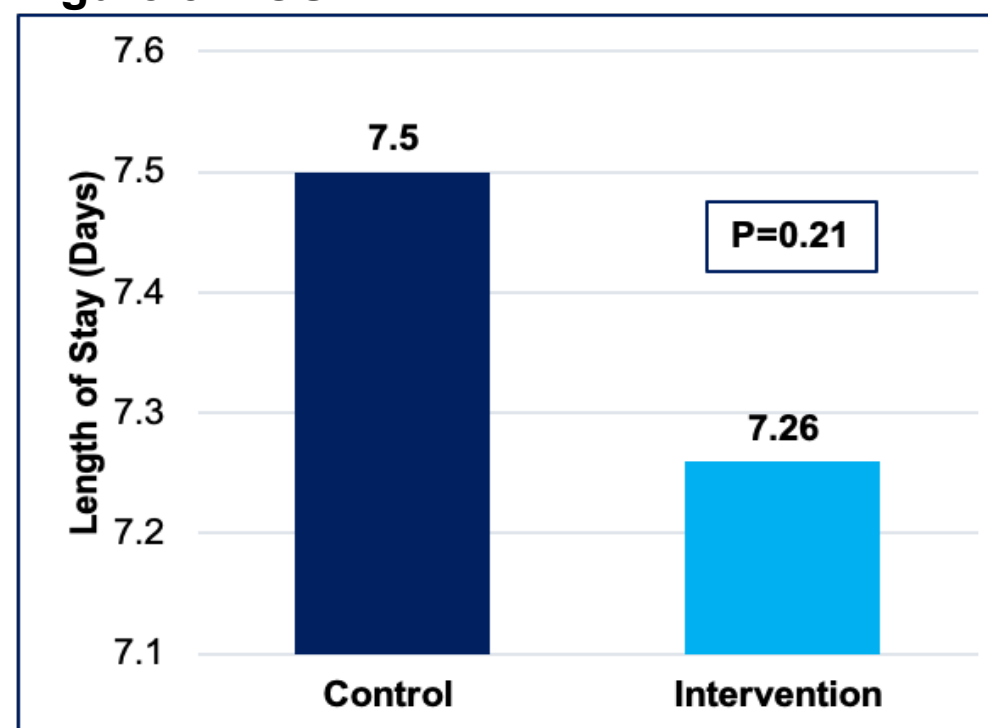


Figure 6. Antimicrobial expenditure per APD

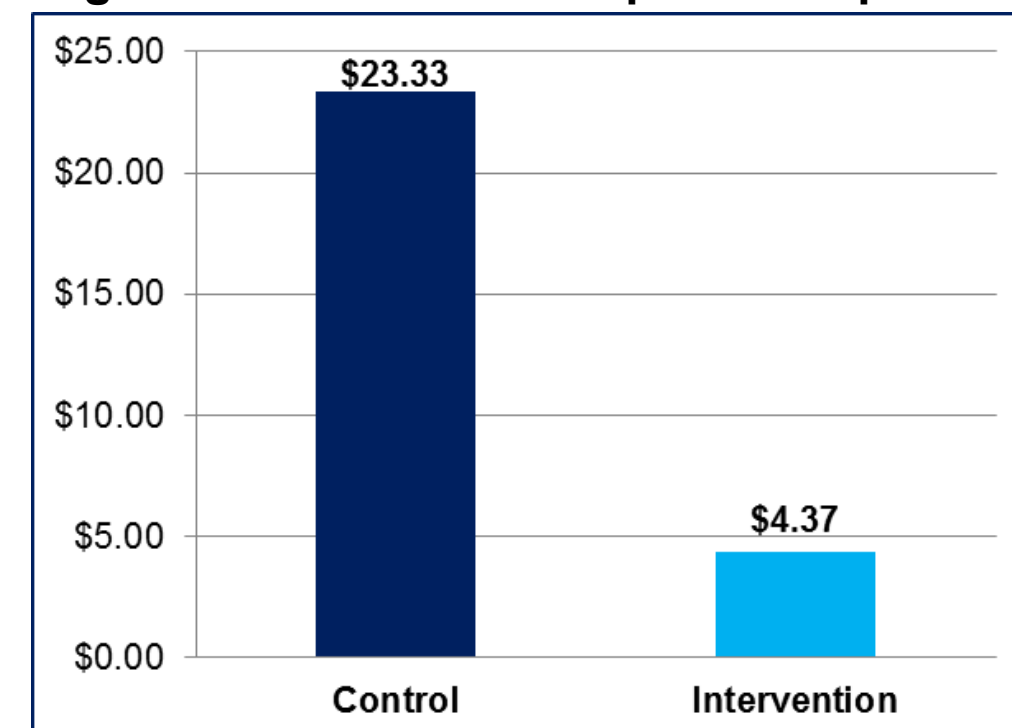


Figure 1. 30-day readmission

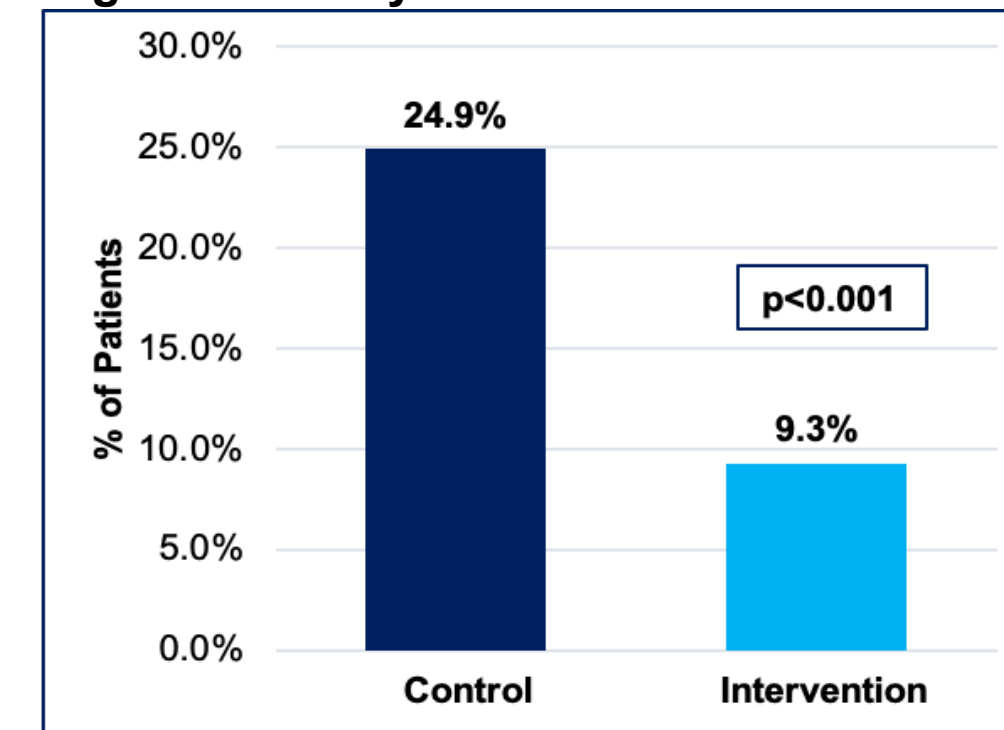


Figure 4. Mortality

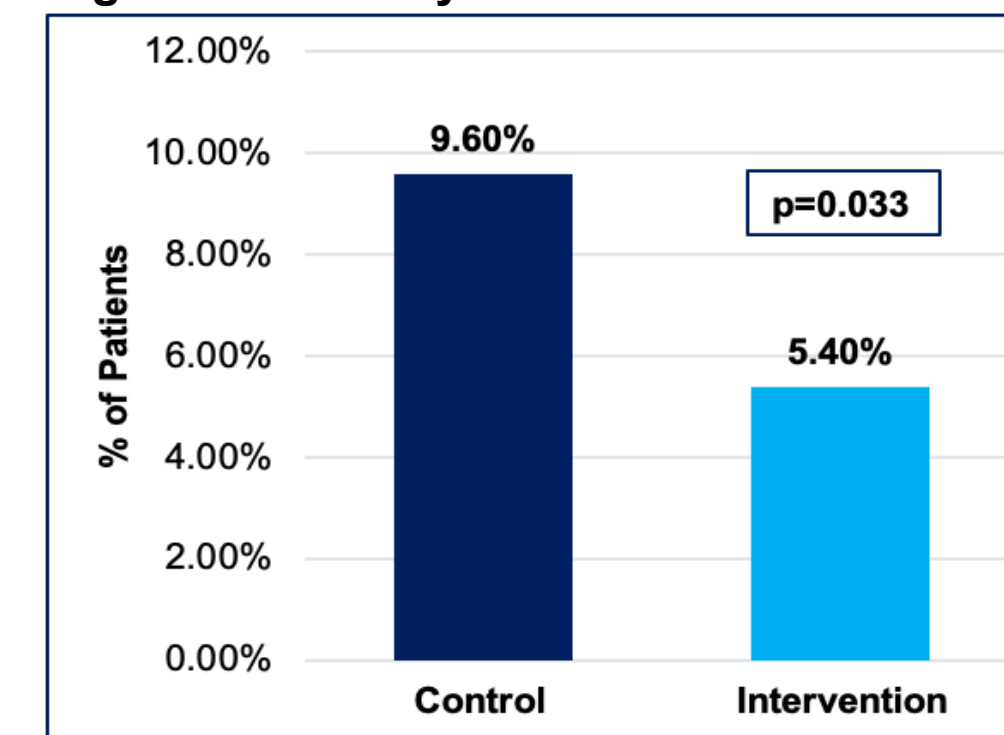
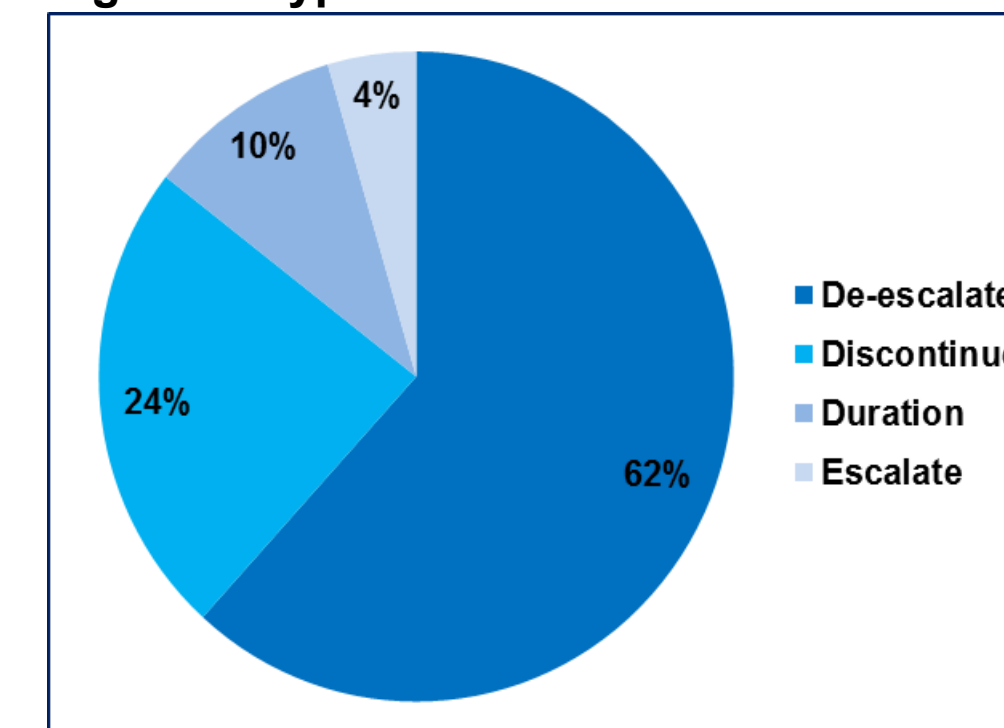
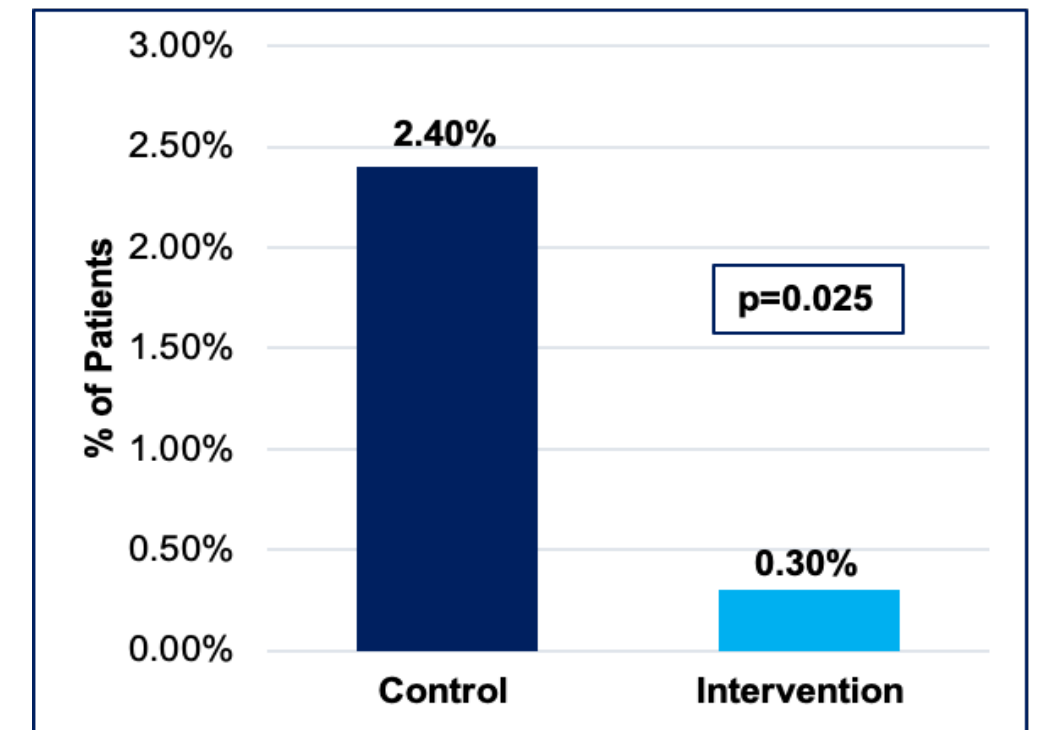


Figure 7. Type of ASP intervention



RESULTS

Figure 2. 30-day readmission for CDI



CONCLUSIONS

ASP efforts led to:

- Decreased 30-day readmission rates for all infection types (p < 0.05) and in the PNA and ABSSSI arms (p < 0.05)
 - Decreased 30-day readmission rate because of CDI (p < 0.05)
 - Decreased mortality (p < 0.05)
 - Large decrease in antimicrobial expenditure per APD
- ASP efforts had no effect on LOS

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DISCLOSURES

Authors of this presentation have nothing 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.

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