



# Antimicrobial Stewardship Program Development and Enhancement in Small Hospitals and Rural Hospitals, California 2011-2012

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## Introduction

- In 2010 – 2011, a public health assessment revealed small hospitals and rural hospitals in California were less likely to have Antimicrobial Stewardship Programs (ASP) than other hospitals
  - Small hospitals: < 100 licensed beds
  - Rural hospitals: census area population  $\leq$ 15,000
  - ASP: promotes appropriate use of antibiotics
- California Rural, Small and Critical Access Hospital Collaborative was formed with a *Clostridium difficile* Infection (CDI) Prevention/ASP Project

## Project Objectives

- Promulgate best practices for CDI prevention
- Develop and enhance ASPs
- Assess reduction of hospital-associated (HA)-CDI rates

## Methods

- Assessment: Web-based tool collected hospital demographics, presence or absence of an ASP, ASP composition, strategies and outcomes
  - Each assessment critically analyzed and shared with all hospitals to identify “low-hanging fruit” for targeted implementation
- Intervention: Monthly conference calls held October 2011 – September 2012 to discuss best practices and provide expert consultation
- Outcome: HA-CDI (sum of hospital-onset and community-onset HA CDI) rates compared using CDC’s National Healthcare Safety Network (NHSN) for the following time periods:
  - Pre-intervention: January – June 2011
  - Post-intervention: July – December 2012
- Analysis: Negative binomial regression models used to calculate rate ratios and 95% Confidence Intervals (CI) adjusting for testing methodology
- Project evaluation: Survey distributed to participants in December 2012

## Results

- Ten hospitals participated in the Project:
  - 5 small and rural hospitals; 4 small hospitals; 1 rural hospital
  - 8 prepared annual antibiogram
  - 8 had Infectious Diseases (ID) availability
  - 5 had Pharmacist dedicated to antimicrobial use oversight

Table 1. Pre-Intervention Characteristics of Hospital ASPs (n=8)

Team	No. (%)
Pharmacists	7 (88)
ID	1 (13)
Infection Preventionists	6 (75)
Microbiologists	5 (63)
ID physicians	4 (50)
Other physicians	3 (38)
<b>Primary Strategies</b>	
Formulary Restriction	6 (75)
Audit	3 (38)
Prior Approval Required	2 (25)
ID consultation recommended	1 (13)
Post-prescription Review with Feedback	2 (25)
Pre-authorization	1 (13)
<b>Supplemental Strategies</b>	
Time-sensitive/automatic stop orders	6 (75)
Dose optimization/automatic dose adjustments	6 (75)
IV-to-PO conversion protocols	6 (75)
Education	6 (75)
<b>Outcomes</b>	
Antimicrobial resistance patterns	6 (75)
Antimicrobial costs	4 (50)
CDI rates	4 (50)
Antimicrobial Use	3 (38)

- 0 hospitals monitoring process measures
- 2 hospitals with ASP software assistance

Table 2. Pre-Intervention Characteristics of Hospitals without an ASP (n=2)

Barriers	No. (%)
No formal ASP proposed	2 (100)
Staffing constraints	1 (50)
<b>Primary Strategies</b>	
Formulary Restriction	2 (100)
Pre-authorization	1 (50)
<b>Supplemental Strategies</b>	
Antimicrobial Order Forms	2 (100)
Time-sensitive/automatic stop orders for surgical prophylaxis only	1 (50)

- Common “low-hanging fruit” for targeted implementation included:
  - Identification of a pharmacy and physician champion
  - Data mining of antibiotic use to focus ASP criteria and formulary restriction
  - Consideration of first 6 months – 1 year of ASP as pilot period
  - Presenting results to administration for support
  - Development of formal ASP proposal to administration
- After two hospitals were excluded from analysis due to non-participation and a CDI outbreak, HA-CDI rates decreased from 3.60/10,000 patient-days in the Pre-intervention to 3.23/10,000 patient-days in the Post-intervention (Adjusted Rate Ratio: 0.68; 95% CI 0.17-2.67)
- In the evaluation survey, 5/5 hospitals reported they made gains in enhancing hospital-specific ASPs by:
  - Establishing clear ASP goals
  - Providing ASP development guidance and support
  - More easily accessing ASP tools

## Conclusion

- Our project revealed ASP activity in California small hospitals and rural hospitals:
  - Core ASP Team members are pharmacists, microbiologists and Infection Preventionists
  - Formulary restriction and supplemental strategies most commonly implemented
- ASP development in these hospitals was enhanced by the identification of “low-hanging fruit” in setting clear ASP goals
- Project efforts may have contributed to an overall decrease in HA-CDI rates, but did not achieve statistical significance in the six-month intervention period
- Novel approaches such as one-on-one consultation should be considered in enhancing ASPs in similar settings
- Findings may not be generalizable to small and rural hospitals in other states where there is no requirement to oversee the judicious use of antibiotics

## References

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