

One Year Outcomes of an Antimicrobial Stewardship Program (ASP) in a Non-Teaching Community Hospital

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ABSTRACT # 41947

- Background:** Despite more than 80% of hospitals in the United States being non-teaching community hospitals, only a small percentage of hospitals have an Antimicrobial Stewardship Program (ASP). Few published studies describe ASP outcomes in these clinical settings. Blount Memorial Hospital is a 304 bed non-teaching community hospital with a formal pharmacist-led ASP that began in October 2011. Data was analyzed to determine outcomes associated with the first year of the program.
- Methods:** Using prospective audit with intervention and feedback, all patients evaluated by the ASP team from October 2011 through September 2012 were included in the data analysis. Monthly utilization was calculated using Defined Daily Doses (DDD) per 1000 patient days with a cohort of 10 months immediately prior to initiating the ASP. For antimicrobial expenditures, the fiscal year prior to initiating ASP was used as a cohort. Statistical analyses performed were 2-tailed, 2-sample t-tests with unequal variances.
- Results:** In the first year, 507 patients were formally evaluated with 81% (n=413) having at least one recommendation. A total of 763 recommendations resulted in an acceptance rate of 92%. The top three recommendation categories were de-escalation (n=227), changes in duration (n=139), and IV to oral conversion (n=130). The top three drugs affected by recommendations were piperacillin-tazobactam (n=123), linezolid (n=99), and vancomycin (n=93). The ASP was directly responsible for initiating 19 infectious diseases (ID) consultations. Piperacillin-tazobactam utilization decreased by 19% (DDD mean: 102 vs 83; $p < 0.001$) while linezolid utilization decreased by 39% (DDD mean: 32 vs 20; $p = 0.003$). Overall antimicrobial expenditure decreased by \$375,000 (\$1,690,000 vs \$1,315,000; 22%) from the previous fiscal year with a net savings of \$231,000 after incorporating the costs of the program. Antimicrobial cost decreased by \$5.29 per patient day (\$28.81 vs \$23.52; 18%).
- Conclusion:** A pharmacist-led ASP in a non-teaching community hospital can help optimize patient antimicrobial therapy while significantly improving antimicrobial utilization and overall antimicrobial expenditure. The program was financially self sufficient and resulted in additional ID consultations.

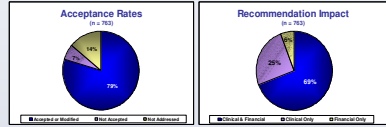
INTRODUCTION

- Blount Memorial Hospital (BMH) is a 304 bed non-teaching community hospital with an average daily census of 209 in FY 2012. The majority of patients are treated by a hospitalist service.
- Hospital Administration approved a pharmacist position dedicated to antimicrobial stewardship, which began in October 2011.
- The ASP pharmacist works four 10-hour shifts per week (1.0 FTE) with the option to consult with an ID physician 2 days per week (when requested). Pharmacy pays ID physicians an hourly rate.
- The ASP strategy is primarily a prospective audit with verbal or written feedback with recommendations left in the progress notes.
- All patients formally evaluated by ASP during the first 12 months (Oct 2011 through Sept 2012) were included.
- Outcomes were determined by assessing the types of recommendations, acceptance rate, impact on antimicrobial utilization, and financial differences from FY 2011 to FY 2012.

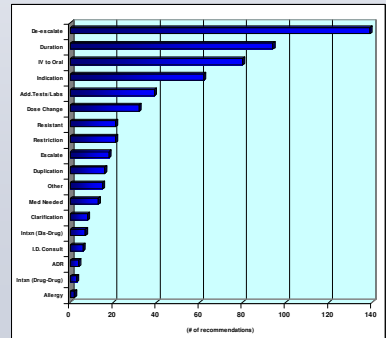
RESULTS

Category	Result
ASP Days – no.	166
Patients – no. (%)	507
Formally Evaluated > 1 recommendation	413 (81)
Recommendations – no. (range):	
Total	763
Average per patient (with recommendation)	1.5 (1 – 7)
Average per ASP day	4.6 (0 – 12)
Recommendation Source – no. (%):	
ASP Pharmacist	706 (93)
ID Physician	57 (7)
Recommendation Outcome – no. (%):	
Addressed	655 (86)
Accepted or Modified (addressed/all)	605 (92 / 79)
Cost Savings:	
Actual (Direct)	\$122,600

Table 1: Recommendation Statistics

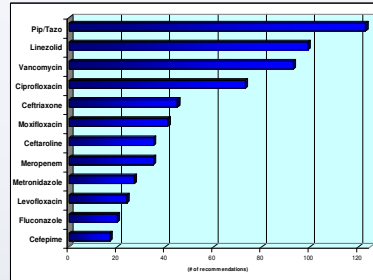


Graphs 1 & 2: Recommendation Statistics

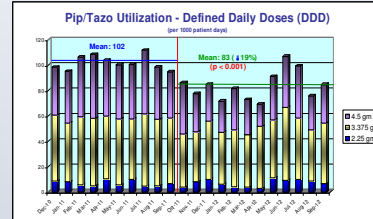


Graph 3: Recommendation Category Breakdown

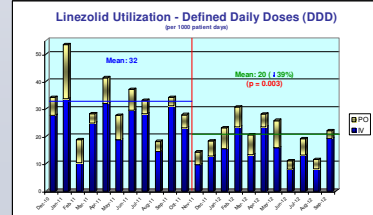
RESULTS



Graph 4: Drugs Affected by Recommendations (minimum: 15)



Graph 5: Pip/Tazo Utilization (before & after implementation)

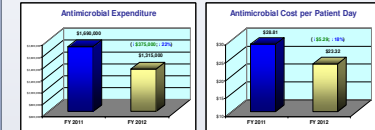


Graph 6: Linezolid Utilization (before & after implementation)

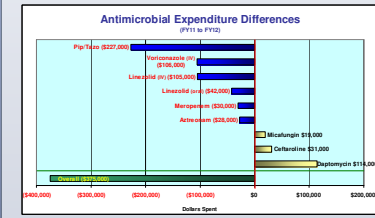
FINANCIAL RESULTS

Antimicrobial Expenditure	FY 2011	FY 2012	Difference
Antimicrobial Expenditure	\$ 1,690,000	\$ 1,315,000	\$ 375,000 (22%)
Patient Days	58,626	55,877	↓ 2,749 (5%)
Census (average)	220	209	↓ 11 (5%)
Cost per Patient Day	\$ 28.81	\$ 23.32	\$ 5.29 (18%)
Program Savings			
ASP Net Savings (FY12)	\$ 375,000 (Antimicrobial Savings)	\$ 144,000 (ASP Costs)	\$ 231,000

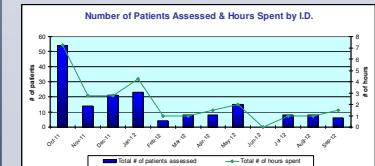
Table 2: Antimicrobial Expenditure (FY 2011 vs. FY 2012)



Graphs 7 & 8: Antimicrobial Expenditure (FY 2011 vs. FY 2012)



Graph 9: Antimicrobial Budget Comparison by Drug (FY11 vs. FY12)



Graph 10: Infectious Diseases Physician Participation

SUMMARY OF RESULTS

- A total of 507 patients were formally evaluated, 81% (n=413) having at least one recommendation, resulting in a total of 763 recommendations in the first 12 months of the ASP.
- Acceptance rate was 92% of recommendations addressed & 79% of all recommendations.
- A clinical impact was reflected in 94% of all recommendations and a positive financial impact was reflected in 75% of all recommendations, indicating the program is clinically driven.
- The most common types of recommendations were de-escalation, duration inquiry, IV to oral route, and questionable indication.
- Pip/tazo was the antimicrobial most affected by recommendations, followed by linezolid, vancomycin, and ciprofloxacin.
- After implementation of ASP:
 - Pip/tazo DDD decreased by 19% (DDD mean: 102 vs 83; $p < 0.001$) and Linezolid DDD decreased by 39% (DDD mean: 32 vs 20; $p = 0.003$).
- Direct documented savings from ASP patients were \$122,600.
- Pip/tazo, linezolid, and voriconazole accounted for the majority of savings (\$480,000), with an overall net decrease in antimicrobial expenditure of \$375,000 (22%).
- ASP net savings (including program costs) was \$231,000
- Antimicrobial cost per patient day decreased from \$28.81 to \$23.52 after implementation of ASP (Δ \$5.29/-18%).
- The necessity of consulting with an ID physician for ASP consultation has significantly decreased while the program progressed, primarily due to similar patient scenarios recurring, resulting in lower cost.
- The ASP was directly responsible for ID consultations in 19 patients.

DISCUSSION/LIMITATIONS

- Fiscal year expenditures were reflective of 9 months of the ASP (Oct 2011 - June 2012) and approximately 0.7 FTE (e.g. staffing responsibilities)
- The decrease in overall expenditure was noticeably more than direct savings, likely due to changes in prescribing habits and adherence to antimicrobial restrictions after physician/pharmacist education.
- Patient length of stay (LOS), readmission rates, and cost-avoidance calculations have not been determined, which could lead to additional clinical outcomes and financial savings.
- What worked well:
 - creating automated reports to identify potential patients
 - creating an antimicrobial cost list
- Lessons learned:
 - Taking on too much too soon. Initiation of the program takes more time at the beginning. Temptation was to assess several patients and tackle many antimicrobial-related issues all at the same time.

CONCLUSIONS

A pharmacist-led ASP in a non-teaching, community hospital can help optimize patient antimicrobial therapy while significantly improving antimicrobial utilization and overall antimicrobial expenditure. The program is clinically driven, financially self sufficient and resulted in additional ID consultations.

DISCLOSURE: The author has no conflicts of interest to disclose