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The Impact of a Massachusetts State Sponsored Educational Program on Antimicrobial Stewardship in Acute Care Hospitals

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Abstract

Our objective was to characterize barriers to antimicrobial stewardship implementation in acute care hospitals in Massachusetts, as well as to identify successful existing antimicrobial stewardship practices. We show that a statewide antimicrobial stewardship educational program had a significant effect on implementation of antimicrobial stewardship programs and improvement of existing programs.

Background

Antimicrobial stewardship programs (ASPs) are critically important for combating the emergence of antimicrobial resistance.¹²³ Despite this there are no regulatory requirements at a national level making initiatives at the state level critical. The objectives of this study were to identify existing antimicrobial stewardship practices, characterize barriers to antimicrobial stewardship implementation in acute care hospitals throughout Massachusetts, and evaluate the impact on these hospitals of a state sponsored educational conference on antimicrobial stewardship.

Methods

In September 2011, a state sponsored educational program entitled, ‘Building Stewardship: A Team Approach Enhancing Antibiotic Stewardship in Acute Care Hospitals’ was offered to interested practitioners from throughout the state. The program consisted of two audio conferences, reading materials, and a one-day conference consisting of lectures focusing on the importance of ASPs, strategies for implementation, improvement strategies for existing programs, as well as panel discussions highlighting successful practices. Smaller breakout sessions focused on operational issues, including understanding of pharmacodynamics, business models, and electronic surveillance.

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Conflict of Interest

The authors all report no conflict of interest.

The data from this manuscript was presented as a poster presentation at IDWeek; 2012 October 17-21; San Diego, CA.

An anonymous survey was sent to all participants shortly after the completion of the educational program, and again 6 months after the conference. Topics of the survey questions included whether the respondent feels that his or her institution has a formal ASP, what stewardship techniques are used, and what antimicrobials are restricted. Responses from multiple participants from a single institution were combined into an institutional response.

All statistical calculations were performed using R 2.13.1. A chi-square analysis was used to compare survey responses.

Results

Thirty-nine out of fifty-five (71%) institutions responded to the initial survey after completion of the educational conference, and 38/55 (69%) institutions responded to the second survey 6 months after the conference. A total of 44/55 (80%) institutions were represented in at least one survey. Combining the results of both surveys, 31 out of 44 (70%) institutions indicated that they had what they perceived to be a formal ASP in place at the time of the educational conference. Those institutions without a formal ASP at the time of the conference were more likely to be non-teaching hospitals ($p < 0.001$) and to lack a full-time infectious disease consult service ($p = 0.043$).

Of the 39 institutions who responded to the initial survey, 30/39 institutions indicated that they had a formal ASP. A wide variety of strategies and techniques for stewardship were utilized with “front end restriction” of antimicrobials and “parenteral to oral conversions” of antimicrobials being the most common. Daptomycin and linezolid were the most frequently restricted antimicrobials. Of the 9 institutions who reported on the first survey not having an ASP at the time of the conference, only one institution practiced any of the surveyed stewardship techniques. Those institutions without ASPs cited funding, organization, and staffing constraints as major barriers to initiating programs.

Of the 13 total institutions that indicated on either survey that they did not have a formal ASP program at the time of the conference, 6/13 (46%) initiated a formal ASP within 6 months (Table 1). Four out of the six institutions indicated that the conference itself had been helpful in starting their program. Two out of these six new programs reported decreases in antimicrobial expenditures as a result of their new ASP.

Of the 25/38 institutions who responded to the second survey and had had an existing ASP at the time of the conference, 13/25 (52%) had implemented a new type of restriction method, 17/25 (68%) had instituted a new stewardship technique, and 8/25 (32%) had added additional antimicrobials to their restricted list (Table 1). Two of these institutions also reported an improvement in antimicrobial expenditures. Twenty seven of thirty eight (71%) institutions indicated that these changes were made in part due to the conference.

Of the 7 institutions that did not start a new ASP, only one implemented any kind of new stewardship techniques (Table 1). However, 3 out of 7 of these programs anticipate starting an ASP within one year and all 3 indicated that the educational conference was helpful in moving towards this goal.

Discussion

Our goal was to understand the effect of an educational intervention on the operation and the impact of ASPs in acute care hospitals throughout Massachusetts. The results of the initial survey indicate that a significant percentage of responding acute care hospitals in Massachusetts did not have a formal ASP at the time of the educational conference. However, the coordinated, statewide educational program was associated with the establishment of new formal ASPs in acute care hospitals and can be credited with enhancing the strategies of established ASPs in acute care hospitals.

Our study is limited by the overall response rate of 44/55 institutions (80%). In addition, respondents used their own definition of “formal ASP” when responding as to whether or not they had one, which limits this study and others like it, as each respondent may define ASP differently.

Currently, there are no national regulatory mandates to optimize antimicrobial stewardship. Therefore, efforts at the state level may be critical to the development of successful ASPs. The recent mandate for ASPs in the state of California has already proven successful in this arena and was recently recognized by the Agency for Healthcare Research and Quality (AHRQ).⁴ We have shown that an educational program in Massachusetts had a significant effect on implementation of ASPs and the improvement of existing programs. Other states or regions should consider a similar program to enhance the success of antimicrobial stewardship programs.

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Table 1

Results of the second survey showing the impact of the educational program. “Front End” restrictions imply restricting the initial availability of selected antimicrobial agents while “Back End” restrictions indicate a process of prospective review of existing antibiotic orders for opportunities for intervention.

	Institutions ASP at the with an time of the conference, n=25 (%)	Institutions without an ASP who started an ASP since the conference, n=6 (%)	Institutions without an ASP, n=7 (%)
New Educational Techniques			
Newsletter	4 (16)	0 (0)	0 (0)
Email	10 (40)	3 (50)	0 (0)
Grand Rounds	8 (32)	2 (33)	0 (0)
Conferences	4 (16)	0 (0)	0 (0)
None	7 (28)	1 (17)	7 (100)
New Restriction Methods			
Front End	6 (24)	2 (33)	0 (0)
Back End	7 (28)	3 (50)	1 (14)
Automatic Stop Orders	5 (20)	1 (17)	1 (14)
ID Consult Required	9 (36)	0 (0)	0 (0)
Verbal Approval Required	4 (16)	0 (0)	0 (0)
None	12 (48)	1 (17)	6 (86)
New Stewardship Techniques			
Guidelines and Clinical Pathways	8 (32)	1 (17)	0 (0)
Antimicrobial Order Forms	2 (8)	2 (33)	0 (0)
Streamlining or De-escalation	8 (32)	3 (50)	0 (0)
Dose Optimization	4 (16)	4 (67)	1 (14)
Parenteral to Oral Conversion	8 (32)	3 (50)	1 (14)
Closed Formulary	3 (12)	1 (17)	0 (0)
None	8 (32)	1 (17)	6 (86)
New Specific Medication Restrictions			
Anti-Pseudomonals	1 (4)	2 (33)	1 (14)
Carbapenems	5 (20)	3 (50)	0 (0)
Fluoroquinolones	1 (4)	0 (0)	0 (0)
Tigecycline	5 (20)	2 (33)	0 (0)
Vancomycin	2 (8)	0 (0)	0 (0)
Colistin	2 (8)	1 (17)	0 (0)
Daptomycin	4 (16)	1 (17)	0 (0)
Linezolid	4 (16)	1 (17)	0 (0)
Antifungals	4 (16)	1 (17)	0 (0)