

Abstract

Background: Hospitals are attempting to address the increase in antimicrobial resistance, the increasing costs of antimicrobials, and the paucity of new antimicrobials entering the marketplace. We assessed the status of antimicrobial stewardship (AS) efforts in a small sample of hospitals.

Methods: A web-based survey was created based on the published recommendations of the Infectious Diseases Society of America/Society for Healthcare Epidemiology of America (IDSA/SHEA) *Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship* (Dellit, et al, 2007).

Results: There were 44 hospitals surveyed, and 25 responses (56.8%). Of the respondents, 56% indicated they had the support of hospital administration and 40% also felt supported by their medical staff leadership. The top three activities for AS efforts included dose optimization (70.8%), parenteral -to- oral (IV to PO) conversion (66.7%), and evidence-based clinical pathways (50%). Formulary restriction (41.7%), prescriber education (41.7%), de-escalation therapy (41.7%), and prospective audit with feedback (37.5%) were also observed. Twenty-one percent reported that AS efforts currently did not include any of the listed elements. Seventy-six percent of respondents used electronic medical records (EMRs), 48% used computer-based surveillance, 44% had computerized physician order entry (CPOE), and 24% had clinical decision support. The majority of respondents received clinical microbiology laboratory support in the form of antibiograms (79.2%) and patient-specific susceptibility data (75%).

Conclusion: Based on the IDSA/SHEA Guidelines, most respondents are making progress in the development of antimicrobial stewardship within their facilities. Less resource-intensive supplementary elements such as dose optimization and IV-to-PO conversion are occurring with greater frequency. The two core proactive antimicrobial stewardship strategies recommended in the IDSA/SHEA *Guidelines*, formulary restriction and prospective audit, are only in place in a little over a third of the facilities. There is a relatively high prevalence of microbiology laboratory support such as antibiograms and patient-specific susceptibility data. Further topics for investigation should include examination of the effectiveness of various antimicrobial stewardship strategies in subpopulations within the acute care setting.

References

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Materials and Methods

•The survey was created using SurveyMonkey®. Questions were based on the IDSA/SHEA *Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship* (Dellit, et al, 2007).

•Universal Health Services (UHS of Delaware, Inc.) Acute Care Division Directors of Pharmacy (n=26), and hospitals in Nevada's Medicare Quality Improvement Organization (QIO) (n=18) were invited to participate.

•Results were assessed for degree of concordance with the IDSA/SHEA *Guidelines*.

Description of Sample

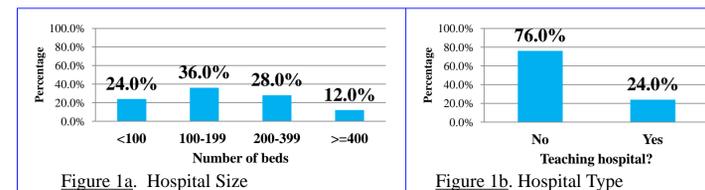


Figure 1a. Hospital Size

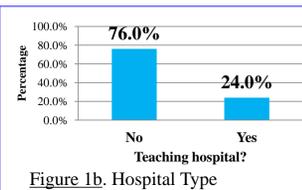


Figure 1b. Hospital Type

Of the 44 hospitals surveyed, 25 hospitals (56.8%) responded. The average hospital size was 203 beds, with a median of 170 beds (Figures 1a & 1b).

Results

•The most common identified disciplines on antimicrobial stewardship (AS) teams were infectious disease pharmacists, infection control professionals, and infectious disease physicians. Hospital epidemiologists, hospital administrators, and information system specialists were notably rare or absent from AS teams (Figure 2).

•Fifty-six percent and 40% of respondents feel they have the support of hospital administration and medical staff leaders, respectively (Figure 3).

•The top AS strategies included dose optimization, parenteral -to-oral (IV to PO) conversion, and evidence-based clinical pathways. More than 1/3 reported use of formulary restriction, education of prescribers, de-escalation therapy, and prospective audit with feedback. A minority reported use of combination therapy, antimicrobial cycling, or antimicrobial order forms (Figure 4).

•A difference exists between the reported use of electronic medical records (EMRs) and computer-based surveillance as well as between the use of computerized physician order entry (CPOE) and clinical decision support (Figure 5).

•A majority of laboratories provide AS support in the form of antibiograms and patient-specific susceptibility data but very few do molecular outbreak investigation (Figure 6).

Results

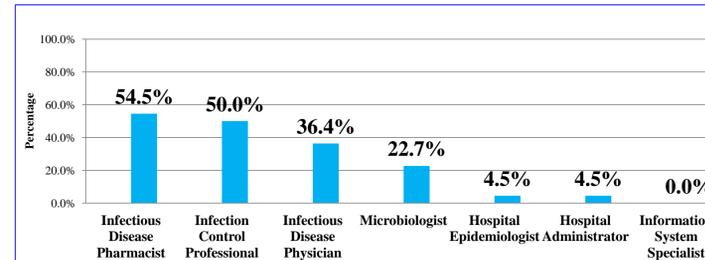


Figure 2. Antimicrobial Stewardship Team Members (N=22)

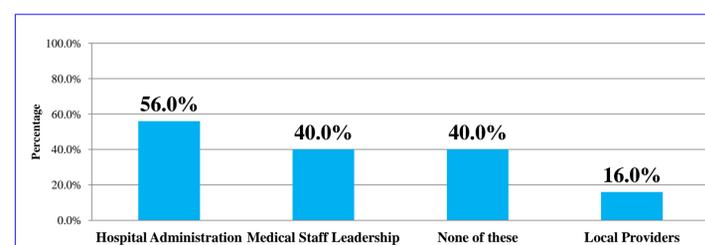


Figure 3. Support for Antimicrobial Stewardship Efforts (N=25)

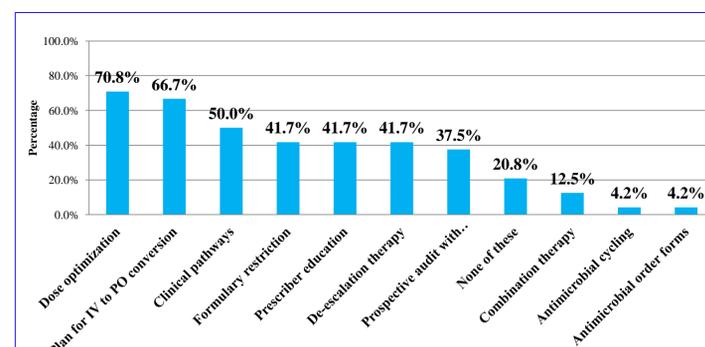


Figure 4. Elements in Antimicrobial Stewardship Efforts (N=24)

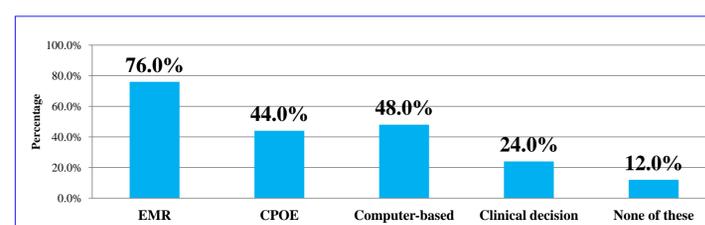


Figure 5. Information Technology Support (N=25)

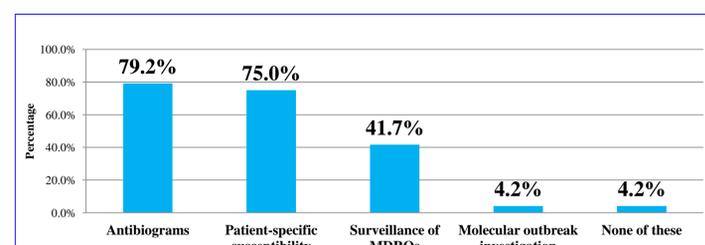


Figure 6. Microbiology Laboratory Support (N=24)

Discussion

•Overall, most respondents have implemented key elements of antimicrobial stewardship within their facilities. Most notable, however, was the lack of collaboration with hospital administration. As a strong infrastructure is necessary in any multidisciplinary venture, this may eventually play a role in the overall success of antimicrobial stewardship efforts. Greater support of medical staff leadership will also be essential, as they represent the prescribers of the antibiotics.

•In terms of the strategies and techniques employed in antimicrobial stewardship efforts, while less resource-intensive supplementary elements such as dose optimization and IV-to-PO conversion are occurring with greater frequency, the two core proactive antimicrobial stewardship strategies recommended, formulary restriction and prospective audit, are only in place in a little over a third of the facilities.

•Given the relatively high prevalence of microbiology laboratory support such as antibiograms and patient-specific susceptibility data, there may be an over-reliance on physicians to both understand and effectively use such information when prescribing antimicrobials. The fairly low reported prevalence of prescriber education and clinical decision support adds credibility to this interpretation.

•When measuring antibiotic use to determine the effects of antimicrobial stewardship interventions, financial expenditures (i.e., drug acquisition costs and cost of drug dispensed) are the lead indicators, while days of therapy or doses of drug prescribed or dispensed are used in a third or less of facilities. Examining costs as a measure of drug utilization may not give an accurate representation of the amount of antimicrobial use, as drug prices can fluctuate due to the principles of supply-and-demand, and better ways of measuring the effectiveness of antimicrobial stewardship interventions are still being researched.

Conclusions

• Antimicrobial stewardship concepts are being implemented in the acute care hospital setting, with the less resource-intensive supplementary strategies (vs. the two core strategies of formulary restriction and prospective audit) leading in frequency.

• Further stewardship efforts need to emphasize increased collaboration with and education of hospital administrators and medical staff leaders as well as on documentation of the impact of recommendations and interventions.

• Future investigation should include examination of the effectiveness of antimicrobial stewardship strategies in various subpopulations and the methods by which to determine effectiveness.