Concise Communication

Driving antimicrobial use improvement: attitudes of providers of adult hospital care on optimal attribution and feedback

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Abstract

Understanding provider perceptions of antimicrobial use (AU) feedback is important for optimal implementation. A survey addressing AU attribution scenarios, feedback methods, and implementation barriers was distributed to inpatient providers. As AU scenarios became more complex, disagreement regarding AU attribution arose. All providers were highly concerned about barriers to AU reporting.

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Mandatory antimicrobial use (AU) reporting to National Healthcare Safety Network is anticipated and will provide national and local benchmarking. These data are currently reported at facility and unit levels and are not specific to service lines or providers.[1,2] Resistance from providers may be encountered given concerns that have been raised related to risk adjustment, data quality, and responsibility.[3,4] Feedback of AU data to providers has been shown to reduce prescribing rates.[5] Knowledge, attitudes, and practices (KAP) surveys have been used to assess provider perceptions of their own practice, antimicrobial stewardship principles, and AU appropriateness and may help identify and address barriers to providing feedback at a provider level.[6–8] Few studies report the effects of providing quantitative AU data directly to providers or provider preference regarding AU feedback methodology.[5,9,10] As institutions move toward providing AU feedback to providers, these behavioral concepts are important to understand provider attitudes better and increasing acceptance of a feedback program. In this study, we surveyed provider opinions and preferences relating to AU attribution, AU feedback methods, and barriers to assist in development of optimal AU feedback programs.

Methods

A 20-question survey approved by the Institutional Review Board at Vanderbilt University Hospital was e-mailed to adult inpatient providers in the following specialties: critical care (CC), emergency medicine (EM), infectious diseases (ID), medicine subspecialties (MED), and surgery (SG). Medicine subspecialties included

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cardiology, endocrinology, gastroenterology, geriatrics, hematology/oncology, hospitalists, nephrology, and rheumatology. The survey included demographic questions, a hypothetical patient hospitalization scenario addressing AU attribution, preferred feedback methods and barriers, and comparison metrics. The clinical scenario became progressively more complex in terms of number of consulting teams involved in the care of the patient and included transitions of care (Appendix A). Providers rated concern about AU feedback barriers on a scale of 1 (no concern) to 5 (very concerned). A small monetary incentive was offered for survey completion.

The χ^2 and Fisher exact tests were employed for categorical variables, analysis of variance for mean comparison between groups, and Bonferroni correction for specific between group differences (α per test was <0.005 based on α per family of 0.05). For questions allowing multiple answers, each answer was analyzed separately and was not mutually exclusive.

Results

Of 766 providers who received the survey, 211 responded (27.5%). Most respondents were attending-level physicians (86.3%). The MED specialty was the most heavily represented among the responses (n = 93; 44% of total), followed by SG (n = 36; 17%), CC (n = 30; 14%), ID (n = 24; 11%), and EM (n = 23; 11%). The CC and ID specialties had the highest response rates (64% and 60%, respectively), and SG had the lowest response rate (13%).
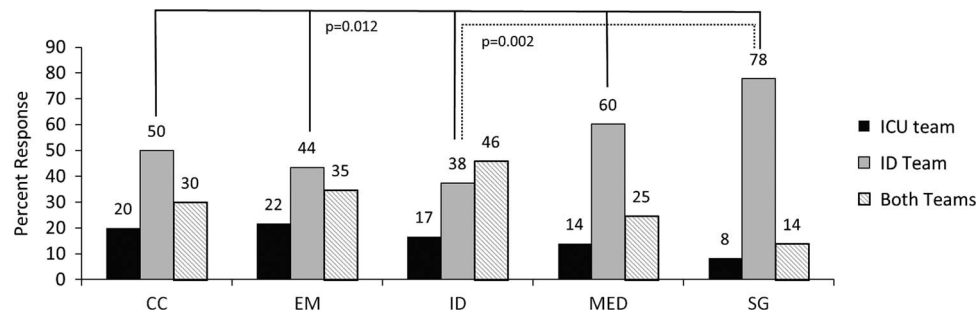
Antimicrobial use attribution questions

Most providers wanted their own institutions to determine attribution (89%) as opposed to external personnel. Specific survey questions and results are available in Appendix B. At the time of admission, 83% of providers attributed AU to the ED team, and 91% attributed AU to the ICU team at time of ICU transfer and subsequent therapy change. In the new ICU team scenario, 74% attributed AU to the new team even though they

Fig. 1. Provider responses on attribution in Infectious Diseases Consult patient case scenario. Note: The question read as follows: "The ICU consults Infectious Diseases who recommends narrowing to ceftriaxone and metronidazole. To whom should the antimicrobial be attributed at this time?" Specialty abbreviations: CC, critical care; EM, emergency medicine; ID, infectious diseases; MED, medicine; SG, surgery.

Table 1. Provider Levels of Concern[a] Regarding AU Feedback, Stratified by Clinical Specialty

Question Domain	All Providers	Critical Care	Emergency Medicine	Infectious Diseases	Medicine	Surgery	P Value[b]
Appropriateness of antimicrobial use	3.4 (1.2)	3.7 (1.7)	3.3 (1.2)	3.6 (1.2)	3.3 (1.3)	3.0 (1.3)	.10
Accuracy of reporting	3.8 (1.2)	4.0 (0.8)	4.1 (1.3)	3.5 (1.0)	3.8 (1.8)	3.6 (1.4)	.29
Following another provider's recommendation	3.3 (1.3)	3.1 (1.6)	3.7 (1.4)	2.3 (1.0)[c]	3.5 (1.7)	3.6 (1.8)	< .001
Complexity of patient population[d]	3.6 (1.3)	3.7 (1.8)	4.4 (0.8)	3.9 (0.8)	3.6 (1.8)	2.8 (1.8)[e]	< .001

[a]1 = no concern, 5 = very concerned.
[b]P value is between groups.
[c]P < .005 when comparing infectious diseases to emergency medicine, medicine, and surgery specialty groups.
[d]Including immunocompromised, critical illness, multidrug-resistant pathogen history, etc.
[e]P < .005 when comparing surgery to all other specialty groups.

were not the providers that changed therapy the preceding day. Providers across all services agreed on AU attribution for the admission scenario, the transfer to ICU scenario, and the new ICU Team scenario ($P > .05$ for all across-group comparisons) (Appendix B). Attribution in the ID consult scenario varied significantly across groups ($P = .012$), driven by the difference between ID and SG ($P = .002$ by Bonferroni correction) (Fig. 1).

Feedback preference

Providers wanted AU feedback on a quarterly basis (69%) via e-mail (73%), and they wanted AU reporting to be grouped by service (63%) rather than patient care unit (27%). Among the providers that wanted unit-based reporting, there were proportionally more CC providers (60%) compared to EM (17%), MED (18%), and SG (22%) providers for all comparisons ($P < .005$). Among the 48% of providers who preferred reporting at the individual provider level, there were significantly more ID providers (71%) than SG providers (33%) ($P = .004$).

Most providers wanted to be compared to other providers within their service (64%). In addition, 60% of providers identified mean AU as the optimal comparison metric when comparing their own AU to that of other providers.

Barriers to feedback

All services were equally concerned that attribution would not account for 2 separate issues: appropriateness of AU and reporting accuracy (Table 1). Moreover, ID providers were significantly less concerned about attribution than EM, MED, or SG providers when a consulting team had provided antimicrobial recommendations ($P < .005$). Also, CC, ED, MED, and ID providers were more

concerned than SG providers that AU would not account for the complexity of specific patient populations ($P < .005$ for all comparisons). Moreover, 51% of providers anticipated changing practice based on AU feedback data.

Discussion

In this study, which is the first study to evaluate provider preferences regarding internal AU reporting by quantitative feedback, we found that providers generally agreed on preferred feedback methods, frequency, and metrics. Although assigning responsibility for prescribing antimicrobial agents may be difficult, providers agreed on initial attribution, but disagreements arose as care became more complex, with some teams deferring and others accepting responsibility. Only a small percentage of respondents attributed antimicrobials to consult services that were not seen as related to the infection, which may pose issues in creating a culture of shared responsibility for antimicrobial stewardship. Although these barriers to acceptance parallel the early struggles assigning responsibility in the mandatory public reporting of healthcare-associated infections, institutions have since been able to successfully implement infection prevention strategies.[3,4]

In this study, providers preferred to receive service- or provider-based feedback. As the current AU reporting module utilizes unit-based reporting in addition to facility-wide data in the standardized antibiotic administration ratio, local antimicrobial stewardship programs will play a crucial role in examining provider- or service-level data to identify stewardship opportunities and to increase the acceptability of internal reporting. Awareness of the concerns raised here regarding patient complexity or severity of illness must be considered in implementing feedback reporting systems. While

many of the respondents agreed on many of the perceived barriers and optimal feedback methods, the "one size fits all" approach is limited, and quantitative feedback must incorporate institution-specific awareness and approaches.

While the response rate in this study was low, it was similar to that of a recently published antimicrobial stewardship KAP survey,[8] and we primarily surveyed attending level physicians who would likely be affected by provider-specific internal AU reporting as providers of record. The ID and CC groups had the highest completion rates, likely due, in part, to interest in AU issues, which may have created a response bias toward more engaged providers or those who are more responsive to electronic communication given the survey distribution method. Considering these factors, the generalizability of these results may be limited. Antimicrobial stewardship is a shared responsibility across the healthcare continuum through myriad roles including house staff, physician assistants, nurse practitioners, pharmacists, nurses, and many others; future studies looking at all team members are needed.

This study provides a framework for other institutions implementing AU feedback; understanding provider opinions can improve acceptance, anticipate operational issues, and inform educational messaging. This study demonstrated general levels of concern with quantitative reporting, lack of consensus of AU attribution, and preference for quarterly e-mails stratified by service compared against similar services with favored metric of average AU. Understanding how feedback of AU rates affects prescribing and appropriateness will be important to optimizing antimicrobial use.

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