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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.

Keywords

antimicrobial stewardship; surveys and questionnaires; perceptions; feedback; antibiotic prescribing

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 providers' perceptions of their own practice, antimicrobial stewardship (AS) 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 towards providing AU feedback to providers, these behavioral concepts are important to better understand provider attitudes and increase acceptance of a feedback program. In this study, we surveyed provider opinions

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and preferences relating to AU attribution, AU feedback methods, and barriers to assist in development of optimal AU feedback programs.

Methods

A 20 question, IRB-approved survey was emailed to adult inpatient providers at Vanderbilt University Hospital in Critical Care (CC), Emergency Medicine (EM), Infectious Diseases (ID), Medicine subspecialties (MED), and Surgery (SG). Medicine subspecialties included 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.

Chi-square 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 (alpha level per test <0.005 based on alpha level per family = 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%). The majority of respondents were attending level physicians (86.3%). MED was most heavily represented ($n=93$; 44% of total), followed by SG ($n=36$; 17%) CC ($n=30$; 14%), ID ($n=24$; 11%), and EM ($n=23$; 11%). CC and ID had the highest response rates (64% and 60%, respectively) and SG with the lowest (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 time of admission, 83% of providers attributed AU to the ED team; 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 were not the providers that changed therapy the preceding day. Providers across all services agreed on AU attribution for the Admission, Transfer to ICU, and New ICU Team scenarios ($p>0.05$ for all across-group comparisons) [Appendix B]. Attribution in the ID Consult scenario varied significantly across groups ($p=0.012$), driven by difference between ID and SG ($p=0.002$ by Bonferroni correction) [Figure 1].

Feedback Preference

Providers wanted AU feedback on a quarterly basis (69%) via email (73%) and AU reporting to be grouped by service (63%) rather than patient care unit (27%). Of the providers that

wanted unit-based reporting, there were proportionally more CC providers (60%) compared to EM (17%), MED (18%), and SG (22%), $p<0.005$ for all comparisons. Of the 48% who preferred reporting at the individual provider level, there were significantly more ID (71%) than SG (33%) providers, $p=0.004$.

The majority of providers wanted to be compared to other providers within their service (64%). Sixty percent of providers identified mean AU as the optimal comparison metric when comparing their own use to that of other providers.

Barriers to feedback

All services were equally concerned that attribution would not account for two separate issues: appropriateness of AU and reporting accuracy (Table 1). ID providers were significantly less concerned than EM, MED, and SG providers about attribution when a consulting team has provided antimicrobial recommendations, $p<0.005$. CC, ED, MED, and ID were more concerned than SG that AU will not account for the complexity of specific patient populations ($p<0.005$ for all comparisons). Fifty-one percent of providers anticipated changing practice based on AU feedback data.

Discussion

This is the first study evaluating provider preferences regarding internal AU reporting by quantitative feedback and 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 of AS. Although these barriers to acceptance parallel the early struggles assigning responsibility in the mandatory public reporting of healthcare-associated infections, institutions have successfully been able to 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 (SAAR), local Antimicrobial Stewardship Programs will play a crucial role in examining provider or service level data to identify stewardship opportunities and increase the acceptability of internal reporting. Awareness of the concerns raised here regarding patient complexity or severity of illness must be considered in feedback reporting system implementation. While many of the respondents agreed on many of the perceived barriers and optimal feedback methods, a “one-size fits all” approach will be limited, and quantitative feedback must incorporate institution-specific awareness and approaches.

While the response rate in this study was low, it was similar to a recently published AS KAP survey⁸ and primarily surveyed were attending level physicians, who would likely be affected by provider-specific internal AU reporting as provider of record. ID and CC groups

had the highest completion rates likely due, in part, to interest in AU issues and may have created a response bias toward more engaged providers or those that are more responsive to electronic communication given survey distribution method. Given the above, generalizability of these results must be measured. 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 as 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 emails 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 optimize antimicrobial use.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

Provider responses on attribution in Infectious Diseases Consult patient case scenario.

NOTE: Question read: "The ICU consults Infectious Diseases who recommends narrowing to ceftriaxone and metronidazole. To whom should the antimicrobial be attributed at this time?" CC: critical care, EM: emergency medicine, ID: infectious diseases, MED: medicine subspecialty, 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)	0.10
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)	0.29
Following other provider's recommendation	3.3 (1.3)	3.1 (1.6)	3.7 (1.4)	2.3 (1.0) [¶]	3.5 (1.7)	3.6 (1.8)	<0.001
Complexity of patient population [*]	3.6 (1.3)	3.7 (1.8)	4.4 (0.8)	3.9 (0.8)	3.6 (1.8)	2.8 (1.8) [‡]	<0.001

^a : 1 = no concern, 5 = very concerned
^b : p value is between groups
[¶] : p<0.005 when comparing ID to EM, MED, and SG
^{*} : including immunocompromised, critical illness, multidrug-resistant pathogen history, etc.
[‡] : p< 0.005 when comparing SG to all other groups