





## Concise Communication

# Exploring unintended consequences of adult antimicrobial stewardship programs: An Emerging Infections Network survey

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## Abstract

We performed a survey of adult infectious diseases (ID) physicians to explore unintended consequences of antimicrobial stewardship programs (ASP). ID physicians worried about disagreement with colleagues, provider autonomy, and remote recommendations. Non-ASP ID physicians expressed more concern regarding ASPs focus on costs, provider efficiency, and unintended consequences of ASP guidance.

(Received 18 January 2022; accepted 25 March 2022; electronically published 20 April 2022)

Unintended consequences of antimicrobial stewardship programs (ASP) exist. Physicians have expressed concerns about of a loss of autonomy,<sup>1–4</sup> reduced efficiency,<sup>3,5,6</sup> and delays in medication administration.<sup>5–7</sup> Such concerns can erode the relationship between the ASP and physician teams in the hospital and lead to workarounds by medical and surgical teams.<sup>6,8</sup>

ASPs may also have unintended consequences for non-ASP infectious disease (ID) physicians. This creates a unique dilemma: non-ASP ID physicians essentially receive the same advanced ID training as ASP ID physicians. Yet non-ASP ID physicians may need “approval” for certain antibiotics from the ASP team or have their antibiotic choices questioned by members of the ASP team who in some cases could have less training, knowledge, and or experience in clinical practice. The purpose of this survey is to explore the unintended consequences of ASPs from the lens of both ASP ID and non-ASP ID physicians.

## Methods

We performed an Infectious Diseases Society of America (IDSA) Emerging Infections Network (EIN) survey of adult infectious diseases physicians in July 2019. EIN is a Centers for Disease Control and Prevention (CDC) network of ID physicians in the United States and Canada who voluntarily participate in research surveys. Baseline geographic and practice characteristics are available for all EIN members.

A 10-question multiple-choice survey was developed by a group of infectious diseases physicians to explore unintended consequences of ASPs. The survey was piloted by coauthors and

revisions made accordingly. The survey’s primary goal was to examine the differing opinions of ASP and non-ASP ID physicians regarding their ASP (supplement). The query was distributed by e-mail or facsimile on June 18, 2019. Two reminders were sent to nonresponders ~1 week apart to increase participation.

We then compared survey responses by self-reported adult ASP and non-ASP physicians. We used Mann-Whitney *U* and  $\chi^2$  for statistical testing for Likert and categorical variables. Analyses were performed using SAS version 9.4 software (SAS Institute, Cary, NC).

## Results

In total, 562 (42%) of 1,333 eligible adult infectious diseases physicians who were participating EIN members completed the survey. Supplementary Table 1 contains the demographic information of the respondents. Almost all, 519 (92%), met our study inclusion criteria of working in a hospital that has an ASP. Of eligible study participants, 380 (73%) stated that they participated in the ASP.

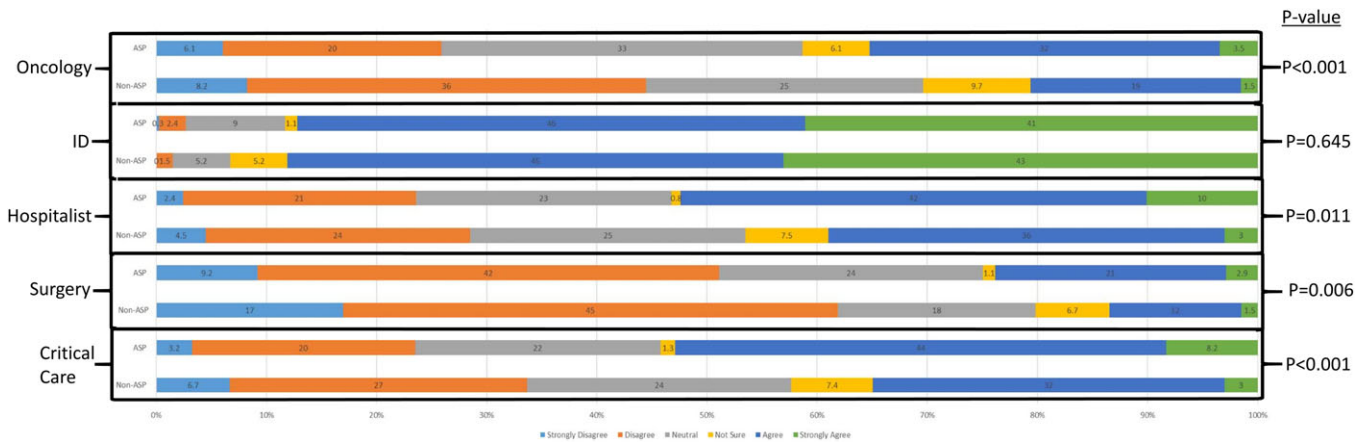
ID physicians generally felt that ASPs were helpful: 436 (84%) reported that ASPs improved overall appropriateness of antibiotic prescribing within the previous 2 years (Supplementary Fig. 1 online). However, our stratified results revealed that ASP ID physicians reported fewer concerns of ASPs compared to non-ASP ID physicians (90% vs 73%;  $P < .001$ ).

Most ID physicians 391 (75%) felt that the ASP was not too focused on reducing antimicrobial costs in a way that may interfere with providing appropriate care (Supplementary Fig. 2 online). However, 60 (10%) respondents felt that ASPs were too focused on costs. Non-ASP ID physicians rated slightly more of concern regarding unintended consequences related to cost than their ASP colleagues (16% vs 10%;  $P = .018$ ).

The greatest concerns among all ID physicians were disagreements between non-ASP and ASP ID physicians (34%), decreasing

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**Cite this article:** Durkin MJ, et al. (2023). Exploring unintended consequences of adult antimicrobial stewardship programs: An Emerging Infections Network survey. *Infection Control & Hospital Epidemiology*, 44: 791–793, <https://doi.org/10.1017/ice.2022.104>



Note. ASP=antimicrobial stewardship program. Comparison is ASP Emerging Infection Network adult infectious diseases physicians vs. non-ASP Emerging Infection Network adult infectious diseases physicians. Analysis was of adult EIN members. Numeric values represent percentage of respondents. Number of missing responses from top to bottom are as follows: 8, 10, 8, 9, 9, and 7.

Fig. 1. Rate your level of concern for the following issues and your facility's ASP.

provider autonomy (28%), ASP making recommendations without examining patients (23%), and delaying antibiotic administration (20%). We also observed differences in level of concern regarding unintended consequences of antibiotic stewardship between ASP physicians and non-ASP physicians (Fig. 1). Specifically, non-ASP ID physicians were more concerned about potential negative consequences of ASP guidance on patient outcomes and decreasing prescriber efficiency.

Survey respondents overwhelmingly felt like ID physicians adhered to antibiotic stewardship principles at a higher rate than non-ID colleagues (Fig. 2); these positive views were similar among both ASP and non-ASP ID physicians. However, for perceptions of other medical specialties, we observed statistically significant differences in responses between ID ASP members and ID non-ASP members. Specifically, non-ASP ID members were less likely to state that critical care, surgery, hospitalist, and oncology physicians followed ASP principles. We also observed heterogeneity in regards to ID ASP teams stewarding the antibiotic choices of their colleagues: 41% of ASP physicians recommended stewardship for ID colleagues whereas 29% of non-ASP physicians recommended stewardship for ID colleagues. However, these results were not statistically significant ( $P = .079$ ).

## Discussion

Whether they were on the ASP team or not, ID physicians expressed concerns regarding unintended consequences of ASPs. Common concerns included disagreeing with colleagues, decreased autonomy, and making recommendations without fully evaluating patients. However, non-ASP ID physicians generally have a greater level of concern regarding unintended consequences of antibiotic stewardship than ASP ID physicians, which includes overemphasis on costs, unintended consequences of ASP guidance, and decreased prescriber efficiency. ASP ID physicians had a more favorable perception of their non-ID colleagues prescribing practices than non-ASP ID physicians. Finally, most ID physicians, both ASP and non-ASP, do not want to be guided regarding stewardship.

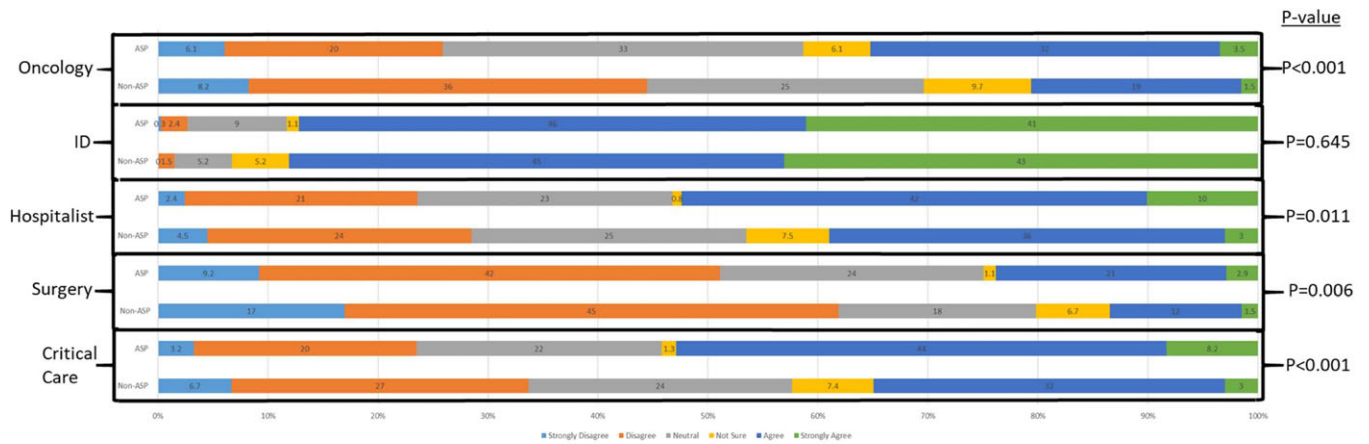
Although we are uncertain why we observed differences between ASP ID physicians and non-ASP ID physicians, we believe that several factors may be playing a role. First, leaders of any program may underestimate any potential negative consequence related to that program. Second, many ASP ID physicians may minimize concerns regarding unintended consequences of ASPs because they receive salary support for their work, which can be a source of bias in pharmaceutical-sponsored studies. Third, non-ASP providers likely do not access to hospital-wide data driving ASP team policies.

ASP ID physicians had a more favorable impression of their non-ID colleagues prescribing practices. We believe that this might be because ASP ID physicians have a more forgiving attitude toward misprescribing antibiotics. An ASP ID physicians may be called to serve as a moderator when an ASP pharmacist may have a disagreement with a medical team. Thus, the ASP physician may be in a role in which he or she needs to view the case from the perspective of the primary team. ASP are increasingly engaging in “handshake” stewardship, which may increase face-to-face interactions between ASP teams and primary teams. Such face-to-face interactions may improve the relationships between the ASP and primary teams.<sup>9,10</sup>

The concept of whether ASP teams should guide non-ASP ID colleagues remains mixed. To our knowledge, literature on this topic has not been published. Many ASP ID physicians and non-ID physicians have reported that ID providers often inappropriately prescribe or recommend antibiotics. However, data assessing the appropriateness of infectious diseases physicians is uncommon.

Our study had several limitations. The percentage of ID physicians who reported being part of the ASP team was high and may have overrepresented the views of those who participate in ASPs; a low response by non-ASP ID providers may have limited the power of our analyses. Although EIN surveys provide a broad national estimate of practices, participation in non-teaching settings is likely underrepresented.

In conclusion, our study identified that ID physicians, in general, believe that ASPs have improved antibiotic prescribing at their institutions; however, both ASP and non-ASP ID physicians had



Note. ASP=antimicrobial stewardship program. Comparison is ASP Emerging Infection Network adult infectious diseases physicians vs. non-ASP Emerging Infection Network adult infectious diseases physicians. Numeric values represent percentage of respondents. Number of missing responses from top to bottom are as follows: 11, 8, 8, 6, and 7.

Fig. 2. Collectively, the physicians/clinicians in each of these groups at my institution prescribe antibiotics according to ASP principles (e.g., right drug, right dose, right duration at the right time).

concerns regarding unintended consequences of ASPs and not wanting the ASP to guide them. In general, these concerns were greater among non-ASP ID physicians than ID physicians that were part of the ASP. Now that ASPs are ubiquitous in all US hospitals, further research is needed to better explore, quantify, and address unintended consequences related to ASPs, including concerns held by other ID physician colleagues.

**Supplementary material.** To view supplementary material for this article, please visit <https://doi.org/10.1017/ice.2022.104>

**Acknowledgments.** The authors thank all the members of the Infectious Diseases Society of America’s Emerging Infections Network who participated in the survey. The findings and conclusions presented in this manuscript are those of the authors and do not necessarily represent the views of the US Centers for Disease Control and Prevention or the Department of Health and Human Services.

**Financial support.** This work was supported by the Centers for Disease Control and Prevention (cooperative agreement no. 1 U50 CK00477).

**Conflicts of Interest.** All authors report no conflicts of interest relevant to this article.

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