

# Antimicrobial Stewardship Training for Infectious Diseases Fellows: Program Directors Identify a Curriculum Need

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A needs assessment survey of infectious diseases (ID) training program directors identified gaps in educational resources for training and evaluating ID fellows in antimicrobial stewardship. An Infectious Diseases Society of America–sponsored core curriculum was developed to address that need.

**Keywords.** antimicrobial stewardship; needs assessment; infectious diseases fellows; education; curriculum.

Antimicrobial resistance is a growing threat to public health [1, 2]. Antimicrobial stewardship (AS) is one tactic to combat this danger and simultaneously improve patient outcomes [2, 3]. The importance of AS efforts has been recently recognized by the White House, the World Health Organization, and the United Nations [1, 4]. In response, healthcare accreditation standards from the Centers for Medicare and Medicaid Services and the Joint Commission were updated to require acute care hospitals and long-term care facilities to have active AS programs with dedicated medical staff expertise and leadership [5, 6].

Guidelines published by the Infectious Diseases Society of America (IDSA) and the Society for Healthcare Epidemiology of America for implementing an AS program (ASP), along with

professional society white papers, endorse clinician education in AS [7, 8] and recommend that academic medical centers and teaching hospitals integrate AS education into their training curricula [7]. These guidelines also state that ASPs should be directed by an infectious diseases (ID) physician, ideally with an ID-trained clinical pharmacist [9]. The importance of ID physician leadership in ASPs is further emphasized in a recent professional society white paper [10]. Because of recent changes in accreditation standards and the rising demand for ID physician leadership in ASPs, the need for ID physicians with a defined focus in AS has increased dramatically. An AS curriculum designed to leverage such training would be especially effective if tailored to distinct learners, such as ID fellows [11, 12]. Moreover, training future leaders and innovators to meet the challenges of multidrug resistance, better patient safety, and improved healthcare quality should be a goal of all ID training programs.

In 2016, the IDSA Board of Directors supported developing a training initiative to ensure the future IS workforce is equipped to oversee or participate in AS efforts. In August 2016, IDSA formed an Antimicrobial Stewardship Curriculum Workgroup (hereafter, “the Workgroup”) to develop an AS curriculum for ID fellows. To formally assess existing AS education for fellows and the need for additional training resources, the Workgroup developed and distributed a needs assessment survey.

## METHODS

Needs assessment questions were developed collaboratively by the Workgroup and collated using SurveyMonkey. The survey was distributed by e-mail to all US adult ID training program directors in 2016, responses were anonymous. Questions focused on assessing current fellowship AS training activities, satisfaction with training if provided, and the resources and methods used. In addition, faculty oversight for AS teaching and fellow participation in restricted antimicrobial approval was explored. Several questions asked about program interest in a national stewardship curriculum developed by IDSA and what resources and training tools would be most useful. Participants were provided the option to skip questions if they did not wish to respond to a particular item.

## RESULTS

Of 151 fellowship directors, 87 (58%) responded to the request for survey participation, and 84 (56%) completed the survey. Sixty-five (77%) reported that AS training is very or extremely important for ID fellows. Likewise, most program directors reported offering multiple AS educational activities during fellowship training: lectures (n = 72; 85%), quality improvement

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or research projects (n = 52; 61%), infection prevention committee participation (n = 65; 77%), AS committee participation (n = 48; 57%), AS approval pager coverage (n = 41; 48%), and AS clinical activities (n = 37; 44%). More than half of fellowship directors reported that their fellows oversee restricted antibiotic approvals (n = 50; 60%). However, few programs reported formally assessing fellow competency in AS (n = 11; 13%).

Half of surveyed fellowship programs (n = 42; 50%) reported having a formal AS curriculum, yet few (n = 17; 20%) reported being very or extremely satisfied with their fellows' current training. Specifically, only a quarter of program directors indicated that they were very or extremely satisfied with the ability of their fellows to assume leadership in an existing AS program on completion of training (n = 22; 26%). Even fewer considered their fellows to be very or extremely well prepared to initiate and build an AS program on completion of training (n = 10; 12%). Approximately half were very or extremely satisfied with their fellows' ability to apply and use AS principles in their routine practice of clinical ID at the end of their training (n = 43; 51%).

A lack of AS curricular materials was identified as a significant barrier to improving education within their respective programs (n = 70; 83%). Most fellowship program directors indicated that a national, IDSA-sponsored curriculum would

be very or extremely useful to their fellowship program (n = 65; 77%) and that they would be very or extremely likely to incorporate resources from that curriculum (n = 67; 80%). Program directors identified case-based questions (n = 71; 85%), lecture slides (n = 67; 80%), and recommended quality improvement activities (n = 55; 66%) as desirable educational resources within a national AS curriculum. Fellow assessment tools (n = 61; 73%) and resources on teaching leadership skills (n = 67; 80%) were frequently requested as well.

## DISCUSSION

In response to this needs assessment, the Workgroup developed a core curriculum for ID fellows to provide foundational training in AS. An advanced curriculum aimed to prepare fellows to lead AS programs is in development. The core curriculum is designed for integration into ID fellowship training and offers distinct modular components that can be used separately to fit into a training program's existing educational structure. The curriculum bundle contains a variety of resources including e-learning modules for use in either an individual or group setting, lecture slides, case-based questions, videos, reading materials, pocket cards, rounding tools, simulations, and other interactive exercises.

**Table 1. Infectious Diseases Society of America Core Curriculum for Antimicrobial Stewardship**

Section	Purpose/Learning Objectives	Educational Resources
Introduction to the curriculum	On completion of this section, fellows will be able to summarize how to use the curriculum	Clinical rounding tool, AS communication skills pocket card, reading materials
Introduction to AS	On completion of this section, fellows will be able to <ul style="list-style-type: none"> <li>Define AS, its programmatic goals, and key strategies to achieve the goals</li> <li>Relate trends and patterns between antimicrobial use and resistance</li> <li>Recognize adverse events associated with the use of specific antimicrobials, including the risk for development of <i>Clostridium difficile</i> infections</li> <li>Describe the role of clinical and laboratory diagnostic tools in improving antimicrobial use</li> <li>Define expected outcomes of an ASP</li> </ul>	e-Learning, lecture slides
AS in everyday practice	On completion of this section, fellows will be able to <ul style="list-style-type: none"> <li>Judge when to recommend formal ID consultation or AS intervention</li> <li>Recognize the major "infectious diseases syndromes" where antimicrobials are overused and misused in acute care inpatient and outpatient settings, and the stewardship techniques to improve prescribing for these infections</li> <li>Identify common process and outcome measures/metrics</li> <li>Compare and contrast effective AS techniques in inpatient vs outpatient settings</li> </ul>	Case-based questions, interactive e-learning, clinical rounding tool and educational activity, reading materials
Educating and coaching on AS	On completion of this section, fellows will be able to <ul style="list-style-type: none"> <li>Explain key behavioral psychology concepts that influence antimicrobial prescribing</li> <li>Propose effective techniques to change antimicrobial prescribing practices</li> <li>Use provider education techniques to effect change in antimicrobial prescribing</li> <li>Demonstrate communication skills to influence antimicrobial prescribing habits of others</li> </ul>	Reading materials, video, role play exercise, small group discussion, case-based questions, e-learning, AS communication skills pocket card
ASP logistics	On completion of this section, fellows will be able to <ul style="list-style-type: none"> <li>Describe key steps in establishing an ASP</li> <li>Identify multidisciplinary collaborations necessary for the success of an ASP</li> <li>Describe how to implement the core elements of ASPs into practice</li> <li>Recognize regulatory and reporting aspects of ASPs</li> <li>Describe AS quality improvement and patient safety activities</li> <li>Recommend strategies for responding to antimicrobial shortages</li> </ul>	Simulation exercise, slides, reading materials, e-learning, meeting attendance and interview activity

Abbreviations: AS, antimicrobial stewardship; ASP, AS program.

To enhance adaptability, each of the curricular elements has >1 option for its application. For example, a module may be offered as an e-learning course that fellows can navigate independently or as lecture slides that faculty could use to instruct fellows in AS. Active learning techniques are used to enhance engagement and retention of information. Instructions and materials for faculty and fellows are provided so that these educational activities can be used to either augment existing resources or capitalize on local infrastructures. Assessment tools are included to evaluate the development of knowledge and skills. In addition, the core elements were designed with respect for the numerous and varied educational priorities of ID fellowship training and can be adapted to programs of differing sizes and resources. The entire core curriculum requires 10–12 hours to complete, with 6–8 hours of faculty preparation, instruction, facilitation, and evaluation. The learning objectives and educational resources for the various components of the curriculum are summarized in [Table 1](#).

The core curriculum will be available through the IDSA Web site starting in July 2018, and the advanced training elements will be available during the following year. Precurriculum and postcurriculum assessments will be collected from fellowship programs electing to use the curriculum the first year it is available. This evaluation data will be used to make necessary revisions to curricular materials.

In conclusion, a need for additional educational resources for training and evaluating ID fellows in AS was identified via a national survey of ID fellowship directors. A core curriculum in AS for use in ID training programs was developed to further ID physician engagement in AS.

## Notes

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