

Health Care Provider Education as a Tool to Enhance Antibiotic Stewardship Practices

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KEYWORDS

- Antibiotic stewardship • Antimicrobial stewardship
- Antibiotic stewardship education • Antibacterial agents • Antibiotic prescribing
- Prescribing • Health care personnel • Antibiotic resistance

KEY POINTS

- Education of health care providers is a key component of an antibiotic stewardship program.
- Antibiotic stewardship education for health care providers is recommended as a strategy to provide a foundation of knowledge and an environment that facilitates and supports optimal antibiotic prescribing.
- Antibiotic stewardship education should start early in the training of health care professionals and should include medical and other health care students, as well as practicing and training physicians and ancillary providers.
- The content of antibiotic stewardship education should include information on antibiotics and antibiotic resistance, teaching on core principles of diagnosis and management of infection, training on appropriate antibiotic prescribing, and coaching to improve communication skills.
- Passive antibiotic stewardship education techniques are modestly effective for increasing prescriber knowledge, whereas education using active techniques is more effective for changing prescribing behavior.
- Health care provider education on appropriate antibiotic prescribing has been shown to enhance other antibiotic stewardship interventions.

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INTRODUCTION

The overuse and inappropriate use of antibiotics are common worldwide and are associated with adverse drug reactions, *Clostridium difficile* infections, and increased health care costs.¹⁻³ Antibiotic misuse has been a major factor in the emergence of extensively multidrug-resistant pathogens over the last 2 decades.⁴ Moreover, the number of new antibiotics recently approved or under development for treatment of these infections is alarmingly low, making current antibiotic drugs a precious commodity.⁵ Antibiotic stewardship has been increasingly recognized as an important tool to combat antibiotic resistance, preserve current antibiotics, and improve patient care through the improvement of antibiotic prescribing at the level of the individual patient and on a larger scale for hospitals and health care systems.^{4,6} Antibiotic stewardship practices include an array of potentially useful interventions of varying effectiveness for both inpatient and outpatient medicine. One of these practices is the provision of antibiotic stewardship education to health care provider students, clinical trainees, practicing clinicians, and ancillary personal, with the goal of improving antibiotic prescribing and use. In this review, the need and suggested audience for antibiotic stewardship education are highlighted, and effective education techniques are recommended for increasing knowledge of antibiotics and improving their use.

THE NEED FOR EDUCATION IN ANTIBIOTIC STEWARDSHIP

Education has been deemed to be the cornerstone of antibiotic stewardship. Usually, this education refers to improving the knowledge and prescribing behavior of current or future health care providers to reduce or improve their antibiotic use. After all, the success of a stewardship program depends on the attitude and action of individuals. Many have pointed out the need to expand antibiotic stewardship education to all of the relevant stakeholder groups, not just health care providers. These groups include patients, parents, children, governmental and regulatory authorities, and society as a whole.⁷⁻¹⁰ Although important, education of health care consumers and other stakeholders in antibiotic stewardship falls outside the scope of this article, which focuses on education of health care providers.

The goal of education in antibiotic stewardship is to not only reduce the total use of antibiotics by an individual prescriber but to ensure that when an antibiotic is truly indicated, it is the right drug at the right dose, via the correct route, and for the proper duration. It can be reasonably assumed that a responsible clinician with proper clinical decision-making skills and sufficient knowledge of patient-specific clinical and microbiological data would use antibiotics wisely and correctly for every patient. However, up to 50% of antibiotic prescribing in both the inpatient and outpatient arena is unnecessary or suboptimal.¹¹⁻¹³ This actuality suggests that there are significant deficits in provider knowledge, skills, and data access. Serious deficits of knowledge in clinicians regarding appropriate antibiotic use have been recognized for some time by infectious diseases physicians, clinical microbiologists and pharmacists, medical professional societies, and public health entities.^{4,6,9,14,15}

Recent studies have shed some light on prescribers' perceptions of their knowledge and clinical decision making in antibiotic use. Surveys of practicing physicians and teaching hospital faculty have shown that clinicians are aware of the relationship between antimicrobial use and resistance and that they believe that most physicians overprescribe antibiotics nationally and in their individual hospitals.^{16,17} The survey respondents tended to believe that the problem of overprescription lay more with others than themselves, although most (>70%) would still like more knowledge about antibiotics and individual feedback on their antibiotic use.¹⁶ Similar surveys of house staff

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