

Education and Communication in an Interprofessional Antimicrobial Stewardship Program

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Context: Interprofessional education/interprofessional practice (IPE/IPP) is an essential component in medical education and training. A collaborative interprofessional team environment ensures optimal patient-centered care.

Objective: To describe the implementation of 2 interprofessional antimicrobial stewardship program (ASP) teams using IPE/IPP and to assess the acceptance rate by the primary medical and surgical teams of ASP recommendations for antimicrobial interventions.

Methods: A business plan for the ASP was approved at 2 academic medical centers used for the present study. During a 3-year study period, 2 interprofessional ASP teams included an attending physician specializing in infectious disease (ID), an ID physician fellow, an ASP pharmacist, physician residents, medical students, pharmacy residents, and pharmacy students. Educational seminars were presented for all adult-admitting physicians to discuss the need for the ASP and the prospective audit and feedback process. Cases were presented for discussion during ASP/ID rounds and recommendations were agreed upon by the ASP team. A motivational interviewing face-to-face technique was frequently used to convey the ASP team recommendation to the primary medical or surgical team in a noncoercive and educational manner. The ASP team recommendations for ASP interventions were documented in the medical records.

Results: The overall acceptance rate of recommendations by the primary medical and surgical teams were greater than 90% (2051 of 2266). The most frequent interventions provided were streamline therapy (601), route of administration change (452), bug-drug mismatch (190), and discontinuation of therapy (179). Route of administration change was also the most frequently accepted intervention (96%).

Conclusions: The motivational face-to-face communication technique was particularly useful in conveying ASP team member recommendations to the primary medical or surgical teams. Communicating recommendations as a multidisciplinary team in an educational manner seems to have resulted in to greater acceptance of recommendations.

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Creighton University, a private, Jesuit university, offers health science programs in dentistry, medicine, nursing, pharmacy, occupational and physical therapy, public health, and emergency medical services. Additionally, medical residency and fellowship programs are offered in many interdisciplinary areas along with 8 postgraduate pharmacy residency positions. The academic medical centers—

CHI Health Creighton University Medical Center and Veterans Affairs Nebraska–Western Iowa Health Care System—that are affiliated with these programs serve as the setting for the interprofessional antimicrobial stewardship program (ASP).

Antimicrobial stewardship programs are essential components of health care systems and have become an area of focus for many hospitals around the world.³ The Infectious Diseases Society of America (IDSA) published clinical practice guidelines for developing an ASP in the acute-care hospital setting and identified the primary goal as optimizing clinical outcomes while minimizing unintended consequences of antimicrobial use.^{1,2} A secondary goal is to reduce health care costs without adversely affecting quality of care. In addition, the Centers for Disease Control and Prevention (CDC) developed guidance for hospital ASPs by outlining the core elements necessary to have a successful program.³

The IDSA and CDC guidelines do not provide an outline for training strategies, however. We developed an interprofessional training strategy that uses an interprofessional education/interprofessional practice (IPE/IPPP) approach involving multiple health care professionals and trainees. The purpose of the current study was to describe our ASP and assess the acceptance rate of ASP recommendations for antimicrobial interventions by the primary medical or surgical team.

Methods

Two academic medical centers associated with the same medical school implemented an ASP. Data generated from the ASPs were deemed nonresearch quality improvement projects by the respective institutional review boards. Further, the data had been deidentified; therefore, the institutional review board approval process was not necessary. The ASP business plan, which targeted expenses, cost savings, and antibiotic use reduction over a 3-year implementation period (2012–

2014), was approved by the administration at each location. Multidisciplinary interprofessional teams were identified as recommended by the IDSA and the CDC. Each ASP team included an attending physician specializing in infectious disease (ID), an ID physician fellow, an ASP-specialized pharmacist, and rotating physician residents, medical students, pharmacy residents, and pharmacy students.

Interprofessional Education

Educational seminars were presented to all adult-admitting physician groups (ie, surgery, obstetrics and gynecology, internal medicine, family medicine) to explain the need for the ASP and the prospective recommendation and acceptance process. Attendance at these meetings was greater than 80%. Educational seminars presented to residents discussed the need for ASPs, such as drug resistance concerns. Concerns were addressed during initial seminars, and approval and agreement was obtained by physicians in attendance. During the ASP/ID rounds, the ID physician and clinical pharmacist modeled techniques to other trainees on how to perform motivational interviewing of the primary medical or surgical team. The trainees then practiced these techniques throughout the month with oversight. In addition, follow-up educational seminars were presented to these physician groups after ASP implementation. Annual educational seminars providing updates on the ASP programs were provided to all ASP physicians during the annual grand rounds presentations.

Patients

The ASP team established criteria for targeted intervention and identified patients who were receiving broad-spectrum or high-cost intravenous antimicrobials and antifungals while in the hospitals' acute-care setting. An ASP patient-monitoring form was developed and used on a daily basis for each patient. Objective parameters were collected for each patient, including demographic information; underlying diseases and co-infectious

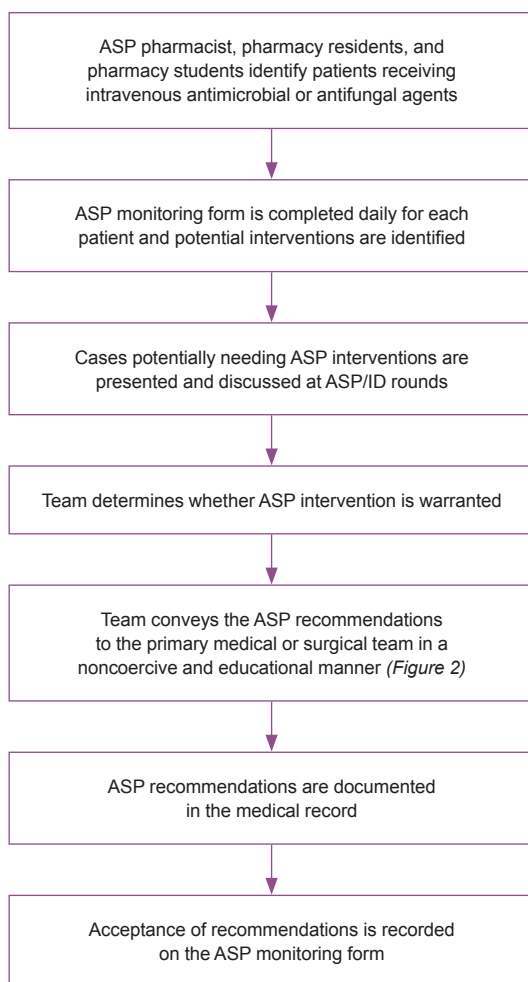


Figure 1. Flow diagram describing the daily activities of the antimicrobial stewardship program (ASP) teams. *Abbreviation:* ID, infectious disease.

processes; admission diagnosis; current antimicrobial therapy; pertinent laboratory data, including culture and susceptibility data; radiographic data; and known prior antimicrobial prescriptions. Patient intervention information (type of intervention proposed, prescribing team, and intervention acceptance or rejection)

was documented, and data were collected daily by the ASP pharmacist.

ASP Protocol

The interprofessional team worked together to implement the ASP (*Figure 1*). The pharmacy resident or pharmacy student presented the identified cases to the ASP pharmacist before formal ASP/ID rounds, and possible interventions to the antimicrobial or antifungal therapy regimens were also identified. Cases deemed to require an ASP intervention were subsequently presented to the ASP team during rounds. These cases were discussed, and definitive ASP interventions were agreed upon by the ASP team. The ASP team then conveyed the recommended interventions to the primary medical or surgical teams during rounds in a noncoercive and educational manner. Face-to-face communication was preferred. The motivational face-to-face interviewing technique was frequently used during this communication (*Figure 2*).

The ASP recommendations provided to the medical and surgical teams were documented in the medical records and on the patient monitoring forms. The recommendations were followed up, and the teams' acceptance of the recommendations was recorded on the monitoring form and in an Excel (version 14.0.7163.5000; Microsoft Corporation) spreadsheet. The ASP pharmacist continued to follow up with the patients while they were receiving intravenous antimicrobials or antifungals to assess whether further ASP interventions were warranted, and he or she would subsequently present any recommendations during ASP/ID rounds.

Results

Five ID physician, 2 ASP pharmacists, 8 ID physician fellows (126 rotation months), 77 physician residents, 30 medical students, 26 pharmacy residents, and 60 pharmacy students participated in the ASP teams during the study period.

From 2012 through 2014, 2266 interventions were recommended to the primary medical or surgical teams, and 2051 were accepted by those teams (90.5%) (*Table 1*). The interventions provided were all encompassing. The most frequent interventions provided were streamline therapy (671), route of administration change (471), discontinuation of therapy (219), and bug-drug mismatch, which is the resistance of an ID to the therapy administered (203) (*Table 2*). The interventions with the highest acceptance rates were route of administration change (96%), dosage change (93.8%), bug-drug mismatch (93.6%), and discontinuation of duplicate therapy (92.8%). Recommendations to discontinue therapy (81.7%), add to therapy (81.7%), and culture (80.5%) had the lowest acceptance rates.

Discussion

The interprofessional ASP teams in the current study included a multidisciplinary approach as recommended by both the IDSA and the CDC.¹⁻³ A prospective audit of medical records with intervention and feedback was the core IPE/IPP strategy used by the ASP team.^{1,2} This method can result in reduced inappropriate use of antimicrobials while providing direct interaction and education to the prescriber. Joint decision making is the goal, which allows each team member to contribute his or her expertise to the ASP recommendations.

The Accreditation Council for Pharmacy Education Standards of 2016 defines interprofessional team practice as follows:

All students competently participate as a health care team member in providing direct patient care and engaging in shared therapeutic decision-making. [Students] participate in experiential educational activities with prescribers/student prescribers and other student/professional health care team members, including face-to-face interactions that are designed to advance interprofessional team effectiveness.⁵

1. Ask about the patient's condition.
2. Affirm the information received.
3. Ask permission to fill in any blanks in information received.
4. Give the ASP recommendations.
5. Ask for thoughts about the recommendations provided.
6. Affirm the decision.

Figure 2.

Motivational face-to-face interviewing technique used to convey recommendations from the antimicrobial stewardship program (ASP) teams to the primary medical or surgical teams in a noncoercive and educational manner.

The implementation of interprofessional education in ASP team practice has been received well at our institutions. Joint decision making was modeled during the ASP prerounds when the ID pharmacist reviewed patient conditions and antimicrobial therapy with the pharmacy residents and students. This modeling was further demonstrated at ASP/ID rounds during the presentation of patients identified for intervention and discussion among the ASP team members and the IPE/IPP discussion that took place with the primary medical and surgical teams. Antimicrobial education in the clinical setting with actual patients enhances the educational experience.

Motivational interviewing techniques have been shown to improve medication adherence⁶⁻⁹ and increase adult immunization readiness.¹⁰ The goal of motivational interviewing is to prompt behavioral change.¹¹ We used this technique to facilitate face-to-face communication of ASP recommendations to the primary medical or surgical teams in a nonconfrontational manner.

The motivational face-to-face interviewing technique has enhanced our ASP educational efforts in optimizing patient care and ASP principles. Revolving monthly rotations of allopathic and osteopathic resi-

Table 1.
Acceptance of Antimicrobial Intervention
Recommendations by Year in an IPE/IPP-Based
Antimicrobial Stewardship Program

Year	Interventions Recommended, No.	Interventions Accepted, No. (%)
2012	911	819 (89.9)
2013	748	685 (91.6)
2014	607	547 (90.1)
Total	2266	2051 (90.5)

Abbreviations: IPE, interprofessional education; IPP, interprofessional practice.

Table 2.
Acceptance of Antimicrobial Intervention
Recommendations in an IPE/IPP-Based
Antimicrobial Stewardship Program

Intervention	Recommended	Accepted, No. (%)
Add antimicrobial agent to therapy	71	58 (81.7)
Alternate therapy ^a	154	140 (90.9)
Bug-drug mismatch ^b	203	190 (93.6)
Culture recommendation	82	66 (80.5)
Discontinue therapy	219	179 (81.7)
Dosage change	97	91 (93.8)
Discontinue duplicate therapy	83	77 (92.8)
ID consultation	117	107 (91.5)
Route of administration change	471	452 (96)
Streamline therapy ^c	671	601 (89.6)
Other	98	90 (91.8)
Total	2266	2051 (90.5)

^a Adjusting regimen to another agent based on infectious disease (ID) state.

^b Laboratory culture results show that the ID is resistant to current therapy; antimicrobial therapy adjusted to a susceptible agent.

^c De-escalating therapy by discontinuing an antimicrobial agent or changing current regimen to more targeted therapy.

Abbreviations: IPE, interprofessional education; IPP, interprofessional practice.

dents allowed the continual use of the motivational interviewing technique in the current study. Many of these interactions were in the presence of the entire primary medical team and surgical team caring for the patients, allowing for abundant dialogue and educational opportunities.

This report has several limitations. There may have been variability in the way in which an ASP team member made recommendations. For example, the motivational interviewing technique may not have been used in every ASP intervention. The ASP team is continually working on the training process for the motivational interviewing technique to standardize the approach. Furthermore, as the rotation month progressed and medical teams became more comfortable with the ASP procedures, the interactions became more routine and less formal discussions occurred. Finally, the data entry into the database was retrospective, allowing for the potential of some patients being missed or data being not entered or tabulated correctly.

Conclusion

Based on the high acceptance rate of proposed recommendations, the interprofessional ASP team implementation and recommendation process was successful at both institutions during the study period. The motivational face-to-face interviewing technique used throughout the study likely played a part in maintaining these high rates, particularly with primary care physicians who were unfamiliar with the ASP process.

Author Contributions

All authors provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; Drs Foral, Anthone, and Destache drafted the article or revised it critically for important intellectual content; all authors gave final approval of the version of the article to be published; and all authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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