Letter to the Editor

Development and Evolution of a 24-Hour Pharmacist-Coordinated Antimicrobial Stewardship Service in a Community Hospital

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To the Editor:

Community and teaching hospitals are implementing antimicrobial stewardship programs to improve antimicrobial use, optimize patient outcomes, minimize adverse effects, and reduce resistance.^{1,2} Reduction in health care costs may also be a benefit of an antimicrobial stewardship program, as long as it does not negatively affect the patients.^{1,2} The Joint Commission Standard NPSG.07.03.01 requires every facility to implement evidence-based practices to prevent health care-associated infections due to multidrug-resistant organisms in acute care hospitals.³ One such practice is implementation of an antimicrobial stewardship program.

Antimicrobial use can be improved in a number of ways, including the selection of antimicrobials, whenever possible, based upon a patient's culture and sensitivity (C&S) report, timely de-escalation of therapy when feasible, antibiotic selection and dosing consistent with the indication, and assurance that the duration of therapy is suitable for the condition being treated.¹ Effective antimicrobial stewardship services also incorporate the change in patients' medications from intravenous (IV) to oral (PO) routes when appropriate.^{1,4} Ongoing education to all health care providers, including clinical pharmacists, nurses, physicians, physician assistants, and nurse practitioners, is also a critical component of any successful antimicrobial stewardship program.^{1,2}

Community hospitals often struggle with the implementation and maintenance of antimicrobial stewardship programs because of limited staffing. Thus, a workable alternative is needed when a full-time team devoted solely to antimicrobial

stewardship is not economically feasible. The following describes a novel approach to implementing a model 24/7 pharmacist-coordinated antimicrobial stewardship service in a community hospital. As in any antimicrobial stewardship program, physician, staff, and administration support was first obtained. After policies and procedures were developed and implemented, staff were trained. A multidisciplinary team was identified to provide guidance and direction to the overall service and regularly scheduled meetings were initiated. After the program was implemented, there was ongoing monitoring and auditing by the multidisciplinary team, as well as constant surveillance of the literature to keep up with best practices.

The first step in the development of the 24/7 pharmacist-coordinated service was to gain physician, staff, and administrative buy-in and support. This was absolutely essential for success.¹ Multiple presentations to administration and physicians at meetings such as the Medical Executive Committee (MEC) and/or the Pharmacy, Nutrition, and Therapeutics Committee (PNT) by infectious disease physicians and one-on-one discussions with primary prescribers laid the groundwork for the antimicrobial stewardship program. The presentations provided information regarding the overuse of antibiotics in hospitals, the reduction of potential antimicrobial resistance, and the rationale for establishing the antimicrobial stewardship committee. Arguments for the program included discussions of The Joint Commission's national patient safety goal number 07.03.01 regarding multidrug-resistant organisms, the facility-specific antibiotic resistance trends, and potential benefits an antimicrobial stewardship team could

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bring to the facility (eg, improved patient care and antibiotic use).

Second, policies and procedures were developed and pharmacy staff were trained. The antimicrobial stewardship policy outlined the goals and objectives of the program; defined the membership of the guiding multidisciplinary team; established vehicles for controlling antimicrobial use (eg, formulary restrictions); defined methods for stewardship (eg, de-escalation, selection, dose optimization, etc); summarized means of education, communication, monitoring, and auditing; and outlined methods for measuring results.

Policies that were potentially controversial were initially limited in scope. After they were fully accepted and became “usual practice,” many of these policies were expanded in scope to broaden the control and utilization of antimicrobials in the institution. For example, our facility had an IV to PO policy that included a limited number of antibiotics with inclusion/exclusion criteria (eg, absence of any nausea or vomiting and on the medication for at least 48 hours). Once the program showed the physicians that patients were being interchanged appropriately based upon the inclusion/exclusion criteria, the policy was revised to include more medications and the time frame was changed from 48 to 24 hours. We opted to recommend, as opposed to require, infectious disease consults for use or continued use of selected antibiotics. By recommending an infectious disease consult, we gained physician acceptance of the program and were successful in changing physicians’ prescribing habits. In a community hospital, restricting prescribing of certain antibiotics to infectious disease physicians may delay therapy to patients. A policy can always be further restricted if it is determined that recommendations are not being accepted and misuse of antibiotics is prevalent. We recommend infectious disease consults on selected (“controlled”) antibiotics after a certain amount of time has lapsed. The majority of our physicians are receptive to our recommendations, and we currently do not have an issue with our controlled antibiotics. Our controlled antibiotics are monitored monthly for appropriate use. Acceptance rates for our recommendations have remained greater than 90% since implementation.

If, after reviewing inappropriate prescribing practices by a specific physician, a quality of care issue is identified by the multidisciplinary antimicrobial stewardship team, the team may direct one or both of the co-chairs (an infectious diseases physician and

the director of pharmacy) to speak with the physician and/or may send an educational letter with a copy to medical quality review.

The third step in our implementation process was to identify the multidisciplinary team members, establish their charge (as a subcommittee of the PNT committee), and schedule regular meetings. We have a small core team that meets biweekly and a larger extended team that meets quarterly. The core team includes an infection control professional, clinical microbiologist, clinical pharmacist and/or director of pharmacy, information system specialists, an infectious disease physician, a nurse, the Surgical Care Improvement Program (SCIP) coordinator, and a hospital administrator. The expanded team includes all core members plus additional physicians from all disciplines (eg, pulmonologist, nephrologist, surgeon, internal medicine, and hospitalist). This structure has worked well for our program.

The director of pharmacy and an infectious disease physician co-chair our multidisciplinary team. To initially select an infectious disease physician co-chairperson, our facility invited all potentially interested infectious disease physicians to a luncheon. At the luncheon, the details of the position and the plan for the antimicrobial stewardship program were reviewed. Interested physicians were presented to the PNT committee for consideration. The PNT committee made a final decision on the nomination. At our facility, the team activities are provided gratis by our infectious diseases physician co-chairperson. The PNT committee appointed the additional physicians on the “extended” team.

Initially the core team met weekly. This served to solidify the team and get procedures “hardwired.” After the program was up and running smoothly, the meetings were moved to every 2 weeks. As noted previously, the extended team meets quarterly to review antimicrobial utilization data (eg, use of controlled antimicrobial agents and physician acceptance rates of pharmacist recommendations), overall progress of the program, and strategies to improve the program. If input is needed from a particular physician, he or she may be invited to the core team meeting prior to a quarterly meeting. Some topics of discussion for the core team meetings have included specific outlier patient cases, staff educational needs, modification of the annual antibiogram, Clinical and Laboratory Standards Institute (CLSI) updates, *Clostridium difficile* patient statistics, frequency of multidrug-resistant organisms, prevention of

infections (eg, ventilator-associated pneumonia), current order set reviews involving antibiotics, and turnaround time of microbiology reports. In reviewing the processes related to the microbiology reports, for example, changes were implemented that allowed microbiology reports to be read earlier by the microbiologist, thus making the culture and sensitivity reports available sooner. We also began automatically printing microbiology reports in the pharmacy so a clinical pharmacist could review a patient's culture and sensitivity results for possible de-escalation or organisms resistant to the current drug regimen as soon as the result was available.

Implementation of the program included revising pharmacist daily assignments and schedules to permit time to provide the new service. In addition, kick-off meetings were held with all involved parties. In the meeting with all clinical pharmacists, we discussed the new process of reviewing patients for appropriate antimicrobial therapy. Monitoring tools were rolled out for the clinical pharmacists. They were given a prospective audit and clinical note form, instructions on how to run and use clinical rounds reports, and how to interpret and use the microbiology reports. The prospective audit and clinical note form is used as a communication tool with physicians when the pharmacist is unable to reach them by phone or when recommending an infectious disease consult. Our prospective audit and clinical note form contains sections for patient-specific information, recommendation, C&S results, and a key for definitions (eg, controlled antimicrobials). Clinical competencies, such as reading a culture and sensitivity report, microbiology testing, and antimicrobial de-escalation, were developed and completed by each pharmacist prior to implementation. After the initial competency assessment, pharmacists are re-educated at 6 months and then yearly. Competencies are re-assessed as needed. One-on-one support by the clinical coordinator is also provided to facilitate learning and to help build confidence of the pharmacy staff.

We used outsourced computer order entry (COE) services to identify a time each day to be devoted to antimicrobial stewardship and other clinical intervention activities. By changing the COE pharmacist coverage times and scheduling blocks of time specifically for these interventions, we were able to provide a dedicated time to perform the necessary monitoring and intervention. In addition to this dedicated time, pharmacists are encouraged to "fill in" slower periods of time and times of overlapping schedules during

the day with these activities. Thus, we were able to incorporate antimicrobial monitoring and interventions without increasing staffing. During the clinical blocks of time, one pharmacist may review profiles for 30 minutes to an hour while another pharmacist covers their floors and then vice versa. This model allows for all pharmacists to have designated uninterrupted time to review profiles.

For the nursing kick-off, a member of the core antimicrobial stewardship team attended all the floor staff meetings and provided a brief discussion of the program. Nursing leadership was actively involved in rolling out education to all units prior to implementation. Some aspects of the antimicrobial stewardship program were implemented prior to rolling out the new service, for example, the extended infusion of piperacillin/tazobactam. The infusion time was a change and the charge nurses, managers, and directors and new nursing staff were educated regarding the reason behind the change and the role of the nurse.

Educating the medical staff in a community hospital can be a challenge. Our medical staff were educated during their monthly medical staff meetings about the program and what it would mean to them and their patients. The new service was announced and described in the quarterly PNT committee newsletter.

After the program had been implemented, scheduled weekly status checks with all the clinical pharmacists provided an opportunity to obtain feedback. Any issues with the program can be discussed and addressed as necessary during these meetings.

The fifth step in the implementation process was the establishment of ongoing monitoring and assessment for appropriateness and effectiveness and auditing for compliance with policies and procedures. At our facility, all antimicrobial interventions recommended to the physicians are classified, monitored by intervention type (eg, IV to PO, de-escalation, initiation of therapy, etc), and documented. If there are any restrictions on antibiotics, those medications may be reviewed to ensure that the proper policy and procedure has been followed. Drug cost savings are also tracked and reported to hospital administration. Antibiotic spending decreased from \$14.46 per adjusted patient day to \$11.22 per adjusted patient day after the first year of implementation of the antimicrobial stewardship service. If more education is needed at any time during the auditing, intervention occurs through one-on-one education or by providing information to the entire

pharmacy staff. The information audited is shared with the clinical pharmacists. This ongoing education and review allows them to take ownership in the program and to see the contributions they are making to patient care.

In summary, antimicrobial stewardship programs have multiple benefits to the facility, practitioner, and patient. An antimicrobial stewardship program can make a significant difference in the patients' care by providing them with safe, appropriate, and effective antibiotic therapy. The facility may benefit by improved susceptibility on the hospital's antibiogram, decreased number of *C. difficile* patients, reduced antibiotic resistance, and decreased antibiotic spending. Clinical pharmacists may experience more job satisfaction by using their clinical skills to impact patients' therapeutic outcomes. Regardless of limitations on resources, every facility may tailor an antimicrobial stewardship program to fit their hospital.

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