PHARMACIST CE:

The Joint Commission's Requirements for Antimicrobial Stewardship in the Ambulatory Practice Setting: An Opportunity to Optimize Patient Care

by Sara Revolinski, PharmD, BCPS, Maxx Enzmann, PharmD, BCPS, John Tierney, 2021 PharmD Candidate

CE FOR **PHARMACISTS**

COMPLETE ARTICLE AND CE EXAM AVAILABLE ONLINE: **WWW.PSWI.ORG**

Learning Objectives

- State the rationale for ambulatory antimicrobial stewardship.
- Recognize how antimicrobial stewardship efforts affect medication safety and quality.
- Describe the rationale for each antimicrobial stewardship requirement as determined by the Joint Commission.
- List examples of actions ambulatory clinics can implement to promote antimicrobial stewardship efforts.
- Identify resources that can be used to assist with implementation of antimicrobial stewardship within an ambulatory care setting.

Up to 56% of outpatient antibiotics in the United States are inappropriately prescribed, with 30% of antibiotic prescriptions deemed unnecessary.[1,2] The over-prescribing of antibiotics can be harmful to patients, because these medications have the potential to cause adverse effects and toxicities. These range from common adverse effects, such as rash and diarrhea, to less common adverse events, such as severe allergic reactions.[3] Furthermore, antibiotic use has been identified as the most important risk factor for *Clostridioides difficile* infection.[4]

In addition to increasing the risk of adverse effects and toxicities, overuse of antimicrobials can also drive antimicrobial resistance and select for resistant pathogens, which is a global public health issue. According to the World Health Organization, antimicrobial-resistant infections contribute to over 500,000 deaths each year and are projected to increase to 10 million deaths per year by 2050.[5] Resistance to first-line antibiotics can also lead to the increased use of unfavorable treatment options, an increase in health care costs, and poorer patient health outcomes.[6]

Antimicrobial stewardship (AMS) functions to maximize the benefit of antimicrobial treatment while minimizing harm to individual patients and communities.[7] AMS helps ensure both the quality and safety of antibiotic treatment by determining whether antibiotic therapy is warranted; helping to ensure the most effective antibiotic is selected at the optimal dose, route, frequency, and duration; and minimizing adverse effects and other collateral damage.[8]

A recent study conducting a cross-sectional, multi-center survey describing the current state of ambulatory AMS programs in a national cohort of hospitals with ambulatory health care settings found only 7% of institutions reported having a fully functioning AMS program in the ambulatory care setting.[9] While AMS programs can be created in all health care settings in which antimicrobials are prescribed, the most common area where AMS programs currently exist is the inpatient hospital setting. This is due in part to the fact that every acute

care hospital in the United States that participates in Medicare or Medicaid is required by the Centers for Medicare and Medicaid Services to have an AMS program.[10] In addition, many AMS programs in acute care settings are driven by pharmacists, as the majority of hospital systems employ pharmacists in a variety of roles. While pharmacists are integral members of the health care team in an ambulatory setting, pharmacist roles are not as prevalent in the ambulatory care setting.

Based on this, regulatory agencies have recently worked to optimize ambulatory antimicrobial stewardship. The Joint Commission (JC) is an independent, non-profit governing body designed to ensure that health care organizations deliver high-quality care to patients through the development of practice standards designed to maximize patient safety and quality.[11] JC-accredited health care organizations must demonstrate effective implementation and maintenance of JC standards. While participation with the JC is voluntary, more than 22,000 health care organizations in the United States maintain accreditation. The JC has implemented an AMS standard for hospitals and nursing care centers since January 1, 2017, and established a similar standard for JC-accredited ambulatory care centers on January 1, 2020.[12,13] JC-accredited ambulatory care centers include organizations providing medical or dental care, urgent care facilities, occupational health centers, episodic care, or convenient care; ambulatory surgery centers are not included in this definition. The standard requires AMS to be an organizational priority, and defines five requirements that must be met by the organization. These requirements include designating a leader to establish and maintain appropriate antibiotic prescribing practices; implementing an annual goal to reduce the use of unnecessary antimicrobials; using current evidence-based guidelines to support antimicrobial prescribing; educating health professionals on AMS practices; and collecting and analyzing data pertaining to the stewardship.

This article will describe these five requirements in detail and contain recommendations for health care organizations that are looking to enhance patient safety and quality in the ambulatory environment by implementing or building on an ambulatory antimicrobial stewardship program.

Requirement #1

The organization identifies individual(s) responsible for developing, implementing and monitoring activities to promote appropriate antimicrobial medication prescribing practices

Identifying leaders for an AMS program establishes ownership and accountability for antibiotic use.[12] While the Infectious Diseases Society of America (IDSA) guidelines for implementing AMS programs in hospitals have suggested that leadership should belong to an infectious diseases-trained physician or pharmacist, this might not be practical in all settings.[8] Effective leadership, regardless of training specific to infectious diseases, increases the likelihood of optimizing antibiotic use through communication, and empowerment and accountability of practitioners.[12] A White Paper published by the Society for Healthcare Epidemiology of America outlines the desired knowledge and skills for an AMS leader, noting that successful AMS leaders demonstrate expertise in change management, project management, and measurement and analysis of project outcomes in addition to clinical expertise.[14]

Leadership plays a key role in ensuring clinical practice aligns with guideline recommendations. A study by Ashiru-Oredope and colleagues surveyed clinical practices in England to look at the review and implementation of AMS techniques found within national AMS toolkits.[15] While 60% of ambulatory practices reported reviewing the toolkits, only 13% created an action plan for implementing the techniques. This is in contrast to 87% of hospitals reviewing the toolkits with 46% implementing the recommendations. Implementation in the hospital setting was largely driven by infectious diseases-trained pharmacists, who are only present in 5% of ambulatory practices. This study suggests effective leadership increases implementation of AMS guidelines in practice.

Previous guidelines have established that pharmacists are critical leaders for antimicrobial stewardship.[16] Pharmacists often have additional time and resources to devote to AMS activities and partner well with other expert practitioners. As pharmacist roles in ambulatory care continue to expand, pharmacists will likely be increasingly involved with outpatient AMS. In addition, community pharmacists who process prescriptions from nearby clinics can begin to implement and lead AMS efforts in their area by assessing prescriptions for appropriateness, providing education to providers and patients, and providing data to prescribers.

A single-center cohort study published in 2018 explored how empowering leadership affected AMS.[17] This study was completed after a children's hospital in Switzerland underwent a leadership change from control-based to empowerment-based, allowing providers the ability to determine antibiotic de-escalation and duration of therapy for patients. Organizational guidelines directed clinical practice under the empowering leadership model, as opposed to laboratory values, which dictated decisions under the previous control-based leadership structure. With empowering leadership, antibiotic days per 1000 patient days decreased significantly over the course of two years, from 474.1 to 403.9. Furthermore, days of therapy for prophylaxis and suspected infection also decreased significantly, as did use of the broad-spectrum antibiotics meropenem or vancomycin.

Literature demonstrates that effective leadership promotes AMS, and can be effective even in the absence of formal training in infectious diseases.

Requirement #2

The organization sets at least one annual antimicrobial stewardship goal

The second requirement set forth by the JC is for the organization to set at least one annual ambulatory antimicrobial stewardship goal.[12] Establishing a goal allows for efforts to be targeted to the area of focus, so all stakeholders are working together to optimize antimicrobial stewardship. Ideally, the annual goal would be based on data from the health care organization that identifies areas of opportunity for antibiotic prescribing. Knowing where antimicrobial overuse

TABLE 1. Ambulatory Antimicrobial Stewardship Interventions Identified in the Literature

Study	*Study Design and Setting*	*Population and Intervention (if applicable)*	*Outcomes and Results*	*Notes and Conclusions*
Studies Identifying Areas where Antibiotic Prescribing is Suboptimal				
Havers, Outpatient Antibiotic Prescribing for ARI during Influenza Season, 2018[29]	Retrospective multicenter cohort study analyzing antibiotic use in patients presenting with an acute respiratory infection during influenza season. 123 outpatient clinics associated with US Influenza Vaccine Effectiveness Network Sites.	14,987 patients analyzed over 2 years: 2013-14 and 2014-15 influenza seasons.	41% of patients received an antibiotic. 41% of those antibiotics were not indicated based on diagnosis (viral URI was 84% of those diagnoses). 29% of patients with influenza but not pneumonia received antibiotics. 35% of patients received antibiotics for group A streptococcus pharyngitis (strep throat), but 38% of those tested negative for group A streptococcus. 38% of patients received antibiotics for sinusitis and only had symptoms for 3 days or less, indicating viral etiology.	Acute URIs are often viral in etiology, but still receive inappropriate antibiotic treatment. Targeting URIs such as viral URI/acute bronchitis, influenza, pharyngitis and group A streptococcus pharyngitis, and sinusitis could optimize ambulatory antibiotic use in outpatient clinics.
Palms, First-Line Antibiotic Selection in Outpatient Settings, 2019[30]	Retrospective cohort study utilizing the IBM MarketScan database for antibiotics prescribed in 2014.	Antibiotic prescriptions for pharyngitis, sinusitis, and AOM prescribed from retail clinics, EDs, urgent care centers, and provider offices were analyzed for place in therapy. First line therapies are amoxicillin or penicillin for streptococcal pharyngitis and amoxicillin or amoxicillin/clavulanate for sinusitis and AOM.	50% of antibiotics prescribed were considered first-line overall. First-line antibiotics based on practice site: Retail clinics: 70% EDs: 57% Urgent care: 49% Prescriber offices: 50% The most common non-first line antibiotics were macrolides.	Antibiotic selection may be a target for antimicrobial stewardship programs. This study did not assess clinical decision making for allergies or other compelling indications for second-line therapies, which may be relevant for different ambulatory care settings.
Jaggi, Outpatient AMS Targets for Treatment of SSTIs, 2018[31]	Retrospective cohort study of ambulatory encounter claims for SSTI or animal bites placed with Medicare in Ohio. Appropriate antibiotic selection (guideline-defined, single antibiotic) and appropriate treatment duration (7 days or less) was analyzed.	10,310 Medicare encounters were analyzed.	77.3% of patients received a duration of antibiotics over 7 days. 10% of patients received inappropriate antibiotics for SSTI. Patients seen by non-pediatricians (e.g., family practice, emergency department) were more likely to prescribe non-recommended antibiotics.	Duration of therapy may be an appropriate target for optimizing antibiotic use in pediatrics with an SSTI. Identifying which provider types are non-adherent can help target which provider groups would benefit from education.
Interventional Studies Analyzing Interventions Designed to Improve Antibiotic Use				
Yadav, A Multifaceted Intervention Improves Prescribing for ARI in ED and Urgent Care Settings, 2019[32]	Cluster randomized clinical trial. Three academic health centers participated with 5 EDs serving adults and pediatrics and 4 urgent care centers.	Adult and pediatric patients presenting with acute viral URI. Intervention included: provider and patient education, naming a physician champion, and providing feedback. Peer comparison was also added at some sites.	Antibiotic prescribing for viral URI reduced from 6.2% to 2.4%. Inappropriate antibiotic prescribing decreased from 2.2% to 1.5%. There was no difference between sites that used peer comparison and those that did not.	A multifaceted intervention reduces inappropriate antibiotic use in viral URI.

TABLE 1. Ambulatory Antimicrobial Stewardship Interventions Identified in the Literature (Continued)

Study	Study Design and Setting	Population and Intervention (if applicable)	Outcomes and Results	Notes and Conclusions
Interventional Studies Analyzing Interventions Designed to Improve Antibiotic Use				
Burns, Implementing Outpatient AMS in a Primary Care Office Through Ambulatory Care Pharmacist-led Audit and Feedback, 2020[33]	Pre-post interventional pilot study. Single-center primary care office.	Biweekly written feedback on antibiotics for UTI and URI given to prescribers (positive and negative feedback). Education and guidelines were provided prior to antibiotic review and feedback.	Guideline concordant antibiotics increased: UTI: 20% to 69.2% URI: 43.3% to 86.8%. Guideline concordant duration of therapy increased from 55% to 70.4%.	A feedback process incorporating both positive and negative feedback improved antibiotic selection and duration of therapy. Pilot studies may support incorporation of stewardship personnel in ambulatory clinics.
Eudaley, Development and Implementation of a Clinical Decision Support Tool for UTIs in a Family Medicine Resident Clinic, 2019[34]	Pre-post interventional study. Single-center family medicine outpatient clinic.	EHR tool to assist with the diagnosis, treatment, and documentation of UTIs. Development of a clinic-specific antibiogram to guide antibiotic use.	EHR utilization occurred 29% of the time. Significant decreases in antibiotic use: FQ: 27% (p<0.001). SMX/TMP: 20% (p=0.003). Significant increase in nitrofurantoin use (first line therapy): 31% (p=0.01). Significant increase in guideline concordance by 32% (p=0.010).	Despite low utilization of the EHR tool, improved antibiotic use was seen for the management of UTI. Sustained impact of the EHR tool was not assessed. Plan to assess impact of reduced FQ use on resistance.
Walters, An Ambulatory AMS Initiative to Improve Diagnosis and Treatment of UTIs in Children, 2019[35]	Pre-post interventional study. Single-center pediatric ED.	Development of a UTI algorithm for pediatric patients. 5 PDSA cycles used during implementation. Each PDSA cycle identified the goal measure, provided multidisciplinary education, provided feedback twice a week on data collected to date, provided positive reinforcement, and answered staff questions on the units.	Guideline concordance increased post-intervention: Urine collection: 54.7% to 96.2%. Antibiotic use: 23.1% to 96.6% (p<0.001). Improvements were sustained for 19 months. No change in ED length of stay or ED readmissions.	Utilization of PDSA techniques, a quality-based improvement method, resulted in sustained improvement in UTI management in pediatric ED patients. This study also ensured the changes did not adversely impact patients by measuring ED length of stay and readmissions.
Jindai, Improving FQ Use in the Outpatient Setting Using a Patient Safety Initiative, 2018[36]	Pre-post interventional study with interrupted time-series analysis. 10 Veterans Affairs community-based outpatient clinics in Oregon and Washington.	Mandated patient safety initiative with multiple interventions: 1. New order in EHR requiring indication for FQs, documentation of education on adverse effects and of medication reconciliation to look for drug interactions 2. Education provided to prescribers.	62% weekly reduction in FQ use upon implementation of the intervention (p<0.001). 2% increase in weekly FQ use after initial reduction. No change observed in rate of non-FQ prescribing	Targeting specific antibiotics can decrease utilization without increasing utilization of other antibiotics. Electronic health record interventions may not provide sustained results; feedback to providers on utilization of the tool may be needed.

AMS: antimicrobial stewardship; AOM: acute otitis media; ARI: acute respiratory infection; ED: emergency department; EHR: electronic health record; FQ: fluoroquinolone; PDSA: plan, do, study, act; SMX/TMP: sulfamethoxazole/trimethoprim; SSTI: skin and soft tissue infection; URI: upper respiratory infection; US: United States; UTI: urinary tract infection

exists, what local resistance patterns are, and what collateral damage is seen in the local population can help determine a goal.

As organizations are only starting to implement ambulatory AMS practices and might not have readily available data to drive goal setting, the first goal could be as simple as identifying antibiotic prescribing patterns in the ambulatory care environment, or establishing an antibiogram for ambulatory care. Considerations for collecting data can be found later in this paper, included in the description of the fifth requirement. Once prescribing patterns, resistance patterns, or other data is readily available, areas of opportunity can be identified that can serve as future goals.

TABLE 2. Resources for Ambulatory Antimicrobial Stewardship

Resource Name	*Description*	*Link to Access*
Centers for Disease Control and Prevention: Core Elements of Outpatient Antibiotic Stewardship	Multiple documents exist including literature supporting AMS, clinician and facility checklists to assess current AMS practice, action plans for practice and more.	https://www.cdc.gov/antibiotic-use/core-elements/outpatient.html
Centers for Disease Control and Prevention: Be Antibiotics Aware Partner Toolkit	Includes patient education documents, infographics, social media content, and public service announcements that can be used to educate patients on appropriate antibiotic use.	https://www.cdc.gov/antibiotic-use/week/toolkit.html
Centers for Disease Control and Prevention: Antimicrobial Resistance	Contains information on antibiotic resistant infection rates and mortality.	https://www.cdc.gov/drugresistance/index.html
Centers for Disease Control and Prevention: Antibiotic Use & Patient Safety Portal	Interactive map to compare outpatient prescriptions by state to determine what antibiotics are most often used in your state.	https://arpsp.cdc.gov/profile/antibiotic-use/208
Infectious Diseases Society of America (IDSA)	Clinical practice guidelines for multiple infectious syndromes. Guidelines for implementation of an antibiotic stewardship program.	www.idsociety.org

AMS: antimicrobial stewardship.

Publicly reported data can also be used to identify opportunities for improvement. The Centers for Disease Control and Prevention (CDC) reports data on antibiotic resistance patterns and outpatient antibiotic prescription rates by state through the Antibiotic Resistance & Patient Safety Portal and compares rates to those seen on a national level.[18] Identifying resistant pathogens or antibiotic overuse can help determine targets for improvement based on location. The healthcare effectiveness data and information set (HEDIS), is a performance improvement tool using data reported via insurance plans.[19] HEDIS contains over 90 different measures, several of which pertain to ambulatory antibiotic use, including appropriate treatment for children with upper respiratory infection and avoidance of antibiotic treatment in adults with acute bronchitis. Organizations can select one of these measures as a goal as well.

Additionally, it would be reasonable for sites to start with some of the areas of inappropriate prescribing or AMS interventions published to date. A study by Shively and colleagues analyzed outpatient prescribing patterns of primary care providers within the Veterans Affairs Pittsburgh Healthcare System over one year.[20] The authors determined the antibiotic index for each prescriber, defined as the number of antibiotic prescriptions per 1,000 patients per year, to identify which practitioners prescribe the most antibiotics. Identifying these prescriber trends at other sites would allow for targeted education to specific providers, which could serve as an AMS goal. The study also evaluated 5% of antibiotic prescriptions for guideline concordance, finding that antibiotics for the treatment of acute respiratory tract infection; skin and soft tissue infection; and urinary tract infections were concordant with guideline recommendations only 11%, 11%, and 29% of the time, respectively. Optimizing prescribing for these indications could also be a future goal. Finally, the authors identified which antibiotics were prescribed inappropriately, finding 84.0% and 78.4% of ciprofloxacin and azithromycin prescriptions, respectively, were inappropriately prescribed. Targeting improved prescribing for one of these antibiotics could also serve as a goal. Developing a goal based on local data can also increase engagement from practitioners and provide a starting point for further AMS initiatives.

A literature summary of relevant ambulatory AMS initiatives through 2016 has been published in the CDC's Core Elements of Outpatient Antibiotic Stewardship Appendix.[21] Further examples of studies that have identified areas of opportunity for ambulatory antibiotic prescribing since 2016 are described in Table 1.

Once the goal is determined, it is important for the AMS leader to communicate the goal to the stakeholders, including prescribers and other administrative leaders, to provide a cohesive approach to AMS. Further education might also be required to help providers reach their goals. Education is the fourth JC requirement and will be addressed later in this paper. Additionally, data demonstrating progress on the AMS goal should be shared with stakeholders and can be used as an educational tool as well.

Requirement #3

The organization uses evidence-based practice guidelines related to its annual antimicrobial stewardship goal(s)

The third requirement from the JC is for the organization to use evidence-based practice guidelines related to its annual AMS goals.[12] Evidence-based practice guidelines can influence appropriate antibiotic prescribing by ensuring patients only receive antibiotics when clinically indicated.[12] Furthermore, when patients do require antibiotic treatment, guidelines assist with antibiotic selection, dosing, and duration. It is appropriate to use nationally recognized guidelines, or to create organizational-specific guidelines from evidence-based literature and local resistance patterns, if known.[8] Some of the studies described in Table 1 have implemented treatment algorithms to optimize AMS.

Organizational guidelines and prescriber education can also be integrated

into the electronic health record (EHR). In a quasi-experimental study by Shoff and colleagues at the Durham Veterans Affairs Health Care System, an institutional guideline was developed based on a local urinary antibiogram and incorporated into the EHR via an order set to encourage guideline-concordant prescribing for outpatient urinary tract infections (UTIs).[22] After guideline implementation, monthly fluoroquinolone prescriptions for acute cystitis decreased from 45% to 32%, in alignment with the local urinary antibiogram which demonstrated fluoroquinolone resistance.

In another study developed to assess the impact of a protocol developed for the treatment of UTIs in patients with spinal cord injuries (SCIs), Patros and colleagues developed an algorithm-based order set using SCI-specific antibiogram data at the Clement J. Zablocki Veterans Affairs Medical Center, and conducted a pre/post interventional study to analyze impact.[23] The authors found that appropriate antimicrobial prescribing increased from 48% to 72% from pre- to post-protocol implementation, conveying that organizational guidelines based on local data can improve the appropriateness of antimicrobial prescribing.

Evidence-based guidelines are useful in the practice of AMS, as they assist with defining goals and implementing strategies for improvement of antibiotic use. They can also serve as educational material for prescribers.

Requirement #4

The organization provides all clinical staff and licensed independent practitioners with educational resources related to its antimicrobial stewardship goal(s) and strategies that promote appropriate antimicrobial medication prescribing practices

The fourth requirement set forth by the JC is for the organization to provide all clinical staff and licensed independent practitioners with educational resources related to its AMS goal(s) and strategies promoting appropriate antimicrobial prescribing.[12] Education of clinicians can be done actively, passively, or with a combination of the two. Passive education involves a one-way method of information being presented to an audience, such as a non-interactive lecture, while active education involves audience participation, such as group discussions or hands-on workshops. Active education has been shown to be more successful than passive education because it involves a more engaged audience, which leads to higher retention of content.[8]

Educational resources that can be provided to clinical staff include recommended prescribing practices and guidelines, such as guidance on medication selection or dosing, as well as strategies for addressing patient expectations and possible adverse effects when antibiotics are

not indicated in a particular patient. The CDC houses a plethora of resources for outpatient antimicrobial prescribing, which are described in Table 2.

In addition to providing resources to clinical staff, direct education of providers, either alone or as part of a multimodal intervention, has been used to implement AMS in the ambulatory care setting.[7] Education of clinical staff can take many forms, including, but not limited to, providing live education at staff meetings, sharing interactive data about AMS on the organization's website, and implementing clinical decision support in the EHR. As part of a multifaceted approach to decreasing inappropriate antibiotic prescribing for acute respiratory tract infections (ARTIs) at three high-volume urgent care clinics, Cummings and colleagues conducted a quasi-experimental study that used patient and staff education in addition to public commitment and peer comparison.[24] Provider education consisted of presentations at several physician staff meetings on the importance of appropriate, guideline-concordant antimicrobial prescribing; sharing an interactive infographic on US Antibiotics Awareness Week that included information about antimicrobial stewardship; and grand rounds presentations on AMS by infectious diseases physicians to medical residents and primary care providers. Patient education consisted of describing antibiotic resistance and antibiotic overuse/misuse via an interview with a local news station during US Antibiotic Awareness Week that was also shared on social media, and placing different print materials from the CDC's Be Antibiotics Aware campaign throughout waiting rooms and patient rooms. Public commitment was demonstrated by the medical director of urgent care signing the CDC's "Commitment Letter to Our Patients" for each respective location. These letters were placed alongside the patient education materials. To implement peer comparison, providers were sent feedback emails categorizing their inappropriate antibiotic use as low (23% or fewer inappropriate prescriptions based on the US National Action Plan for Combating Antibiotic Resistant Bacteria 2020 goal) or high (45% or more inappropriate prescriptions). In addition, emails containing blinded rankings of providers and their peers based on inappropriate antibiotic prescriptions for ARTIs were distributed. The authors found that fewer inappropriate antibiotic prescriptions for ARTIs were written during the intervention period (57.7%) compared with the pre-intervention period (72.6%). This study conveys that education as a part of a multimodal intervention was successful in optimizing antibiotic use.

Education of clinical staff can also be medication-focused, rather than disease-state-oriented. Another study implemented a multimodal AMS approach to specifically decrease the inappropriate outpatient use of fluoroquinolones within Parkland Health & Hospital system.[25] In addition to creating an outpatient protocol for management of cystitis and suppressing fluoroquinolone susceptibilities when appropriate, ambulatory care providers were educated on the risks of using fluoroquinolones via various forums. The authors found that after the intervention period, total fluoroquinolone prescriptions per 1000 patient visits decreased by 39%, and inappropriate fluoroquinolone use decreased from 53% to 34% across all primary care clinics, urgent care clinics, and emergency departments, once again demonstrating that multifaceted interventions that include education can optimize antibiotic use.

Education is an important component of an AMS program, because it helps ensure that prescribers are aware of AMS goals and current antibiotic use recommendations, which ultimately leads to optimized antibiotic use within an organization.

Requirement #5

The organization collects, analyzes, and reports data pertaining to the antimicrobial stewardship goal(s) to organizational leadership and prescribers

The last requirement for ambulatory AMS ties together many of the earlier requirements by helping to ensure that goals and processes such as guidelines and education are monitored to ensure effectiveness.[12] The data obtained can also then be used to inform leaders on AMS progress and serve as the basis for further education to practitioners and development of subsequent annual goals.[21]

Data can be analyzed on a population or individual level and can be broad or narrow in scope. Potential data could include antibiotic prescription rates; resistance trends or antibiograms; or clinical and process outcomes after implementation of an antimicrobial stewardship intervention.[12] Ideally, data should be easy to obtain on demand, sustainable, and gathered from an EHR or other database used by the health care system. Knowing this might not be feasible, manual chart review could also be employed, but this can be time-consuming, could lead to delayed sharing of data, and is difficult to sustain.

A variety of papers have described methods to report on and disseminate antibiotic prescribing data. Meeker and colleagues analyzed the impact of up to 3 interventions on antibiotic prescribing by 248 primary care clinicians for acute, viral upper respiratory infections (URIs).[26] One of the interventions included monthly peer comparison emails sent to each provider comparing his or her individual prescribing to that of prescribers with the lowest rate of inappropriate antibiotic prescribing. Antibiotic prescription data was obtained from the EHR. Emails either identified the prescriber as a top performer (top-performing decile for the lowest inappropriate antibiotic prescriptions) or not a top performer where individual antibiotic prescription rates were shared in addition to rates by top performers. In addition, prescribers also were educated on appropriate antibiotic prescribing for URIs. Prescribing rates significantly decreased to 3.7% from 19.9%. This study demonstrated that timely sharing of antibiotic prescribing, and the use of peer comparison data, decreased inappropriate use. The same authors analyzed prescription rates 12 months after the intervention was complete and found that antibiotic use increased, suggesting that sustained intervention and data sharing might be required to maintain appropriate prescribing.[27]

A similar study conducted in 2019 by Shively, et al. shared monthly e-mails describing individual, peer, and goal antibiotic prescription rates with primary care providers.[28] Compared to baseline,

monthly antibiotic prescribing decreased from 76.9 to 49.5 prescriptions per 1,000 office visits, as did unnecessary antibiotic prescribing (58.8% versus 38.9%).

Additionally, all studies in Table 1 demonstrate the use of data to describe outcomes related to antimicrobial stewardship goals. The majority of these studies demonstrate positive outcomes; however, not every intervention will be successful. When interventions are not successful, it is important to determine why, to modify or change the goal in the future.

Data is a necessary for implementing an effective AMS program, as it serves as evidence of goal attainment as well as education for practitioners.

Resources for Practitioners

Various publicly available resources exist to assist with the implementation of ambulatory antimicrobial stewardship and are described in Table 2. Any resources available from the CDC can be reproduced and posted within ambulatory clinics or provided to patients as educational materials.

Conclusion

AMS is an important patient safety and quality initiative, because it functions to optimize antibiotic use by helping ensure treatment effectiveness while minimizing collateral damage from antibiotic use, including adverse effects, resistance, and selection for resistant pathogens such as *C. difficile*. While AMS has been minimally employed in ambulatory settings, the ambulatory setting accounts for the majority of antibiotic use. The JC developed an ambulatory AMS standard with five individual requirements to promote evidence-based antibiotic use and to promote patient safety and quality. These requirements can assist any ambulatory setting with AMS implementation.

Sara Revolinski is an Antimicrobial Stewardship Pharmacist at Froedtert Hospital and Assistant Professor and Director of Experiential Education and Professional Labs at the Medical College of Wisconsin School of Pharmacy in Milwaukee, WI. Maxx Enzmann is a PGY2 Infectious Diseases Pharmacy Resident at Froedtert Hospital in Milwaukee, WI. John Tierney is a Doctor of Pharmacy Candidate at the Medical College of Wisconsin School of Pharmacy In Milwalukee, WI.

PR *This article has been peer-reviewed. The contribution in reviewing is greatly appreciated!*

Disclosure: The authors declare no real or potential conflicts or financial interest in any product or service mentioned in the manuscript, including grants, equipment, medications, employment, gifts, and honoraria.

References

1. Young EH, Panchal RM, Yap AG, Reveles KR. National trends in oral antibiotic prescribing in United States physician offices from 2009 to 2016. *Pharmacotherapy*. 2020;40(10):1012-1021. doi:10.1002/phar.2456
2. Fleming-Dutra KE, Hersh AL, Shapiro DJ, et al. Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2010-2011. *JAMA*. 2016;315(17):1864-1873. doi:10.1001/jama.2016.4151
3. Shehab N, Patel PR, Srinivasan A, Budnitz DS. Emergency department visits for antibiotic-associated adverse events. *Clin Infect Dis.* 2008;47(6):735-743. doi:10.1086/591126
4. Kutty PK, Woods CW, Sena AC, et al. Risk factors for and estimated incidence of community-associated *Clostridium difficile* infection, North Carolina, USA. *Emerg Infect Dis.* 2010;16(2):197-204. doi:10.3201/eid1602.090953
5. No time to wait: securing the future from drug-resistant infections. Accessed November 1, 2020. https://www.who.int/antimicrobial-resistance/interagency-coordination-group/final-report/en/
6. Gandra S, Barter DM, Laxminarayan R. Economic burden of antibiotic resistance: how much do we really know? *Clin Microbiol Infect*. 2014;20(10):973-980. doi:10.1111/1469-0691.12798
7. Sanchez GV, Fleming-Dutra KE, Roberts RM, Hicks LA. Core elements of outpatient antibiotic stewardship. *MMWR Recomm Rep.* 2016;65(6):1-12. doi:10.15585/mmwr.rr6506a1
8. Barlam TF, Cosgrove SE, Abbo LM, et al. Implementing an antibiotic stewardship program: guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. *Clin Infect Dis.* 2016;62(10):e51-77. doi:10.1093/cid/ciw118
9. Eudy JL, Pallotta AM, Neuner EA, et al. Antimicrobial stewardship practice in the ambulatory setting from a national cohort. *Open Forum Infect Dis.* 2020;7(11): ofaa513. doi:10.1093/ofid/ofaa513
10. CMS takes a significant step against antimicrobial resistance with hospital stewardship requirement. Accessed August 1, 2020. https://www.idsociety.org/news--publications-new/articles/2019/cms-takes-a-significant-step-against-antimicrobial-resistance-with-hospital-stewardship-requirement/#:~:text=CMS%20Takes%20a%20Significant%20Step%20Against%20Antimicrobial%20Resistance%20with%20Hospital%20Stewardship%20Requirement,-The%20Centers%20for&text=Stewardship%20can%20help%20limit%20the,of%20antibiotics%20leads%20to%20resistance
11. The Joint Commission. Accessed November 20, 2020. https://www.jointcommission.org/
12. Antimicrobial stewardship in ambulatory health care. The Joint Commission. Accessed November 25, 2020, 2020. https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/r3_23_antimicrobial_stewardship_amb_6_14_19_final2.pdf
13. R3 Report Issue 8: new antimicrobial stewardship standard. Accessed November 15, 2020. https://www.jointcommission.org/standards/r3-report/r3-report-issue-8-new-antimicrobial-stewardship-standard/
14. Cosgrove SE, Hermsen ED, Rybak MJ, et al. Guidance for the knowledge and skills required for antimicrobial stewardship leaders. *Infect Control Hosp Epidemiol.* 2014;35(12):1444-1451. doi:10.1086/678592
15. Ashiru-Oredope D, Budd EL, Bhattacharya A, et al. Implementation of antimicrobial stewardship interventions recommended by national toolkits in primary and secondary healthcare sectors in England: TARGET and Start Smart Then Focus. *J Antimicrob Chemother.* 2016;71(5):1408-1414. doi:10.1093/jac/dkv492
16. Dellit TH, Owens RC, McGowan JE, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clin Infect Dis.* 2007;44(2):159-177. doi:10.1086/510393
17. Steinmann KE, Lehnick D, Buettcher M, et al. Impact of empowering leadership on antimicrobial stewardship: a single center study in a neonatal and pediatric intensive care unit and a literature review. *Front Pediatr.* 2018;6:294. doi:10.3389/fped.2018.00294
18. Antibiotic Resistance and Patient Safety Portal. Accessed November 28, 2020. https://arpsp.cdc.gov/
19. HEDIS and performance measurement. Accessed November 28, 2020. https://www.ncqa.org/hedis/
20. Shively NR, Buehrle DJ, Clancy CJ, Decker BK. Prevalence of inappropriate antibiotic prescribing in primary care clinics within a Veterans Affairs health care system. *Antimicrob Agents Chemother*. 2018;62(8):e00337-18. doi:10.1128/AAC.00337-18
21. Core elements of outpatient antibiotic stewardship. Accessed November 16, 2020. https://www.cdc.gov/antibiotic-use/core-elements/outpatient.html
22. Shoff CJ, Townsend ML, Tillekeratne LG, et al. Improved empiric antibiotic prescribing for acute cystitis with use of local urinary antibiogram and clinical decision support system. *Infect Control Hosp Epidemiol.* 2020;41(11):1351-1353. doi:10.1017/ice.2020.357
23. Patros C, Sabol M, Paniagua A, Lans D. Implementation and evaluation of an algorithm-based order set for the outpatient treatment of urinary tract infections in the spinal cord injury population in a VA medical center. *J Spinal Cord Med.* 2018;41(2):192-198. doi:10.1080/10790268.2017.1324355

24. Cummings PL, Alajajian R, May LS, et al. Utilizing behavioral science to improve antibiotic prescribing in rural urgent care settings. *Open Forum Infect Dis.* 2020;7(7):ofaa174. doi:10.1093/ofid/ofaa174
25. Lin K, Zahlanie Y, Ortwine JK, et al. Decreased outpatient fluoroquinolone prescribing using a multimodal antimicrobial stewardship initiative. *Open Forum Infect Dis*. 2020;7(6):ofaa182. doi:10.1093/ofid/ofaa182
26. Meeker D, Linder JA, Fox CR, et al. Effect of behavioral interventions on inappropriate antibiotic prescribing among primary care practices: a randomized clinical trial. *JAMA.* 2016;315(6):562-570. doi:10.1001/jama.2016.0275
27. Linder JA, Meeker D, Fox CR, et al. Effects of behavioral interventions on inappropriate antibiotic prescribing in primary care 12 months after stopping interventions. *JAMA.* 2017;318(14):1391-1392. doi:10.1001/jama.2017.11152
28. Shively NR, Buehrle DJ, Wagener MM, Clancy CJ, Decker BK. Improved antibiotic prescribing within a Veterans Affairs primary care system through a multifaceted intervention centered on peer comparison of overall antibiotic prescribing rates. *Antimicrob Agents Chemother.* 2019;64(1):e00928-19. doi:10.1128/AAC.00928-19
29. Havers FP, Hicks LA, Chung JR, et al. Outpatient antibiotic prescribing for acute respiratory infections during influenza seasons. *JAMA* Netw Open. 2018;1(2):e180243. doi:10.1001/jamanetworkopen.2018.0243
30. Palms DL, Hicks LA, Bartoces M, et al. First-line antibiotic selection in outpatient settings. *Antimicrob Agents Chemother.* 2019;63(11):e01060-19. doi:10.1128/AAC.01060-19
31. Jaggi P, Wang L, Gleeson S, Moore-Clingenpeel M, Watson JR. Outpatient antimicrobial stewardship targets for treatment of skin and soft-tissue infections. *Infect Control Hosp Epidemiol.* 2018;39(8):936-940. doi:10.1017/ice.2018.124
32. Yadav K, Meeker D, Mistry RD, et al. A multifaceted intervention improves prescribing for acute respiratory infection for adults and children in emergency department and urgent care settings. *Acad Emerg Med.* 2019;26(7):719-731. doi:10.1111/acem.13690
33. Burns KW, Johnson KM, Pham SN, Egwuatu NE, Dumkow LE. Implementing outpatient antimicrobial stewardship in a primary care office through ambulatory care pharmacist-led audit and feedback. *J Am Pharm Assoc* (2003). 2020;60(6):e246-e251. doi:10.1016/j.japh.2020.08.003
34. Eudaley ST, Mihm AE, Higdon R, Jeter J, Chamberlin SM. Development and implementation of a clinical decision support tool for treatment of uncomplicated urinary tract infections in a family medicine resident clinic. *J Am Pharm Assoc* (2003). 2019;59(4):579-585. doi:10.1016/j.japh.2019.03.006
35. Walters EM, D'Auria J, Jackson C, Walsh-Kelly C, Park D, Willis ZI. An ambulatory antimicrobial stewardship initiative to improve diagnosis and treatment of urinary tract infections in children. *Jt Comm J Qual Patient Saf.* 2019;45(12):829-837. doi:10.1016/j.jcjq.2019.08.004
36. Jindai K, Goto M, MacKay K, et al. Improving fluoroquinolone use in the outpatient setting using a patient safety initiative. *Infect Control Hosp Epidemiol.* 09 2018;39(9):1108-1111. doi:10.1017/ice.2018.169

Assessment Questions

1. All of the following are reasons supporting why antimicrobial stewardship (AMS) is a patient quality and safety initiative, EXCEPT:
   a. Up to 50% of antibiotics in the ambulatory environment are inappropriate
   b. Antibiotics have been associated with adverse effects and other collateral damage, like C. difficile
   c. Antibiotics are a significant financial burden on health care organizations
   d. Antimicrobial resistance is a significant health risk and resistance is propagated by antibiotic use

2. Which practice setting must meet the Joint Commission's Ambulatory Antimicrobial Stewardship standard?
   a. All dental clinics where antibiotics are prescribed
   b. Ambulatory surgical centers
   c. Urgent care facilities currently accredited by the Joint Commission
   d. Only ambulatory care facilities that have an outpatient pharmacy within its building

3. Which of the following reasons supports the need to identify a leader for ambulatory antimicrobial stewardship?
   a. Establishing a leader ensures accountability and communication for antimicrobial stewardship
   b. There is an abundance of infectious diseases-trained practitioners in the ambulatory environment who could serve as leaders
   c. The leader will be the sole person responsible for conducting antimicrobial stewardship interventions
   d. All of the above

4. Which of the following data could be used to monitor the impact of the ambulatory antimicrobial stewardship program?
   a. Antibiotic utilization
   b. Guideline adherence
   c. Resistance development
   d. All of the above

5. Education is an important requirement for ambulatory antimicrobial stewardship. Which of the following statements about education is TRUE?
   a. Passive education is more effective than active education
   b. Education allows for consistent antibiotic use among prescribers
   c. Education is ineffective when paired with another intervention
   d. Education must be developed by the organization; external resources cannot be used

6. Which of the following national organizations have publicly-available stewardship resources available for ambulatory antimicrobial stewardship?
   a. Centers for Disease Control and Prevention
   b. Society for Healthcare Epidemiology of America
   c. National Antibiotics Society
   d. Antimicrobial Stewardship Taskforce

7. Based on published literature, what disease states could be targets for ambulatory antimicrobial stewardship interventions?
   a. Upper respiratory infections
   b. Urinary tract infections
   c. Skin and soft tissue infections
   d. All of the above

8. Which of the following is an example of how AMS can optimize quality of care?
   a. Ensuring antibiotics are prescribed according to guidelines
   b. Monitoring antibiotic costs
   c. Recommending the newest antibiotics for treatment
   d. Requiring leader approval of antibiotic use

9. **True or False:** AMS functions to optimize patient safety by ensuring appropriate antibiotic use when necessary to minimize adverse effects
   a. True
   b. False

10. All of the following resources can be used to develop an ambulatory antimicrobial stewardship goal EXCEPT:
    a. Internal organizational data
    b. Leader preference
    c. Antibiogram data
    d. Published literature

11. Did the activity meet the stated learning objectives? (if you answer no, please email sarahs@pswi.org to explain)
    a. Yes
    b. No

12. On a scale of 1 – 10 (1-no impact; 10-strong impact), please rate how this program will impact the medication therapy management outcomes or safety of your patients.

13. On a scale of 1 – 10 (1-did not enhance; 10-greatly enhanced), please rate how this program enhanced your competence in the clinical areas covered.

14. On a scale of 1 – 10 (1-did not help; 10-great help), please rate how this program helped to build your management and leadership skills.

15. How useful was the educational material?
    a. Very useful
    b. Somewhat useful
    c. Not useful

16. How effective were the learning methods used for this activity?
    a. Very effective
    b. Somewhat effective
    c. Not effective

17. Learning assessment questions were appropriate.
    a. Yes
    b. No

18. Were the authors free from bias?
    a. Yes
    b. No

19. If you answered "no" to question 18, please comment (email info@pswi.org).

20. Please indicate the amount of time it took you to read the article and complete the assessment questions.

CE FOR **PHARMACISTS**

Continuing Education Credit Information

The Pharmacy Society of Wisconsin is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. Continuing education credit can be earned by completing the self assessment questions. Questions may be completed online at www.pswi.org or by mailing completed answer form to PSW, 701 Heartland Trail, Madison, WI 53717. Participants receiving a score of 70% or better will be granted 1.25 hours (0.125 CEU) credit through CPE Monitor within 60 day of quiz completion. Accurate birth date (MMDD) and CPE Monitor ID must be provided in order to receive this credit as required by ACPE.

This CE offering is offered free-of-charge to all PSW members. Nonmembers are charged $20 for each exam submitted to cover administrative costs.

March/April 2021
The Joint Commission's Requirements for Antimicrobial Stewardship in the Ambulatory Practice Setting: An Opportunity to Optimize Patient Care

ACPE Universal Activity Number: 0175-0000-21-052-H04-P

Target Audience: Pharmacists
Activity Type: Knowledge-based
Release Date: March 1, 2021
(No longer valid for CE credit after March 1, 2024)

Submit Your CE Online!

www.pswi.org/Education/Journal-CE

Quiz Answer Form

circle one answer per question

1) a b c d
2) a b c d
3) a b c d
4) a b c d
5) a b c d
6) a b c d
7) a b c d
8) a b c d
9) a b
10) a b c d
11) a b
12)_____
13)_____
14)_____
15) a b c
16) a b c
17) a b
18) a b
19)_____
20)_____

Name_____Designation (RPh, PharmD, etc.)_____

CPE Monitor #_____ DOB (MMDDYY)_____

Preferred Mailing Address_____

City_____State_____ Zip _____

Is this your home ☐ or work ☐ address?