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APIC/SHEA/SIDP Antimicrobial Stewardship Position Paper

Antimicrobial stewardship and infection prevention—leveraging the synergy: A position paper update

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During 2012, the Association for Professionals in Infection Control and Epidemiology (APIC) and the Society for Healthcare Epidemiology of America (SHEA) published a position paper highlighting the critical importance of infection preventionists (IPs) and health care epidemiologists (HEs) in effective antimicrobial stewardship (AS) programs.[1] AS refers to collaborative, coordinated programs and interventions designed to improve antimicrobial prescribing (ie, right drug, dose, duration, and route of administration when antibiotics are needed) to optimize clinical outcomes while minimizing unintended consequences of antimicrobial agent use such as toxicity, selection of pathogenic organisms, and emergence of resistance.[2,3]

In the intervening 5 years, much has happened to garner national and regulatory attention to the growing problem of antimicrobial resistance (AMR) and the importance of AS and the concomitant stewardship of diagnostic testing as strategies to slow the emergence of resistant organisms while limiting unintended consequences such as selecting for resistant pathogens and the development of *Clostridium difficile* infection (CDI). This paper updates and reaffirms the critical role of IPs and HEs in the prevention and control of health care-associated infections (HAIs), particularly those caused by multidrug-resistant organisms (MDROs). The key supporting role of infection prevention and control (IPC) programs in advancing the synergistic strategy of AS alongside physician and pharmacist AS leaders is also highlighted.

Three watershed events occurred in recent years to increase AMR and AS awareness among health care providers, policy makers, and the public. First, the human and economic cost of AMR in the United States was revealed in the Centers for Disease Control and Prevention (CDC) report, *Antibiotic Resistance Threats in the United States, 2013*.[4] Using conservative estimates, the CDC determined that antibiotic-resistant organisms are responsible for more than 2 million infections and 23,000 deaths per year in the United States, at a direct cost of $20 billion.[4] This report provided the first comprehensive snapshot of dangers posed by antibiotic-resistant organisms in the United States, categorizing these hazards as urgent, serious, or concerning. A subsequent, and perhaps more sobering 2014 report commissioned by the UK Prime Minister and the Wellcome Trust suggested that without global action, 10 million deaths from AMR infections will occur worldwide by 2050.[5] Second, in response to this escalating problem, in 2014 President Obama implemented the National Strategy on Combating Antibiotic Resistant Bacteria through Executive Order 13676, followed in March 2015 by release of the *National Action Plan for Combating Antibiotic-Resistant Bacteria*,[6] which outlines specific actions to be taken to implement the strategy. The action plan provides a 5-year roadmap outlining critical actions by key federal departments and agencies, as well as goals, milestones, and metrics for measuring progress. Of specific interest to IPs and HEs are actions for major reductions in the incidence of urgent and serious threats, including carbapenem-resistant Enterobacteriaceae, methicillin-resistant *Staphylococcus aureus*, and CDI; improved AS across all health care settings; and enhanced capacity to prevent the spread of resistant infections.[6] Third, following release of the action plan, the White House convened the first-ever Forum on Antibiotic Stewardship and established the Presidential Advisory Council on Combating Antibiotic Resistant Bacteria. The Forum brought together 150 key human and animal health

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constituencies involved in AS, providing participants the opportunity to exchange ideas on ways public and private sectors can work together to improve responsible use of antibiotics, as well as commit to action.[7] The Advisory Council provides advice, information, and recommendations to the Secretary of Health and Human Services regarding programs and policies intended to support and evaluate the implementation of federal activities related to combating antibiotic-resistant bacteria.[8] Of note, the 2015 APIC, SHEA, and Society of Infectious Diseases Pharmacists (SIDP) presidents participated in the Forum on Antibiotic Stewardship and the 2017 APIC and SHEA presidents gave presentations during the Advisory Council meeting for nonfederal stakeholders during January 2017.

These 3 events directly influenced the development of subsequent reports and recent regulatory mandates that highlight the key supporting role of IPC programs in advancing successful AS interventions across the entire continuum of patient care, including:

- CDC Core Elements of Hospital Antibiotic Stewardship Programs,[9] CDC Core Elements of Antibiotic Stewardship for Nursing Homes,[10] CDC Core Elements of Outpatient Antibiotic Stewardship,[11] and Implementation of Antibiotic Stewardship Core Elements at Small and Critical Access Hospitals.[12] Each document identifies key structural and functional aspects of effective programs, and indicates that the work of physician and pharmacist AS program leaders is greatly enhanced by the support of other key groups, including IPC programs.
- National Quality Partners Playbook: Antibiotic Stewardship in Acute Care.[13] This comprehensive tool uses the CDC core elements as a framework and provides concrete strategies and practical suggestions to guide hospitals in strengthening existing AS initiatives or creating successful AS programs from the ground up.
- The Centers for Medicare and Medicaid Services new requirements for participation rule, effective in 2016, requires long-term care (LTC) facilities to update their IPC program, including requiring an IPC officer in 2019, and an AS program that includes antibiotic use protocols and a system to monitor antibiotic use to be implemented in 2017.[14] The Centers for Medicare and Medicaid Services proposed infection control conditions-of-participation rule that requires AS programs in all acute care and critical access hospitals is among the pending regulations awaiting approval.
- The Joint Commission Antimicrobial Stewardship Standard MM.09.01.01, effective January 1, 2017, requires hospitals, critical access hospitals, and nursing care centers have AS programs based on current scientific publications, and to have an AS multidisciplinary team that includes IPs.[15] The original standard contained 8 elements of performance (EPs)[15]; however, effective October 1, EP 3 (The [critical access] hospital educates patients, and their families as needed regarding the appropriate use of antimicrobial medications, including antibiotics) was deleted. This decision was based on feedback to The Joint Commission that education for patients regarding specific antimicrobial therapy they are receiving is already required under other medication management standards and that the value of general education on AS principles was unlikely to be retained by hospitalized patients and families and would be more appropriately delivered in outpatient settings.[16]

THE SYNERGY OF IPC AND AS PROGRAMS

IPC and AS are bound by a strong *esprit de corps* and shared common goal—to keep patients safe and to improve patient outcomes, regardless of where care is delivered. The increasing incidence of MDRO infections has become a safety concern for patients across the continuum of patient care. MRDO infections are more difficult to treat, incur greater treatment costs, and have greater morbidity and mortality than infections caused by organisms susceptible to antibiotics. Antibiotic misuse and overuse facilitates the development of MDROs, as well as CDI infections – an antibiotic-associated adverse drug event – making AS an important synergistic HAI prevention and control strategy.[17] In fact, a recent meta-analysis showed AS programs reduced the incidence of infections and colonization with multidrug-resistant gram-negative bacteria, extended-spectrum β-lactamase-producing gram-negative bacteria, and methicillin-resistant *S aureus*, as well as the incidence of CDI infections.[18] Furthermore, AS programs, when implemented alongside IPC measures, especially hand-hygiene interventions, were more effective than implementation of AS alone—verifying that a well-functioning IPC program is fundamental to a successful organizational AS strategy.[18] Similar data have also shown that the addition of AS interventions can enhance results of robust IPC measures, particularly when addressing an outbreak.[19]

AS programs have been shown to improve patient outcomes, reduce antimicrobial agent-related adverse events, and decrease AMR.[18-21] To date, primary strategies include prescriber preauthorization and prospective audit and feedback, with supplemental strategies such as guidelines and clinical pathway development, intravenous-to-oral conversion protocols, limiting inappropriate culturing, and provider education.[2,9-12] Changing practices and prescribing patterns and learned behaviors of physicians, nurses, pharmacists, and other health care providers will take time and investment, but is critical to affecting a long-term solution to the rise of AMR and CDI infections. It is equally important that all clinicians depend on evidence-based IPC interventions to reduce demand for antimicrobial agents by preventing infections from occurring in the first place, and making every effort to prevent transmission when they do. IP and HE leaders are credible IPC subject-matter experts with additional social and behavioral skills to effectively engage the different professional disciplines to promote, implement, support, sustain, and evaluate IPC strategies across practice settings—many of the same skills needed by those leading AS programs. IPC and AS programs are intrinsically linked, making effective collaboration essential to ensure patient safety.

The CDC identifies core elements associated with successful AS programs—7 elements for hospitals and LTC facilities[9,10,12] and 4 elements for outpatient facilities[11]—and provides a framework for implementation. Tables 1 and 2 provide a description of each element. APIC, SHEA, and SIDP support the CDC core elements as an AS framework and believe the following related to the synergy of IPC and AS:

1. Leadership commitment. Health care system leaders must prioritize IPC and AS as part of wider patient safety strategies, creating an infrastructure to promote, sustain, and disseminate best practices across the continuum of patient care. IPC and AS program leaders must work together to align their programs, promoting communication and collaboration, and reducing the likelihood of redundant initiatives. Given the synergy between the programs, they should seize every opportunity to benefit from each other's expertise and organizational influence and partner when making the case for program support and necessary resource allocation to clinical and administrative leadership.
2. Accountability. AS programs are best led by infectious disease (ID) physicians with clinical pharmacists with additional stewardship training.[2,3,9] Although this is the preferred approach, assuming this additional responsibility may exceed the capacity and/or capability of some ID physicians and/or clinical pharmacists and be impractical for community and critical access