

SHEA Antimicrobial Stewardship Education Program:

Transforming Practice, Improving Care

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Structured Abstract max 250 words

Purpose: Define a universal, inter-professional profile of the knowledge and skills required for effective antimicrobial stewardship (AS).

Scope: Create a distilled a list of learning needs and priorities to guide initiatives to advance the practice and impact of antimicrobial stewardship in a needs document and Web resource.

Methods: Work with SHEA volunteers and partner leaders to scope out the issue, develop a white paper, and create a web resource to targeted physicians and pharmacists with this information.

Results: The white paper will be published in the December 2014 issue of *Infection Control and Hospital Epidemiology*, the Website www.stewardship-education.org is online. The white paper was used as the reference to create training by SHEA and IDAC in response to a California law requiring stewardship programs at all California Acute Care facilities.

Key Words: Stewardship, Education, Best practices, stewardship knowledge gap

Purpose (Objectives of Study).

The specific objectives of this project included the following:

1. **Define a universal, inter-professional profile of the knowledge and skills required for effective antimicrobial stewardship (AS).** This objective will clarify the definition of antimicrobial stewardship in practice and provide a benchmark for individuals and institutions to assess skill sets and team resources and roles essential to improving antimicrobial use in patient care.
2. **Widely disseminate this resource to an inter-professional community across healthcare settings.** Using collaborator networks, media extensions via relationships with such organizations as the CDC and Medscape, and international collaborations (e.g., PAHO, WHO Global Infection Control Network), we will expand the awareness of this resource and drive audience development for educational content.
3. **Facilitate individualized benchmarking and skill development planning.** Evaluating professional society programs, educational content and other resources allows an individual to assess their skills and knowledge against the “map” and create a customized educational pathway. This “mapping” also will highlight content needs that will be essential to continuous skill development in the field.
4. **Evaluate impact and identify additional unmet educational needs.** Aggregating uptake data and information about the change in knowledge and practice will demonstrate the value of the inter-professional intervention focus. Such evaluation will also lead to clarification on knowledge and skills where collaborative content development could be most beneficial to the field.

Scope (Background, Context, Settings, Participants, Incidence, Prevalence).

While antimicrobial drugs revolutionized healthcare across medical disciplines, drug resistance is a serious threat to public health in the United States and internationally. The urgency of the problem of drug resistance cannot be overstated, as multidrug resistant infections are difficult to treat and, in some cases, medications of last resort are becoming ineffective. The World Health Organization concluded in a recent surveillance report that antibiotic resistance threatens to unravel decades of medical progress and warns of a “post-antibiotic era” where treatable, common injuries or illnesses may become incurable and fatal.

The Centers for Disease Control and Prevention (CDC) estimate that 2 million United States’ residents acquire a drug resistant infection each year. While the CDC estimates 23,000 annual fatalities from drug-resistant pathogens, the agency acknowledges this statistic to be a gross underestimate. Clostridium difficile (C. difficile), carbapenem-resistant enterobacteriaceae (CRE), and drug-resistant Neisseria gonorrhoeae are classified as “urgent threats” because of a relative high mortality and/or severely limited treatment options. C. difficile, the most common hospital-acquired infection, is responsible for 14,000 deaths, annually, and a fluoroquinolone-resistant strain has developed. CRE is of grave concern because these pathogens are resistant to carbapenems, which is considered treatment of

last resort. CRE is responsible for approximately 9,000 infections and 610 fatalities, annually. Systemic infections with methicillin-resistant *Staphylococcus aureus* (MRSA) have a mortality rates as high as 20% with approximately 19,000 deaths each year in the US.

Because antimicrobial agents lose their efficacy if not appropriately used, programs to stem inappropriate and redundant antimicrobial use is an urgent priority. However, the use of these agents is a complex subject in light of changing resistance patterns and optimal regimens, coupled with and rising healthcare costs. Therefore, antimicrobial stewardship programs are increasingly recognized as an essential intervention to preserve the effectiveness of antimicrobial agents, reduce resistance, and improve patient outcomes while lowering healthcare costs.

Antimicrobial stewardship programs (ASPs) have arisen in the past fifteen years to respond to drug resistance at the level of hospital or medical system. Studies of ASPs have found consistent reductions in antibiotic use, which has benefits in patient safety and in healthcare costs. These programs are especially beneficial in adapting to the latest scientific research and medical data, as pathogens evolve and new knowledge supplants prior guidelines. Despite the preponderance of data that finds benefits and reduced costs of antimicrobial stewardship programs, adoption on the hospital level has been inconsistent.

From SHEA member surveys, program evaluations from five years of SHEA-CDC Epidemiology Training courses and workshop evaluations from four unique activities addressing AS (data on file), SHEA discerned the knowledge and practice needs that guide our inception of this project. Data were collected using a one-month all-member survey of research and practice priorities in 2008 and 2012; post-activity evaluation surveys; and 60-day post-activity follow up surveys. All responses were aggregated and reviewed by educational staff, the SHEA Antimicrobial Stewardship Task Force, and SHEA research and education committees. Based on this review, SHEA distilled a list of learning needs and priorities to guide initiatives to advance the practice and impact of antimicrobial stewardship, including the following:

- Improved understanding of how inappropriate prescribing contributes to resistance;
- Consistent knowledge of regulatory mandates regarding appropriate antimicrobial use;
- Improved clinical understanding of antimicrobial classes;
- Ability to develop algorithms and antimicrobial use guidelines;
- Ability to identify viable interventions appropriate to unique populations;
- Ability to identify and respond to antimicrobial shortages;
- Improved knowledge of methods of obtaining and interpretation of microbiologic data;
- Ability to create and interpret an institutional antibiogram; and
- Ability to identify appropriate outcome and process measures that demonstrate impact of antimicrobial stewardship interventions on cost and patient outcomes.

Ultimately, this in house research led us to understand the scope of the issue and the best ways to address it – in both the healthcare epidemiology community and with other physicians and pharmacists involved in stewardship.

Methods (Study Design, Data Sources/Collection, Interventions, Measures, Limitations).

Our approach included the following methods:

- Identification of key partner organizations based on established interest in antimicrobial stewardship and efforts specifically in education and practice implementation
- Consensus building process using a series of guided discussions over teleconference to pinpoint specific areas of knowledge and skills essential to implementing antimicrobial stewardship
- Refinement of core competencies that can be endorsed by the partners and published as a consensus document
- Collaborative review of existing educational content (modules, certification programs, sample and template documents and other resources) to map these resources to the core competencies
- Creation of a centralized, co-branded web portal that presents these resources to the target audiences
- Measurement of dissemination and utilization through web analytics, surveys, and post content evaluations and feedback tools

While the technical expertise was provided by volunteer members of SHEA and our partner organizations, SHEA staff provided the backbone of setting up the calls, developing the Website, measurements, etc. in order to implement the approach outlined above.

Results (Principal Findings, Outcomes, Discussion, Conclusions, Significance, Implications).

SHEA worked with volunteers from our membership as well as partner organizations including American Society of Health System Pharmacists (ASHP), Infectious Diseases Society of America (IDSA), MAD-ID, National Foundation of Infectious Diseases (NFID), Pediatric Infectious Diseases Society (PIDS) and Society for Infectious Disease Pharmacists (SIDP). It was essential that all of the partner organizations met and collaborated on this project to ensure a collaborative approach to stewardship best practices. This group was able to lend expertise to the issue and cover all sides of the needs assessment for stewardship programs and establish a baseline of knowledge through numerous teleconferences and email exchanges.

The core competencies document was finalized and will be printed in the December 2014 issue of *Infection Control and Hospital Epidemiology* (ICHE). It took time to develop and finalize but the significance is key since it provides a roadmap to those hospitals looking to develop a stewardship program as well as showing hospitals what a ‘best practice’ program looks like as a goal. In researching this matrix it was apparent that not all stewardship programs are created equal and the availability of resources to even know where to start is often lacking. The fact that all the partners could come to consensus on this white paper illustrates the strength of this document as a resource.

As this was in process, the Website www.stewardship-education.org was created to map existing programs to these vital areas. Through this ongoing mapping, it was determined that there were

elements that were not being addressed and the groups involved agreed to develop or address in training in order to better round out the offerings. The groups each sent out the link to the Website and it was included in some press and op eds that SHEA specifically wrote in conjunction with CDC's Get Smart Week 2013 as well as the CDC's Vital Signs launch in March 2014 that addressed stewardship goals and resources.

Ultimately, all of this work will be incorporated as the partner organizations, particularly SHEA, addresses the call to action set forth in the National Strategy and President's Council of Advisors on Science and Technology (PCAST) that addressed the issue of antimicrobial resistance but highlighted the role of antimicrobial stewardship. This is best highlighted with SHEA's creation of training that follows the outline of the matrix for California hospitals impacted by the SB1311 law that mandates all acute care hospitals implement a stewardship program.

In conclusion, this work is the necessary backbone for the larger work that needs to be done which is the creation of stewardship programs at not only acute care facilities – but at post-acute care, long-term care and outpatient facilities in order to solve the larger issue of antimicrobial resistance. It also addresses one of the main barriers to implementation included awareness about how to implement an antimicrobial stewardship program. With the national spotlight on antimicrobial resistance and the role that stewardship plays this effort is exceedingly important to get the message into the hands of every practitioner and hospital in order to make stewardship central to all decision making in regards to antibiotics.

List of Publications and Products

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