A Petition to the Board of Pharmacy Specialties Requesting Recognition of Infectious Diseases Pharmacy Practice as a Specialty

Prepared by:

Vicki Basalyga

Stephanie Bulak

Patrick G. Clay

Sandy Estrada

Jason C. Gallagher

Patti G. Manolakis

Mitchel C. Rothholz

Douglas Slain

C. Edwin Webb

Sponsored by:

American College of Clinical Pharmacy

American Pharmacists Association

American Society of Health-System Pharmacists

Society of Infectious Diseases Pharmacists

October 2016

Table of Contents

Task Group on Infectious Diseases Pharmacy

Member Roster

CLINICAL EXPERTS

STAFF LIAISONS

American College of Clinical Pharmacy (ACCP)

Jason C. Gallagher, PharmD, FCCP, BCPS, FIDSA
Clinical Professor
Clinical Specialist, Infectious Diseases
Director, PGY2 Residency in Infectious Diseases Pharmacy
Temple University
307 North Broad Street
Philadelphia, PA 19140
Office Phone: 215-707-2573
Email: jason.gallagher@temple.edu

C. Edwin Webb, PharmD, MPH
Associate Executive Director
American College of Clinical Pharmacy
1455 Pennsylvania Avenue, NW, Suite 400
Washington, DC 20004-1017
Office Phone: 202-621-1820
Email: ewebb@accp.com

American Pharmacists Association (APhA)

Patrick G. Clay, PharmD, AAHIVP, CPI, CCTI, FCCP
Professor, Pharmacotherapy, University of North Texas System College of Pharmacy
3500 Camp Bowie Blvd., RES 411F
Fort Worth, TX 76107
Office Phone: 817-735-2798
Email: Patrick.Clay@unthsc.edu

Mitchel C. Rothholz, RPh, MBA
Chief Strategy Officer
American Pharmacists Association
2215 Constitution Ave, NW
Washington, DC 20037
Office Phone: 800-237-2742, ext. 7549
Email: mrothholz@aphanet.org

American Society of Health-System Pharmacists (ASHP)

Douglas Slain, PharmD, BCPS, FCCP, FASHP
Professor
Infectious Diseases Clinical Specialist
West Virginia University
1124 Health Sciences North
P.O. Box 9520
Morgantown, WV 26506-9520
Office Phone: 304-293-1462
Email: dslain@hsc.wvu.edu

Vicki Basalyga, PharmD, BCPS
Director, Section of Clinical Specialists and Scientists
Pharmacy Practice Sections
American Society of Health-System Pharmacists
7272 Wisconsin Ave
Bethesda, MD 20814
Office Phone: 301-664-5813
Email: vbasalyga@ashp.org

Society of Infectious Diseases Pharmacists (SIDP)

Sandy Estrada, PharmD, BCPS (AQ-ID)
Pharmacy Clinical Specialist, Infectious Diseases
Lee Memorial Health System
2776 Cleveland Ave
Ft. Myers, FL 33901
Office Phone: 239-343-3737
Email: sandy.estrada@leememorial.org

Stephanie Bulak
Associate Executive Director
Society of Infectious Diseases Pharmacists
823 Congress Avenue, Suite 230
Austin, Texas 78701
Office Phone: 512-328-8632
Email: sbulak@eami.com

BPS Petition Development Consultant

Patti Gasdek Manolakis, PharmD
President, PMM Consulting, LLC
16726 Hammock Creek Place
Charlotte, NC 28278
Office Phone: 704-588-3981
Email: pmanolakis@pmmcsolutions.com

Disclosure: Patti Gasdek Manolakis is under contract with the petitioning organizations to coordinate the development and submission of this petition. She received payment for her work on this initiative.

Definition of Infectious Diseases Pharmacy Practice

Infectious diseases pharmacy practice specializes in the use of microbiology and pharmacology to develop, implement, and monitor drug regimens that incorporate the pharmacodynamics and pharmacokinetics of antimicrobials to optimize therapy for patients. The practice requires pharmacists to use clinical and evidence-driven knowledge to develop appropriate antimicrobial therapies to more rapidly resolve infections while decreasing adverse events, complications, and resistance. The practice includes direct patient care provided through interprofessional health care teams, collaborative leadership of antimicrobial stewardship programs, education of health care providers, preventive services including immunizations, and advocacy for appropriate antimicrobial utilization. Specialty pharmacy practice in infectious diseases uniquely improves public health by optimizing antimicrobial potential in individual patients and narrowing the resistance trends that occur in society by preventing progression of antimicrobial resistance and infectious diseases.

Executive Summary

American College of Clinical Pharmacy (ACCP)
American Pharmacists Association (APhA)
American Society of Health-System Pharmacists (ASHP)
Society of Infectious Diseases Pharmacists (SIDP)

A Petition to the Board of Pharmacy Specialties Requesting Recognition of Infectious Diseases Pharmacy Practice as a Specialty

Executive Summary

Definition of Infectious Diseases Pharmacy Practice

Infectious diseases pharmacy practice specializes in the use of microbiology and pharmacology to develop, implement, and monitor drug regimens that incorporate the pharmacodynamics and pharmacokinetics of antimicrobials to optimize therapy for patients. The practice requires pharmacists to use clinical and evidence-driven knowledge to develop appropriate antimicrobial therapies to more rapidly resolve infections while decreasing adverse events, complications, and resistance. The practice includes direct patient care provided through interprofessional health care teams, collaborative leadership of antimicrobial stewardship programs, education of health care providers, preventive services including immunizations, and advocacy for appropriate antimicrobial utilization. Specialty pharmacy practice in infectious diseases uniquely improves public health by optimizing antimicrobial potential in individual patients and narrowing the resistance trends that occur in society by preventing progression of antimicrobial resistance and infectious diseases.

— ACCP/APhA/ASHP/SIDP Infectious Diseases Task Group

Background

By acquiring specialized knowledge and skills and creating a unique practice beyond the scope of entry-level pharmacy practice defined by licensure examination, an increasing number of pharmacists have distinguished themselves through the care of patients with infectious diseases according to the above *Definition of Infectious Diseases Pharmacy Practice*. In recognition of these efforts, the American College of Clinical Pharmacy (ACCP), the American Pharmacists Association (APhA), American Society of Health-System Pharmacists (ASHP), and the Society of Infectious Diseases Pharmacists (SIDP) have partnered to develop a petition to the Board of Pharmacy Specialties (BPS) to recognize infectious diseases pharmacy practice as a specialty.

BPS Petition Process

The *BPS Petitioner's Guide for Recognition of a Pharmacy Practice Specialty* outlines seven criteria, each with a list of supporting guidelines, to be addressed in a petition for specialty recognition. The petitioning organizations conducted a comprehensive literature review, examined in detail the 2013 BPS *Report of the Role Delineation Study of Infectious Diseases Pharmacy*, and conducted web-based surveys of infectious diseases pharmacists and their employers to amass evidence to support the development of this petition. The evidence presented in the petition for each of the BPS criteria is summarized below.

Criterion A: Need

This criterion identifies the public health and patient care needs that are currently unmet by pharmacists in generalized practice, pharmacists practicing in other specialty areas, or by other health professionals. The petition establishes how specifically trained pharmacists in specialized infectious diseases pharmacy practice can effectively meet these needs and fulfill the profession's responsibility to improve the health and welfare of the public.

Infectious diseases and their pervasive effects know no boundaries; patients of all ages, cultures, socioeconomic distinctions, and with all types of comorbidities are affected. Unlike other specialties and diseases where the disease processes are driven by functions and dysfunctions of the human body, the opponent in infectious diseases is a living organism with its own DNA and processes of replication, battle, and adaptations. Predictive models of response may or may not apply. Infectious diseases pharmacists provide care to patients across the spectrum of infectious diseases, including human immunodeficiency virus infection; provide expertise within interprofessional care teams; engage in collaborative leadership of antimicrobial stewardship programs to ensure appropriate and judicious use of antimicrobials to prevent emergence and proliferation of resistant organisms; and engage in preventive care through championing of immunizations against vaccine-preventable illnesses. In patients with serious infections and patients who may be immunocompromised or compromised by other coexisting conditions, care provided by infectious diseases pharmacists has potentially life-and-death consequences.

To accurately, safely, and skillfully manage and provide care to patients, pharmacists with specialized knowledge and experience work in interprofessional teams to assimilate clinical and technological information as well as develop and refine treatment plans. Medication therapy is a central component to the care of patients with infectious diseases, who sometimes require specialized pharmacologic interventions, to efficiently and effectively treat an infection, manage complications and adverse events, and prevent emergence of resistance within institutions. The infectious diseases pharmacist brings a deep understanding of

pharmacotherapeutics in patients with infectious diseases, resistance patterns of microorganisms, and epidemiology, and has the ability to adeptly interpret and apply clinical, biochemical, technological, and microbiologic data to monitor response. Pharmacists with the expertise to perform these functions and skills are central to interprofessional health care teams.

BPS recognition of infectious diseases pharmacy practice as a specialty and certification of infectious diseases pharmacists would provide a foundation and pathway for pharmacists who desire to meet these important public health and societal needs to focus their efforts to advance their knowledge, skills, and abilities through training, education, and professional development needed to equip and prepare themselves to meet these needs.

Criterion B: Demand

This criterion establishes that there exists a significant and clear health demand to provide the necessary public reason for certification. This is demonstrated through employer survey data, assessment of employment opportunities for infectious diseases pharmacy specialists, and letters and statements by individuals in specific areas within the health care system. Demand is viewed as a willingness and ability to purchase the services of a Board Certified Pharmacist.

The demand for infectious diseases pharmacists with specialized knowledge and skills needed to perform the unique and specialized functions required of pharmacists in infectious diseases pharmacy practice has increased steadily over time. With greater emergence of antimicrobial-resistant organisms and changes in federal regulations and policies, there has been a marked and sharp increase in demand over the last 5 years, concurrent with enhanced emphasis on stemming emerging antimicrobial resistance and improving health care quality—resulting in doubling of the number of residency training positions and increasing employer demand.

Key national medical and health care organizations and leaders in infectious diseases have demonstrated support for specialty recognition and attest to the demand for infectious diseases pharmacists with specialized knowledge and skills. This petition includes organizational letters of support from the American Society for Microbiology (ASM), the Infectious Diseases Society of America (IDSA), and the Society for Healthcare Epidemiology of America (SHEA), as well as individual leaders from The Pew Charitable Trusts and Infectious Diseases Physicians of Spokane, Deaconess Hospital.

The *Survey of Infectious Diseases Pharmacists* demonstrates a persistent and growing demand for infectious diseases pharmacists. Infectious diseases pharmacist employers who responded were asked to provide the total number of full-time equivalents (FTEs) allocated to serving

patients with infectious diseases within their institutions. The average number of FTEs across responding institutions was 3.7. One hundred percent of employers of infectious diseases pharmacists from the institutions that responded estimate maintaining or growing the number of infectious diseases pharmacists within their institutions. Eighty percent anticipate an increase in number of infectious diseases pharmacist positions within their institutions over the next 5 years.

Of responding employers, 99% indicate a desire for advanced training of infectious diseases pharmacists in their institutions: 95% desire residency training programs or fellowships, and 56% desire completion of certificate training programs in antimicrobial stewardship and/or immunizations. Seventy-eight percent of employers responding to the *Infectious Diseases Pharmacist Survey* indicated that it was "highly likely," "likely," or "somewhat likely" that they would require a new specialty credential in infectious diseases if approved by BPS for newly hired infectious diseases pharmacists within their institutions.

The *Survey of Infectious Diseases Pharmacists* also demonstrated strong demand for specialty certification among pharmacists practicing in the proposed specialty. Through this survey, 64% of responding pharmacists reported they would be "highly likely," "likely," or "somewhat likely" to pursue specialty certification within the next 5 years if the petition to recognize infectious diseases pharmacy practice as a specialty is approved.

Criterion C: Number and Time

This criterion quantifies that there are a reasonable number of individuals who devote most of the time of their practice to infectious diseases pharmacy practice.

The web-based *Survey of Infectious Diseases Pharmacists* was fielded to 11,233 individuals who are members of the petitioning organizations practicing within an infectious diseases setting, having an expressed interest in infectious diseases practice, or having completed a postgraduate year two (PGY2) residency in infectious diseases. Names were identified through membership records within ACCP, APhA, ASHP, and SIDP, and the lists were deduplicated. The survey yielded 628 responses, of these, 606 responses are from pharmacists who practice in infectious diseases. More than 89% of practicing infectious diseases pharmacist respondents indicated they are practicing at a specialty level as defined in this petition.

Based on survey results, membership records evaluated, and the estimated percentages of pharmacists who join professional organizations, we estimate that a total of 14,000 to 15,000 pharmacists are currently engaged in infectious diseases pharmacy practice at a specialty level. This number is likely underestimated because not all pharmacists in infectious diseases practice

are members of ACCP, APhA, ASHP, SIDP, or other organizations; however, we believe that those pharmacists who are more professionally engaged are more likely to pursue specialty recognition.

The *Report of the Role Delineation Study of Infectious Diseases Pharmacy* and the *Survey of Infectious Diseases Pharmacists* quantified the percentage of time in an average week that responding infectious diseases pharmacists spent engaged in direct patient care activities. Through the role delineation study, approximately 56% of respondents were found to practice 40 or more hours per week in their infectious diseases practice site; this number was replicated through the *Survey of Infectious Diseases Pharmacists*, which also quantified that more than 70% engage more than 20 hours per week directly in infectious diseases practice. The survey results also showed more than 72% of infectious diseases pharmacists responding reported spending more than 50% of their time dedicated to direct patient care at the specialty level.

The growth in the number of residency training programs and positions further demonstrates increasing demand for and numbers of pharmacists with specialty training in infectious diseases pharmacy. In only 5 years, the number of PGY2 infectious diseases residency graduates has nearly doubled, from 40 PGY2 infectious diseases residency programs and positions in 2011 to 78 programs in 2016.

Furthermore, over 80% of infectious diseases pharmacists who responded to the *Survey of Infectious Diseases Pharmacists* have completed advanced clinical training through residencies and fellowships, and nearly a quarter have more than 10 years of experience practicing in infectious diseases pharmacy.

Criterion D: Specialized Knowledge and Criterion E: Specialized Tasks/Skills

These criteria outline the specialized knowledge of one or more of the pharmaceutical sciences and the biological, physical, behavioral, and administrative sciences which underlie them that are required by infectious diseases pharmacy specialists and define the specialized tasks/skills of infectious diseases pharmacy, which are distinct from other BPS-recognized pharmacy specialties.

BPS has conducted a role delineation study of infectious diseases pharmacy practice and has issued a call for petition in this specialty area; therefore, according to the *BPS Petitioner's Guide for Recognition of a Pharmacy Practice Specialty,* Criterion D and Criterion E are not required to be a part of this petition to BPS.

The *Report of the Role Delineation Study of Infectious Diseases Pharmacy* outlines four domains within the proposed specialty. Sixty-nine distinct specialized knowledge bases were validated to underpin these four domains of infectious diseases pharmacy practice. Pharmacists practicing within infectious diseases pharmacy must acquire specialized knowledge and skills in these areas in order to perform the specialized tasks and functions performed in this proposed specialty. A high-level summary is provided in the table below.

Domains of Infectious Diseases Pharmacy Role Delineation

Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and desigining/modifying, implementing, and monitoring patient-specific plans of care.
Domain 2: Education, Research, and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious diseases pharmacy, and the education of current and future healthcare professionals.
Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.

Criterion F: Education and/or Training

This criterion describes the education, training, and experience offered and required to acquire specialized knowledge and skills to perform the specialized functions and distinguishes from the generalist practitioner and the requirements of initial licensure.

According to the Accreditation Council for Pharmacy Education (ACPE) *Accreditation Standards and Key Elements for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree,* the pharmacy curriculum provides a thorough foundation in the biomedical, pharmaceutical, social/behavioral/administrative, and clinical sciences. Based on the ACPE standards, the Doctor of Pharmacy degree program prepares graduates with the competencies needed to: [1]

- Enter advanced pharmacy practice experiences (APPE-ready)

- Provide direct patient care in a variety of health care settings (practice-ready)
- Contribute as a member of an interprofessional collaborative patient care team (team-ready).

The North American Pharmacist Licensure Examination and state licensure requirements set a minimum standard for practicing pharmacy. Following licensure, pharmacists have not yet acquired the differentiated knowledge and skills required for specialty practice in infectious diseases pharmacy. The most direct and efficient training path to obtain the required specialized knowledge and skills includes completion of a Doctor of Pharmacy degree, postgraduate year one (PGY1) residency training, followed by PGY2 infectious diseases residency or fellowship, clinical work experience, and self-study. Other methods, depending on the years of experience in infectious diseases pharmacy, may include a combination of Doctor of Pharmacy education, clinical work experience, certificate training programs, other advanced training through self-study, and experiential learning.

Specialty residency training programs provide effective structured experiential learning opportunities in infectious diseases pharmacy and have been increasingly utilized to prepare pharmacists for advanced practice in infectious diseases as more programs have become available over time. As of 2016, there are 78 PGY2 infectious diseases residency programs that train up to 80 infectious diseases pharmacists with specialized knowledge and skills each year. This number has more than tripled since 2007 when there were 20 programs and nearly doubled over the past 5 years, from 40 programs in 2011. There are also 13 infectious diseases pharmacy fellowship positions available as of July 2016.

BPS makes final determinations regarding the education and training requirements for eligibility for specialty certification.

Criterion G: Transmission of Knowledge

This criterion establishes that there is adequate transmission of specialized knowledge through professional, scientific, and technical literature directly related to specialized infectious diseases pharmacy practice.

The literature base and foundation of evidence in infectious diseases is strong and long-standing. Dissemination of information, emerging evidence, and pharmacotherapeutic advances occur through a wide array of peer-reviewed medical, pharmacy, and health care journals and other publications. Issues related to medication use in infectious diseases are of interest to a multidisciplinary team, which demands dissemination of information through mainstream journals, newsletters, and other publications—including those that are not limited

to infectious diseases issues—in order to advance practitioner knowledge of infectious diseases and emerging threats, resistance trends, and emerging pharmacotherapeutic advances in preventing and managing infectious diseases and vaccine-preventable illnesses. A select bibliography of 72 articles in infectious diseases pharmacy practice was compiled for this petition; 36 of these are annotated and summarized in an evidence table to support the petition.

Professional organizations and networking groups provide means and venues for connection, networking, and sharing of evidence, information, and best practices for infectious diseases pharmacists to provide optimal care in infectious diseases practice. These organizations and networking groups promote mentorship and expansion of knowledge. Pharmacy practice organizations offer hundreds of hours of live and web-based continuing education opportunities related to new developments and issues in infectious diseases practice each year that foster dissemination of knowledge and practice excellence. Enduring resources are also available through various modalities, technologies, and formats. Professional association awards programs also establish and recognize excellence in practice and research in infectious diseases.

Conclusion

The demand for care provided by infectious diseases pharmacists has grown consistently over time, with a sharp increase in the past 5 years and demand continues to grow. Public health threats from continuous evolution of drug-resistant organisms coupled with efforts to improve medication use and health care quality have resulted in a series of federal policies, regulations, and standards through the Centers for Medicare and Medicaid Services, the Centers for Disease Control and Prevention, the White House, quality organizations, and accrediting agencies that drive demand for advancement. Given the predicted increase in unmet public health needs, it is clear that high-quality care for patients with infectious diseases will require the full application of specialized knowledge and skills of infectious diseases pharmacists and their direct involvement in medical teams and antimicrobial stewardship programs to help improve health outcomes and medication use for patients treated for infectious diseases and to prevent morbidity and mortality associated with infectious diseases and their complications.

The specialized knowledge and skills acquired by infectious diseases pharmacists, supported collectively by urgent societal need; an increasing demand for, and numbers of, infectious diseases pharmacists; and the evolution of training programs combine to produce a foundation that is substantive and sufficiently unique to support the recognition of infectious diseases pharmacy practice as a distinct specialty. Availability of BPS specialty certification of infectious diseases pharmacists would provide a valid, rigorous method to recognize infectious diseases

pharmacists and their contributions to preventive care, public safety, and the care of patients with infectious diseases. In addition to supporting the pharmacist's path to advancement in contemporary medicine, BPS specialty certification provides assurance of pharmacists' specialized knowledge and skills to other health professionals, stakeholders, and society.

Reference

[1] Accreditation Council for Pharmacy Education. *Accreditation Standards and Key Elements for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree*. 2015. Available at: https://acpe-accredit.org/pdf/Standards2016FINAL.pdf. Accessed August 30, 2016.

Criterion A

Need

CRITERION A: Need

The area of specialization shall be one for which specifically trained practitioners are needed to fulfill the responsibilities of the profession of pharmacy in improving the health and welfare of the public, which responsibilities may not otherwise be effectively fulfilled.

This criterion addresses NEED. BPS defines NEED as a condition of requiring supply.

Infectious diseases and their pervasive effects know no boundaries; patients of all ages, cultures, socioeconomic distinctions, and with all types of comorbidities are at risk. Unlike other specialties and diseases where the disease processes are driven by functions and dysfunctions of the human body, the opponent in infectious diseases is a living organism with its own DNA and processes of replication, battle, and adaptations. Predictive models of response may or may not apply. Infectious diseases pharmacists provide care to patients across the spectrum of infectious diseases, including human immunodeficiency virus (HIV) infection; provide expertise within interprofessional care teams; engage in collaborative leadership of antimicrobial stewardship programs to ensure appropriate and judicious use of antimicrobials to prevent emergence and proliferation of resistant organisms; and engage in preventive care through championing of immunizations against vaccine-preventable illnesses. In patients with serious infections and patients who may be immunocompromised or compromised by other coexisting conditions, care provided by infectious diseases pharmacists has potentially life and death consequences.

To accurately, safely, and skillfully manage and provide care to patients, infectious diseases pharmacists work collaboratively in interprofessional teams to assimilate clinical and technological information and develop and refine treatment plans. Medication therapy is a central component to the care of patients with infectious diseases and specialized knowledge and skills are needed to efficiently and effectively treat an infection, prevent and manage complications and adverse events, and slow the emergence of resistance within institutions. The infectious diseases pharmacist brings a deep understanding of pharmacotherapeutics in patients with infectious diseases, local patterns of antimicrobial resistance, and epidemiology. Furthermore, the infectious diseases pharmacist is able to skillfully and accurately interpret and

apply clinical, biochemical, technological, and microbiologic data to plan empiric regimens, monitor response, and adjust treatment plans.

Recognition by the Board of Pharmacy Specialties (BPS) of infectious diseases pharmacy practice as a specialty and board certification of infectious diseases pharmacists would provide a foundation and pathway for pharmacists who desire to meet these important public health and societal needs to focus their efforts to advance their knowledge, skills, and abilities through training, education, and professional development required to equip and prepare themselves to meet these needs.

GUIDELINE 1. Identify specific public health and/or patient care needs which are not being met currently and which pharmacists in the proposed specialty can meet effectively. If these needs are currently being met by another BPS Specialty, other areas of pharmacy practice, or by other health professionals, describe how these needs can be met more effectively by pharmacists in the proposed specialty.

Public Health Burden of Infectious Diseases

Infectious diseases present complex and serious public health and patient care needs. The Centers for Disease Control and Prevention (CDC) estimates that in 50% of cases, antimicrobials are used inappropriately—characterized by use when not indicated, the wrong type of antimicrobial, improper dosing and/or inadequate duration of therapy.[1] Infectious diseases and complications also cause a substantial burden on the economy through direct and indirect costs. In 2012, more than 20 million visits to physician offices and 3.9 million visits to hospital outpatient departments were due to infectious and parasitic diseases.[2] In hospitals, antimicrobials comprise nearly one-third of pharmacy medication budgets to provide inpatient care for infectious disease and complications from primary and health care–associated infections.[3] Health care–associated infections alone account for $45 billion in direct medical costs each year; *Clostridium difficile* adds $1 billion in excess health care costs every year.[4,5,6] Two infectious diseases, pneumonia and influenza, are among the leading causes of death and together constitute the third leading cause of catastrophic disability in the United States.[7,8] Furthermore, infectious diseases and their impact are not limited to eradication of the infecting organisms within afflicted patients. Treatment decisions for these patients can affect other patients around them, entire institutions, and communities with lasting complications and downstream implications for wellness and daily living.

Broadly, the public health threats from infectious diseases are so prevalent, with potential consequences so dire, that over the past 3.5 years from 2013 to the third quarter of 2016, the U.S. federal government has invested nearly $1 trillion ($929,941,000) in the research, tracking,

and dissemination of emerging scientific evidence, best practices, and information regarding infectious diseases, patient care, prevention, new treatments, and practice improvements to combat emerging drug resistance, through the National Institutes of Health National Institute of Allergy and Infectious Diseases, the CDC, the Food and Drug Administration, and other entities.[9,10] Emerging viral pathogens such as Ebola virus and Zika virus are increasing in prevalence and spreading beyond original geographic boundaries. No longer regionally isolated, they—along with HIV, hepatitis, and threats of pandemics—are routinely part of health care deliberations, policy emphasis, and mainstream consumer news. Infectious diseases pharmacists are strategically positioned at key points within patient care delivery, practice, and health systems to provide patient care and collaborative leadership and support in guiding therapeutic decisions in the best interest of patient care and society.

With evolving and emerging infectious organisms as well as limits in development of new and evolving therapies, the need for careful selection and management of infectious diseases treatments is paramount; these key functions are carried out by infectious diseases pharmacists. Likewise, the judicious use and stewardship of currently available antimicrobials and antivirals is paramount to extend the utility of these agents for the effective treatment of infections and prevent misuse and overuse that fuel the emergence of resistance. On the front end of the spectrum of care and management of infectious diseases, pharmacists engage in prevention through immunizations for vaccine-preventable diseases, empiric use and selection in primary infections, prevention of health care–associated or nosocomial infections, and use of immunotherapy in some infectious diseases—all of which require special knowledge, expertise, and attention best carried out by infectious diseases pharmacists.

Unmet Patient Care and Safety Needs in the Complex Clinical Management of Patients With Infectious Diseases and Complications

Antimicrobials, antivirals, and other anti-infectives and treatments that are central to the care of patients with infectious diseases require careful selection, dosing, and monitoring. Many patients treated in hospitals and health systems are seriously ill. Patients usually also have coexisting diseases and conditions, other medications, and factors that influence medication use, antimicrobial selection, and monitoring. Infectious diseases pharmacists, with specialized knowledge of infectious diseases and the microbiology behind these infections, are uniquely positioned and skilled to optimize antibiotic, antifungal, and antiviral therapies for patients. Their expertise equips them to incorporate pharmacodynamics and pharmacokinetics into the clinical decision-making process. Pharmacists with specialized knowledge, skills, experience, and education in infectious diseases recognize adverse events and toxicities associated with antimicrobial regimens and help interprofessional health care teams weigh the risks of these therapies against the benefits of eradicating the targeted pathogens and successfully treating

infections. They further recommend measures and monitoring to minimize the risk and impact of such adverse events. Programs that engage infectious diseases pharmacists to provide direct patient care for patients with infectious diseases have demonstrated improvements in clinical and humanistic outcomes.[11]

Unmet Needs in Antimicrobial Use, Stewardship, and Reversing Trends of Rapidly Progressing Antimicrobial Resistance

The CDC estimates that half of all antibiotic prescriptions in the United States are inappropriate, unnecessary, or not optimal for treatment. The prevalence of antimicrobial resistance in inpatient settings continues to increase as antibiotics are overprescribed, ineffectively selected for empiric therapy, prescribed with incorrect dosing, or prescribed for too short of a duration. Antimicrobial resistance presents current and heightening threats to society and, in particular, to individuals who are hospitalized, residing in institutions of care, and are immunocompromised or otherwise in fragile health. Improper antimicrobial use increases the prevalence and evolution of drug resistance and adds considerably to unnecessary patient care costs.

In its report, *Antibiotic Resistance Threats in the United States, 2013*, the CDC estimates that each year at least 2 million people are infected with antibiotic-resistant bacteria and at least 23,000 die as a direct result of that infection.[12] In follow up to the CDC report, President Obama issued an Executive Order and the White House has issued additional follow-up reports, including a National Action Plan for combatting antimicrobial resistance in the United States.[13] The plan outlines steps for implementing the National Strategy and addressing other federal policy recommendations, issuing a call for implementation by the year 2020. Infectious diseases pharmacists have the greatest depth of knowledge and insight into antimicrobials and their use, clinical microbiology, and identification of adverse events from antimicrobial use and misuse.

The Pew Charitable Trusts' Antibiotic Resistance Project aims to protect the public, including vulnerable patients receiving chemotherapy or being treated in intensive care units for antibiotic resistance. The project overview states the reality of the current crisis in this way: "…the proliferation of antibiotic-resistant bacteria—a result of decades of overuse in animal agriculture and human medicine combined with a lack of new drug development and innovation—has placed humanity on the precipice of what public health leaders call a 'post-antibiotic' world in which even routine and simple surgical procedures could have deadly consequences…."[14,15] This situation compels action among all in health care to identify evidence-based processes and methods to assure safe and effective use of antimicrobials and management of patients with infectious diseases.

Infectious diseases pharmacists are integral to solutions. Pharmacists with training in infectious diseases pharmacy practice contribute meaningfully to improving the quality of patient care; educating patients, families, and medical staff; and reducing antibiotic resistance. In addition to the direct impact on improving the quality of patient care, infectious diseases pharmacists serve invaluably in antimicrobial stewardship, which helps improve appropriateness, safety, and efficiency of antimicrobial use and decrease antimicrobial resistance in hospitals, other health care facilities, communities, and society. In one of the letters of support included under Criterion B, David Hyun, MD, of Pew's Antibiotic Resistance Project, contends, "Leadership and expertise provided by these pharmacists are an indispensable element of meaningful antimicrobial stewardship programs in hospitals and is recognized as such by the Centers for Disease Control and Prevention's (CDC) Core Elements of Hospital Antibiotic Stewardship Programs."

Peer-reviewed research and other scientific evidence presented as part of this petition document the value, role, and contributions by infectious diseases pharmacists in improving clinical outcomes of patients, identifying and correcting drug therapy problems, guiding appropriate use, and reducing unnecessary costs of care of patients with infectious diseases.[16,17,18,19] One study measured the impact of an infectious diseases pharmacist's temporary absence from the antimicrobial stewardship team; the investigators documented an increase in rates of inappropriate use of imipenem-cilastatin, linezolid, and micafungin during the pharmacist's absence of 27%, 39%, and 35%, respectively.[18] Corresponding increases in the average duration of therapy of 0.7, 4.0, and 3.2 days also were observed. In addition, there was a threefold increase in the number of cases of *C. difficile* infection during this period. [18] Infectious diseases pharmacists are integral members critical to effective, high-quality antimicrobial stewardship programs.[20,21,22]

Unmet Needs in Preventing and Treating HIV/AIDS and Other Chronic Viral Infections

In the United States, 1.2 million people currently live with HIV—the highest level ever—as treatments are extending lives, heightening the importance of prevention, treatment, and adherence to antiretroviral therapy (ART). While numerous successes have been achieved in fighting HIV since it first presented in the United States in 1981, compelling, unmet public health and patient care needs and challenges remain as HIV infection continues to spread and present risk to individuals and society. More than 44,000 people were diagnosed with HIV infection in the United States and territories in 2014; 13% of individuals who are infected with HIV are unaware of their condition. HIV testing allows early identification necessary for treatment and prevention. Certain geographic areas of the United States and populations of individuals are disproportionately affected by HIV. Treatment advances have substantially

reduced AIDS-related morbidity and mortality, extending lives and preventing transmission of the virus.[23]

Infectious diseases pharmacists serve critical functions in the care and management of patients with HIV infection as key members of the health care team guiding initiation of ART, managing and identifying adverse events, positively influencing adherence to ART, and engaging in practice-based research. Many HIV-infected patients are not in care, on treatment, or virally suppressed, and nearly a quarter of people newly diagnosed with HIV infection already had AIDS at the time of diagnosis—underscoring the importance of testing and early treatment. Infectious diseases pharmacists serve critical functions in screening and testing and encouraging initiation of and adherence to ART to prevent disease progression and transmission, and improving outcomes. HIV/AIDS remains a leading cause of death for some populations—eighth for individuals aged 25 to 34 years and ninth for those aged 35 to 44 years.[23]

Several studies have examined the effect of pharmacists' interventions on the treatment of HIV-infected patients. A systematic review of the effect of HIV clinical pharmacists on HIV treatment outcomes found that, in the majority of studies, involvement by an infectious diseases pharmacist was associated with significant improvements in ART adherence and higher rates of viral load suppression.[24,25]

Hepatitis C virus (HCV) infection is increasing in prevalence and impact, with high morbidity and disease progression that may ultimately lead to the need for liver transplantation in patients. Treatment and management of HCV often center primarily on medications, laboratory monitoring, and management of adverse effects, compounding morbidity and adding annual costs of $100,000 in the care for patients who require transplantation. U.S. health care costs related to HCV are projected to reach $10.7 billion in annual expenditures by 2019.[26] Infectious diseases pharmacists are integral throughout the continuum of care, ranging from the prevention of HCV infection to the care of patients with HCV infection, including guidance in the selection, management, and monitoring of treatment in HCV-infected patients.[26]

Unmet Needs in Preventing Hospital Readmissions and Health Care–Associated Infections

Inadequate treatment, duration of therapy, and prevention of infectious diseases in hospitals and health care facilities and across transitions of care contribute to spread of diseases among patients, acquisition of nosocomial infections, increased rates of re-hospitalization, progression of antimicrobial resistance, and increased morbidity and mortality. Increasingly efforts and incentives within health care are focused on ensuring appropriate use of antimicrobials,

adequacy of follow up and follow through across transitions of care, and prevention of secondary infections.

Community-acquired pneumonia is one of six diagnoses for which the Centers for Medicare and Medicaid Services (CMS) has implemented penalties for 30-day readmission following inpatient treatment of Medicare beneficiaries. Infectious diseases pharmacists play an important role not only in the proper selection and adjustment of inpatient therapy, but also in advising adjustments in therapy for patients in preparation for discharge. Functions performed by infectious diseases pharmacists also include communication among providers and education of patients and caregivers during transitions of care for patients who are discharged after, and oftentimes amid, therapy for community-acquired pneumonia and other infectious diseases. Ensuring appropriate medication selection and follow up affects not only inpatient care and clinical progress, but outcomes are also tied to potential economic penalties by CMS. More than half of the hospitals in the United States will incur penalty withholdings this fall (of 2016), collectively totaling upward of $528 million for the six diagnoses; this penalty amount is 20% higher than 2015, even though a comparable number of hospitals are affected.[27] Infectious diseases pharmacists serve an important role clinically and economically in facilitating transitions of care for patients with community-acquired pneumonia and other infectious diseases.

Health care–associated infections are increasingly the subject of emerging efforts, federal policies, and incentives and disincentives.[28] CMS is no longer reimbursing for care for some nosocomial infections.

In 2013, the National Quality Forum (NQF) Board of Directors endorsed 14 infectious disease quality measures. The measures address issues including appropriate treatment for upper respiratory infections, screening for tuberculosis and sexually transmitted diseases in HIV/AIDS patients, and vaccination and treatment for HCV infection.[29] Earlier this year, the National Quality Partners of NQF published an antimicrobial stewardship guidebook that highlights the drug expertise required in antimicrobial stewardship programs as part of the care and management of infectious diseases programs within hospitals and other institutions.

Evolving Needs in Outpatient Parenteral Antimicrobial Therapy

Outpatient parenteral antimicrobial therapy (OPAT) refers to the administration of parenteral antimicrobial therapy in at least two doses on different days without intervening hospitalization. OPAT has been shown to be clinically efficient and cost effective. Approximately 250,000 patients receive OPAT per year in the United States, allowing patients to complete treatment safely and effectively at home or another outpatient site, avoiding the need for

hospitalization and thus potential exposure to nosocomial pathogens, and decreasing costs. Examples of infections for which OPAT may sometimes be employed include infective endocarditis and other cardiovascular infections as well as osteoarticular, abdominal, respiratory, genitourinary, and skin and soft tissue infections.[30]

Infectious diseases pharmacists perform functions in patient selection for OPAT, antimicrobial selection, dosing and duration of therapy, and identification of adverse effects or secondary infections. They also manage complex needs of patients with underlying conditions and concomitant medications that compound the complexity of their care needs.

Unmet Needs in Evidence-Based Practice and Practice-Based Research

Immediate access to evidence-based medicine, current research, and a deep understanding of their application to the care of patients with infectious diseases are required to advance practice and improve quality of care for patients with infectious diseases. Infectious diseases pharmacists possess specialized knowledge and skills that enable them to collaborate with their interdisciplinary team members, determine the best course of action for these patients, and collaborate in research. The multidisciplinary care team relies on the infectious diseases pharmacist to adeptly assess medication regimens, patient status, and response based on clinical, microbiologic, and technological data, and to make recommendations that optimize patient outcomes. The infectious diseases pharmacist in specialized practice is a vital member of the multidisciplinary team by providing pharmacotherapy knowledge that helps to reduce adverse events and improve patient outcomes.

Although the existing research literature in infectious diseases is relatively strong, the scientific evidence underpinning infectious diseases practice is continuously evolving with emergence of drug-resistant organisms and emerging new mechanisms for resistance. As an example, Pew reports on a new type of antibiotic resistance discovered in China at the end of 2015, which has also been found in bacterial samples in the United States and other parts of the world. This resistance is of particular concern because it is caused by a gene that makes bacteria resistant to colistin and is readily transferable to different kinds of bacteria; these factors together increase the potential for new types of multidrug-resistant bacteria against which there may not yet be effective antimicrobials.[31]

Advances in technology and medication therapy demand aggressive ongoing research to assess the treatment of emerging infectious diseases and organisms and use of new medications, screenings, and technology. Patient safety relies on research and dissemination of information in the management of patients with infectious diseases. Infectious diseases pharmacists play an active and integral role in conducting and collaborating in practice-based research that refines

patient care practices, prevention, antimicrobial stewardship, and patient outcomes and disseminating results.

Infectious Diseases Pharmacists and Other Health Care Practitioners

Currently, physicians and pharmacist specialists in pharmacotherapy (including some with added qualifications in infectious diseases) and critical care are currently performing some of the functions in managing patients and participating in antimicrobial stewardship. The medical specialty of infectious diseases may be declining; measures such as underutilization of available fellowship positions may indicate an emerging trend toward reduction of interest in or emphasis on this specialty among physicians, although long-term implications are not yet known.[32] A reduction in the number of infectious diseases physicians would potentially compound the unmet needs, particularly in this time of increasing emphasis of health care and society on the burden of infectious diseases and antimicrobial resistance.

Infectious diseases pharmacists can more effectively perform these functions and provide necessary care and collaborative leadership of antimicrobial stewardship programs as a direct result of their in-depth level of knowledge, training, and specialized skills acquired through advanced training and practice. Infectious diseases pharmacy practice involves the application of specialized knowledge of infectious diseases, antimicrobials, microbiology, virology, immunology, and epidemiological patterns which are distinct from those required for practice in specialties of critical care, pharmacotherapy, and other specialties, as well as generalized practice.

In generalized pharmacy practice, the entry-level Doctor of Pharmacy degree and licensure by examination provide assurance of a baseline level of minimum competence; whereas specialty practice requires additional knowledge, skills, and the ability to assimilate complex and changing data and information at a much deeper level. Infectious diseases pharmacists provide care of patients at the bedside, as part of health care provider teams in caring for patients with infectious diseases, in addition to collaborative leadership of administrative and system-related functions.

Infectious diseases pharmacists apply foundational scientific knowledge of infectious diseases, microbiology, and specialized pharmacologic, pharmacotherapeutic, and pharmacokinetic principles and knowledge in the provision of direct patient care. Infectious diseases pharmacists share expertise to advise interprofessional team members in collaboratively discerning, analyzing, and making an informed recommendation for an empiric regimen for each individual patient, based on the assimilation of many factors. Education of patients and caregivers—particularly in transitions of care within hospitals and into the community—adds to the impact

on individual patients, health systems, and public health. Research and documentation functions and skills also contribute to effective monitoring processes, practice improvements, early identification of emerging patterns in care and resistance, and better patient and economic outcomes. The public health impact of antimicrobial stewardship is an important contribution and a unique aspect of infectious diseases pharmacy practice relative to other existing pharmacy specialties and to generalized pharmacy practice.

Critical care pharmacists approach antimicrobial stewardship through a lens of intensive care units and critically ill patients. Infectious diseases pharmacists add a broader perspective of the hospital and system, with insights that are more broadly inclusive of other areas of care and specialties.

Pharmacotherapy specialists bring a broad foundation of specialized knowledge across many areas, whereas the infectious diseases pharmacists would demonstrate a depth and breadth of expertise in infectious diseases and related medication use that clinical pharmacists who focus deeply in other specialty areas of practice may not have.

Added Qualifications. While there currently exists a mechanism for added qualifications in infectious diseases within the pharmacotherapy specialty through portfolio submission and review to document training and experience, this system does not provide the rigorous demonstration of the acquisition and application of knowledge available through certification by examination and related mechanisms. There are currently 275 pharmacists who are Board Certified Pharmacotherapy Specialists with Added Qualifications in Infectious Diseases (BCPS-AQ-ID).[33] The Portfolio Review Committee of the Specialty Council on Pharmacotherapy evaluates and recommends successful candidates to BPS for recognition of Added Qualifications. As the health care system demands greater priority, quality, and emphasis on antimicrobial use and stewardship—within all of health care by interprofessional teams that integrate infectious diseases pharmacists who have demonstrated the acquisition of specialized knowledge and skills and the ability to apply and perform functions required—a valid, reliable, assured mechanism must exist for the certification of these professionals.

GUIDELINE 2. Specify how the functions performed by pharmacists in the proposed specialty address these specific needs of the public's health and well-being such as improved safety, cost, quality of life and outcomes. Included in this discussion should be a description of how the public's health and well-being may be at risk if the services of practitioners in the proposed specialty are not provided.

As stated in the *Definition of Infectious Diseases Pharmacy Practice:* Infectious diseases pharmacy practice specializes in the use of microbiology and pharmacology to develop, implement, and monitor drug regimens that incorporate the pharmacodynamics and pharmacokinetics of antimicrobials to optimize therapy for patients. The practice requires pharmacists to use clinical and evidence-driven knowledge to develop appropriate antimicrobial therapies to more rapidly resolve infections while decreasing adverse events, complications, and resistance. The practice includes direct patient care provided through interprofessional health care teams, collaborative leadership of antimicrobial stewardship programs, education of health care providers, preventive services including immunizations, and advocacy for appropriate antimicrobial utilization. Specialty pharmacy practice in infectious diseases uniquely improves public health by optimizing antimicrobial potential in individual patients and narrowing the resistance trends that occur in society by preventing progression of antimicrobial resistance and infectious diseases. These functions require specialized knowledge and skills and are performed by infectious diseases pharmacists.

To accurately, safely, and skillfully manage and provide care to patients with infectious diseases, pharmacists with specialized knowledge and experience work in interprofessional teams to assimilate clinical and technological information and develop and refine treatment plans. Medication therapy is a central component to the care of patients with infectious diseases, who sometimes require specialized pharmacologic interventions, to efficiently and effectively treat an infection, manage complications and adverse events, and prevent emergence of resistance within institutions. The infectious diseases pharmacist brings a deep understanding of pharmacotherapeutics in patients with infectious diseases, resistance patterns of microorganisms, and epidemiology, and has the ability to adeptly interpret and apply clinical, biochemical, technological, and microbiologic data to monitor response. Pharmacists with the expertise to perform these functions and skills are central to interprofessional health care teams.

BPS recognition of infectious diseases pharmacy practice as a specialty and board certification of infectious diseases pharmacists would provide a foundation and pathway for pharmacists who desire to meet these important public health and societal needs to focus their efforts to advance their knowledge, skills, and abilities through training, education, and professional development required to equip and prepare themselves to meet these needs.

The unmet public health and patient care needs related to infectious diseases are compelling and the risks of antimicrobial resistance to patients and society are clear. Both the CDC and the World Health Organization have declared antibiotic resistance to be one of the most serious problems facing our national and global health systems. The unchecked proliferation of

resistant organisms due to decades of overuse and misuse of antimicrobials, which have risen at increasing rates, coupled with a reduction over time in new antimicrobial development and discovery have led to this multifaceted public health crisis. This reality is demanding and compelling the involvement, action, and innovative collaborations among the federal government, health care providers, health systems, researchers, and others through new programs, policy development, implementation of positive and negative incentives, evolution of quality measures, research, public education, and outreach. Infectious diseases pharmacists' functions in all areas of practice in meeting these public health needs contribute to safe medication use, improved quality of care, improved safety, and better patient outcomes as presented within the body of this criterion response as well as within the evidence presented in Criterion G and its accompanying appendices. Improving antimicrobial use also helps prevent the development and proliferation of antimicrobial resistance.

The *Role Delineation Study of Infectious Diseases Pharmacy* conducted by the BPS in 2012 outlines domains of knowledge within infectious diseases pharmacy practice. Infectious diseases functions fall within the following categories:

- Domain 1. Patient Care and Therapeutics: 51%
- Domain 2. Education, Research and Scholarship: 19%
- Domain 3. Antimicrobial Stewardship and Practice Management: 25%
- Domain 4. Public Health and Advocacy: 5%

Patients' and society's health and well-being remain at risk from infectious diseases and improper utilization and management of anti-infectives. Infectious diseases pharmacists serve important functions to address unmet needs in public health and preventive care in vaccine education, administration, use within the health care system, and advocacy. Public health is positively affected by infectious diseases pharmacists' efforts to improve the empiric use of antimicrobials, adjusting and monitoring of regimens based on patient factors and response as well as microbiologic and culture/sensitivity data; further, infectious diseases pharmacists improve the care of patients with infectious diseases through fostering safe and appropriate medication use, in recognition that the treatment of one patient may influence health, well-being, care, and outcomes of other patients—a phenomenon unique to infectious diseases pharmacy. In addition, prevention and early detection and resolution of adverse events, misuse, and drug therapy problems improve patient outcomes, reduce cost, and foster proper use and stewardship of antimicrobials and other anti-infectives.

As discussed, the vast majority of antimicrobial use is empiric, providing significant opportunities to curb antimicrobial misuse. Advising on initial empiric therapy selection is fundamentally different from other specialties and may be compounded by the acuteness of

some infectious diseases that compel urgency and demand immediate action; in contrast, initial therapy for other conditions such as essential hypertension or major depression, is initiated and adjusted over longer periods of time.

With the emergence and increase in disincentives employed by CMS and other payers in effort to improve care and reduce nosocomial infections and hospital readmissions, involvement of infectious diseases pharmacists can have direct positive financial effect on hospitals and health systems through improved antimicrobial empiric selection, use of anti-infectives, prevention of health care–acquired urinary tract infections, improvements in transitions of care, and prevention of readmission following hospitalization for community-acquired pneumonia.

In the quality arena, engagement of infectious diseases pharmacists in immunizations and prevention, as well as provision of care that aligns with quality measures, can contribute to improved performance in addition to improvements in patient outcomes. Infectious diseases pharmacists also engage to help prepare patients, caregivers, and providers across transitions in care when patients are discharged to home while continuing on intravenous therapy. Efforts such as these to reduce health care costs have the potential to result in negative clinical and financial outcomes; infectious diseases pharmacists bring perspective and expertise to guide these processes toward positive outcomes.

GUIDELINE 3. Describe how functions provided by the practitioners in the proposed specialty will fulfill the responsibility of the profession of pharmacy in improving the public's health. Petitioners may use the following Vision for Pharmacists' Practice adopted by the Joint Commission of Pharmacy Practitioners in January 2014 when defining the responsibilities of the profession:

> ***Patients achieve optimal health and medication outcomes with pharmacists as essential and accountable providers within patient-centered, team-based healthcare.***[34]

Functions provided by infectious diseases pharmacists for the care of patients with the full spectrum of infectious diseases directly contribute to the fulfillment of this vision and the responsibility of the pharmacy profession in improving the public's health. Their care and leadership influence the outcomes and well-being of individual patients through careful selection, monitoring, and management of therapy; through the prompt identification and resolution of drug therapy problems; and by aiding them in transitions of care among units and areas of care within hospitals and health systems and in transitions to home, rehabilitative care, and long-term care. When infectious diseases are well managed through application of

specialized knowledge and skills and through a team-based approach, patients achieve optimal outcomes and predictable complications are averted.

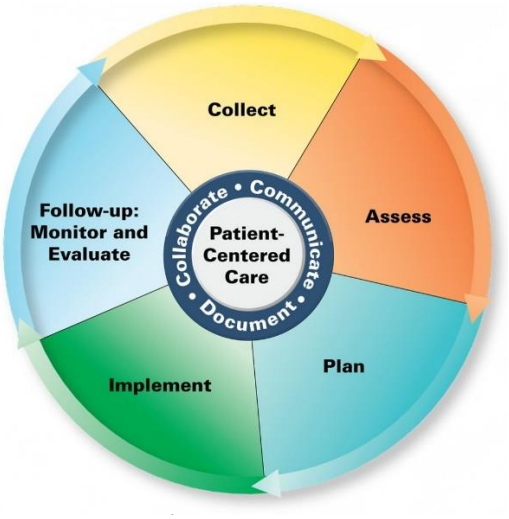
The specialized functions performed by infectious diseases pharmacists for the care of patients also directly influence the public health and well-being of society through immunizations; by improving use of antimicrobials, antivirals, and other anti-infectives; and through engagement and collaborative leadership in antimicrobial stewardship programs. Immunizations are a core component of primary and preventive care in all patient care settings. Vaccines have helped eradicate some infectious diseases that once caused widespread sickness, morbidity, and mortality. Through guiding appropriate use of antimicrobials in selection of empiric regimens, at proper dosages and durations of therapy, infectious diseases pharmacists help prevent emergence and progression of antimicrobial resistance, which has been established as a public health crisis in the United States and around the world. Antimicrobial stewardship program engagement and leadership also improve use of antimicrobials within hospitals, health systems, long-term care facilities, and other venues of care, and these activities strongly impede the development and proliferation of antimicrobial-resistant organisms.

The U.S. Public Health Service, in a report to the U.S. Surgeon General, describes the value of advanced practice patient care by pharmacists and the resulting benefits to patients to improve patient outcomes and public health in the United States.[35] Infectious diseases pharmacists have further acquired a unique and specialized body of knowledge and skills, which they assimilate and apply in the care and management of patients with infectious diseases and in the prevention of infectious diseases, their spread, and their associated complications.

In 2014, the Joint Commission of Pharmacy Practitioners delineated a patient care process employed by pharmacists in providing patient care (Figure A-1).[34] Infectious diseases pharmacists perform specialized functions in alignment with the pharmacists' patient care process at a deep level that employs their specialized knowledge and skills in the collection of the patient's clinical and microbiological data and information, assessment and assimilation of this information with epidemiologic and local resistance patterns in order to plan and implement empiric therapy. Follow up and ongoing collection, assessment, and application of evolving patient and microbiologic data are essential to providing quality care of patients with infectious diseases and guides adjustments and refinement of antimicrobial and pharmacotherapeutic regimens. Collaboration with other members of the health care team, documentation, and effective communication underpin the patient care and system-wide activities and tasks of infectious diseases pharmacists and are valued by health care teams. The care provided and functions performed by infectious diseases pharmacists contribute positively to patient care, improved health, and economic outcomes in patients with infectious diseases;

the influence of the care provided further extends to benefit public health and society as a whole.

Figure A-1. Pharmacists' Patient Care Process[36]



Reprinted with permission.

In accurately, safely, and skillfully managing and providing care to patients with infectious diseases and in their effort to control the spread of disease and emergence of antimicrobial resistance, pharmacists with specialized knowledge and experience work collaboratively in interprofessional teams to assimilate clinical and technological information in the care of patients, helping to fulfill the profession's responsibility in improving public health and achieving optimal medication outcomes.

Infectious diseases pharmacists bring a deep understanding of pharmacotherapeutics in patients with infectious diseases, resistance patterns of microorganisms, epidemiology, and the ability to adeptly interpret and apply clinical, biochemical, technological, and microbiologic data to monitor response. They serve as essential and accountable members of interprofessional health care teams who are relied upon by their health professional colleagues and the health care system.

The public health needs and risks compel the recognition of infectious diseases pharmacy as a specialty. BPS recognition of infectious diseases pharmacy practice as a specialty and board certification of infectious diseases pharmacists would provide a foundation for the public assurance of the knowledge and skills of infectious diseases pharmacists, through demonstration of their knowledge, skills, and abilities to perform the necessary functions to

meet the needs of patients, public health, and society related to infectious diseases, antimicrobial use, infectious disease prevention with vaccines, and antimicrobial resistance.

Board certification of infectious diseases specialty practice would provide infectious diseases pharmacists with a mechanism to achieve the public recognition that they have acquired the knowledge and skills required to perform the specialized functions to address the public health needs related to infectious diseases. Furthermore, other pharmacists who desire to meet these important public health and societal needs would have a pathway for advancing their knowledge, skills, and abilities through specialized training, education, and professional development to equip and prepare for infectious diseases specialty practice.

References

[1] Centers for Disease Control and Prevention. *Antibiotic Resistance Threats in the United States, 2013.* Available at: http://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf. Accessed July 21, 2016.
[2] National Center for Health Statistics. Infectious Disease. Available at: http://www.cdc.gov/nchs/fastats/infectious-disease.htm. Accessed September 15, 2016.
[3] 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):159–77.
[4] The White House. *National Action Plan for Combating Antibiotic Resistant Bacteria*. March 2015. Available at: https://www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibotic-resistant_bacteria.pdf. Accessed July 31, 2016.
[5] Lessa FC, Mu Y, Bamberg WM, et al. Burden of *Clostridium difficile* infection in the United States. *N Engl J Med*. 2015;372(9):825–34.
[6] Centers for Disease Control and Prevention. *Antibiotic Resistance Threats in the United States, 2013.* Available at: http://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf. Accessed July 21, 2016.
[7] Ferrucci L, Guralnik JM, Pahor M, et al. Hospital diagnoses, Medicare charges, and nursing home admissions in the year when older persons become severely disabled. *JAMA*. 1997;277(9):728–34.
[8] Centers for Disease Control and Prevention. Estimates of deaths associated with seasonal influenza—United States, 1976–2007. *MMWR Morb Mortal Wkly Rep*. 2010;59(33):1057–62.
[9] USA Spending.Gov. Available at: https://www.usaspending.gov/Pages/AdvancedSearch.aspx?sub=y&ST=G&FY=2016,2015,2014,2013&A=0&SS=USA&k=infectious%20diseases. Accessed September 15, 2016.
[10] National Institute of Allergy and Infectious Diseases (NIAID). Congressional Testimony: Prepared Statement of Anthony S. Fauci, MD, Director, NIAID: Dr. Fauci's Statement for the Record Submitted to the Senate Subcommittee on Labor-HHS-Education Appropriations for Hearing on National Institutes of Health Fiscal Year 2017 Budget. April 7, 2016. Available at: https://www.niaid.nih.gov/sites/default/files/documents/FY%202017%20Senate%20Statements%20for%20the%20Record%20-%20NIAID_2.pdf. Accessed September 12, 2016.
[11] Calloway S, Akilo HA, Bierman K. Impact of a clinical decision support system on pharmacy clinical interventions, documentation efforts, and costs. *Hosp Pharm.* 2013;48(9):744–52.
[12] Centers for Disease Control and Prevention. *Antibiotic Resistance Threats in the United States, 2013.* Available at: http://www.cdc.gov/drugresistance/threat-report-2013/index.html. Accessed May 1, 2016.
[13] The White House. *National Action Plan for Combatting Antibiotic-Resistant Bacteria*. March 2015. Available at: https://www.whitehouse.gov/sites/default/files/docs/national_action_plan_for_combating_antibotic-resistant_bacteria.pdf. Accessed August 31, 2016.
[14] The Pew Charitable Trusts. *A Path to Better Antibiotic Stewardship in Inpatient Settings.* April 2016. Available at: http://www.pewtrusts.org/~/media/assets/2016/04/apathtobetterantibioticstewardshipininpatientsettings.pdf. Accessed September 11, 2016.
[15] Antibiotic Resistance Project Overview. The Pew Charitable Trusts. Available at: http://www.pewtrusts.org/en/projects/antibiotic-resistance-project. Accessed September 11, 2016.

[16] Baker SN, Acquisto NM, Ashley ED, et al. Pharmacist-managed antimicrobial stewardship program for patients discharged from the emergency department. *J Pharm Pract*. 2012;25(2):190–4.
[17] Bauters TG, Buyle FM, Peleman R, et al. Antifungal drugs and rational use of antifungals in treating invasive aspergillosis: the role of the hospital pharmacist. *Pharm World Sci*. 2005;27(1):31–4.
[18] Cappelletty D, Jacobs D. Evaluating the impact of a pharmacist's absence from an antimicrobial stewardship team. *Am J Health Syst Pharm*. 2013;70(12):1065–9.
[19] Gallagher J, Byrne S, Woods N, et al. Cost-outcome description of clinical pharmacist interventions in a university teaching hospital. *BMC Health Serv Res*. 2014;14:177.
[20] Heil EL, Kuti JL, Bearden DT, et al. The essential role of pharmacists in antimicrobial stewardship. *Infect Control Hosp Epidemiol*. 2016;37(7):753–4.
[21] Centers for Disease Control and Prevention. Core Elements of Hospital Antibiotic Stewardship Programs. Updated May 26, 2016. Available at: http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html. Accessed June 14, 2016.
[22] Centers for Disease Control and Prevention. *The Core Elements of Antibiotic Stewardship for Nursing Homes*. August 2016. Available at: http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html. Accessed September 20, 2016.
[23] Kaiser Family Foundation. The HIV/AIDS Epidemic in the United States. August 2016. Available at: http://kff.org/hivaids/fact-sheet/the-hivaids-epidemic-in-the-united-states/. Accessed September 10, 2016.
[24] Nevo ON, Lesko CR, Colwell B, et al. Outcomes of pharmacist-assisted management of antiretroviral therapy in patients with HIV infection: a risk adjusted analysis. *Am J Health Syst Pharm*. 2015;72(17):1463– 70.
[25] Saberi P, Dong BJ, Johnson MO, et al. The impact of HIV clinical pharmacists on HIV treatment outcomes: a systematic review. *Patient Prefer Adherence*. 2012;6:297–322.
[26] Mohammad RA, Bulloch MN, Chan J, et al. Provision of clinical pharmacist services for individuals with chronic hepatitis C viral infection: Joint Opinion of the GI/Liver/Nutrition and Infectious Diseases Practice and Research Networks of the American College of Clinical Pharmacy. *Pharmacotherapy*. 2014;34(12):1341–54.
[27] Rau J. Medicare's readmission penalties hit new high. *Kaiser Health News*. August 2, 2016. Available at: http://khn.org/news/more-than-half-of-hospitals-to-be-penalized-for-excess-readmissions/. Accessed September 10, 2016.
[28] Department of Health and Human Services. *National Action Plan to Prevent Health Care–Associated Infections: Road Map to Elimination*. 2013. Available at: https://health.gov/hcq/prevent-hai-action-plan.asp. Accessed September 20, 2016.
[29] National Quality Forum. NQF Endorses Infectious Disease Measures. January 8, 2013. Available at: http://www.qualityforum.org/News_And_Resources/Press_Releases/2013/NQF_Endorses_Infectious_Disease_Measures.aspx. Accessed September 15, 2016.
[30] Infectious Diseases Society of America. *Handbook of Outpatient Parenteral Antimicrobial Therapy for Infectious Diseases.* 3rd ed. Tarrytown, NY: CRG Publishing; 2016. Available at: https://www.idsociety.org/uploadedFiles/IDSA/Manage_Your_Practice/OPAT_eHandbook/Chapter_01.pdf. Accessed September 20, 2016.
[31] The Pew Charitable Trusts. New type of Antibiotic Resistance Raises Alarm. August 22, 2016. Available at: http://www.pewtrusts.org/en/research-and-analysis/q-and-a/2016/08/new-type-of-antibiotic-resistance-raises-alarm. Accessed September 10, 2016.
[32] Branswell H. Who will manage outbreaks? A crisis looms for infectious disease specialists. STAT Reporting from the frontiers of health and medicine. December 8, 2015. Available at: https://www.statnews.com/2015/12/08/infectious-disease-match-day/. Accessed May 1, 2016.
[33] Board of Pharmacy Specialties. Board of Pharmacy Specialties confers added qualifications to 82 pharmacists [press release]. April 28, 2016. Available at: http://www.bpsweb.org/2016/04/28/board-of-pharmacy-specialties-confers-added-qualifications-to-82-pharmacists/. Accessed June 1, 2016.
[34] Joint Commission of Pharmacy Practitioners. Vision of Pharmacists' Practice. Available at: http://jcpp.net/wp-content/uploads/2016/02/JCPP-Vision-Slide.pptx. Accessed July 10, 2016.
[35] Giberson S, Yoder S, Lee MP. *Improving Patient and Health System Outcomes Through Advanced Pharmacy Practice. A Report to the U.S. Surgeon General*. Office of the Chief Pharmacist. U.S. Public Health Service: Rockville, MD: U.S. Public Health Service; December 2011. Available at: http://jcpp.net/wp-content/uploads/2015/09/Improving-Patient-and-Health-System-Outcomes-through-Advanced-Pharmacy-Practice.pdf. Accessed September 1, 2016.
[36] Joint Commission of Pharmacy Practitioners. *Pharmacists' Patient Care Process.* May 29, 2014. Available at: http://jcpp.net/wp-content/uploads/2016/03/PatientCareProcess-with-supporting-organizations.pdf. Accessed September 2, 2016.

Criterion B
Demand

CRITERION B: Demand

The area of specialization shall be one in which there exists a significant and clear health demand to provide the necessary public reason for certification.

This criterion emphasizes DEMAND. BPS defines DEMAND as a willingness and ability to purchase the services of a Board Certified Pharmacist.

Demand for Infectious Diseases Pharmacist Services

Infectious diseases and their impact span across patients of all ages, cultures, socioeconomic groups, and with all types of comorbidities. Patients with infectious diseases are treated in most settings of care, including ambulatory, acute, and long-term care settings. Infections treated range from self-limiting to life-threatening and are influenced by many different individual, clinical, and epidemiologic factors. Infectious diseases pharmacists accurately, safely, and skillfully work as part of interprofessional health care teams to provide care to these patients and work to ensure appropriate use of antimicrobials within hospitals, health systems, institutions, and home health settings.

The demand for infectious diseases pharmacists with specialized knowledge and skills needed to perform the unique and specialized functions required of pharmacists in infectious diseases pharmacy practice has increased steadily over time. With greater emergence of antimicrobial-resistant organisms and changes in federal regulations and policies, we have observed a marked and sharp increase in demand for infectious diseases pharmacists and training over the last 5 years, concurrent with enhanced emphasis on stemming emerging antimicrobial resistance and improving health care quality—resulting in doubling of the number of residency training positions and increasing employer demand.

GUIDELINE 1. Include statements of support by stakeholder organizations and other entities, other than petitioners, that attest to the demand for pharmacists with training and knowledge to provide services in the proposed specialty. Stakeholder organizations can include non-pharmacist health professional organizations, public and private health care entities, and consumer organizations.

Key national medical and health care organizations and leaders in infectious diseases have demonstrated support for specialty recognition and attest to the demand for infectious diseases pharmacists with specialized knowledge and skills. Appendix B-1 provides letters of support from the following individuals and organizations, demonstrating strong evidence of the demand for pharmacists with training and knowledge to provide patient care and services in infectious diseases pharmacy practice:

- Society for Healthcare Epidemiology of America (SHEA)
- Infectious Diseases Society of America (IDSA)
- American Society for Microbiology (ASM)
- David Hyun, MD, Senior Officer, Antibiotic Resistance Project, The Pew Charitable Trusts
- Michael Gillum, MD, Infectious Diseases Physicians of Spokane, Deaconess Hospital

These letters of support speak to the strong and increasing demand for infectious diseases pharmacists practicing at the specialty level. A brief summary highlighting key points of each letter is outlined below.

The Society for Healthcare Epidemiology of America (SHEA) is a professional society representing physicians and other health care professionals around the world with expertise and passion in health care epidemiology, infection prevention, and antimicrobial stewardship. SHEA serves to promote the prevention of health care–associated infections and antibiotic resistance and to advance the fields of health care epidemiology and antibiotic stewardship. SHEA considers reducing the prevalence of antibiotic-resistant bacteria through antibiotic stewardship programs among its top priority policy issues.

On behalf of SHEA, President **Louise Dembry, MD, MS, MBA, FSHEA,** voices strong support of the recognition of infectious diseases pharmacy practice as a specialty and attests to the value of board certification of infectious diseases pharmacists in this way: "Recognition of the specialty is important in preparing the healthcare system for identifying qualified pharmacists to meet the workforce needs leading up to the development and implementation of antibiotic stewardship regulatory requirements for healthcare facilities." Adding, "Recognition of an Infectious Diseases Pharmacy Practice specialty will enhance this well-established profession and raise awareness of the value and demand for not only pharmacists trained in infectious diseases, but for all clinicians trained in infectious diseases." This becomes increasingly important as SHEA "anticipates new regulatory requirements and clinical standards for antibiotic stewardship will be forthcoming for all healthcare settings in the near future, and stands

ready to support the incorporation of these requirements as the standard of practice for all health care facilities."

"The expectation for adoption of antibiotic stewardship programs is upon us today, and the need for not only training, but recognition of clinicians who are trained in infectious diseases is critical to help the healthcare system identify experts that can work toward, meet, and exceed the requirements for antibiotic stewardship programs outlined in these pending regulations," states Dr. Dembry. SHEA describes many of the important functions served by pharmacists who are trained in infectious diseases, highlighting co-directing antimicrobial stewardship programs; influencing prescribers through prospective audits of antimicrobial use; recommending empiric antibiotic selection, preauthorization programs; and making recommendations for de-escalation or discontinuation of antibiotics as appropriate—emphasizing that these functions when performed by infectious diseases pharmacists "have demonstrated reductions in overall antibiotic use, the prevalence of *Clostridium difficile,* the occurrence of drug-resistant infections, and healthcare delivery costs."

Infectious Diseases Society of America (IDSA) is a multidisciplinary professional association that represents physicians, scientists, and other health care professionals who specialize in infectious diseases. IDSA's purpose is to improve the health of individuals, communities, and society by promoting excellence in patient care, education, research, public health, and prevention relating to infectious diseases.

Ensuring the appropriate use of anti-infective drugs across all health care settings through antimicrobial stewardship programs is a long-standing priority for IDSA. IDSA President **Johan S. Bakken, MD, PhD, FIDSA,** states that recognition of infectious diseases pharmacy practice as a specialty is critical for training qualified infectious diseases pharmacists to meet increasing workforce needs. Dr. Bakken emphasizes data for curbing the up to 50% of antimicrobial misuse and suboptimal selection, overuse and misuse, resistance, and deaths from infections; this need and demand will continue to grow significantly as hospitals, health systems, and other facilities prepare to implement antimicrobial stewardship programs in accordance with new and emerging regulatory requirements.

IDSA expressed the "immediate need to train more pharmacists in infectious diseases to help meet these coming [antimicrobial stewardship] program requirements, and, even more importantly, to make sure the programs are effective in fostering appropriate antimicrobial use and reducing antimicrobial resistance."

IDSA states that infectious diseases pharmacists with specialty training are essential members of multidisciplinary teams and further believes that recognition of an infectious diseases pharmacy practice specialty will raise awareness of the value and need for pharmacists with specialty training in infectious diseases.

The **American Society for Microbiology (ASM)** is the largest single life science society, composed of over 47,000 scientists and health professionals. ASM's mission is to promote and advance the microbial sciences through conferences, publications, certifications, and educational opportunities. It enhances laboratory capacity around the globe through training and resources and provides a network for scientists in academia, industry, and clinical settings. Additionally, ASM promotes a deeper understanding of the microbial sciences to diverse audiences.

On behalf of ASM, Chief Executive Officer **Stefano Bertuzzi, PhD, MPH**, emphasizes the importance of antimicrobial stewardship programs to improve patient care, reduce health care expenditures, potentially reduce rates of resistance, and prolong the longevity of the limited number of antimicrobial agents available to treat infections. In ASM's letter of support, Dr. Bertuzzi describes the rapidly evolving and growing demand for antimicrobial stewardship programs and attests to the critical functions infectious diseases pharmacists perform as part of multidisciplinary teams with infectious diseases physicians and clinical microbiologists to ensure the appropriate use of anti-infectives in the diagnosis and treatment of infectious diseases. Dr. Bertuzzi describes the urgent need to combat the threat of expanding antimicrobial resistance to public health, national security, and patients, particularly for immunocompromised individuals including chemotherapy and transplant patients, elderly patients, preterm infants, and individuals with HIV/AIDS who are at greatest risk of poor outcomes.

The ASM letter delineates key specialized roles and functions that infectious diseases pharmacists serve in facilitating optimal and safe medication management practices for antimicrobial agents by collaborating with clinical microbiologists, infectious diseases specialists, and infection preventionists; utilizing efficient and effective systems; reducing potential errors and adverse drug events; ensuring optimal antimicrobial use in patients; and analyzing quantitative data. ASM also emphasizes the important role of infectious diseases pharmacists in efforts to prevent or reduce the transmission of infections among patients, health care workers, and others within all health-system practice settings.

David Hyun, MD, is Senior Officer for The Pew Charitable Trusts' Antibiotic Resistance Project. In his individual letter of support, Dr. Hyun draws on his experience and leadership in outlining the demand for infectious diseases pharmacists, their important roles and functions in improving patient care, antimicrobial use, and in reversing trends caused by decades of overuse of antimicrobials in human medicine and animal agriculture coupled with a paucity in antimicrobial drug development and innovation. Dr. Hyun attests that pharmacists with training in infectious diseases pharmacy practice significantly contribute to improving the quality of patient care; educating patients, families, and medical staff; and reducing antibiotic resistance. He describes the value of pharmacists with knowledge of infectious diseases and the microbiology behind these infections in uniquely positioning and qualifying them to optimize antibiotic, antifungal, and antiviral therapies for patients by incorporating pharmacodynamics and pharmacokinetics into the clinical decision making process, ensuring selection of the most appropriate antimicrobial agents for individual patients, and ensuring effectiveness and safety of dosing. Dr. Hyun emphasizes that pharmacists with experience and education in infectious diseases recognize adverse events and toxicities associated with antimicrobial regimens; help weigh the risk of these therapies against the efficacy of treating the targeted infections and pathogens; and recommend measures and monitoring to minimize the risk of such adverse events.

In addition to direct contributions to improving the quality of patient care, Dr. Hyun reinforces the invaluable role infectious diseases pharmacists serve within antimicrobial stewardship programs to improve antimicrobial use and prevent resistance. Dr. Hyun states: "Leadership and expertise provided by these pharmacists are an indispensable element of meaningful antimicrobial stewardship programs in hospitals and is recognized as such by the Centers for Disease Control and Prevention's (CDC) Core Elements of Hospital Antibiotic Stewardship Programs." He also speaks to the anticipation that a requirement for antimicrobial stewardship programs will be added to survey standards for hospitals by both The Joint Commission and the Centers for Medicare and Medicaid Services within the next year, and he concludes that these forces "undoubtedly create a strong and increasing demand for infectious disease pharmacy practice specialists who can not only provide the necessary pharmacologic expertise but also serve as leaders responsible and accountable for stewardship programs."

Michael Gillum, MD, is an infectious diseases physician practicing at Infectious Diseases Physicians of Spokane and Deaconess Hospital in Spokane, Washington. Deaconess Hospital is a 388-bed acute care hospital that provides inpatient, outpatient, diagnostic

imaging, medical, surgical, and emergency services. The hospital has a Level III trauma center, a Level III neonatal intensive care unit, a certified chest pain center, a certified total joint restoration center, an accredited primary stroke center, a maternal fetal medicine program, and bariatric surgery. Dr. Gillum attests to the value of and demand for infectious diseases pharmacists in patient care at the institution. "Our [antimicrobial stewardship] program has been extremely successful and will most likely expand over the next few years with increasing demand. Ensuring our partners, especially our pharmacists involved in the care of our infectious disease patients, are held to a high standard and continuously strive for professional development, is a key pillar for providing quality health care."

Public health threats from continued emergence of antimicrobial-resistant organisms coupled with policy and regulatory changes are catalyzing the rapid evolution of effective antimicrobial stewardship programs. This creates a critical need and demand to dramatically and urgently provide a mechanism for the recognition of infectious diseases pharmacy practice and board certification of infectious diseases pharmacists. The current prevalence of antimicrobial misuse (50%) is unacceptable and if sustained has the potential for dramatic detrimental public health effects over time.[1] Collectively, these factors are propelling unyielding, growing demand for the recognition of infectious diseases pharmacy practice as a specialty.

GUIDELINE 2. Include estimates of positions for pharmacists with specialized training and knowledge in the proposed specialty that are currently filled and those that are currently unfilled. Identify these positions by practice settings, if possible. Describe the sources and methods used to determine these estimates.

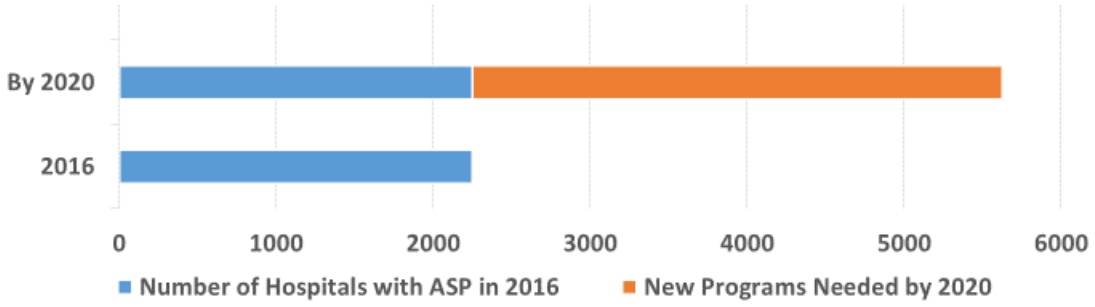
In an effort to estimate the number of positions for pharmacists with specialized training and knowledge in infectious diseases pharmacy practice and the demand for specialty certification in this area, the petitioning organizations conducted a *Survey of Infectious Diseases Pharmacist Employers* (Appendix B-2) that was fielded through embedding into the *Survey of Infectious Diseases Pharmacists* (described in Criterion C) to identify those who have direct responsibility for hiring pharmacists for infectious diseases practice. Responses were received from 100 employers of infectious diseases pharmacists.

Responding infectious diseases pharmacist employers indicated that they collectively employ 353.5 full-time equivalents to provide care for patients with infectious diseases and engage in leadership of antimicrobial stewardship in their institutions. The vast majority of these positions are within hospitals and health systems. The average number of FTEs across responding institutions was 3.7.

Employers who responded have collectively recruited for 108 infectious diseases pharmacists over the past 3 years and filled 95% of these positions. These 100 employers report 14 current vacant positions for infectious diseases pharmacists within their institutions. One hundred percent of these responding employers of infectious diseases pharmacists estimate maintaining or growing the number of infectious diseases pharmacists within their institutions. Eighty percent anticipate an increase in the number of infectious diseases pharmacist positions within their institutions over the next 5 years, in hospitals that already employ infectious diseases pharmacists to practice within the defined proposed specialty.

CDC estimates that only 40% of hospitals currently have antimicrobial stewardship programs; however, the federal government, payers, and accreditors are calling for the establishment of antimicrobial stewardship programs in all hospitals by 2020.[1] Figure B-1 shows the increase in numbers of antimicrobial stewardship programs needed over the next 3 years (i.e., by 2020). Based on data from the American Hospital Association, there are currently 5,627 registered hospitals in the United States, which yields an urgent demand for 3,376 new programs that will require infectious diseases pharmacists, physicians, and others to effectively implement and lead.[2] The critical need for infectious diseases pharmacists as part of multidisciplinary leadership of antimicrobial stewardship program teams has already been established. The ability for public assurance of the specialized knowledge and skills of individual practitioners will be increasingly crucial to the foundational development and quality evolution and operation of these programs as we move into the 2020s.

Figure B-1. Anticipated Growth in Demand for New Antimicrobial Stewardship Program Development by 2020



These data demonstrate an urgent, consistent, and growing demand for infectious diseases pharmacists.[2]

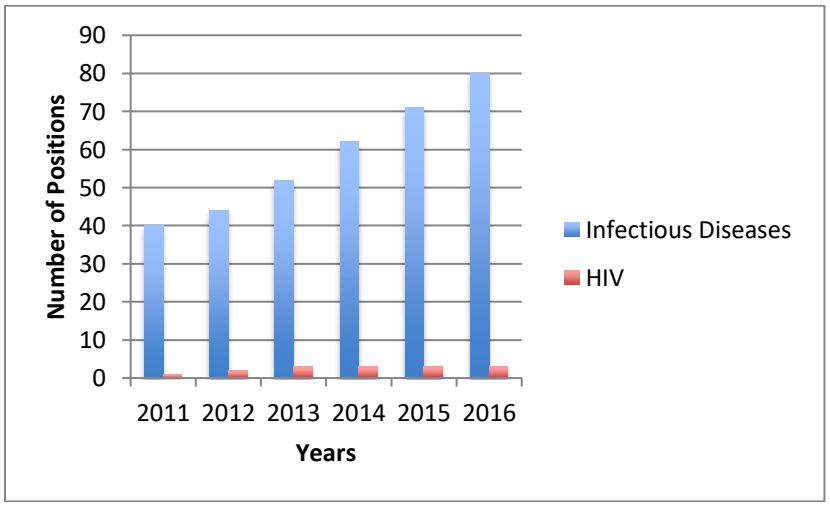
Growing Demand for Advanced Training of Pharmacists in Infectious Diseases

The demand for infectious diseases pharmacists' specialized knowledge, skills, and abilities has increased consistently over time. Employer data show a constant demand over the past 3 years and a trend toward increasing projected over the next 5 years. Increases in the number of infectious diseases specialty residency programs and positions provide additional evidence of this demand as employers create residency programs to meet clinical needs and expand the number of pharmacists with the specialized knowledge and skills of a infectious diseases pharmacist specialist.

Trends in Postgraduate Year Two Infectious Diseases Residency Programs and Positions

The numbers of postgraduate year two (PGY2) residency programs and positions in infectious diseases have increased steadily, nearly doubling in number over the past 5 years, as noted in Figure B-2. PGY2 infectious diseases residency programs and positions available have grown from 40 programs in 2011 to 78 programs with 80 available positions in 2016.

Figure B-2. Growth in Number of Postgraduate Year 2 Residencies in Infectious Diseases From 2011 to 2016



In making hiring decisions, 99% of responding employers indicated a desire for advanced training of infectious diseases pharmacists in their institutions: 95% desire residency training programs or fellowships, and 56% desire completion of certificate training programs in antimicrobial stewardship and/or immunizations. Seventy-eight percent of infectious diseases pharmacist employers responding to the *Survey of Infectious Diseases Pharmacists* indicated that it was "highly likely," "likely," or "somewhat likely" that they would require a new specialty credential in infectious diseases if approved by the Board of Pharmacy Specialties for newly hired infectious diseases pharmacists within their institutions.

The *Survey of Infectious Diseases Pharmacists* also demonstrated strong demand for specialty certification among pharmacists practicing in the proposed specialty. Through this survey, 64% of responding pharmacists reported they would be "highly likely," "likely," or "somewhat likely" to pursue specialty certification within the next 5 years if the petition to recognize infectious diseases pharmacy practice as a specialty is approved.

References

[1] Centers for Disease Control and Prevention. *Antibiotic Resistance Threats in the United States, 2013*. Available at: http://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf. Accessed July 27, 2016.
[2] American Hospital Association. Fast Facts on U.S. Hospitals. Available at: http://www.aha.org/research/rc/stat-studies/fast-facts.shtml. Accessed September 7, 2016.

Criterion C
Number and Time

CRITERION C: Number and Time

The area of specialization shall include a reasonable number of individuals who devote most of their practice to the specialty area.

This criterion relates to the NUMBER of practitioners and the amount of TIME spent in the practice of the specialty.

To determine the number of practitioners and the time spent in infectious diseases pharmacy practice, we developed a web-based survey and fielded it to pharmacists in infectious diseases practice identified through membership records of the American College of Clinical Pharmacy (ACCP), the American Pharmacists Association (APhA), the American Society of Health-System Pharmacists (ASHP), and the Society of Infectious Diseases Pharmacists (SIDP). After removing duplicate entries and undeliverable email addresses, we defined 11,233 individuals as currently practicing in infectious diseases, having an expressed interest in infectious diseases practice, or having completed a postgraduate year 2 (PGY2) infectious diseases pharmacy practice residency. Clearly, this number is underestimated because not all pharmacists practicing in infectious diseases are members of the four organizations from whose records names were drawn; however, we believe that those pharmacists who are more professionally engaged are more likely to pursue specialty recognition.

GUIDELINE 1. Estimate the number of pharmacists currently practicing in the proposed specialty. Identify the types of practice settings for these pharmacists (e.g., academic, hospital, managed health care, community). Describe the sources and methods used to determine these estimates.

Specialty practice in infectious diseases pharmacy has grown substantially, and PGY2 residency programs have produced increasing numbers of infectious diseases pharmacists with specialized knowledge and skills over the past 5 years (2011 to 2016). During this period, the number of infectious diseases residency positions available increased from 40 to 80.[1]

The *Survey of Infectious Diseases Pharmacists* was developed by the petitioning organizations to obtain quantitative information about the demand for infectious diseases pharmacy practice specialists, the amount of time dedicated to infectious diseases practice, and the education and

training of those practicing in the specialty. The survey was fielded in June 2016 to 11,233 individuals identified through analysis of the sponsoring organizations' membership database records. The survey yielded 628 responses. Of these, 606 responses are from pharmacists who practice in infectious diseases. A copy of the survey instrument is attached as Appendix C-1. Approximately 420 pharmacists took the initiative to sign the online petition in support of recognition for the infectious diseases pharmacy specialty.

More than 89% of infectious diseases pharmacists responding to the *Survey of Infectious Diseases Pharmacists* report that they practice in the area of infectious diseases specialization as defined below:

Definition of Infectious Diseases Pharmacy Practice

Infectious diseases pharmacy practice specializes in the use of microbiology and pharmacology to develop, implement, and monitor drug regimens that incorporate the pharmacodynamics and pharmacokinetics of antimicrobials to optimize therapy for patients. The practice requires pharmacists to use clinical and evidence-driven knowledge to develop appropriate antimicrobial therapies to more rapidly resolve infections while decreasing adverse events, complications, and resistance. The practice includes direct patient care provided through interprofessional health care teams, collaborative leadership of antimicrobial stewardship programs, education of health care providers, preventive services including immunizations, and advocacy for appropriate antimicrobial utilization. Specialty pharmacy practice in infectious diseases uniquely improves public health by optimizing antimicrobial potential in individual patients and narrowing the resistance trends that occur in society by preventing progression of antimicrobial resistance and infectious diseases.

Based upon survey results, membership records evaluated, and the estimated percentages of pharmacists who join professional organizations, we estimate that a total 14,000 to 15,000 pharmacists are currently engaged in specialized infectious diseases pharmacy practice.

This number is likely underestimated because not all pharmacists in infectious diseases practice are members of ACCP, APhA, ASHP, SIDP, or other organizations; however, we believe that those pharmacists who are more professionally engaged are more likely to pursue specialty recognition.

Over 80% of infectious diseases pharmacists who responded to the *Survey of Infectious Diseases Pharmacists* have completed advanced clinical training through residencies and fellowships, and nearly a quarter have more than 10 years of experience practicing in infectious diseases pharmacy. Infectious diseases pharmacists practice in a variety of settings, primarily in

hospitals and health systems as well as in academia. A vast majority practice in community hospitals, university hospitals, academic medical centers, and community teaching hospitals. They serve as clinical pharmacists on medical teams, residency directors, coordinators of antimicrobial stewardship, and health systems administrators.[2]

In the *Report of the Role Delineation Study of Infectious Diseases Pharmacy*, respondents were asked to indicate the type of practice setting where they provided the majority of their patient care. Thirty-seven percent of infectious diseases pharmacists worked in community hospitals. The results reported in the role delineation study are shown in Figure C-1.[2]

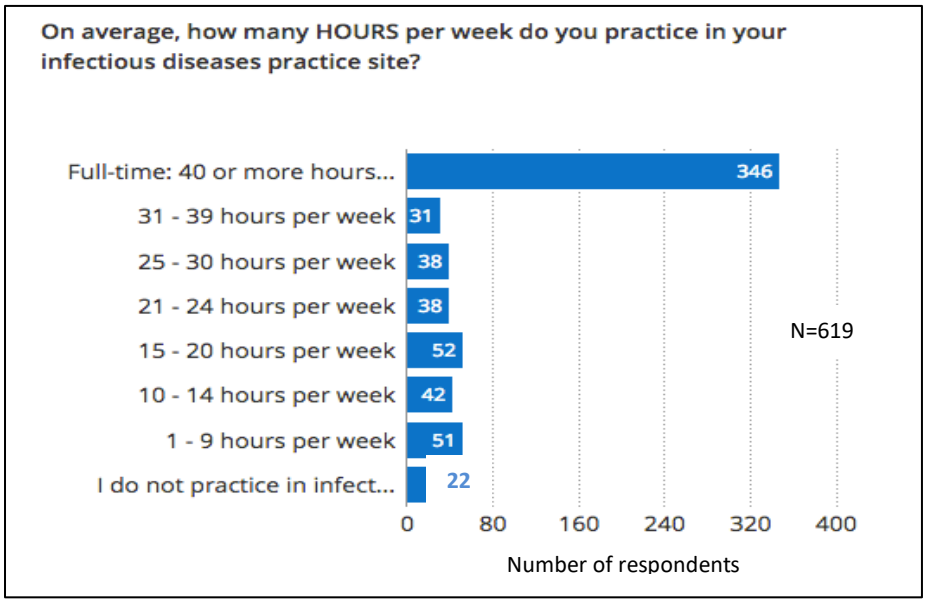
Figure C-1. Practice Settings for Infectious Diseases Pharmacist Specialists

Practice Setting	N	Percentage
Hospital	212	77.7%
Private Medical Group	2	0.7%
Managed Care	3	1.1%
Industry	2	0.7%
Academic Setting (teaching/research)	26	9.5%
Governmental Organization	7	2.6%
Other (Please specify.)	21	7.7%
Total	273	100%

GUIDELINE 2. For the pharmacists identified in Guideline C1, estimate the percentage of time they devote exclusively to the practice of the proposed specialty. Describe the sources and methods used to determine these estimates.

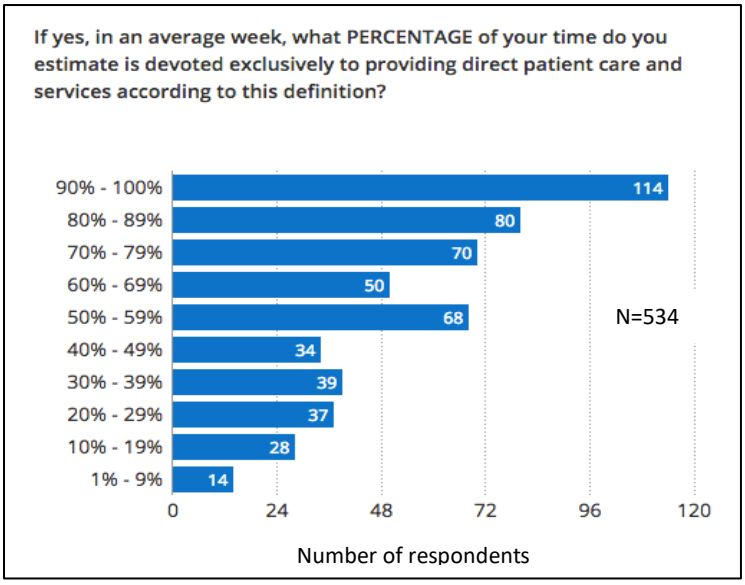
In the *Survey of Infectious Diseases Pharmacists,* infectious diseases pharmacists were asked to indicate the number of hours per week that they practiced in their infectious diseases practice site. The results shown in Figure C-2 reveal that approximately 56% of respondents practice 40 or more hours per week at their infectious diseases practice site.

Figure C-2. Pharmacist-Reported Hours Worked per Week in Infectious Diseases Practice Site



In addition, the survey asked pharmacists to quantify the average weekly percentage of time devoted exclusively to providing direct patient care and services according to the *Definition of Infectious Diseases Pharmacy Practice*. Of the respondents, 382 pharmacists (72%) report spending more than 50% of their time dedicated to direct patient care at the specialty level. The results are outlined in Figure C-3.

Figure C-3. Percent of Time Devoted Exclusively to Providing Direct Patient Care and Services According to the *Definition of Infectious Diseases Pharmacy Practice*

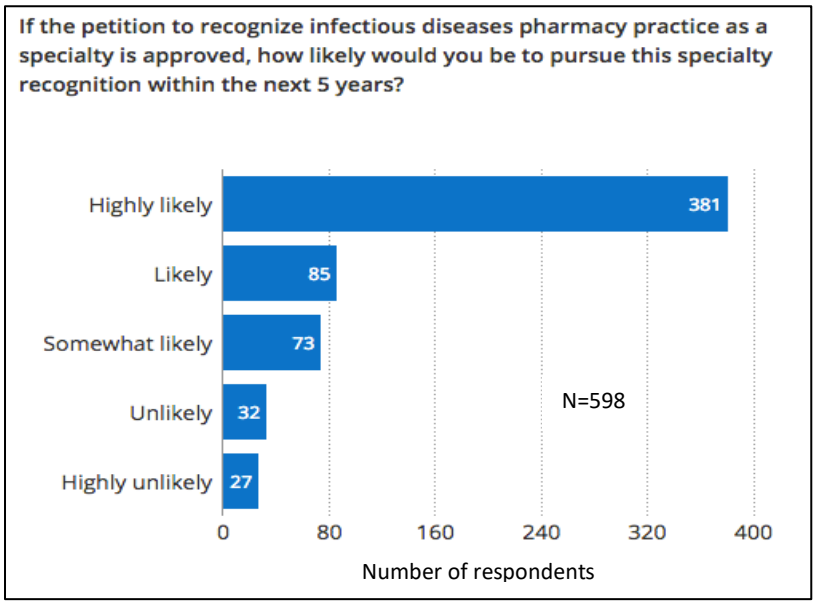


GUIDELINE 3. Estimate the number of pharmacists who would likely seek board certification in the proposed specialty during the first five years in which board certification would be available. Describe the sources and methods used to determine these estimates.

ACCP conducted a survey of their membership in March 2011 to assess opinions regarding the recognition of new specialties (Appendix C-2). Respondents indicated that a specialty certification in infectious diseases pharmacy was necessary to appropriately certify clinical pharmacy practitioners. Of the 1,099 respondents who are currently board certified, 53.8% believed that new specialty certification by the Board of Pharmacy Specialties (BPS) is needed to appropriately recognize and credential clinical pharmacy practitioners in infectious diseases practice. The ACCP survey also showed that 57% of the 724 respondents who were not currently board certified also agreed that BPS specialty certification in infectious diseases pharmacy practice is needed. Finally, the ACCP survey found that 377 respondents (163 who are not yet certified in any specialty and 214 who are currently board certified in another specialty) would seek specialty recognition in infectious diseases if offered by BPS.

The *Survey of Infectious Diseases Pharmacists* also asked respondents to indicate how likely they would be to pursue infectious diseases specialty recognition within the next 5 years if the petition to recognize infectious diseases pharmacy practice is approved by BPS. In response, 64% indicated that they would be "highly likely," "likely," or "somewhat likely" to pursue specialty recognition in infectious diseases pharmacy practice (Figure C-4). The likelihood was also strongly correlated to the percentage of time spent per week practicing in the specialty.

Figure C-4. Likelihood of Pursuing Specialty Recognition Within the Next 5 Years



As described in Criterion B, PGY2 infectious diseases pharmacy residency programs have the capacity for up to 80 graduates annually—a number that has doubled in recent years and more than tripled over the last decade. Individuals who complete specialized residency training in infectious diseases would be likely to pursue specialty recognition, yielding an additional 400 or more potential candidates over the next 5 years.

Since the *Survey of Infectious Diseases Pharmacists* was disseminated only to individuals who were members of certain organizations, the number of infectious diseases pharmacists who would seek certification for infectious diseases as a specialty is probably underrepresented. The growth and number of residency programs in infectious diseases pharmacy show an increased need for certification of pharmacists who are practicing at the specialty level to care for patients with infectious diseases. Recognition of infectious diseases pharmacy practice as a BPS specialty area has broad acceptance within the profession and will certainly increase the numbers of individuals who are likely to seek certification.

References

[1] National Matching Services. American Society of Health-System Pharmacists Resident Matching Program—Match Statistics. Available at: http://www.natmatch.com/ashprmp/aboutstats.html. Accessed July 27, 2016.

[2] Professional Examination Service on behalf of the Board of Pharmacy Specialties. *Report of the Role Delineation Study of Infectious Diseases Pharmacy.* Washington, DC: Board of Pharmacy Specialties; April 2013.

Criterion D
Specialized Knowledge

CRITERION D: Specialized Knowledge

The area of specialization shall be based on specialized knowledge of one or more of the pharmaceutical sciences and the biological, physical, behavioral, and administrative sciences which underlie them. Procedural or technical services and the specific environment in which pharmacy is practiced are not applicable to this criterion.

This criterion relates to SPECIALIZED KNOWLEDGE.

The Board of Pharmacy Specialties (BPS) has conducted a role delineation study of infectious diseases pharmacy practice and has issued a call for petition in this specialty area. Therefore, according to the criteria in the *BPS Petitioner's Guide for Recognition of a Pharmacy Practice Specialty,* this section is not required to be completed as part of the petition. The *Report of the Role Delineation Study of Infectious Diseases Pharmacy* is attached as Appendix D-1.

The role delineation study lists four domains within the proposed specialty of infectious diseases pharmacy practice (Table D-1). Sixty-nine distinct specialized knowledge bases were validated to underpin these four domains. Pharmacists practicing within infectious diseases pharmacy must acquire specialized knowledge in these areas in order to perform the specialized tasks and skills of this proposed specialty. These specialized knowledge bases are detailed in the role delineation study.

Table D-1. Domains of Infectious Diseases Pharmacy Role Delineation

Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and desigining/modifying, implementing, and monitoring patient-specific plans of care.
Domain 2: Education, Research, and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious diseases pharmacy, and the education of current and future healthcare professionals.

Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.

Criterion E
Specialized Tasks/Skills

CRITERION E: Specialized Tasks/Skills

The area of specialization shall represent an identifiable field of pharmacy practice which requires specialized tasks/skills by the practitioner and which is distinct from other BPS-recognized pharmacy specialties.

This criterion refers to SPECIALIZED TASKS/SKILLS.

The Board of Pharmacy Specialties (BPS) has conducted a role delineation study of infectious diseases pharmacy practice and has issued a call for petition in this specialty area. Therefore, according to the criteria in the *BPS Petitioner's Guide for Recognition of a Pharmacy Practice Specialty,* this section is not required to be completed as part of the petition. The *Report of the Role Delineation Study of Infectious Diseases Pharmacy* is attached as Appendix D-1.

The role delineation study lists four domains within the proposed specialty of infectious diseases pharmacy practice (Table E-1). Twenty distinct specialized tasks/skills were validated to underpin these four domains. Pharmacists practicing within infectious diseases pharmacy must acquire specialized knowledge in these areas in order to accomplish the specialized tasks and skills performed in this proposed specialty. These specialized tasks and skills are detailed in the role delineation study.

Table E-1. Domains of Infectious Diseases Pharmacy Role Delineation

Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and desigining/modifying, implementing, and monitoring patient-specific plans of care.
Domain 2: Education, Research, and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious diseases pharmacy, and the education of current and future healthcare professionals.

Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.

Criterion F
Education and/or Training

CRITERION F: Education and/or Training

The area of specialization shall be one in which schools and colleges of pharmacy and/or other organizations offer recognized education and training programs to those seeking advanced knowledge and skills in the area of specialty practice.

This criterion addresses EDUCATION and/or TRAINING.

GUIDELINE 1. Describe in detail the education, post-graduate training programs and/or experience required to acquire such specialized knowledge and skills. Discuss how such education, post-graduate training programs and/or experience differ from the education, post-graduate training programs and/or experience of a recent graduate with a Doctor of Pharmacy degree.

According to the Accreditation Council for Pharmacy Education (ACPE) *Accreditation Standards and Key Elements for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree,* the pharmacy curriculum provides a thorough foundation in the biomedical, pharmaceutical, social/behavioral/administrative, and clinical sciences. The degree programs are structured to inculcate student readiness to:[1]

- Enter advanced pharmacy practice experiences (APPE-ready)
- Provide direct patient care in a variety of healthcare settings (Practice-ready)
- Contribute as a member of an interprofessional collaborative patient care team (Team-ready).

The pharmacy curriculum ensures optimal medication therapy outcomes and patient safety, satisfies the educational requirements for licensure as a pharmacist, and meets the requirements of universities for the degree. Graduates are prepared to meet educational competencies and outcomes centered on foundational knowledge, essentials of patient care, approach to practice and care, as well as personal and professional development including professional skills, attitudes, and values and the ability to integrate and apply learning both to the present practice of pharmacy and to the advancement of the profession. The Doctor of Pharmacy degree curriculum provides the basic education and training that graduates need to practice at a generalist level. It also provides general education and training in infectious diseases to care for patients with acute and chronic needs.

ACPE standards also require a pharmacy practitioner to be knowledgeable and competent in many areas critical to the foundation and delivery of effective patient care. The standards outline broad, general requirements for pharmacist-provided care for special populations, including patients with acute and chronic diseases. These requirements indicate that pharmacists must be competent in pathophysiologic and pharmacotherapeutic alterations specific for special populations of patients, prescription and nonprescription medications dosage calculations, and adjustments in drug monitoring for positive/negative outcomes in special populations of patients.

Experientially, ACPE standards require students to complete introductory pharmacy practice experiences (IPPEs) and advanced pharmacy practice experiences (APPEs). Furthermore, ACPE standards require that APPEs include primary, acute, chronic, and preventive care among patients of all ages and that these experiences develop pharmacist-delivered patient care competencies. ACPE standards do not require APPEs to specifically address the area of infectious diseases practice. However, some schools and colleges of pharmacy do require completion of an APPE and/or IPPE in infectious diseases. In other schools and colleges of pharmacy, infectious diseases can be chosen as an elective or, to some extent, may be experienced during an inpatient or acute care medicine rotation.

Following completion of the academic degree program, pharmacists must pass the North American Pharmacist Licensure Examination (NAPLEX) developed by the National Association of Boards of Pharmacy. Successful performance on the NAPLEX is an indication that the candidate demonstrates the knowledge, judgment, and skills required of an entry-level pharmacist. The NAPLEX Competency Statements provide a blueprint of the topics covered on the examination. The two areas of expected competency assessed on the NAPLEX are as follows:[2]

- *Area 1*: Ensure Safe and Effective Pharmacotherapy and Health Outcomes
- *Area 2*: Safe and Accurate Preparation, Compounding, Dispensing, and Administration of Medications and Provision of Health Care Products

Following licensure, pharmacists can acquire the differentiated knowledge and skills required for specialized infectious diseases pharmacy practice by a variety of methods. These methods may include:

- Doctor of Pharmacy degree education, clinical work experience, and self-study
- Doctor of Pharmacy degree education, postgraduate year one (PGY1) residency training, clinical work experience, and self-study

- Doctor of Pharmacy degree education and PGY1 residency training, followed by postgraduate year two (PGY2) residency training or fellowship in infectious diseases, clinical work experience, and self-study

The most effective way to prepare for a career as an infectious diseases pharmacist is to complete a PGY1 pharmacy practice residency followed by a PGY2 specialty residency or fellowship in infectious diseases. Residency programs provide the most effective structured experiential learning opportunities in infectious diseases pharmacy practice.

The petitioning organizations conducted a *Survey of Infectious Diseases Pharmacists* that asked employers of infectious diseases pharmacists the desired level of training for pharmacists practicing in this specialty. Ninety-five percent of the 100 employers that responded indicated that they desire advanced training for infectious diseases pharmacists hired to provide care within their organizations, including PGY1 or PGY2 residency programs or fellowships in infectious diseases; over half also desire completion of a certificate training program related to antimicrobial stewardship, human immunodeficiency virus (HIV) infection, or other infectious diseases.

- PGY1 residency: 79%
- PGY2 residency in infectious diseases: 67%
- Fellowship in infectious diseases/antimicrobial stewardship: 19%
- Certificate training programs in infectious diseases (e.g., antimicrobial stewardship, HIV, immunizations): 56%

Based on employer responses, the survey results indicate that over the next 3 to 5 years, the desired level of training for infectious diseases pharmacists will be maintained and advance over time. Respondents were permitted to select all types of advanced training desired; thus the sum of the numbers above exceed 100%.

The Doctor of Pharmacy degree alone does not provide knowledge of sufficient depth and breadth for infectious diseases pharmacists to provide specialized care. Additional training, clinical work experience, and study are necessary. Because infectious diseases is an evolving specialty, many infectious diseases pharmacists may have obtained specialized knowledge, skills, and abilities through mechanisms other than structured training programs.

GUIDELINE 2. Describe in detail the nature of training programs in the area of specialty practice including their length, content, and objectives.

As stated above, there are several ways in which pharmacists can acquire the knowledge and skills needed to provide a specialized practice in infectious diseases. The most efficient way is through an accredited PGY2 residency program in infectious diseases pharmacy practice. The *American Society of Health-System Pharmacists (ASHP) Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs* is included as Appendix F-1 and the *ASHP Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases* is included as Appendix F-2.

Residency Training

PGY2 residency training is an organized, directed, accredited program that builds on the broad-based competencies established in PGY1 residency training. The PGY2 program increases the resident's depth of knowledge, skills, attitudes, and abilities and is designed to develop accountability, practice patterns, and habits to raise the resident's level of expertise in medication management and clinical leadership in the area of focus. PGY2 programs strengthen the resident's ability to provide care in the most complex cases and to support care through practice leadership. Therefore, PGY2 residencies provide residents with opportunities to function independently as practitioners by conceptualizing and integrating accumulated experience and knowledge, transforming both into improved medication therapy. A resident who successfully completes an accredited PGY2 residency program should possess the competencies needed to earn board certification in the practice area (provided that certification for the particular practice area exists).

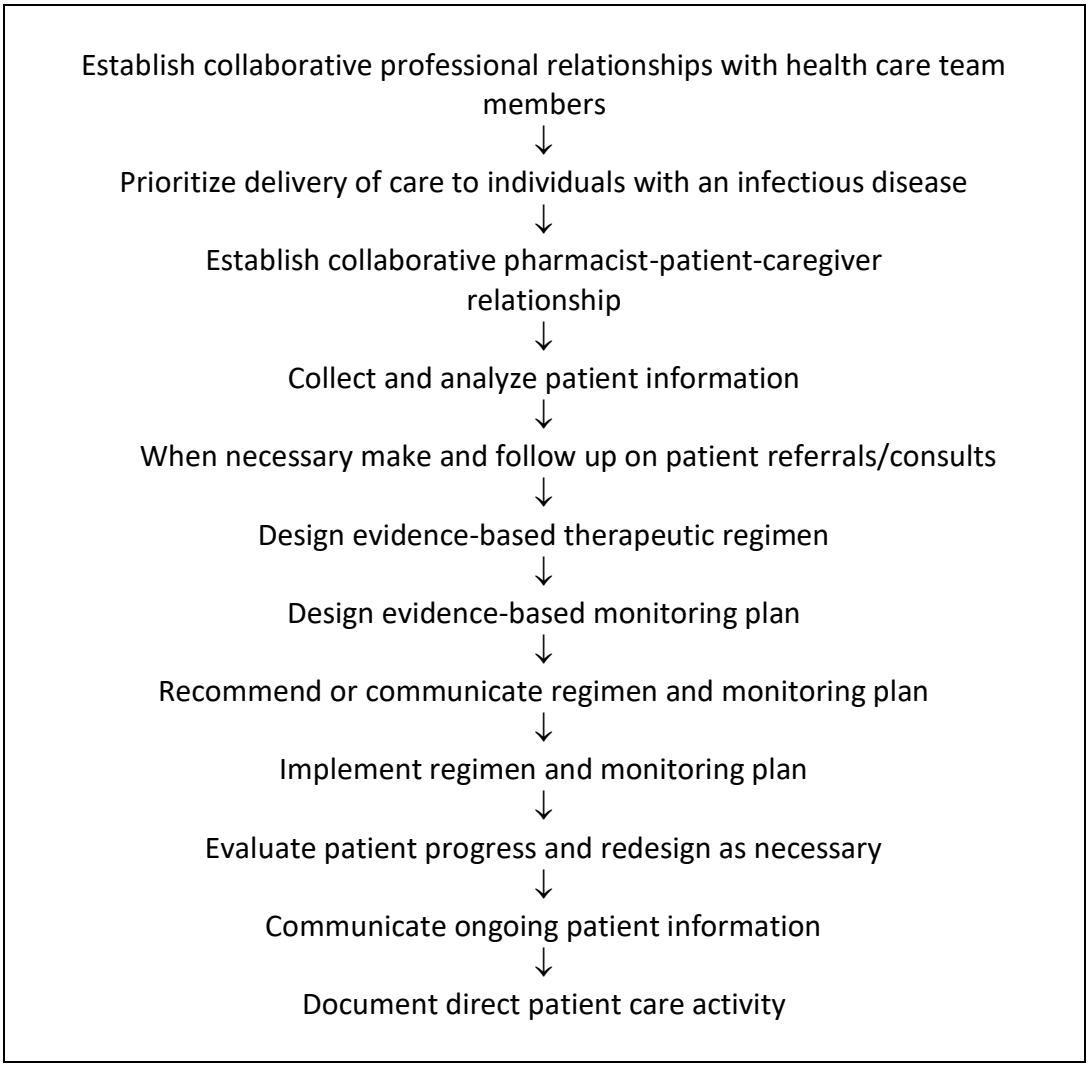
The PGY2 pharmacy residency in infectious diseases is designed to transition PGY1 residency graduates from generalist practice to specialized practice, focused on the care of patients with infectious diseases. Residency graduates are equipped to participate as integral members of interdisciplinary teams caring for patients with infectious diseases, assuming the responsibility for pharmaceutical care. They are also trained to provide this care as an independent practitioner. The wealth of residency graduates' knowledge of infectious diseases and their treatment with anti-infective medications, combined with extensive care of individuals with an infectious disease produce a pharmacist who can successfully serve health care organizations as the ultimate resource for information about anti-infectives and for decision making affecting the care of these patients. This includes leadership in making formulary decisions for anti-infectives.[3,4]

Infectious diseases residency graduates exhibit the characteristics of practice leaders. They have been trained to assume responsibility for identifying and implementing opportunities to improve the medication-use system in the area infectious diseases practice. They possess advanced skills to identify the pharmacotherapy and medication-use training needs of other

health care professionals caring for individuals with infectious diseases; deliver effective training to those health professionals; and contribute to public health efforts for health improvement, wellness, and the prevention of infectious diseases. In this public health role, they are trained to initiate efforts to reduce the spread of antibiotic resistance and vaccine-preventable diseases.[3]

Required outcomes for PGY2 residencies in infectious diseases include the following:[3]

- Outcome R1: Promote health improvement, wellness, and the prevention of infectious diseases.
- Outcome R2: Optimize the outcomes of individuals with an infectious disease by providing evidence-based, patient-centered medication therapy as an integral member of an interdisciplinary team or as an independent clinician.



- Outcome R3: Manage and improve anti-infective-use processes.

- Outcome R4: Demonstrate excellence in the provision of educational activities for health care professionals and health care professionals in training centering on optimizing anti-infective pharmacotherapy.
- Outcome R5: Serve as an authoritative resource on the optimal use of medications used to treat individuals with an infectious disease.
- Outcome R6: Demonstrate leadership and practice management skills.
- Outcome R7: Conduct infectious diseases pharmacy practice research.

Elective educational outcomes for pharmacy residencies in infectious diseases include:[3]

- Outcome E1: Demonstrate added skills for managing and improving anti-infective-use processes.
- Outcome E2: Demonstrate skills required to function in an academic setting.
- Outcome E3: Conduct outcomes research.

Traditionally, completion of PGY2 goals and objectives would provide the education and training needed to sit for a Board of Pharmacy Specialties certification exam.

Fellowship Training

According to the *American College of Clinical Pharmacy* (*ACCP) Guidelines for Clinical Research Fellowship Training Programs*, a fellowship program is a directed, individualized postgraduate training program designed to prepare the fellow to function as an independent investigator.[5] Fellowships typically require prior completion of a master's degree or doctoral degree in a health science discipline, completion of a residency or equivalent clinical experience, and demonstrated interest in research. Fellowship programs prepare the pharmacist to be competent in the scientific research process. The training is typically divided as approximately 80% research and 20% advanced practice experiences.

Infectious diseases fellowship programs model other fellowships and emphasize research and practice in the area of infectious diseases, which cross many patient care areas. Fellowship experience is typically gained in protocol design; study design; data acquisition, analysis, and interpretation; grant writing; manuscript preparation; implementation of institutional review board submission; and conducting clinical and laboratory research projects. Didactic and clinical training of pharmacy students and other health care professionals is also a common component of these programs. The ultimate goal of an infectious diseases fellowship program is to provide the pharmacist with specialized practice experience and essential knowledge, skills, and abilities to conduct research and function as a primary investigator in infectious diseases.[5] A copy of the *ACCP Guidelines for Clinical Research Fellowship Training Programs* is attached as Appendix F-3.

GUIDELINE 3. Provide a comprehensive listing of the programs, sponsoring organizations or institutions, locations and individuals in charge.

Table F-1 lists PGY2 infectious diseases residency programs that are ASHP-accredited as of July 27, 2016. According to ASHP, there are currently 78 programs with up to 80 residency positions. This number has more than tripled from since 2007 when there were 20 programs, and nearly doubled from 41 to 80 positions since 2011. Seventeen of these residencies programs are in candidate or pre-candidate accreditation status, demonstrating the growth and increasing demand for specialty training of pharmacists in infectious diseases. In addition to PGY2 residency programs, fellowship programs in infectious diseases also train pharmacists for specialty practice and research. As of July 2016, there are 13 infectious diseases pharmacy fellowship positions; these are detailed in Table F-2.

Table F-1. Postgraduate Year 2 Infectious Diseases Residency Programs as of October 1, 2016

Sponsoring Organization	Status	City	State	Program Director and Contact Information	Number of Positions
Abbott Northwestern Hospital	Accredited	Minneapolis	MN	Jessica S. Holt, PharmD, BCPS (AQ-ID) jessica.holt@allina.com	1
Abington Memorial Hospital	Candidate	Abington	PA	Sareen A. Vartanian, PharmD, BCPS svartanian@abingtonhealth.org	1
Allegheny General Hospital	Accredited	Pittsburg	PA	Noreen H. Chan Tompkins, PharmD ntompkin@wpahs.org	1
Aurora Health Care–Aurora St. Luke's Medical Center	Candidate	Milwaukee	WI	Valerie L. Ravenna, PharmD, BCPS Valerie.Ravenna@aurora.org	1
Barnes–Jewish Hospital	Accredited	St. Louis	MO	David J. Ritchie, PharmD, FCCP, BCPS (AQ-ID) djr0519@bjc.org	1
Baystate Medical Center	Pre-Candidate	Springfield	MA	Erica Housman, Pharm.D., BCPS AQ-ID erica.housman@baystatehealth.org	
Beaumont Hospital – Royal Oak	Pre-Candidate	Royal Oak	MI	Christine Yost, PharmD christine.yost@beaumont.org	
Beth Israel Deaconess Medical Center	Accredited	Boston	MA	Christopher McCoy, PharmD, BCPS cmccoy@bidmc.harvard.edu	1
Boston Medical Center	Accredited	Boston	MA	Kelly Wright, PharmD, BCPS kelly.wright@bmc.org	1
Carolinas Medical Center	Pre-Candidate	Charlotte	NC	Kelly E Pillinger, Pharm.D., BCPS-AQ ID	
Carilion Roanoke Memorial Hospital	Accredited	Roanoke	VA	Marissa L. Grifasi, PharmD, BCPS mlgrifasi@carilionclinic.org	1
Clement J. Zablocki Veterans Affairs Medical Center	Accredited	Milwaukee	WI	Jamie Winner, PharmD, BCPS (AQ-ID) Jamie.winner@va.gov	1
Cleveland Clinic	Accredited	Cleveland	OH	Elizabeth Neuner, PharmD, BCPS (AQ-ID) neunere@ccf.org	1
Connecticut Children's Medical Center/University of Connecticut	Accredited	Hartford	CT	Jennifer Girotto, PharmD jgirotto@connnecticutchildrens.org	1
Detroit Medical Center/	Accredited	Detroit	MI	Ryan P. Mynatt, PharmD, BCPS (AQ-ID)	1

Detroit Receiving Hospital				rmynatt@dmc.org	
Duke Medicine/Campbell University College of Pharmacy and Health Sciences	Accredited	Durham	NC	Richard Drew, PharmD, MS, BCPS, FCCP richard.drew@duke.edu	1
Edward Hines, Jr. VA Hospital	Candidate	Hines	IL	Ursula C. Patel, PharmD, BCPS (AQ-ID) ursula.patel@va.gov	1
Emory Healthcare	Candidate	Atlanta	GA	Steve Y. Mok, PharmD, BCPS (AQ-ID) steve.mok@emoryhealthcare.org	1
Fairview Pharmacy Services/ University of Minnesota Medical Center	Accredited	Minneapolis	MN	Kimberly D. Boeser, PharmD, BCPS (AQ-ID) kvarejc1@fairview.org	1
Froedtert and the Medical College of Wisconsin–Froedtert Hospital	Candidate	Milwaukee	WI	Angela Huang, PharmD, BCPS angela.huang@froedtert.com	1
Grady Health System	Accredited	Atlanta	GA	Manish Patel, PharmD, BCPS mpatel@gmh.edu	1
Hartford Hospital	Accredited	Hartford	CT	Michael Nailor, PharmD, BCPS (AQ-ID) mnailor@harthosp.org	1
Henry Ford Hospital	Accredited	Detroit	MI	Rachel Kenney, PharmD, BCPS (AQ-ID) rkenney1@hfhs.org	1
Houston Methodist Hospital	Accredited	Houston	TX	William L. Musick, PharmD, BCPS wmusick@houstonmethodist.org	1
HSHS St. John's Hospital	Accredited	Springfield	IL	Scott Bergman, PharmD, BCPS scbergm@siue.edu	1
Indiana University Health	Accredited	Indianapolis	IN	Jon J. Hiles, PharmD, BCPS jhiles@iuhealth.org	1
Jackson Memorial Hospital	Accredited	Miami	FL	Laura Smith, PharmD, BCPS (AQ-ID) lsmith5@jhsmiami.org	1
James A. Haley Veterans Hospital	Accredited	Tampa	FL	Jaela Dahl Jaela.Dahl@va.gov	1
James J. Peters VA Medical Center	Accredited	Bronx	NY	Mei H. Chang, PharmD, BCPS (AQ-ID) mei.chang2@va.gov	1
Jesse Brown VA Medical Center	Accredited	Chicago	IL	Lisa R. Young, PharmD, BCPS (AQ-ID) lisa.young2@va.gov	1
Kansas City VA Medical Center	Candidate	Kansas City	MO	Jamie Guyear, PharmD jamie.guyear@va.gov	1
Lee Memorial Hospital	Accredited	Fort Myers	FL	Sandy Estrada, PharmD, BCPS sandy.estrada@leememorial.org	1
Louis Stokes Cleveland VA Medical Center	Candidate	Cleveland	OH	Sharanie V. Sims, PharmD, BCPS (AQ-ID) Sharanie.sims@va.gov	1
Mercy Medical Center	Candidate	Des Moines	IA	Jeff Brock, PharmD, MBA, BCPS jbrock@mercydesmoines.org	1
Meriter Hospital	Candidate	Madison	WI	Steven C. Ebert, PharmD, FCCP, FIDSA Steven.Ebert@UnityPoint.org	
Michael E. DeBakey Veterans Affairs Medical Center	Accredited	Houston	TX	Richard M. Cadle, PharmD, BCPS (AQ-ID), FASHP cadle.richardmark@va.gov	1
Midwestern University, Chicago College of Pharmacy	Accredited	Downers Grove	IL	Sheila K. Wang, PharmD, BCPS (AQ-ID) swangx@midwestern.edu	2 (RUMC and NHC)

Morton Plant Hospital Association Inc.	Accredited	Clearwater	FL	Lynne C. Krop, PharmD, BCPS (AQ-ID) lynne.krop@baycare.org	1
Munson Medical Center	Candidate	Traverse City	MI	Michael D. Tiberg, PharmD, BCPS (AQ-ID) mtiberg@mhc.net	1
MUSC Medical Center and South Carolina College of Pharmacy	Accredited	Charleston	SC	John A. Bosso, PharmD, FCCP, FIDSA, BCPS (AQ-ID) bossoja@musc.edu	1
New York–Presbyterian Hospital	Accredited	New York	NY	Christine J. Kubin, PharmD, BCPS (AQ-ID) chk9005@nyp.org	1
Norton Healthcare	Candidate	Louisville	KY	Ashley Wilde, PharmD, BCPS ashley.wilde@nortonhealthcare.org	1
NYU Langone Medical Center	Accredited	New York	NY	Yanina Dubrovskaya, PharmD, BCPS, (AQ-ID) yanina.dubrovskaya@nyumc.org	1
Oklahoma City Department of Veterans Affairs Medical Center	Accredited	Oklahoma City	OK	Chris Gentry, PharmD chris.gentry@va.gov	1
Renown Regional Medical Center	Accredited	Reno	NV	Jessica Thompson, PharmD, BCPS (AQ-ID) JThompson@renown.org	1
Seton Healthcare Family	Accredited	Austin	TX	Theresa C. Jaso, PharmD, BCPS (AQ-ID) tjaso@seton.org	1
South Carolina College of Pharmacy, University of South Carolina, and Palmetto Health	Accredited	Columbia	SC	P. Brandon Bookstaver, PharmD, BCPS (AQ-ID), AAHIVP bookstaver@sccp.sc.edu	1
South Texas Veterans Health Care System	Accredited	San Antonio	TX	Kelly Echevarria, PharmD, BCPS (AQ-ID) kelly.echevarria@va.gov	1
SUNY Downstate Medical Center	Accredited	Brooklyn	NY	Roopali Sharma, BS, PharmD, BCPS Roopali.Sharma@downstate.edu	
The Brooklyn Hospital Center	Accredited	Brooklyn	NY	Thy Nguyen Le, PharmD TNL9001@nyp.org	1
The Johns Hopkins Hospital	Accredited	Baltimore	MD	Edina Avdic, PharmD, MBA, BCPS (AQ-ID) eavdic1@jhmi.edu	1
The Ohio State University Wexner Medical Center	Accredited	Columbus	OH	Karri Bauer, PharmD, BCPS karri.bauer@osumc.edu	1
Temple University School of Pharmacy	Accredited	Philadelphia	PA	Jason C. Gallagher, PharmD, FCCP, BCPS jasoncg@temple.edu	1
Thomas Jefferson University Hospital	Accredited	Philadelphia	PA	Brian P. Roslund, PharmD, BCPS (AQ-ID) Brian.Roslund@jefferson.edu	1
UF Health Shands Hospital	Accredited	Gainesville	FL	Kenneth P. Klinker, PharmD klinkk@shands.ufl.edu	
University of Arizona–University Medical Center/ College of Pharmacy	Accredited	Tucson	AZ	David E. Nix, PharmD, BCPS nix@pharmacy.arizona.edu	1
University of California, Davis Medical Center	Accredited	Sacramento	CA	Cinda Christensen, PharmD, BCPS (AQ-ID) cinda.christensen@ucdmc.ucdavis.edu	
University of California, San Diego Health System	Accredited	San Diego	CA	Charles L. James, PharmD, BCPS (AQ-ID), FCSHP cljames@ucsd.edu	1

University of Chicago Medical Center	Accredited	Chicago	IL	Natasha Pettit, PharmD, BCPS (AQ-ID) Natasha.pettit@uchospitals.edu	1
University of Colorado Hospital	Accredited	Aurora	CO	Doug Fish, PharmD, BCPS (AQ-ID) doug.fish@ucdenver.edu	1
University of Kentucky Medical Center	Accredited	Lexington	KY	Scott E. Kincaid, PharmD, BCPS seki232@uky.edu	1
University of Michigan Hospitals and Health Centers	Accredited	Ann Arbor	MI	Jerod L. Nagel, PharmD nageljl@umich.edu	1
University of Mississippi Medical Center	Accredited	Jackson	MS	Kayla R. Stover, PharmD, BCPS (AQ-ID) kstover@umc.edu	1
University of New Mexico–Health Sciences Center	Accredited	Albuquerque	NM	Renee-Claude Mercier, PharmD rmercier@salud.unm.edu	1
University of North Carolina Hospitals and Clinics/UNC School of Pharmacy	Accredited	Chapel Hill	NC	Lindsay M. Daniels, PharmD, BCPS lsdaniel@unch.unc.edu	1
University of Rochester Medical Center	Accredited	Rochester	NY	Erica L. Dobson, PharmD, BCPS (AQ-ID), AAHIVP Erica_Dobson@urmc.rochester.edu	1
University of Virginia Health System	Candidate	Charlottesville	VA	Heather L. Cox, PharmD, BCPS (AQ-ID) hlc4b@virginia.edu	1
University of Wisconsin Hospital and Clinics	Accredited	Madison	WI	Lucas T. Schulz, PharmD, BCPS lschulz2@uwhealth.org	1
UPMC Presbyterian Shadyside	Accredited	Pittsburgh	PA	Brian A. Potoski, PharmD, BCPS (AQ-ID) potoskiba@upmc.edu	1
Upstate University Hospital	Candidate	Syracuse	NY	Jeff Steele, PharmD steelej@upstate.edu	1
VA North Texas Healthcare System Dallas	Accredited	Dallas	TX	Susan Duquaine, PharmD, BCPS (AQ-ID), AAHIVP SusanM.Duquaine@va.gov	1
VA San Diego Healthcare System	Accredited	San Diego	CA	Scott T. Johns, PharmD, BCPS Scott.johns@va.gov	1–2
VA St. Louis Health Care System–John Cochran Division	Candidate	St. Louis	MO	Ryan P. Moenster, PharmD, BCPS (AQ-ID) ryan.moenster@stlcop.edu	1
Wake Forest Baptist Health	Accredited	Winston-Salem	NC	John Williamson, PharmD, BCPS johnwill@wakehealth.edu	1
West Virginia University Healthcare	Accredited	Morgantown	WV	Douglas Slain, PharmD, BCPS, FCCP, FASHP dslain@hsc.wvu.edu	1
Western New York Veterans Affairs Healthcare System	Accredited	Buffalo	NY	Kari A. Mergenhagen, PharmD, BCPS (AQ-ID) kari.mergenhagen@va.gov	1
Yale–New Haven Health System	Accredited	New Haven	CT	Maribeth A. Cabie, PharmD, BCPS Maribeth.Cabie@ynhh.org	1

Table F-2. Infectious Diseases Pharmacy Fellowship Programs as of July 27, 2016

Sponsoring Organization	City	State	Program Contact	Number of Positions	Specialties
Department of Veterans Affairs	Boise	ID	Karl Madaras-Kelly, PharmD, MPH Karl.Madaras-Kelly2@va.gov	1	Antimicrobial Stewardship Health Outcomes
Hartford Hospital Infectious Disease Pharmacotherapy	Hartford	CT	David P. Nicolau, PharmD, FCCP, FIDSA dnicola@harthosp.org	1	Antimicrobial Pharmacodynamics Clinical Pharmacokinetics
Loma Linda University Medical Center and School of Pharmacy	Loma Linda	CA	Steve Forland, PharmD sforland@llu.edu	1	Infectious Diseases
Midwestern University/ Northwestern Memorial Hospital/Rush University Medical Center	Downers Grove/ Chicago	IL	Marc H. Scheetz, PharmD, MSc mschee@midwestern.edu	1	Infectious Diseases
South Carolina College of Pharmacy–USC	Columbia	SC	P. Brandon Bookstaver, PharmD, BCPS (AG-ID), AAHIVP bookstaver@sccp.sc.edu	1	Infectious Diseases Academia
St. Luke's Episcopal Hospital –University of Houston College of Pharmacy	Houston	TX	Hannah Palmer, PharmD, BCPS hpalmer@sleh.com	1	Infectious Diseases
The Oregon State University/Oregon Health and Science University	Portland	OR	Jessina C. McGregor, PhD mcgregoj@ohsu.edu	1	Infectious Diseases
University Health Network and Mount Sinai Hospital	Toronto	ONT Canada	Linda Dresser linda.dresser@uhn.ca	1	Antibiotic Stewardship
UNC Eshelman School of Pharmacy	Chapel Hill	NC	Angela Kashuba, BScPhm, PharmD, DABCP akashuba@unc.edu	1	Infectious Diseases
University of Kentucky	Lexington	KY	David S. Burgess, PharmD, FCCP David.burgess@uky.edu	1	Infectious Diseases Pharmacodynamics
University of Illinois at Chicago	Chicago	IL	Keith A. Rodvold, PharmD, FCCP kar@uic.edu	1	Infectious Diseases Pharmacokinetics-Pharmacodynamics
University of Rhode Island College of Pharmacy/ Providence VA Medical Center	Providence	RI	Kerry LaPlante, PharmD kerrylaplante@uri.edu	3	Antimicrobial Stewardship In Vitro Pharmacodynamics in Infectious Diseases
Wayne State University	Detroit	MI	Michael J. Rybak, PharmD, MPH, FCCP m.rybak@wayne.edu	1	Infectious Diseases Outcomes Research

Table F-3 demonstrates the growth of PGY2 pharmacy residency programs in infectious diseases as they have evolved from 2007 to 2016. The demand for specialty training programs in infectious diseases has more than tripled since 2007.

Table F-3. Growth of Postgraduate Year Two Programs in Infectious Diseases and Human Immunodeficiency Virus Infection Over the Past 10 Years

PGY2 Program	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Infectious diseases	20	31	33	34	40	43	51	59	68	78
HIV	3	3	3	3	1	2	3	3	3	2

References

[1] Accreditation Council for Pharmacy Education. *Accreditation Standards and Key Elements for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree.* 2016. Available at: https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf. Accessed January 23, 2016.

[2] National Association of Boards of Pharmacy. NAPLEX Competency Statements. In *NAPLEX/MJPE 2016 Candidate Registration Bulletin*. Available at: https://nabp.pharmacy/wp-content/uploads/2016/07/NAPLEX_MPJE_Bulletin_10-11-16.pdf. Accessed January 23, 2016.

[3] *ASHP Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases* http://www.ashp.org/DocLibrary/Residents/RTP-Infectious-Diseases.pdf. Accessed July 27, 2016.

[4] *ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs* http://www.ashp.org/DocLibrary/Residents/ASO-PGY2-Guidance-Document.pdf. Accessed July 27, 2016.

[5] American College of Clinical Pharmacy. *AACP Guidelines for Clinical Research Fellowship Training Programs*. Available at: https://www.accp.com/docs/positions/guidelines/pos15.pdf. Accessed July 27, 2016.

Criterion G
Transmission of Knowledge

CRITERION G: Transmission of Knowledge

The area of specialization shall be one in which there is an adequate transmission of specialized knowledge through professional, scientific and technical literature directly related to the specialty area.

This criterion refers to the TRANSMISSION OF KNOWLEDGE.

From 2013 to the third quarter of 2016, the United States federal government—through the National Institutes of Health National Institute of Allergy and Infectious Diseases, the Centers for Disease Control and Prevention, the Food and Drug Administration, and other entities—has invested $929,941,000 in grants related to infectious diseases research, tracking, and dissemination of knowledge and information. This widely researched area is situated at the intersection of public health and health care and it crosses all venues of care and living.[1]

The transmission of knowledge of infectious diseases pharmacy practice is broad, multifaceted, and well-established. Dissemination and transmission of knowledge, emerging evidence, and practice models occur widely through professional and scientific literature; within public policy and health care literature and agencies; among health professionals and professional practice organizations, which provide connection and networking opportunities; through live, online, and home-based continuing education; and via award programs that recognize and disseminate best practices in infectious diseases pharmacy practice.

GUIDELINE 1. Identify journals and other periodicals dealing specifically with the proposed specialty.

Clinical research, emerging evidence, clinical guidelines, case studies, and emerging best practices in infectious diseases are the focus of many scientific, professional association, medical, pharmacy, and health care journals. Some journals focus exclusively on infectious diseases issues and others integrate infectious diseases as part of their focus on health care. Key journals that engage in dissemination of evidence and transmission of knowledge in infectious diseases and their brief descriptions are as follows:

- ***AIDS Research and Therapy:*** This journal publishes articles on basic science as well as translational, clinical, social, epidemiological, behavioral, and educational sciences focused on the treatment and prevention of HIV/AIDS and the search for the cure.
- ***The American Journal of Emergency Medicine:*** Covering all activities concerned with emergency medicine, the journal provides information to increase the ability to understand, recognize, and treat emergency conditions through clinical articles, case reports, review articles, editorials, international notes, and book reviews.
- ***American Journal of Health-System Pharmacy:*** The official publication of the American Society of Health-System Pharmacists (ASHP) publishes peer-reviewed scientific papers on contemporary drug therapy and pharmacy practice innovations in hospitals and health systems.
- ***The American Journal of Medicine:*** The official journal of the Alliance for Academic Internal Medicine publishes original clinical research on internal medicine.
- ***Annals of Emergency Medicine:*** The official journal of the American College of Emergency Physicians is an international, peer-reviewed publication dedicated to improving the quality of care in emergency medicine and related medical specialties.
- ***Annals of Family Medicine:*** This peer-reviewed research journal is dedicated to meeting the needs of scientists, practitioners, policymakers, and the patients and communities they serve.
- ***Annals of Internal Medicine:*** This journal, by the American College of Physicians, publishes original research, review articles, practice guidelines, and commentary relevant to clinical practice, health care delivery, public health, health care policy, medical education, ethics, and research methodology.
- ***Annals of Pharmacotherapy:*** This peer-reviewed journal advances pharmacotherapy worldwide by publishing high-quality research and review articles to achieve the most desired health outcomes, highlighting cutting-edge information about the most efficient, safe, and cost-effective pharmacotherapy for the treatment and prevention of a wide variety of illnesses and diseases.
- ***Antimicrobial Agents and Chemotherapy:*** This publication of the American Society for Microbiology features interdisciplinary studies that build our understanding of the underlying mechanisms and therapeutic applications of antimicrobial and antiparasitic agents and chemotherapy.
- ***BMC Infectious Diseases:*** An open-access, peer-reviewed journal, *BMC Infectious Diseases* considers articles on all aspects of the prevention, diagnosis, and management of infectious and sexually transmitted diseases in humans, as well as related molecular genetics, pathophysiology, and epidemiology.
- ***The BMJ*****:** Originally called the *British Medical Journal*, *The BMJ* is an international weekly peer-reviewed medical journal and one of the oldest general medical journals.

- ***British Journal of General Practice:*** The Royal College of General Practitioners publishes this journal, which includes research, debate, and analysis for clinicians and researchers worldwide.
- ***The Canadian Journal of Hospital Pharmacy:*** This academic journal focuses on how pharmacists in hospitals and other collaborative health care settings optimize safe and effective drug use for patients in Canada and throughout the world.
- ***Canadian Medical Association Journal:*** *CMAJ* is a peer-reviewed general medical journal that publishes original clinical research, commentaries, analyses, and reviews of clinical topics, health news, clinical practice updates, and editorials.
- ***Canadian Pharmacists Journal:*** As the oldest continuously published periodical in Canada, the journal's mission is to attract, disseminate, and discuss research and contemporary health care issues and link knowledge to practice.
- ***Clinical Infectious Diseases:*** This official publication of the Infectious Diseases Society of America is a leading journal in the field of infectious diseases with a broad international readership.
- ***Current Infectious Disease Reports:*** The journal provides in-depth review articles contributed by international experts on the most significant developments in the field and elucidates current and emerging approaches to the diagnosis, treatment, management, and prevention of infectious diseases.
- ***Drugs & Aging:*** The journal delivers essential information on the most important aspects of drug therapy to professionals involved in the care of elderly patients.
- ***Hospital Pharmacy:*** This independent, peer-reviewed journal is practitioner-focused and dedicated to the promotion of best practices and medication safety.
- ***International Journal of Clinical Pharmacy:*** *IJCP* publishes articles on clinical pharmacy, research, and application in pharmaceutical care and related practice-oriented subjects in the pharmaceutical sciences.
- ***International Journal of Pharmaceutical Sciences and Research:*** This peer-reviewed journal aims to communicate high-quality original research, reviews, case reports, and other features that contribute scientific knowledge in the field of pharmacy.
- ***Journal of the American Medical Association:*** *JAMA* is the official publication of the American Medical Association and publishes peer-reviewed articles on general medicine.
- ***Journal of the American Pharmacists Association:*** *JAPhA* is the official publication of the American Pharmacists Association (APhA) and addresses topics including medication therapy management, pharmacotherapy, pharmacoepidemiology, pharmacoeconomics, pharmacy management, and public health.

- ***Journal of Antimicrobial Chemotherapy:*** *JAC* is among the foremost international journals in antimicrobial research with a readership representing academia, industry, health services, and those who are influential in formulary decisions.
- ***Journal of Clinical Microbiology:*** This publication by the American Society of Microbiology covers current research related to the laboratory diagnosis of human and animal infections and the role of the laboratory in both the management of infectious diseases and the elucidation of the epidemiology of infections.
- ***The Journal of Infection in Developing Countries:*** *JIDC* was launched to help infectious diseases researchers from developing countries have an international forum for publishing their research findings.
- ***Journal of Managed Care and Specialty Pharmacy:*** As a peer-reviewed journal of the Academy of Managed Care Pharmacy, this publication is dedicated to improving the quality of care delivered to patients.
- ***Journal of Pharmaceutical Policy and Practice:*** Formerly known as *Southern Med Review*, this journal provides a platform for researchers to disseminate empirical research findings.
- ***Journal of Pharmacy Practice:*** This peer-reviewed journal offers practicing pharmacists in-depth reviews, research trials, and surveys of new drugs and novel therapeutic approaches, pharmacotherapy reviews, and pharmacy practice topics.
- ***Journal of Research in Pharmacy Practice:*** *JRPP* is an international peer-reviewed quarterly research journal published by Wolters Kluwer Health.
- ***The Lancet Infectious Diseases:*** Launched in August 2001, this monthly journal disseminates original research, review, opinion, and news covering international issues relevant to clinical infectious diseases specialists worldwide.
- ***The New England Journal of Medicine:*** *NEJM* is a weekly general medical journal that publishes new medical research, review articles, and editorial opinions.
- ***Patient Preference and Adherence:*** This international, peer-reviewed, open-access journal focuses on the growing importance of patient preference and adherence throughout the therapeutic continuum.
- ***Pediatrics:*** The official journal of the American Academy of Pediatrics, *Pediatrics* publishes original articles, reviews, commentaries, policy statements, and practice guidelines for the health of infants, children, adolescents, and young adults.
- ***Pharmacotherapy:*** *Pharmacotherapy* is the journal of human pharmacology and drug therapy.
- ***Trials:*** This peer-reviewed journal encompasses all aspects of the performance and findings of randomized controlled trials in health.

- ***World Journal of Critical Care Medicine:*** This academic journal is devoted to reporting research progress and findings of basic research and clinical practice in critical care medicine.

Newsletters and Online Periodicals

Professional pharmacy practice associations publish a variety of print and online media that disseminate information about infectious diseases. Making a Difference in Infectious Diseases (MAD-ID) publishes a newsletter twice annually with news, information, and best practices, along with an embedded continuing education activity. See Appendix G-1 for a recent issue of the MAD-ID newsletter.

Electronic Mailing Lists (e.g., Listserv). Within the American College of Clinical Pharmacy (ACCP), the Infectious Diseases Practice and Research Network (PRN) electronic mailing list serves as a mechanism for sharing, obtaining, and reporting data among infectious diseases pharmacist members. The ASHP Section of Clinical Specialists and Scientists also hosts an electronic mailing platform to facilitate communication, collaboration, and problem solving among members.

GUIDELINE 2. Provide a select bibliography of published abstracts, articles, positions papers, and white papers in the professional literature dealing with the proposed specialty.

More than 2,000 articles related to infectious diseases and pharmacy were published in the professional literature in English during the 3.5 year period from January 1, 2013, to June 1, 2016—among these articles, 336 integrated pharmacy practice directly. The prevalence of articles in pharmacy and medical journals focusing on infectious diseases pharmacy practice, infectious diseases pharmacists' involvement and leadership in antimicrobial stewardship programs, immunizations, and care of complex patients by infectious diseases pharmacists in specialty practice provides further evidence of the specialized nature of this practice. A select bibliography of articles and resources published regarding specialized pharmacy practice in infectious diseases and related issues is attached as Appendix G-2.

GUIDELINE 3. Reference and summarize selected experimental and quasi-experimental, peer-reviewed articles demonstrating the value of the proposed specialty (if available and appropriate).

An evidence table presenting a summary of 36 key peer-reviewed articles, clinical guidelines, and pivotal policy reports related to infectious diseases pharmacy practice, their outcomes, and relevance to this petition, as determined by the infectious diseases pharmacy experts from the petitioning organizations, is attached as Appendix G-3.

GUIDELINE 4. Describe methods of knowledge transmission through symposia, seminars, workshops, etc., and enclose representative programs concerning these activities.

A wide range and deep portfolio of programs, symposia, and workshops in infectious diseases pharmacy practice are offered every year by the petitioning organizations, other continuing pharmacy education (CPE) providers that are accredited by the Accreditation Council for Pharmacy Education (ACPE), and other health care associations. Representative programs are described in the following sections.

CPE Programs, Seminars, Symposia, and Workshops

Seminars, symposia, and workshops on infectious diseases therapeutics, issues, and new developments are held at numerous professional society meetings every year, including those of ACCP, APhA, ASHP, and the Society of Infectious Diseases Pharmacists (SIDP). Knowledge transmission is carried out in a variety of formats, including live and web-based seminars, symposia, application-based workshops, mentorships, and a national journal club. Hundreds of hours of programming are presented at these events, most of which are accredited by ACPE as CPE programs. Table G-1 provides a comprehensive list of infectious diseases programming conducted during national meetings of the petitioning organizations from December 2013 to June 2016.

Table G-1. Infectious Diseases Programming Provided During National Meetings of the Petitioning Organizations From December 2013 to June 2016

Organization	Infectious Diseases Programs
American College of Clinical Pharmacy (ACCP)	Infectious Diseases PRN Focus Session—Difficult to Treat Infections
ACCP	2014 From Theory to Bedside: Clinical Reasoning Series Health Care-Associated Infections
ACCP	Curricular Track II: Emerging Issues, Challenges, and Concepts in Infectious Diseases
ACCP	Curricular Track II: Focus on Fungus
ACCP	Infectious Diseases PRN Focus Session—Infectious Diseases Rapid Diagnostic and Point-of-Care Tests Across Sites of Care
ACCP	Curricular Track II: Infectious Diseases: Drugs and Bugs Return
ACCP	Updates in the Management of Viral Infections
ACCP	Infectious Diseases PRN Focus Session—Antimicrobial Stewardship in Unique Practice Settings
ACCP	Optimal Management of Community- and Hospital-Acquired Methicillin-Resistant Staphylococcus aureus Infections
ACCP	Infectious Diseases I and Infectious Diseases II
ACCP	Dermatologic and Eyes, Ears, Nose, and Throat, and Immunologic; Infectious Diseases I; and Infectious Diseases II
ACCP	Infectious Diseases
ACCP	Infectious Diseases, Immunology, and Fluids, Electrolytes, and Nutrition

ACCP	Nephrology, Infectious Diseases, and HIV/Infectious Diseases
ACCP	Nephrology, Infectious Diseases, and Infectious Diseases/HIV
American Pharmacists Association (APhA)	2016 APhA Annual Meeting: Pharmacy-Based Immunization Certificate Training
APhA	2016 APhA Annual Meeting: Pharmacy-Based Travel Health Services Advanced Competency Training
APhA	2016 APhA Annual Meeting: Immunization Update 2016
APhA	2016 APhA Annual Meeting: Presentation Theater: Pneumococcal Disease in Adults 65+: Keeping Vaccination in Focus
APhA	2016 APhA Annual Meeting: Zika Outbreak: What Pharmacists Need to Know
APhA	2016 APhA Annual Meeting: Presentation Theater: Helping to Prevent Select Infectious Diseases in Adults
APhA	2016 APhA Annual Meeting: A Stormy C: Challenges to Hepatitis C Management
APhA	2016 APhA Annual Meeting: Turning the Tide: How to Improve Antibiotic Use and Stop a Killer
APhA	2016 APhA Annual Meeting: Beware: Clinically Significant Drug Interactions in the Treatment of HIV
APhA	2016 APhA Annual Meeting: Penicillin Allergy: A Rare Case Demanding Special Attention
APhA	2015 APhA Annual Meeting: Pharmacy-Based Immunization Certificate Training
APhA	2015 APhA Annual Meeting: Pharmacy-Based Travel Health Services Advanced Competency Training
APhA	2015 APhA Annual Meeting: Immunization Update 2015
APhA	2015 APhA Annual Meeting: CDC and Pharmacists: Partners in Protecting the Nation's Health
APhA	2015 APhA Annual Meeting: Improving Immunization Rates: Focus on Children and Adolescents
APhA	2015 APhA Annual Meeting: CLIA-Waived Point of Care Testing for Managing Infectious Diseases
APhA	2015 APhA Annual Meeting: HIV Update
APhA	2015 APhA Annual Meeting: Special Consideration in the Management of Hepatitis C
APhA	2014 APhA Annual Meeting: Pharmacy-Based Immunization Certificate Training
APhA	2014 APhA Annual Meeting: Pharmacy-Based Travel Health Services Advanced Competency Training
APhA	2014 APhA Annual Meeting: Managing Comorbid Conditions in Patients with HIV
APhA	2014 APhA Annual Meeting: Immunization Update 2014
APhA	2014 APhA Annual Meeting: Antimicrobial Stewardship in the Health System and Beyond
APhA	2014 APhA Annual Meeting: Pediatric and Adolescent Immunizations
American Society of Health-System Pharmacists (ASHP)	2015 Midyear Clinical Meeting: Making Sense of Infectious Disease Clinical Practice Guidelines
ASHP	2015 Midyear Clinical Meeting: Treating the Flu Is SNOT That Easy: An Update on Influenza Antiviral Therapy
ASHP	2015 Midyear Clinical Meeting: Antimicrobial Stewardship in the Emergency Department: Challenges and Opportunities
ASHP	2015 Midyear Clinical Meeting: Worrying About Tomorrow Today: Expanding Pharmacists' Knowledge of Laboratory Tests in Infectious Diseases
ASHP	2015 Midyear Clinical Meeting: Networking Session: Infectious Disease
ASHP	2015 Midyear Clinical Meeting: A Case-Based Approach: Treating Infections in Children
ASHP	2015 Midyear Clinical Meeting: Antimicrobial Stewardship—More Important Than Ever
ASHP	2015 Midyear Clinical Meeting: Update on Invasive Candidiasis Treatment in the ICU

ASHP	2015 Midyear Clinical Meeting: The Long and Short of It: Comparison of Extended Infusion to Standard Infusion of Antibiotics
ASHP	2015 Midyear Clinical Meeting: Lock It Up: Prevention and Treatment of Central Line Associated Bloodstream Infections
ASHP	2015 Midyear Clinical Meeting: Managing HIV-Positive Individuals in the Acute Care Setting: When the Reason for Admission Is Anything but HIV
ASHP	2015 Midyear Clinical Meeting: Guiding Us to the Path of Least Resistance: Infectious Disease Practice Guideline Updates
ASHP	2015 Midyear Clinical Meeting: Ongoing Management of the HIV Patient in the Ambulatory Care Setting: Strategies for Achieving Long-Term Viral Suppression
ASHP	2015 Midyear Clinical Meeting: Agents for the Treatment of Gram-Negative Infections: The Old and the New
ASHP	2015 Midyear Clinical Meeting: Improving Prevention and Management of Febrile Neutropenia: A Framework for Health-System Pharmacists
ASHP	2015 Midyear Clinical Meeting: Improving Patient Outcomes With Effective Antimicrobial Stewardship Programs
ASHP	2014 Midyear Clinical Meeting: Pipeline Antimicrobials and the Need for Intensified Antimicrobial Stewardship
ASHP	2014 Midyear Clinical Meeting: Prodigal Pathogens: Optimal Management of Highly Resistant Pathogens
ASHP	2014 Midyear Clinical Meeting: Surviving Sepsis Campaign Guidelines Updates
ASHP	2014 Midyear Clinical Meeting: Clinical Updates: New Agents and the Antibiotic Pipeline
ASHP	2014 Midyear Clinical Meeting: Management of Invasive Fungal Infections: Applying Evidence-Based Strategies and Individualizing Antifungal Therapy
ASHP	2014 Midyear Clinical Meeting: Optimizing Care of the HIV Patient in the Ambulatory Care Setting: Role of the Pharmacist
ASHP	2013 Midyear Clinical Meeting: Ambulatory Care Intensive Study A: Mental Health Issues and Antimicrobial Stewardship in Ambulatory Care
ASHP	2013 Midyear Clinical Meeting: Pharmacotherapy Intensive Study A: Carbapenem Resistance and Febrile Neutropenia
ASHP	2013 Midyear Clinical Meeting: Applying the Basics of Anti-infective Resistance to Clinical Practice
ASHP	2013 Midyear Clinical Meeting: Combination Antimicrobial Therapy and Optimal Beta-Lactam Administration: Pro/Con Debates in ID
ASHP	2013 Midyear Clinical Meeting: Updates in the Management of Septic Shock: Application of International Guidelines
ASHP	2013 Midyear Clinical Meeting: What a Zoo! Animal Influences on Emerging Viral Infections
ASHP	2013 Midyear Clinical Meeting: Applying the Basics of Anti-infective Resistance to Clinical Practice
ASHP	2013 Midyear Clinical Meeting: Infectious Diseases Update: Using Guidelines to Optimize Treatment
ASHP	2013 Midyear Clinical Meeting: Brave New World—Antimicrobial Stewardship in the Pediatric, Oncology, and Emergency Room Units
ASHP	2013 Midyear Clinical Meeting: Adaptation in the Management of MRSA: Keeping Up With the Bug, the Drugs, and the Healthcare System
ASHP	2013 Midyear Clinical Meeting: Advances in the Treatment of HIV: Focus on New Therapies
ASHP	2013 Midyear Clinical Meeting: Applying Antimicrobial Stewardship Principles to the Treatment of CABP and ABSSSI: Complying With CMS Criteria and Clinical Guidelines
SIDP	2016 Annual Meeting: Management of MDR Gram-Negative Infectious and the Role of

	Newer Beta-Lactam Antibiotics
Society of Infectious Diseases Pharmacists (SIDP)	2016 Annual Meeting: Trials and Tribulations of Antimicrobial Stewardship in the SOT Population
SIDP	2016 Annual Meeting: FARMaceuticals: Antibiotic Use in Animals and Agriculture
SIDP	2016 Annual Meeting: Antimicrobial Research and Development in the Industry: Reestablishing the Antimicrobial Pipeline
SIDP	2016 Annual Meeting: Antibiotic Resistance Stewardship: Where We and Where Must We Go
SIDP	2015 Annual Meeting: Integrating Molecular Diagnostic Platforms Into Your Clinical Practice: Looking Beyond MALDI-TOF
SIDP	2015 Annual Meeting: Perusing the Anti-infective Pipeline
SIDP	2015 Annual Meeting: The Expanding Reach of Antibiotic Stewardship Outside of Acute Care—Are We Prepared?
SIDP	2015 Annual Meeting: The CDC's Plan and Legislative Efforts to Advance Antimicrobial Stewardship
SIDP	2014 Annual Meeting: Advances in Hepatitis C Treatment
SIDP	2014 Annual Meeting: Using Quasi-Experimental Study Design to Evaluate Antimicrobial Stewardship Programs
SIDP	2014 Annual Meeting: Novel Combination Therapies for Gram-Positive Bacteremia
SIDP	2014 Annual Meeting: What Should an ID Pharmacist Know About the Human Microbiome?

In addition, Table G-2 provides a list of home study programs in infectious diseases pharmacy offered through APhA.

Table G-2. Home Study Programs in Infectious Diseases Provided by the American Pharmacists Association

Title	Summary/Description	Continuing Education Units
Pneumococcal Immunization Update—Home Study	This recorded webinar will educate pharmacists about the risk of pneumococcal disease and discuss recommendations, including risks and benefits of pneumococcal immunization. This activity is based on a live recording from June 26, 2013.	0.2
Hepatitis C Therapy: Looking Toward Interferon Sparing Regimens	This activity provides information on the role of pharmacists in hepatitis C therapy.	0.1
Expanding Pharmacy-Based Pneumococcal Immunization Services—Home Study	This archived webinar is designed to assist pharmacists to develop a process to begin or expand their pneumococcal immunization services. This activity is based on a live recording from August 8, 2013.	0.15
Putting Adult Immunizations Standards Into Action: Pharmacists' Role in the Immunization Neighborhood—Home Study	This archived webinar discusses the purpose of the immunization neighborhood, the role of the pharmacist, and collaboration between pharmacists and physicians within the neighborhood. The webinar also describes the key elements of the updates to the Adult Immunization Standards and much more.	0.2

The Pharmacists Role in Promoting Preconception Health	Learn more about how pharmacists play an important role in medication screening, chronic disease state management, and preconception planning to aid women in preparing for healthy pregnancies.	0.2
Optimization of the Pharmacists Role Within the Immunization Neighborhood With Emphasis on HPV—Home Study	This webinar will educate pharmacists on the key components to implementing a human papilloma-virus (HPV) "immunization neighborhood" and the coordination, collaboration, and communication among immunization stakeholders and will discuss key components and implementation strategies.	0.15
Immunization Updates and Best Practices: National and State Perspectives (California Home Study)	Learn the importance of immunization registries and protocols implemented for recordkeeping and documentation, updates on adult and pediatric immunization schedules in 2015, and treatment of anaphylaxis following vaccination.	0.2
Immunization Updates and Best Practices: National and State Perspectives (Arkansas Home Study)	Gain a better understanding of immunization best practices by exploring state statutes and regulations; 2014-15 statistical data related to seasonal influenza are presented, and age restrictions for administration of medications/immunizations are addressed.	0.2
Immunization Updates and Best Practices: National and State Perspectives (Illinois Home Study)	Learn how practice insights from immunization laws and administrative codes pertaining to the Pharmacy Practice Act can improve your practice's immunization rates.	0.2
Immunization Updates and Best Practices: National and State Perspectives (Georgia Home Study)	Discover new updates to immunization protocols, and explore new requirements for pharmacist-administered vaccinations pursuant to state-specific immunization laws that may help increase your practice's immunization rates.	0.2
Immunization Updates and Best Practices: National and State Perspectives (Pennsylvania Home Study)	Discover new updates to immunization protocols, and explore new requirements for pharmacist-administered vaccinations pursuant to state-specific immunization laws that may help you increase your practice's immunization rates.	0.2
Test Your Knowledge: Immunization Delivery 2016	This activity is intended to provide ongoing assessment and professional development for pharmacists who have completed the APhA certificate training program, "Pharmacy-Based Immunization Delivery."	0.2

Appendix G-4 provides a detailed summary of CPE programs related to infectious diseases, immunizations, and HIV offered over the past 3 years (January 2013 to April 2016) by all ACPE-accredited providers of CPE. This information is drawn from an April 2016 search of the ACPE Pharmacists Learning Assistance Network (P.L.A.N.). The ACPE P.L.A.N. database, which catalogs CPE programs conducted by ACPE-accredited providers, can be searched according to predefined search terms. This search of infectious diseases, immunizations, and HIV produced 1,193 programs that collectively provided 3,347 contact hours of CPE.

In addition to annual educational meetings of the petitioning organizations, MAD-ID conducts an annual spring meeting targeted for infectious diseases pharmacists and physicians. The MAD-ID meetings focus primarily on sharing information, technology, and best practices in antimicrobial stewardship; 2017 will mark MAD-ID's 20th annual meeting.

Sample program materials from select representative live educational activities are attached as Appendix G-5.

- Antimicrobial Stewardship: A Certificate Program for Pharmacists (SIDP)
- Pharmacy-based Immunization Delivery (APhA)

Networking

Professional practice associations provide opportunities for health professionals to network and share ideas, experiences, best practices, knowledge, and evolving scientific knowledge. The sponsoring pharmacy organizations of this petition include infectious diseases pharmacists among their membership, offering opportunities for professional networking and sharing. In addition, other professional medical and multidisciplinary health care societies provide opportunities for networking and dissemination of information through symposia, publications, email lists and other electronic platforms, and other mechanisms.

SIDP is an association of pharmacists and allied health care professionals dedicated to promoting the appropriate use of antimicrobial agents; membership encompasses individuals engaged in patient care, research, teaching, pharmaceutical industry, and government. Their mission is focused exclusively on infectious diseases pharmacy practice, offering connection for communication and networking among its members.

The ACCP Infectious Diseases PRN facilitates the dissemination and sharing of information on infectious diseases pharmacotherapy practice, teaching, and research among its members. The PRN's objectives are to: provide a means for communication and networking among members; provide quality educational programming and networking opportunities at national meetings; use the Internet to facilitate access to relevant information, expertise, and professional opportunities; and provide opportunities for collaborative research. The ACCP Infectious Diseases PRN has over 5,000 members.

While formal infectious diseases networking or special interest groups are not specifically delineated within the APhA and ASHP organizational structures, both associations offer professional networking opportunities and continuing professional education opportunities for infectious diseases pharmacist members within the section structures of their respective organizations. The APhA Academy of Pharmacy Practice and Management (APhA-APPM)

Clinical/Pharmacotherapeutic Practice section includes diverse clinical practitioners such as clinical specialists, practitioner educators, clinical researchers, and infectious diseases pharmacists. The APhA Academy of Pharmaceutical Research and Science (APhA-APRS) includes infectious diseases pharmacist clinical researchers and educators. Within ASHP, infectious diseases pharmacists find opportunities for networking within the ASHP Section of Clinical Specialists and Scientists. This section offers connection among those who practice and/or conduct clinical research in a number of recognized and emerging specialty areas of pharmacy practice, including infectious diseases. The ASHP Section of Clinical Specialists and Scientists also hosts an electronic mailing list service to facilitate communication, collaboration, and problem solving among members.

Broadly within health care associations, infectious diseases pharmacists also engage in the Infectious Diseases Society of America, the American Academy of HIV Medicine, MAD-ID, the American Society for Microbiology, the National Adult and Influenza Immunization Summit, the Society for Healthcare Epidemiology of America, The Gerontological Society of America, and other multidisciplinary organizations of health professionals, researchers, advocates, and behavioral health professionals engaged in networking and sharing of scientific, policy, and practice information.

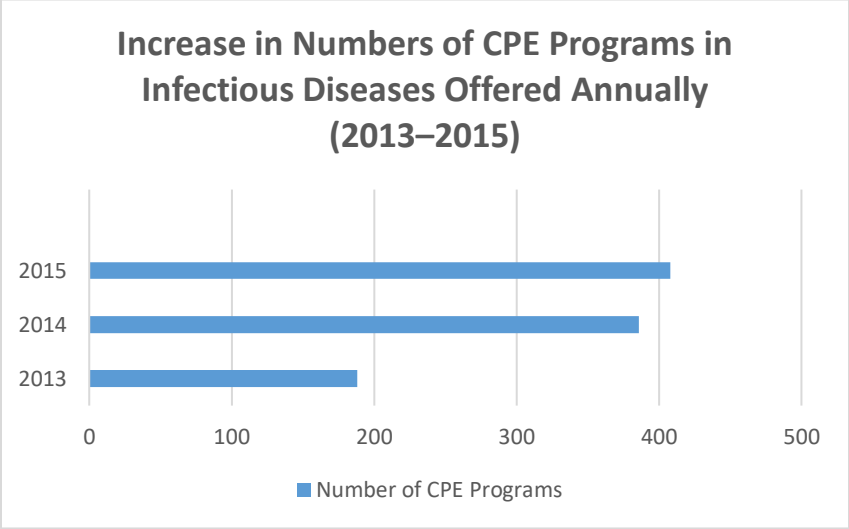
Research Network. MAD-ID has a practice-based research network that aims to establish a large network of varied hospitals to share and gather data pertinent to antimicrobial stewardship and infectious diseases pharmacotherapy on a national level. This network also will perform research and benchmarking utilizing these data and disseminate results. The network focuses on science and practice to ensure that issues concerning antimicrobial stewardship programs and infectious diseases pharmacotherapy practices can be explored, described, and advanced.

GUIDELINE 5. Provide the number of such events, included in #4 above, which occur on an annual basis, and the average total attendance at such programs.

Consistent with the trends for increasing demand of advanced knowledge and skills in infectious diseases and antimicrobial stewardship, the number of annual CPE programs related to infectious diseases has increased substantially. Figure G-1 shows an increase in the number of infectious diseases CPE programs of more than twofold, from 188 programs in 2013 to 408 programs in 2015, based on data from a search of the ACPE P.L.A.N. database. Ongoing growth appears to be progressing at an increasing rate: within the first 4 months of 2016, 211 programs were already accredited—a level greater than all of 2013 and greater than half of 2015. This level suggests a possible projected total in the range of 500 to 600 CPE programs in infectious diseases for 2016. A total of 1,787.8 hours of CPE programming in infectious diseases was

accredited by CPE providers during the 16-month period from January 1, 2015, to April 30, 2016, which exceeds the 24-month period encompassing all of 2013 and 2014.

Figure G-1. Trends in Numbers of Annual Continuing Pharmacy Education Programs in Infectious Diseases



Source: ACPE P.L.A.N. Database search of CPE Programs in 2013, 2014, and 2015.

Among the sponsoring associations, ACCP, APhA, ASHP, and SIDP collectively provide an extensive collection of comprehensive programming annually related to infectious diseases pharmacy. These programs, previously listed in Table G-1, represent 116.5 hours of CPE programming in infectious diseases pharmacy during the organizations' national events from 2013 to 2015. As a measure of attendance, more than 2,500 certificates were issued for pharmacists by ACCP for participation in their 35 hours of programming. MAD-ID also offers a wide array of infectious diseases-related continuing education programming for pharmacists and other health professionals during their 3-day annual meeting.

Professional Awards

Professional awards programs serve important roles in recognition of excellence and sharing of best practices and innovation among many health care disciplines and areas of practice and patient care. Further, such awards programs foster innovation and stretch health care professionals. A number of awards programs that recognize excellence in practice and research in infectious diseases pharmacy have been identified and are presented in Table G-3.

The ASHP Best Practice Award Program has recognized outstanding practitioners in health-system pharmacy who have successfully implemented innovative systems that demonstrate best practices in health-system pharmacy. Infectious diseases pharmacists are among recipients

and eligible nominees. APhA established special awards in 2008 to recognize the value and extraordinary contributions pharmacists provide to improving the immunization rates in their communities. Appendix G-6 features *In Recognition of Excellence,* which highlights the 2016 awards and honors presented by APhA and its academies, which includes infectious diseases pharmacist recipients noted within Table G-3.

The National Adult and Influenza Immunization Summit and the American Academy of HIV Medicine also have extensive awards programs, including those that recognize infectious diseases pharmacists among their recipients and nominees.

Table G-3. Professional Awards Recognizing Excellence in Infectious Diseases Pharmacy Practice and Research

Organization	Award	Description/Recipient
American Pharmacists Association (APhA)	2016 Individual Practitioner	Honorable Mention: Deanne Hall and Anne Skoe National Winner: Holly Van Lew
APhA	2016 Friend of Pharmacy	National Winner: Bruce Gellin
APhA	2016 Corporation/Institution	Honorable Mention: Realo Discount Drugs and SUPERVALU Pharmacies National Winner: Giant Eagle Pharmacy
APhA	2016 Partnership	Honorable Mention: Cape Fear Clinic National Winner: Maryland Partnership for Prevention
APhA	2016 Community Outreach	Honorable Mention: West Penn Hospital Immunization Clinic National Winner: Pratik Patel
APhA	2016 Pharmacy Team Member	National Winner: Kathie Smith
APhA	2015 Individual Practitioner	Honorable Mentions: Mary Choy, MAJ Brandi Schuyler, and Maria Young National Winners: Kelechi Aguwa and Kenneth McCall
APhA	2015 Friend of Pharmacy	National Winner: Paul Jarris
APhA	2015 Corporation/Institution	Honorable Mention: H-E-B Pharmacy National Winner: Walgreens Co.
APhA	2015 Partnership	National Winner: Garth Reynolds
APhA	2015 Community Outreach	Honorable Mention: Safeway Pharmacy National Winner: Mayank Amin
APhA	2015 Pharmacy Team Member	National Winner: Louis Jimenez III
APhA	2014 Individual Practitioner	Honorable Mentions: Carlisha Gentles, Todd McWilliams, and George Veltri National Winners: Eric Crumbaugh and Julie Gambaini
APhA	2014 Friend of Pharmacy	National Winner: William Schaffner
APhA	2014 Corporation/Institution	Honorable Mention: Osterhaus Pharmacy National Winner: Safeway
APhA	2014 Partnership	Honorable Mention: Lifetime Health Medical

		Group National Winner: White County, Arkansas Local Health Unit
APhA	2014 Community Outreach	Honorable Mention: Allison Dering-Anderson National Winner: Monali Majmudar
APhA	2014 Pharmacy Team Member	National Winner: Marianne Reed
American Society of Health-System Pharmacists (ASHP)	2014: Code Sepsis: Improving Sepsis Care; Saving Patients' Lives	James R. Beardsley, PharmD, BCPS; Catherine M. Jones, MD; Jason Chou, PharmD, MS; Margaret Currie-Coyoy, MBA; Teresa Jackson, RN; Adam Orsborn, PharmD, MS Wake Forest Baptist Medical Center, Winston-Salem, North Carolina
ASHP	2012: Raising the Bar on Antimicrobial Stewardship: The Evolution of a Comprehensive Program Model Using a Multifaceted, Rapid Sequence Approach	Benjamin D. Brielmaier, PharmD, BCPS (AQ-ID); Natasha N. Pettit, PharmD, BCPS; Emily Landon, MD; Jennifer Pisano, MD; Palak Bhagat, PharmD, BCPS; Allison Bartlett, MD; Dave Hicks, RPh, MBA; Heath R. Jennings, PharmD, BCPS (AQ-Cardiology) The University of Chicago Medicine, Chicago, Illinois
ASHP	2011: Pharmacist-Led Antibiotic Stewardship Program Reduces Inappropriate Antibiotic Use and Hospital-Acquired *Clostridium difficile*	Jessica Holt, PharmD, BCPS-ID; Kristine Gullickson, PharmD; Daniel Anderson, MD; Elliot Francke, MD; Jessica Nerby, MPH; Jason Sanchez, MD Abbott Northwestern Hospital, Allina Hospitals and Clinics, Minneapolis, Minnesota
ASHP	2010: Center for Antimicrobial Stewardship and Epidemiology (CASE): Improving Patient Care Through Clinical Service, Teaching, and Research	Hannah R. Palmer, PharmD, BCPS; Jaye Weston, RPh, MS; Layne Gentry, MD; Miguel Salazar, PharmD, PhD; Kimberly Putney, PharmD; Craig Frost, MBA, RPh; Joyce A. Tipton, MBA, RPh, FASHP; Jessica Cottreau, PharmD, BCPS; Vincent H. Tam, PharmD; Kevin W. Garey, PharmD, MS St. Luke's Episcopal Hospital, Houston, Texas University of Houston, College of Pharmacy, Houston Texas
ASHP	2010: Successes of a *Clostridium difficile* Infection Reduction Team	Ed Eiland, PharmD, MBA, BCPS-ID; Lyn Tipton, RN, BSN, CIC; Kathi Hathcock, M(ASCP)SM, CIC; Cindy Mize, RN, BSN, CIC; Bill Lindgren, MT (ASCP); Joycelyn Craighead, RN, MPH; Linda Bonilla, RN; Diane Pratt, RN, MSN; David Crump; Vicky McClain; John Dunkel, MD Huntsville Hospital System, Huntsville, Alabama
ASHP	2009: Enhancing Antimicrobial Therapy Through a Pharmacist-Managed Culture Review Process in an Emergency Department Setting	Timothy C. Randolph, PharmD; Andrea Parker, PharmD; Liz Meyer, PharmD; Renee Zeina, PharmD Carolinas Medical Center–NorthEast, Concord, North Carolina
ASHP	2009: Improving Patient Care Through a Collaborative and Innovative Antimicrobial Stewardship Program	Catherine Baker, PharmD; Paul Sehdev, MD; Woody English II, MD; Nancy Church, RN, CIC; Steve Stoner, PharmD Providence St. Vincent Medical Center, Portland, Oregon
ASHP	2004: Improving Antimicrobial Use at a University Hospital: Results of the First	Craig Martin, PharmD; Robert P. Rapp, PharmD; Martin Evans, MD; Ardis Hoven, MD; John

	Five Years of a Multidisciplinary Antimicrobial Management Program	Armistead, MS, FSHP University of Kentucky, Chandler Medical Center Lexington, Kentucky
ASHP	1999: A Community-Based Antimicrobial Management Program	Nishaminy Kasbekar, PharmD
Society of Infectious Diseases Pharmacists (SIDP)	2016 Outstanding Clinical Practice in Infectious Diseases Pharmacotherapy Award	In recognition of an innovative and/or excellent clinical practice site, such as development of innovative services, documentation of benefits, and methods of promoting the safe, effective, and rational use of anti-infective agents.
SIDP	2016 SIDP/Alere Research Award	Rapid diagnostics and point-of-care testing
SIDP	2016 Young Investigator Research Award	In recognition of past research accomplishments and reward young investigators who show research promise in the broad area of infectious diseases
SIDP	2016 Infectious Diseases Pharmacotherapy Paper Award	In recognition of a significant contribution to the peer-reviewed literature in infectious diseases pharmacotherapy by an active or associate SIDP member
SIDP	2016 SIDP/BioMerieux Research Award	Antimicrobial stewardship and microbial diagnostics grant
SIDP	2016 Gita Patel Best Practice Achievement Award	Awarded to a pharmacist with exemplary skills as a practitioner and educator who demonstrated expertise in infectious diseases pharmacy practice, as exemplified by: (a) maintenance of an active clinical practice in infectious diseases pharmacy; (b) outstanding capabilities as a practitioner; (c) leader in development and implementation of infectious diseases pharmacotherapy program or intervention demonstrated to provide benefit to the treatment of patients with infection

References

[1] USA Spending.Gov. Available at: https://www.usaspending.gov/Pages/AdvancedSearch.aspx?sub=y&ST=G&FY=2016,2015,2014,2013&A=0&SS=USA&k=infectious%20diseases. Accessed September 15, 2016.

Appendices

Appendix B-1

Letters of Support

May 23, 2016

William M. Ellis, BSPharm, MS
Executive Director
Board of Pharmacy Specialties
2215 Constitution Ave., NW
Washington, DC 20037

Dear Mr. Ellis,

The Society of Healthcare Epidemiology of America (SHEA) is pleased to provide this letter of support for the recognition of Infectious Diseases Pharmacy Practice as a specialty by the Board of Pharmacy Specialties (BPS). SHEA has enjoyed a collaborative and productive relationship with the Society of Infectious Diseases Pharmacists (SIDP), the recognized professional society for pharmacists dedicated to practicing, teaching, and research in infectious diseases, and shares SIDP's goal of improving patient safety through promoting and ensuring the appropriate use of antibiotics in all healthcare settings. SHEA believes recognition of an Infectious Diseases Pharmacy Practice specialty will enhance this well-established profession and raise awareness of the value and demand for not only pharmacists trained in infectious diseases, but for all clinicians trained in infectious diseases. SHEA also believes recognition of the specialty is important in preparing the healthcare system for identifying qualified pharmacists to meet the workforce needs leading up to the development and implementation of antibiotic stewardship regulatory requirements for healthcare facilities.

Each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections. Antibiotics are among the most commonly prescribed drugs used in human medicine and can be lifesaving drugs. However, up to 50% of the time antibiotics are not optimally prescribed, often done so when not needed, or with incorrect dosing or duration. Overuse and misuse of antibiotics over many decades has resulted in the regular occurrence of preventable illness and death from infections that occur or persist due to antibiotic resistance. Both the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have declared antibiotic resistance to be one of the most serious problems facing our national and global health systems today. SHEA considers reducing the prevalence of antibiotic-resistant bacteria through antibiotic stewardship programs among its top priority policy issues. Further, the Society anticipates new regulatory requirements and clinical standards for antibiotic stewardship will be forthcoming for all healthcare settings in the

near future, and stands ready to support the incorporation of these requirements as the standard of practice for all healthcare facilities.

To ensure the healthcare system is successful in the adoption of antibiotic stewardship programs across the country, all healthcare facilities must have access to a multidisciplinary, inter-professional antibiotic stewardship team that is physician-directed or supervised. One or more members of the team should have training in antibiotic stewardship, and should include but are not limited to: a physician, a pharmacist, a clinical microbiologist and an infection preventionist. This is supported by the Presidential Advisory Council on Combatting Antibiotic-Resistant Bacteria's (PACCARB) draft report on the Initial Assessments on the National Action Plan for Combatting Antibiotic Resistant Bacteria recommendation to enlarge and train the healthcare workforce, specifically physicians and pharmacists specializing in infectious disease, with appropriate expertise in antibiotic use and resistance in antibiotic stewardship programs. The CDC's *Core Elements of Hospital Antibiotic Stewardship Programs* guidance published in 2014 states that "…experience demonstrates that antibiotic stewardship programs can be implemented effectively in a wide variety of hospitals and that success is dependent on defined leadership and a coordinated multidisciplinary approach."

The role of pharmacists in antibiotic stewardship programs is critical to their success. Pharmacists who are trained in infectious diseases and serve on antibiotic stewardship teams perform a variety of functions. These include co-directing programs; interacting with prescribers through performing prospective audits of antimicrobial use; making recommendations on antibiotic selection as part of a preauthorization program; and making recommendations for de-escalation or discontinuation of antibiotics after initiation. When performed by a pharmacist, these functions have demonstrated reductions in overall antibiotic use, the prevalence of *Clostridium difficile*, the occurrence of drug-resistant infections, and healthcare delivery costs.

In an effort to move the healthcare system toward these goals, the Centers for Medicare & Medicaid Services (CMS) will publish imminently a proposed rule for Conditions of Participation (CoP) in Medicare and Medicaid programs requiring the adoption of antibiotic stewardship programs in inpatient healthcare facilities. In July 2015, CMS issued a proposed rule for Requirements of Participation in Medicare and Medicaid for Long-term Care Facilities, for which final regulations are expected in the fall of 2016. The expectation for adoption of antibiotic stewardship programs is upon us today, and the need for not only training, but recognition of clinicians who are trained in infectious diseases is critical to help the healthcare system identify experts that can work toward, meet, and exceed the requirements for antibiotic stewardship programs outlined in these pending regulations.

In December 2014, SHEA published a white paper in *Infection Control and Hospital Epidemiology* (ICHE), *Guidance for the Knowledge and Skills Required for Antimicrobial Stewardship Leaders,* which describes the core knowledge and the skills required for antimicrobial stewardship professionals engaged with building, leading, and evaluating antibiotic stewardship programs. This document reflects SHEA's

current thinking on the required infectious disease and microbiology proficiencies that stewardship team members should obtain, and includes pharmacists in outlining these recommendations. Among other purposes, this white paper serves as a framework for administrators to determine which knowledge and skills are needed for developing an antibiotic stewardship program. SHEA envisions a BPS-recognized Infectious Diseases Pharmacy Practice specialty would be aligned with the principles outlined in this paper.

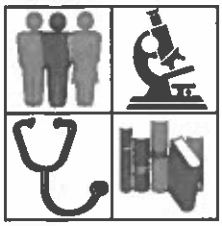
SHEA supports recognition of an Infectious Diseases Pharmacy Practice specialty and looks forward to notification of this designation from the Board of Pharmacy Specialties. This recognition will bolster our efforts toward incorporating antibiotic stewardship programs across all healthcare settings by providing a framework for identifying appropriate pharmacist expertise. Thank you for your consideration. Please contact me at louise-marie.dembry@yale.edu if you have any additional questions or inquiries.

Sincerely,

Louise Dembry, MD, MS, MBA, FSHEA
President, SHEA

References:

1. "Antibiotic/Antimicrobial Resistance." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, 19 Apr. 2016. Web. 11 May 2016.
2. "Policy Statement on Antimicrobial Stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS)." Infection Control and Hospital Epidemiology Special Topic Issue: Antimicrobial Stewardship Vol. 33.No. 4 (2012): 322-27. Web. 11 May 2016
3. National Strategy and Action Plan for Combating Antibiotic Resistant Bacteria: First 180 Days Report. Presidential Advisory Council on Combatting Antibiotic Resistance. Department of Health and Human Services. Web. 11 May 2016.
4. "Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America." Clinical Infectious Diseases. Oxford Press, 26 Apr. 2016. Web. 11 May 2016.
5. "Core Elements of Hospital Antibiotic Stewardship Programs." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, 07 May 2015. Web. 11 May 2016.
6. Proposed Rule: Medicare and Medicaid Programs; Reform of Requirements for Long-Term Care Facilities, 80 FR 42167 (2015) 42167 -42269.
7. "Guidance for the Knowledge and Skills Required for Antimicrobial Stewardship Leaders." Infection Control, Cambridge. Vol. 35 No. 12 (2014) Web. 11 May 2016.



IDSA
Infectious Diseases Society of America

IDSA Headquarters
1300 Wilson Boulevard
Suite 300
Arlington, VA 22209
TEL: (703) 299-0200
FAX: (703) 299-0204
EMAIL ADDRESS:
info@idsociety.org
WEBSITE:
www.idsociety.org

May 16, 2016

William M. Ellis, BSPharm, MS
Executive Director
Board of Pharmacy Specialties
2215 Constitution Ave., NW
Washington, DC 20037

Dear Mr. Ellis,

The Infectious Diseases Society of America (IDSA) supports the recognition of Infectious Diseases Pharmacy Practice as a specialty by the Board of Pharmacy Specialties (BPS). Ensuring the appropriate use of anti-infective drugs across all healthcare settings through antimicrobial stewardship programs (ASPs) is a long standing high priority for IDSA, and we greatly appreciate the partnership of the Society of Infectious Disease Pharmacists (SIDP) in advancing this important goal. IDSA believes recognition of the specialty is critical for training qualified ID pharmacists to meet the workforce needs that will continue to grow significantly as facilities prepare to implement ASPs in accordance with new regulatory requirements.

According to Centers for Disease Control and Prevention (CDC), each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections. Up to 50% of antibiotic prescriptions in the U.S. are suboptimal (including inappropriate drug choice, dosing, or duration) or entirely unnecessary. Overuse and misuse of antibiotics continues to drive the development of antibiotic resistance, resulting in increasing numbers of preventable illnesses and deaths from infections that can no longer be treated effectively with existing antibiotics. Both the CDC and the World Health Organization (WHO) have declared antibiotic resistance one of the most serious problems facing our national and global health systems today.

To ensure that antimicrobial stewardship programs are able to deliver optimal outcomes for patients and public health, all healthcare facilities must have access to a multidisciplinary, inter-professional antibiotic stewardship team that is ID physician-directed or supervised and includes a pharmacist trained in infectious diseases. This is supported by the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria's (PACCARB) draft report on the Initial Assessments on the National Action Plan for Combating Antibiotic Resistant Bacteria recommendation to enlarge and train the healthcare workforce, specifically physicians and pharmacists specializing in infectious disease, with appropriate expertise in antibiotic resistance and stewardship. The CDC's *Core Elements of Hospital Antibiotic Stewardship Programs* guidance published in 2014 states that "...experience demonstrates that antibiotic

stewardship programs can be implemented effectively in a wide variety of hospitals and that success is dependent on defined leadership and a coordinated multidisciplinary approach." IDSA believes recognition of an Infectious Diseases Pharmacy Practice specialty will raise awareness of the value and need for not only pharmacists trained in infectious diseases, but also for physician specialists trained in infectious diseases.

In July 2015, Centers for Medicare & Medicaid Services (CMS) issued a proposed rule for Requirements of Participation in Medicare and Medicaid for Long-term Care Facilities requiring the adoption of antibiotic stewardship programs, for which final regulations are expected in the fall of 2016. It is expected that CMS will soon publish a similar proposed rule for acute care hospitals. There is an immediate need to train more pharmacists in infectious diseases to help meet these coming program requirements, and, even more importantly, to make sure the programs are effective in fostering appropriate antimicrobial use and reducing antimicrobial resistance. Pharmacists with specialty training will be essential members of the multi-disciplinary team approach necessary for implementing successful programs.

IDSA supports recognition of an Infectious Diseases Pharmacy Practice specialty and looks forward to notification of this designation from the Board of Pharmacy Specialties.

Sincerely,

Johan S. Bakken

Johan S. Bakken, MD, PhD
President, IDSA

May 24, 2016

William M. Ellis, BSPharm, MS
Executive Director
Board of Pharmacy Specialties
2215 Constitution Ave., NW
Washington, DC 20037

Dear Mr. Ellis,

The American Society for Microbiology (ASM) is pleased to support the recognition of Infectious Diseases Pharmacy Practice as a specialty by the Board of Pharmacy Specialties (BPS). The partnership among the infectious diseases physicians, infectious diseases pharmacists and clinical microbiologists is essential to ensuring the effectiveness of antimicrobial stewardship programs within the healthcare community and will become increasingly critical as the requirements for establishment of antimicrobial stewardship programs (ASPs) are implemented.

The continued increase in antimicrobial resistance (AMR) has been recognized as a threat to public health, national security and patients; particularly for immunocompromised individuals including chemotherapy and transplant patients, the elderly, pre-term infants, and individuals with HIV/AIDS. The Centers for Disease Control and Prevention (CDC) initiated the charge in 2013 with their report on *Antibiotic Resistance Threats in the United States.* Based on the report, it was estimated that each year at least 2 million people are infected with antibiotic resistant bacteria and at least 23,000 die as a direct result of that infection. It was also highlighted that 50% of antibiotic prescriptions in the US are not optimal for treatment or are not necessary for treatment.

In follow up to the CDC report, President Obama issued an Executive Order in 2014 on Combating Antibiotic-Resistant Bacteria. Two additional reports were issued the same year from the White House: the *National Strategy to Combat Antibiotic-Resistant Bacteria* and the *President's Council of Advisors on Science and Technology (PCAST) report to the President on Combating Antimicrobial Resistance in the U.S.* In 2015, the White House released the *National Action Plan for Combating Antibiotic Resistant Bacteria*, which outlines steps for implementing the National Strategy and addressing policy recommendations of the PCAST report, and the White House hosted more than 100 key human and animal health leaders for the *Forum on Antibiotic Stewardship*.

More recently, the Centers for Medicare & Medicaid Services (CMS) issued a proposed rule for *Requirements of Participation in Medicare and Medicaid for Long-term Care Facilities* requiring the

adoption of ASPs and it is anticipated that a similar proposed rule will be issued soon for acute care hospitals.

Recommendations from all these efforts have emphasized the need for ASPs in the broad spectrum of health care settings, including hospitals, long-term care facilities, long-term acute care facilities, ambulatory surgical centers, dialysis centers, and private practices. The White House has called for implementation of these programs by 2020. A successful ASP will improve patient care, reduce healthcare expenditures and potentially reduce rates of resistance and prolong the longevity of the limited number of antimicrobial agents available to treat infections. A critical element of the ASP is the multidisciplinary collaboration of the infectious diseases physician, infectious diseases pharmacist and the clinical microbiologist. This group works collectively to ensure the appropriate use of anti-infective drugs in the diagnosis and treatment of infectious diseases.

Infectious diseases physicians serve as the lead in the stewardship program and are the decision makers for patient care. Clinical microbiologists conduct surveillance on local antimicrobial resistance trends among microbial pathogens; provide patient-specific information by identifying microbial pathogens and performing antimicrobial susceptibility testing; and ensure high-quality specimen processing that contributes to limiting unnecessary antimicrobial use. The infectious disease pharmacists' responsibilities include promoting the optimal use of antimicrobial agents, through tasks such as generating and analyzing quantitative data on antimicrobial drug use; collaborating with the clinical microbiologists, infectious diseases specialists, and infection preventionists in compiling susceptibility reports; and facilitating safe medication management practices for antimicrobial agents by utilizing efficient and effective systems to reduce potential errors and adverse drug events. Infectious diseases pharmacists also participate in efforts to prevent or reduce the transmission of infections among patients, health care workers, and others within all of the health system's applicable practice settings.

In light of these recent recommendations, and the essential role and increased need for infectious diseases pharmacists in antimicrobial stewardship, ASM supports BPS recognition of Infectious Diseases Pharmacy Practice as a specialty. We look forward to hearing of the positive outcome of this designation.

Sincerely,

Stefano Bertuzzi, PhD, MPH
CEO, American Society for Microbiology

May 20th, 2016

William M. Ellis, BSPharm, MS
Executive Director
Board of Pharmacy Specialties
2215 Constitution Ave., NW
Washington, DC 20037

Dear Mr. Ellis,

I am writing this letter in support of the petition to the Board of Pharmacy Specialties for recognition of Infectious Disease Pharmacy Practice as a specialty. As a pediatric infectious diseases physician who practiced and led a antimicrobial stewardship program at an academic children's hospital, and who is currently working to develop public health policies to address the growing threat of antibiotic resistance, I strongly believe that pharmacists with training in infectious disease pharmacy practice significantly contribute to improving the quality of patient care, educating patients, families, and medical staff, and reducing antibiotic resistance.

Pharmacists with knowledge of infectious diseases and the microbiology behind these infections are uniquely positioned and qualified to optimize antibiotic, antifungal, and antiviral therapies for patients by incorporating pharmacodynamics and pharmacokinetics into the clinical decision making process. My patients at my former hospital have greatly benefited from the expertise of my pharmacy colleagues with infectious diseases training. They were instrumental in the selection of the most appropriate antimicrobial agents for the patients and in ensuring that the most effective doses were administered. For example, they led and organized efforts to develop hospital-wide guidelines for vancomycin use that standardized empiric dosing and intervals as well as protocols for subsequent therapeutic drug monitoring.

Infectious disease pharmacy practice also plays an important role in improving patient safety. Pharmacists with experience and education in infectious diseases can recognize adverse events and toxicities associated with antimicrobial regimens and help weigh the risk of these therapies against the efficacy of treating the targeted infections and pathogens. They are able to recommend measures and monitoring to minimize the risk of such adverse events. During my practice, I observed numerous cases where a pharmacist with in-depth knowledge of antimicrobials recognized potentially harmful drug interactions and recommended alternative agents, early laboratory findings of renal toxicity to antimicrobials, and redundant antimicrobial selections some of which could lead to severe drug-associated immune reactions.

In addition to the direct impact on improving the quality of patient care, infectious disease pharmacy practice specialists play an invaluable role in antimicrobial stewardship which helps

improve appropriate antimicrobial use and decrease antibiotic resistance in facilities and communities. Leadership and expertise provided by these pharmacists are an indispensable element of meaningful antimicrobial stewardship programs in hospitals and is recognized as such by the Centers for Disease Control and Prevention's (CDC) Core Elements of Hospital Antibiotic Stewardship Programs. As a former director of a stewardship program, I can attest that a successful program requires collaboration and partnership between infectious disease physicians and pharmacists and that an infectious disease pharmacy practice specialist can serve as a leader and bridge between these two disciplines. In fact, there are many hospital stewardship programs that are led by such pharmacists.

Antimicrobial stewardship programs are widely recognized by medical professional societies and policymakers as an essential component in combating antibiotic resistance. As a result, it is anticipated that both The Joint Commission and the Centers for Medicare and Medicaid will begin requiring hospitals to implement stewardship programs as part of their survey standards within the next year. With only 40% of hospitals with comprehensive stewardship programs as measured by the CDC, there are still many facilities that will need to implement new programs. In smaller and rural hospitals, this will likely prove to be challenging as they are frequently lacking pharmacists with expertise in infectious diseases. These upcoming regulatory requirements for stewardship programs will undoubtedly create a strong and increasing demand for infectious disease pharmacy practice specialists who can not only provide the necessary pharmacologic expertise but also serve as leaders responsible and accountable for stewardship programs.

In summary, I strongly voice my support for the petition to recognize Infectious Disease Pharmacy Practice as a specialty by the Board of Pharmacy Specialties which will improve patient care and outcomes, and help fight against the growing public health threat of antibiotic resistance. Thank you and please do not hesitate to contact me with any questions.

Sincerely,

David Hyun, M.D.
Senior Officer, Antibiotic Resistance Project
The Pew Charitable Trusts

May 16, 2016

PMM Consulting, LLC
16726 Hammock Creek Place
Charlotte, NC 28278

To whom it may concern,

Antimicrobial Stewardship Programs within health-systems are becoming increasingly important for not only individual patient care and safety, but also to minimize the impact of growing and inevitable antimicrobial resistance, a huge public health threat to our nation and world. At the helm of these programs are infectious disease physicians working in concert with infectious disease pharmacists, both of whom are required to stay current with the latest clinical and evidence-based guidelines and continuously improve on how health-systems and practitioners can implement the best care plan.

It is my understanding that the current board certification exam in Pharmacotherapy includes a wide variety of topics, such as anticoagulation, drug information and statistics, pharmacy management and economics, pain management, psychiatric medicine, with an emphasis in the ambulatory care setting, and only a fraction of the content in the field of infectious diseases (ID). There is a great need for an exam which challenges a pharmacist's clinical knowledge in infectious disease, particularly in the acute care setting and promotes staying current in this filed. This exam could set a standard for pharmacists, practicing in antimicrobial stewardship programs, who cannot or have not all received specialized training in infectious diseases. However, the demand for these pharmacists, with this certification will be great. This is unlike the high demand for ID physicians, who are boarded and recertify every five years.

Three years ago Deaconess Hospital was contemplating starting antimicrobial stewardship program and recently hired a clinical pharmacist to fill this role. On a daily basis my colleagues and I review 10-15 complex infectious disease cases and assist with transition of care to help decrease length of stay and risk of hospital-acquired infections. Our program has been extremely successful and will most likely expand over the next few years with increasing demand. Ensuring our partners, especially our pharmacists involved in the care of our infectious disease patients, are held to a high standard and continuously strive for professional development, is a key pillar for providing quality health care.

Please strongly consider adding Infectious Diseases as a Board of Pharmacy Specialties exam for our pharmacy colleagues and stewardship partners.

Dr Michael Gillum, MD
Infectious Diseases Physicians of Spokane

800 W. Fifth Avenue
Spokane, WA 99204
509.458.5800
DeaconessSpokane.com

Appendix B-2

Infectious Diseases Pharmacist Employers Survey Instrument

33% Complete

Infectious Diseases Pharmacist Employers

What is the size of your institution? *

- ○ <50 beds
- ○ 50-99 beds
- ○ 100-199 beds
- ○ 200-299 beds
- ○ 300-399 beds
- ○ >400 beds
- ○ Other (please comment):

What is the total number of FTEs allocated to serving infectious diseases patients within your organization?

What percentage of these pharmacists do you believe are currently practicing in the area of specialization as defined above?

What percentage of these pharmacists practicing in the area of specialization are currently required to have advanced clinical training (e.g., residency training)?

What percentage of these infectious diseases pharmacist positions currently require BPS specialty certification or other earned credentials?

How many infectious diseases pharmacist positions within your institution are currently vacant/unfilled?

Comments:

Please indicate the desired level of training for pharmacists who provide infectious diseases clinical services in your institution, currently and anticipated within the next 3 to 5 years. (Check all that apply) *

	Current Level	Anticipated within 3 to 5 years
PGY-1 Residency - Pharmacy Practice	☐	☐

PGY-2 Residency - Infectious Diseases Pharmacy	☐	☐
PGY-2 Residency - Other (please specify below)	☐	☐
Fellowship (Infectious Diseases or Antimicrobial Stewardship)	☐	☐
Infectious Diseases/Antimicrobial Stewardship Certificate Training Program	☐	☐
Immunization Certificate Training Program	☐	☐
Employer-provided training program	☐	☐
No additional training required or desired	☐	☐

PGY-2 Residency - Other (Please specify):

If BPS recognizes infectious diseases pharmacy practice as a specialty, what is the likelihood that you would require this new specialty credential for infectious diseases pharmacists within your institution? *

- ○ Highly likely
- ○ Likely
- ○ Somewhat likely
- ○ Unlikely
- ○ Highly unlikely

Which of the following ranges best describes your organization's anticipated growth in the number of infectious diseases pharmacists (as described above) over the next 5 years? *

- ○ 0 FTE (no growth)
- ○ 0.5 to 1 FTE
- ○ 1 FTE
- ○ 2 FTEs
- ○ 3 FTEs
- ○ 4 or more FTEs
- ○ Projected decrease. Please quantify:

How many positions for infectious diseases pharmacy specialists (as defined above) has your organization recruited over the past 3 years, from January 1, 2013 to January 1, 2016? *

What percentage of these positions were filled?

How many positions for infectious diseases pharmacy specialists (as defined above) do you estimate you will hire from January 1, 2016 through January 1, 2019? *

Please add any additional comments that would help us understand the demand for specialists in infectious diseases pharmacy practice within your organization.

<< Previous **Next >>**

Definition of Infectious Diseases Pharmacy Practice

Infectious diseases pharmacy practice specializes in the use of microbiology and pharmacology to develop, implement, and monitor drug regimens that incorporate the pharmacodynamics and pharmacokinetics of antimicrobials to optimize therapy for patients. The practice requires pharmacists to use clinical and evidence-driven knowledge to develop appropriate antimicrobial therapies to more rapidly resolve infections while decreasing adverse events, complications, and resistance. The practice includes direct patient care provided through interprofessional healthcare teams, collaborative leadership of antimicrobial stewardship programs, education of health care providers, preventive services including immunizations, and advocacy for appropriate antimicrobial utilization. Specialty pharmacy practice in infectious diseases uniquely improves public health by optimizing antimicrobial potential in individual patients and narrowing the resistance trends that occur in society by preventing progression of antimicrobial resistance and infectious diseases.

Appendix C-1

Infectious Diseases Pharmacists Survey Instrument

Survey of Infectious Diseases Pharmacists Interested in Board Certification

Dear Infectious Diseases Pharmacist:

Thank you for taking the time to provide background information for consideration of the proposed specialty certification of infectious diseases pharmacists who have distinguished themselves in the care of patients by gaining specialized knowledge, skills, and abilities.

The American College of Clinical Pharmacy (ACCP), the American Pharmacists Association (APhA), the American Society of Health-System Pharmacists (ASHP), and the Society of Infectious Diseases Pharmacists (SIDP) have partnered to develop and submit a petition to the Board of Pharmacy Specialties (BPS) to recognize infectious diseases pharmacy practice as a specialty. **For purposes of this petition, the definition of infectious diseases pharmacy practice is:**

Definition of Infectious Diseases Pharmacy Practice

Infectious diseases pharmacy practice specializes in the use of microbiology and pharmacology to develop, implement, and monitor drug regimens that incorporate the pharmacodynamics and pharmacokinetics of antimicrobials to optimize therapy for patients. The practice requires pharmacists to use clinical and evidence-driven knowledge to develop appropriate antimicrobial therapies to more rapidly resolve infections while decreasing adverse events, complications, and resistance. The practice includes direct patient care provided through interprofessional healthcare teams, collaborative leadership of antimicrobial stewardship programs, education of health care providers, preventive services including immunizations, and advocacy for appropriate antimicrobial utilization. Specialty pharmacy practice in infectious diseases uniquely improves public health by optimizing antimicrobial potential in individual patients and narrowing the resistance trends that occur in society by preventing progression of antimicrobial resistance and infectious diseases.

Please complete this 5-10 minute survey by **July 7, 2016**, which will provide the petitioning organizations with supplemental data to support the petition to BPS. **Your individual responses will be kept confidential.** Collectively, all pharmacist responses will be compiled to further document the unique elements of this specialty and provide support for this specialty in a petition to the Board of Pharmacy Specialties. At the end of the survey, you will have an opportunity to enter information to add your signature to the petition. Thank you for your time and assistance in this effort.

If questions arise, contact Patti Manolakis, PharmD, at pmanolakis@pmmcsolutions.com.

Patrick G. Clay, PharmD, AAHIVP, CPI, CCTI, FCCP
Professor, Pharmacotherapy
University of North Texas System College of Pharmacy

Sandy Estrada, PharmD, BCPS (AQ-ID)
Pharmacy Clinical Specialist, Infectious Diseases
Lee Memorial Health System

Jason C. Gallagher, PharmD, FCCP, BCPS, FIDSA
Clinical Professor
Clinical Specialist, Infectious Diseases
Temple University

Doug Slain, PharmD, BCPS, FCCP, FASHP
Professor
Infectious Diseases Clinical Specialist
West Virginia University

Practicing Infectious Diseases Pharmacists

* Indicates response required

How many years have you been a licensed pharmacist? *

- < 5 years
- 5-9 years
- 10-14 years
- 15-19 years
- > 20 years

How many years have you been in infectious diseases pharmacy practice? *

- < 5 years
- 5-9 years
- 10-14 years
- 15-19 years
- > 20 years

On average, how many HOURS per week do you practice in your infectious diseases practice site? *

- Full-time: 40 or more hours per week
- 31 - 39 hours per week
- 25 - 30 hours per week
- 21 - 24 hours per week
- 15 - 20 hours per week
- 10 - 14 hours per week
- 1 - 9 hours per week
- I do not practice in infectious diseases pharmacy

Do you believe that you currently practice in the area of infectious diseases specialization as defined by the Task Group? *

- Yes
- No

If yes, in an average week, what PERCENTAGE of your time do you estimate is devoted exclusively to providing direct patient care and services according to this definition? *

- 90% - 100%
- 80% - 89%
- 70% - 79%
- 60% - 69%
- 50% - 59%
- 40% - 49%
- 30% - 39%
- 20% - 29%
- 10% - 19%
- 1% - 9%

Please check all types of residencies/fellowships completed. *

- [ ] PGY1 Pharmacy Practice Residency
- [ ] PGY2 Infectious Diseases Pharmacy Residency
- [ ] Other PGY2 Residency
- [ ] Infectious Diseases Fellowship
- [ ] No residency or fellowship
- [ ] Other (please specify)

Please check all certificate training programs in antimicrobial stewardship or infectious diseases completed. *

- [ ] No certificate training program completed
- [ ] Certificate training program in Antimicrobial Stewardship
- [ ] Certificate training program in Immunizations
- [ ] Other certificate training program in Infectious Diseases (please specify)

If the petition to recognize infectious diseases pharmacy practice as a specialty is approved, how likely would you be to pursue this specialty recognition within the next 5 years? *

- ○ Highly likely
- ○ Likely
- ○ Somewhat likely
- ○ Unlikely
- ○ Highly unlikely

Are you directly responsible for hiring infectious diseases pharmacists within your organization? *

- ○ Yes
- ○ No

Next >>

Definition of Infectious Diseases Pharmacy Practice

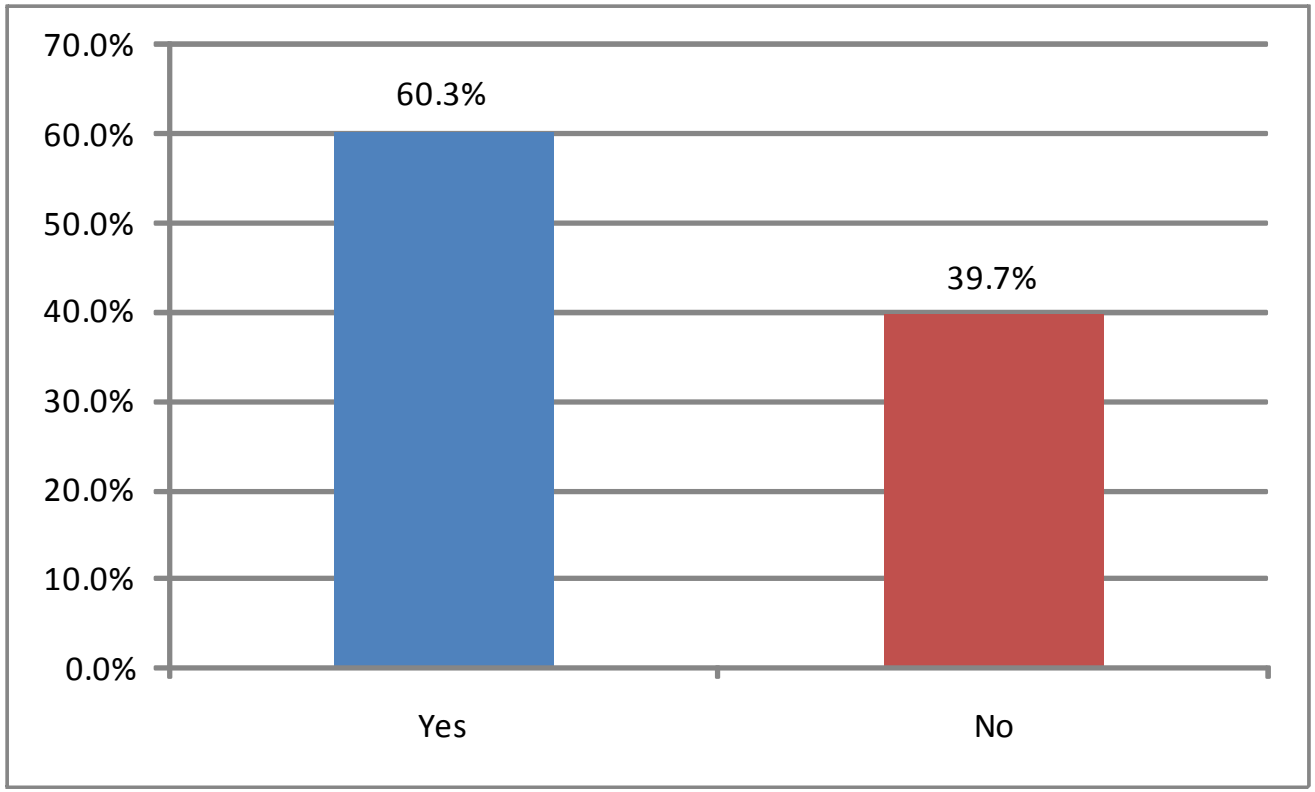
Infectious diseases pharmacy practice specializes in the use of microbiology and pharmacology to develop, implement, and monitor drug regimens that incorporate the pharmacodynamics and pharmacokinetics of antimicrobials to optimize therapy for patients. The practice requires pharmacists to use clinical and evidence-driven knowledge to develop appropriate antimicrobial therapies to more rapidly resolve infections while decreasing adverse events, complications, and resistance. The practice includes direct patient care provided through interprofessional healthcare teams, collaborative leadership of antimicrobial stewardship programs, education of health care providers, preventive services including immunizations, and advocacy for appropriate antimicrobial utilization. Specialty pharmacy practice in infectious diseases uniquely improves public health by optimizing antimicrobial potential in individual patients and narrowing the resistance trends that occur in society by preventing progression of antimicrobial resistance and infectious diseases.

Appendix C-2

ACCP Membership Survey on Recognition of New Specialties

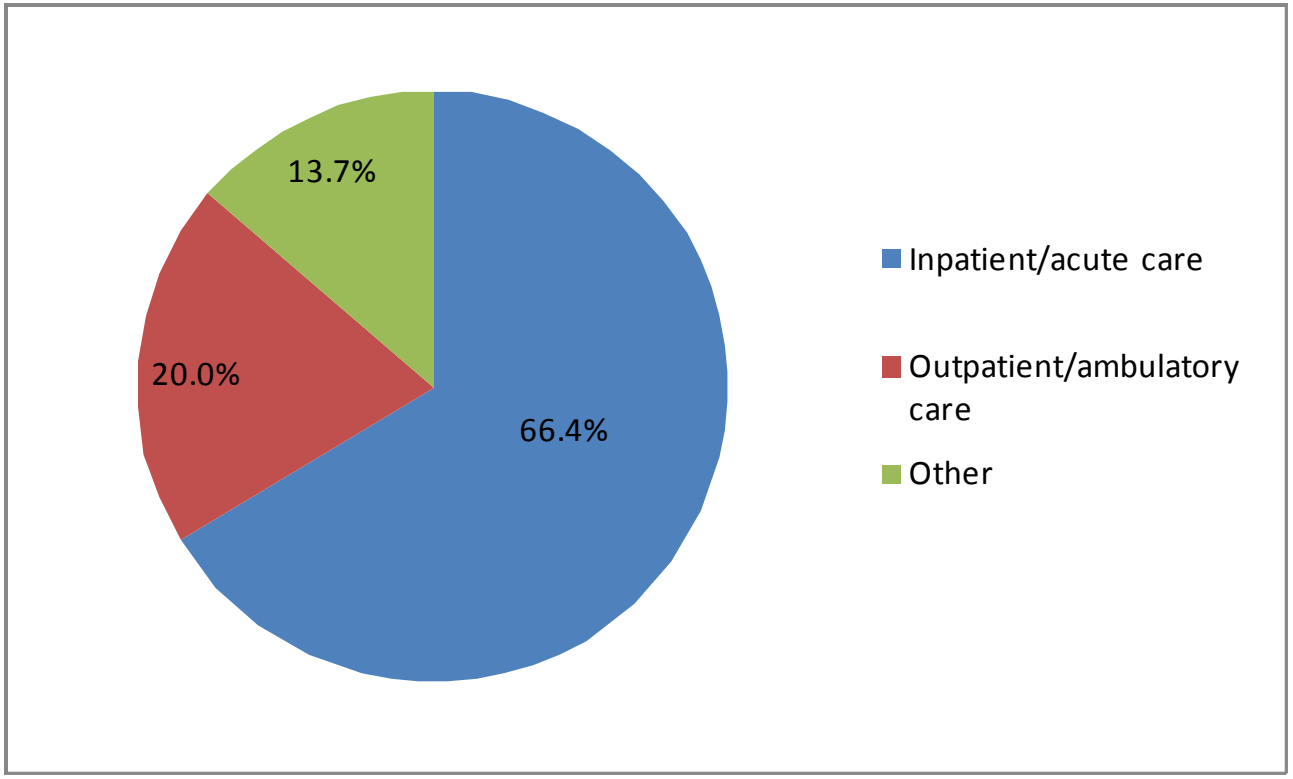
ACCP Opinion Survey: Recognition of New Specialties March 22 – 29, 2011

I am board certified by the Board of Pharmacy Specialties (BPS) in at least one of the BPS specialties (nuclear pharmacy, nutrition support pharmacy, oncology pharmacy, pharmacotherapy, or psychiatric pharmacy). Total respondents = 1823

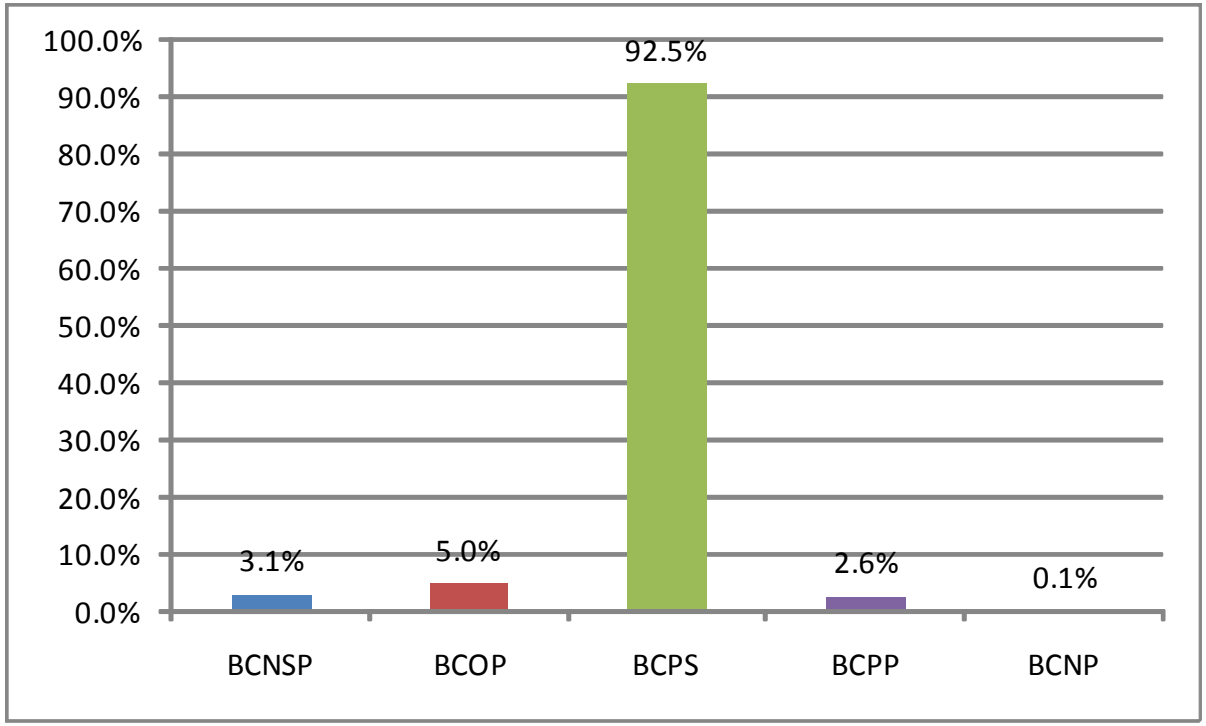


Branch 1: Board Certified (n=1099)

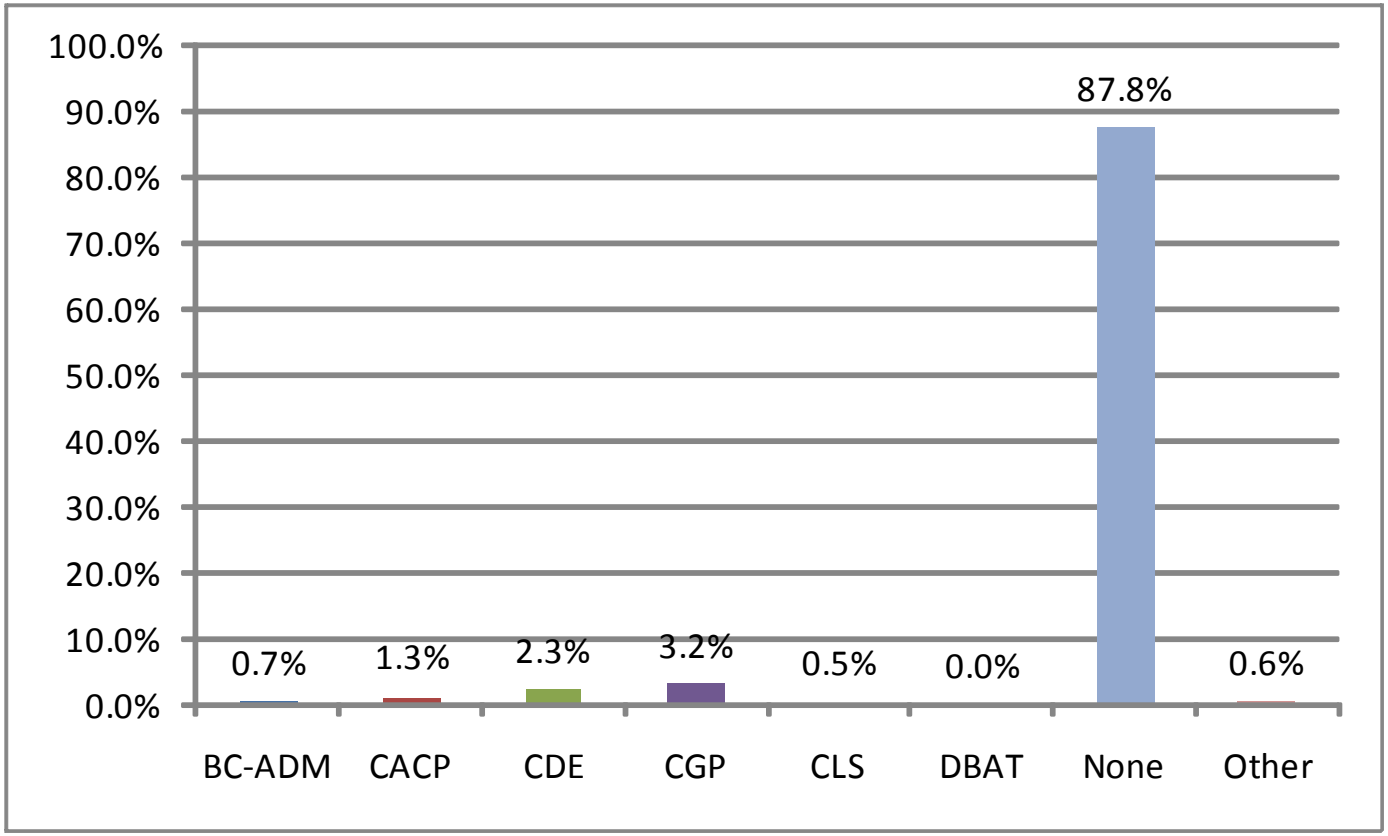
My primary professional/practice setting is:
Total Respondents = 1097



I am board certified in:
Total Respondents = 1099

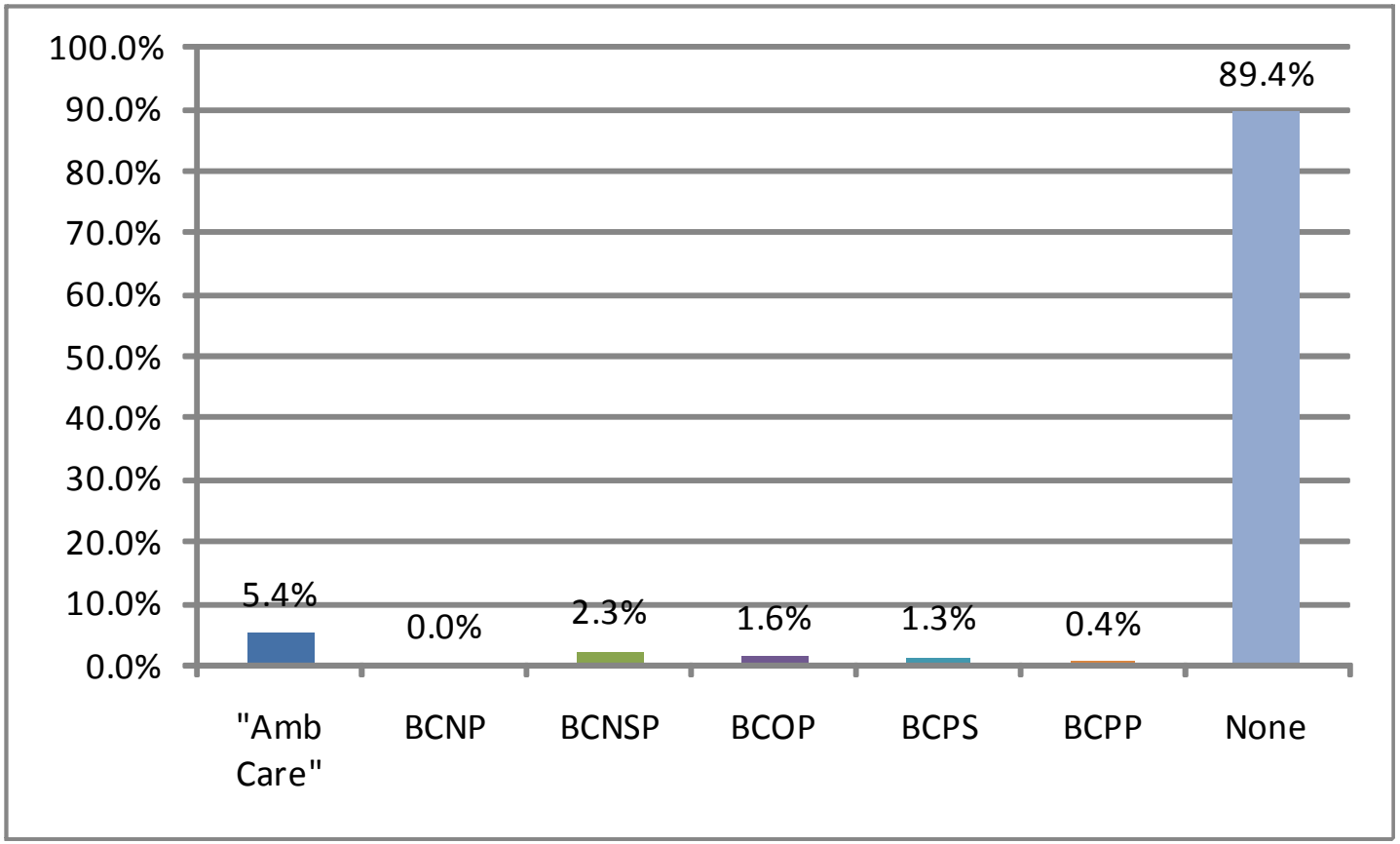


I hold other non-BPS certifications in:
Total Respondents = 1099



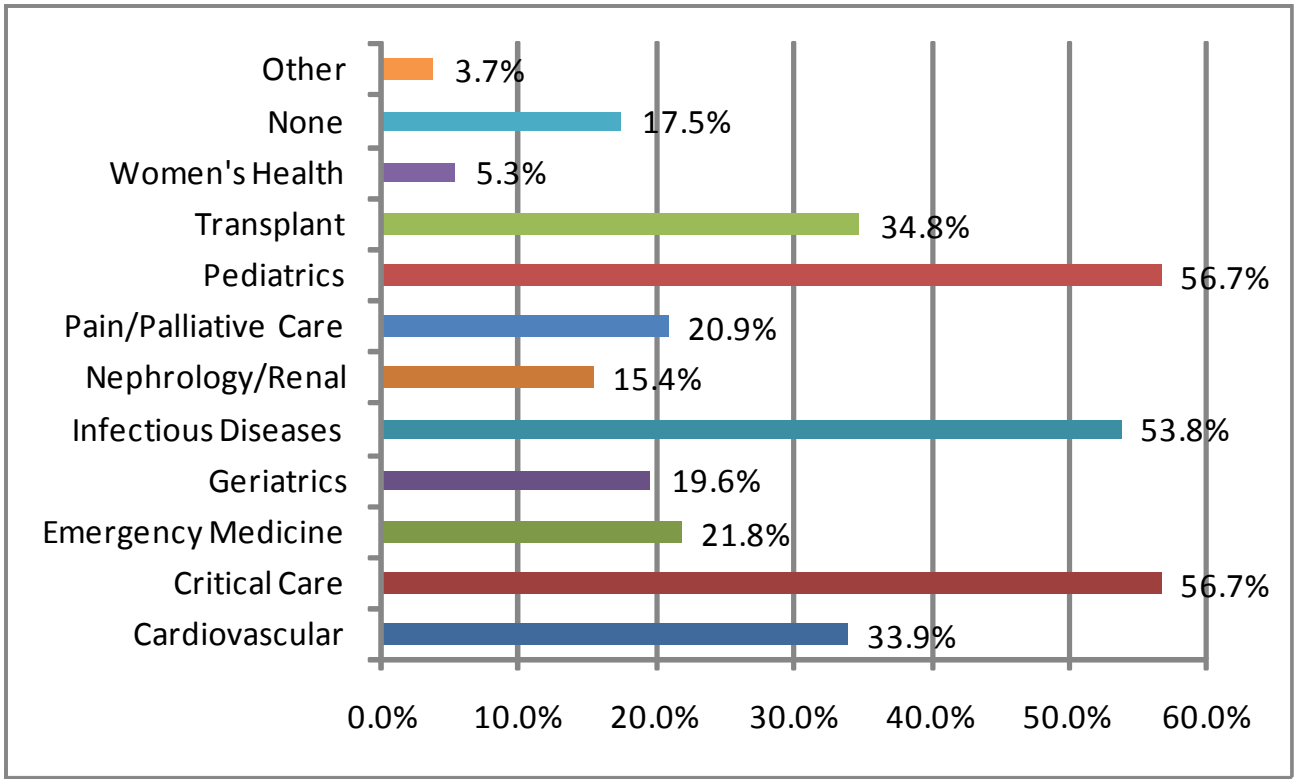
Do you plan to seek certification for a different BPS specialty within the next 2 years?

Total Respondents = 555* ***Note: only 555 of this question's 1099 respondents had access to all 7 possible responses.**

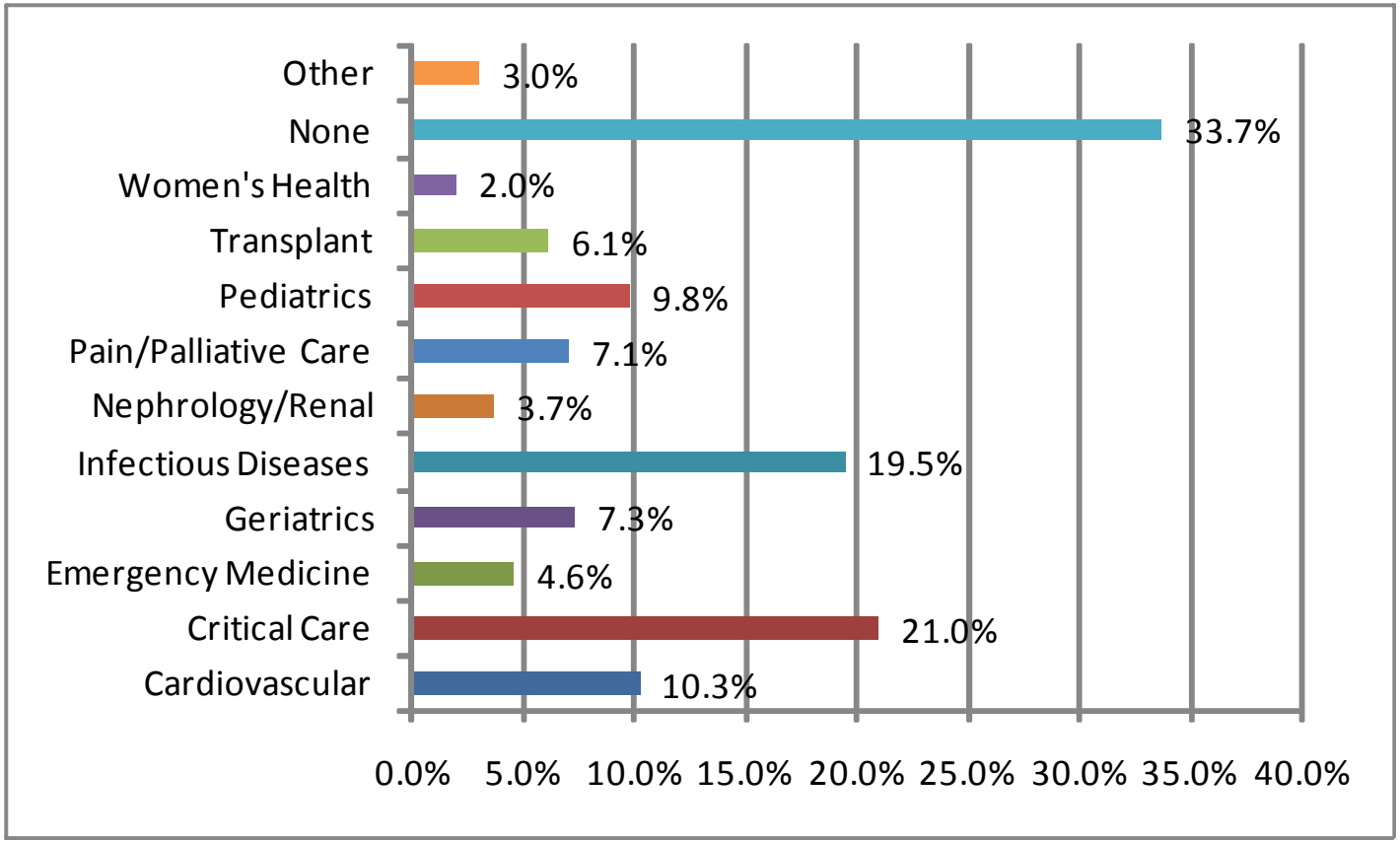


I believe that new BPS specialty certifications (not Added Qualifications within a specialty) are needed to appropriately certify clinical pharmacy practitioners in the area(s) below.

Total Respondents = 1099

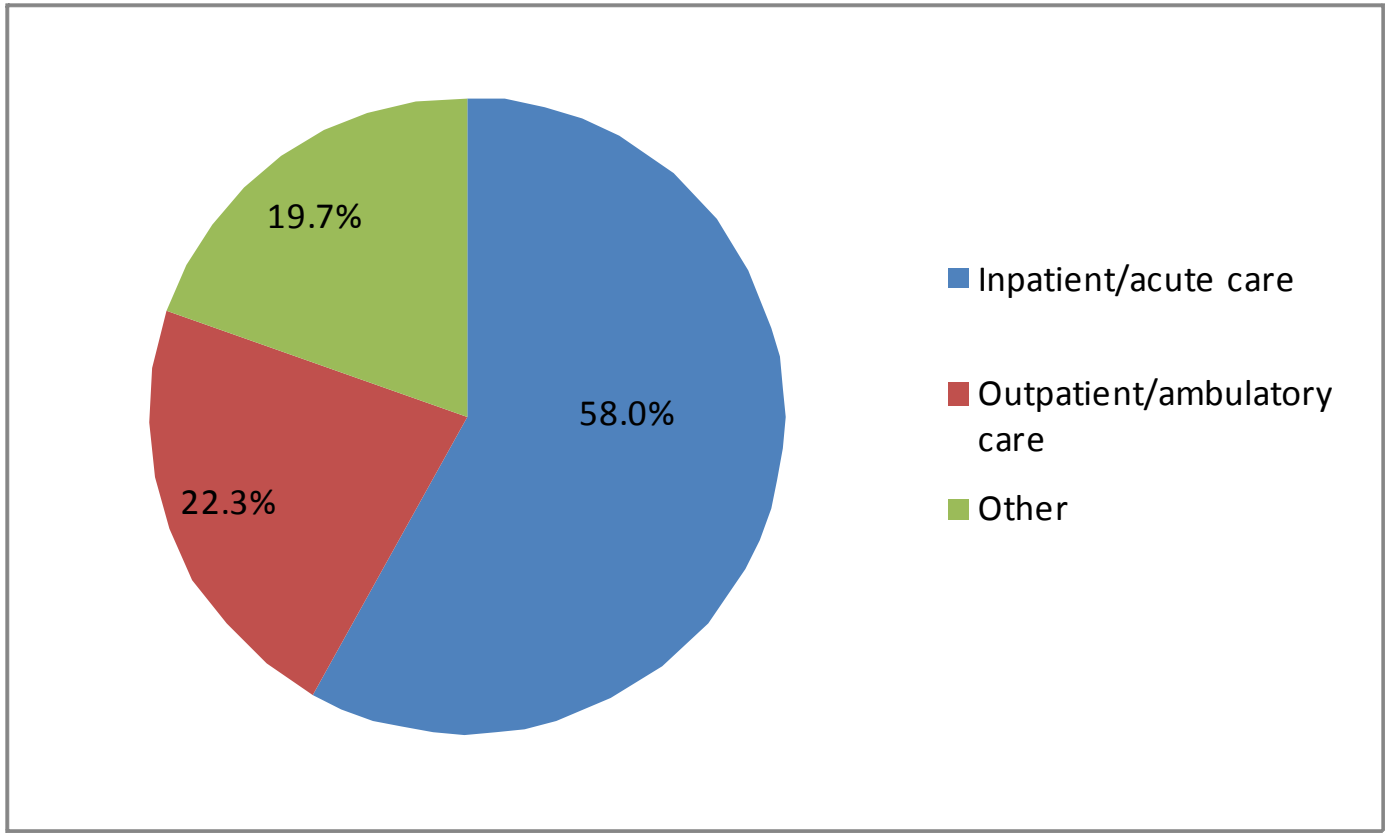


If new BPS specialty certifications are offered, I will likely choose to become certified in: Total Respondents = 1099

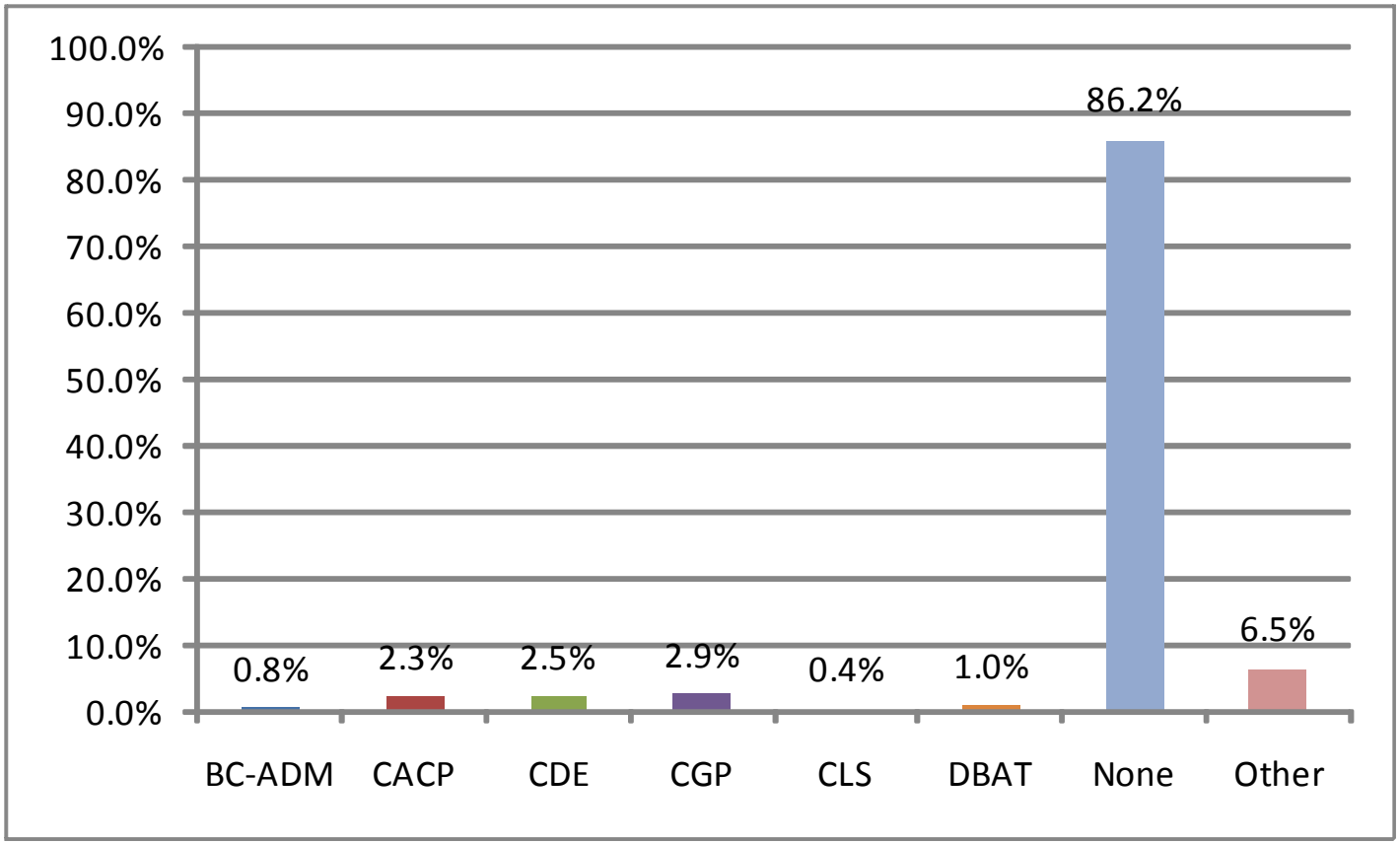


Branch 2: Not Board Certified (n=724)

My primary professional/practice setting is:
Total Respondents = 722

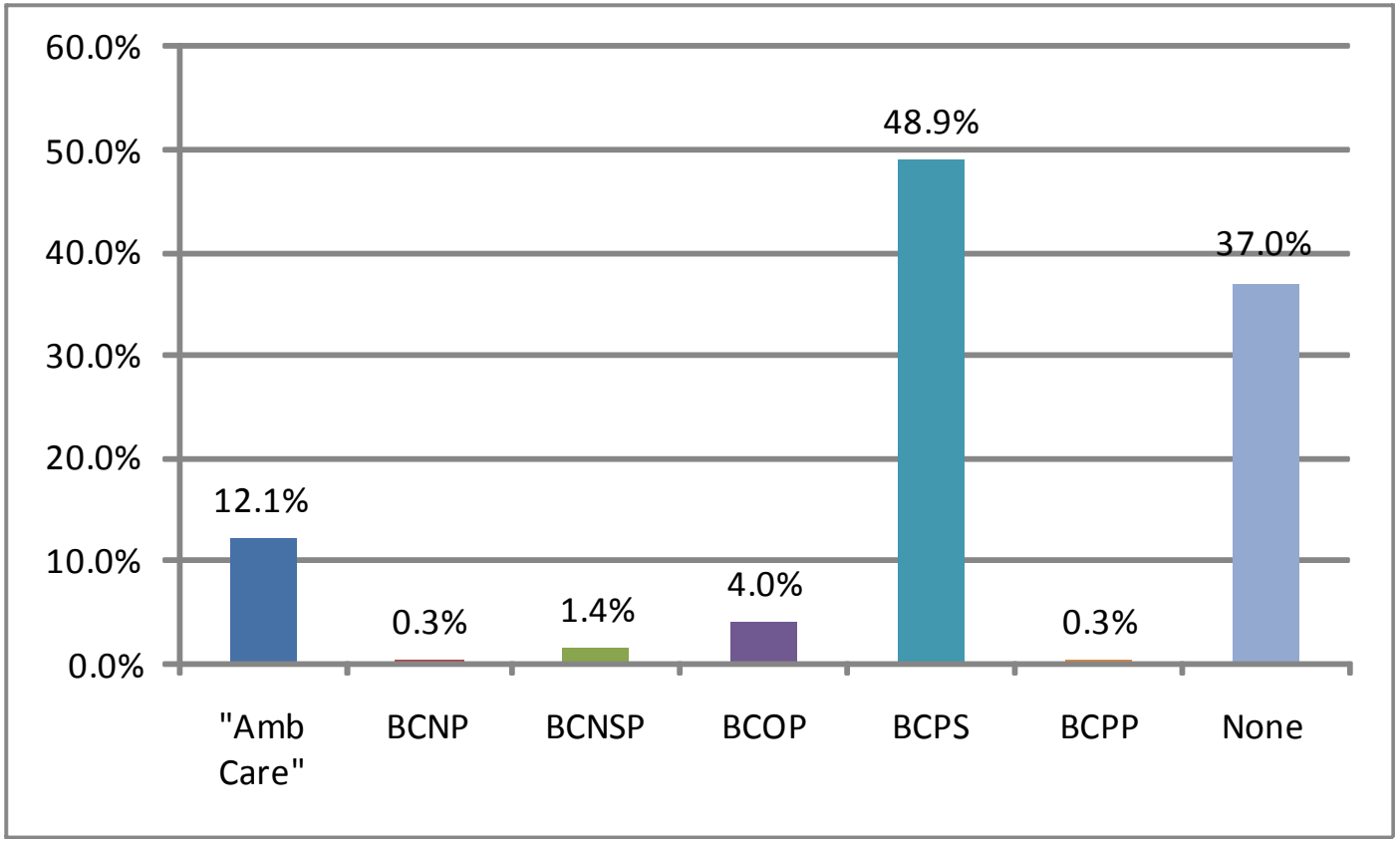


I hold other non-BPS certifications in:
Total Respondents = 724

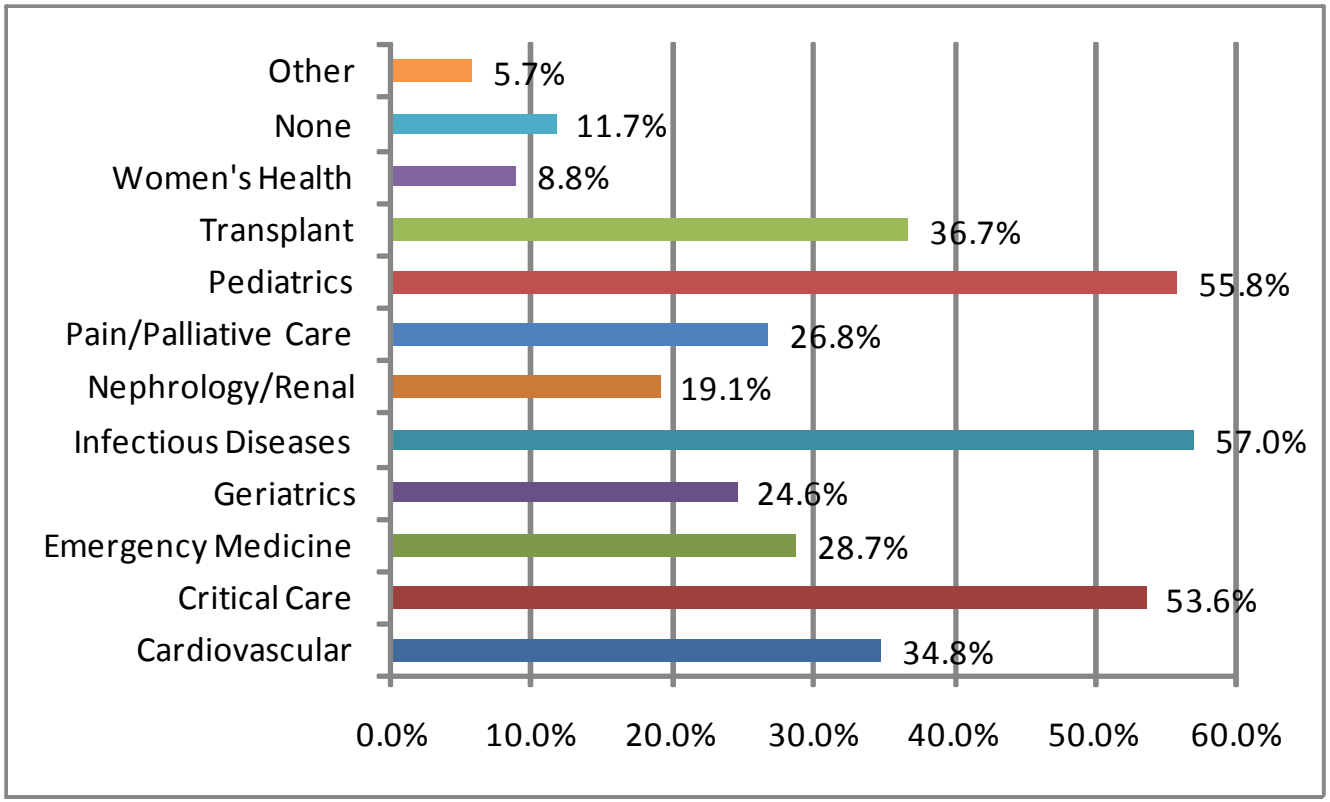


Do you plan to seek certification for a BPS specialty within the next 2 years?

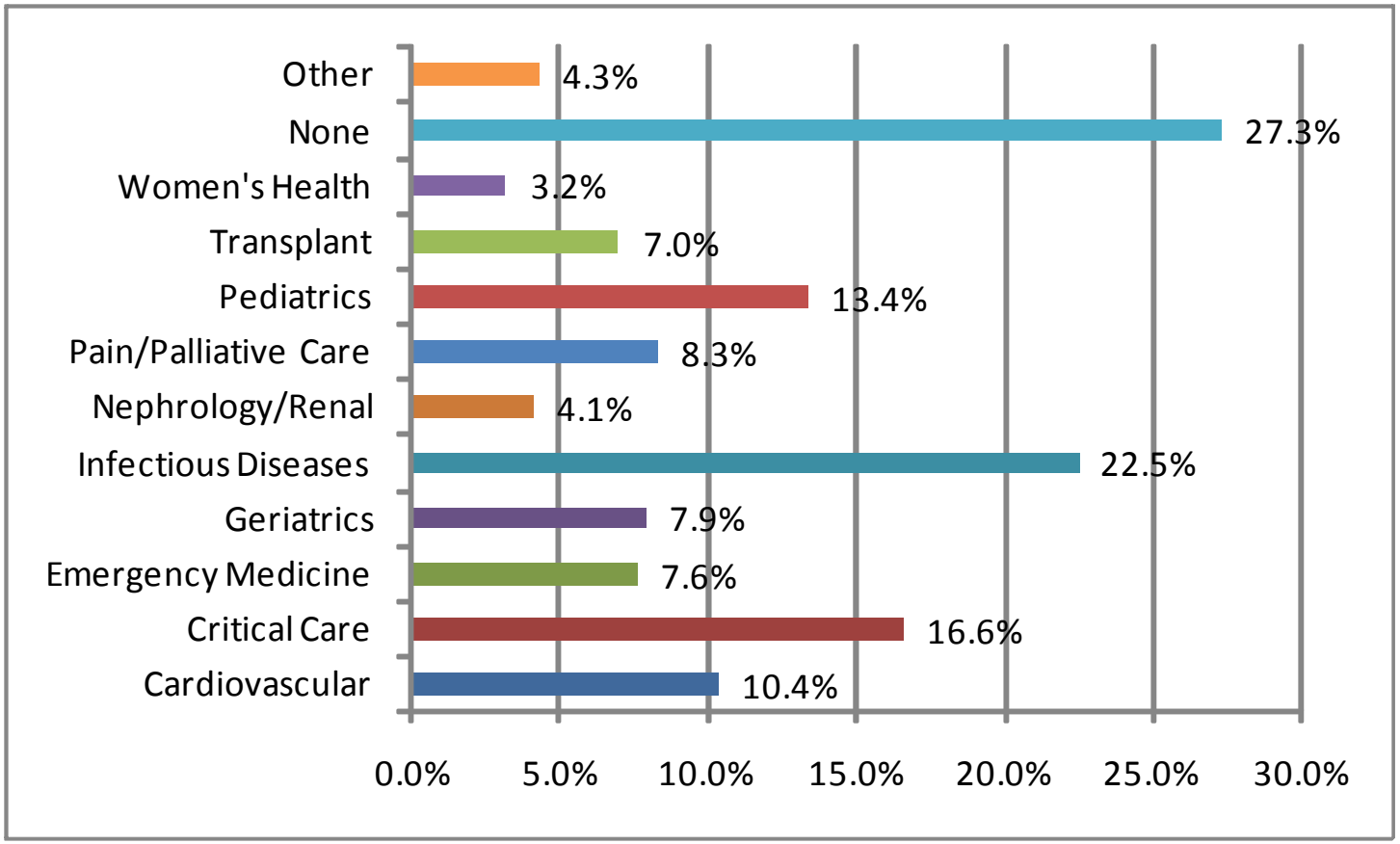
Total Respondents = 354* ***Note: only 354 of this question's 724 respondents had access to all 7 possible responses.**



I believe that new BPS specialty certifications (not Added Qualifications within a specialty) are needed to appropriately certify clinical pharmacy practitioners in the area(s) below.
Total Respondents = 724



If new BPS specialty certifications are offered, I will likely choose to become certified in:
Total Respondents = 724



Appendix D-1

Report of the Role Delineation Study of Infectious Diseases Pharmacy

Report of the Role Delineation Study of Infectious Diseases Pharmacy

Prepared for

Board of Pharmacy Specialties
2215 Constitution Avenue, NW
Washington, DC 20037-2985

Prepared by

Professional Examination Service
Department of Research and Advisory Services
475 Riverside Drive
New York, NY 10115

April 2013

Executive Summary

In 2012, the Board of Pharmacy Specialties (BPS) contracted with Professional Examination Service (ProExam) to conduct a role delineation study (RDS) of infectious diseases pharmacy practice. This area of pharmacy practice had been identified as a potential new BPS specialty certification.

The primary purpose of the study was to define the role of the infectious diseases pharmacist, in the format used to define existing BPS specialties. Additionally, if infectious diseases pharmacy were to become a specialty examination, the RDS also provides a basis on which content valid examinations can be developed. According to standards established by the testing industry, the mechanism for establishing the content to be assessed in a certification examination is the conduct of an RDS of the profession.

The RDS of infectious diseases pharmacists was undertaken in two phases: (1) development of the role delineation by subject-matter experts, and (2) conduct of a survey to validate the description of specialty practice and develop a hypothetical examination content outline.

Methodology

Development of the Description of Specialty Practice

Appointment of the Role Delineation Task Force – BPS put out a call for nominations in the spring of 2012 to assemble a diverse nominee pool from which the RDS task force was selected. In selecting the members of the role delineation task force, BPS took into consideration critical demographic and professional background variables to be represented in the group. The task force was comprised of 11 subject-matter experts representing a range of practice settings and years of experience.

Pre-Meeting Data Collection Activity – In order to begin the process of delineating infectious diseases-specific tasks and knowledge statements, ProExam performed a brief web-based data collection activity with the task force. Task force members were asked to describe specific tasks performed by a pharmacist specializing in infectious diseases as well as the specialized knowledge that a pharmacist practicing in infectious diseases must have in order to be effective. ProExam reviewed and synthesized the results of the pre-meeting data collection activity for use at the first meeting of the task force.

Meeting 1 of the Task Force – The role delineation task force met in Washington, DC in July 2012 for a 2-day meeting. At the meeting, ProExam facilitated a discussion regarding the most useful structure for the delineation, and the process for developing the tasks and knowledge to be included in the infectious diseases pharmacy role delineation. The task force adopted a four domain organizing structure for the delineation. The domains were *Patient Care and Therapeutics, Education, Research and Scholarship; Antimicrobial Stewardship and Practice Management,* and *Public Health and Advocacy*. Tasks performed and knowledge necessary for competent practice within each of these four domains were delineated over the course of the meeting.

Post-Meeting Review – Immediately following this meeting, the role delineation was sent to all task force members for critical review. After all comments and feedback were received, task force members met for a series of virtual meetings in order to reconcile the comments and prepare a revised draft of the role delineation.

Independent Review – To support and supplement the work of the task force, an independent review procedure was implemented. Independent review is a process by which persons not involved in the initial development of the role delineation are given the opportunity to review the work in progress. A total of 14 participants were selected from the pool of nominees assembled at the outset of the study. A total of 7 independent reviewers responded, for a 50% return rate, which is an average response rate for this type of activity. All reviewer comments were documented for the task force and reviewed during a series of virtual meetings with the task force.

Meeting 2 of the Task Force – Meeting 2 of the task force was scheduled as a series of two virtual meetings. The purpose of these virtual meetings was to review and reconcile the feedback received from the independent reviewers. The role delineation finalized during meeting 2 of the task force consisted of 4 domains, 26 tasks, and 80 knowledge bases. The number of tasks and knowledge bases in each domain is displayed in Exhibit 1.

Exhibit 1
Structure of Infectious Diseases Pharmacy Role Delineation

	Task Statements	Knowledge Bases
Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.	7	43
Domain 2: Education, Research and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious disease pharmacy, and the education of current and future healthcare professionals.	5	9
Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.	9	14
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.	5	14
Total	**26**	**80**

Conduct of Survey to Validate the Delineation of Practice

Development of Survey Instrument – The infectious diseases pharmacy role delineation was validated through implementation of a web-based survey of pharmacists practicing in the specialty. The delineation of practice was assessed by using quantitative and qualitative data collection procedures. From a quantitative standpoint, rating scales were designed to measure the *frequency* of use and *importance* of the tasks; the *percentage of time* spent in each domain and the *importance* of each domain; and how *important* the knowledge is to effective practice of infectious diseases pharmacy, as well as the *frequency of use* of the knowledge. From a qualitative standpoint, open-ended questions were developed to assess any tasks or knowledge missing from the delineation.

Conduct of Survey Pilot Test – The purpose of the pilot test was to ensure that all content and technical aspects of the survey instrument were of the highest quality and that the survey was as clear and user-friendly as possible. The entire Task Force and an additional 14 additional SMEs were asked to participate in the pilot test of the study. The 24 pilot testers were sent invitations and personalized, password-protected links to the beta test version of the survey. Feedback was received from 10 participants for a return rate of about 67% — an above average response rate for this type of activity. ProExam reviewed the results of the pilot test and, based on the pilot feedback, made minor adjustments to the survey in advance of the large-scale administration.

Dissemination of Survey – BPS obtained the Infectious Diseases Pharmacy survey sample from several sources. After eliminating duplicates from across the sources, the final sample was comprised of 1495 pharmacists identified as infectious diseases pharmacy specialists. Invitations to participate in the survey were disseminated in February 2013. In order to encourage participation, a reminder was sent to all non-respondents one week after the initial invitation. To allow for more time to complete the survey, a final e-mail communication was sent extending the deadline by one week.

Results

Return Rate – A total of 1495 survey invitations were disseminated, and of these 52 could not be delivered due to invalid email addresses, leaving a valid sample size of 1448. A total of 275 pharmacists completed the survey for a return rate of about 19%. This is an average return rate for not yet established credentialing programs.

Professional Background and Demographic Information – The following section provides background and demographic information regarding the infectious diseases pharmacists who responded to the survey.

- Respondents spent an average of 65% of their overall work time focused on infectious diseases pharmacy practice.
- Of the time spent focused on infectious diseases pharmacy practice, an average of 46% was spent providing direct patient care.
- Survey respondents had an average of 13 years of experience as a licensed pharmacist with the least being 1 year and most 46 years.

- Respondents had an average of 9 years of experience working in infectious diseases pharmacy, with 2% of respondents having less than 1 year of specialty experience, 46% of respondents having 1-5 years, 23% having 6-10 years of experience, 22% having 11-20 years of experience, and about 8% having more than 20 years of experience in the specialty.
- The strong majority of respondents worked in a hospital (about 78%).
- The three types of hospitals most represented were community hospital (37%), university hospital/academic medical center (27%), and community teaching hospital (23%).
- On average, respondents spent about 12% of their time carding for HIV infected patients; 18% of respondents did not provide care for HIV infected patients.
- Most patients were in the 18 – 64 (47%) or 65+ (47%) age categories. About 9% of patients, on average, were under 18 years of age.
- About 92% of respondents earned a Pharm. D. degree.
- About 60% of respondents completed a PGY1 residency and 30% completed a PGY2 Infectious Diseases Residency.
- Most respondents (61%) held the BPS pharmacotherapy specialty certification and 18% of respondents held the BPS added qualification in infectious diseases.

Domain Ratings – Participants were asked to make two ratings for the domains. **Percentage of time**: *Considering the time you spend focused on infectious diseases pharmacy, what percentage of that work time do you spend performing the tasks related to each domain?* and **Importance**: *Overall, how important are the tasks in this domain to the effective practice of infectious diseases pharmacy? 1=Not important, 2=Minimally important, 3=Moderately important, or 4=Highly important.*

Respondents reported spending the most time in Domain 1 – Patient Care and Therapeutics (49%) and the least time in Domain 4 – Public Health and Advocacy (6%). Twenty percent of their time was spent in Domain 2 – Education, Research and Scholarship, and 25% was spent in Domain 3 – Antimicrobial Stewardship and Practice Management.

Overall, the mean domain importance ratings were high. A total of 94% of respondents selected highly important for Domain 1, and the mean rating for this domain was 3.9 on a 4-point scale. The second highest importance rating was 3.7 for Domain 3, with about 76% of respondents selecting highly important. The lowest rating was for Domain 4 (2.8 indicating about moderately important).

Task Ratings and Validation Decisions – Participants were asked to make two ratings for the tasks. Mean values were generated for by assigning numerical values to each for response option. **Frequency:** *How frequently did you perform the task during the past 12 months? 1=Never, 2=Quarterly or less, 3=Monthly, 4=Weekly, or 5=Daily* and **Importance:** *How important is the task to effective infectious diseases practice?1=Not important, 2=Minimally important, 3=Moderately important, or 4=Highly important.*

Of the 26 task statements, 10 received mean frequency ratings above 3.5, 5 received a mean frequency rating between 3.0 and 3.5, 5 received a mean frequency rating between 2.5 and 3.0, and 6 received a mean frequency rating below 2.5. Fifteen tasks received mean importance

ratings 3.5 or above, 8 received mean importance ratings between 3.1 and 3.5, and 3 received mean importance ratings below 3.0.

The task force met virtually to review the validation evidence collected in the role delineation survey. During the meeting, the task force reviewed all results of the survey, and discussed in detail those task statements that did not receive clear validation evidence. These were defined as instances where 30% or more of the respondents reported never performing the task, and/or the mean frequency rating fell below a 2.5. Based on these criteria, there was sufficient validation evidence to support inclusion of 20 of the 26 task statements in the description of infectious diseases specialty practice. The remaining 6 tasks were discussed in greater detail. The validation discussion regarding these 6 tasks was informed by the frequency ratings, the importance ratings, considerations regarding the nature of the tasks, and the ratings of respondent subgroups. Exhibit 2 documents the validation decisions for these 6 tasks and the rationale for the decisions.

Exhibit 2
Task Validation Decisions and Rationales

Task	Validation Decision (Retain or Remove)	Rationale for Validation Decision
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	**Retain**	Retained based on moderate mean importance rating of 3.0 and the nature of the task – by its nature, this task would typically be performed quarterly or less, and therefore have a lower mean frequency rating.
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	**Retain**	Retained based on moderate-to-high mean importance rating of 3.4 and the nature of the task – by its nature, this task would typically be performed quarterly or less, and therefore have a lower mean frequency rating.
3.5 Collaborate in the development of institutional infection prevention policies.	**Retain**	Retained based on moderate mean importance rating of 3.0 and the nature of the task – by its nature, this task would typically be performed quarterly or less, and therefore have a lower mean frequency rating.
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention	**Retain**	Task retained based on mean importance rating (about moderately) of 2.9.
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	**Retain**	Task retained based on mean importance rating (about moderately) of 2.9 and key content testing around HIV.
4.6 Promote the role of the infectious diseases pharmacy specialist to stakeholders (e.g., healthcare system administrators, legislators, patients/parents/caregivers).	**Remove**	Key content covered in other tasks within the domain. Not enough validation evidence or strong rationale for retention.

Knowledge Ratings and Validation Decisions – Participants were asked to make two ratings for the knowledge bases. Mean values were generated by assigning numerical values to each for response option. **Frequency:** *How frequently did you use the knowledge during the past 12 months? 1=Never, 2=Quarterly or less, 3=Monthly, 4=Weekly, or 5=Daily* and **Importance:** *How important is the knowledge to effective infectious diseases practice?1=Not important, 2=Minimally important, 3=Moderately important, or 4=Highly important.*

Of the 80 knowledge bases, 36 received mean frequency ratings 3.5 or above, 16 received mean frequency ratings between 3.0 and 3.5, and 28 received mean frequency ratings below 3.0. Seventy knowledge bases received mean importance ratings above 3.0 (moderately important) and 10 received mean importance ratings below 3.0.

During the web-based meeting to review the survey results, the task force discussed those knowledge bases that did not receive clear validation evidence; that is, those instances where 30% or more of the respondents reported *never* using the knowledge and/or the mean frequency rating fell below a 2.5. There was sufficient validation evidence to support inclusion of 69 of the 80 knowledge bases in the description of infectious diseases specialty practice. The remaining 11 knowledge statements were discussed in greater detail. The validation discussion was informed by the frequency ratings, the importance ratings, considerations regarding the nature of the knowledge, and the relationship between the knowledge and task statements. Exhibit 3 captures the validation decisions and rationales for each of these 11 knowledge statements.

Exhibit 3
Knowledge Validation Decisions and Rationales

Knowledge Statement	Validation Decision (Retain or Remove)	Rationale for Validation Decision, if Retained
k1.1.9 Ophthalmologic infections	**Retain**	Retained based on 88% of respondents reporting that they used the knowledge at some frequency, and the mean importance rating of about moderately important (2.9)
k1.6 Pharmacology of biological response modifiers (e.g., TNF inhibitors, colony stimulating factors)	**Retain**	Respondents may have misunderstood the knowledge statement, resulting in the low rating. Retained with slight modification. Example list (shown in red) was added to clarify meaning of the statement.
k1.26 Antimicrobial desensitization	**Retain**	Retained based on 90% of respondents reporting that they used the knowledge at some frequency, and the mean importance rating of about moderately important (3.1)
k2.7 Regulatory and ethical issues related to conducting research	**Retain**	Task 2.4 for which this knowledge is needed was retained; therefore knowledge statement must also be retained.
k4.2 Public health services related to infectious diseases	**Retain**	Task 4.2 for which this knowledge is needed was retained; therefore knowledge statement must also be retained.
k4.3 Centers for Disease Control and Prevention (CDC) notifiable infectious diseases	**Retain**	Retained based on mean importance rating of about moderately (3.0) and obligation under law to know these. May not use the knowledge very

Knowledge Statement	Validation Decision (Retain or Remove)	Rationale for Validation Decision, if Retained
		often, but it is necessary to practice.
k4.4 Strategies to tailor ID-related communications to the public	**Remove**	Not essential to practice
k4.10 Agents of bioterrorism	**Remove**	May be too forward thinking and not reflective of current practice
k4.11 Agents that have the potential to become epidemic or pandemic	**Retain**	Retained based on 80% of respondents reporting that they used the knowledge at some frequency, and the mean importance rating of about moderately important (2.9)
k4.13 CDC emergency preparedness guidelines	**Remove**	Task 4.5 for which this knowledge is needed was removed.
k4.14 History of vaccine preventable diseases	**Retain**	Retained based on 80% of respondents reporting that they used the knowledge at some frequency. May not use the knowledge very often, but it is necessary to properly perform the validated tasks.

Examination Specifications – ProExam calculated hypothetical specifications for a potential new certification examination in infectious diseases pharmacy based on the domain percentage of time and importance ratings. Hypothetical examination specifications are presented for the total sample, and for those respondents spending less (< 50%) or more (≥ 50%) time focused on infectious diseases pharmacy (Exhibit 4). After examining the hypothetical, empirically-derived examination specifications, the task force deemed the percentages derived from the total survey respondent group to be the best representation of specialty practice. Thus, the recommended examination specifications for a potential new specialty certification (shown in **bold**) are the empirically derived examination specifications for the total sample.

Exhibit 4
Hypothetical Examination Specifications

	Total Sample	< 50% specialty work time	≥ 50% specialty work time
Domain 1: Patient Care and Therapeutics	**51%**	52%	50%
Domain 2: Education, Research and Scholarship	**19%**	19%	19%
Domain 3: Antimicrobial Stewardship and Practice Management	**25%**	24%	26%
Domain 4: Public Health and Advocacy	**5%**	5%	5%

Summary and Recommendations

The conduct of the role delineation study of infectious diseases pharmacy specialists yielded a structured description of specialty practice in terms of major domains and tasks, as well as the specialized knowledge base that supports task performance.

The results of this study provide the validity foundation for future credentialing initiatives. Should BPS decide to develop a new specialty certification in infectious diseases pharmacy, ProExam recommends that:

- examination items be developed to assess the specialty knowledge and tasks validated by survey respondents
- items be classified in terms of domain, task, and specialty knowledge base assessed by the item, and
- examinations be constructed to match the percentage weight examination specifications recommended by the task force.

By following this guidance, BPS will create a chain of validity evidence that that ties examination content to the role delineation study. By so doing, BPS will meet best practice recommendations and accreditation requirements for credentialing programs.

Contents

Table of Tables

Table of Appendices

Introduction

In 2012, the Board of Pharmacy Specialties (BPS) contracted with Professional Examination Service (ProExam) to conduct a role delineation study (RDS) of infectious diseases pharmacy practice. This area of pharmacy practice had been identified as a potential new BPS specialty certification. In an RDS, the domains of practice and associated tasks are defined for the professional role under consideration, and the knowledge bases required to perform the defined tasks of the specialty are articulated.

The primary purpose of the study reported herein was to define the role of the infectious diseases pharmacist, in the format used to define existing BPS specialties. In particular, the RDS was conducted in order to delineate the tasks performed by the pharmacists specializing in infectious diseases within broad domains of practice, and to identify the specialized (i.e., beyond licensure) knowledge bases needed to perform the delineated tasks.

If infectious diseases pharmacy were to become a specialty examination, the RDS also provides a valid basis on which examinations can be developed. According to standards established by the testing industry, the mechanism for establishing the content to be assessed in a certification examination is the conduct of an RDS of the profession. Conduct of RDSs is required in order to meet the certification program accreditation requirements of the American National Standards Institute (ANSI).

The RDS of infectious diseases pharmacists was undertaken in two phases: (1) development of the role delineation by subject-matter experts, and (2) conduct of a survey to validate the description of specialty practice and develop a hypothetical examination content outline.

Methodology

Phase 1 – Development of the Description of Specialty Practice

Appointment of the Role Delineation Task Force

To assemble a diverse nominee pool from which to assemble the role delineation task force and appoint subject-matter experts to participate in other aspects of the study, BPS put out a call for nominations in the spring of 2012.

An online questionnaire was created to capture information about volunteers needed to fill various roles in the RDS process. In addition to identifying the activities for which the nominee was willing to participate, BPS collected professional background information about each nominee, including percentage of time spent in the specialty of infectious diseases pharmacy, work setting, and years of experience. For additional description of the online data collection instrument and the activities for which nominees could volunteer, see Appendix 1.
BPS received 68 nominations, and reviewed the CVs of all nominees prior to the selection of the task force.

In selecting the members of the role delineation task force, BPS took into consideration critical demographic and professional background variables to be represented in the group. The task force was comprised of 11 subject-matter experts representing a range of practice settings and years of experience.

Pre-Meeting Data Collection Activity

Prior to the first meeting of the task force, ProExam conducted a data collection activity with the task force members. In order to begin the process of delineating infectious diseases-specific tasks and knowledge statements, ProExam created a brief web-based form to collect initial data regarding potential content for the infectious diseases pharmacy specialty role delineation. Task force members were asked to describe specific tasks performed by a pharmacist specializing in infectious diseases as well as the specialized knowledge that a pharmacist practicing in infectious diseases must have in order to be effective.

ProExam provided the task force members with a resource manual describing role delineation terminology and procedures. Task force members were instructed to review the resource manual prior to completing the data collection activity. Additional guidance was also provided throughout the online data collection form. See Appendix 2 for screen captures of this data collection form.

ProExam reviewed and synthesized the results of the pre-meeting data collection activity for use at the first meeting of the task force. The domains, tasks, and knowledge statements produced during the pre-meeting data collection activity served as a starting point for the development of the infectious diseases pharmacy role delineation.

Meeting 1 of the Task Force

In order to define the tasks and knowledge specific to the practice of infectious diseases pharmacy, the role delineation task force met in Washington, DC in July 2012 for a 2-day meeting. See Appendix 3 for a list of meeting attendees.

At the meeting, ProExam facilitated a discussion regarding the most useful structure for the delineation, and the process for developing the tasks and knowledge to be included in the infectious diseases pharmacy role delineation. The task force adopted a four domain organizing structure for the delineation. The domains were *Patient Care and Therapeutics; Education, Research and Scholarship; Antimicrobial Stewardship and Practice Management;* and *Public Health and Advocacy*. Tasks performed and knowledge necessary for competent practice within each of these four domains were delineated over the course of the meeting.

Immediately following this meeting, the role delineation was sent to all task force members for critical review. Task force members were asked to (1) provide solutions for any outstanding issues, (2) ensure that all tasks and knowledge required for effective practice were included in the delineation, (3) confirm that each statement was delineated as accurately and concisely as possible, and (4) ensure that each knowledge statement could be matched to at least one task statement and that a complete set of required knowledge had been identified for each task

statement. Task force members then met for a series of virtual meetings in order to reconcile the comments and prepare a revised draft of the role delineation. This document was then disseminated to additional infectious diseases pharmacists for review and comment.

Conduct of Independent Review

To support and supplement the work of the task force, an independent review procedure was implemented. Independent review is a process by which persons not involved in the initial development of the role delineation are given the opportunity to review the work in progress. This review ensures that a fresh perspective is brought to bear on the ongoing work of the task force.

A total of 14 participants were selected from the pool of nominees assembled at the outset of the study. Selections were made so as to represent a range of practice settings and experience levels. Reviewers were asked to evaluate the delineation for comprehensiveness, redundancy, clarity, consistency, and sequence. Appendix 4 contains a copy of the detailed instructions provided for performing the review.

A reminder e-mail was sent to reviewers prior to the submission deadline in order to encourage participation. A total of 7 independent reviewers responded, for a 50% return rate, which is an average response rate for this type of activity.

All reviewer comments were documented for the task force and reviewed during a series of virtual meetings with the task force.

Meeting 2 of the Task Force

Meeting 2 of the task force was scheduled as a series of two virtual meetings. One week prior to the first of these meetings, ProExam sent the members of the task force the results of the independent review of the infectious diseases role delineation.

Task force members, after thoughtful discussion, were able to make decisions regarding all suggested edits to the tasks and knowledge statements, and finalized the delineation of practice in preparation for a validation survey of pharmacists practicing in the infectious diseases specialty. The role delineation finalized during meeting 2 of the task force consisted of 4 domains, 26 tasks, and 80 knowledge bases. The number of tasks and knowledge bases in each domain is displayed in Table 1.

Table 1
Structure of Infectious Diseases Pharmacy Role Delineation

	Task Statements	Knowledge Bases
Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.	7	43
Domain 2: Education, Research and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious disease pharmacy, and the education of current and future healthcare professionals.	5	9
Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.	9	14
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.	5	14
Total	**26**	**80**

Phase 2 – Conduct of Survey to Validate the Delineation of Practice

Development of Survey Instrument

The infectious diseases pharmacy role delineation was validated through implementation of a web-based survey of pharmacists practicing in the specialty. The delineation of practice was assessed by using quantitative and qualitative data collection procedures. From a quantitative standpoint, rating scales were designed to measure the *frequency* of use and *importance* of the tasks; the *percentage of time* spent in each domain and the *importance* of each domain; and how *important* the knowledge is to effective practice of infectious diseases pharmacy, as well as the *frequency of use* of the knowledge. From a qualitative standpoint, open-ended questions were developed to assess any tasks or knowledge missing from the delineation.

The specific rating scales used in the survey follow.

Tasks

Frequency **How frequently did you perform the task during the past 12 months?**

1=Never, 2=Less than monthly, 3=About monthly, 4=About weekly, 5=About daily

Importance **How important is the task to the effective practice of infectious diseases pharmacy?**

1=Not important, 2=Minimally important, 3=Moderately important, 4=Highly important

Domains

% of Time **Considering the time you spend focused on infectious diseases pharmacy, what percentage of that work time do you spend performing the tasks related to each domain?**

Importance **Overall, how important are the tasks in this domain to the effective practice of infectious diseases pharmacy?**

1=Not important, 2=Minimally important, 3=Moderately important, 4=Highly important

Knowledge

Frequency **How frequently did you use the knowledge during the past 12 months?**

1=Never, 2=Less than monthly, 3=About monthly, 4=About weekly, 5=About daily

Importance **How important is the knowledge to the effective practice of infectious diseases pharmacy?**

1=Not important, 2=Minimally important, 3=Moderately important, 4=Highly important

Screen captures of the validation survey can be found in Appendix 5.

Conduct of Survey Pilot Test

After the role delineation was incorporated into the online survey instrument, a pilot test was conducted. The purpose of the pilot test was to ensure that all content and technical aspects of the survey instrument were of the highest quality and that the survey was as clear and user-friendly as possible.

The entire Task Force and an additional 14 additional SMEs were asked to participate in the pilot test of the study. Therefore, a total of 24 pilot testers were sent invitations and personalized, password-protected links to the beta test version of the survey. Pilot testers were asked to provide feedback regarding clarity of instructions, utility of rating scales, technical difficulties, and time to complete, as well as make any additional suggestions or comments to improve the survey experience. For a copy of the invitation sent to pilot testers, see Appendix 6.

Feedback was received from 10 participants for a return rate of about 67% — an above average response rate for this type of activity. ProExam reviewed the results of the pilot test and, based on the pilot feedback, made minor adjustments to the survey in advance of the large-scale administration.

Dissemination of Survey

BPS obtained the Infectious Diseases Pharmacy survey sample from several sources. After eliminating duplicates from across the sources, the final sample was comprised of 1495 pharmacists identified as infectious diseases pharmacy specialists.

In collaboration with BPS, ProExam developed survey invitation letters and reminders to be sent to the sample of specialty pharmacists selected for the survey. These e-mail communications were designed to inform potential participants of the purpose of the validation survey and to encourage them to respond.

Invitations to participate in the survey were disseminated in February 2013. Each invitation e-mail included an embedded, customized link containing a unique password to the survey. The use of the password permitted recipients to start and stop the survey without loss of data; that is, the survey could be completed only one time, but across multiple sessions.

In order to encourage participation, a reminder was sent to all non-respondents one week after the initial invitation. To allow for more time to complete the survey, a final e-mail communication was sent extending the deadline by one week. Copies of all e-mail communications with the sample can be found in Appendix 7.

As incentive to participate, all survey participants could elect to be entered into a prize drawing to win one of four $50 Amazon.com gift cards.

Results of the Survey of Infectious Diseases Pharmacy Practice

Return Rate

A total of 1495 survey invitations were disseminated, and of these 52 could not be delivered due to invalid email addresses, leaving a valid sample size of 1448. As seen in Table 2, a total of 275 pharmacists completed the survey for a return rate of about 19%. This is an average return rate for not yet established credentialing programs.

Table 2
Survey Return Rate

Number of Invitations	Invalid	Valid Sample Size	Number of Responses	Return Rate
1495	52	1448	275	19%

Professional Background and Demographic Information

The following section provides background and demographic information regarding the infectious diseases pharmacists who responded to the survey.

As seen in Table 3, respondents were engaged in the specialty of infectious diseases pharmacy with an average of 65% of their work time focused on infectious diseases pharmacy practice.

Table 3
What percentage of your overall work time is focused on infectious diseases pharmacy practice?

Mean	Median	Minimum	Maximum	Mode	SD
65%	75%	1%	100%	100%	(30.2)

Table 4 shows the percentage of work time spent providing pharmacy services to infectious diseases patients in another way. This presentation expands upon Table 3. Here we see that only 4 respondents (1.5%) spent 10% or less of their time, 46 respondents (16.7%) spent 11-25% of their time, 53 respondents (19.3%) spent 26-50% of their time, 56 respondents (20.4%) spent 51-75% of their time, and 116 respondents (42.2%) spent 76-100% of their time focused on infectious diseases pharmacy practice.

Table 4
Percentage of work time focused on infectious diseases pharmacy practice

0%		1-10%		11-25%		26-50%		51-75%		76-100%	
N	%	N	%	N	%	N	%	N	%	N	%
0	0%	4	1.5%	46	16.7%	53	19.3%	56	20.4%	116	42.2%

Of the time spent providing pharmacy services to infectious diseases patients, an average of 46% was spent providing direct patient care (Table 5).

Table 5
Of this time, what percent is spent providing *direct* patient care?

Mean	Median	Minimum	Maximum	Mode	SD
46%	50%	0%	100%	50%	(29.8)

Survey respondents had an average of 13 years of experience as a licensed pharmacist with the least being 1 year and most 46 years (Table 6). There was a good distribution of respondents across the spectrum of years of experience from 1 to more than 20 years as a licensed pharmacist (Table 7).

Table 6
How many years have you worked as a licensed pharmacist?

Mean	Median	Minimum	Maximum	Mode	SD
13	10	1	46	5	(10.2)

Table 7
Years as a licensed pharmacist

< 1 year		1-5 years		6-10 years		11 - 20 years		More than 20 years	
N	%	N	%	N	%	N	%	N	%
1	.4%	72	26.3%	73	26.6%	63	23.0%	65	23.7%

Tables 8 and 9 show the results for years working in the infectious diseases pharmacy specialty. Respondents had an average of 9 years, with 2% of respondents having less than 1 year of specialty experience, 46% of respondents having 1-5 years, 23% having 6-10 years of experience, 22% having 11-20 years of experience, and about 8% having more than 20 years of experience in the specialty.

Table 8
How many years (since licensure) have you worked in infectious diseases pharmacy?

Mean	Median	Minimum	Maximum	Mode	SD
9	6	0	32	3	(7.5)

Table 9
Years (since licensure) in infectious diseases pharmacy

< 1 year		1-5 years		6-10 years		11 - 20 years		More than 20 years	
N	%	N	%	N	%	N	%	N	%
4	1.5%	127	46.4%	63	23.0%	59	21.5%	21	7.7%

Table 10 shows the setting in which the majority of respondents' practice took place. The strong majority of respondents worked in a hospital (about 78%). The only other setting represented by about 10% of the respondent group was the academic setting.

Table 10
In what setting does the *majority* of your practice take place?

	N	%
Hospital	212	77.7%
Private Medical Group	2	.7%
Managed Care	3	1.1%
Industry	2	.7%
Academic Setting (teaching/research)	26	9.5%
Governmental Organization	7	2.6%
Other (Please specify.)	21	7.7%
Total	273	100.0%

If respondents reported working in a hospital, they were asked to specify the type of hospital in which the majority of their practice takes place. Table 11 shows that the three types of hospitals most represented were community hospital (37%), university hospital/academic medical center (27%), and community teaching hospital (23%).

Table 11
If you work in a hospital setting, in what type of hospital does the majority of your practice take place?

	N	%
Community Hospital	93	36.9%
Community Teaching Hospital	57	22.6%
Government (including VA/DOD) Hospital	20	7.9%
Private Teaching Hospital	6	2.4%
University Hospital/Academic Medical Center	67	26.6%
Other (Please specify.)	9	3.6%
Total	252	100.0%

Table 12 and Table 13 show the results of the question specific to time spent caring for HIV infected patients. On average, respondents spent about 12% of their time carding for HIV infected patients. About 18% did not provide care for HIV infected patients, and about two-thirds spent up to half their time with HIV infected patients. Very few respondents spending more than half their time focused just on this patient population.

Table 12
What percentage of your time is spent caring for HIV infected patients?

Mean	Median	Minimum	Maximum	Mode	SD
12%	5%	0%	100%	5%	(20.4)

Table 13
Percentage of time is spent caring for HIV infected patients

0%		1-10%		11-25%		26-50%		51-75%		76-100%	
N	%	N	%	N	%	N	%	N	%	N	%
46	17.6%	122	46.7%	59	22.6%	19	7.3%	5	1.9%	10	3.8%

As seen in Table 14, respondents reported that most of their patients were in the 18 – 64 (47%) and 65+ (47%) age categories. About 9% of patients, on average, were under 18 years of age.

Table 14
What percentage of your patients falls into each of the following age ranges?

	Mean	SD
Under 18	8.8%	(19.0)
18 - 64	46.6%	(18.6)
65+	46.7%	(18.3)

Table 15 shows the highest pharmacy-related degree earned. About 92% of respondents earned a Pharm.D. degree.

Table 15
What is the highest pharmacy-related degree you have earned?

	N	%
Bachelor's degree	16	5.9%
Master's degree	3	1.1%
Pharm.D.	249	92.2%
Ph.D.	2	.7%
Other (Please specify.)	0	0%
Total	270	100.0%

Table 16 illustrates which residency program(s) and/or fellowships respondents had completed. Twenty five percent of respondents indicated they did not complete a residency. About 60% indicated they completed a PGY1 residency and 30% completed a PGY2 Infectious Diseases residency.

Table 16
Which of the following have you completed? (Select all that apply.)

	N	%
PGY1 Residency	163	60.1%
PGY2 Infectious Diseases Residency	79	29.2%
PGY2 Residency (Not in infectious diseases)	20	7.4%
Infectious Diseases Research Fellowship	17	6.3%
Fellowship (Not in infectious diseases)	3	1.1%
No Residency	67	24.7%
Other (Please specify.)	18	6.6%

*Multiple responses permitted – percentages may not total 100%

As seen in Table 17, most respondents (61%) held the BPS pharmacotherapy specialty certification and 18% of respondents held the BPS added qualification in infectious diseases.

Table 17
What BPS specialty certifications do you hold? (Select all that apply.)

	N	%
Ambulatory Care Pharmacy	2	.7%
Nuclear Pharmacy	0	.0%
Nutrition Support Pharmacy	1	.4%
Oncology	5	1.9%
Psychiatric Pharmacy	2	.7%
Pharmacotherapy	163	60.8%
Added Qualification in Cardiology	0	.0%
Added Qualification in Infectious Diseases	49	18.3%
None	95	35.4%

*Multiple responses permitted – percentages may not total 100%

Ratings for Domains

This section presents the results of the ratings made for percentage of work time spent performing tasks in each domain, and the importance of each domain.

Two sets of subgroup analyses were performed to explore how consistent the ratings were for respondents (1) spending differing percentages of time focused on infectious diseases pharmacy and (2) having different levels of experience in the specialty. Subgroup analyses for domain ratings appear in Appendix 8. Differences in mean percentage of time ratings of 5% or more are illustrated through the use of **bolding.**

Percentage of Infectious diseases Work Time per Domain

The mean percentages of time participants spent in each domain are presented in Table 18. Respondents spent the most time in *Patient Care and Therapeutics* (49%) and the least time in *Public Health and Advocacy* (6%). The standard deviations around each mean indicate that there was some individual variation in the time spent by respondents in each of the four domains.

Table 18
Considering the time you spend focused on infectious diseases pharmacy, what percentage of that work time do you spend performing the tasks related to each domain?

	N	Mean	SD
Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.	275	49%	(21.1)
Domain 2: Education, Research and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious disease pharmacy, and the education of current and future healthcare professionals.	275	20%	(13.7)
Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.	275	25%	(16.5)
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.	275	6%	(6.7)

Table 19 presents the percentage of respondents spending 0%, 1 -25%, 26-50%, 51-75% and more than 75% of their work time in each domain. From this presentation of the results, we can see that Domain 1 is the only domain wherein more than 4% of respondents reported spending over 50% of their work time.

Table 19
Percentage of work time per domain

	0%		1-25%		26-50%		51-75%		76-100%	
	N	%	N	%	N	%	N	%	N	%
Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.	3	1.1%	39	14.2%	125	45.5%	79	28.7%	29	10.5%
Domain 2: Education, Research and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious disease pharmacy, and the education of current and future healthcare professionals.	1	.4%	215	78.2%	49	17.8%	10	3.6%	0	.0%
Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.	7	2.5%	160	58.2%	96	34.9%	9	3.3%	3	1.1%
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.	63	22.9%	206	74.9%	6	2.2%	0	.0%	0	.0%

Domain Importance Ratings

Results related to the importance ratings for domains are shown in Table 20. The results are displayed in two ways. First, the percentage of respondents selecting *Not important, Minimally important, Moderately important,* or *Highly important* for each domain are displayed. Second, under the Total column, mean values were generated for by assigning numerical values to each for response option as follows: 1 = Not important, 2 = Minimally important, 3 = Moderately important, and 4 = Highly important.

Table 20
Overall, how important are the tasks in this domain to the effective practice of infectious diseases pharmacy?

	Not	Min	Mod	High	Total		
	%	%	%	%	N	M	SD
Domain 1: Patient Care and Therapeutics Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.	.4%	.0%	5.8%	93.8%	275	3.9	(.3)
Domain 2: Education, Research and Scholarship Tasks related to generation, interpretation, and dissemination of knowledge related to infectious disease pharmacy, and the education of current and future healthcare professionals.	.0%	4.7%	44.0%	51.3%	275	3.5	(.6)
Domain 3: Antimicrobial Stewardship and Practice Management Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.	.0%	2.9%	20.7%	76.4%	275	3.7	(.5)
Domain 4: Public Health and Advocacy Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.	2.9%	35.6%	42.5%	18.9%	275	2.8	(.8)

Overall, the mean domain importance ratings were high. A total of 94% of respondents selected highly important for Domain 1, and the mean rating for this domain was 3.9 on a 4-point scale. The second highest importance rating was 3.7 for Domain 3, with about 76% of respondents selecting highly important. The lowest rating was for Domain 4 (2.8 indicating about moderately important). There were no differences in subgroup ratings in the mean importance ratings for domains that were greater than half a scale point (0.5).

Ratings for Tasks

This section presents the results related to the frequency of performance and importance ratings made for the task statements.

Subgroup analyses were also performed at the task level to explore how consistent the ratings were for respondents spending differing percentages of time providing pharmacy services to infectious diseases patients and for respondents having different levels of experience in the specialty. Subgroup analyses for task ratings appear in Appendix 9. Differences of greater than 0.5 are highlighted through the use of **bolding.**

Task Frequency Ratings

The percentage of respondents selecting each response option with respect to frequency of task performance is shown in Table 21, along with the mean, standard deviation, and number of respondents. The means were calculated after assigning numerical values to each response option as follows: 1=Never, 2=Less than monthly, 3=About monthly, 4=About weekly, 5=About daily.

Of the 7 task statements in Domain 1, 5 received mean frequency ratings above 3.5, and 2 received a mean frequency between 3.0 and 3.5. For the 5 tasks included in Domain 2, 3 received a mean frequency rating above 3.5, 1 between 3.0 and 3.5 and 1 had mean ratings below 2.5. Of the 9 statements included in Domain 3, 1 received a mean frequency rating above 3.5, 2 received a mean frequency rating between 3.0 and 3.5, 4 received a mean frequency rating between 2.5 and 3.0, and 2 received a mean frequency rating below 2.5. Finally, of the 5 statements included in Domain 4, 1 received a mean frequency rating above 3.5, 1 received a mean frequency rating between 2.5 and 3.0, and 3 received a mean frequency rating below 2.5.

The tasks performed least frequently were:

2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process). (Mean rating = 2.3)

3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific). (Mean rating = 2.0)

3.5 Collaborate in the development of institutional infection prevention policies. (Mean rating = 2.2)

4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention. (Mean rating = 2.0)

4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education). (Mean rating = 2.1)

4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections). (Mean rating = 1.7)

Table 21
Task Frequency Ratings

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
Domain 1: Patient Care and Therapeutics								
1.1 Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.	.7%	4.0%	4.0%	10.9%	80.4%	275	4.7	.8
1.2 Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.	1.8%	6.6%	8.5%	34.6%	48.5%	272	4.2	1.0
1.3 Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.	.7%	2.6%	4.4%	13.5%	78.8%	274	4.7	.7
1.4 Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.	1.1%	4.0%	5.1%	16.8%	73.0%	274	4.6	.9
1.5 Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.	.7%	4.8%	8.4%	20.9%	65.2%	273	4.5	.9
1.6 Develop preventative or a postexposure therapy plan for patients with increased risk for infection.	9.2%	28.6%	23.4%	27.1%	11.7%	273	3.0	1.2

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
1.7 Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacother	10.9%	17.9%	16.8%	28.1%	26.3%	274	3.4	1.3
Domain 2: Education, Research and Scholarship								
2.1 Provide infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists.	1.5%	10.3%	16.5%	20.5%	51.3%	273	4.1	1.1
2.2 Provide education and guidance to professionals and/or trainees in other health professions concerning infectious diseases pharmacotherapy.	.7%	12.8%	24.9%	29.3%	32.2%	273	3.8	1.1
2.3 Critically evaluate infectious diseases literature in both the basic and clinical sciences with regard to study design, statistical analysis, study results, and applicability to patient care and policy development.	.7%	13.2%	27.5%	41.8%	16.8%	273	3.6	.9
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	18.0%	51.1%	16.5%	7.7%	6.6%	272	2.3	1.1
2.5 Participate in continuous professional development related to infectious diseases pharmacy practice.	.4%	24.5%	43.2%	21.2%	10.6%	273	3.2	.9
Domain 3: Antimicrobial Stewardship and Practice Management								
3.1 Monitor and evaluate institutional antimicrobial usage, susceptibility trends and/or infection rates.	7.4%	18.4%	36.4%	16.5%	21.3%	272	3.3	1.2
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	23.3%	64.4%	7.0%	3.0%	2.2%	270	2.0	.8

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
3.3 Develop/modify institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence.	7.0%	43.4%	37.5%	8.8%	3.3%	272	2.6	.9
3.4 Develop/modify and recommend institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use).	7.4%	35.8%	42.1%	10.0%	4.8%	271	2.7	.9
3.5 Collaborate in the development of institutional infection prevention policies.	18.5%	47.8%	26.3%	5.6%	1.9%	270	2.2	.9
3.6 Establish collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases)	7.1%	12.6%	23.0%	24.2%	33.1%	269	3.6	1.3
3.7 Evaluate and foster compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	9.6%	36.5%	31.0%	13.3%	9.6%	271	2.8	1.1
3.8 Lead quality improvement initiatives (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics) in the area of infectious diseases.	6.3%	29.6%	40.0%	13.7%	10.4%	270	2.9	1.0
3.9 Justify and document clinical and financial value of infectious diseases pharmacy services.	13.2%	29.8%	16.5%	9.6%	30.9%	272	3.2	1.5
Domain 4: Public Health and Advocacy								
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention.	35.3%	45.6%	7.4%	5.9%	5.9%	272	2.0	1.1
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	32.7%	42.6%	10.7%	6.3%	7.7%	272	2.1	1.2

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
4.3 Advocate for adult and child vaccination.	17.4%	43.7%	17.8%	9.3%	11.9%	270	2.5	1.2
4.4 Advocate for prudent antimicrobial use.	4.4%	12.9%	11.1%	16.2%	55.4%	271	4.1	1.3
4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections).	42.6%	46.0%	8.8%	1.5%	1.1%	272	1.7	.8

How frequently did you perform the task during the past 12 months? 1=Never, 2=Quarterly or less, 3=Monthly, 4=Weekly, 5=Daily

Task Importance Ratings

The percentage of respondents selecting each response option with respect to importance to effective infectious diseases pharmacy practice is shown in Table 22 along with the mean, standard deviation, and number of respondents. The means were calculated after assigning numerical values to each response option as follows: 1 = Not important, 2 = Minimally important, 3 = Moderately important, and 4 = Highly important.

Fifteen tasks received mean importance ratings 3.5 or above, 8 received mean importance ratings between 3.1 and 3.5, and 3 received mean importance ratings below 3.0. These latter three tasks were:

4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention. (Mean rating = 2.9)

4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education) . (Mean rating = 2.9)

4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections). (Mean rating = 2.7)

Table 22
Task Importance Ratings

	Not	Minimally	Moderately	Highly	Total		
	%	%	%	%	N	Mean	SD
Domain 1: Patient Care and Therapeutics							
1.1 Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.	.4%	.8%	7.9%	90.9%	265	3.9	.4
1.2 Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.	.4%	3.4%	31.8%	64.4%	264	3.6	.6
1.3 Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.	.4%	.4%	4.2%	95.1%	264	3.9	.3

	Not	Minimally	Moderately	Highly	Total		
	%	%	%	%	N	Mean	SD
1.4 Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.	.0%	.8%	6.8%	92.4%	264	3.9	.3
1.5 Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.	.0%	1.5%	15.6%	82.8%	262	3.8	.4
1.6 Develop preventative or a postexposure therapy plan for patients with increased risk for infection.	.4%	14.1%	49.6%	35.9%	262	3.2	.7
1.7 Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacother	.4%	8.4%	36.9%	54.4%	263	3.5	.7
Domain 2: Education, Research and Scholarship							
2.1 Provide infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists.	.0%	1.9%	28.9%	69.2%	266	3.7	.5
2.2 Provide education and guidance to professionals and/or trainees in other health professions concerning infectious diseases pharmacotherapy.	.0%	1.9%	38.7%	59.4%	266	3.6	.5
2.3 Critically evaluate infectious diseases literature in both the basic and clinical sciences with regard to study design, statistical analysis, study results, and applicability to patient care and policy development.	.4%	3.4%	32.3%	63.9%	266	3.6	.6
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	1.9%	23.4%	47.5%	27.2%	265	3.0	.8
2.5 Participate in continuous professional development related to infectious diseases pharmacy practice.	.0%	4.9%	36.2%	58.9%	265	3.5	.6
Domain 3: Antimicrobial Stewardship and Practice Management							
3.1 Monitor and evaluate institutional antimicrobial usage, susceptibility trends and/or infection rates.	.0%	2.3%	24.9%	72.8%	265	3.7	.5

	Not	Minimally	Moderately	Highly	Total		
	%	%	%	%	N	Mean	SD
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	1.1%	12.9%	33.1%	52.9%	263	3.4	.8
3.3 Develop/modify institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence.	.4%	4.2%	25.3%	70.2%	265	3.7	.6
3.4 Develop/modify and recommend institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use).	.8%	4.5%	25.4%	69.3%	264	3.6	.6
3.5 Collaborate in the development of institutional infection prevention policies.	2.3%	17.2%	46.6%	34.0%	262	3.1	.8
3.6 Establish collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases)	.8%	5.3%	19.7%	74.2%	264	3.7	.6
3.7 Evaluate and foster compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	2.3%	9.8%	49.8%	38.1%	265	3.2	.7
3.8 Lead quality improvement initiatives (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics) in the area of infectious diseases.	.8%	7.6%	38.6%	53.0%	264	3.4	.7
3.9 Justify and document clinical and financial value of infectious diseases pharmacy services.	1.9%	12.5%	31.4%	54.2%	264	3.4	.8
Domain 4: Public Health and Advocacy							
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention.	2.7%	28.8%	46.2%	22.3%	264	2.9	.8
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	2.7%	27.4%	44.1%	25.9%	263	2.9	.8
4.3 Advocate for adult and child vaccination.	2.7%	14.9%	39.7%	42.7%	262	3.2	.8
4.4 Advocate for prudent antimicrobial use.	.4%	4.2%	14.0%	81.4%	264	3.8	.5
4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections).	4.6%	35.7%	41.4%	18.3%	263	2.7	.8

How important is the task to effective infectious diseases practice?
1=Not important, 2=Minimally important, 3=Moderately important, or 4=Highly important

Missing Tasks

After rating all of the tasks, participants were asked to indicate any additional tasks they perform as an infectious diseases pharmacy specialist that may have been omitted from the survey. There were 46 write-in responses to this question. Prior to a task force meeting to review the survey results, these verbatim suggested additions were sent to members of the task force for review. Task force members were asked to determine whether any suggestions represented concepts truly missing from the task list. Write-in responses were deemed by the task force to be either more general or more specific instances of statements already contained in the delineation, content not suitable for testing, or outside the scope of specialty practice. Thus, the delineation of tasks was validated as comprehensive.

Task Validation Decisions

The task force met virtually to review the validation evidence collected in the role delineation survey. Task force members were asked to consider if the ratings for the tasks were sufficiently high to suggest that they be included in the final, validated description of infectious diseases specialty practice. During the meeting, the task force reviewed all results of the survey, and discussed in detail those task statements that did not receive clear validation evidence. These were defined as instances where 30% or more of the respondents reported never performing the task and/or the mean frequency rating fell below a 2.5. Based on these criteria, there was sufficient validation evidence to support inclusion of 20 of the 26 task statements in the description of infectious diseases specialty practice. The remaining 6 tasks were discussed in greater detail. These tasks were Task 2.4, Task 3.2, Task 3.5, Task 4.1, Task 4.2, and Task 4.5. The validation discussion regarding these 6 tasks was informed by the frequency ratings, the importance ratings, considerations regarding the nature of the tasks, and the subgroup ratings. Table 23 documents the validation decisions for these 6 tasks and the rationales for the decisions.

Table 23
Task Validation Decisions and Rationales

Task	Validation Decision (Retain or Remove)	Rationale for Validation Decision
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	**Retain**	Retained based on moderate mean importance rating of 3.0 and the nature of the task – by its nature, this task would typically be performed quarterly or less, and therefore have a lower mean frequency rating.
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	**Retain**	Retained based on moderate-to-high mean importance rating of 3.4 and the nature of the task – by its nature, this task would typically be performed quarterly or less, and therefore have a lower mean frequency rating.
3.5 Collaborate in the development of institutional infection prevention policies.	**Retain**	Retained based on moderate mean importance rating of 3.0 and the nature of the task – by its nature, this task would typically be performed quarterly or less, and therefore have a lower mean frequency rating.
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention	**Retain**	Task retained based on mean importance rating (about moderately) of 2.9.
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	**Retain**	Task retained based on mean importance rating (about moderately) of 2.9 and key content testing around HIV.
4.5 Promote the role of the infectious diseases pharmacy specialist to stakeholders (e.g., healthcare system administrators, legislators, patients/parents/ caregivers).	**Remove**	Key content covered in other tasks within the domain. Not enough validation evidence or strong rationale for retention.

Ratings for Knowledge

This section presents the results of the ratings for the knowledge statements. Participants rated the knowledge statements on frequency of use and importance of the knowledge to effective infectious diseases pharmacy practice.

Knowledge Frequency Ratings

The percentage of respondents selecting each response option with respect to frequency of use is shown in Table 24, along with the mean, standard deviation, and number of respondents.

Knowledge statement 1.1 is comprised of 15 sub-components. Therefore, participants provided validation ratings for 43 knowledge bases in Domain 1. Of these, 30 received mean frequency ratings 3.5 or above, 4 received mean frequency ratings between 3.0 and 3.5, and 9 received mean frequency ratings below 3.0. For the 9 knowledge statements included in Domain 2, 4 received mean frequency ratings 3.5 or above, 2 received mean frequency ratings between 3.0 and 3.5, and 2 had mean ratings below 3.0. Of the 14 knowledge statements included in Domain 3, 2 received mean frequency ratings above 3.5, 6 received mean frequency ratings between 3.0 and 3.5, and 6 received mean frequency ratings below 3.0. Finally, 3 knowledge statements included in Domain 4 received mean frequency ratings between 3.0 and 3.5 and the other 11 received mean frequency ratings below 3.0.

The knowledge bases used least frequently (mean frequency ratings below 2.5) were:

k1.1.9 Ophthalmologic infections (Mean rating = 2.3)

k1.6 Pharmacology of biological response modifiers (Mean rating = 2.4)

k1.26 Antimicrobial desensitization (Mean rating = 2.4)

k2.7 Regulatory and ethical issues related to conducting research (Mean rating = 2.4)

k4.2 Public health services related to infectious diseases (Mean rating = 2.4)

k4.3 Centers for Disease Control and Prevention (CDC) notifiable infectious diseases (Mean rating = 2.4)

k4.4 Strategies to tailor ID-related communications to the public (Mean rating = 2.0)

k4.10 Agents of bioterrorism (Mean rating = 1.8)

k4.11 Agents that have the potential to become epidemic or pandemic (Mean rating = 2.2)

k4.13 CDC emergency preparedness guidelines (Mean rating = 2.0)

k4.14 History of vaccine preventable diseases (Mean rating = 2.1)

Table 24
Knowledge Frequency Ratings

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
Domain 1: Patient Care and Therapeutics Knowledge of:								
k1.1 Pathophysiology and epidemiology of infections including:								
k1.1.1 Bone and joint infections	1.1%	10.2%	17.5%	40.5%	30.7%	274	3.9	1.0
k1.1.2 Cardiovascular infections	1.8%	19.3%	25.8%	35.3%	17.8%	275	3.5	1.1
k1.1.3 Central nervous system infections	1.5%	20.0%	32.4%	33.1%	13.1%	275	3.4	1.0
k1.1.4 Gastrointestinal infections	.7%	6.6%	17.5%	43.1%	32.1%	274	4.0	.9
k1.1.5 HIV infection and AIDS (including opportunistic infections)	7.3%	33.8%	22.2%	16.7%	20.0%	275	3.1	1.3
k1.1.6 Infections of reproductive organs	6.2%	39.6%	28.7%	21.1%	4.4%	275	2.8	1.0
k1.1.7 Intra abdominal infections	.7%	5.9%	15.4%	34.2%	43.8%	272	4.1	.9
k1.1.8 Lower respiratory tract infections	.7%	1.1%	9.5%	19.3%	69.5%	275	4.6	.8
k1.1.9 Ophthalmologic infections	11.7%	52.9%	28.8%	5.5%	1.1%	274	2.3	.8
k1.1.10 Sepsis	2.9%	4.4%	8.4%	26.3%	58.0%	274	4.3	1.0
k1.1.11 Sexually transmitted diseases	8.4%	41.2%	28.8%	13.9%	7.7%	274	2.7	1.1
k1.1.12Skin and soft tissue infections	.0%	1.8%	8.0%	25.9%	64.2%	274	4.5	.7
k1.1.13 Tuberculosis and other mycobacterial infections	7.3%	44.3%	31.9%	11.0%	5.5%	273	2.6	1.0
k1.1.14 Upper respiratory tract infections	1.5%	5.1%	12.8%	28.2%	52.4%	273	4.2	1.0
k1.1.15 Urinary tract infections	.4%	1.8%	6.9%	21.1%	69.8%	275	4.6	.7
k1.2 Pharmacotherapies related to specific infectious diseases	.0%	.7%	4.4%	10.4%	84.4%	270	4.8	.6

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
k1.3 Pharmacokinetics and pharmacodynamics of antimicrobials	.0%	2.6%	4.1%	18.5%	74.8%	270	4.7	.7
k1.4 Pharmacology of antimicrobials	.0%	4.1%	8.2%	21.9%	65.8%	269	4.5	.8
k1.5 Pharmacology of vaccines	4.5%	36.1%	34.9%	16.7%	7.8%	269	2.9	1.0
k1.6 Pharmacology of biological response modifiers	15.2%	44.4%	24.4%	12.6%	3.3%	270	2.4	1.0
k1.7 Mechanisms of pathogen resistance	.4%	13.0%	20.4%	35.6%	30.7%	270	3.8	1.0
k1.8 Antimicrobial drug interactions	.0%	1.9%	9.3%	30.0%	58.9%	270	4.5	.7
k1.9 Complications of antimicrobials	.0%	2.6%	8.9%	28.9%	59.6%	270	4.5	.8
k1.10 Complications of vaccines	10.4%	41.1%	31.9%	11.9%	4.8%	270	2.6	1.0
k1.11 Pharmacoeconomics	3.0%	17.8%	24.8%	27.4%	27.0%	270	3.6	1.2
k1.12 Spectrum of activity of antimicrobials	.0%	.7%	4.5%	13.8%	81.0%	269	4.8	.6
k1.13 Basic microbiology laboratory procedures	2.2%	10.7%	16.7%	23.7%	46.7%	270	4.0	1.1
k1.14 Clinical laboratory tests in ID (e.g., rapid diagnostic testing, RPR, antibody concentrations)	3.0%	11.2%	17.9%	29.5%	38.4%	268	3.9	1.1
k1.15 Diagnostic and therapeutic procedures in ID (e.g., lumbar puncture, paracentesis)	4.4%	13.8%	16.0%	34.2%	29.1%	266	3.7	1.2
k1.16 Factors that alter the risk of infection	.8%	3.0%	16.9%	30.1%	49.2%	266	4.2	.9
k1.17 Immunologic response to infection	1.1%	10.2%	27.1%	32.0%	29.7%	266	3.8	1.0
k1.18 Immunologic therapy (e.g., immunoglobulin, Mannose Binding Lectin)	11.7%	38.0%	32.0%	14.3%	4.1%	266	2.6	1.0
k1.19 Outpatient parenteral antimicrobial therapy	8.3%	21.6%	20.8%	29.9%	19.3%	264	3.3	1.2
k1.20 Therapeutic monitoring of antimicrobials	.0%	1.9%	8.6%	13.5%	75.9%	266	4.6	.7

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
k1.21 Factors that may impact response to therapy (e.g., dose optimization, penetration of antimicrobials, source control, immune status)	.0%	2.3%	7.2%	20.4%	70.2%	265	4.6	.7
k1.22 Antimicrobial de-escalation	1.5%	3.4%	8.3%	13.3%	73.5%	264	4.5	.9
k1.23 Measures to monitor response to antimicrobial therapy (e.g., resolution of signs and symptoms, laboratory data, readmission, development of drug resistance)	.0%	1.1%	6.4%	16.7%	75.8%	264	4.7	.6
k1.24 Patient and caregiver education and counseling techniques	11.7%	26.4%	18.9%	26.4%	16.6%	265	3.1	1.3
k1.25 Antimicrobial allergy and cross-reactivity	.4%	3.8%	15.5%	29.8%	50.6%	265	4.3	.9
k1.26 Antimicrobial desensitization	9.8%	50.6%	30.9%	5.7%	3.0%	265	2.4	.9
k1.27 Preventive therapies (e.g., infection prophylaxis, vaccines, behavior modification)	4.9%	22.3%	28.3%	24.9%	19.6%	265	3.3	1.2
k1.28 Factors to consider when differentiating infection from non-infection	.8%	7.5%	14.0%	21.9%	55.8%	265	4.2	1.0
k1.29 Considerations in special populations (e.g., geriatrics, pediatrics, obesity)	.0%	4.2%	10.9%	24.5%	60.4%	265	4.4	.8
Domain 2: Education, Scholarship and Research **Knowledge of:**								
k2.1 Principles and methods of educating, training and mentoring pharmacists, pharmacy students, residents and fellows	1.5%	10.1%	19.4%	26.1%	42.9%	268	4.0	1.1
k2.2 Principles and methods of educating and communicating with other healthcare professionals	.4%	5.2%	11.6%	26.9%	56.0%	268	4.3	.9

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
k2.3 Appropriate resources for infectious disease information	1.1%	.7%	9.0%	24.0%	65.2%	267	4.5	.8
k2.4 Research study design and methodology, including those specific to ID (e.g., Monte Carlo simulation, microbiologic surveillance, time-kill)	8.6%	22.6%	33.1%	20.3%	15.4%	266	3.1	1.2
k2.5 Statistical methods	8.2%	31.5%	29.2%	24.0%	7.1%	267	2.9	1.1
k2.6 Clinical application and limitations of published data and reports	2.6%	16.5%	26.2%	30.7%	24.0%	267	3.6	1.1
k2.7 Regulatory and ethical issues related to conducting research	17.7%	43.4%	24.2%	8.3%	6.4%	265	2.4	1.1
k2.8 Venues and processes for disseminating knowledge (e.g., audience-specific medical writing, publication, presentation)	10.5%	46.6%	27.8%	11.3%	3.8%	266	2.5	1.0
k2.9 Mechanisms for continuing professional development in ID pharmacy	3.4%	31.5%	37.8%	18.4%	9.0%	267	3.0	1.0
Domain 3: Practice Management and Antimicrobial Stewardship Knowledge of:								
k3.1 Antibiogram design and development	14.1%	51.1%	17.8%	7.8%	9.3%	270	2.5	1.1
k3.2 Antimicrobial stewardship strategies	3.7%	9.6%	16.7%	24.1%	45.9%	270	4.0	1.2
k3.3 Antimicrobial resistance trends	4.1%	20.9%	31.3%	21.6%	22.0%	268	3.4	1.2
k3.4 Metrics for antimicrobial use	7.4%	20.7%	38.5%	18.1%	15.2%	270	3.1	1.1
k3.5 Clinical practice guidelines for ID (e.g., IDSA, SHEA, CDC)	1.9%	7.8%	15.6%	29.3%	45.6%	270	4.1	1.0
k3.6 Methods for developing and evaluating clinical practice guidelines	7.4%	25.9%	30.4%	25.2%	11.1%	270	3.1	1.1
k3.7 Infection control and prevention strategies	5.9%	27.5%	37.2%	18.2%	11.2%	269	3.0	1.1

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
k3.8 Metrics for infection control	14.1%	35.3%	36.4%	9.7%	4.5%	269	2.6	1.0
k3.9 National accreditation and regulatory organizations and requirements (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	7.4%	34.9%	37.2%	13.4%	7.1%	269	2.8	1.0
k3.10 Quality improvement strategies (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics)	7.8%	31.0%	44.4%	13.4%	3.4%	268	2.7	.9
k3.11 Roles of infection control and prevention, microbiology and ID divisions/departments	4.1%	24.7%	38.2%	21.3%	11.6%	267	3.1	1.0
k3.12 Collaboration strategies and consensus building	5.6%	19.0%	36.6%	20.1%	18.7%	268	3.3	1.1
k3.13 Metrics for evaluating value of ID pharmacy services	9.7%	34.3%	32.8%	11.9%	11.2%	268	2.8	1.1
k3.14 Pharmacoeconomic assessment of antimicrobials	7.5%	29.6%	38.2%	13.1%	11.6%	267	2.9	1.1
Domain 4: Public Health and Patient Advocacy Knowledge of:								
k4.1 Public health information resources related to infectious diseases	11.1%	45.4%	24.0%	15.5%	4.1%	271	2.6	1.0
k4.2 Public health services related to infectious diseases	15.5%	46.1%	22.1%	12.5%	3.7%	271	2.4	1.0
k4.3 Centers for Disease Control and Prevention (CDC) notifiable infectious diseases	16.7%	40.9%	27.5%	10.4%	4.5%	269	2.4	1.0
k4.4 Strategies to tailor ID-related communications to the public	31.5%	46.7%	14.1%	5.9%	1.9%	270	2.0	.9

	Never	Less than monthly	About monthly	About weekly	About daily	Total		
	%	%	%	%	%	N	Mean	SD
k4.5 Populations at risk for infection	10.7%	28.5%	24.4%	19.6%	16.7%	270	3.0	1.3
k4.6 ACIP immunization recommendations and schedules	10.4%	36.8%	29.0%	16.7%	7.1%	269	2.7	1.1
k4.7 Strategies for advocating vaccination and prudent antimicrobial use	8.1%	29.6%	23.3%	20.7%	18.1%	270	3.1	1.2
k4.8 Professional organizations and their roles and resources related to patient advocacy (e.g., Immunization Action Coalition, IDSA, ASHP, APhA, SIDP)	6.0%	26.9%	37.7%	17.9%	11.6%	268	3.0	1.1
k4.9 Screening guidelines for infectious diseases (e.g. HIV, STDs, tuberculosis)	11.2%	32.5%	30.6%	14.9%	10.8%	268	2.8	1.2
k4.10 Agents of bioterrorism	35.6%	54.4%	7.8%	1.5%	.7%	270	1.8	.7
k4.11 Agents that have the potential to become epidemic or pandemic	18.6%	52.4%	21.2%	5.9%	1.9%	269	2.2	.9
k4.12 Emerging infectious diseases	9.7%	41.4%	34.7%	9.7%	4.5%	268	2.6	1.0
k4.13 CDC emergency preparedness guidelines	26.0%	53.9%	15.2%	3.0%	1.9%	269	2.0	.8
k4.14 History of vaccine preventable diseases	20.9%	56.0%	14.9%	5.2%	3.0%	268	2.1	.9

Knowledge Importance Ratings

The percentage of respondents selecting each response option with respect to knowledge importance is shown in Table 25 along with the mean, standard deviation, and number of respondents. The means were calculated after assigning numerical values to each response option as follows: 1 = Not important, 2 = Minimally important, 3 = Moderately important, and 4 = Highly important.

There were 10 knowledge statements that received a mean importance rating below 3.0 (moderately important). These were:

k1.1.9 Ophthalmologic infections (Mean rating = 2.9)

k1.6 Pharmacology of biological response modifiers (Mean rating = 2.8)

k1.18 Antimicrobial desensitization (Mean rating = 2.8)

k2.7 Regulatory and ethical issues related to conducting research (Mean rating = 2.7)

k2.8 Venues and processes for disseminating knowledge (e.g., audience-specific medical writing, publication, presentation) (Mean rating = 2.8)

k4.2 Public health services related to infectious diseases (Mean rating = 2.9)

k4.10 Agents of bioterrorism (Mean rating = 2.6)

k4.11 Agents that have the potential to become epidemic or pandemic (Mean rating = 2.9)

k4.13 CDC emergency preparedness guidelines (Mean rating = 2.7)

k4.14 History of vaccine preventable diseases (Mean rating = 2.7)

Table 25
Knowledge Importance Ratings

	Not	Minimally	Moderately	Highly	Total		
	%	%	%	%	N	Mean	SD
Domain 1: Patient Care and Therapeutics Knowledge of:							
k1.1 Pathophysiology and epidemiology of infections including:							
k1.1.1 Bone and joint infections	.4%	2.6%	18.8%	78.2%	266	3.7	.5
k1.1.2 Cardiovascular infections	.0%	3.0%	16.2%	80.8%	266	3.8	.5
k1.1.3 Central nervous system infections	.0%	3.4%	18.1%	78.5%	265	3.8	.5
k1.1.4 Gastrointestinal infections	.0%	1.9%	28.2%	69.9%	266	3.7	.5
k1.1.5 HIV infection and AIDS (including opportunistic infections)	1.1%	8.7%	27.3%	62.9%	264	3.5	.7
k1.1.6 Infections of reproductive organs	.4%	16.5%	35.0%	48.1%	266	3.3	.8
k1.1.7 Intra abdominal infections	.0%	1.9%	18.9%	79.2%	265	3.8	.5
k1.1.8 Lower respiratory tract infections	.0%	1.5%	9.5%	89.0%	264	3.9	.4
k1.1.9 Ophthalmologic infections	3.0%	33.6%	30.9%	32.5%	265	2.9	.9
k1.1.10 Sepsis	.8%	.8%	7.6%	90.9%	263	3.9	.4
k1.1.11 Sexually transmitted diseases	1.9%	12.9%	37.5%	47.7%	264	3.3	.8
k1.1.12Skin and soft tissue infections	.0%	1.5%	11.7%	86.8%	266	3.9	.4
k1.1.13 Tuberculosis and other mycobacterial infections	.8%	13.3%	31.4%	54.5%	264	3.4	.7
k1.1.14 Upper respiratory tract infections	.0%	1.9%	19.7%	78.4%	264	3.8	.5
k1.1.15 Urinary tract infections	.0%	1.9%	12.9%	85.2%	264	3.8	.4
k1.2 Pharmacotherapies related to specific infectious diseases	.0%	.8%	6.0%	93.2%	265	3.9	.3
k1.3 Pharmacokinetics and pharmacodynamics of antimicrobials	.0%	.4%	12.5%	87.2%	265	3.9	.4
k1.4 Pharmacology of antimicrobials	.0%	2.6%	15.4%	82.0%	266	3.8	.5
k1.5 Pharmacology of vaccines	.8%	19.6%	46.8%	32.8%	265	3.1	.7
k1.6 Pharmacology of biological response modifiers	3.0%	33.5%	45.9%	17.7%	266	2.8	.8
k1.7 Mechanisms of pathogen resistance	.0%	4.5%	27.1%	68.4%	266	3.6	.6
k1.8 Antimicrobial drug interactions	.0%	1.1%	14.3%	84.5%	265	3.8	.4
k1.9 Complications of antimicrobials	.0%	1.1%	13.2%	85.7%	266	3.8	.4
k1.10 Complications of vaccines	1.5%	22.9%	44.7%	30.8%	266	3.0	.8
k1.11 Pharmacoeconomics	1.9%	12.4%	38.0%	47.7%	266	3.3	.8
k1.12 Spectrum of activity of antimicrobials	.0%	.4%	7.6%	92.0%	262	3.9	.3

	Not	Minimally	Moderately	Highly	Total		
	%	%	%	%	N	Mean	SD
k1.13 Basic microbiology laboratory procedures	.4%	7.5%	28.6%	63.5%	266	3.6	.6
k1.14 Clinical laboratory tests in ID (e.g., rapid diagnostic testing, RPR, antibody concentrations)	.8%	8.6%	33.8%	56.8%	266	3.5	.7
k1.15 Diagnostic and therapeutic procedures in ID (e.g., lumbar puncture, paracentesis)	.8%	13.2%	36.5%	49.6%	266	3.3	.7
k1.16 Factors that alter the risk of infection	.0%	5.7%	26.6%	67.7%	263	3.6	.6
k1.17 Immunologic response to infection	.4%	12.3%	41.4%	46.0%	261	3.3	.7
k1.18 Immunologic therapy (e.g., immunoglobulin, Mannose Binding Lectin)	4.6%	34.7%	39.3%	21.4%	262	2.8	.8
k1.19 Outpatient parenteral antimicrobial therapy	2.3%	14.4%	36.5%	46.8%	263	3.3	.8
k1.20 Therapeutic monitoring of antimicrobials	.0%	1.5%	7.6%	90.8%	262	3.9	.4
k1.21 Factors that may impact response to therapy (e.g., dose optimization, penetration of antimicrobials, source control, immune status)	.0%	1.5%	9.9%	88.5%	262	3.9	.4
k1.22 Antimicrobial de-escalation	.4%	1.9%	10.7%	87.0%	262	3.8	.4
k1.23 Measures to monitor response to antimicrobial therapy (e.g., resolution of signs and symptoms, laboratory data, readmission, development of drug resistance)	.0%	.4%	11.5%	88.2%	262	3.9	.3
k1.24 Patient and caregiver education and counseling techniques	2.7%	20.1%	40.2%	37.1%	259	3.1	.8
k1.25 Antimicrobial allergy and cross-reactivity	.4%	3.1%	22.2%	74.3%	261	3.7	.5
k1.26 Antimicrobial desensitization	2.3%	21.8%	38.5%	37.4%	262	3.1	.8
k1.27 Preventive therapies (e.g., infection prophylaxis, vaccines, behavior modification)	.4%	16.2%	38.8%	44.6%	260	3.3	.7
k1.28 Factors to consider when differentiating infection from non-infection	.0%	6.1%	21.8%	72.0%	261	3.7	.6
k1.29 Considerations in special populations (e.g., geriatrics, pediatrics, obesity)	.0%	2.3%	24.8%	72.9%	262	3.7	.5
Domain 2: Education, Scholarship and Research **Knowledge of:**							
k2.1 Principles and methods of educating, training and mentoring pharmacists, pharmacy students, residents and fellows	.4%	6.5%	29.7%	63.5%	263	3.6	.6
k2.2 Principles and methods of educating and communicating with other healthcare professionals	.4%	2.7%	22.4%	74.5%	263	3.7	.5

	Not	Minimally	Moderately	Highly	Total		
	%	%	%	%	N	Mean	SD
k2.3 Appropriate resources for infectious disease information	.4%	3.4%	15.2%	81.0%	263	3.8	.5
k2.4 Research study design and methodology, including those specific to ID (e.g., Monte Carlo simulation, microbiologic surveillance, time-kill)	2.7%	18.0%	40.6%	38.7%	261	3.2	.8
k2.5 Statistical methods	3.8%	22.5%	43.9%	29.8%	262	3.0	.8
k2.6 Clinical application and limitations of published data and reports	1.5%	10.0%	37.2%	51.3%	261	3.4	.7
k2.7 Regulatory and ethical issues related to conducting research	6.9%	34.4%	36.3%	22.4%	259	2.7	.9
k2.8 Venues and processes for disseminating knowledge (e.g., audience-specific medical writing, publication, presentation)	6.5%	30.2%	40.1%	23.3%	262	2.8	.9
k2.9 Mechanisms for continuing professional development in ID pharmacy	2.3%	13.0%	38.5%	46.2%	262	3.3	.8
Domain 3: Practice Management and Antimicrobial Stewardship Knowledge of:							
k3.1 Antibiogram design and development	1.1%	9.7%	31.8%	57.3%	267	3.5	.7
k3.2 Antimicrobial stewardship strategies	.0%	3.8%	16.6%	79.6%	265	3.8	.5
k3.3 Antimicrobial resistance trends	.0%	3.0%	22.9%	74.1%	266	3.7	.5
k3.4 Metrics for antimicrobial use	1.1%	9.4%	30.1%	59.4%	266	3.5	.7
k3.5 Clinical practice guidelines for ID (e.g., IDSA, SHEA, CDC)	.0%	1.5%	17.7%	80.8%	265	3.8	.4
k3.6 Methods for developing and evaluating clinical practice guidelines	1.5%	9.4%	36.1%	53.0%	266	3.4	.7
k3.7 Infection control and prevention strategies	1.1%	14.2%	43.8%	40.8%	267	3.2	.7
k3.8 Metrics for infection control	3.1%	26.7%	42.0%	28.2%	262	3.0	.8
k3.9 National accreditation and regulatory organizations and requirements (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	.8%	20.2%	43.9%	35.1%	262	3.1	.8
k3.10 Quality improvement strategies (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics)	1.9%	18.3%	41.1%	38.8%	263	3.2	.8
k3.11 Roles of infection control and prevention, microbiology and ID divisions/departments	1.5%	16.7%	40.7%	41.1%	263	3.2	.8
k3.12 Collaboration strategies and consensus building	1.5%	14.4%	34.5%	49.6%	264	3.3	.8

	Not	Minimally	Moderately	Highly	Total		
	%	%	%	%	N	Mean	SD
k3.13 Metrics for evaluating value of ID pharmacy services	2.3%	11.4%	32.7%	53.6%	263	3.4	.8
k3.14 Pharmacoeconomic assessment of antimicrobials	1.1%	14.0%	34.8%	50.0%	264	3.3	.8
Domain 4: Public Health and Patient Advocacy Knowledge of:							
k4.1 Public health information resources related to infectious diseases	2.3%	24.2%	46.8%	26.8%	265	3.0	.8
k4.2 Public health services related to infectious diseases	1.9%	26.8%	49.1%	22.3%	265	2.9	.7
k4.3 Centers for Disease Control and Prevention (CDC) notifiable infectious diseases	2.3%	25.8%	45.8%	26.1%	264	3.0	.8
k4.4 Strategies to tailor ID-related communications to the public	5.7%	39.2%	37.0%	18.1%	265	2.7	.8
k4.5 Populations at risk for infection	2.3%	16.3%	41.1%	40.3%	263	3.2	.8
k4.6 ACIP immunization recommendations and schedules	2.3%	14.8%	43.2%	39.8%	264	3.2	.8
k4.7 Strategies for advocating vaccination and prudent antimicrobial use	1.1%	11.4%	36.0%	51.5%	264	3.4	.7
k4.8 Professional organizations and their roles and resources related to patient advocacy (e.g., Immunization Action Coalition, IDSA, ASHP, APhA, SIDP)	2.3%	22.0%	37.5%	38.3%	264	3.1	.8
k4.9 Screening guidelines for infectious diseases (e.g. HIV, STDs, tuberculosis)	2.3%	19.3%	39.8%	38.6%	264	3.1	.8
k4.10 Agents of bioterrorism	6.8%	43.4%	36.6%	13.2%	265	2.6	.8
k4.11 Agents that have the potential to become epidemic or pandemic	3.4%	22.6%	53.2%	20.8%	265	2.9	.8
k4.12 Emerging infectious diseases	1.9%	19.4%	46.8%	31.9%	263	3.1	.8
k4.13 CDC emergency preparedness guidelines	4.2%	36.5%	41.1%	18.3%	263	2.7	.8
k4.14 History of vaccine preventable diseases	5.3%	38.0%	39.5%	17.1%	263	2.7	.8

Missing Knowledge

After participants rated the knowledge statements, they were asked to indicate any additional knowledge they use as an infectious diseases pharmacy specialist that may have been omitted from the survey. There were only 10 write-in responses to this question. These verbatim suggested additions were reviewed by the task force, and the knowledge list was deemed to be comprehensive.

Knowledge Validation Decisions

Task force members were also asked to consider if the ratings for the knowledge statements were sufficiently high to suggest that they be included in the final, validated description of infectious diseases specialty practice. During the web-based meeting to review the survey results, the task force discussed those knowledge statements that did not receive clear validation evidence; that is, those instances where 30% or more of the respondents reported *never* using the knowledge and/or the mean frequency rating fell below a 2.5. There was sufficient validation evidence to support inclusion of 69 of the 80 knowledge statements (including sub-components of k1.1) in the description of infectious diseases specialty practice. The remaining 11 knowledge statements were discussed in greater detail. These knowledge statements were k1.1.9, k1.6, k2.4, k2.7, k4.2, k4.3, k4.4, k4.10, k4.11, k4.13 and k4.14. The validation discussion was informed by the frequency ratings, the importance ratings, considerations regarding the nature of the knowledge, and the relationship between the knowledge and task statements. Table 26 captures the validation decisions and rationales for each of these 11 knowledge statements. For the final version of validated description of infectious diseases pharmacy practice, see Appendix 10.

Table 26
Knowledge Validation Decisions and Rationales

Knowledge Statement	Validation Decision (Retain or Remove)	Rationale for Validation Decision, if Retained
k1.1.9 Ophthalmologic infections	**Retain**	Retained based on 88% of respondents reporting that they used the knowledge at some frequency, and the mean importance rating of about moderately (2.9)
k1.6 Pharmacology of biological response modifiers (e.g., TNF inhibitors, colony stimulating factors)	**Retain**	Respondents may have misunderstood the knowledge statement, resulting in the low rating. Retained with slight modification. Example list (shown in red) was added to clarify meaning of the statement.
k1.26 Antimicrobial desensitization	**Retain**	Retained based on 90% of respondents reporting that they used the knowledge at some frequency, and the mean importance rating of about moderately (3.1)
k2.7 Regulatory and ethical issues related to conducting research	**Retain**	Task 2.4 for which this knowledge is needed was retained; therefore knowledge statement must also be retained.
k4.2 Public health services related to infectious diseases	**Retain**	Task 4.2 for which this knowledge is needed was retained; therefore knowledge statement must also be retained.
k4.3 Centers for Disease Control and Prevention (CDC) notifiable infectious diseases	**Retain**	Retained based on mean importance rating of about moderately (3.0) and obligation under law to know these. May not use the knowledge very often, but it is necessary to practice.
k4.4 Strategies to tailor ID-related communications to the public	**Remove**	Not essential to practice
k4.10 Agents of bioterrorism	**Remove**	May be too forward thinking and not reflective of current practice
k4.11 Agents that have the potential to become epidemic or pandemic	**Retain**	Retained based on 80% of respondents reporting that they used the knowledge at some frequency, and the mean importance rating of about moderately (2.9)
k4.13 CDC emergency preparedness guidelines	**Remove**	Task 4.5 for which this knowledge is needed was removed.
k4.14 History of vaccine preventable diseases	**Retain**	Retained based on 80% of respondents reporting that they used the knowledge at some frequency. May not use the knowledge very often, but it is necessary to properly perform the validated tasks.

Development of Examination Specifications

Development of Domain Weights

ProExam calculated hypothetical specifications for a potential new certification examination in infectious diseases pharmacy.

While there are many variations in methodology, there are two main methods of developing examination specifications from validation survey ratings. The first is the "top-down" approach. In this approach, weights representing percentages of an examination devoted to each domain are calculated using respondents' domain-level *Percentage of Work Time* and *Importance* ratings. The second approach is the "bottom-up" approach. This approach involves calculating weights using the respondents' task *Frequency* and *Importance* ratings, and summing those weights within each domain. In the "top-down" approach, the weights are based on the ratings for domains. In the "bottom-up" approach, the weights are based on the ratings for tasks.

ProExam used the "top-down" method to develop the weights for the domains. This approach is preferred over the "bottom-up" approach when domains contain different numbers of tasks (Spray & Huang, 2000), as is the case in the current delineation.

ProExam calculated the domain weights as follows:

First, domain sums (D) were derived using the formula:

$$D_i = \sum_{k=1}^{n} (P_k * I_k)$$

where

i = a single domain
k = a single respondent
n = the number of respondents
P = a respondent's *Percentage of time* rating for a domain
I = a respondent's *Importance* rating for a domain

Domain weights (DWs) were calculated by dividing each domain sum by the sum of all domain sums (∑D):

$$DW_i = D_i / \sum_{i=1}^{4} D$$

Hypothetical examination specifications are presented for the total sample, and for those respondents spending less (< 50%) or more (≥ 50%) time focused on infectious diseases pharmacy (Table 27).

Table 27
Hypothetical Examination Specifications

	Total Sample	< 50% specialty work time	≥ 50% specialty work time
Domain 1: Patient Care and Therapeutics	51%	52%	50%
Domain 2: Education, Research and Scholarship	19%	19%	19%
Domain 3: Antimicrobial Stewardship and Practice Management	25%	24%	26%
Domain 4: Public Health and Advocacy	5%	5%	5%

Recommended Examination Specifications

After examining the hypothetical, empirically-derived examination specifications, the task force deemed the percentages derived from the total survey respondent group to be the best representation of specialty practice. Thus, the recommended examination specifications for a potential new specialty certification found in Table 28 reflect the empirically derived examination specifications for the total sample.

Table 28
Final Recommendations for Examination Specifications

	% of Exam
Domain 1: Patient Care and Therapeutics	51%
Domain 2: Education, Research and Scholarship	19%
Domain 3: Antimicrobial Stewardship and Practice Management	25%
Domain 4: Public Health and Advocacy	5%
Total	100%

Summary and Recommendations

The conduct of the role delineation study of infectious diseases pharmacy specialists yielded a structured description of specialty practice in terms of major domains and tasks, as well as the specialized knowledge base that supports task performance.

The results of this study provide the validity foundation for future credentialing initiatives. Should BPS decide to develop a new specialty certification in infectious diseases pharmacy, ProExam recommends that:

- examination items be developed to assess the specialty knowledge and tasks contained in Appendix 10,
- items be classified in terms of domain, task, and specialty knowledge base assessed by the item, and
- examinations be constructed to match the percentage weight examination specifications recommended by the task force.

By following this guidance, BPS will create a chain of validity evidence that that ties examination content to the role delineation study. By so doing, BPS will meet best practice recommendations and accreditation requirements for credentialing programs.

References

ISO/IEC 17024 International Organization for Standards (IOS) and International Electrotechnical Commission (IEC) (2003). *Conformity assessment - General requirements for bodies operating certification of persons*. Geneva: ISO.

National Organization for Competency Assurance (2002). National Commission for Certifying Agencies Standards for the Accreditation of Certification Programs. Washington, DC: NOCA.

Spray, J.A. & Huang, C. (2000). Obtaining test blueprint weights from job analysis surveys. *Journal of Educational Measurement*, *37*, 187-201.

Appendix 1
SME Nomination Form

Nomination Form for Board of Pharmacy Specialties Infectious Diseases Job Analysis

Exit >>

Self-nominations are welcome.

All nominations must be received by May 4, 2012.

***1. Name of Nominator**

***2. Nominator's e-mail**

***3. Name of Nominee**

***4. Nominee's Job Title**

***5. Nominee's Employer**

***6. Employer's Address**

***7. Employer's City, State, Zip**

***8. Nominee's Work Phone**

***9. Nominee's e-mail address**

***10. Select the box next to each activity in which the nominee is willing to participate. In addition to supplying the information below, please send a copy of the nominee's resume or CV to info@bpsweb.org, and include the phrase *Infectious Diseases Pharmacy* in the subject line.**

(Please note that nomination does not guarantee participation. Participants in each activity will be selected to achieve the best balance of professional background and experience.)

☐ **Task Force Member:** (July 2012 to March 2013)
Serve on committee that creates domains, tasks, and knowledge statements comprising the infectious diseases pharmacy delineation of practice. **Attend a face-to-face meeting in Washington, DC on July 17 - 18, 2012**. Participate in a pre-meeting data collection activity and a post-meeting homework assignment. Participate in virtual meetings from August 2012 to March 2013 to refine and finalize the delineation of infectious diseases specialty practice.

☐ **Independent Review:** (August/September 2012)
Participate in a 1-hour email review of the domains, tasks, and knowledge statements comprising the infectious diseases pharmacy delineation of practice.

☐ **Survey Pilot Test:** (November 2012)
Participate in a 1-hour critical review of an e-survey of infectious diseases pharmacy practice.

***11. In what setting does the MAJORITY of the nominee's practice take place?**

- ○ Academic Institution
- ○ Ambulatory Care
- ○ Cancer Center
- ○ Chain Community Pharmacy
- ○ Community Hospital, For Profit
- ○ Community Hospital, Not-For-Profit
- ○ Drug Information Center
- ○ Federal Hospital/Institution
- ○ Home Health Care
- ○ Independent Community Pharmacy
- ○ Long-Term Care
- ○ Managed Health Care
- ○ Pharmaceutical Industry
- ○ Physician's Office
- ○ University Affiliated Hospital
- ○ Other (Please specify.)

***12. On average, what percentage of time does the nominee spend in providing infectious diseases pharmacy services to patients?**

***13. What was the nominee's ENTRY LEVEL pharmacy-related degree?**

- ○ Bachelor's degree
- ○ Pharm.D.
- ○ Other
- ○ Other (Please specify.)

***14. What is the HIGHEST pharmacy-related degree the nominee has earned?**

- ○ Bachelor's degree
- ○ Master's degree
- ○ Pharm.D.
- ○ Ph.D.
- ○ Other (Please specify.)

***15. How many years has the nominee worked as a licensed pharmacist?**

***16. How many years has the nominee worked in infectious diseases pharmacy?**

***17. During the past 12 months, with which patient population did the nominee spend the MOST amount of time?**

- ○ Pediatric
- ○ Adolescent (13- 20)
- ○ Adult (21- 65)
- ○ Adult (65+)
- ○ Both adult age groups (21-65+)
- ○ All of the above

***18. What BPS specialty certifications, including added qualifications, does the nominee hold? (Select all that apply)**

- ☐ Ambulatory Care Pharmacy
- ☐ Nuclear Pharmacy
- ☐ Nutrition Support Pharmacy
- ☐ Oncology
- ☐ Psychiatric Pharmacy
- ☐ Pharmacotherapy
- ☐ Pharmacotherapy with added qualifications in cardiology
- ☐ Pharmacotherapy with added qualifications in infectious diseases
- ☐ None

Next >>

Appendix 2
Pre-meeting Data Collection Activity Screen Captures

Exit this survey

bps Board of Pharmacy Specialties

Infectious Diseases Pharmacy Pre-meeting Data Collection

To make our work more efficient at our in-person meeting, we are asking you each to contribute your intial thoughts regarding the format and content of the Infectious Diseases Pharmacy role delineation document. Please provide your answers to these questions no later than **July 1, 2012**, so that we may review and compile the results into a summary report in advance of our July 17-18 meeting.

Please use the Resource Manual provided on pages 3 - 8 of the Task Force pre-meeting memo to help you effectively respond to the questions below.

Name:

Domains are the major areas that make up practice in a profession. Domains are mutually exclusive and encompass all work activities performed across all work settings in which practitioners may be located.

What major categories of practice might serve as a possible domain structure describing the roles of the infectious diseases pharmacist? See page 5 of the pre-meeting mailing for examples of domain structures for other BPS specialty certification areas.

Tasks are discrete work elements within each domain, and represent actions taken or activities performed in the domain of practice. Tasks describe distinct, observable, and specific practice-related activities.

What specific tasks are performed by a pharmacist specializing in infectious diseases pharmacy that are NOT performed by a non-specialist? For more information on delineating task statements, see pages 6 - 7 of the pre-meeting mailing.

Knowledge is factual or procedural information which, when applied, makes successful performance of a task possible (i.e., what a practitioner needs to know).

What specialty-specific, beyond licensure knowledge must a pharmacist specializing in infectious diseases pharmacy have in order to be effective? Be as specific as possible. See pages 7 - 8 of the pre-meeting mailing for additional information on delineating knowledge areas.

Please provide any additional information here that you feel would be important for BPS to consider regarding the potential new specialty of infectious diseases pharmacy.

Submit your responses

Appendix 3
Infectious diseases Pharmacy Task Force
Meeting #1 Attendees

BOARD OF PHARMACY SPECIALTIES

Infectious Diseases Pharmacy Role Delineation Study
Task Force Meeting 1

July 17 – 18, 2012
Washington, DC

ATTENDEES

Task Force Members

David Bearden
Russell Benefield
Rachel Chambers
John Cleary
Jarrod Kile
Kerry LaPlante
Jennifer Le
Craig Martin
Kari Mergenhagen
Marisel Segarra-Newnham
Douglas Slain

Board of Pharmacy Specialties

William Ellis, Executive Director
Brian Lawson, Director of Professional Affairs
Jacquelyn Kelly Marshall, Associate Director for Certification

Professional Examination Service

Patricia Muenzen, Director of Research Programs
Jacqueline Siano, Research Director

Appendix 4
Instructions for Independent Review

Infectious Diseases Pharmacy

Thank you again for taking the time to participate in this important independent review of the description of the specialty practice of Infectious Diseases Pharmacy. This review is an important step in the role delineation study (RDS) process. The purpose of an RDS is to analyze the knowledge and unique tasks that comprise a proposed specialty. The results of this role delineation study may be incorporated into the official petition to BPS to recognize Infectious Diseases Pharmacy as a specialty.

RDS Task Force meetings have been conducted to develop an initial description of the proposed pharmacy specialty area. The description consists of domains of practice and specific tasks performed by Infectious Diseases pharmacists, as well as the specialized knowledge base required to perform the tasks. We are now circulating the work product to subject matter experts (SMEs), like yourself, for further review.

A draft role delineation document is attached for your review. Please review this document for completeness and clarity, and make your suggestions (additions, deletions, new wording, etc.) directly in the document. The tracking feature has been enabled.

The tasks and knowledge in the role delineation are organized into four domains: Patient Care and Therapeutics, Education, Research and Scholarship, Antimicrobial Stewardship and Practice Management, Public Health and Advocacy. Please think about the following when you review the outline:

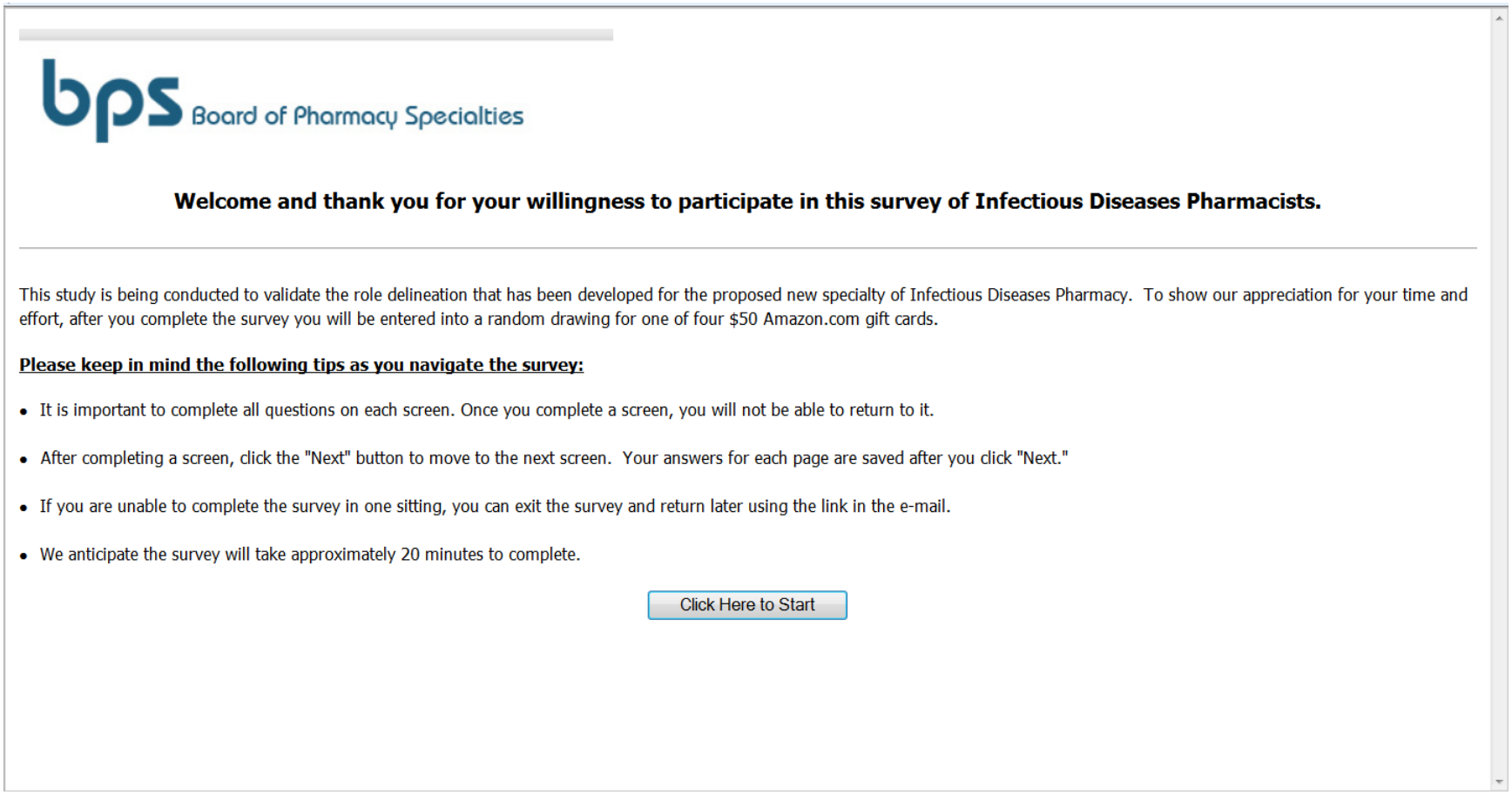
- Have all required tasks and knowledge bases *specific to specialty practice* been included?
- Are there redundancies?
- Is each statement delineated as accurately and concisely as possible? Have examples been provided if necessary?

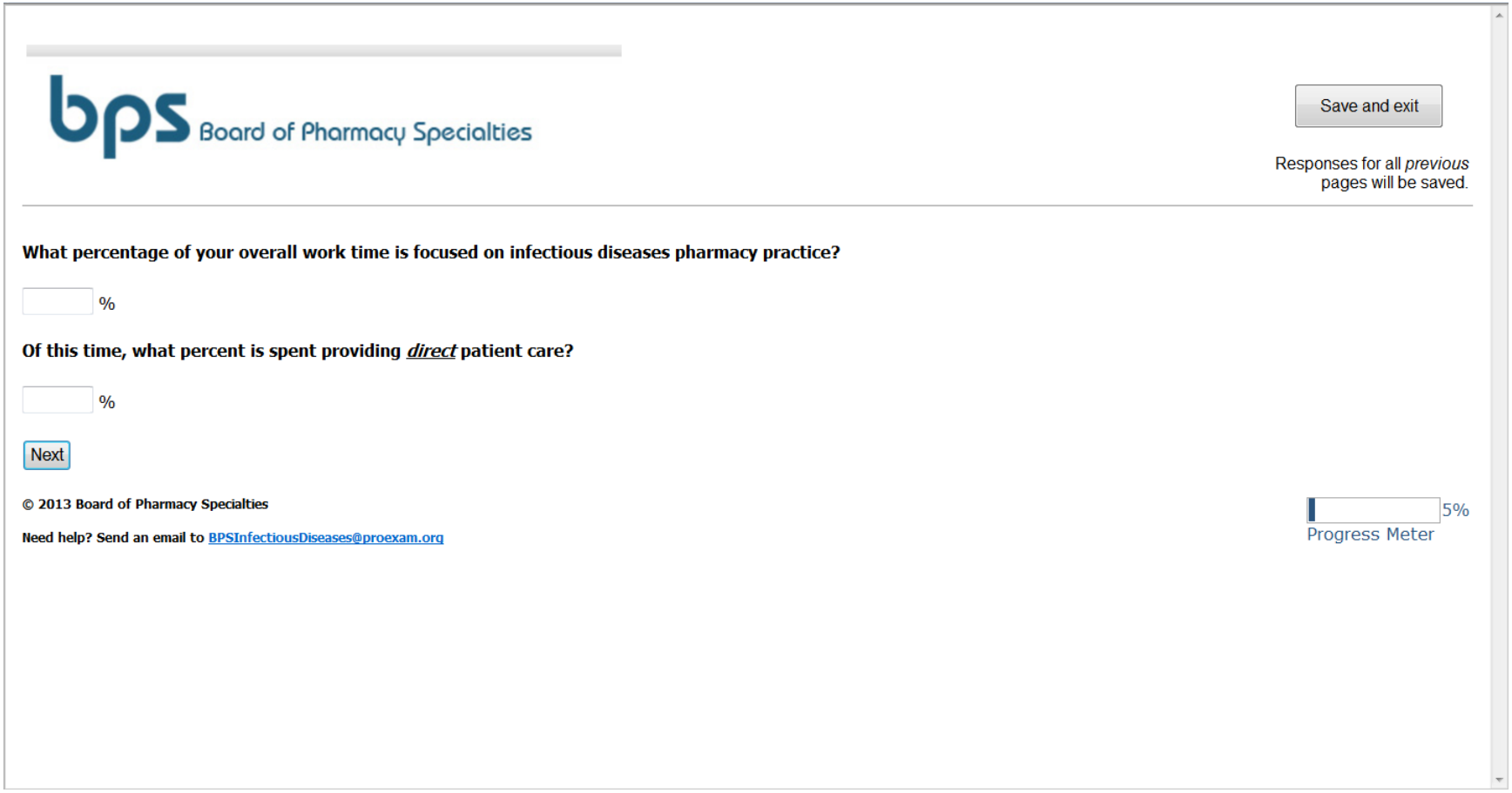
Once we have collected your comments, the RDS Task Force will meet via a series of virtual meetings to finalize the delineation based on your feedback. Subsequently, a survey will be developed and sent to a large sample of Infectious Diseases pharmacists who will be asked to rate the tasks and the knowledge for validation purposes.

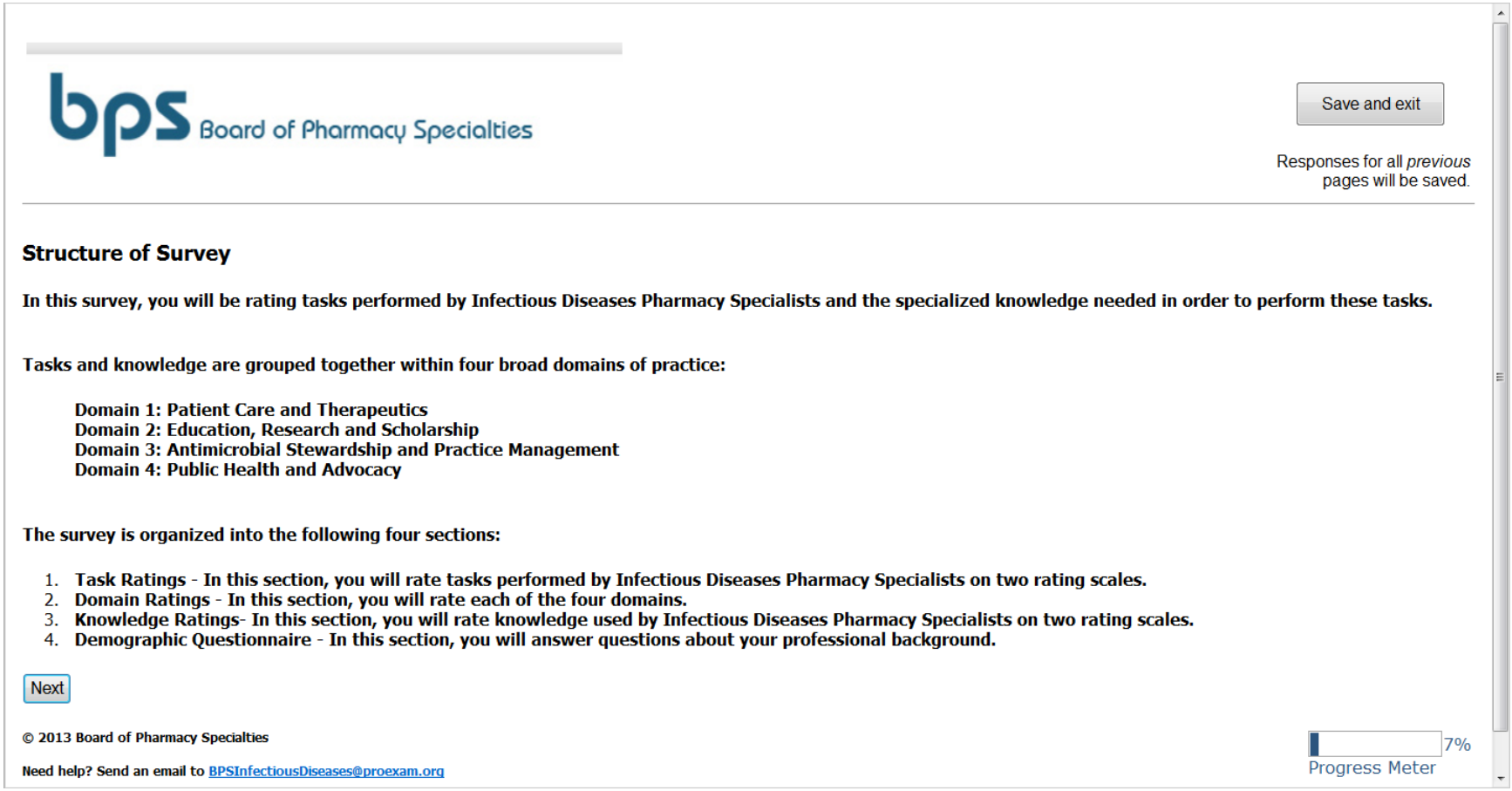
Please e-mail your edited copies (with track changes shown) to jsiano@proexam.org by **Monday October 15, 2012.**

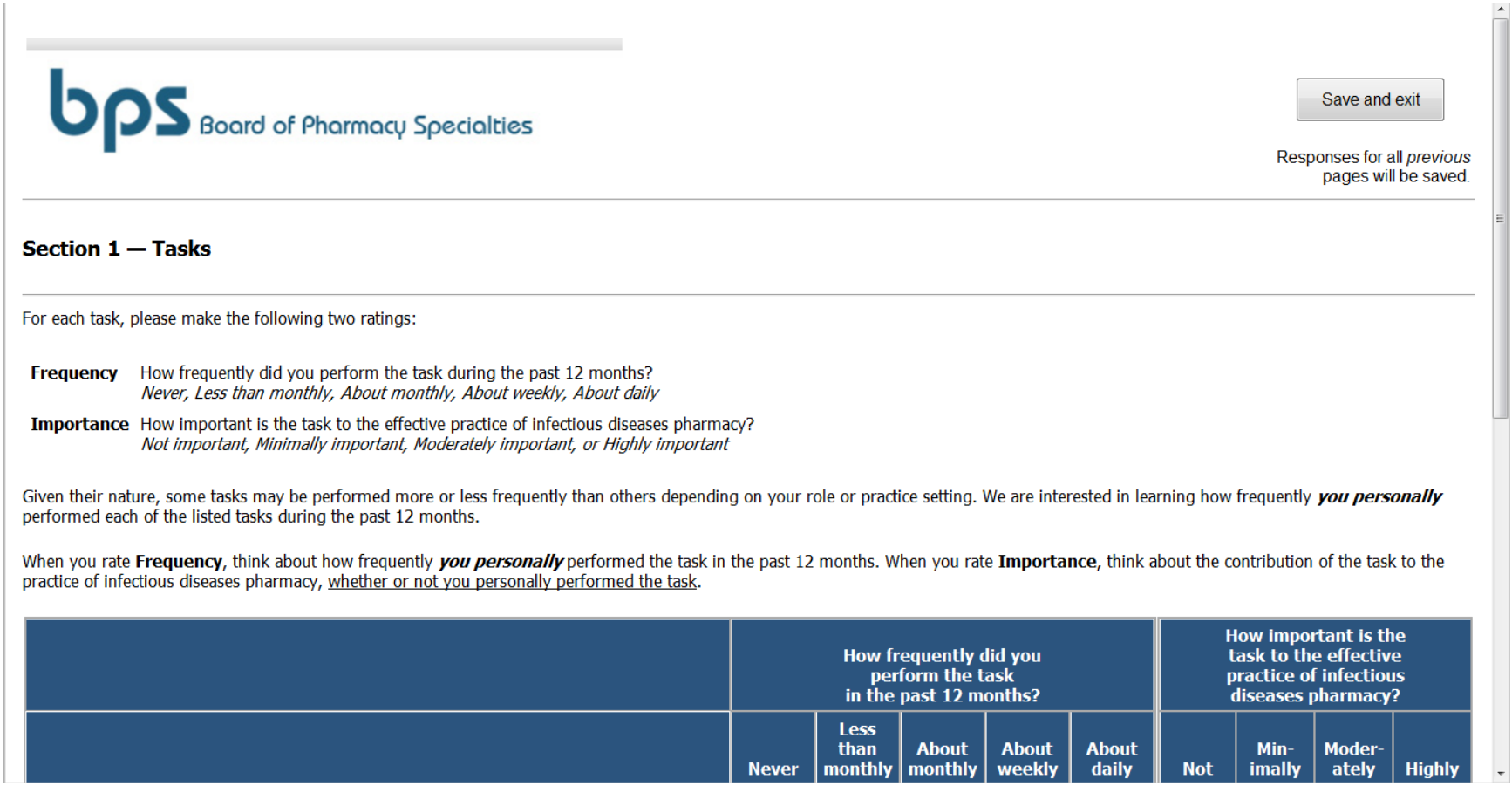
Thank you very much.

Appendix 5
Survey Screen Captures


bps Board of Pharmacy Specialties
Welcome and thank you for your willingness to participate in this survey of Infectious Diseases Pharmacists.
This study is being conducted to validate the role delineation that has been developed for the proposed new specialty of Infectious Diseases Pharmacy. To show our appreciation for your time and effort, after you complete the survey you will be entered into a random drawing for one of four $50 Amazon.com gift cards.
Please keep in mind the following tips as you navigate the survey:
It is important to complete all questions on each screen. Once you complete a screen, you will not be able to return to it.
After completing a screen, click the "Next" button to move to the next screen. Your answers for each page are saved after you click "Next."
If you are unable to complete the survey in one sitting, you can exit the survey and return later using the link in the e-mail.
We anticipate the survey will take approximately 20 minutes to complete.
Click Here to Start


bps Board of Pharmacy Specialties
Save and exit
Responses for all previous pages will be saved.
What percentage of your overall work time is focused on infectious diseases pharmacy practice?
%
Of this time, what percent is spent providing direct patient care?
%
Next
© 2013 Board of Pharmacy Specialties
Need help? Send an email to BPSInfectiousDiseases@proexam.org
5%
Progress Meter

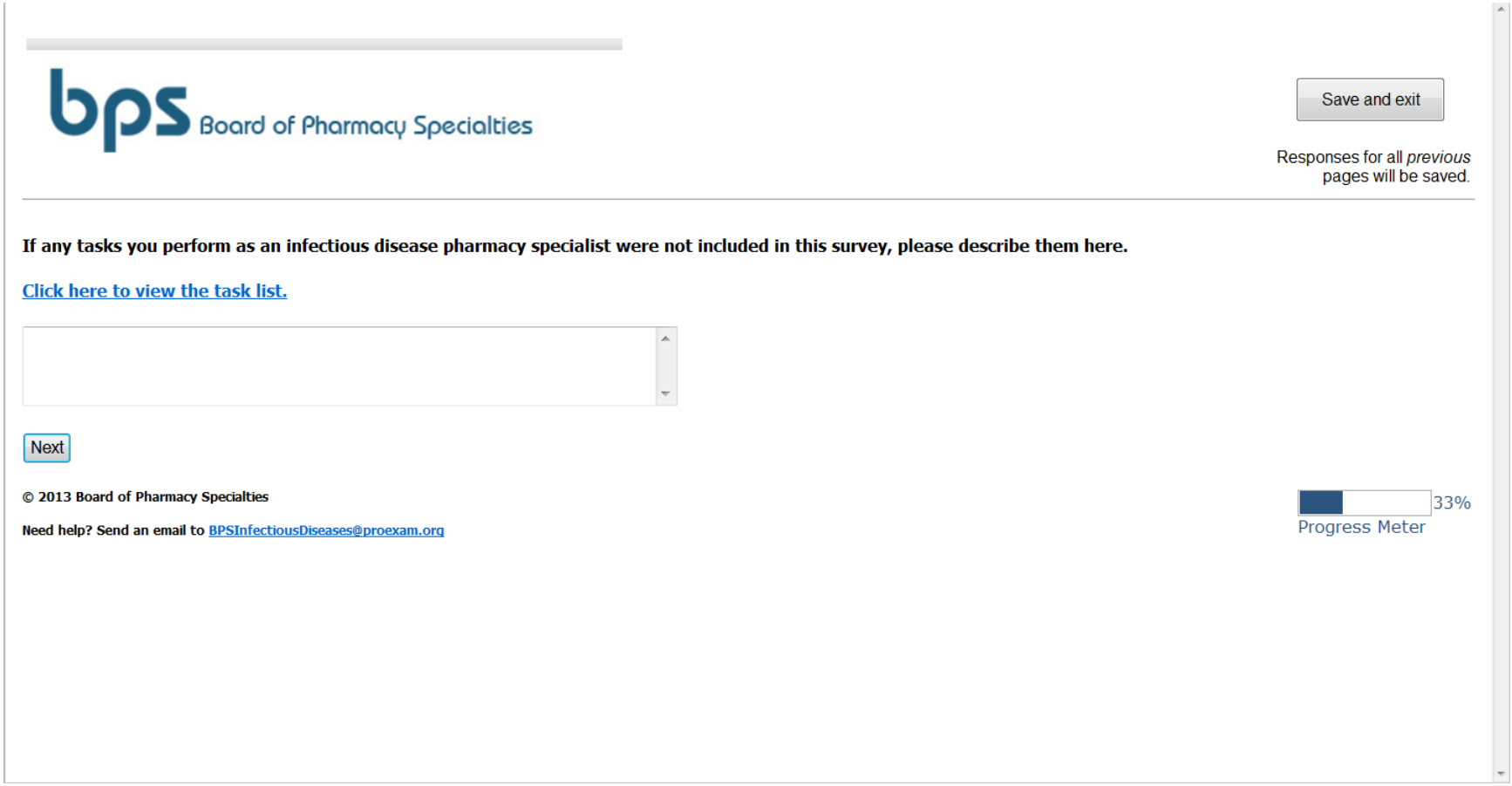

bps Board of Pharmacy Specialties
Save and exit
Responses for all previous pages will be saved.
Structure of Survey
In this survey, you will be rating tasks performed by Infectious Diseases Pharmacy Specialists and the specialized knowledge needed in order to perform these tasks.
Tasks and knowledge are grouped together within four broad domains of practice:
Domain 1: Patient Care and Therapeutics
Domain 2: Education, Research and Scholarship
Domain 3: Antimicrobial Stewardship and Practice Management
Domain 4: Public Health and Advocacy
The survey is organized into the following four sections:
1. Task Ratings - In this section, you will rate tasks performed by Infectious Diseases Pharmacy Specialists on two rating scales.
2. Domain Ratings - In this section, you will rate each of the four domains.
3. Knowledge Ratings- In this section, you will rate knowledge used by Infectious Diseases Pharmacy Specialists on two rating scales.
4. Demographic Questionnaire - In this section, you will answer questions about your professional background.
Next
© 2013 Board of Pharmacy Specialties
Need help? Send an email to BPSInfectiousDiseases@proexam.org
7%
Progress Meter

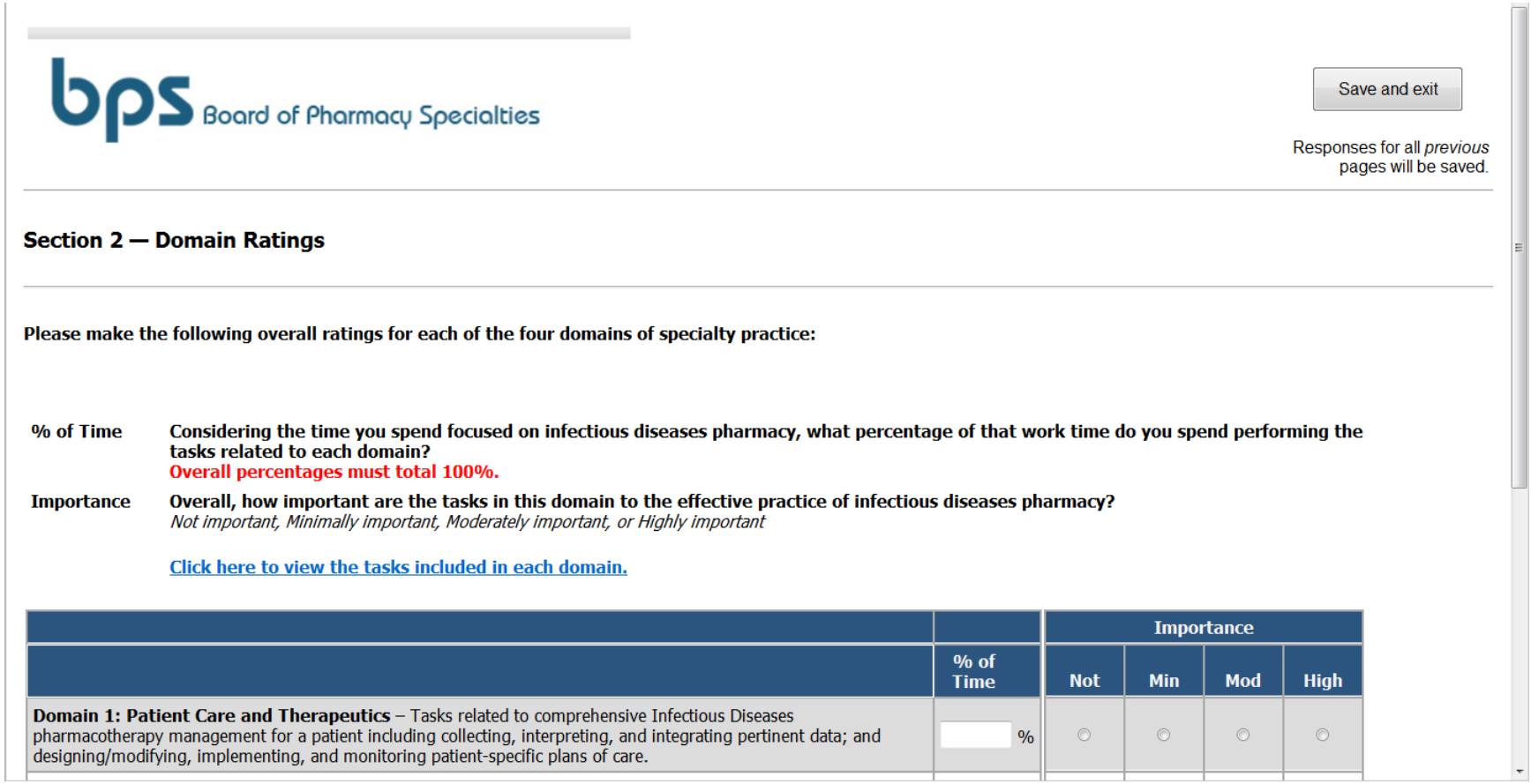

bps Board of Pharmacy Specialties
Save and exit
Responses for all previous pages will be saved.
Section 1 — Tasks
For each task, please make the following two ratings:
Frequency How frequently did you perform the task during the past 12 months?
Never, Less than monthly, About monthly, About weekly, About daily
Importance How important is the task to the effective practice of infectious diseases pharmacy?
Not important, Minimally important, Moderately important, or Highly important
Given their nature, some tasks may be performed more or less frequently than others depending on your role or practice setting. We are interested in learning how frequently you personally performed each of the listed tasks during the past 12 months.
When you rate Frequency, think about how frequently you personally performed the task in the past 12 months. When you rate Importance, think about the contribution of the task to the practice of infectious diseases pharmacy, whether or not you personally performed the task.
How frequently did you perform the task in the past 12 months?
How important is the task to the effective practice of infectious diseases pharmacy?
Never
Less than monthly
About monthly
About weekly
About daily
Not
Min-imally
Moder-ately
Highly

When you rate **Frequency**, think about how frequently ***you personally*** performed the task in the past 12 months. When you rate **Importance**, think about the contribution of the task to the practice of infectious diseases pharmacy, whether or not you personally performed the task.

	How frequently did you perform the task in the past 12 months?					How important is the task to the effective practice of infectious diseases pharmacy?			
	Never	Less than monthly	About monthly	About weekly	About daily	Not	Min-imally	Moder-ately	Highly
Domain 1: Patient Care and Therapeutics									
Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.	○	○	○	○	○	○	○	○	○
Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.	○	○	○	○	○	○	○	○	○
Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.	○	○	○	○	○	○	○	○	○
Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.	○	○	○	○	○	○	○	○	○
Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.	○	○	○	○	○	○	○	○	○
Develop preventative or a postexposure therapy plan for patients with increased risk for infection.	○	○	○	○	○	○	○	○	○
Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacotherapeutic plan.	○	○	○	○	○	○	○	○	○

Next


bps Board of Pharmacy Specialties
Save and exit
Responses for all previous pages will be saved.
If any tasks you perform as an infectious disease pharmacy specialist were not included in this survey, please describe them here.
Click here to view the task list.
Next
© 2013 Board of Pharmacy Specialties
Need help? Send an email to BPSInfectiousDiseases@proexam.org
33%
Progress Meter


bps Board of Pharmacy Specialties
Save and exit
Responses for all previous pages will be saved.
Section 2 — Domain Ratings
Please make the following overall ratings for each of the four domains of specialty practice:
% of Time
Considering the time you spend focused on infectious diseases pharmacy, what percentage of that work time do you spend performing the tasks related to each domain?
Overall percentages must total 100%.
Importance
Overall, how important are the tasks in this domain to the effective practice of infectious diseases pharmacy?
Not important, Minimally important, Moderately important, or Highly important
Click here to view the tasks included in each domain.
Importance
% of Time
Not
Min
Mod
High
Domain 1: Patient Care and Therapeutics – Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.
%

% of Time **Considering the time you spend focused on infectious diseases pharmacy, what percentage of that work time do you spend performing the tasks related to each domain?**
Overall percentages must total 100%.

Importance **Overall, how important are the tasks in this domain to the effective practice of infectious diseases pharmacy?**
Not important, Minimally important, Moderately important, or Highly important

Click here to view the tasks included in each domain.

		Importance			
	% of Time	Not	Min	Mod	High
Domain 1: Patient Care and Therapeutics – Tasks related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.	%				
Domain 2: Education, Research and Scholarship – Tasks related to generation, interpretation, and dissemination of knowledge related to infectious disease pharmacy, and the education of current and future healthcare professionals.	%				
Domain 3: Antimicrobial Stewardship and Practice Management – Tasks related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.	%				
Domain 4: Public Health and Advocacy – Tasks related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.	%				
Sum	0 %				

Next

39%
Progress Meter

Section 3 — Knowledge Ratings

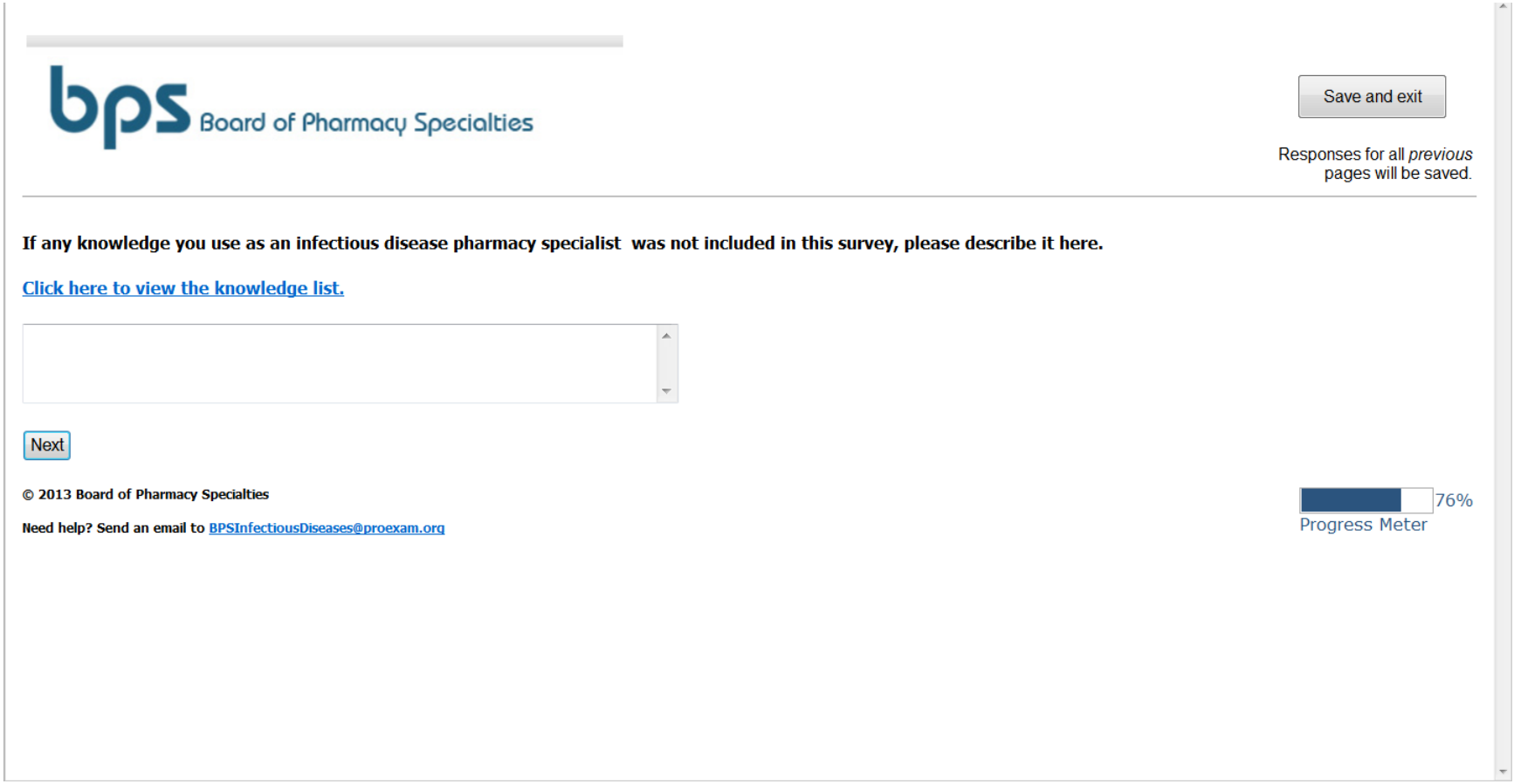
For each knowledge area, please make the following two ratings:

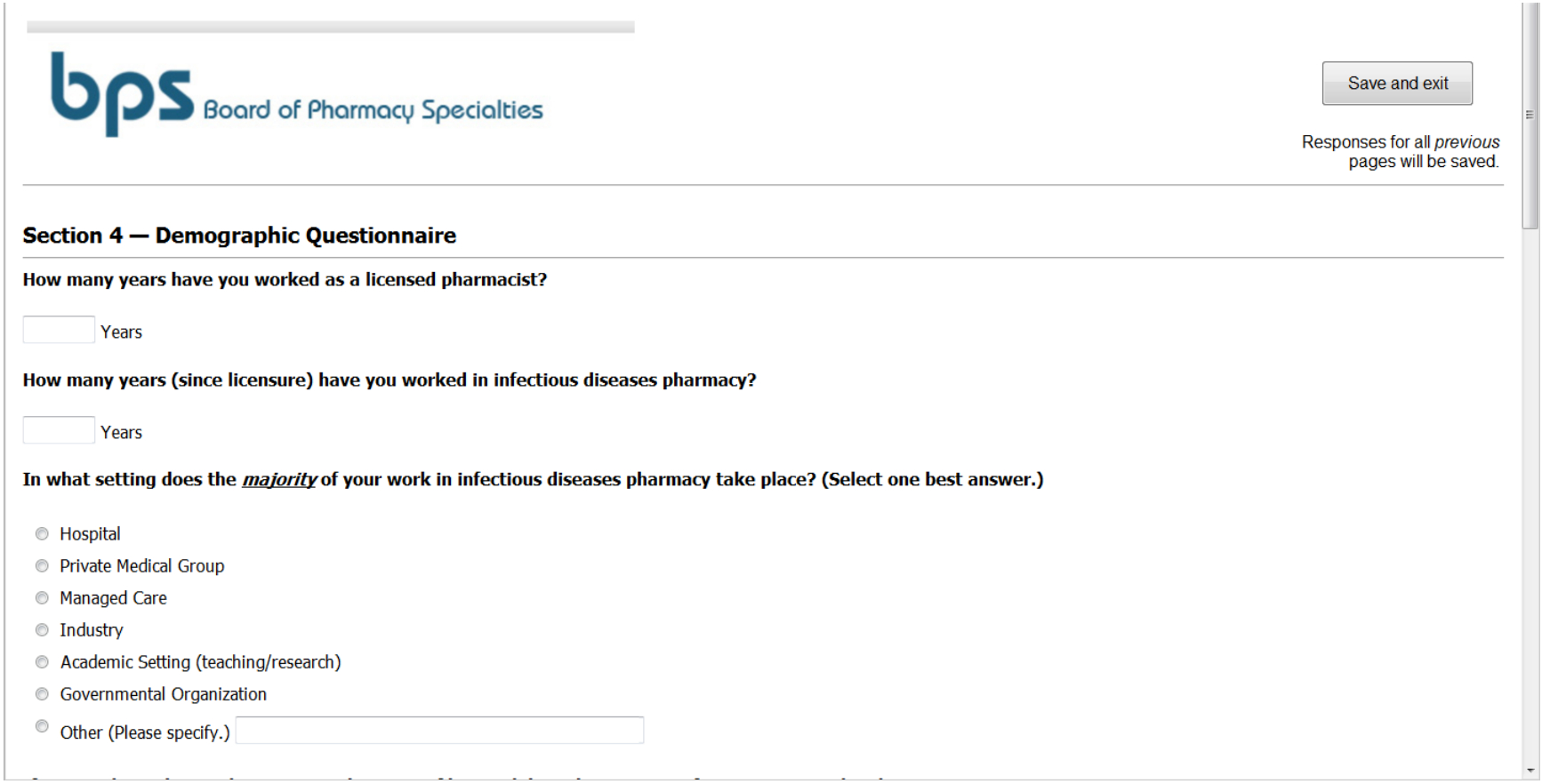
Frequency How frequently did you use the knowledge during the past 12 months?
Never, Less than monthly, At least monthly, At least weekly, At least daily

Importance How important is the knowledge to the effective practice of infectious diseases pharmacy?
Not important, Minimally important, Moderately important, or Highly important

When you rate **Frequency**, think about how frequently ***you personally*** used the knowledge in the past 12 months. When you rate **Importance**, think about the contribution of the knowledge area to the effective practice of infectious diseases pharmacy, in general.

	How frequently did you use the knowledge in the past 12 months?					How important is the knowledge to the effective practice of infectious diseases pharmacy?			
	Never	Less than monthly	About monthly	About weekly	About daily	Not	Min-imally	Moder-ately	Highly
Domain 1: Patient Care and Therapeutics									
Knowledge of:									
Pathophysiology and epidemiology of infections including:									
♦ Bone and joint infections	○	○	○	○	○	○	○	○	○
♦ Cardiovascular infections	○	○	○	○	○	○	○	○	○
♦ Central nervous system infections	○	○	○	○	○	○	○	○	○
♦ Gastrointestinal infections	○	○	○	○	○	○	○	○	○


bps Board of Pharmacy Specialties
Save and exit
Responses for all previous pages will be saved.
If any knowledge you use as an infectious disease pharmacy specialist was not included in this survey, please describe it here.
Click here to view the knowledge list.
Next
© 2013 Board of Pharmacy Specialties
Need help? Send an email to BPSInfectiousDiseases@proexam.org
76%
Progress Meter


bps Board of Pharmacy Specialties
Save and exit
Responses for all previous pages will be saved.
Section 4 — Demographic Questionnaire
How many years have you worked as a licensed pharmacist?
Years
How many years (since licensure) have you worked in infectious diseases pharmacy?
Years
In what setting does the majority of your work in infectious diseases pharmacy take place? (Select one best answer.)
Hospital
Private Medical Group
Managed Care
Industry
Academic Setting (teaching/research)
Governmental Organization
Other (Please specify.)

If you work in a hospital setting, in what type of hospital does the majority of your practice take place?

- ○ Community Hospital
- ○ Community Teaching Hospital
- ○ Government (including VA/DOD) Hospital
- ○ Private Teaching Hospital
- ○ University Hospital/Academic Medical Center
- ○ Other (Please specify.)

What percentage of your time is spent caring for HIV infected patients?

____ %

What percentage of your patients falls into each of the following age ranges?
(Estimate the percentage of your patients in each age range. Your percentages should total 100%.)

Age Range	% of Your Patients
Under 18	
18-64	
65+	
Sum	0

What is the highest pharmacy-related degree you have earned?

- ○ Bachelor's degree
- ○ Master's degree
- ○ Pharm.D.
- ○ Ph.D.
- ○ Other (Please specify.)

Which of the following have you completed? (Select all that apply.)

- ☐ PGY1 Residency
- ☐ PGY2 Infectious Diseases Residency
- ☐ PGY2 Residency (Not in infectious diseases)
- ☐ Infectious Diseases Research Fellowship
- ☐ Fellowship (Not in infectious diseases)
- ☐ No Residency
- ☐ Other (Please specify.)

What BPS specialty certifications or added qualifications do you hold? (Select all that apply.)

- ☐ Ambulatory Care Pharmacy
- ☐ Nuclear Pharmacy
- ☐ Nutrition Support Pharmacy
- ☐ Oncology Pharmacy
- ☐ Psychiatric Pharmacy
- ☐ Pharmacotherapy
- ☐ Added Qualification in Cardiology
- ☐ Added Qualification in Infectious Diseases
- ☐ None

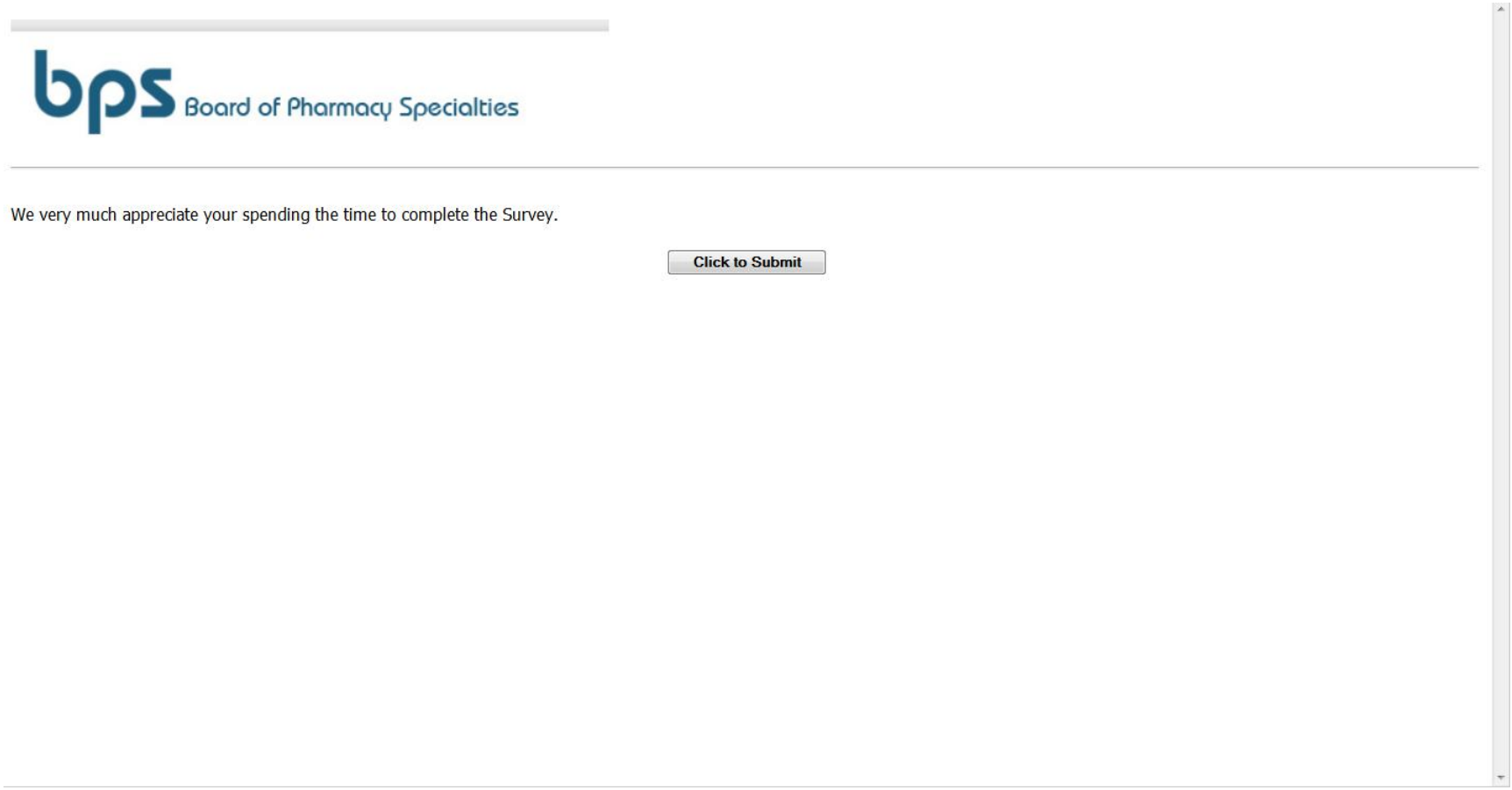
If you currently have the Added Qualification in Infectious Diseases, in what year did you first receive this Added Qualification?

Click to select-->

Next

Need help? Send an email to BPSInfectiousDiseases@proexam.org

98%
Progress Meter


bps Board of Pharmacy Specialties
We very much appreciate your spending the time to complete the Survey.
Click to Submit

Appendix 6
Pilot Test Invitation

Dear <<First>>:

The role delineation for the proposed new specialty of Infectious Diseases Pharmacy has been developed and reviewed by several subject-matter experts currently practicing in the Infectious Diseases Pharmacy specialty. The role delineation, including specialized tasks and knowledge bases, has been translated into a web-based Survey of Infectious Diseases Pharmacy Practice.

We now need you to participate in a pilot test of this online survey in advance of the survey's administration to a large sample of pharmacists practicing in this specialty.

You will be asked to respond to the following questions throughout the survey:

1. Did you experience any difficulties using the ratings scales?
2. Are the questions in the demographic and background questionnaire clear and accurate?
3. Were the directions for taking the survey clear?
4. Did you experience any technical difficulties?
5. How many minutes did it take you to complete the survey?
6. Please provide additional suggestions or comments to improve the survey experience.

To access the survey, copy and paste the entire link below into your browser:

<<URL>>

If you are unable to complete the entire survey in one sitting, you may exit and return later using the above URL.

We ask you to complete the pilot test of the survey no later than January 18, 2013.

If you experience any difficulties while pilot testing the survey, please contact me at BPSInfectiousDiseases@proexam.org.

Thank you in advance for taking the time to perform this critical review.

Jacqueline Siano
Research Director
Professional Examination Service
475 Riverside Drive
New York, NY 10115

Appendix 7
Survey Invitation and Reminders

Dear <<First>>:

The Board of Pharmacy Specialties (BPS) is currently conducting a study to analyze the knowledge and unique tasks that comprise the proposed new specialty of Infectious Diseases Pharmacy. The results of this study will be incorporated into the official petition to BPS to recognize Infectious Diseases Pharmacy as a specialty.

If you are currently practicing in the specialty of infectious diseases pharmacy, we are asking you to complete an online role delineation survey. We anticipate the survey taking about 25 minutes to complete. Your responses to the survey questions will be entirely confidential and only aggregated results will be reported.

We understand how valuable your time is. To show our appreciation, after you complete the survey you will be entered into a random drawing for one of four $50 Amazon.com gift cards.

The link below will take you to the survey:

<<URL>>

If you are unable to complete the entire survey in one sitting, you may exit and return later using the above URL.

Thank you in advance for contributing to the advancement of the Infectious Diseases Pharmacy specialty in this way.

Board of Pharmacy Specialties
Infectious Diseases Pharmacy Task Force

Dear <<First>>,

Last week you received an invitation to contribute to the development of the proposed new pharmacy specialty in Infectious Diseases. The Board of Pharmacy Specialties (BPS) is conducting this study to analyze the knowledge and unique tasks that comprise infectious diseases Pharmacy. The results of this study will be incorporated into the official petition to BPS to recognize infectious diseases pharmacy as a specialty.

If you are currently practicing in the specialty of Infectious Diseases, we are asking you to complete an online role delineation survey. We anticipate the survey taking about 25 minutes to complete. Your responses to the survey questions will be entirely confidential and only aggregated results will be reported.

We understand how valuable your time is. To show our appreciation, after you complete the survey you will be entered into a random drawing for one of four $50 Amazon.com gift cards.

The link below will take you to the survey:

<<URL>>

If you are unable to complete the entire survey in one sitting, you may exit and return later using the above URL.

We ask you to please complete the survey no later than February 27, 2013.

Thank you in advance for contributing to the advancement of the Infectious Diseases Pharmacy specialty in this way.

Board of Pharmacy Specialties
Infectious Diseases Pharmacy Task Force

Dear <<First>>,

We still need your valuable feedback regarding the practice of Infectious Diseases Pharmacy. In order to allow for your participation, we have extended the deadline to participate in the survey of Infectious Diseases Pharmacists sponsored by the Board of Pharmacy Specialties (BPS).

The purpose of the survey is to validate the knowledge and unique tasks that comprise Infectious Diseases Pharmacy. The results of this study will be incorporated into the official petition to BPS to recognize Infectious Diseases pharmacy as a specialty.

We anticipate the survey taking about 25 minutes to complete.

We understand how valuable your time is. To show our appreciation, after you complete the survey you will be entered into a random drawing for one of four $50 Amazon.com gift cards.

The link below will take you to the survey:

<<URL>>

If you are unable to complete the entire survey in one sitting, you may exit and return later using the above URL.

We ask you to please complete the survey by the extended deadline of March 6, 2013.

Thank you in advance for contributing to the advancement of the Infectious Diseases Pharmacy specialty in this way.

Board of Pharmacy Specialties
Infectious Diseases Pharmacy Task Force

Appendix 8
Subgroup Analysis for Domain Ratings

Percentage of Time Ratings for Domains by Subgroups

Domain Percentage of Time Ratings by Percentage of Time Providing Pharmacy Services for Infectious Diseases Patients

	< 50% Infectious Diseases Time		≥ 50% Infectious Diseases Time	
	M	SD	M	SD
Domain 1: Patient Care and Therapeutics	50.5%	25.5	48.3%	19.2
Domain 2: Education, Research and Scholarship	19.9%	16.1	20.4%	12.7
Domain 3: Antimicrobial Stewardship and Practice Management	23.4%	17.8	25.4%	16.0
Domain 4: Public Health and Advocacy	6.3%	7.7	5.9%	6.2

Domain Percentage of Time Ratings by Years of Experience Working in Infectious Diseases Specialty

	1-5 yrs		6-10 yrs		11-20 yrs		20+ yrs	
	M	SD	M	SD	M	SD	M	SD
Domain 1: Patient Care and Therapeutics	**46.8%**	20.0	**46.7%**	20.3	**53.6%**	21.7	**52.3%**	25.7
Domain 2: Education, Research and Scholarship	19.4%	12.3	22.0%	14.5	21.3%	15.8	19.2%	13.4
Domain 3: Antimicrobial Stewardship and Practice Management	**27.8%**	18.8	24.4%	12.1	**19.8%**	13.5	23.7%	16.7
Domain 4: Public Health and Advocacy	6.0%	6.7	6.8%	7.7	5.3%	5.8	4.8%	4.2

Importance Ratings for Domains by Subgroups

Domain Importance Ratings by Percentage of Time Providing Infectious Diseases Pharmacy Services

	< 50% Infectious Diseases Time		≥ 50% Infectious Diseases Time	
	M	SD	M	SD
Domain 1: Patient Care and Therapeutics	3.8	.5	4.0	.2
Domain 2: Education, Research and Scholarship	3.4	.6	3.5	.6
Domain 3: Antimicrobial Stewardship and Practice Management	3.7	.5	3.7	.5
Domain 4: Public Health and Advocacy	2.7	.8	2.8	.8

Domain Importance by Years of Experience Working in Infectious Diseases Specialty

	1-5 yrs		6-10 yrs		11-20 yrs		20+ yrs	
	M	SD	M	SD	M	SD	M	SD
Domain 1: Patient Care and Therapeutics	3.9	.3	4.0	.2	3.9	.4	4.0	.2
Domain 2: Education, Research and Scholarship	3.5	.5	3.4	.6	3.4	.6	3.5	.6
Domain 3: Antimicrobial Stewardship and Practice Management	3.8	.4	3.7	.5	3.6	.6	3.6	.6
Domain 4: Public Health and Advocacy	2.9	.8	2.8	.8	2.6	.7	2.7	.8

Appendix 9
Subgroup Analysis for Task Ratings

Task Frequency Ratings by
Percentage of Time Providing Infectious Diseases Pharmacy Services

	< 50% Infectious Diseases Time	≥ 50% Infectious Diseases Time
	Mean	Mean
Domain 1: Patient Care and Therapeutics		
1.1 Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.	**4.1**	**4.9**
1.2 Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.	**3.6**	**4.5**
1.3 Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.	**4.2**	**4.8**
1.4 Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.	**4.1**	**4.8**
1.5 Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.	**3.8**	**4.7**
1.6 Develop preventative or a postexposure therapy plan for patients with increased risk for infection.	**2.6**	**3.2**
1.7 Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacother	3.1	3.5
Domain 2: Education, Research and Scholarship		
2.1 Provide infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists.	**3.5**	**4.3**

	< 50% Infectious Diseases Time	≥ 50% Infectious Diseases Time
	Mean	Mean
2.2 Provide education and guidance to professionals and/or trainees in other health professions concerning infectious diseases pharmacotherapy.	**3.3**	**4.0**
2.3 Critically evaluate infectious diseases literature in both the basic and clinical sciences with regard to study design, statistical analysis, study results, and applicability to patient care and policy development.	**3.1**	**3.8**
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	2.1	2.4
2.5 Participate in continuous professional development related to infectious diseases pharmacy practice.	3.0	3.2
Domain 3: Antimicrobial Stewardship and Practice Management		
3.1 Monitor and evaluate institutional antimicrobial usage, susceptibility trends and/or infection rates.	3.0	3.4
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	1.9	2.0
3.3 Develop/modify institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence.	2.4	2.6
3.4 Develop/modify and recommend institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use).	2.5	2.8
3.5 Collaborate in the development of institutional infection prevention policies.	2.0	2.3
3.6 Establish collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases)	**3.1**	**3.8**
3.7 Evaluate and foster compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	2.5	2.9

	< 50% Infectious Diseases Time	≥ 50% Infectious Diseases Time
	Mean	Mean
3.8 Lead quality improvement initiatives (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics) in the area of infectious diseases.	2.7	3.0
3.9 Justify and document clinical and financial value of infectious diseases pharmacy services.	**2.6**	**3.4**
Domain 4: Public Health and Advocacy		
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention.	1.9	2.1
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	2.0	2.2
4.3 Advocate for adult and child vaccination.	2.4	2.6
4.4 Advocate for prudent antimicrobial use.	3.7	4.2
4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections).	1.8	1.7

Task Frequency Ratings by
Years of Experience Working in Infectious Diseases Specialty

	1-5 yrs	6-10 yrs	11-20 yrs	20+ yrs
	Mean	Mean	Mean	Mean
Domain 1: Patient Care and Therapeutics				
1.1 Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.	4.7	4.7	4.7	4.5
1.2 Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.	4.1	4.3	4.3	4.2
1.3 Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.	4.7	4.8	4.7	4.6
1.4 Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.	4.5	4.6	4.6	4.6
1.5 Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.	4.3	4.6	4.5	4.6
1.6 Develop preventative or a postexposure therapy plan for patients with increased risk for infection.	2.9	3.2	3.1	3.3
1.7 Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacother	3.3	3.5	3.5	3.8
Domain 2: Education, Research and Scholarship				

	1-5 yrs	6-10 yrs	11-20 yrs	20+ yrs
	Mean	Mean	Mean	Mean
2.1 Provide infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists.	4.0	4.3	4.2	4.4
2.2 Provide education and guidance to professionals and/or trainees in other health professions concerning infectious diseases pharmacotherapy.	3.7	3.8	3.9	4.1
2.3 Critically evaluate infectious diseases literature in both the basic and clinical sciences with regard to study design, statistical analysis, study results, and applicability to patient care and policy development.	3.6	3.7	3.6	3.5
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	2.3	2.4	2.3	2.4
2.5 Participate in continuous professional development related to infectious diseases pharmacy practice.	3.2	3.1	3.1	3.3
Domain 3: Antimicrobial Stewardship and Practice Management				
3.1 Monitor and evaluate institutional antimicrobial usage, susceptibility trends and/or infection rates.	3.3	3.3	3.2	3.4
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	2.0	2.0	1.9	2.0
3.3 Develop/modify institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence.	2.6	2.6	2.5	2.7
3.4 Develop/modify and recommend institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use).	2.7	2.7	2.6	2.8
3.5 Collaborate in the development of institutional infection prevention policies.	2.2	2.3	2.2	2.4

	1-5 yrs	6-10 yrs	11-20 yrs	20+ yrs
	Mean	Mean	Mean	Mean
3.6 Establish collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases)	3.8	3.5	3.5	3.7
3.7 Evaluate and foster compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	2.9	2.8	2.6	2.6
3.8 Lead quality improvement initiatives (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics) in the area of infectious diseases.	3.0	2.9	2.9	2.8
3.9 Justify and document clinical and financial value of infectious diseases pharmacy services.	3.2	3.1	3.2	3.0
Domain 4: Public Health and Advocacy				
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention.	1.9	2.2	1.9	2.2
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	2.1	2.3	1.9	2.6
4.3 Advocate for adult and child vaccination.	2.5	2.6	2.5	2.8
4.4 Advocate for prudent antimicrobial use.	4.1	4.1	3.9	4.1
4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections).	1.6	1.9	1.8	2.0

Task Importance Ratings by
Percentage of Time Spent in Infectious Diseases Pharmacy-related Activities

	< 50% Infectious Diseases Time	≥ 50% Infectious Diseases Time
	Mean	Mean
Domain 1: Patient Care and Therapeutics		
1.1 Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.	3.8	3.9
1.2 Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.	3.5	3.6
1.3 Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.	3.9	4.0
1.4 Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.	3.9	3.9
1.5 Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.	3.7	3.9
1.6 Develop preventative or a postexposure therapy plan for patients with increased risk for infection.	3.2	3.2
1.7 Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacother	3.5	3.4
Domain 2: Education, Research and Scholarship		
2.1 Provide infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists.	3.6	3.7

	< 50% Infectious Diseases Time	≥ 50% Infectious Diseases Time
	Mean	Mean
2.2 Provide education and guidance to professionals and/or trainees in other health professions concerning infectious diseases pharmacotherapy.	3.5	3.6
2.3 Critically evaluate infectious diseases literature in both the basic and clinical sciences with regard to study design, statistical analysis, study results, and applicability to patient care and policy development.	3.5	3.6
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	3.0	3.0
2.5 Participate in continuous professional development related to infectious diseases pharmacy practice.	3.5	3.6
Domain 3: Antimicrobial Stewardship and Practice Management		
3.1 Monitor and evaluate institutional antimicrobial usage, susceptibility trends and/or infection rates.	3.7	3.7
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	3.5	3.3
3.3 Develop/modify institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence.	3.6	3.7
3.4 Develop/modify and recommend institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use).	3.6	3.6
3.5 Collaborate in the development of institutional infection prevention policies.	3.3	3.1
3.6 Establish collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases)	3.6	3.7
3.7 Evaluate and foster compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	3.3	3.2

	< 50% Infectious Diseases Time	≥ 50% Infectious Diseases Time
	Mean	Mean
3.8 Lead quality improvement initiatives (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics) in the area of infectious diseases.	3.4	3.4
3.9 Justify and document clinical and financial value of infectious diseases pharmacy services.	3.3	3.4
Domain 4: Public Health and Advocacy		
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention.	2.9	2.9
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	3.0	2.9
4.3 Advocate for adult and child vaccination.	3.3	3.2
4.4 Advocate for prudent antimicrobial use.	3.8	3.8
4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections).	2.9	2.7

Task Importance Ratings by
Years of Experience Working in Infectious Diseases Specialty

	1-5 yrs	6-10 yrs	11-20 yrs	20+ yrs
	Mean			Mean
Domain 1: Patient Care and Therapeutics				
1.1 Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.	3.9	3.9	3.9	4.0

	1-5 yrs	6-10 yrs	11-20 yrs	20+ yrs
	Mean			Mean
1.2 Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.	3.5	3.6	3.7	3.7
1.3 Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.	3.9	4.0	3.9	4.0
1.4 Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.	3.9	3.9	3.9	4.0
1.5 Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.	3.8	3.9	3.7	3.9
1.6 Develop preventative or a postexposure therapy plan for patients with increased risk for infection.	3.2	3.3	3.2	3.4
1.7 Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacother	3.4	3.5	3.4	3.7
Domain 2: Education, Research and Scholarship				
2.1 Provide infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists.	3.7	3.7	3.6	3.7
2.2 Provide education and guidance to professionals and/or trainees in other health professions concerning infectious diseases pharmacotherapy.	3.6	3.5	3.5	3.6

	1-5 yrs	6-10 yrs	11-20 yrs	20+ yrs
	Mean			Mean
2.3 Critically evaluate infectious diseases literature in both the basic and clinical sciences with regard to study design, statistical analysis, study results, and applicability to patient care and policy development.	3.7	3.6	3.5	3.5
2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).	3.1	3.0	2.8	3.0
2.5 Participate in continuous professional development related to infectious diseases pharmacy practice.	3.6	3.5	3.4	3.6
Domain 3: Antimicrobial Stewardship and Practice Management				
3.1 Monitor and evaluate institutional antimicrobial usage, susceptibility trends and/or infection rates.	3.7	3.7	3.6	3.8
3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).	3.4	3.5	3.2	3.3
3.3 Develop/modify institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence.	3.8	3.6	3.5	3.6
3.4 Develop/modify and recommend institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use).	3.7	3.6	3.5	3.5
3.5 Collaborate in the development of institutional infection prevention policies.	3.2	3.1	3.0	3.1
3.6 Establish collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases)	3.8	3.6	3.6	3.6

	1-5 yrs	6-10 yrs	11-20 yrs	20+ yrs
	Mean			Mean
3.7 Evaluate and foster compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, Centers for Medicare/Medicaide Services, National Healthcare Safety Network).	3.3	3.2	3.1	3.2
3.8 Lead quality improvement initiatives (e.g., Medically Unlikely Edit [MUE], medication safety, timing of antibiotics) in the area of infectious diseases.	3.5	3.4	3.2	3.3
3.9 Justify and document clinical and financial value of infectious diseases pharmacy services.	3.5	3.2	3.3	3.4
Domain 4: Public Health and Advocacy				
4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention.	3.0	2.9	2.7	2.9
4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).	3.0	2.9	2.8	3.1
4.3 Advocate for adult and child vaccination.	3.3	3.1	3.2	3.3
4.4 Advocate for prudent antimicrobial use.	3.8	3.7	3.7	3.9
4.5 Participate in strategic planning for emergency preparedness (e.g., bioterrorism, pandemic infections).	2.8	2.7	2.5	3.0

Appendix 10
Final Infectious Diseases Pharmacy Role Delineation

Infectious Diseases Pharmacy Role Delineation

Domain 1: Patient Care and Therapeutics

Related to comprehensive Infectious Diseases pharmacotherapy management for a patient including collecting, interpreting, and integrating pertinent data; and designing/modifying, implementing, and monitoring patient-specific plans of care.

1.1 Collect and organize patient-specific information (e.g., demographics, medical history, infection risks), disease-specific information, and microbiologic and laboratory reports needed to design an infectious diseases pharmacotherapeutic plan.

1.2 Identify and recommend additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan.

1.3 Interpret, analyze, and integrate patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic plan.

1.4 Design/modify, recommend, and implement an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence.

1.5 Design/modify, recommend, and implement a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan.

1.6 Develop preventative or a postexposure therapy plan for patients with increased risk for infection.

1.7 Educate and provide counseling to patients/caregivers regarding the safe and effective use of antimicrobials and preventative therapies, monitoring for therapeutic and adverse outcomes, and the importance of adherence to the infectious disease pharmacotherapeutic plan.

Knowledge of:

k1.1 Pathophysiology and epidemiology of infections including:

k 1.1.1 Bone and joint infections

k 1.1.2 Cardiovascular infections

k 1.1.3 Central nervous system infections

k 1.1.4 Gastrointestinal infections

k 1.1.5 HIV-infection and AIDS (including opportunistic infections)

k 1.1.6 Infections of reproductive organs

k 1.1.7 Intra-abdominal infections

k 1.1.8 Lower respiratory tract infections

k 1.1.9 Ophthalmologic infections

- k 1.1.10 Sepsis
- k 1.1.11 Sexually transmitted diseases
- k 1.1.12 Skin and soft tissue infections
- k 1.1.13 Tuberculosis and other mycobacterial infections
- k 1.1.14 Upper respiratory tract infections
- k 1.1.15 Urinary tract infections

1.2 Pharmacotherapies related to specific infectious diseases

1.3 Pharmacokinetics and pharmacodynamics of antimicrobials

1.4 Pharmacology of antimicrobials

1.5 Pharmacology of vaccines

1.6 Pharmacology of biological response modifiers (for example, TNF inhibitors, colony stimulating factors)

1.7 Mechanisms of pathogen resistance

1.8 Antimicrobial drug interactions

1.9 Complications of antimicrobials

1.10 Complications of vaccines

1.11 Pharmacoeconomics

1.12 Spectrum of activity of antimicrobials

1.13 Basic microbiology laboratory procedures

1.14 Clinical laboratory tests in ID (e.g., rapid diagnostic testing, RPR, antibody concentrations)

1.15 Diagnostic and therapeutic procedures in ID (e.g., lumbar puncture, paracentesis)

1.16 Factors that alter the risk of infection

1.17 Immunologic response to infection

1.18 Immunologic therapy (e.g., immunoglobulin, Mannose Binding Lectin)

1.19 Outpatient parenteral antimicrobial therapy

1.20 Therapeutic monitoring of antimicrobials

1.21 Factors that may impact response to therapy (e.g., dose optimization, penetration of antimicrobials, source control, immune status)

1.22 Antimicrobial de-escalation

1.23 Measures to monitor response to antimicrobial therapy (e.g., resolution of signs and symptoms, laboratory data, readmission, development of drug resistance)

1.24 Patient and caregiver education and counseling techniques

1.25 Antimicrobial allergy and cross-reactivity

1.26 Antimicrobial desensitization

1.27 Preventive therapies (e.g., infection prophylaxis, vaccines, behavior modification)

1.28 Factors to consider when differentiating infection from non-infection

1.29 Considerations in special populations (e.g., geriatrics, pediatrics, obesity)

Domain 2: Education, Research and Scholarship

Related to generation, interpretation, and dissemination of knowledge related to infectious disease pharmacy, and the education of current and future healthcare professionals.

2.1 Provide infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists.

2.2 Provide education and guidance to professionals and/or trainees in other health professions concerning infectious diseases pharmacotherapy.

2.3 Critically evaluate infectious diseases literature in both the basic and clinical sciences with regard to study design, statistical analysis, study results, and applicability to patient care and policy development.

2.4 Contribute to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).

2.5 Participate in continuous professional development related to infectious diseases pharmacy practice.

Knowledge of:

k2.1 Principles and methods of educating, training and mentoring pharmacists, pharmacy students, residents and fellows

k2.2 Principles and methods of educating and communicating with other healthcare professionals

k2.3 Appropriate resources for infectious disease information

k2.4 Research study design and methodology, including those specific to ID (e.g., Monte Carlo simulation, microbiologic surveillance, time-kill)

k2.5 Statistical methods

k2.6 Clinical application and limitations of published data and reports

k2.7 Regulatory and ethical issues related to conducting research

k2.8 Venues and processes for disseminating knowledge (e.g., audience-specific medical writing, publication, presentation)

k2.9 Mechanisms for continuing professional development in ID pharmacy

Domain 3: Antimicrobial Stewardship and Practice Management

Related to advancing antimicrobial stewardship and to managing infectious diseases policies and guidelines designed to optimize the care of patients in collaboration with the healthcare team.

3.1 Monitor and evaluate institutional antimicrobial usage, susceptibility trends and/or infection rates.

3.2 Participate in the development of antibiogram(s) (e.g., institution-specific, unit-specific).

3.3 Develop/modify institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence.

3.4 Develop/modify and recommend institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use).

3.5 Collaborate in the development of institutional infection prevention policies.

3.6 Establish collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases)

3.7 Evaluate and foster compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, CMS, NHSN).

3.8 Lead quality improvement initiatives (e.g., MUE, medication safety, timing of antibiotics) in the area of infectious diseases.

3.9 Justify and document clinical and financial value of infectious diseases pharmacy services.

Knowledge of:

k3.1 Antibiogram design and development

k3.2 Antimicrobial stewardship strategies

k3.3 Antimicrobial resistance trends

k3.4 Metrics for antimicrobial use

k3.5 Clinical practice guidelines for ID (e.g., IDSA, SHEA, CDC)

k3.6 Methods for developing and evaluating clinical practice guidelines

k3.7 Infection control and prevention strategies

k3.8 Metrics for infection control

k3.9 National accreditation and regulatory organizations and requirements (e.g., Joint Commission, CMS, NHSN)

k3.10 Quality improvement strategies (e.g., MUE, FMEA, root cause analysis)

k3.11 Roles of infection control and prevention, microbiology and ID divisions/departments

k3.12 Collaboration strategies and consensus building

k3.13 Metrics for evaluating value of ID pharmacy services

k3.14 Pharmacoeconomic assessment of antimicrobials

Domain 4: Public Health and Advocacy

Related to preventive health services, public health information, and advocacy for vaccination and prudent antimicrobial use.

4.1 Provide information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention.

4.2 Support public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education).

4.3 Advocate for adult and child vaccination.

4.4 Advocate for prudent antimicrobial use.

Knowledge of:

k4.1 Public health information resources related to infectious diseases

k4.2 Public health services related to infectious diseases

k4.3 CDC notifiable infectious diseases

k4.4 Populations at risk for infection

k4.5 ACIP immunization recommendations and schedules

k4.6 Strategies for advocating vaccination and prudent antimicrobial use

k4.7 Professional organizations and their roles and resources related to patient advocacy (e.g., Immunization Action Coalition, IDSA, ASHP, APhA, SIDP)

k4.8 Screening guidelines for infectious diseases (e.g. HIV, STDs, tuberculosis)

k4.9 Agents that have the potential to become epidemic or pandemic

k4.10 Emerging infectious diseases

k4.11 History of vaccine preventable diseases

Appendix F-1

ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs

ASHP ACCREDITATION STANDARD FOR POSTGRADUATE YEAR TWO (PGY2) PHARMACY RESIDENCY PROGRAMS

Introduction

Purpose of this Standard: the *ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs* (hereinafter the Standard) establishes criteria for systematic training of pharmacists in advanced areas of pharmacy practice. Its contents delineate the requirements for PGY2 residencies, which build upon the foundation provided through completion of an accredited Doctor of Pharmacy degree program and an accredited postgraduate year one (PGY1) pharmacy residency program.

PGY2 Program Purpose: PGY2 pharmacy residency programs build on Doctor of Pharmacy (Pharm.D.) education and PGY1 pharmacy residency programs to contribute to the development of clinical pharmacists in specialized areas of practice. PGY2 residencies provide residents with opportunities to function independently as practitioners by conceptualizing and integrating accumulated experience and knowledge and incorporating both into the provision of patient care that improves medication therapy. Residents who successfully complete an accredited PGY2 pharmacy residency should possess competencies that qualify them for clinical pharmacist and/or faculty positions and position them to be eligible for attainment of board certification in the specialized practice area (when board certification for the practice area exists).

Application of the Standard: the requirements serve as the basis for evaluating PGY2 pharmacy residency programs for accreditation.

PGY2 pharmacy residencies are offered in a variety of practice environments and may focus on specific practice areas, patient populations, and/or disease states. Therefore, a corresponding set of educational goals and objectives[1] has been developed for many of the practice settings and areas of practice (e.g., critical care, drug information, geriatrics, oncology, health-system pharmacy administration, ambulatory care). Each takes into account the unique elements of the practice site and the focused area of practice. To structure the PGY2 residency, the program must use the set of educational goals and objectives that best corresponds to the practice site and the focused area of practice. These educational goals and objectives must be used with this Standard, and the appropriate selection and use of them will be evaluated in site surveys for accreditation.

Throughout the Standard use of the auxiliary verbs *will* and *must* implies an absolute requirement, whereas use of *should* and *may* denotes a recommended guideline.

The Standard describes the criteria used in evaluation of practice sites that apply for accreditation. The accreditation program is conducted under the authority of the ASHP Board of Directors and is supported through formal partnerships with several other pharmacy associations. The *ASHP Regulations on Accreditation of Pharmacy Residencies*[1] describes the policies governing the accreditation program and procedures for seeking accreditation.

Overview of the Standards for PGY2 Pharmacy Residencies

Standard 1: **Requirements and Selection of Residents**
PGY2 residents must be pharmacists having sufficiently broad knowledge, skills, attitudes, and abilities in pharmacy practice necessary for further professional development at an advanced level of pharmacy practice.

Standard 2: **Responsibilities of the Program to the Resident**
It is important that pharmacy residency programs provide an exemplary environment for residents' learning. This area indicates policies that must be in place to help protect residents and organizations during unusual situations that may arise with residency programs (e.g., extended leaves, dismissal, duty hours).

Standard 3: **Design and Conduct of the Residency Program**
It is important that residents' training enables them to achieve the purpose, goals, and objectives of the residency program. Residents should develop into more mature, clinically competent, and independent practitioners able to address patients' needs. Proper design and implementation of programs helps ensure successful residency programs.

Standard 4: **Requirements of the Residency Program Director and Preceptors**
The residency program director (RPD) and preceptors are critical to the residency program's success and effectiveness. Their qualifications and skills are crucial. Therefore, the RPD and preceptors will be professionally and educationally qualified pharmacists who are committed to providing effective training of residents and being exemplary role models for residents.

Standard 5: **Requirements of the Site Conducting the Residency Program**
It is important that residents learn to incorporate best practices into their future roles; therefore, the organization conducting the residency must meet accreditation standards, regulatory requirements, and other nationally applicable standards and will have sufficient resources to achieve the purposes of the residency program.

Standard 6: **Pharmacy Services**
When pharmacy facilities and services provide the learning environment where residents are trained, it is important that they train in exemplary environments. Residents' expectations as they leave residency programs should be to strive for exemplary pharmacy services to improve patient care outcomes. Pharmacy's role in providing effective leadership, quality improvement efforts, appropriate organization, staffing, automation, and collaboration with others to provide safe and effective medication-use systems are reviewed in this section. This section encourages sites to continue to improve and advance pharmacy services and should motivate the profession to continually improve patient care outcomes.

Standard 1: Requirements and Selection of Residents

1.1 The applicant must be participating in, or have completed, an ASHP-accredited PGY1 pharmacy residency program or one in the ASHP accreditation process (i.e., one with candidate or preliminary accreditation status).

1.2 The RPD or designee must evaluate the qualifications of applicants to pharmacy residencies through a documented and formal procedure based on predetermined criteria, which includes an assessment of applicants' ability to achieve the educational goals and objectives selected for the program.

1.3 The predetermined criteria and procedure used to evaluate applicants' qualifications must be used by all involved in the evaluation and ranking of applicants.

1.4 Applicants to pharmacy residencies must be graduates of an Accreditation Council for Pharmacy Education (ACPE) accredited degree program (or one in process of pursuing accreditation) or have a Foreign Pharmacy Graduate Equivalency Committee (FPGEC) certificate from the National Association of Boards of Pharmacy (NABP).

1.5 Applicants to pharmacy residencies must be licensed or eligible for licensure in the state or jurisdiction in which the program is conducted.

1.6 Consequences of residents' failure to obtain appropriate licensure either prior to or within 90 days after the start date of the residency must be addressed in written policy of the residency program.

1.7 Requirements for successful completion and expectations of the residency program must be documented and provided to applicants invited to interview, including policies for professional, family, and sick leave; consequences of any such leave on residents' ability to complete the residency program; and for dismissal from the residency program.

1.7.a. These policies must be reviewed with residents once they have started the program and be consistent with the organization's human resources policies.

Standard 2: Responsibilities of the Program to the Resident

2.1 Programs must be a minimum of 12 months and a full-time practice commitment or equivalent.

2.1.a. Nontraditional residency programs must describe the program's design and length used to meet the required educational competency areas, goals, and objectives.

2.2 Programs must comply with the ASHP duty-hour standards.[2] (http://www.ashp.org/DocLibrary/Residents/Pharmacy-Specific-Duty-Hours.pdf)

2.3 All programs in the ASHP accreditation process must adhere to the *Rules for the ASHP Pharmacy Resident Matching Program*[3], unless exempted by the ASHP Commission on Credentialing.

2.4 The RPD must ensure that residents who are accepted into the program are provided with a letter outlining their acceptance to the program.

2.4.a. Information on the pre-employment requirements for the organization (e.g., licensure and human resources requirements, such as drug testing, criminal record check) and other relevant information (e.g., benefits, stipend) must be provided.

2.4.b. Acceptance by residents of these terms and conditions, requirements for successful completion, and expectations of the residency program must be documented prior to the beginning of the residency.

2.5 The residency program must provide qualified preceptors to ensure appropriate training, supervision, and guidance to all residents to fulfill the requirements of the standards.

2.6 The residency program must provide residents an area in which to work, references, an appropriate level of relevant technology (e.g., clinical information systems, workstations, databases), access to extramural educational opportunities (e.g., a pharmacy association meeting, a regional residency conference), and sufficient financial support to fulfill the responsibilities of the program.

2.7 The RPD will award a certificate of residency only to those who complete the program's requirements.

2.7.a. Completion of the program's requirements must be documented.

2.8 The certificate provided to residents who complete the program's requirements must be issued in accordance with the provisions of the *ASHP Regulations on Accreditation of Pharmacy Residencies*[1], and signed by the RPD and the chief executive officer of the organization or an appropriate executive with ultimate authority over the residency.

2.8.a. Reference must be made in the certificate of residency that the program is accredited by ASHP.

2. 9 The RPD must maintain the program's compliance with the provisions of the current version of the *ASHP Regulations on Accreditation of Pharmacy Residencies*[1] throughout the accreditation cycle.

Standard 3: Design and Conduct of the Residency Program

3.1 Residency Purpose and Description

3.1.a. The residency program must be designed and conducted in a manner that supports residents in achieving the following purpose and the required educational competency areas, goals, and objectives described in the remainder of the standards.

3.1.b. PGY2 Program Purpose: PGY2 pharmacy residency programs build on Doctor of Pharmacy (Pharm.D.) education and PGY1 pharmacy residency programs to contribute to the development of clinical pharmacists in advanced or specialized practice. PGY2 residencies provide residents with opportunities to function independently as practitioners by conceptualizing and integrating accumulated experience and knowledge and incorporating both into the provision of patient care that improves medication therapy. Residents who successfully complete an accredited PGY2 pharmacy residency should possess competencies that qualify them for clinical pharmacist and/or faculty positions and position them to be eligible for attainment of board certification in the specialized practice area (when board certification for the practice area exists).

3.2 Competency Areas, Educational Goals, and Objectives

3.2.a. The program's educational goals and objectives must support achievement of the residency's purpose.

3.2.b. At the beginning of the resident's program, RPDs must document an individualized set of program competency areas, educational goals, and educational objectives for each resident. In doing so, PGY2 residencies in advanced areas of pharmacy practice must draw upon the program competency areas, educational goals, and educational objectives that have been developed by ASHP specifically for that practice area (e.g., critical care, drug information, geriatrics, oncology, ambulatory care). RPDs may establish additional program competency areas, educational goals, and educational objectives that reflect the site's strengths.

For PGY2 residencies in advanced areas of clinical pharmacy practice for which ASHP has not developed a complete set of competency areas, educational goals, and educational objectives, a generic set of program competency areas, educational goals, and educational objectives (*Program Competency Areas, Educational Goals, and Educational Objectives for Postgraduate Year Two (PGY2) Residencies in an Advanced Area of Pharmacy Practice*) is available. This generic set of advanced clinical practice goals and objectives is provided as a required framework for programs that must develop their own Standard-mandated, area-specific, complete set of program competency areas, educational goals, and educational objectives. Also, RPDs for programs in nonclinical practice areas lacking ASHP-developed program competency areas, educational goals, and educational objectives must develop a complete set for their residencies. In both cases, RPDs must provide ASHP's Accreditation Service Office their complete set of program competency areas, educational goals, and educational objectives at the time of application. These competency areas, educational goals, and educational objectives must be reviewed by the ASHP Commission on Credentialing before the application for accreditation status will be accepted.

3.2.c. Programs may select additional competency areas for all residents to complete. Elective competency areas may be selected for specific residents only.

3.3 Resident Learning

3.3.a. Program Structure

3.3.a.(1) A written description of the structure of the program (the designation of types, lengths, and sequence of learning experiences) must be documented formally.

3.3.a.(1)(a) The description must include required learning experiences and the length of time for each experience.

3.3.a.(1)(b) Elective experiences must also be listed in the program's design.

3.3.a.(2) The educational goals and objectives, including those for residents' projects, will be assigned for teaching to a learning experience or a sequence of learning experiences to allow sufficient practice for their achievement by residents.

3.3.a.(3) The program's structure must facilitate achievement of the program's educational goals and objectives.

3.3.b. Orientation

RPDs must orient residents to the residency program.

3.3.c. Learning Experiences

3.3.c.(1) Learning experience descriptions must be documented and include the following:

3.3.c.(1)(a) a general description, including the practice area and the roles of pharmacists in the practice area;

3.3.c.(1)(b) expectations of residents;
3.3.c.(1)(c) educational goals and objectives assigned to the learning experience;
3.3.c.(1)(d) for each objective, a list of learning activities that will facilitate achievement; and,
3.3.c.(1)(e) a description of evaluations that must be completed by preceptors and residents.

3.3.c.(2) Preceptors must orient residents to their learning experience using the learning experience description.

3.3.c.(3) During learning experiences, preceptors will use the four preceptor roles as needed based on residents' needs.

3.4 Evaluation

3.4.a. The extent of residents' progression toward achievement of the program's required educational goals and objectives must be evaluated.

3.4.b. Initial assessment

3.4.b.(1) At the beginning of the residency, the RPD in conjunction with preceptors must assess each resident's entering knowledge and skills related to the educational goals and objectives.

3.4.b.(2) The results of residents' initial assessments must be documented by the program director or designee in each resident's development plan by the end of the orientation period and taken into consideration when determining residents' learning experiences, learning activities, evaluations, and other changes to the program's overall plan.

3.4.c. Formative (ongoing, regular) Assessment

3.4.c.(1) Preceptors must provide ongoing feedback to residents about how they are progressing and how they can improve that is frequent, immediate, specific, and constructive.

3.4.c.(2) Preceptors must make appropriate adjustments to residents' learning activities in response to information obtained through day-to-day informal observations, interactions, and assessments.

3.4.d. Summative Evaluation

3.4.d.(1) At the end of each learning experience, residents must receive, and discuss with preceptors, verbal and written assessment on the extent of their progress toward achievement of assigned educational goals and objectives, with reference to specific criteria.

3.4.d.(2) For learning experiences greater than or equal to 12 weeks in length, a documented summative evaluation must be completed at the 3-, 6-, and 12-month points.

3.4.d.(3) If more than one preceptor is assigned to a learning experience, all preceptors must provide input into residents' evaluations.

3.4.d.(4) For preceptors-in-training, both the preceptor-in-training and the preceptor advisor/coach must sign evaluations.

3.4.d.(5) Residents must complete and discuss at least one evaluation of each preceptor at the end of the learning experience.

3.4.d.(6) Residents must complete and discuss an evaluation of each learning experience at the end of the learning experience.

3.4.e. Residents' Development Plans

3.4.e(1) Each resident must have a development plan documented by the RPD or designee.

3.4.e.(2) On a quarterly basis, the RPD or designee must assess residents' progress and determine if the development plan needs to be adjusted.

3.4.e.(3) The development plan and any adjustments must be documented and shared with all preceptors.

3.5 Continuous Residency Program Improvement

3.5.a. The RPD, residency advisory committee (RAC), and pharmacy executive must engage in an ongoing process of assessment of the residency program including a formal annual program evaluation.

3.5.b. The RPD or designee must develop and implement program improvement activities to respond to the results of the assessment of the residency program, if needed.

3.5.c. The residency program's continuous quality improvement process must evaluate whether residents fulfill the purpose of a PGY2 pharmacy residency program through graduate tracking.

3.5.c.(1) Information tracked must include employment upon completion of PGY2 residency training and may include changes in employment, board certification, surveys of past graduates, or other applicable information.

Standard 4: Requirements of the Residency Program Director and Preceptors

4.1 Program Leadership Requirements

4.1.a. Each residency program must have a single RPD who must be a pharmacist from a practice site involved in the program or from the sponsoring organization.

4.1.b. The RPD may delegate, with oversight, the administrative duties/activities for the conduct of the residency program to one or more individuals (e.g., residency program coordinator).

4.1.c. For residencies conducted by more than one organization (e.g., two organizations in a partnership) or residencies offered by a sponsoring organization (e.g., a college of pharmacy, hospital) in cooperation with one or more practice sites:

4.1.c.(1) A single RPD must be designated in writing by responsible representatives of each participating organization.

4.1.c.(2) The agreement must include definition of the following:

4.1.c.(2)(a) responsibilities of the RPD; and,

4.1.c.(2)(b) RPD's accountability to the organizations and/or practice site(s).

4.2 Residency Program Directors' Eligibility

RPDs must be licensed pharmacists with demonstrated expertise in the chosen area of advanced practice, as substantiated by all of the following: (a.) an ASHP-accredited PGY2 residency in the advanced practice area, followed by a minimum of three years of practice experience or equivalent in the advanced practice area (i.e., five years of practice experience in the advanced area with demonstrated mastery of the knowledge, skills, attitudes, and abilities expected of one who has completed a PGY2 residency); (b.) board certification in the specialty when certification is offered in

that specific advanced area of practice; and, (c.) maintenance of an active practice in the respective advanced practice area.

4.3 Residency Program Directors' Qualifications

RPDs serve as role models for pharmacy practice, as evidenced by the following:

- 4.3.a. leadership within the pharmacy department or within the organization, through a documented record of improvements in and contributions to pharmacy practice;
- 4.3.b. demonstrating ongoing professionalism and contribution to the profession; and
- 4.3.c. representing pharmacy on appropriate drug policy and other committees of the pharmacy department or within the organization.

4.4 Residency Program Leadership Responsibilities

RPDs serve as organizationally authorized leaders of residency programs and have responsibility for the following:

- 4.4.a. activities of a RAC that provides guidance for residency program conduct and related issues;
- 4.4.b. oversight of the progression of residents within the program and documentation of completed requirements;
- 4.4.c. implementing use of criteria for appointment and reappointment of preceptors;
- 4.4.d. evaluation, skills assessment, and development of preceptors in the program;
- 4.4.e. creating and implementing a preceptor development plan for the residency program;
- 4.4.f. continuous residency program improvement in conjunction with the RAC; and,
- 4.4.g. working with pharmacy administration to ensure ongoing support of the program.

4.5 Appointment or Selection of Residency Program Preceptors

- 4.5.a. Organizations shall allow RPDs to appoint and develop pharmacists to become preceptors for the program.
- 4.5.b. RPDs shall develop and apply criteria for preceptors consistent with those required by the Standard.

4.6 Pharmacist Preceptors' Eligibility

Pharmacist preceptors must be licensed pharmacists who

- 4.6.a. have completed an ASHP-accredited PGY2 residency followed by a minimum of one year of pharmacy practice in the advanced practice area; or,
- 4.6.b. without completion of an ASHP-accredited PGY2 residency, have three or more years of practice in the advanced area.

4.7 Preceptors' Responsibilities

Preceptors serve as role models for learning experiences. They must

- 4.7.a. contribute to the success of residents and the program;
- 4.7.b. provide learning experiences in accordance with Standard 3;
- 4.7.c. participate actively in the residency program's continuous quality improvement processes;
- 4.7.d. demonstrate practice expertise and preceptor skills and strive to continuously improve;
- 4.7.e. adhere to residency program and department policies pertaining to residents and services; and,
- 4.7.f. demonstrate commitment to advancing the residency program and pharmacy services.

4.8 Preceptors' Qualifications

Preceptors must demonstrate the ability to precept residents' learning experiences as described in

sections 4.8.a-f.

4.8.a. ability to precept residents' learning experiences by use of clinical teaching roles (i.e., instructing, modeling, coaching, facilitating) at the level required by residents;

4.8.b. ability to assess residents' performance;

4.8.c. recognition in the area of pharmacy practice for which they serve as preceptors;

4.8.d. an established, active practice in the area for which they serve as preceptor;

4.8.e. maintenance of continuity of practice during the time of residents' learning experiences; and,

4.8.f. ongoing professionalism, including a personal commitment to advancing the profession.

4.9 Preceptors-in-Training

4.9.a. Pharmacists new to precepting who do not meet the qualifications for residency preceptors in sections 4.6, 4.7, and 4.8 above (also known as preceptors-in-training) must

4.9.a.(1) be assigned an advisor or coach who is a qualified preceptor; and,

4.9.a.(2) have a documented preceptor development plan to meet the qualifications for becoming a residency preceptor within two years.

4.10 Nonpharmacist preceptors

When nonpharmacists (e.g., physicians, physician assistants, certified nurse practitioners) are utilized as preceptors,

4.10.a. the learning experience must be scheduled after the RPD in consultation with preceptors agree that residents are ready for independent practice; and,

4.10.b. a pharmacist preceptor works closely with the nonpharmacist preceptor to select the educational goals and objectives for the learning experience.

Standard 5: Requirements of the Sponsoring Organization and Practice Site(s) Conducting the Residency Program

5.1 As appropriate, residency programs must be conducted only in practice settings that have sought and accepted outside appraisal of facilities and patient care practices. The external appraisal must be conducted by a recognized organization appropriate to the practice setting.

5.2 Residency programs must be conducted only in those practice settings where staff are committed to seek excellence in patient care as evidenced by substantial compliance with professionally developed and nationally applied practice and operational standards.

5.3 Two or more practice sites, or a sponsoring organization working in cooperation with one or more practice sites (e.g., college of pharmacy, health system), may offer a pharmacy residency.

5.3.a. Sponsoring organizations must maintain authority and responsibility for the quality of their residency programs.

5.3.b. Sponsoring organizations may delegate day-to-day responsibility for the residency program to a practice site; however, the sponsoring organization must ensure that the residency program meets accreditation requirements.

5.3.b.(1) Some method of evaluation must be in place to ensure the purpose of the residency and the terms of the agreement are being met.

5.3.c. A mechanism must be documented that designates and empowers an individual to be responsible for directing the residency program and for achieving consensus on the evaluation and ranking of applicants for the residency.

5.3.d. Sponsoring organizations and practice sites must have signed agreement(s) that clearly define the responsibilities for all aspects of the residency program.

5.3.e. Each of the practice sites that provide residency training must meet the requirements set forth in Standard 5.2 and the pharmacy's service requirements in Standard 6.

5.4 Multiple-site residency programs must be in compliance with the *ASHP Accreditation Policy for Multiple-Site Residency Programs.*[4]

Standard 6: Pharmacy Services

The most current edition of the ASHP *Best Practices for Health-System Pharmacy*, available at www.ashp.org, and, when necessary, other pharmacy association guides to professional practice and other relevant standards (e.g., NIOSH, OSHA, EPA) that apply to specific practices sites will be used to evaluate any patient care sites or other practice operations providing pharmacy residency training.

6.1 Pharmacist Executive
The pharmacy must be led and managed by a professional, legally qualified pharmacist.

6.2 The pharmacy must be an integral part of the healthcare delivery system at the practice site in which the residency program is offered, as evidenced by the following:

6.2.a. the scope and quality of pharmacy services provided to patients at the practice site is based upon the mission of the pharmacy department and an assessment of pharmacy services needed to provide care to patients served by the practice site;

6.2.b. the practice site includes pharmacy in the planning of patient care services;

6.2.c. the scope of pharmacy services is documented and evidenced in practice and quality measures;

6.2.d. pharmacy services extend to all areas of the practice site in which medications for patients are prescribed, dispensed, administered, and monitored;

6.2.e. pharmacists are responsible for the procurement, preparation, distribution, and control of all medications used; and,

6.2.f. pharmacists are responsible for collaborating with other health professionals to ensure safe medication-use systems and optimal drug therapy.

6.3 The pharmacist executive must provide effective leadership and management for the achievement of short- and long-term goals of the pharmacy and the organization for medication-use and medication-use policies.

6.4 The pharmacist executive must ensure that the following elements associated with a well-managed pharmacy are in place (as appropriate to the practice setting):

6.4.a. a pharmacy mission statement;

6.4.b. a well-defined pharmacy organizational structure;

6.4.c. current policies and procedures which are available readily to staff participating in service provision;

6.4.d. position descriptions for all categories of pharmacy personnel, including residents;

6.4.e. procedures to document patient care outcomes data;

6.4.f. procedures to ensure medication-use systems (ordering, dispensing, administration, and monitoring) are safe and effective;

6.4.g. procedures to ensure clinical pharmacy services are safe and effective; and,

6.4.h. a staff complement that is competent to perform the duties and responsibilities assigned (e.g., clinical and distributive services).

6.5 Pharmacy leaders must ensure pharmacy's compliance with

6.5.a. all applicable contemporary federal, state, and local laws, codes, statutes, and regulations governing pharmacy practice unique to the practice site; and,

6.5.b. current national practice standards and guidelines.

6.6 The medication distribution system must include the following components (as applicable to the practice setting):

6.6.a. effective use of personnel (e.g., pharmacy technicians);

6.6.b. a unit-dose drug distribution service;

6.6.c. an intravenous admixture and sterile product service;

6.6.d. a research pharmacy including an investigational drug service;

6.6.e. an extemporaneous compounding service;

6.6.f. a system for handling hazardous drugs;

6.6.g. a system for the safe use of all medications (e.g., drug samples, high alert, look-alike/sound-alike, emergency preparedness programs, medical emergencies);

6.6.h. a secure system for the use of controlled substances;

6.6.i. a controlled floor-stock system for medications administered;

6.6.j. an outpatient drug distribution service including a patient assessment and counseling area; and,

6.6.k. a system ensuring accountability and optimization for the use of safe medication-use system technologies.

6.7 The following patient care services and activities are provided by pharmacists in collaboration with other healthcare professionals to optimize medication therapy for patients:

6.7.a. membership on interdisciplinary teams in patient care areas;

6.7.b. prospective participation in the development of individualized medication regimens and treatment plans;

6.7.c. implementation and monitoring of treatment plans for patients;

6.7.d. identification and responsibility for resolution of medication-related problems;

6.7.e. review of the appropriateness and safety of medication prescriptions/orders;

6.7.f. development of treatment protocols, care bundles, order sets, and other systematic approaches to therapies involving medications for patients;

6.7.g. participation as a provider of individual and population-based patient care services and disease state management, initiating and modifying drug therapy, based on collaborative practice agreements or other treatment protocols;

6.7.h. a system to identify appropriately trained and experienced pharmacists and ensure quality care is provided, including when pharmacists are practicing under collaborative practice agreements (e.g., complete credentialing and privileging for pharmacists providing patient care service);

6.7.i. documentation of significant patient care recommendations and resulting actions, treatment plans, and progress notes in the appropriate section of patients' permanent medical records;

6.7.j. medication administration consistent with laws, regulations, and practice site policy;

6.7.k. disease prevention and wellness promotion programs (e.g., smoking cessation, immunization);

6.7.l. a system to ensure and support continuity-of-care during patient care transitions; and,

6.7.m. drug use policy activities including, but not limited to, the following (as applicable to the practice setting):

6.7.m.(1) developing and maintaining an evidence-based formulary;

6.7.m.(2) educating healthcare providers on timely medication-related matters and medication policies;

6.7.m.(3) development and monitoring of evidence-based medication-use guidelines, policies, and order sets;

6.7.m.(4) managing adverse drug event monitoring, resolution, reporting, and prevention programs; and,

6.7.m.(5) managing selection, procurement, storage, and dispensing of medications used within the organization.

6.8 The pharmacy practice must have personnel, facilities, and other resources to carry out a broad scope of pharmacy services (as applicable to the practice setting). The pharmacy's

6.8.a. facilities are designed, constructed, organized, and equipped to promote safe and efficient work;

6.8.b. professional, technical, and clerical staff complement is sufficient and diverse enough to ensure that the department can provide the level of service required by all patients served; and,

6.8.c. resources can accommodate the training of the current and future workforce (e.g., residents, students, technicians).

6.9 Continuous Quality Improvement

6.9.a. Pharmacy department personnel must engage in an ongoing process to assess the quality of pharmacy services.

6.9.b. Pharmacy department personnel must develop and implement pharmacy services improvement initiatives to respond to assessment results.

6.9.c. The pharmacy department's assessment and improvement process must include assessing and developing skills of the of pharmacy department's staff.

6.10 Pharmacy services must be provided to all patients of the organization (or practice) that are in the PGY2 residency's practice area. Additional considerations are (as applicable to the practice setting):

6.10.a. A sufficient patient population (both in terms of the number of patients and the variety of disease states) must be available in all areas required for instruction in the PGY2 residency program.

6.10.b. Pharmacists providing advanced practice services must be essential members of interdisciplinary teams in the patient care areas associated with the residency program.

6.10.c. Pharmacists providing advanced practice pharmacy services must participate in the development of treatment protocols, critical pathways, order sets, and other systems approaches involving medications for patients on involved services.

6.10.d. For patients of involved advanced practice services, pharmacists must engage in collaborative practice agreements with other providers and should be authorized to manage patients following collaborative practice agreements, treatment protocols, critical pathways; and,

6.10.e. Pharmacists providing advanced practice pharmacy services must participate prospectively in the development of individualized treatment plans for patients of involved services.

Glossary

Assessment. Measurement of progress on achievement of educational objectives.

Certification. A voluntary process by which a nongovernmental agency or an association grants recognition to an individual who has met certain predetermined qualifications specified by that organization. This formal recognition is granted to designate to the public that the individual has attained the requisite level of knowledge, skill, or experience in a well-defined, often specialized, area of the total discipline. Certification usually requires initial assessment and periodic reassessments of the individual's qualifications.

Clinical pharmacist. Clinical pharmacists work directly with physicians, other health professionals, and patients to ensure that the medications prescribed for patients contribute to the best possible health outcomes. Clinical pharmacists practice in healthcare settings where they have frequent and regular interactions with physicians and other health professionals, contributing to better coordination of care. *(American College of Clinical Pharmacy)*.

Competency area. Category of residency graduates' capabilities.

Complex condition. Patients with complex conditions are those who are being treated with high-risk medications, high numbers of medications, and/or have multiple disease states.

Criteria. Examples intended to help preceptors and residents identify specific areas of successful skill development or needed improvement in residents' work.

Educational goal. Broad statement of abilities.

Educational objective. Observable, measurable statement describing what residents will be able to do as a result of participating in the residency program.

Evaluation. Judgment regarding quality of learning.

Formative assessment. Ongoing feedback to residents regarding their progress on achievement of educational objectives for the purpose of improving learning.

Interdisciplinary team. A team composed of members from different professions and occupations with varied and specialized knowledge, skills, and methods. The team members integrate their observations, bodies of expertise, and spheres of decision making to coordinate, collaborate, and communicate with one another in order to optimize care for a patient or group of patients. (Institute of Medicine. Health professions education: a bridge to quality. Washington, DC: The National Academy Press; 2001.)

Multiple-site residency. A residency site structure in which multiple organizations or practice sites are involved in the residency program. Examples include programs in which residents spend greater than 25% of the program away from the sponsoring organization/main site at another single site; or there are multiple residents in a program, and they are home-based in separate sites.

1. To run a multiple-site residency, there must be a compelling reason for offering the training in a multiple-site format (that is, the program is improved substantially in some manner). For example:
    a. An RPD has expertise; however, the site needs development (e.g., site has a good variety of patients and potentially good preceptors, but the preceptors may need some oversight related to the residency program, or services need to be more fully developed);
    b. The quality of preceptorship is enhanced by adding multiple sites;
    c. An increased variety of patients/disease states allows wider scope of patient interactions for residents;
    d. Increased administrative efficiency develops more sites that can handle more residents across multiple sites/geographic areas;
    e. Synergy of the multiple sites increases the quality of the overall program;
    f. Training ensures the program meets all of the requirements (that could not be done in a single site alone); and,
    g. There is the ability to increase the number of residents in a quality program.
2. A multiple-site residency program conducted in multiple hospitals that are part of a health system that is considering CMS pass-through funding should conduct a thorough review of 42CFR413.85 and have a discussion with the finance department to ensure eligibility for CMS funding.
3. In a multiple-site residency program, a sponsoring organization must be identified to assume ultimate responsibility for coordinating and administering the program. This includes the following:
    a. designating a single RPD;
    b. establishing a common residency purpose statement to which all residents at all sites are trained;
    c. ensuring a program structure and consistent required learning experiences;
    d. ensuring the required learning experiences are comparable in scope, depth, and complexity for all residents, if home based at separate sites;
    e. ensuring a uniform evaluation process and common evaluation tools are used across all sites;
    f. ensuring there are consistent requirements for successful completion of the program;
    g. designating a site coordinator to oversee and coordinate the program's implementation at each site that is used for more than 25% of the learning experiences in the program (for one or more residents); and,
    h. ensuring the program has an established, formalized approach to communication that includes at a minimum the RPD and site coordinators to coordinate the conduct of the program across all sites.

Nontraditional residency: Residency program that meets requirements of a 12-month residency program in a different timeframe.

Pharmacist executive. The person who has ultimate responsibility for the residency practice site/pharmacy in which the residency program is conducted. (In some settings, this person is referred to, for example, as the *director of pharmacy*, the *pharmacist-in-charge*, the *chief of pharmacy services.*) In a multiple-site residency, a sponsoring organization must be identified to assume ultimate responsibility for coordinating and administering the program.

Preceptor. An expert pharmacist who gives practical experience and training to a pharmacy resident. Preceptors have responsibility for the evaluation of residents' performance.

Preceptor-in-training. Pharmacists who are new to precepting residents who have not yet met the qualification for a preceptor in an accredited program. Through coaching and a development plan, they may be a preceptor for a learning experience and become full preceptors within two years.

Residency program director. The pharmacist responsible for direction, conduct, and oversight of the residency program. In a multiple-site residency, the RPD is a pharmacist designated in a written agreement between the sponsoring organization and all of the program sites.

Resident's development plan. Record of modifications to a resident's program based on the resident's learning needs.

Self-evaluation. A process of reflecting on one's learning progress and/or performance to determine strengths, weaknesses, and actions to address them.

Service commitments. Clinical and operational practice activities, which may be defined in terms of the number of hours, types of activities, and a set of educational goals and objectives.

Single-site residency. A residency site structure in which the practice site assumes total responsibility for the residency program. In a single-site residency, the majority of the resident's training program occurs at the site; however, the resident may spend assigned time in short elective learning experiences off-site.

Site. The actual practice location where the residency experience occurs.

Site coordinator. A preceptor in a multiple-site residency program who is designated to oversee and coordinate the program's implementation at an individual site that is used for more than 25% of the learning experiences. This individual may also serve as a preceptor in the program. A site coordinator must

1. be a licensed pharmacist who meets the minimum requirements to serve as a preceptor (meets the criteria identified in Principle 5.9 of the appropriate pharmacy residency accreditation standard);
2. practice at the site at least 10 hours per week;
3. have the ability to teach effectively in a clinical practice environment; and,
4. have the ability to direct and monitor residents' and preceptors' activities at the site (with the RPD's direction).

Sponsoring organization. The organization assuming ultimate responsibility for the coordination and administration of the residency program. The sponsoring organization is charged with ensuring that residents' experiences are educationally sound and are conducted in a quality practice environment. The sponsoring organization is also responsible for submitting the accreditation application and ensuring periodic evaluations are conducted. If several organizations share responsibility for the financial and management aspects of the residency (e.g., school of pharmacy, health system, and individual site), the organizations must mutually designate one organization as the sponsoring organization.

Staffing. See *Service commitments.*

Summative evaluation. Final judgment and determination regarding quality of learning.

References

1. American Society of Health-System Pharmacists. ASHP regulations on accreditation of pharmacy residencies, 2010. http://www.ashp.org. Accessed September 2, 2014.

2. American Society of Health-System Pharmacists. Pharmacy specific duty hour requirements for the ASHP accreditation standards for pharmacy residencies, 2012. http://www.ashp.org. Accessed September 2, 2014.

3. American Society of Health-System Pharmacists. Rules for the ASHP pharmacy resident matching program, 2006. http://www.ashp.org. Accessed September 2, 2014.

4. American Society of Health-System Pharmacists. ASHP accreditation policy for multiple-site residency programs. http://www.ashp.org. Accessed September 2, 2014.

Approved by the ASHP Board of Directors September 18, 2015. Developed by the ASHP Commission on Credentialing. This standard replaces the previous *ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs* approved by the ASHP Board of Directors on September 23, 2005. For existing programs this revision of the accreditation standard takes effect July 1, 2017. Until that time the current standard, which was approved September 23, 2005, is in force.

Appendix F-2

ASHP Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases

Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases

Prepared in collaboration with the Society of Infectious Diseases Pharmacists

Overview of PGY2 Pharmacy Residency in Infectious Diseases

The PGY2 pharmacy residency in infectious diseases is designed to transition PGY1 residency graduates from generalist practice to specialized practice focused on the care of patients with infectious diseases. Residency graduates are equipped to participate as integral members of interdisciplinary teams caring for patients with infectious diseases, assuming responsibility for their pharmaceutical care. They are also trained to provide this care as an independent practitioner. The wealth of residency graduates' knowledge of infectious diseases and their treatment with the anti-infectives class of medications combined with extensive care of individuals with an infectious disease produces a pharmacist who can successfully serve health care organizations as the ultimate resource for information about anti-infectives and for decision-making affecting the care of these patients. This includes leadership in formulary decision-making for anti-infectives.

Exiting residents have been trained to assume responsibility for identifying and implementing opportunities to improve the medication-use system in the infectious diseases practice area.

Groomed for practice leadership, infectious diseases pharmacy residency graduates can be expected to continue their pursuit of expertise in practice; to possess advanced skills to identify the pharmacotherapy and medication-use training needs of other health care professionals caring for individuals with infectious diseases; to deliver effective training to those health professionals; and to contribute to public health efforts for health improvement, wellness, and the prevention of infectious diseases. In this public health role they are trained to initiate efforts to reduce the spread of antibiotic resistance and vaccine preventable diseases.

Explanation of the Contents of This Document:

Each of the document's objectives has been classified according to educational taxonomy (cognitive, affective, or psychomotor) and level of learning. An explanation of the taxonomies is available elsewhere.[1]

The order in which the required educational outcomes are presented in this document does not suggest relative importance of the outcome, amount of time that should be devoted to teaching the outcome, or sequence for teaching.

The educational outcomes, goals, and objectives are divided into those that are required and those that are elective. The required outcomes, including all of the goals and objectives falling under them, must be included in the design of all programs. The elective outcomes are provided for those programs that wish to add to the required outcomes. Programs selecting an elective outcome are not required to include all of the goals and objectives falling under that outcome. In addition to the potential elective outcomes contained in this document, programs are free to create their own elective outcomes with associated goals and objectives. Other sources of elective outcomes may include elective educational outcomes in the list provided for PGY1 pharmacy residencies and educational outcomes for training in other PGY2 areas. Each of the goals falling under the program's selection of program outcomes (required and elective) must be evaluated at least once during the resident's year.

Educational Outcomes (*Outcome*): Educational outcomes are statements of broad categories of the residency graduates' capabilities.

Educational Goals (Goal): Educational goals listed under each educational outcome are broad sweeping statements of abilities.

Educational Objectives (OBJ): Resident achievement of educational goals is determined by assessment of the resident's ability to perform the associated educational objectives below each educational goal.

Instructional Objectives *(IO)*: Instructional objectives are the result of a learning analysis of each of the educational objectives. They are offered as a resource for preceptors encountering difficulty in helping residents achieve a particular educational objective. The instructional objectives falling below the educational objectives suggest knowledge and skills required for successful performance of the educational objective that the resident may not possess upon entering the residency year. Instructional objectives are teaching tools only. They are not required in any way nor are they meant to be evaluated.

[1] Nimmo, CM. Developing training materials and programs: creating educational objectives and assessing their attainment. In: Nimmo CM, Guerrero R, Greene SA, Taylor JT, eds. Staff development for pharmacy practice. Bethesda, MD: ASHP; 2000.

Required Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases

Outcome R1: Promote health improvement, wellness, and the prevention of infectious diseases.

Goal R1.1 Contribute to the development and delivery of health improvement, wellness, and screening initiatives for preventing infectious diseases.

OBJ R1.1.1 (Synthesis) Participate in a public health department's system for reporting infectious diseases.

IO Explain the infectious diseases pharmacy specialist's role in working with public health officials to maintain systems for reporting the incidence of infectious diseases.

OBJ R1.1.2 (Comprehension) Explain the infectious diseases pharmacy specialist's role in the development of emergency protocols for public health disasters (e.g., natural disaster, bioterrorism, epidemic).

OBJ R1.1.3 (Comprehension) Explain the role of the infectious diseases pharmacy specialist in advocacy for vaccination.

IO Explain the importance of vaccination in the prevention and control of the spread of infectious diseases.

IO Explain how to secure credentials for administering vaccinations.

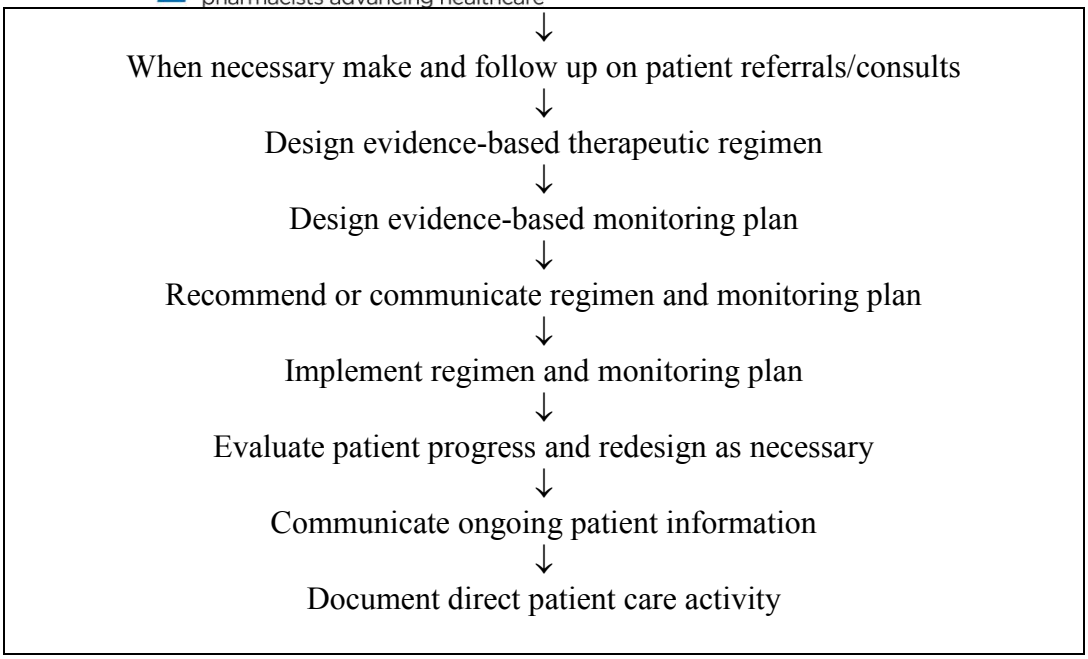
OBJ R1.1.4 (Comprehension) Explain the impact of the agricultural use of anti-infectives[2] in animal husbandry on human pharmacotherapy.

Outcome R2: Optimize the outcomes of individuals with an infectious disease by providing evidence-based, patient-centered medication therapy as an integral member of an interdisciplinary team or as an independent clinician.

(A residency in infectious diseases pharmacy is dependent upon the availability of a broad range of patient categories and professional practice experience. Therefore, learning experiences in direct patient care should occur in diverse patient populations, a variety of disease states, and a range of complexity of patient problems.)

Establish collaborative professional relationships with health care team members
↓
Prioritize delivery of care to individuals with an infectious disease
↓
Establish collaborative pharmacist-patient-caregiver relationship
↓
Collect and analyze patient information

[2] Anti-infective: This term includes antibacterials, antifungals, antivirals, antiparasitics, vaccines, and biological response modifiers employed in the management of infectious diseases.



Goal R2.1 When appropriate, establish collaborative professional relationships with members of the infectious diseases health care team (e.g., infection control personnel, clinical microbiology laboratory staff, physicians).

OBJ R2.1.1 (Synthesis) Implement a strategy that effectively establishes cooperative, collaborative, and communicative working relationships with members of the interdisciplinary infectious diseases health care team.

IO *Explain the training and expected areas of expertise of the members of the infectious diseases interdisciplinary team with which one works.*

IO *For each of the professions with which one interacts on the infectious diseases interdisciplinary team, explain the profession's view of its role and responsibilities in collaborations on patient-centered care.*

IO *Explain the expectations of the pharmacist's role on the infectious diseases team from the viewpoint of different collaborating professions.*

IO *Explain the professional dynamics of the different services that contribute to the care of individuals with an infectious disease.*

IO *Identify the interpersonal dynamics of each member of the infectious diseases team.*

Goal R2.2 Prioritize the delivery of care to individuals with an infectious disease.

OBJ R2.2.1 (Synthesis) Devise a plan for deciding which individuals with an infectious disease to focus on if given limited time and multiple patient care responsibilities.

IO *Explain factors to consider when determining priority for care among individuals with an infectious disease.*

IO *Explain how the complexity or severity of the problems of individuals with an infectious disease may mandate urgency of care and reordering of current priorities for care (e.g. medical emergencies).*

OBJ R2.2.2 (Synthesis) Formulate a strategy for continuity of pharmaceutical care in all applicable treatment settings.

- *IO Explain the types of patient and caregiver education required to facilitate self-care.*
- *IO Explain methods for coordinating information between multiple pharmacy and other health care workers serving the needs of individuals with an infectious disease that will facilitate the provision of pharmaceutical care.*
- *IO Explain methods for assuring continuity of pharmaceutical care across all treatment settings (e.g., hospital, clinic, home) used by a specific patient.*

Goal R2.3 Establish collaborative pharmacist-patient-caregiver relationships.

OBJ R2.3.1 (Synthesis) Formulate a strategy that effectively establishes a patient-centered pharmacist-patient-caregiver relationship.

- *IO Explain the impact of fear, anger, depression, loss, grief and their opposites on patients' perception of their disease.*
- *IO Explain the impact of fear, anger, depression, loss, grief, and their opposites on the health care professional's approach to caring for individuals with an infectious disease.*
- *IO Explain social and pharmacoeconomic issues encountered frequently in individuals with an infectious disease.*
- *IO Explain problems associated with emotional attachments between health care professionals and patients.*
- *IO Explain the importance of including in the strategy an explanation to the patient of the infectious diseases pharmacist's role in his/her care.*

Goal R2.4 Collect and analyze patient information.

OBJ R2.4.1 (Analysis) Collect and organize all patient-specific information needed by the infectious diseases pharmacist to anticipate, prevent, detect, and/or resolve medication-related problems and to make appropriate evidence-based, patient-centered medication therapy recommendations.

- *IO Accurately write and interpret medical terminology and abbreviations particular to the discussion of an infectious disease.*
- *IO Identify the types of patient-specific information, including complementary and alternative medicines, the pharmacist requires to anticipate, prevent, detect, and/or resolve medication-related problems and to make appropriate evidence-based, patient-centered medication therapy recommendations for individuals with an infectious disease.*
- *IO Explain signs and symptoms, epidemiology, risk factors, pathogenesis, natural history of disease, pathophysiology, clinical course, etiology, and treatment of those infectious diseases listed in the appendix.*
- *IO Explain signs and symptoms, epidemiology, risk factors, pathogenesis, pathophysiology, clinical course (onset, peak and duration), etiology, and treatment of allergic responses, including hypersensitivity reactions to anti-infectives.*
- *IO Explain the mechanism of action, pharmacokinetics, pharmacodynamics, pharmacogenomics, pharmacoeconomics, usual regimen (dose, schedule, form, route, and method of administration), indications, contraindications,*

interactions, adverse reactions, and therapeutics of anti- infective classes listed in the appendix.

IO *Explain current trends and issues in nontraditional medication therapy (e.g., interactions, adverse events).*

IO *Explain host factors instrumental in all aspects of anti-infective pharmacotherapy.*

IO *Accurately interpret microbiological and serological data (e.g., culture, stains).*

OBJ R2.4.2 (Analysis) Determine the presence of any of the following medication therapy problems in the pharmacotherapy of an individual with an infectious disease:

1. Medication used with no medical indication.
2. Patient has medical conditions for which there is no medication prescribed.
3. Medication prescribed inappropriately for a particular medical condition.
4. Immunization regimen is incomplete.
5. Current medication therapy regimen contains something inappropriate (dose, dosage form, duration, schedule, route of administration, method of administration).
6. Presence of therapeutic duplication.
7. Medication to which the patient is allergic has been prescribed.
8. There are adverse drug- or device-related events or potential for such events.
9. There are clinically significant drug-drug, drug-disease, drug-nutrient, or drug-laboratory test interactions or potential for such interactions.
10. Medical therapy has been compromised by social, recreational, nonprescription, complementary, or alternative drug use by the patient or others.
11. Patient not receiving full benefit of prescribed medication therapy.
12. There are problems arising from the financial impact of medication therapy on the patient.
13. Patient lacks understanding of medication therapy.
14. Patient not adhering to medication regimen.

OBJ R2.4.3 (Analysis) Using an organized collection of patient-specific information, summarize the health care needs of an individual with an infectious disease.

Goal R2.5 When necessary, make and follow up on referrals/consults for individuals with an infectious disease.

OBJ R2.5.1 (Evaluation) When presented with an individual with an infectious disease with health care needs that cannot be met by the pharmacist, make a referral/consult to the appropriate health care provider based on the patient's acuity and the presenting problem.

OBJ R2.5.2 (Synthesis) Devise a plan for follow-up for a referral/consult for an individual with an infectious disease.

Goal R2.6 Design evidence-based therapeutic regimens for individuals with an infectious disease.

OBJ R2.6.1 (Synthesis) Specify therapeutic goals for an individual with an infectious disease incorporating the principles of evidence-based medicine that integrate patient-specific data, disease and medication-specific information, ethics, and quality-of-life considerations.

- *IO Identify the sources of disease management and drug-use guidelines currently used in infectious diseases practice.*
- *IO Explain various genetic, race, gender-related, age-related, and disease-related factors that influence the achievement of therapeutic goals.*
- *IO Explain how a patient's performance status or mental status might affect the setting of therapeutic goals.*
- *IO Explain the potential impact of patient, family member, caregiver, and/or health care professional misconceptions of realistic treatment outcomes on the setting of pharmacotherapeutic goals.*

OBJ R2.6.2 (Synthesis) Design a patient-centered regimen that meets the evidence-based therapeutic goals established for an individual with an infectious disease; integrates patient-specific information, disease information, drug information (e.g., pharmacokinetics, pharmacodynamics, pharmacogenomics), ethical issues and quality-of-life issues; and considers pharmacoeconomic principles.

- *IO Explain various sources of disease management and drug-use guidelines applicable to infectious diseases populations.*
- *IO Explain the potential impact of anti-infective medication side effects, costs, and scheduling on the adherence and persistence of individuals with an infectious disease treated in the ambulatory versus acute care environment.*
- *IO Explain factors to consider when comparing the benefits and risks of an alternate anti-infective therapy.*
- *IO Explain the rationale for drug combinations used in the treatment of individuals with an infectious disease.*
- *IO Explain various host-related (e.g., genetic, race, gender, age, disease) factors that influence response to an infectious disease-related drug therapy.*
- *IO Explain additional concerns with microbial resistance, adherence/persistence, cost, and route of administration when making decisions on anti-infective regimens.*
- *IO Explain strategies for anticipating and desensitizing patients with hypersensitivity reactions.*

Goal R2.7 Design evidence-based monitoring plans for individuals with an infectious disease.

OBJ R2.7.1 (Synthesis) Design a patient-centered, evidenced-based monitoring plan for a therapeutic regimen that effectively evaluates achievement of the therapeutic goals set for an individual with an infectious disease.

- *IO Explain the use of treatment guidelines, protocols, and/or critical pathways in the design of monitoring plans.*
- *IO State monitoring parameters for therapeutic response to those infectious diseases listed in the appendix.*

IO *State parameters for monitoring adverse events for the anti-infective classes listed in the appendix.*

IO *Explain considerations of practicality, clinical utility, and economics in choosing frequency of monitoring.*

Goal R2.8 Recommend or communicate regimens and monitoring plans for individuals with an infectious disease.

OBJ R2.8.1 (Application) Recommend or communicate a patient-centered, evidence-based therapeutic regimen and corresponding monitoring plan to other members of the interdisciplinary team and an individual with an infectious disease in a way that is systematic, logical, accurate, timely, sensitive, and secures consensus from the team and patient.

IO *Explain the kinds of issues that require particular sensitivity when discussing treatment plans with individuals with an infectious disease.*

Goal R2.9 Implement regimens and monitoring plans.

OBJ R2.9.1 (Application) When appropriate, initiate the patient-centered, evidence-based therapeutic regimen and monitoring plan for an individual with an infectious disease according to the organization's policies and procedures.

IO *Explain the organization's policies and procedures for ordering diagnostic or monitoring tests.*

IO *Explain the organization's policies and procedures for issuing medication orders.*

OBJ R2.9.2 (Application) When necessary, contribute to the work of the team to facilitate patient access to necessary anti-infectives.

IO *Explain the general framework of patient assistance programs available for anti-infectives.*

IO *Explain the pharmacist's role (versus other interdisciplinary team members) in securing payer coverage or patient assistance.*

IO *Explain circumstances in which it may be appropriate to redesign a patient's medication regimen in order to ensure that a patient will have financially viable access to the prescribed anti-infectives.*

IO *Explain various approaches used to adjust medication regimens in order to facilitate patient access to anti-infectives.*

IO *Explain organizational policies and procedures for securing compassionate use medications needed for an individual patient.*

IO *Explain organizational policies and procedures for securing the use of an investigational drug needed for an individual patient.*

OBJ R2.9.3 (Application) Use effective patient education techniques to provide counseling to individuals with an infectious disease and their caregivers, including information on anti-infective therapy, interactions, adverse effects, adherence, persistence, appropriate use, handling, storage, and administration.

IO *Explain issues unique to the counseling of individuals with an infectious disease.*

IO *Explain the critical role of adherence and persistence in the short and long-term success of anti-infective therapy.*

Goal R2.10 Evaluate the progress of individuals with an infectious disease and, as necessary, redesign regimens and monitoring plans.

OBJ R2.10.1 (Evaluation) Accurately assess the progress toward the therapeutic goal(s) of an individual with an infectious disease.

IO Explain factors that may contribute to the unreliability of assays and microbial cultures.

OBJ R2.10.2 (Synthesis) As necessary, redesign the regimen and monitoring plan of an individual with an infectious disease based on evaluation of monitoring data and therapeutic outcomes.

IO Explain how the rapidity of evolving infectious diseases research can affect the redesign of a patient's therapeutic regimen.

IO Explain a scenario where therapeutic failure leads to redesigning a patient's anti-infective regimen.

Goal R2.11: Communicate ongoing patient information.

OBJ R2.11.1 (Application) Ensure that accurate and timely medication-specific information regarding a specific individual with an infectious disease reaches those who need it at the appropriate time.

IO Recognize instances in which there is urgency in communicating the results of monitoring to the appropriate members of the infectious diseases team.

OBJ R2.11.2 (Application) When given an individual with an infectious disease who is transitioning from one health care setting to another, communicate pertinent pharmacotherapeutic information to the receiving health care professionals.

IO Identify information critical to ongoing implementation or monitoring a plan of pharmaceutical care.

IO Identify the key recipients of critical information and the most effective means of communicating such information for a given care setting.

Goal R2.12: Document direct patient care activities appropriately.

OBJ R2.12.1 (Analysis) Appropriately select direct patient care activities for individuals with an infectious disease for documentation.

OBJ R2.12.2 (Application) Use effective communication practices when documenting a direct patient care activity for an individual with an infectious disease.

IO If working for a public health agency, explain the agency's requirements for the documentation of patient follow-up (e.g., anti-tubercular prophylaxis and therapy, vaccination programs).

Outcome R3: Manage and improve anti-infective-use processes.

Goal R3.1 Contribute to the maintenance of the organization's formulary for anti-infectives.

OBJ R3.1.1 (Evaluation) Make recommendations for additions or deletions to the organization's anti-infective formulary based on literature and/or comparative reviews.

IO State the elements of a comparative review for an anti-infective.

IO Explain the importance of each of the anti-infective-specific elements of a comparative review.

IO *State resources to consult in the preparation of an anti-infective comparative review*.

OBJ R3.1.2 (Evaluation) Make recommendations for anti-infective class decisions based on comparative reviews.

OBJ R3.1.3 (Synthesis) Formulate effective strategies for communicating anti-infective drug use policies to providers.

IO *Explain routes of communication of formulary information in the infectious diseases setting*.

OBJ R3.1.4 (Evaluation) When presented with a real or hypothetical anti-infective shortage, identify an appropriate alternative.

IO *State resources for identifying medications in short supply*.

IO *Explain the organization's system for communicating information regarding drug shortages*.

IO *Explain a strategy for making optimal choices for alternative medications*.

OBJ R3.1.5 (Evaluation) When the needs of a particular patient warrant, determine if a non-formulary anti-infective should be considered for use.

IO *Identify the appropriate literature that supports the use of a non-formulary medication in a clinical situation*.

IO *Explain the organization's system for approving, obtaining, and handling non-formulary medications used by patients*.

OBJ R3.1.6 (Synthesis) Contribute to the activities of the anti-infective subcommittee of the pharmacy and therapeutics (P&T) committee.

Goal R3.2 Lead the review of existing, or the development and implementation of, anti-infective guidelines/protocols.

OBJ R3.2.1 (Analysis) Identify the need for an anti-infective guideline/ protocol by comparing the applicability of existing guidelines/protocols to the needs of the organization.

IO *Identify mechanisms for prevention of infection (e.g., surgical prophylaxis, anti-infective order forms, pneumococcal vaccine)*.

OBJ R3.2.2 (Synthesis) Develop a medication-related guideline/protocol for the care of individuals with an infectious disease based on best evidence and the characteristics of the local environment and patients.

IO *Explain factors to consider when tailoring an existing guideline/ protocol to the needs of one's organization.*

OBJ R3.2.3 (Synthesis) Formulate a strategy that will allow for successful implementation of an anti-infective guideline/protocol for the care of individuals with an infectious disease.

IO *Explain the importance of using an interdisciplinary approach to implementation of an anti-infective guideline/protocol*.

Goal R3.3 Contribute to organizational decision-making for infection control.

OBJ R3.3.1 (Synthesis) Formulate a strategy for assuring infectious diseases pharmacy specialist representation on the organization's policy-making committee for infection control.

IO *Explain the meaning of the term "antimicrobial stewardship".*

OBJ R3.3.2 (Synthesis) Contribute evidence-based pharmacy support for organizational infection control activities.

Goal R3.4 Assist the organization in achieving compliance with accreditation, legal, regulatory, and safety requirements related to the use of anti-infective agents (e.g., Joint Commission requirements; ASHP standards, statements, and guidelines; state and federal laws regulating pharmacy practice; OSHA regulations).

OBJ R3.4.1 (Evaluation) Determine appropriate activities and documentation to meet accreditation, legal, regulatory, and safety requirements in the area of infectious diseases.

Goal R3.5 Identify opportunities for improvement of the organization's use of anti-infectives.

OBJ R3.5.1 (Comprehension) Explain those aspects of the organization's anti-infective use that place patients at risk for adverse drug events (ADEs).

OBJ R3.5.3 (Evaluation) Identify opportunities for improvement in the organization's use of anti-infectives by comparing anti-infective use to relevant best practices.

IO Explain the meaning of the term "continuous quality improvement."

Outcome R4: Demonstrate excellence in the provision of educational activities for health care professionals and health care professionals in training centering on optimizing anti-infective pharmacotherapy.

Goal R4.1 Provide effective education to health care professionals and health care professionals in training centering on optimizing anti-infective pharmacotherapy.

OBJ R4.1.1 (Application) Use effective educational techniques in the design of all educational activities.

IO Identify emerging issues in infectious diseases pharmacy that would be suitable for interdisciplinary educational sessions.

IO Explain the differences in effective educational strategies when teaching colleagues versus residents versus students versus health professionals in other disciplines.

IO Design instruction that meets the individual learner's needs.

IO Explain the concept of learning styles and its influence on the design of instruction.

IO Write appropriately worded educational objectives.

IO Explain the match between instructional delivery systems (e.g., demonstration, written materials, videotapes) and the specific types of learning each facilitates.

IO Design instruction that employs strategies, methods, and techniques congruent with the objectives for education or training.

IO Explain effective teaching approaches for the various types of learning (e.g., imparting information, teaching psychomotor skills, inculcation of new attitudes).

OBJ R4.1.2 (Synthesis) Design an assessment strategy that appropriately measures the specified objectives for education and fits the learning situation.

IO Explain appropriate assessment techniques for assessing the learning outcomes of educational or training programs.

OBJ R4.1.3 (Application) Use skill in the four preceptor roles employed in practice-based teaching (direct instruction, modeling, coaching, and facilitation).

IO Explain the stages of learning that are associated with each of the preceptor roles.

OBJ R4.1.4 (Application) Use skill in case-based teaching.

IO Explain the importance of identifying the key teaching points for a case before attempting to construct it.

IO Explain factors to consider when deciding the patient data to present in a case.

OBJ R4.1.5 (Application) Use public speaking skills to speak effectively in large and small group situations.

IO Explain techniques that can be used to enhance audience interest.

IO Explain techniques that can be used to enhance audience understanding of one's topic.

IO Explain speaker habits that distract the audience.

Outcome R5: Serve as an authoritative resource on the optimal use of medications used to treat individuals with an infectious disease.

Goal R5.1 Select core biomedical literature resources appropriate for infectious diseases pharmacy practice.

OBJ R5.1.1 (Application) Use a knowledge of standard resources to select core primary, secondary, and tertiary biomedical literature resources appropriate for infectious diseases pharmacy practice.

Goal R5.2 Contribute the infectious diseases pharmacy practice perspective to technology and automation systems decisions.

OBJ R5.2.1 (Synthesis) When appropriate, contribute to the organization's design of its technology and automation systems.

IO Explain the infectious diseases pharmacist's role in contributing to the design of technology systems (e.g., CPOE, PDAs, software) for the organization.

IO Explain the infectious diseases pharmacist's role in contributing to decisions regarding automation systems (e.g., smart pumps).

Goal R5.3 Establish oneself as an organizational expert for infectious diseases pharmacy-related information and resources.

OBJ R5.3.1 (Synthesis) Implement a successful strategy for earning credibility within the organization to be an authoritative resource on the pharmaceutical care of individuals with an infectious disease.

IO Identify barriers to the infectious diseases pharmacist for earning credibility with members of the infectious diseases team.

IO Identify barriers to the infectious diseases pharmacist for earning credibility within the organization.

OBJ R5.3.2 (Comprehension) Explain the resources that the specialist should negotiate when establishing a new infectious diseases pharmacy practice.

Outcome R6: Demonstrate leadership and practice management skills.

Goal R6.1 Exhibit the ongoing development of essential personal skills of an infectious diseases pharmacy practice leader.

OBJ R6.1.1 (Characterization) Practice self-managed continuing professional development with the goal of improving the quality of one's own performance through self-assessment and personal change.

IO *State criteria for judging one's performance of tasks that are critical in one's own practice.*

IO *Explain the role of participation in infectious diseases and pharmacy professional organization meetings in the ongoing development of expertise in infectious diseases pharmacy.*

IO *Explain the importance of staying current with pertinent infectious diseases-related literature when one's goal is to develop expertise in the field.*

IO *Explain the process and requirements for acquiring Board of Pharmaceutical Specialties (BPS) added qualifications in infectious diseases pharmacotherapy.*

OBJ R6.1.2 (Characterization) Demonstrate commitment to the professional practice of infectious diseases pharmacy through active participation in the activities of local, state, and/or national infectious diseases and pharmacy professional organizations.

IO *Assess the relevance of membership or participation in various professional associations associated with infectious diseases or pharmacy practice.*

IO *Explain the importance of contributing to the work of infectious diseases professional organizations in advancing the visibility of the pharmacist's role in the care of individuals with an infectious disease.*

Goal R6.2 Contribute to the leadership and management activities within the infectious diseases pharmacy practice area.

OBJ R6.2.1 (Application) Use effective negotiation skills to resolve conflicts.

OBJ R6.2.2 (Synthesis) Use group participation skills when leading or working as a member of a formal or informal work group.

Goal R6.3 Exercise practice leadership.

OBJ R6.3.1 (Characterization) Demonstrate a commitment to advocacy for the optimal care of individuals with an infectious disease through the assertive and persuasive presentation of patient care issues to members of the health care team, the patient, and/or the patient's representative(s).

OBJ R6.3.2 (Comprehension) Explain the nature of mentoring in pharmacy, its potential connection with achievement, and the importance of being willing to serve as a mentor to appropriate individuals.

OBJ R6.3.3 (Comprehension) Explain the general processes of establishing and maintaining an infectious diseases pharmacy residency program.

OBJ R6.3.4 (Comprehension) Explain the potential benefits, to the practitioner and the profession, of contributing to the infectious diseases pharmacy literature.

OBJ R6.3.5 (Evaluation) Perform peer review of a pharmacy professional's article submitted for publication or presentation.

IO *Explain sources of information on the components of a peer review.*

OBJ R6.3.6 (Synthesis) Capitalize on personal skills and interests to offer community service.

IO *List several community service organizations in one's area.*

IO *Explain for a couple of the above organizations the potential match between skills and knowledge needs of the organization and one's skills and knowledge.*

OBJ R6.3.7 (Synthesis) Capitalize on personal skills and interests to offer public service.

IO *Explain the specialist's role in the development of health care laws and regulations.*

IO *Explain how to identify laws and regulations currently under consideration that may have impact on the care of individuals with infectious diseases.*

Outcome R7: Conduct infectious diseases pharmacy practice research.

Goal R7.1 Conduct an infectious diseases practice research project using effective project management skills.

OBJ R7.1.1 (Synthesis) Formulate a hypothesis to test a topic of significance for an infectious diseases pharmacy research project.

IO *Explain the types of resident projects (e.g., prospective, retrospective, clinical trials) that will meet residency program project requirements and timeframe.*

IO *Explain how one determines if a potential project topic is of significance in one's particular practice setting.*

IO *Explain how to conduct an efficient and effective literature search for the background analysis.*

IO *Explain how to generate research objectives that will address the hypothesis.*

OBJ R7.1.2 (Synthesis) Formulate a feasible design for an infectious diseases pharmacy research project.

IO *Explain the elements of a project proposal.*

IO *Explain how to identify those individuals who will be affected by the conduct of the project and strategies for gaining their cooperation.*

IO *Explain how to determine a timeline with suitable milestones that will result in project completion by an agreed upon date.*

IO *Explain the ethics of research on human subjects and the role of the IRB.*

IO *Explain various methods for constructing data collection tools.*

OBJ R7.1.3 (Synthesis) Secure any necessary approvals, including IRB, for one's design of a project.

IO *Explain how to identify those stakeholders who must approve a particular project.*

IO *Explain the components that make up a budget for a project.*

IO *Explain strategies for seeking funding for a research project.*

IO *Explain the role of the organization's IRB in the approval process.*

OBJ R7.1.4 (Synthesis) Implement an infectious diseases pharmacy research project as specified in its design.

- *IO* *Explain strategies for keeping one's work on a project at a pace that matches with the projected timeline.*
- *IO* *When given a particular approved residency project, explain methods for organizing and maintaining project materials and documentation of the project's ongoing implementation.*
- *IO* *Explain methods for data analysis.*
- *IO* *Explain issues surrounding confidentiality of patient information accessed for a research study.*
- *IO* *Explain the particular sensitivity of patient information when the patient has HIV.*

OBJ R7.1.5 (Synthesis) Effectively present the results of an infectious diseases pharmacy research project.

- *IO* *Explain the biomedical literature guidelines for authorship of research.*

OBJ R7.1.6 (Synthesis) Successfully employ accepted manuscript style to prepare a final report of an infectious diseases pharmacy research project.

- *IO* *When given a particular residency project ready for presentation, explain the type of manuscript style appropriate to the project and criteria to be met when using that style.*

Elective Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Infectious Diseases

Outcome E1: Demonstrate added skills for managing and improving anti-infective-use processes.

Goal E1.1 Lead the review of existing, or the development and implementation of, anti-infective guidelines/protocols.

OBJ E1.1.1 (Evaluation) Assess the results of implementing a medication-related guideline/protocol for the care of individuals with an infectious disease.

Goal E1.2 Identify opportunities for improvement of aspects of the organization's medication-use system affecting individuals with an infectious disease.

OBJ E1.2.1 (Analysis) Analyze the structure and process and measure outcomes of the medication-use system in the infectious disease environment.

Goal E1.3 Design and implement quality improvement changes to the organization's use of anti-infectives.

OBJ E1.3.1 (Synthesis) Design and implement pilot interventions to change problematic or potentially problematic aspects of the organization's use of anti-infectives.

Goal E1.4 Provide infectious diseases pharmacy specialist input to the organization's medication-use safety policy.

OBJ E1.4.1 (Synthesis) Formulate a strategy for assuring that medication-use safety decisions related to the use of anti-infectives involve the contribution of the infectious diseases pharmacy specialist.

OBJ E1.4.2 (Synthesis) Contribute evidence-based pharmacy support for organizational medication-use safety activities.

Outcome E2: Demonstrate skills required to function in an academic setting.

Goal E2.1 Understand faculty roles and responsibilities.

OBJ E2.1.1 (Comprehension) Explain variations in the expectations of different colleges/schools of pharmacy for teaching, practice, research, and service.

IO Discuss how the different missions of public versus private colleges/schools of pharmacy can impact the role of faculty members.

IO Discuss maintaining a balance between teaching, practice, research and service.

IO Discuss the relationships between scholarly activity and teaching, practice, research and service.

OBJ E2.1.2 (Analysis) Explain the role and influence of faculty in the academic environment.

IO Explain the responsibilities of faculty in governance structure (e.g. the faculty senate, committee service).

IO *Describe the responsibilities of faculty (e.g. curriculum development and committee service) related to teaching, practice, research, and service roles.*

OBJ E2.1.3 (Comprehension) Describe the academic environment.

IO *Describe how the decisions by university and college administration impact the faculty.*

IO *Discuss outside forces (e.g. change in the profession, funding source, accreditation requirements) that impact administrator and faculty roles.*

OBJ E2.1.4 (Comprehension) Describe the types and ranks of faculty appointments.

IO *Explain the various types of appointments (e.g. non-tenure, tenure-track, and tenured faculty).*

IO *Differentiate among the various ranks of faculty (e.g. instructor, assistant professor, associate professor, full professor).*

IO *Discuss the role and implications of part-time and adjunct faculty as schools continue to expand and faculty shortages occur.*

OBJ E2.1.5 (Comprehension) Discuss the promotion and tenure process for each type of appointment.

IO *Identify the types of activities that are considered in the promotion process.*

IO *Identify the types of activities that are considered for tenure.*

OBJ E2.1.6 (Application) Identify resources available to help develop academic skills.

IO *Explain the role of academic-related professional organizations (e.g. AACP) in faculty professional development.*

IO *Identify resources to help develop teaching skills and a teaching philosophy.*

OBJ E2.1.7 (Comprehension) Explain the characteristics of a typical affiliation agreement between a college of pharmacy and a practice site (e.g., health system, hospital, clinic, retail pharmacy).

IO *Explain how the political environments of either a college or a practice site may affect the other.*

Goal E2.2 Exercise teaching skills essential to pharmacy faculty.

OBJ E2.2.1 (Synthesis) Develop an instructional design for a class session, module, or course.

IO *Construct a student-centered syllabus.*

IO *Construct educational objectives for a class session, module, or course that is appropriate to the audience.*

IO *Identify appropriate instructional strategies for the class session, module, or course to achieve the objectives.*

IO *Consider assessment tools that measure student achievement of the educational objectives.*

OBJ E2.2.2 (Synthesis) Prepare and deliver didactic instruction on a topic relevant to the specialized area of pharmacy residency training.

IO *Identify educational technology that could be used for a class session, module, or course (e.g., streaming media, course management software, audience response systems).*

IO *Create instructional materials appropriate for the topic and audience.*

IO *Identify strategies to deal with difficult learners.*

IO *Given feedback from teaching evaluations (e.g. student and or peer), devise a plan to incorporate improvements in future instruction.*

OBJ E2.2.3 (Application) Develop and deliver cases for workshops and exercises for laboratory experiences.

- *IO Identify the appropriate level of case-based teachings for small group instruction.*
- *IO Identify appropriate exercises for laboratory experiences.*
- *IO Provide appropriate and timely feedback to improve performance.*

OBJ E2.2.4 (Application) Serve as a preceptor or co-preceptor utilizing the four roles employed in practice-based teaching (direct instruction, modeling, coaching and facilitation).

- *IO Assess the learner's skill level to determine the appropriate preceptor strategy for providing practice-based teaching.*
- *IO Given performance-based criteria, identify ways to provide constructive feedback to learners.*
- *IO Develop strategies to promote professional behavior.*
- *IO Identify strategies to deal with difficult learners in the practice setting.*
- *IO Given a diverse learner population, identify strategies to interact with all groups with equity and respect.*

OBJ E2.2.5 (Analysis) Develop a teaching experience for a practice setting (e.g., introductory or advanced pharmacy experience).

- *IO Create educational goals and objectives to be achieved.*
- *IO Develop activities that will allow achievement of identified educational goals and objectives.*
- *IO Identify how and when feedback should be provided.*
- *IO Identify other preceptors for the experience, if appropriate.*
- *IO Determine training that might be needed for the preceptors to deliver student education.*
- *IO Identify potential challenges of precepting and providing patient care services simultaneously.*

OBJ E2.2.6 (Synthesis) Design an assessment strategy that appropriately measures the specified educational objectives for the class session, module, course, or rotation.

- *IO Identify appropriate techniques for assessing learning outcomes in various educational settings [e.g., written examinations, oral examinations, practical examinations, Objective Structured Clinical Examination (OSCE)].*
- *IO Develop examination questions to assess the knowledge, skills, attitudes and behaviors that are appropriate to the learner's level and topic.*
- *IO Discuss the various methods for administering examination questions (e.g., computerized testing, paper testing).*

OBJ E2.2.7 (Evaluation) Create a teaching portfolio.

- *IO Define the concept of a teaching portfolio and describe its primary purpose*
- *IO Outline the steps in building a teaching portfolio.*
- *IO Develop a personal teaching philosophy to guide one's teaching efforts and facilitate student learning.*

OBJ E2.2.8 (Evaluation) Compare and contrast methods to prevent and respond to academic and profession dishonesty.

- *IO Evaluate physical and attitudinal methods to prevent academic dishonesty.*
- *IO Discuss methods of responding to incidents of academic dishonesty.*
- *IO Discuss the role of academic honor committees in cases of academic dishonesty.*
- *IO Identify examples and methods to address unprofessional behavior in learners.*

OBJ E2.2.9 (Comprehension) Explain the relevance of copyright laws to developing teaching materials.

- *IO Discuss copyright regulations as related to reproducing materials for teaching purposes.*
- *IO Discuss copyright regulations as related to linking and citing on-line materials.*

Outcome E.3: Conduct outcomes research.

Goal E3.1 Contribute to clinical, humanistic and economic outcomes analyses.

OBJ E3.1.1 (Evaluation) Contribute to a prospective clinical, humanistic and/or economic outcomes analysis.

- *IO Explain the principles and methodology of basic pharmacoeconomic analyses.*
- *IO Explain the purpose of a prospective clinical, humanistic or economic outcomes analysis.*
- *IO Explain study designs appropriate for a prospective clinical, humanistic and economic outcomes analysis.*
- *IO Explain the technique and application of modeling.*
- *IO Explain the types of data that must be collected in a prospective clinical, humanistic and economic outcomes analysis.*
- *IO Explain possible reliable sources of data for a clinical, humanistic and economic outcomes analysis.*
- *IO Explain methods for analyzing data in a prospective clinical, humanistic and economic outcomes analysis.*
- *IO Explain how results of a prospective clinical, humanistic and economic outcomes analysis can be applied to internal business decisions and modifications to a customer's formulary or benefit design.*

OBJ E3.1.2 (Evaluation) Contribute to a retrospective clinical, humanistic, and/or economic outcomes analysis.

- *IO Explain the purpose of a retrospective clinical, humanistic or economic outcomes analysis.*
- *IO Explain study designs appropriate for a retrospective clinical, humanistic and economic outcomes analysis.*
- *IO Explain the types of data that must be collected in a retrospective clinical, humanistic and economic outcomes analysis.*
- *IO Explain the content and utilization of reports and audits produced by the pharmacy department.*

- IO *Explain possible reliable sources of data for a retrospective clinical, humanistic and economic outcomes analysis.*
- IO *Explain methods for analyzing data in a retrospective clinical, humanistic and economic outcomes analysis.*
- IO *Explain the impact of limitations of retrospective data on the interpretation of results.*
- IO *Explain how results of a retrospective clinical, humanistic and economic outcomes analysis can be applied to internal business decisions and modifications to a customer's formulary or benefit design.*

Approved by the ASHP Commission on Credentialing on August 21, 2007. Endorsed by the ASHP Board of Directors on September 28, 2007. Developed by the ASHP Commission on Credentialing in collaboration with the American College of Clinical Pharmacy (ACCP) and the Society of Infectious Diseases Pharmacists (SIDP). The design group comprised the following infectious diseases pharmacy practitioners, residency program directors, and ASHP staff: John D. Cleary, Pharm.D., FCCP, Professor and Vice-Chairman of Research, Department of Pharmacy Practice, School of Pharmacy, University of Mississippi Medical Center; Daryl D. DePestel, Pharm.D., Clinical Assistant Professor, University of Michigan Health System; Brian A. Potoski, Pharm.D., Assistant Professor, Department of Pharmacy and Therapeutics, University of Pittsburgh School of Pharmacy; Bruce A. Nelson, R.Ph., M.S., Director, Operations, Accreditation Services Division, ASHP; and Christine M. Nimmo, Ph.D., Director, Standards Development and Training, Accreditation Services Division, ASHP. This document replaces the educational goals and learning objectives for infectious diseases pharmacy residencies approved by the ASHP Board of Directors on April 22, 1998. The contribution of reviewers is gratefully acknowledged.

The effective date for implementation of these educational outcomes, goals and objectives is commencing with the entering resident class of Year 2008.

pharmacists advancing healthcare

Appendix
PGY2 Pharmacy Residency in Infectious Diseases

I. **Learning experiences must include care of patients with the following diseases/infections**
   - A. Bone and joint infections
   - B. Cardiovascular infections
   - C. Central nervous system infections
   - D. Fungal infections
   - E. Gastrointestinal infections
   - F. HIV-infection and AIDS (including opportunistic infections)
   - G. Infections of reproductive organs
   - H. Intra-abdominal infections
   - I. Lower respiratory tract infections
   - J. Ophthalmologic infections
   - K. Sepsis
   - L. Sexually transmitted diseases
   - M. Skin and soft tissue infections
   - N. Tuberculosis and other mycobacterial Infections
   - O. Upper respiratory tract infections
   - P. Urinary tract infections
   - Q. Viral infections

II. **Learning experiences must include the care of patients using the following anti-infective classes**
   - A. Antibacterials
   - B. Antifungals
   - C. Antiretrovirals
   - D. Antivirals
   - E. Antiparasitics
   - F. Immunomodulators

Some examples of learning experiences for a PGY2 residency in infectious diseases pharmacy are described below.

- Foundations of microbiology laboratory,
- Infectious diseases consultation service serving adult patients,
- Ambulatory care clinic with an infectious diseases emphasis, and
- Antimicrobial surveillance/outcomes program(s).
- Ambulatory care AIDS clinic
- Basic or clinical research
- Bone marrow transplantation services
- Drug information

- Infection control
- Infectious diseases consultation service serving pediatric patients
- Inpatient AIDS service
- Inpatient medical service
- Inpatient surgery service
- Medical intensive care
- Medical oncology and/or hematology service
- Pharmacoeconomics/health economics
- Pharmaceutical industry
- Solid organ transplantation services

Appendix F-3

ACCP Guidelines for Clinical Research Fellowship Training Programs

ACCP Guidelines for Clinical Research Fellowship Training Programs

Definition

A research fellowship is a directed, highly individualized, postgraduate training program designed to prepare the participant to function as an independent investigator.

Introduction

The purpose of fellowship training programs is to develop competency and expertise in the scientific research process, including hypothesis generation and development, study design, protocol development, grantsmanship, study coordination, data collection, analysis, and interpretation, technical skills development, presentation of results, and manuscript preparation and publication. A fellowship candidate is expected to possess appropriate practice skills relevant to the knowledge area of the fellowship. Such skills may be obtained through prior practice experience or completion of a residency program.

Under the close direction, instruction and supervision of a qualified investigator-preceptor, the fellow receives a highly individualized learning experience, utilizing the fellow's research interests and knowledge needs as a focus for his/her education and training. Fellowships are typically offered through schools/colleges of pharmacy, academic health centers, the pharmaceutical industry, and/or specialized care institutions. A fellowship graduate should be capable of conducting independent and collaborative research and functioning as principal investigator.

Training Program Requirements

1. A minimum of 3,000 hours of the fellowship training time should be devoted to research-related activities over a minimum period of two years.
2. Administrative institutional support for the preceptor's research program and the fellowship training program.
3. Availability of advanced educational opportunities (e.g., graduate level coursework) in research-related topics. Such coursework may include, but is not limited to, courses in research design and methods, biostatistics, ethical issues, pharmacokinetics, pharmacodynamics, pharmacoeconomics, and others as appropriate to the specific fellow and program.
4. Availability of appropriate facilities (e.g., laboratory and/or clinical) to conduct research.
5. Availability of qualified personnel to teach clinical, laboratory, and/or computer technology-based research skills.
6. Ready access to scientific literature and computer facilities.

Preceptor Qualifications

1. A clinical scientist with an established and on-going record of independent research accomplishments and expertise in the area of specialization related to the fellowship, which may be exemplified by:
   a. fellowship training, a graduate degree, and/or equivalent experience;
   b. principal or primary investigator on research grants and/or projects; and
   c. published research papers in peer-reviewed scientific literature on which the preceptor is the primary or senior author.
2. Active collaborative research relationships with other scientists.

Fellowship Applicant Criteria

1. Masters or doctoral degree in a health science discipline required
2. Residency or equivalent clinical experience preferred.
3. Demonstrated interest in or an aptitude for a career in research.

Fellowship Experiences

Ideally, a research fellow should initiate and complete at least one original research project. However, it is recognized that this may not be possible in every case. Whether through the completion of one project from start to finish or through participation in multiple projects, the fellow should obtain extensive experience in:

1. Development of at least one scientific hypothesis
2. Development of experimental methods to test the developed hypothesis.
3. Preparation of a protocol and submission of the protocol to the appropriate institutional review committee.
4. Grantsmanship, including identification of appropriate funding sources for specific projects and the preparation and submission of a grant for extramural funding consideration.
5. Study design and coordination and data collection.
6. Statistical analysis of data.
7. Data analysis and interpretation
8. Development of clinical, laboratory, and/or computer-based research skills as appropriate to the specific training program
9. Abstract preparation and submission
10. Presentation of research at peer-reviewed scientific meetings
11. Manuscript preparation and submission for publication in peer-reviewed journals.
12. Participation in journal clubs, research workshops, and/or seminar series.
13. Instruction in biomedical science ethics.

Approved by the ACCP Board of Regents, October 22, 2004

Appendix G-1

MAD-ID Newsletter

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES

ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

What's inside this summer issue?

Record Attendance at Annual MAD-ID Meeting May 2016
Over 400 pharmacists and physicians!

With the partnership of MAD-ID and NFID (National Foundation of Infectious Diseases) physicians and pharmacists came in record numbers to the only meeting dedicated to antimicrobial stewardship. Keynote speaker **Don Levine MD** with over 40 years of hands on experience in infectious diseases gave an excellent talk on Endocarditis. This was his last lecture at a major meeting as he prepares to retire this year.

Don Levine MD with attendees at the poster session

.

MAD-ID connecting ASP globally
8 countries represented
US + UK + South Africa + Israel + Egypt + Singapore + Canada + Taiwan

As pharmacists and physicians work to implement antimicrobial stewardship programs around the world they are looking to learn from experts in the field. MAD-ID is the **ONLY** conference dedicated to antimicrobial stewardship. Healthcare providers from every country need to share success stories and help each other. The ability to talk face-to-face and interact with pharmacists/physicians from and other countries is important as we struggle to fight the global spread of superbugs.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

Attendees from 8 countries interact, exchange ideas and build relationships

Travel Grant Recipients (awarded $26,500)

Residents and Fellows who applied for a travel grant and had their abstract accepted, received a $500.00 grant to help offset travel related expenses. There were many smiling faces as the board members awarded the recipients with their checks at the poolside reception.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

Cross Collaboration in Antimicrobial Stewardship

ASP + Surgeons

Have you mastered the art of doing stewardship with surgeons? Christian Jones MD trauma and critical care surgeon was the first surgeon to give a presentation at MAD-ID. He gave an enthusiastic talk on how to work with a surgeon in antimicrobial stewardship from a surgeon's perspective. He provided many valuable tips and lessons learned. Follow him on Twitter @jonessurgery

Things Heard on Twitter and seen LIVE on Periscope

MAD-ID attendees were busy tweeting live from the conference using the **#madid16** The impact attendees had on social media was rather impressive! Over 500,000 viewed tweets with the conference hashtag #madid16

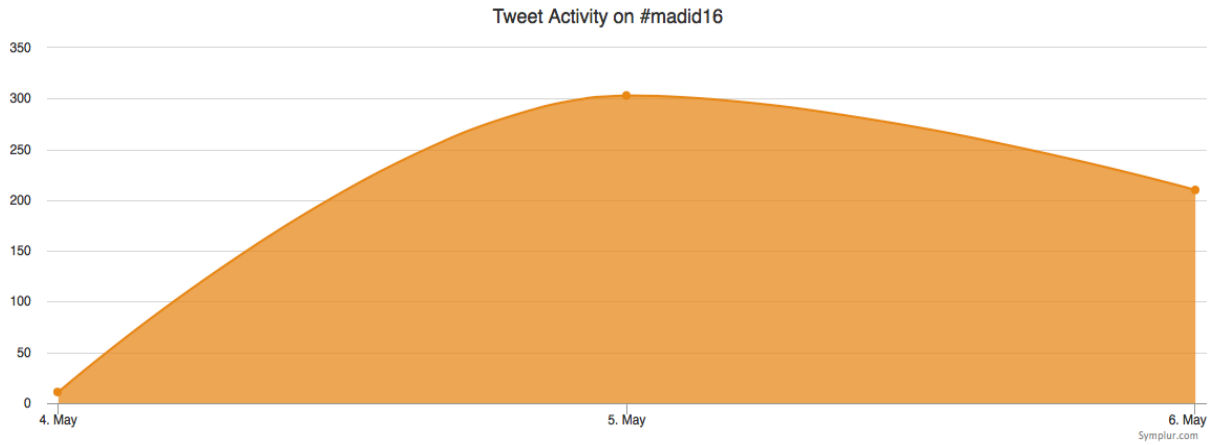
MAD-ID conference tweets were being viewed and retweeted by pharmacists from Saudi Arabia, UK, South Africa and the US.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES

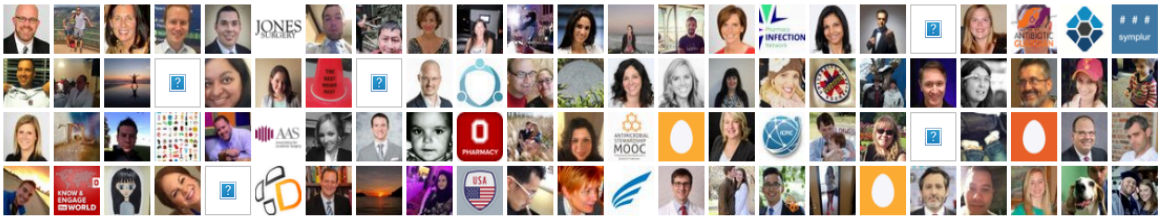
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016



#madid16 Participants



Members may recognize themselves in this summary of Tweet activity during the conference. Of interest many people not in attendance participated in the twitter dialog extending our reach to others including surgeons. Christian Jones MD is one of the leading surgeons on social media with over 2,000 followers on Twitter and co-founder of JAMA Surgery Twitter journal club.

We introduced a new social media tool called **Periscope**. This lets you broadcast live video to the world via twitter. Several speakers, industry sponsors, first time attendees, and board members were interviewed. Many twitter followers loved the idea and said it was the next best thing to being there. The goal is to engage others in the antimicrobial stewardship conversation.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

New "Must Read" article

Take a minute (actually several minutes) to read this compelling article written by an infectious diseases physician and other noted experts on the topic of *Antibiotic Resistance in Humans and Animals*
Click on this link https://nam.edu/wp-content/uploads/2016/06/Antibiotic-Resistance-in-Humans-and-Animals.pdf

Brad Spellberg, Los Angeles County+University of Southern California (LAC+USC) Medical Center and Department of Medicine, Keck School of Medicine at USC; Gail R. Hansen, Hansen Consulting; Avinash Kar, Natural Resources Defense Council; Carmen D. Cordova, Natural Resources Defense Council; Lance B. Price, Milken Institute School of Public Health, George Washington University; and James R. Johnson, Department of Medicine, University of Minnesota and Minneapolis VA Medical Center

Here is a snip it from the article. "As we consider the framework of policy solutions to combat antibiotic resistance, there is a fundamental principle that must be at the heart of our efforts. Antibiotics are unique among all drugs, and virtually unique among all technologies, in that they suffer from transmissible loss of efficacy over time. Because antibiotic-resistant bacteria spread from person to person, every individual's use of antibiotics affects the ability of every other person to use the same antibiotics. Your use of an antibiotic affects our ability to use them. Our use affects your grandchildren's future ability to use them. Antibiotics are therefore a shared societal trust or property. It is not acceptable for one group of people to abuse this trust for the purpose of perceived economic advantage, while harming everyone else.

Breaking News: MAD-ID Research Grants

.

Following a well noted RFP, the MAD-ID Research Network is currently reviewing research applications from members. Three proposals (2 funded by MAD-ID and a 3rd funded by bioMérieux, will be selected that represent innovative applications that advance the science and practice of antimicrobial stewardship. The best 3 proposals will be funded at the level $30,000.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

MAD-ID Members in the News

Several members have achieved noteworthy accomplishments. Some of these accomplishments were shared with the MAD-ID board members during conversations had during the breaks. This intimate setting and ability to talk with the speakers, board members, and colleagues has always been identified as a valuable part of the annual meeting. Collaboration is the key to antimicrobial stewardship success and it starts with some of the friendships formed at the annual conference.

Ohio pharmacist Khaula Sawah, Pharm.D., BCPS is involved in helping to operate a post-op rehab center along with outpatient clinics in Ryehanli, Turkey (at the Syrian-Turkish Border) Her son, a TedX speaker shared his story about the Syrian refugee crisis See the link below.
http://tedxtalks.ted.com/video/Rewriting-Our-Narrative-Syria-s

South African pharmacist Anjeliki Messina demonstrated her ability to apply her skills learned from the MAD-ID Advanced Stewardship certification to research. She authored a paper in Lancet Infectious Diseases titled Antimicrobial stewardship across 47 South African hospitals: an implementation study June 13, 2016 http://dx.doi.org/10.1016/S1473-3099(16)30012-3

Board Members in the news!

John Bosso PharmD, FCCP, FIDSA received the 2016 Phi Lambda Sigma Procter & Gamble National Leadership Award in recognition of a long and distinguished career.

Debra Goff PharmD, FCCP is The Ohio State University 2016 recipient of the *Emerging International Outreach and Engagement Award* for her mentoring program in South Africa

Michael Rybak PharmD, MPH, FCCP (PI) received an R01 NIH grant with Co-Investigators Cesar Arias, M.D., Ph.D., Barbara Murray, M.D. to study “A Pharmacologic approach to prevent daptomycin resistance in vancomycin resistant enterococci”

Would you like your ASP to be featured in a future newsletter?

Our members enjoy learning about other members programs. It can be a big or small healthcare environment, community or academic setting, it just needs to be successful! If you’re willing to share your success story please contact Debbie.goff@osumc.edu for details.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

MAD-ID NEWSLETTER CONTINUING EDUCATION ARTICLE

The self-assessment quiz which can be found at the end of this article can be completed for 1 CEU of Continuing Pharmacy Education credit. The quiz may be completed online at (http://mad-idtraining.org/newsletter/) at no cost for MAD-ID members. Non-members should print and mail the completed quiz, along with a $15.00 check made payable to MAD-ID to: MAD-ID, 537 Calico Retreat, Mt. Pleasant, SC 29464-2765. Your CE credit will be reported on CPE monitor within 4 weeks of receipt. ACPE UAN# 0485-0000-16-030-H01-P. Knowledge-based activity. Target audience: pharmacists and other healthcare providers *(expires 7/7/17)*

MAD-ID is accredited by the Accreditation Council for Pharmacy Education as the provider of continuing pharmacy education.

Beyond Acute Care; What are Antimicrobial Stewardship Needs in Long-Term Care Facilities?

Tristan T. Timbrook, PharmD, MBA, BCPS[a,b], Haley J. Morrill, PharmD[a,b], and Kerry L. LaPlante, PharmD, FCCP[a,b]
[a]Department of Pharmacy Practice, Veterans Affairs Medical Center, Providence, Rhode Island,
[b]Rhode Island Infectious Diseases Research Program

Disclosures:
Dr. Timbrook, Dr. Morrill, and Dr. LaPlante have no conflicts of interest related to this learning activity to disclose

Learning Objectives:
1. Recognize the importance of antimicrobial stewardship (AMS) in long-term care facilities (LTCFs).
2. Describe the current practices in LTCFs in antibiotic use and challenges to AMS.
3. Identify tools specific to LTCFs for implementing AMS practices.
4. Discuss opportunities for AMS programs in acute care facilities (ACFs) to collaborate with local LTCFs.

Introduction
Antibiotic resistance has been described as a public health threat by both the Centers for Disease Control (CDC) and Prevention and the World Health Organization.[1,2] There is a call for urgent action to address this global health crisis that leaves many infections untreatable and others with few remaining treatment options. The importance of this problem was acknowledged by the White House with the passing of an Executive Order to Combat Antibiotic-Resistant Bacteria in September 2014.[3] Among many initiatives, this executive order calls for the implementation of antimicrobial stewardship in settings beyond acute care facilities (ACFs) such

as office-based practices, outpatient settings, emergency departments, and institutional and long-term care facilities such as nursing homes. The importance of expanding antimicrobial stewardship (AMS) into settings beyond ACFs cannot be overstated as the overwhelming majority of antibiotic utilization occurs in alternative healthcare settings.[4]

LTCFs include skilled nursing facilities (SNFs), nursing homes, and assisted living facilities. These facilities function to provide residents medical and/or social services. According to the CDC, more than 4 million Americans are served by LTCFs per year.[5] However, infections in LTCFs are currently not well described. Estimates suggest 1.6 to 3.8 million infections per year in the US and associated costs surpass 1 billion dollars.[6] A significant number of these infections can be prevented through prudent antimicrobial use.

Data on effective and optimal AMS interventions in LTCFs are limited.[7] The executive order requested a five year plan for combating antibiotic-resistant bacteria which includes expanding AMS in LTCFs through engaging experts from ACFs, community and professional organizations, and state and local health departments to work together towards solutions.[3] The expansion of AMS into LTCFs may soon be mandatory condition of participation as the CMS released a proposed rule for changed in conditions of participation for LTCFs in July 2015.[8] This is likely to significantly impact LTCFs as the majority of financial support for LTCFs comes from taxpayer dollars through Centers for Medicare & Medicaid Services (CMS).[5] This proposed rule outlines requirements in LTCFs for an AMS program with antimicrobial use protocols and monitoring.[8]

Antibiotic Use and AMS Challenges in Long Term Care Facilities

Antibiotic Prescribing

Antibiotics are frequently used in LTCFs. While it is widely stated 50% of antibiotic use in hospitals is inappropriate, it is suggested up to 75% of antibiotic prescribing is inappropriate in LTCFs.[9,10] In fact, antibiotics are prescribed more than any other class of medication in LTCFs.[10] Additionally, 47-79% of all nursing home residents receive at least a single course of antibiotics each year.[11] This results in approximately one in ten LTCF residents being administered at least one antibiotic each day.[12] Urinary tract infections (UTI) (32-66%), skin and soft tissue infections (SSTI) (13-18%), and respiratory tract infections (15-36%) are the most common indications for antibiotics in LTCFs.[11] Greater than 60% of residents in LTCFs receive antibiotic durations longer than evidence-based recommendations, these potentially unnecessary prolonged exposures can lead to adverse outcomes like adverse drug reactions or *Clostridium difficile* infection (CDI).[12] One of the largest landmark studies in LTCF investigated antibiotic use and associated harm across 607 nursing homes in Canada.[13] Authors evaluated the association of residing in a nursing home with high antibiotic prescribing and risk of antibiotic related harm (defined as CDI, diarrhea or gastroenteritis, antibiotic-resistant organisms, allergic reactions, and general medication adverse reactions). Nursing homes were categorized into high, medium, and low levels based on their antibiotic use relative to others. Residents at facilities with high antibiotic utilization were significantly more at risk of antibiotic related harm (13.3%) even if they

did not receive an antibiotic than low use facilities (11.4%) (P<0.001). This translated into an estimated antibiotic related harm in one out of every 53 residents admitted to a high antibiotic utilization facility.

Diagnosing Infection In Geriatric Populations.

There are many challenges to making an accurate infectious diagnosis in persons that reside in LTCFs. These patients are often elderly and frail, they suffer from waning immunity, and infection control practices are inconsistent. The diagnosis of infectious diseases can often prove challenging in LTCFs' patient population. Older adults' symptoms can be vague (e.g. altered mental status), co-morbidities may cloud the clinical picture, and the ability to mount a fever may be diminished.[14] Additionally, many residents may not be able to describe symptoms due to baseline cognitive deficits or communication disorders, the former affecting up to 50% of residents.[12]

Beyond challenges with vague clinical presentation in frail and/ or elderly patients, onsite diagnostic testing is often lacking in LTCFs and utilization of remote labs for rapid turnaround can be problematic.[10] Prescribers have described logistical challenges with remote labs including time to culture results and coordinating labs to pick-up specimens outside of a "once-daily" scheduled pick-up.[15]

Diagnosis of urinary tract infections in the elderly residents is particularly challenging. Presence of bacteriuria is defined as two consecutive clean-catch voided urine specimens in women or one in men that result in at least 10^5 colony-forming units per mL (cfu/mL) of bacteria.[16] Urinary symptoms such as frequency, urgency, suprapubic pain, and dysuria are required for diagnosis of a UTI. In elderly this can also include altered mental status. Asymptomatic bacteriuria (ASB), in contrast, reflects an absence of infection and does not require antibiotic therapy. More than 30% of LTCF residents are colonized in their urinary tract, making the differentiation of a true UTI from ASB challenging in many cases related to difficulty in obtaining symptom history or evaluating altered mental status as noted previously.[11,17]

Finally, the prescribing process in nursing homes contributes to the challenge of having an accurate diagnosis. Often, nurses are the only healthcare providers on site 24 hours per day in LTCFs.[18] Physicians are employed full-time in less than 20% of facilities,[19] and often have been reported as providing primary care on average to 4 LTCFs.[20] Therefore, the prescribing process is primary executed by the nurse within the nursing home setting.[21] The nurse is responsible for making assessments for infections and communicating their assessments to prescribers. Often antibiotics are initiated based on the nurse's assessment before an examination for infection is performed by the prescriber.[22]

Infectious Diseases Trained Clinicians

In the CDC's Core Elements for LTCFs, healthcare providers with antibiotic expertise, either infectious diseases physicians or stewardship trained pharmacists, are recommended.[23] However, a statewide survey of all LTCFs in Rhode Island reflected a lack of full-time equivalent

infectious diseases pharmacist or physicians in 80% of facilities.[24] Lack of infectious diseases trained clinicians to assist in both routine auditing of facility antibiotic use and assisting in development of antibiotic use guidelines may contribute to the overall inappropriate prescribing observed in these settings.

Treatment Decisions

Decisions on the initiation of antibiotic treatment in elderly in LTCFs is challenging. LTCF providers may often perceive antibiotic treatment as the safest treatment option.[15] Physicians have reported the belief of antibiotics not being a problem with resistance based on the individual life expectancy of a patient. Family expectations of treatment also play a strong role and have been reported as a significant barrier to AMS in LTCFs.[25] In particular, this has been noted as most commonly occurring in end-of-life care.[15] In the last 2 weeks of life, 42% of LTCF advanced dementia residents receive antibiotic therapy.[26] In general, around 25% of hospice residents with comfort care goals are prescribed antibiotics in the last weeks of life.[27] A survey of hospice program reflected approximately a third or less had policies on the initiation or discontinuation of antibiotics.[28] Opportunities for increased collaboration between infectious disease and palliative care specialist exist in this area.[27]

Studied Applications of Antimicrobial Stewardship in Long Term Care Facilities

Overall, the AMS literature in LTCFs is lacking and therefore much opportunity for research in this area exists.[24] Below is a review of select AMS studies in LTCFs related to education, prospective audit and feedback, implementation of antibiograms, and addition of an infectious diseases consult service.

Resources and Tools for AMS in LTCF

In a recent survey of long-term care facilities, a lack of knowledge on methods for program implementation was noted in over half of sites surveyed while less than 10% note staffing issues as a limitation for implementation.[29] Therefore, awareness of resources and tools for AMS in LTCFs may serve to facilitate the expansion of AMS into these practice areas. Selected resources and tools for AMS in LTCFs include the CDC Core Elements of Antimicrobial Stewardship for Nursing Homes, a recent paper from Zarowitz and colleagues entitled, “Antimicrobial Stewardship Algorithms for Common Infections in Long Term Care”, and the Agency for Healthcare Research and Quality’s Nursing Home Antimicrobial Stewardship Modules.

Education

A good starting point may be with educating on the basic principles and goals of AMS as these concepts may be less well known among healthcare providers in LTCFs.[30] Multifaceted educational applications may be of benefit. A quasi-experimental study of 12 nursing homes investigated changes in rates of antibiotic use for UTI, SSTI, and respiratory infections subsequent to providing education to prescribers and nurses.[31] Education was provided on prescribing guidelines, including common situations antibiotics aren’t indicated (e.g. ASB). Nurses also received education on communication of signs and symptoms of possible infections.

Finally, residents and families were provided with brochures on appropriate antibiotic prescribing and given the opportunity to attend multiple meetings where this information was presented. A decrease in prescriptions was observed in the interventional LTCFs at approximately 1.8 prescriptions per 1,000 resident days.

Audit and Feedback

Few studies have examined prospective audit and feedback AMS approaches in LTCFs.[24] A preintervention and postintervention 3-year study evaluated the effect of introducing guidelines (adapted from Infectious Diseases Society of America guidelines) for catheter associated ASB and providing audit and feedback.[32] The study included both inpatient wards and long-term care units at comparable Veterans Affairs sites with one as the intervention site and the other as the comparison site. All residents with urine catheters were included with the exception of pregnancy or planned urological procedures. For the audit and feedback, they specifically targeted decisions to order a urine culture and to treat a positive culture. A decrease was observed in urine culture ordering by 17.9 orders per 1000 patient bed days ($p < 0.001$), and the rate of ASB overtreatment decreased by 1.0 per 1000 bed-days ($P<0.001$).

Antibiograms

High rates of resistant organisms and *Clostridium difficile* infection (CDI) have been reported in LTCFs.[11] Approximately 30-50% of residents are colonized with at least one resistant organism which places the resident at risk for infection with a drug-resistant organism.[24] With the high rates of drug-resistant organisms and the majority of prescribing being empiric, the development and use of antibiograms may benefit resident care.[14] A cross-sectional and 6-month pretest-posttest study among residents of 3 skilled nursing facilities (SNFs) examined the change in empiric antibiotic prescribing associated with implementing an antibiogram.[33] Additionally, they assessed the appropriateness of empiric therapy in two other SNFs. Multiple in-service presentations were performed on antibiograms and how to appropriately use the antibiograms. Outcomes were evaluated on the choice of empiric antibiotic therapy covering the organism based on culture results. Only 35% of therapies across all 3 SNFs were appropriate based on culture results. In the interventional SNF, the implementation of the antibiogram was associated with an increase in the appropriateness of empiric antibiotic prescribing from 32% to 45% ($p = 0.32$).

Infectious Diseases Consult Service

As noted previously, the availability of formally trained infectious diseases specialists in LCTFs is often limited.[24] A preintervention and postintervention quasi-experimental study at 160-bed Veterans Affairs LTCF examined the initiation of an infectious diseases consult service and associated changes in antibiotic prescribing.[34] The consult team consisted of infectious diseases physician and nurse practitioner that rounded once weekly and were available by pager otherwise. Residents and prescriptions were reviewed per consult only. A baseline chart review reflected 43% of antibiotics were unnecessary. During 18 months of consult, the team was most commonly consulted on CDI (14.1%), UTI (9.8%), ASB (9.5%), non-infectious diagnoses (9.5%), and wound infection/pressure ulcers (8.5%). Changes were recommended in

46% of consults and all were accepted. These changes included discontinuation of antibiotics (32%), initiation of antibiotics (26%), alternative therapy selection (14%), a decreased duration (7%), and de-escalation (7%). The authors note that although they found success in this model, reimbursement models outside of the VA make this type of initiative prohibitive. Elsewhere the authors described the effect of this initiation on overall antibiotic prescribing and noted a decrease of 30% ($p<0.001$).[35]

CDC Core Elements of Antibiotic Stewardship for Nursing Homes

In September 2015, the CDC released the Core Elements of Antibiotic Stewardship for Nursing Homes.[23] The core elements released are an adaptation of the previous CDC Core Elements of Hospital Antibiotic Stewardship and represent practical methods of introducing stewardship into this healthcare setting. The core elements include leadership commitment, accountability, drug expertise, action, tracking, reporting, and education.

Leadership commitment calls on the leadership and administrators within LTCFs to enact formal commitments to AMS through activities such as including AMS in formal job descriptions. Additionally, it is suggested that a leadership created culture of stewardship should be invoked by expressing it to be a philosophy and expectation for the facility.

Accountability recommends enabling the medical director, director of nursing, and the consultant pharmacist to be key figures in ensuring appropriate antibiotics use is performed. Moreover, it is noted these key leaders should reach out to the infection prevention program coordinator, consultant laboratories, and both state and local health departments for help in streamlining stewardship efforts.

Drug expertise notes the importance of establishing support from infectious diseases prescribers or pharmacists with training in antibiotic stewardship. In either case, consideration is given to stewardship training for practitioners that can be obtained via formal programs such as the Making a Difference in Infectious Diseases (MAD-ID) Antibiotic Stewardship Programs.

Action refers to making policy and practice change to improve antibiotic use. It is recommended to introduce policies and practices that are tailored to the needs of the facility. Akin to principles of AMS for ACF, documentation should be made of dose, route, start date, end date, duration, and indication. Sites are recommended to establish best practices for microbiology testing such as avoiding test of cure in certain disease states (e.g. CDI). Facility specific guidelines are suggested to be created that are adapted from national guidelines and adjusted to local antibiotic resistance patterns based off of antibiogram data. Development of infection assessment tools and standardized communication tools that nursing can use to give information to prescribers to improve prescribing is advised. Consultant pharmacists are called upon to review the appropriateness of antibiotic therapies, including review potential updates in microbiology culture reporting, and adherence to facility guidelines.

Tracking practices and reporting outcomes suggests to track how and why antibiotic are used to assess for compliance with facility developed guidelines with notation given to the adherence to complete documentation of antibiotic use parameters (e.g. duration). Additionally, facilities should track how often and how many antibiotics are prescribed such that trends in usage may be observed. Finally, the evaluation and tracking of clinical outcomes is recommended and should include adverse clinical outcomes and costs of antibiotics.

Education signifies education for clinicians, nursing, families, and residents. They suggest use of different modalities for education (pocket guides, academic detailing, etc.). Related to the core element of education, antibiotic stewardship fact sheets for families are available on the website and include the "Top ten infection prevention question to ask a nursing home's leaders", "What to ask your healthcare provider about antibiotics", and "What you need to know about antibiotics in a nursing home". Finally, AMS fact sheets available for medical leaders and administrators which include "Leading antibiotic stewardship in nursing homes" and "Creating a culture to improve antibiotic use in nursing homes".

While the CDC recommends to incorporate all of these core elements of stewardship into nursing home facilities, they recommend using the site-available checklist to develop a baseline assessment of stewardship activities in their facilities. Subsequently, elements are recommended to be reviewed periodically (i.e. annually) and continue to implement elements over time.

Antimicrobial Stewardship Algorithms for Common Infections in Long Term Care

While the CDC offers framework that may assist administrators in planning the implementation of AMS, specific clinician tools are needed for immediate action. Recently, Zarowitz and colleagues published five detailed and yet easy to use algorithms for prescribers on UTIs, catheter-associated UTIs, upper respiratory tract infections, bacterial pneumonia, mild or moderate non-purulent SSTIs.[36] Each algorithm includes information for assisting in the diagnosis, empiric treatments with recommended dosing and duration, and follow-up recommendations such as IV-to-po switch criteria. These evidence-based quick reference tools are obtained from the Omnicare's Geriatric Pharmaceutical Care Guidelines which are externally peer reviewed and also endorsed by the American Geriatrics Society. The algorithms offer an immediate method to improve antibiotic prescribing in LTCFs.

Agency for Healthcare Research and Quality - Nursing Home Antimicrobial Stewardship Modules

The Agency for Healthcare Research and Quality (AHRQ) has released two Nursing Home Antimicrobial Stewardship Modules, titled "Improving Communication and Decisions about Antibiotic Use in Nursing Homes" and "Antibiogram: Choosing an Appropriate Antibiotic".[37] These resources and tools differ from the previously discussed tools as they focus on both implementation and clinician tools.

The first module contains two toolkits. The first is a toolkit to improve communication between nursing and prescribers and decision making surrounding suspected urinary tract infections. This includes a handout for staff to explain the problem of overuse of antibiotics in nursing homes. Also, it describes UTI SBAR (Situation, Background, Assessment, and Recommendation; communication improvement tool) forms for nursing use and their importance. A clinical letter is provided that informs prescribers about the incorporation of the UTI SBAR forms into clinical practice. Finally, the toolkit contains a PowerPoint presentation for training on UTI SBAR form for nursing and prescribers.

The second toolkit in the first module is aimed at improving communication and decision making in many infections with general considerations for UTI, SSTI, and respiratory tract infections. This toolkit includes a handout for residents describing when antibiotics aren't indicated and associated risks with antibiotic use. A quality improvement (QI) team tip sheet for administration and leadership gives information on successful models of QI. A medical care referral form for nurses is available for improving transitions of care. The kit contains antibiotic pocket cards for healthcare providers that describe when antibiotics may not be indicated and infection control guidelines for the LTCF. Lastly, a PowerPoint presentation is available for nurses and prescribers to educate on risks associated with antibiotic use and the evidence-based tools for communication between nursing and prescribers to improve prescribing practices.

Similar to the first module, the second module consists of two toolkits: a concise and a comprehensive kit. Either antibiogram toolkit can be used by nursing home staff depending on the needs of the facility. Toolkit 1 describes implementation of antibiograms and use. Specifically, it has background on what an antibiogram is, the importance of its use, resources for creating an antibiogram, and how to interpret and implement once created. Toolkit 2 contains assessment and planning, development, implementation, and monitoring sections each containing documents, 29 in total, that vary from resources on technical aspects of antibiogram calculations to clinician surveys on willingness to use and interest in antibiograms.

AMS Organization Facilitated Collaboration

Though the resources above are immensely important and helpful, the benefit of insight from and collaboration with clinicians currently practicing in antimicrobial stewardship cannot be understated. Local or state-wide stewardship groups can serve to overcome barriers to the expansion of stewardship.[38] These groups may act as a platform for current stewardship practitioners to invite and engage healthcare colleagues currently serving in LTCF practice areas to discuss challenges and develop solutions together.

Conclusion

The expansion of antimicrobial stewardship into LTCFs is important but highly complex. Challenges with implementation include antibiotic prescribing patterns, diagnostic equipment availability, assessments for infections being nurse driven, and absence of formal infectious diseases trained prescribers or pharmacists. While there have been some literature describing stewardship initiatives, overall, data are lacking and much needed. Limited but helpful LTCF-

specific tools are available that range from institutional framework recommendations to implementation tools to clinician tools. To assist in the successful expansion of stewardship into this much needed area, established stewardship programs in other practice areas such as Acute Care Facilities, are encouraged to collaborate with colleagues in LTCF settings.

References

1. Centers for Disease Control and Prevention. Antibiotic Resistance Threats in the United States, 2013. Available at: http://www.cdc.gov/drugresistance/threat-report-2013. Accessed February 28, 2016.
2. World Health Organization. Antibiotic resistance - a threat to global health security. Available at: http://www.who.int/drugresistance/activities/wha66_side_event/en. Accessed February 28, 2016.
3. White House. Executive Order -- Combating Antibiotic-Resistant Bacteria. Available at: https://www.whitehouse.gov/the-press-office/2014/09/18/executive-order-combating-antibiotic-resistant-bacteria. Accessed February 28, 2016.
4. Suda KJ, Hicks LA, Roberts RM, Hunkler RJ, Danziger LH. A national evaluation of antibiotic expenditures by healthcare setting in the United States, 2009. *J Antimicrob Chemother*. 2013;68(3):715-718.
5. Centers for Disease Control and Prevention. FastStats: Nursing home care. Available at: http://www.cdc.gov/nchs/fastats/nursing-home-care.htm. Accessed February 28, 2016.
6. Strausbaugh LJ, Joseph CL. The burden of infection in long-term care. *Infect Control Hosp Epidemiol*. 2000;21(10):674-679.
7. 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.
8. Federal Register. Reform of Requirements for Long-Term Care Facilities. Available at: https://www.federalregister.gov/articles/2015/07/16/2015-17207/medicare-and-medicaid-programs-reform-of-requirements-for-long-term-care-facilities. Accessed March 5, 2016.
9. Peron EP, Hirsch AA, Jury LA, Jump RLP, Donskey CJ. Another Setting for Stewardship: High Rate of Unnecessary Antimicrobial Use in a Veterans Affairs Long-Term Care Facility. *J Am Geriatr Soc*. 2013;61(2):289-290.
10. Nicolle LE, Bentley DW, Garibaldi R, Neuhaus EG, Smith PW, SHEA Long-Term–Care Committee. Antimicrobial Use in Long-Term–Care Facilities. Infect Control Hosp Epidemiol. 2000;21(8):537-545.
11. van Buul LW, van der Steen JT, Veenhuizen RB, et al. Antibiotic Use and Resistance in Long Term Care Facilities. *J Am Med Dir Assoc*. 2012;13(6):568.e1-e568.e13.
12. Crnich CJ, Jump R, Trautner B, Sloane PD, Mody L. Optimizing Antibiotic Stewardship in Nursing Homes: A Narrative Review and Recommendations for Improvement. *Drugs Aging*. 2015;32(9):699-716.
13. Daneman N, Bronskill SE, Gruneir A, et al. Variability in Antibiotic Use Across Nursing Homes and the Risk of Antibiotic-Related Adverse Outcomes for Individual Residents. *JAMA Intern Med*. 2015;175(8):1331.
14. Dyar OJ, Pagani L, Pulcini C. Strategies and challenges of antimicrobial stewardship in long-term care facilities. *Clin Microbiol Infect*. 2015;21(1):10-19.
15. van Buul LW, van der Steen JT, Doncker SM, et al. Factors influencing antibiotic prescribing in long-term care facilities: a qualitative in-depth study. *BMC Geriatr*. 2014;14(1):136.
16. Nicolle LE, Bradley S, Colgan R, et al. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infect Dis*. 2005;40(5):643-654.
17. Warren JW, Tenney JH, Hoopes JM, Muncie HL, Anthony WC. A prospective microbiologic study of bacteriuria in patients with chronic indwelling urethral catheters. *J Infect Dis*. 1982;146(6):719-723.
18. Fleet E, Gopal Rao G, Patel B, et al. Impact of implementation of a novel antimicrobial stewardship tool on antibiotic use in nursing homes: a prospective cluster randomized control pilot study. *J Antimicrob Chemother*. 2014;69(8):2265-2273.
19. Jones AL, Dwyer LL, Bercovitz AR, Strahan GW. The National Nursing Home Survey: 2004 overview. Vital Health Stat 13 2009;126:1-155.
20. Caprio TV, Karuza J, Katz PR. Profile of Physicians in the Nursing Home: Time Perception and Barriers to Optimal Medical Practice. *J Am Med Dir Assoc*. 2009;10(2):93-97.

21. Fleming A, Bradley C, Cullinan S, Byrne S. Antibiotic Prescribing in Long-Term Care Facilities: A Meta-synthesis of Qualitative Research. *Drugs Aging*. 2015;32(4):295-303.
22. Daneman N, Gruneir A, Bronskill SE, et al. Prolonged Antibiotic Treatment in Long-term Care: Role of the Prescriber. *JAMA Intern Med*. 2013;173(8):673.
23. Centers for Disease Control and Prevention. The Core Elements of Antibiotic Stewardship for Nursing Homes. Available at: http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html. Accessed February 29, 2016.
24. Morrill HJ, Caffrey AR, Jump RLP, Dosa D, LaPlante KL. Antimicrobial Stewardship in Long-Term Care Facilities: A Call to Action. *J Am Med Dir Assoc*. 2016;17(2):183.e1-e183.e16.
25. Schooneveld TV, Miller H, Sayles H, Watkins K, Smith PW. Survey of Antimicrobial Stewardship Practices in Nebraska Long-Term Care Facilities. *Infect Control Hosp Epidemiol*. 2011;32(07):732-734.
26. D'Agata E. Patterns of Antimicrobial Use Among Nursing Home Residents With Advanced Dementia. *Arch Intern Med*. 2008;168(4):357.
27. Juthani-Mehta M, Malani PN, Mitchell SL. Antimicrobials at the End of Life: An Opportunity to Improve Palliative Care and Infection Management. *JAMA*. 2015;314(19):2017-2018.
28. Novak RL, Noble BN, Fromme EK, Tice MO, McGregor JC, Furuno JP. Antibiotic Policies and Utilization in Oregon Hospice Programs. Am J Hosp Palliat Care. 2015. Published online 12 August 2015.
29. Malani AN, Brennan BM, Collins CD, Finks J, Pogue JM, Kaye KS. Antimicrobial Stewardship Practices in Michigan Long-Term Care Facilities. *Infect Control Hosp Epidemiol*. 2016;37(02):236-237.
30. Lim C, Kwong M, Stuart RL, et al. Antimicrobial stewardship in residential aged care facilities: need and readiness assessment. *BMC Infect Dis*. 2014;14(1):410.
31. Zimmerman S, Sloane PD, Bertrand R, et al. Successfully Reducing Antibiotic Prescribing in Nursing Homes. *J Am Geriatr Soc*. 2014;62(5):907-912.
32. Trautner BW, Grigoryan L, Petersen NJ, et al. Effectiveness of an Antimicrobial Stewardship Approach for Urinary Catheter–Associated Asymptomatic Bacteriuria. *JAMA Intern Med*. 2015;175(7):1120.
33. Furuno JP, Comer AC, Johnson JK, et al. Using Antibiograms to Improve Antibiotic Prescribing in Skilled Nursing Facilities. *Infect Control Hosp Epidemiol*. 2014;35(S3):S56-S61.
34. Jump RLP, Olds DM, Jury LA, et al. Specialty Care Delivery: Bringing Infectious Disease Expertise to the Residents of a Veterans Affairs Long-Term Care Facility. *J Am Geriatr Soc*. 2013;61(5):782-787.
35. Jump RLP, Olds DM, Seifi N, et al. Effective Antimicrobial Stewardship in a Long-Term Care Facility through an Infectious Disease Consultation Service: Keeping a LID on Antibiotic Use. *Infect Control Hosp Epidemiol*. 2012;33(12):1185-1192.
36. Zarowitz BJ, Allen C, Tangalos E, Ouslander JG. Algorithms Promoting Antimicrobial Stewardship in Long-Term Care. *J Am Med Dir Assoc*. 2016;17(2):173-178.
37. Agency for Healthcare Research & Quality. Nursing Home Antimicrobial Stewardship Modules. Available at: http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/nh-aspguide/index.html. Accessed February 29, 2016.
38. Morrill HJ, LaPlante KL. Overconsumption of antibiotics. *Lancet Infect Dis*. 2015;15(4):377-378. doi:10.1016/S1473-3099(15)70083-6.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

ABOUT THE AUTHORS

Tristan Timbrook obtained his PharmD and MBA from Sullivan University, completed his PGY-1 residency and PGY-2 Infectious Diseases pharmacy residency at Medical University of South Carolina (MUSC). He is currently an infectious diseases outcomes fellow in antimicrobial stewardship at the Providence Veterans Affairs Medical Center in Rhode Island.

Haley Morrill received her PharmD at the University of Connecticut School of Pharmacy, and then completed a PGY-1 residency at the Providence Veterans Affairs Medical Center (VAMC). After residency, she completed a 2-year fellowship as an infectious diseases outcomes fellow in antimicrobial stewardship at the Providence VAMC with the Rhode Island Infectious Diseases (RIID) Research Program. Dr. Morrill is the Director of Clinical Outcomes for the RIID Research Program, co-pharmacy champion of the Antimicrobial Stewardship Program and a health services investigator with the Center of Innovation in Long-Term Services and Supports for Vulnerable Veterans (COIN-LTSS) at the Providence VAMC. Dr. Morrill is also competing a 2-year research Career Development Award from the VA New England Healthcare System (VISN-1).

Kerry LaPlante, Pharm.D. is a tenured Professor of Pharmacy and Adjunct Professor of Medicine at the University of Rhode Island and the Alpert Medical School of Brown University, respectively. She is also an infectious diseases pharmacotherapy specialist at the Providence Veterans Affairs Medical Center, where she has developed and Co-Directed the Antimicrobial Stewardship Program and Pharmacy Training fellowship since 2001. She is also the Senior Director of the Rhode Island Infectious Diseases (RIID) Research Program and Vice-Chairperson for the Rhode Island Department of Health Task Force for Antimicrobial Stewardship and Environmental Cleaning.

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES
ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

SELF-ASSESSMENT QUESTIONS

(To be completed online or, in the case of non-MAD members, printed and mailed. You must achieve a grade of 80% of better to receive continuing education credit.)

1. Why is the expansion of antibiotic stewardship into the long-term care important?
    A. Up to 75% of antibiotic prescribing in this setting is inappropriate
    B. High rates of antibiotic resistant organisms are reported
    C. Antibiotic expertise in the form of an ID physician or pharmacists are not currently available in most facilities to guide antibiotic use
    D. More than 60% of residents receive antibiotic durations longer than evidence-based medicine recommendations
    E. All of the above

2. Which of the following is not true about the challenges to implementing stewardship in long-term care?
    A. Onsite diagnostic testing equipment is often lacking
    B. Cognitive deficits affect more than 50% of residents making clinical histories for diagnosis difficult to obtain
    C. Data on effective and optimal AMS interventions are abundant
    D. The prescribing process is primarily nurse driven

3. Which of the following resources contains antibiotic stewardship implementation tools and clinician tools?
    A. CDC Core Elements of Antibiotic Stewardship for Nursing Homes
    B. Antimicrobial Stewardship Algorithms for Common Infections in Long Term Care
    C. AHRQ Nursing Home Antimicrobial Stewardship Modules
    D. None of the above

4. Which of the following is a CDC Core Element of Antibiotic Stewardship for Nursing Homes?
    A. Leadership Commitment
    B. Accountability
    C. Drug expertise and education
    D. Action, tracking, and reporting
    E. All of the above

5. Which of the following resources contains evidence-based quick reference tools with treatment specific recommendations (e.g. antimicrobial dosing) for common infections in LTCF including UTIs, catheter-associated UTIs, upper respiratory tract infections, bacterial pneumonia, and mild or moderate non-purulent SSTIs?
    A. CDC Core Elements of Antibiotic Stewardship for Nursing Homes
    B. Antimicrobial Stewardship Algorithms for Common Infections in Long Term Care
    C. AHRQ Nursing Home Antimicrobial Stewardship Modules
    D. None of the above

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES

ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

LEARNING ACTIVITY ASSESSMENT

(Please provide your honest assessment of the value of this learning activity so that we can continue to improve our offerings.)

Please indicate your degree of agreement or disagreement with the following statements regarding this learning activity by indicating strong agreement (a), general agreement (b), no opinion (c), mild disagreement (d), or strong disagreement (e):

1. The information presented was relevant to my practice
   a.
   b.
   c.
   d.
   e.

2. This program/session met the stated learning objectives
   a.
   b.
   c.
   d.
   e.

3. The information was presented in an objective and balanced manner without commercial bias
   a.
   b.
   c.
   d.
   e.

4. The information presented will alter/affect the my practice (usefulness)
   a.
   b.
   c.
   d.
   e.

5. The educational materials enhanced my learning
   a.
   b.
   c.
   d.
   e.

6. The learning method was effective
   a.
   b.
   c.
   d.
   e.

7. The learning assessment activity (self-assessment quiz) was appropriate
   a.
   b.
   c.
   d.
   e.

8. The faculty/authors were of appropriate quality
   a.
   b.
   c.
   d.
   e.

EMPLOYMENT OPPORTUNITY

Clinical Pharmacy Specialist (Antimicrobial Stewardship)

St. Joseph's Hospital in Savannah, Georgia is seeking applicants for an Antibiotic Stewardship Clinical Pharmacist. This full time position works in conjunction with the city-wide antimicrobial management program.
Position responsibilities include daily interactions with infectious disease attendings, medical providers, nursing and pharmacy staff, and patients to optimize antimicrobial therapy and clinical outcomes. Strong teaching abilities, research skills and knowledge base in infectious diseases and laboratory medicine will be required for precepting PharmD candidates, PGY 1 residents, and PGY2 residents in Emergency Medicine and Critical Care. Education on antimicrobial stewardship and bacterial resistance to the medical and clinical staff will be required. Stewardship team members work together on quality improvement initiatives, tracking and reporting of interventions. The successful candidate will be highly motivated with excellent communication and interpersonal skills to work within a multidisciplinary team.
PGY-1 residency required
PGY-2 residency in infectious disease preferred

MAD-ID
MAKING A DIFFERENCE IN INFECTIOUS DISEASES

ANTIMICROBIAL STEWARDSHIP EDUCATION AND TRAINING

MAD-ID NEWSLETTER

Volume 6, Number 2 Summer 2016

ABOUT MAD-ID

MAD-ID is incorporated as a non-profit entity [501(c)(3)] in the state of South Carolina. MAD-ID provides continuing professional education in the general area of infectious diseases pharmacotherapy and the specific area of antimicrobial stewardship. Educational initiatives and content are determined by an eight-member Scientific Committee composed of infectious diseases experts from clinical pharmacy and medicine and are based upon ongoing needs assessments. The main venue for our programming is an annual meeting, which takes place in May of each year. Other MAD-ID initiatives have included regional programs related to specific topics and our Antimicrobial Stewardship Training Programs.

***OUR MISSION**. The mission/purpose of the Foundation is to provide education, in the form of traditional continuing education, skills training, and other pertinent life-long learning methods, to pharmacists and other healthcare professionals concerning pharmacotherapy as it pertains to the prevention and treatment of infectious diseases and to do all things necessary or convenient to further these goals, with a special emphasis on antimicrobial stewardship.*

***MEMBERSHIP.** Membership in MAD-ID is available to all healthcare providers, including students and post-graduate trainees, interested and/or practicing in the area of infectious diseases. For more info-mation, visit our webpage (**www.mad-id.org**).*

MAD-ID SCIENTIFIC COMMITTEE

Appendix G-2

Infectious Diseases Pharmacy Bibliography

Appendix G-2
Infectious Diseases Pharmacy Bibliography

Al-Somai N, Al-Muhur M, Quteimat O, et al. The Impact of clinical pharmacist and ID intervent in rationalization of antimicrobial use. *Saudi Pharm* J. 2014;22(6):515-21.

The Pew Charitable Trusts. Antibiotic Resistance Project : A Path to Better Antimicrobial Stewardship in Inpatient Settings. 2016. Available at: http://www.pewtrusts.org/~/media/assets/2016/04/apathtobetterantibioticstewardshipinpatientsettings.pdf. Accessed September 11, 2016.

Baker SN, Acquisto NM, Ashley ED, et al. Pharmacist-managed antimicrobial stewardship program for patients discharged from the emergency department. *J Pharm Pract*. 2012;25(2):190-4.

Bartlett JM, Siola PL. Implementation and first-year results of an antimicrobial stewardship program at a community hospital. *Am J Health Syst Pharm*. 2014;71(11):943-9.

Bauer KA, West JE, Balada-Llasat JM, et al. An antimicrobial stewardship program's impact with rapid polymerase chain reaction methicillin-resistant Staphylococcus aureus/S. aureus blood culture test in patients with S. aureus bacteremia. *Clin Infect Dis.* 2010;51(9):1074-80

Bauters TG, Buyle FM, Peleman R, et al. Antifungal drugs and rational use of antifungals in treating invasive aspergillosis: the role of the hospital pharmacist. *Pharm World Sci.* 2005;27(1):31-4.

Bearden DT, Gallagher JC, Heil EL, Kuti JL. The Essential Role of Pharmacists in Antimicrobial Stewardship. *Am J Infect Control Hosp Epidemio.* 2016;(37):753-754 doi:10.1017/ice.2016.82

Beaulac K, Corcione S, Epstein L, et al. Antimicrobial Stewardship in a Long-Term Acute Care Hospitals Using Offsite Electronic Medical Record Audit. *Am J Infect Control Hosp Epidemio*. 2016;11:1-7.

Benson JM. Incorporating pharmacy student activities into an antimicrobial stewardship program in a long-term acute care hospital. *Am J Health Syst Pharm*. 2014;17(3):227-30.

Bessesen MT, Ma A, Clegg D, et al. Antimicrobial Stewardship Programs: Comparison of a Program with Infectious Diseases Pharmacist Support to a Program with a Geographic Pharmacist Staffing Model. *Hosp Pharm*. 2015;50(6):477-83.

Booth JL, Mullen AB, Thomson DA, et al. Antibiotic treatment of urinary tract infection by community pharmacists: a cross-sectional study. *Br J Gen Pract*. 2013;63(609):244-249.

Buyle FM, Wallaert M, Beck N, et al. Implementation of a multidisciplinary infectious diseases team in a tertiary hospital within an Antimicrobial Stewardship Program. *Acta Clin Belg*. 2014;69(5):320-326.

Cachay ER, Hill L, Ballard C, et al. Increasing Hepatitis C treatment uptake among HIV-infected patients using an HIV primary care model. *AIDS Res Ther*. 2013;10(1):9.

Calloway S, Akilo HA, Bierman K. Impact of a clinical decision support system on pharmacy clinical interventions, documentation efforts, and costs. *Hosp Pharm*. 2013;48(9):744-752.

Cappelletty D, Jacobs D. Evaluating the impact of a pharmacist's absence from an antimicrobial stewardship team. *Am J Health Syst Pharm*. 2013;70(12):1065-9.

Carcelero E, Tuset M, Martin M, et al. Evaluation of antiretroviral-related errors and interventions by the clinical pharmacist in HIV-infected patients*. HIV Med*. 2011;12(8):494-9.

The Centers for Disease Control and Prevention. National and State Healthcare Associated Infections Progress Report. 2014. Published March, 2016. Available at: www.cdc.gov/hai/progress-report/index.html.

Centers for Medicare and Medicaid Services. Hospital and Critical Access Hospital (CAH) Changes to Promote Innovation, Flexibility, and Improvement in Patient Care. Proposed Rule; Docket No. CMS-3295-P. *Federal Register.* 2016; 81:39447. Available at: http://federalregister.gov/a/2016-13925.

Chellangi S, Pokala S, Vantipalli R, Nadendia R. Importance of Pharmacist Intervention in the Management of Ulcerative Colitis- A Case Study. *Int J Phar Sci & Rsch.* 2015;6(3):1326-1329.

Cook PP, Gooch M. Long-term effects of antimicrobial stewardship programme at a tertiary-care teaching hospital. *Int J Antimicrob Agents*. 2015;45(3):262-7.

Cosgrove SE, Hermsen ED, Rybak MJ, et al. Guidance for the knowledge and skills required for antimicrobial stewardship leaders. *Am J Infect Control Hosp Epidemiol*. 2014;35(12):14444-51.

Cuba GT, Pignatari AC, Patekoski KS, et al. Pharmacodynamic profiling of commonly prescribed antimicrobial drugs against Escherichia coli isolates from urinary tract. *Braz J Infect Dis*. 2014;18(5):512-7.

Di Pentima MC, Chan S, Hossain J. Benefits of a pediatric antimicrobial stewardship program at a children's hospital. *Pediatr*. 2011;128(6):1062-1070.

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. *CID.* 2007:44.

Dryden M, Saeed K, Townsend R, et al. Antibiotic stewardship and early discharge from hospital: impact of a structured approach to antimicrobial management. *J of Antimicrob Chemother.* 2012;67(9):2289-2296.

Dunn K, O'Reilly A, Silke B, et al. Implementing a pharmacist-led sequential antimicrobial therapy strategy: a controlled before and after study. *Int J Clin Pharm*. 2011;33(2):208-14.

Ernst EJ, Klepser ME, Bosso JA, et al. Recommendations for training and certification for pharmacists practicing, mentoring, and educating in infectious diseases pharmacotherapy. *Pharmacotherapy*. 2009;29(4):482-8.

Farinas MC, Saravia G, Calvo-Montes J, et al. Adherence to recommendations by infectious disease consultants and its influence on outcomes of intravenous antibiotic-treated hospitalized patients. *BMC Infectious Diseases*. 2012;(12):292.

Farley TM, Shelsky C, Powell S, et al. Effect of clinical pharmacist intervention on medication discrepancies following hospital discharge. *Int Jrnl of Clin Pharm*. 2014;36(2):430-437.

Farsaei S, Karimzadeh I, Elyasi S, et al. Glycemic control in the infectious diseases ward; role of clinical pharmacist interventions. *J. Infect Dev Ctries.* 2014;8(4):480-489.

Fleming A, Bradley C, Cullinan S, Byrne S. Antibiotic prescribing in long-term care facilities- a qualitative, multidisciplinary investigation. *BMJ*. 2014;(4):1.

Fleming A, Browne J, Byrne S. The effect of interventions to reduce potentially inappropriate antibiotic prescribing in long-term care facilities: a systematic review of randomised controlled trials. *Drug Aging J*. 2013;30(6):401-408.

Fukuda T, et al. Contribution of antimicrobial stewardship programs to reduction of antimicrobial therapy costs in community hospital with 429 Beds --before-after comparative two-year trial in Japan. *J. Pharm Policy Pract*. 2014;7(10):1-7.

Gallagher J, Byrne S, Woods N, et al. Cost-outcome description of clinical pharmacist interventions in a university teaching hospital. *BMC Infect Dis*. 2014;14:177.

Gill TK, McNicholl IR, Schafer JJ, Sherman EM. ASHP Guidelines on Pharmacist Involvement in HIV Care. Am J Health-Syst Pharm. 2016; 73:72-98

Goad JA, Taitel MS, Fensterheim LE, et al. Vaccinations administered during off-clinic hours at a national community pharmacy: implications for increasing patient access and convenience. *Ann Fam Med*. 2013;11(5):429-436.

Goff DA. Antimicrobial stewardship: bridging the gap between quality care and cost. *Curr Opin Infect Dis*. 2011;24(1):S11-20.

Gudka S, et al. To develop and measure the effectiveness and acceptability of a pharmacy-based chlamydia screening intervention in Australia. *BMJ*. 2013;3:1-9.

Haas-Gehres A, Sebastian S, Lamberjack K. Impact of pharmacist integration in a pediatric primary care clinic on vaccination errors: a retrospective review. *JAPhA*. 2014;54(4):415-418.

Hasan SS, Lim KN, Anwar M, et al. Impact of pharmacists' intervention on identification and management of drug-drug interactions in an intensive care setting. *Singapore Med J.* 2012;53(8):526-531.

Hecker MT, Fox CT, Son AH, et al. Effect of a stewardship intervention on adherence to uncomplicated cystitis and pyelonephritis guidelines in an emergency department setting. *PLoS One*. 2014;9(2):e87899.

Heelon M, Skiest D, Tereso G, et al. Effect of a clinical pharmacist's intervention on duration of antiretroviral-related errors in hospitalized patients. *Am J Health Syst Pharm*. 2007;64(19):2064-8.

Heintz BH, Halilovic J, Christensen CL. Impact of a Multidisciplinary Team Review of Potential Outpatient Parenteral Antimicrobial Therapy Prior to Discharge from an Academic Medical Center. *Ann Pharmacother*. 2011;(45):1329-1337.

Hernandez Arroyo MJ, Cabrera Figueroa SE, Sepulveda Correa R, et al. Impact of a pharmaceutical care program on clinical evolution and antiretroviral treatment adherence: a 5-year study. *Patient Prefer Adherence*. 2013;(7):729-739.

Kripalani S, Roumie CL, Dalal AK. et al. Effect of a pharmacist intervention on clinically important medication errors after hospital discharge: a randomized trial. *Ann Intern Med*. 2012;157(1):1-10.

Laxminarayan R, Duse A, Wattal C, et aL Antibiotic resistance-the need for global solutions. *Lancet Infect Dis*. 2013;13(12):1057-1098.

Magedanz L, Silliprandi EM, dos Santos RP. Impact of the pharmacist on a multidisciplinary team in an antimicrobial stewardship program: a quasi experimental study. *Int J Clin Pharm*. 2012;34(2):290-4.

May L, Cosgrove S, L'Archeveque M, et al. A call to action for antimicrobial stewardship in the emergency department: approaches and strategies. *Ann Emerg Med*. 2013;62(1):69-77 e62.

McLaughlin CM, Bodasing N, Boyter AC. Pharmacy-implemented guidelines on switching from intravenous to oral antibiotics: an intervention study. *QJM*. 2005;(10):745-52.

Miller K, McGraw MA, Tomsey A, et aL Pharmacist addition to the post-ED visit review of discharge antimicrobial regimens. *Am J Emerg Med*. 2014;32(10):1270-1274.

Miyamoto T. Appropriate use of antibiotics-practice we should employ now: appropriate use of antibiotics by pharmacists at university hospitals. *Rinsho Byori*. 2010;56(7):698-705.

Mohammad RA, Bulloch MN, Chan J, et al. Provision of clinical pharmacist services for individuals with chronic hepatitis C viral infection: Joint Opinion of the GI/Liver/Nutrition and Infectious Diseases Practice and Research Networks of the American College of Clinical Pharmacy. *Pharmacotherapy.* 2014;34(12):1341-54.

Murray C, Shaw A, Lloyd M, et al. A multidisciplinary intervention to reduce antibiotic duration in lower respiratory tract infections. *J. Antimicrob Chemother*. 2014;69(2):515-518.

Nagel JL. Huang AM, Kunapuli A, et al. Impact of antimicrobial stewardship intervention on coagulase-negative Staphylococcus blood cultures in conjunction with rapid diagnostic testing. *J Clin Microb*. 2014;52(8):2849-2854.

Nevo ON, Lesko CR, Colwell B, et al. Outcomes of pharmacist-assisted management of antiretroviral therapy in patients with HIV infection: A risk adjusted analysis. *Am J Health Syst Pharm.* 2015;72(17):1463-70.

O'Brien KA, Zhang J, Mauldin PD, et al. Impact of Stewardship-Initiated Restriction on Empirical Use of Ciprofloxacin on Nonsusceotibility Escherichia coli Urinary Isolates to Ciprofloxacin. *Pharmacotherapy.* 2015;35(5):464-9.

Otsuka SH, Tayal NH, Porter K, et al. Improving herpes zoster vaccination rates through use of a clinical pharmacist and a personal health record. *Am J Med.* 2013;126(9):832 e831-836.

Papaevangelou V, Rousounides A, Hadjipanagis A, et al. Decrease of antibiotic consumption in children with upper respiratory tract infections after implementation of an intervention program in Cyprus. J *Antimicrob Agents Chemother.* 2012;56(3):1658-1661.

Percival KM, Valenti KM, Schmittling SE, et al. Impact of an antimicrobial stewardship intervention on urinary tract infection in the ED. *Am J Emerg Med*. 2015;33(9): 1129 – 33.

Popovski Z, Mercuri M, Main C, et al. Multifaceted intervention to optimize antibiotic use for intra-abdominal infections. *J Antimicrob Chemother*. 2015;70(4):1226-9.

Rafati M, Shiva A, Ahmadi A, Habibi O. Adherence to American society of health-system pharmacists surgical antibiotic prophylaxis guidelines in a teaching hospital. *J ResPharm Pract*. 2014;3(2):62-66.

Richey EA, Dudley L, Liu SK. Quality improvement in hospital management of community-acquired pneumonia: focus on new strategies and current challenges. *Curr Infect Dis Rep.* 2014;16(2):395.

Ruhnke M. Antifungal stewardship in invasive Candida infections. *Clin Microbiol Infect.* 2014;20 Suppl 6:11-8.

Sango A, McCarter YS, Johnson 0, et al. Stewardship approach for optimizing antimicrobial therapy through use of a rapid microarray assay on blood cultures positive for Enterococcus species. *J Clin Microb*. 2013;51(12):4008-4011.

Septimus EJ, Owens RC. Need and potential of antimicrobial stewardship in community hospitals. *Clin Infect Dis*. 2011;531:S8-S14.

Talasaz AH. Detection and Management of Medication Errors in Internal Wards of a teaching hospital by clinical pharmacists. *ACTA Medica lranica*. 2013;51 (7):482-486.

Thakkar K, Gilchrist M, Dickinson E, et al. A quality improvement programme to increase compliance with an anti-infective prescribing policy. *J Antimicrob Chemother.* 2011;66(8):1916-20.

Tice AD, Rehm SJ, Dalovisio JR, et al. IDSA Practice Guidelines for Outpatient Parenteral Antimicrobial Therapy. IDSA guidelines. *Clin Infect Dis.* 2004;38(12):1651-72.

Wang J, Ford LJ, Wingate L, et al. Effect of pharmacist intervention on herpes zoster vaccination in community pharmacies. *JAPhA*. 2013;53(1):46-53.

Wickens HJ, Farrell S, Ashiru-Oredope DA, et al. The increasing role of pharmacists in antimicrobial stewardship in English hospitals. *J Antimicrob Chemother*. 2013;68(11):2675-2681.

Yu K, Rho J, Morcos M, et al. Evaluation of dedicated infectious diseases pharmacists on antimicrobial stewardship teams. *Am J Health Syst Pharm*. 2014:15;71(12):1019-28.

Zhang HX, Li X, Huo HQ, et al. *Pharmacist interventions for prophylactic antibiotic use in urological inpatients undergoing clean or clean-contaminated operations in a Chinese hospital. PloS one*. 2014;9(2):e88971.

Zhang YZ, Singh S. Antibiotic stewardship programs in intensive care units: Why, how, and where are they leading us. *World J Crit Care Med*. 42015;4(1):13-28.

Appendix G-3

Infectious Diseases Pharmacy Annotated Evidence Table

APPENDIX G-3
Infectious Diseases Pharmacy Annotated Evidence Table

Citation	Summary	Conclusion	Relevance to BPS Petition	Category (Role of Pharmacist, Education/Training, Clinical outcomes, Economic Outcomes, Patient Satisfaction, Public Health Outcomes)	Criteria
A Path to Better Antimicrobial Stewardship in Inpatient Settings. The Pew Charitable Trusts Antibiotic Resistance Project. 2016. Available at: http://www.pewtrusts.org/~/media/assets/2016/04/apathtobetterantibioticstewardshipinpatientsettings.pdf. Accessed September 11, 2016.	10 case studies showcased how to improve antibiotic use in acute and long-term care facilities. The article demonstrates a number of tools used to develop and implement ASPs successfully.	Though ASPs differ in their details, the case studies reveal themes that are critical to any successful program implementation.	This article demonstrates the demand and impact of pharmacist-led ASP improving public health. This article provides evidence to support criterion A and B.	Public Health and Clinical Outcome	A, B
Baker SN, Acquisto NM, Ashley ED, et al. Pharmacist-managed antimicrobial stewardship program for patients discharged from the emergency department. *J Pharm Pract*. 2012;25(2):190-4	This report describes a retrospective case-control study of patients discharged from the emergency department (ED) with subsequent positive cultures conducted to determine whether integrating antimicrobial stewardship responsibilities into practice of the emergency medicine clinical pharmacist (EPh) decreased times to positive culture follow-up, patient or primary care provider (PCP) notification, and appropriateness of antimicrobial therapy.	Median time to culture review in the pre-implementation group was 3 days and 2 days in the post-implementation group (P = .0001). There were 74 (71.2%) and 36 (49.3%) positive cultures that required notification in the pre- and post-implementation groups, respectively, and the median time to patient or PCP notification was 3 days and 2 days in the 2 groups (P = .01). In conclusion, EPh involvement reduced time to positive culture review and	This article showcases the role of pharmacists reviewing cultures and demonstrates positive clinical outcomes for patients when therapy is corrected early. This article provides evidence to support criterion A.	Role of the Pharmacist Clinical Outcomes	A

		time to patient or PCP notification when indicated.			
Bartlett JM, Siola PL. Implementation and first-year results of an antimicrobial stewardship program at a community hospital. *Am J Health Syst* Pharm. 2014;1 (11):943-9.	Implementation of an antimicrobial stewardship program (ASP) in a small community hospital including an ID physician and pharmacists, where interventions and tracking and reporting of outcomes were done primarily by pharmacists.	Monitoring of pharmacy purchases in the first year of the program indicated an annualized 26% decrease in overall antimicrobial expenditures from prior-year spending, with a nearly 18% decrease in defined daily doses per 1000 patient-days. Total first-year direct cost savings attributed to the ASP were estimated at $145,353. Pharmacist-initiated conversions of patients from intravenous to oral antimicrobial therapy increased by 688% ($p < 0.0001$). Overall, the rate of ID physician acceptance of ASP-recommended interventions was 74%. Antimicrobial expenditures were reduced and there was a significant increase in pharmacist-initiated intravenous to oral conversions.	This article demonstrates the impact of pharmacist-initiated changes in antimicrobial therapy on reducing hospital expenditures. This article provides evidence to support criterion A and B.	Economic Outcomes	A, B

Bauters TG, Buyle FM, Peleman R, et al. Antifungal drugs and rational use of antifungals in treating invasive aspergillosis: the role of the hospital pharmacist. *Pharm Wold Sci.* 2005;27(1):31-4.	This review discusses the most common used antifungal agents in the treatment of invasive fungal infections and the importance of determining the effectiveness of antifungal therapy as well as the potential role of the hospital pharmacist in the management of this infection is highlighted. A review of the English-language literature was conducted using recent treatment guidelines.	An overview of the most recent advances in antifungal therapy is described. In addition, a flowchart for treatment of invasive aspergillosis (proven, probable or possible) has been developed. Invasive fungal infections will remain a frequent and important complication of modern medicine. Considering the clinical and financial outcome of invasive fungal infections, the role of the hospital pharmacist can be a paramount to the treatment.	This article demonstrates the effectiveness of pharmacist developed antifungal treatment plans showing positive clinical and economic outcomes. This article provides evidence to support criterion A and E.	Clinical and Economic Outcomes	A, E
Beaulac K, Corcione S, Epstein L, et al. Antimicrobial Stewardship in a Long-Term Acute Care Hospitals Using Offsite Electronic Medical Record Audit. Infect Control *Hosp Epidemiol.* 2016;11:1-7.	The objective of this study was to offer antimicrobial stewardship to a long-term acute care hospital using telemedicine. An uninterrupted time-series analysis was conducted to measure the impact of antimicrobial stewardship on hospital-acquired Clostridium difficile infection (CDI) rates and antimicrobial use.	During the preimplementation period, total antimicrobial usage was rose 4.54 DDD/1,000 PD per month then significantly decreased from preimplementation to postimplementation. The same trend was observed for antibiotics against methicillin-resistant Staphylococcus aureus. There was a significant decrease in usage of anti-clostridium difficile infection antibiotics by 50.4 DDD/1,000 PD per month at program implementation that was maintained afterwards. Intervention was associated with a significant decrease in hospital-acquired clostridium difficile infection. Antimicrobial stewardship using an electronic medical record via remote access led to a significant decrease in antibacterial usage and a decrease in clostridium difficile infection rates.	This article demonstrates the demand and impact of pharmacist-led ASP improving public health. This article provides evidence to support criterion A and B.	Public Health and Clinical Outcome	A, B, E

Bessesen MT, Ma A, Clegg D, et al. Antimicrobial Stewardship Programs: Comparison of a Program with Infectious Diseases Pharmacist Support to a Program with a Geographic Pharmacist Staffing Model. *Hosp Pharm*. 2015;50(6):477-83.	Stewardship of antimicrobial agents is an essential function of hospital pharmacies. To inform staffing decisions for antimicrobial stewardship teams, we aimed to compare an antimicrobial stewardship program with an ID pharmacist dedicated to a program relying on ward pharmacists for stewardship activities (Geographic Model Hospital). A randomly selected sample of 290 cases of inpatient parenteral antibiotic use were reviewed. The electronic medical record was reviewed for compliance with indicators of appropriate antimicrobial stewardship.	At the hospital staffed by a dedicated ID pharmacist, 96.8% of patients received initial antimicrobial therapy that adhered to local treatment guidelines compared to 87% of patients at the hospital that assigned antimicrobial stewardship duties to ward pharmacists (P < .002). Therapy was modified within 24 hours of availability of laboratory data in 86.7% of cases at the Dedicated ID Pharmacist Hospital versus 72.6% of cases at the Geographic Model Hospital (P < .03). When a patient's illness was determined not to be caused by a bacterial infection, antibiotics were discontinued in 78.0% of cases at the Dedicated ID Pharmacist Hospital and in 33.3% of cases at the Geographic Model Hospital (P < .0002). An ASP with a dedicated ID pharmacist was associated with greater adherence to recommended antimicrobial therapy practices when compared to a stewardship program that relied on ward pharmacists.	This article demonstrates the demand and impact of ID pharmacists improving clinical outcomes through ASP. This article provides evidence to support criterion A, D, and E.	Role of Pharmacist Clinical Outcome	A,D,E
Calloway S, Akilo HA, Bierman K. Impact of a clinical decision support system on pharmacy clinical interventions, documentation efforts, and costs. *Hospital pharmacy.* 2013;48(9):744-752.	A clinical decision support systems (CDSS) is a promising approach to the aggregation and use of patient data to identify patients who would most benefit from interventions by pharmacy clinicians. An acute care community hospital implemented a CDSS (TheraDoc Clinical Surveillance System). Prior to CDSS implementation, clinicians struggled with obtaining and documenting the data needed to support clinical initiatives.	The value of having both clinical and staff pharmacists utilizing the CDSS has improved communication and knowledge among staff and improved relationships with medical staff, nursing, and case management. The department of pharmacy increased its clinical interventions from an average of 1,986 per month to 4,065 per month; this represents a 105% increase in the number of interventions. The annual estimated cost savings after CDSS	This article demonstrates the effectiveness of pharmacist interventions improving clinical and economic outcomes. This article provides evidence to support criterion A, B and E.	Economic Outcome Role of Pharmacist	A, B, E

		implementation is $2,999,508, representing a 96% increase per year and translating into a $1,469,907 annual return on investment.			
Cappelletty D, Jacobs D. Evaluating the impact of a pharmacists absence from an antimicrobial stewardship team. *Am J Health Syst Pharm*. 2013; (12):1065-9.	This study compared the appropriateness of the use of selected antimicrobial medications with and without regular pharmacist involvement on the hospital's antimicrobial stewardship team (AST). Two samples of patients were evaluated: patients who had received prolonged imipenem-cilastatin, linezolid, or micafungin therapy, and patients treated with one of the three drugs during a three-month period when the clinical pharmacist did not serve on the AST.	Relative to the period of active pharmacist involvement in the AST, rates of inappropriate use of imipenem-cilastatin, linezolid, and micafungin during the pharmacist's absence were deemed to have increased by 27, 39, and 35 percentage points, respectively, with corresponding increases in the average duration of therapy of 0.7, 4.0, and 3.2 days; in addition, the number of cases of Clostridium difficile infection increased more than threefold during the pharmacist's absence. The temporary absence of a pharmacist from the AST was associated with increased rates of inappropriate use of restricted antimicrobial agents and consequent increases in average durations of therapy.	This article shows the impact of the pharmacist's role in treating antimicrobial infections accurately thus improving public health outcomes by reducing inappropriate use of antimicrobials. This article provides evidence to support criterion A and B.	Public Health Outcome Role of the Pharmacist	A, B

Cook PP, Gooch M. Long-term effects of antimicrobial stewardship programme at a tertiary-care teaching hospital. *Int J Antimicrob Agents*. 2015;45(3):262-7.	Antimicrobial stewardship has been shown to reduce unnecessary antibiotic use, but there are few data on the long-term benefits of such a program. Antimicrobial use over a 13-year period since implementing an ASP at our institution was examined. Nosocomial rates of Clostridium difficile infection (CDI) and antimicrobial susceptibility patterns of common nosocomial micro-organisms over the same period were also reviewed.	Total antimicrobial use decreased significantly by 62.8%.There were significant decreases in use of aminoglycosides (-91.3%), cephalosporins (-68.3%), extended-spectrum penicillins (-77.7%), macrolides (-27.2%), clindamycin (-95.9%) and quinolones (-78.7%). Antifungal use significantly decreased by 71.0%. There were significant increases in the use of carbapenems and anti-MRSA drugs. There was a significant reduction in nosocomial MRSA infections. There were significant decreases in the rate (-71.9%) and percentage (-51.4%) of quinolone-resistant Pseudomonas aeruginosa. There were significant decreases in the rate and percentage of carbapenem-resistant P. aeruginosa following implementation of a policy restricting ciprofloxacin use. We have demonstrated sustained reductions in both antimicrobial use and drug-resistant organisms following implementation of an ASP.	This article shows the impact of the pharmacist's role in treating antimicrobial infections accurately thus improving public health outcomes by reducing inappropriate use of antimicrobials. This article provides evidence to support criterion A and B.	Public Health Outcome Clinical Outcomes	A, B
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):14444-51.	ASPs are increasingly recognized as critical in optimizing the use of antimicrobials. Consequently, more physicians, pharmacists, and other healthcare providers are developing and implementing such programs in a variety of healthcare settings. The purpose of this guidance document is to outline the knowledge and skills that are needed to lead an ASP. It was developed by antimicrobial stewardship experts from organizations that are engaged in	Society for Healthcare Epidemiology of America has partnered with other leaders in advancing the field of antimicrobial stewardship, including the Infectious Diseases Society of America, Making-A-Difference in Infectious Diseases, the National Foundation of Infectious Diseases, the Pediatric Infectious Diseases Society, and the Society of Infectious Disease Pharmacists, to develop a summary description of the core knowledge and skills required for antimicrobial stewardship professionals engaged	This article demonstrates the knowledge and sills needed to lead an ASP successfully. This article provides evidence to support criterion D and E.	Role of Pharmacist	D, E

	advancing the field of antimicrobial stewardship.	with building, leading, and evaluating ASPs (Table 1). Those core knowledge and skills include understanding the rationale for antimicrobial stewardship, the types of stewardship interventions and activities that a program may consider, and approaches to measuring process and outcomes associated with an ASP.			
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. *CID* 2007:44.	This document presents guidelines for developing institutional programs to enhance antimicrobial stewardship, an activity that includes appropriate selection, dosing, route, and duration of antimicrobial therapy. The primary goal of antimicrobial stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use, including toxicity, the selection of pathogenic organisms (such as *Clostridium difficile*), and the emergence of resistance.	Effective antimicrobial stewardship programs can be financially self-supporting and improve patient care. Comprehensive programs have consistently demonstrated a decrease in antimicrobial use (22%–36%), with annual savings of $200,000–$900,000 in both larger academic hospitals and smaller community hospitals. Thus, health care facilities are encouraged to implement antimicrobial stewardship programs.	This article demonstrates the knowledge, skills, and impact of pharmacist led ASP on public health as well as improving clinical and economic outcomes. This article provides evidence to support criterion A, B, D and E.	Public Health, Clinical, Economic Outcomes	A,B,D,E
Di Pentima MC, Chan S, Hossain J. Benefits of a pediatric antimicrobial stewardship program at a children's hospital. *Pediatrics*. 2011;128(6):1062-1070.	The objective of this study is to prospectively evaluate the effect of a comprehensive ASP on antimicrobial use, physician interventions, patient outcomes, and rates of antimicrobial resistance. Active surveillance of antimicrobial use with intervention and real-time feedback to providers and reinforcement of prior authorization for selected antimicrobials were introduced at a pediatric teaching hospital. An	Total antimicrobial use peaked at 3089 doses administered per 1000 patient-days per year in 2003-2004 before implementation of the program and steadily decreased to 1904 doses administered per 1000 patient-days per year during the postintervention period. Targeted-antimicrobial use declined from 1250 to 988 doses administered per 1000 patient-days per year. Nontargeted-antimicrobial use declined from 1839	This article shows the impact of antimicrobial stewardship strategies on reducing antimicrobial use, improving quality of patient care and preventing emergence of resistance. This article provides evidence to support criterion A, E.	Public Health Outcome Clinical Outcome	A, E

	automated report of antimicrobials prescribed, doses, patient demographics, and microbiology data was generated and reviewed by an ID pharmacist and a pediatric ID physician.	to 916 doses administered per 1000 patient-days per year. Rates of antimicrobial resistance to broad-spectrum antimicrobials among the most common Gram-negative bacilli remained low and stable over time. The successful implementation of antimicrobial stewardship strategies had a significant impact on reducing targeted- and nontargeted-antimicrobial use, improving quality of care of hospitalized children and preventing emergence of resistance.			
Dryden M, Saeed K, Townsend R, et al. Antibiotic stewardship and early discharge from hospital: impact of a structured approach to antimicrobial management. *The Journal of Antimicrobial Chemotherapy.* 2012;67(9):2289-2296.	The objective of this study is to assess the impact of an infection team review of patients receiving antibiotics in six hospitals across the UK and to establish the suitability of these patients for continued care in the community. Clinical and antibiotic use data were collected by an infection team (doctor, nurse and antibiotic pharmacist). Assessments were made of the requirement for continuing antibiotic treatment, route and duration [including intravenous (iv)/oral switch] and of the suitability of the patients for discharge from hospital and their requirement for community support.	Ninety-nine (23%) patients had their antibiotics stopped immediately on clinical grounds. Eighty-nine (21%) patients were considered eligible for discharge, comprising 10 who would have required outpatient parenteral antibiotic therapy (OPAT), 55 who were suitable for oral outpatient treatment and 24 who had their antibiotics stopped. Infection team review had a significant impact on antimicrobial use, facilitating iv to oral switch and a reduction in the volume of antibiotic use, possibly reducing the risk of healthcare-associated complications and infections. It identified many patients who could potentially have been managed in the community with appropriate resources, saving 481 bed-days.	This article shows the impact of the pharmacist's role in treating antimicrobial infections accurately thus improving public health outcomes by reducing inappropriate use of antimicrobials. This article provides evidence to support criterion A and B.	Public Health and Clinical Outcomes Role of Pharmacist	A, B

Emily L. Heil, Joseph L. Kuti, Bearden DT, Gallagher JC.. The Essential Role of Pharmacists in Antimicrobial Stewardship. Infection Control & Hospital *Epidemiology*, 2016;37, pp 753-754 doi:10.1017/ice.2016.82	The rapid increase in antibiotic resistance in conjunction with a decline in discovery and development of new antibiotics and widespread misuse of antibiotics is considered a global crisis. This position paper highlights the critical importance of pharmacists with training in antimicrobial stewardship in an effective antimicrobial stewardship program. As outlined in the CDC's Core Elements document, successful stewardship programs must have not only physician leadership and accountability but also drug expertise from a pharmacist leader.	Pharmacists play an essential role in decreasing antimicrobial resistance and saving lives, and healthcare organizations should effectively use their unique knowledge to make antimicrobial stewardship programs successful. Finally, ID pharmacy specialists should be engaged and available for consultation to provide the utmost quality and knowledge whenever possible, and the number of pharmacists practicing in this area needs to be greatly expanded to meet current demands.	This article demonstrates the knowledge, skills, and impact of pharmacist led ASP on public health as well as improving clinical outcomes. This article provides evidence to support criterion A, B, D and E.	Public Health and Clinical Outcomes Role of the Pharmacist	A,B,D,E
Farsaei S, Karimzadeh I, Elyasi S, et al. Glycemic control in the infectious diseases ward; role of clinical pharmacist interventions. *Journal of Infection in Developing Countries.* 2014;8(4):480-489.	In this study the impact of the clinical pharmacist interventions on the glycemic control in patients admitted to ID ward has been evaluated. The clinical pharmacist-led multidisciplinary team managed the glycemic profile of patients according to an established insulin protocol commonly used in internal wards. Clinical pharmacists reviewed patients' medical charts for proper insulin administration, evaluated nurses' technique for insulin injection and blood glucose measurement, and educated patients.	The percentage of controlled random blood sugar significantly increased from 13.8% in the pre-intervention to 22.3% in the post-intervention group (p value < 0.01). Pharmacists and additional health care providers from other departments such as nursing and dietary departments need to be devoted to glycemic control service. Collaborative practice agreement between physicians is necessary to promote this service and help to increase the use of such services in different settings for diabetes control.	This article demonstrates the importance of pharmacist's role in treating all the components involved in antimicrobial infections. This article provides evidence to support criterion A.	Role of Pharmacist Clinical Outcomes	A
Fleming A, Bradley C, Cullinan S, Byrne S. Antibiotic prescribing in long-term care facilities- a qualitative, multidisciplinary	The objective of this study is to explore healthcare professionals' views of antibiotic prescribing in long-term care facilities (LTCFs) and use the findings to recommend	Many participants believed that antibiotic prescribing was satisfactory at their LTCF, despite the lack of surveillance activities. This study, has found that antibiotic prescribing in LTCFs is influenced by many social and	This article demonstrates the knowledge, skills, and impact of pharmacist evaluating antimicrobials on public health as well as improving clinical	Public Health Outcome	A,B,D,E

investigation. *BMJ*. 2014;(4):1.	intervention strategies for antimicrobial stewardship in LTCFs.	contextual factors. The challenges of the setting and patient population, the belief about consequences to the patient, and the lack of implementation of guidelines and knowledge regarding antibiotic prescribing patterns are significant challenges to address. On the basis of the study findings and the application of the TDF and BCT taxonomy, we suggest some practical intervention functions for antimicrobial stewardship in LTCFs.	outcomes at LTCFs. This article provides evidence to support criterion A, B, D and E.		
Fleming A, Browne J, Byrne S. The effect of interventions to reduce potentially inappropriate antibiotic prescribing in long-term care facilities: a systematic review of randomized controlled trials. *Drugs & Aging*. 2013;30(6):401-408.	The prevalence of antibiotic use in long-term care facilities (LTCF) is high and in many cases it may not be in accordance with local guidelines. It is important to review interventions that aim to improve the quality of antibiotic prescribing in this setting. The objective of this systematic review was to collect and interpret the results of studies of interventions to improve the quality of or appropriateness of antibiotic prescribing in LTCF in order to determine the key components for a successful intervention.	Interventions in the long-term care setting involving local consensus procedures, educational strategies, and locally developed guidelines may improve the quality of antibiotic prescribing, but the quality of the evidence is low. Due to the poor quality of evidence and mixed results, no definitive conclusion can be reached about the effect of the interventions. The contribution of a multidisciplinary antibiotic management team, which could include a pharmacist, a nurse and specialists in microbiology and ID and geriatrics, needs further investigation in order to improve antibiotic prescribing practices in LTCF.	This article demonstrates the knowledge, skills, and impact of pharmacist evaluating antimicrobials on public health as well as improving clinical outcomes at LTCFs. This article provides evidence to support criterion A, B, D and E.	Role of Pharmacist	A,B,D,E

Gallagher J, Byrne S, Woods N, et al. Cost-outcome description of clinical pharmacist interventions in a university teaching hospital. *BMC Infectious Diseases.* 2014;14:177.	This study estimates the cost avoidance generated by pharmacist interventions due to the prevention of adverse drug events. Interventions were assigned a rating score, determined by the probability that an ADE would have occurred in the absence of an intervention. These scores were then used to calculate cost avoidance. Net cost benefit and cost benefit ratio were the primary outcomes.	A total cost avoidance of $708,221 was generated. Input costs were calculated at $81,942. This resulted in a net cost benefit of $626,279 and a cost benefit ratio of 8.64: 1. The most common type of intervention was the identification of medication omissions, followed by dosage adjustments and requests to review therapies. This study provides further evidence that pharmacist interventions provide substantial cost avoidance to the healthcare payer.	This article demonstrates the effectiveness of pharmacist interventions improving economic outcomes. This article provides evidence to support criterion A and B.	Economic Outcomes	A, B
Gill TK, McNicholl IR, Schafer JJ, Sherman EM. ASHP Guidelines on Pharmacist Involvement in HIV Care. Am J Health-Syst Pharm. 2016; 73:72-98.	The epidemic of human immunodeficiency virus (HIV) infection in the United States has changed dramatically since its initial recognition in 1981. Despite remarkable advances in HIV treatment and prevention, the HIV epidemic in the United States has persisted. While the annual incidence of AIDS and AIDS-related deaths initially declined after the introduction of ART in 1995, the annual numbers of new HIV infections, AIDS diagnoses, and AIDS-related deaths have remained constant since 2000. These statistics indicate that significant challenges remain for public health officials and HIV care providers to properly address the HIV epidemic.	As the HIV epidemic in the United States evolves and new challenges to successful care and prevention emerge, healthcare providers—including pharmacists—are expanding their roles to ensure optimal patient care. Pharmacists have long been recognized as essential members of the HIV patient care team, and their involvement in managing HIV-infected patients has been associated with improved outcomes. Pharmacist activities such as helping the team in selecting individualized HIV treatment regimens, providing patient counseling, monitoring for treatment responses and adverse effects, evaluating regimens for potential drug–drug interactions, and identifying opportunities for regimen simplification are associated with better viral load reductions and CD4+ T-lymphocyte responses, improved ART adherence, simpler regimens, and reductions in medication errors.	This article demonstrates the knowledge, skills, and impact of pharmacist involvement in HIV treatment and it's effect on public health as well as improving clinical outcomes. This article provides evidence to support criterion A, B, D and E.	Role of the Pharmacist Public Health Outcomes Clinical Outcomes	A, B, D, E

Hecker MT, Fox CT, Son AH, et al. Effect of a stewardship intervention on adherence to uncomplicated cystitis and pyelonephritis guidelines in an emergency department setting. *PLoS One*. 2014;9(2):e87899.	The objective of this study is to evaluate adherence to uncomplicated urinary tract infections (UTI) guidelines and UTI diagnostic accuracy in an emergency department (ED) setting before and after implementation of an antimicrobial stewardship intervention. The study evaluated adherence to guidelines, antimicrobial use, and diagnostic accuracy at baseline, after implementation of the order set (period 1), and after audit and feedback (period 2).	Adherence to UTI guidelines significantly increased from 44% (baseline) to 68% (period 1) to 82% (period 2). Prescription of fluoroquinolones for uncomplicated cystitis significantly decreased from 44% (baseline) to 14% (period 1) to 13% (period 2). Unnecessary antibiotic days for the 200 patients evaluated in each period significantly decreased. A stewardship intervention including an electronic order set and audit and feedback was associated with increased adherence to uncomplicated UTI guidelines and reductions in unnecessary antibiotic therapy and fluoroquinolone therapy for cystitis.	This article demonstrates the knowledge, skills, and impact of pharmacist led ASP on public health as well as improving clinical outcomes. This article provides evidence to support criterion A, B, D and E.	Public Health and Clinical Outcomes Role of the Pharmacist	A,B,D,E
Hernandez Arroyo MJ, Cabrera Figueroa SE, Sepulveda Correa R, et al. Impact of a pharmaceutical care program on clinical evolution and antiretroviral treatment adherence: a 5-year study. *Patient Preference and Adherence*. 2013;7:729-39.	The objectives of this study are to determine the impact of the implementation of a pharmaceutical care program on improvement of ART adherence and on the immunovirological response of the patients; and to detect possible correlations between different adherence evaluation measurements.	Significant improvement was observed in the mean adherence level, and there was a considerable decrease in the percentage of patients with CD4 lymphocytes less than 200 cells/mm3. A relationship was found between the number of patients with optimum adherence levels and the time that plasma viral load remained undetected. The number of interviews and interventions performed in each patient in the first 12 months from the onset of the pharmaceutical care program, was related to a significant increase in adherence during this same time period. The results suggest that the establishment and permanence of the pharmaceutical care program may increase ART adherence, increase permanence time of the patient with undetectable	This article demonstrates the knowledge, skills, and impact of pharmacist on improving adherence of antiretroviral agents in addition to improving public health and clinical outcomes. This article provides evidence to support criterion A, B, D and E.	Public Health and Clinical Outcomes Role of the Pharmacist	A,B,D,E

		plasma viral loads, and improve patients' lymphocyte count.			
Kripalani S, Roumie CL, Dalal AK. et al. Effect of a pharmacist intervention on clinically important medication errors after hospital discharge: a randomized trial. *Annals of Intemal Medicine.* 2012;157(1):1-10.	The objective of this study is to determine the effect of a tailored intervention on the occurrence of clinically important medication errors after hospital discharge. Intervention included pharmacist-assisted medication reconciliation, inpatient pharmacist counseling, low-literacy adherence aids, and individualized telephone follow-up after discharge. The primary outcome was the number of clinically important medication errors per patient during the first 30 days after hospital discharge. Secondary outcomes included preventable or ameliorable ADEs, as well as potential ADEs.	Among 851 participants, 432 (50.8%) had 1 or more clinically important medication errors; 22.9% of such errors were judged to be serious and 1.8% life-threatening. Adverse drug events occurred in 258 patients (30.3%) and potential ADEs in 253 patients (29.7%). Patients in the intervention group tended to have fewer potential ADEs (unadjusted incidence rate ratio, 0.80 [CI, 0.61 to 1.04]). Clinically important medication errors were present among one half of patients after hospital discharge and were not significantly reduced by a health-literacy-sensitive, pharmacist-delivered intervention.	This article demonstrates the role of pharmacists decreasing antimicrobial errors and adverse effects thus improving clinical outcomes. This article provides evidence to support criterion A, E.	Clinical Outcomes	A, E
Magedanz L, Silliprandi EM, dos Santos RP. Impact of the pharmacist on a multidisciplinary team in an antimicrobial stewardship program: a quasi experimental study. *Int J Clin Pharm*. 2012;34(2):290-4.	The objective of this study is to assess the impact of ASP, with and without the presence of a pharmacist, in a cardiology hospital in Brazil. The program started with an infectious disease (ID) physician, and after 22 months, a pharmacist started to work on the ASP team.	After the start of ASP there was a significant reduction of consumption of all antimicrobials. The pharmacist contributed to the significant reduction in consumption of fluoroquinolones, clindamycin and ampicillin/sulbactam and in increase in total cephalosporins use. There was a significant reduction of 69% in hospital antibiotics costs. A non-expensive ASP in a limited resource country resulted in reductions in antimicrobial consumption and costs. The multidisciplinary team contributed to maximize the impact of interventions.	This article demonstrates the impact of pharmacist led ASP on public health as well as improving clinical and economic outcomes. This article provides evidence to support criterion A and B.	Clinical, Public Health, and Economic Outcomes	A, B

McLaughlin CM, Bodasing N, Boyter AC. Pharmacy-implemented guidelines on switching from intravenous to oral antibiotics: an intervention study. *QJM.* 2005;98(10):745-52.	The objective of this study is to assess the impact of guideline implementation on IV antibiotic prescribing in medical admissions to a general hospital. Data relating to infection and antibiotic therapy were collected for 4 weeks pre-intervention (group 1) and 4 weeks post intervention (group 2). Six months later, data was collected for a further 4 weeks following a second intervention (group 3). Interventions consisted of pharmacy-led implementation of guidelines incorporating criteria for IV therapy and switching to the oral route. The second intervention also included pharmacy-initiated feedback on prescribing.	IV therapy was used in 40%, 46% and 36% (groups 1, 2 and 3, respectively) and was appropriate in 92% vs. 100% (group 1 vs. 2). In groups 2 and 3, oral switch timing was appropriate in 90% and 88%, vs. 17% in group 1 ($p < 0.001$). Between groups 1 and 2, median duration of IV therapy was reduced from 3 to 2 days ($p = 0.01$). More patients in group 2 received appropriate exclusively IV therapy (65% vs. 96%, $p < 0.01$). Duration of stay in IV-treated patients significantly decreased from 13 to 10 days in groups 2 and 3 ($p = 0.047$). IV antibiotic expenditure reduced by 13% per patient admitted between groups 1 and 2. Pharmacy-led introduction of antibiotic guidelines appears to result in clinically appropriate reductions in IV therapy.	This article shows the impact of the pharmacist's role in treating antimicrobial infections accurately thus improving public health outcomes by reducing inappropriate use of antimicrobials. This article provides evidence to support criterion A and B.	Role of Pharmacist Clinical Outcomes	A, B
Hospital and Critical Access Hospital (CAH) Changes to Promote Innovation, Flexibility, and Improvement in Patient Care. Centers for Medicare and Medicaid Services. 2016. http://federalregister.gov/a/2016-13925.	This proposed rule would update the requirements that hospitals and critical access hospitals (CAHs) must meet to participate in the Medicare and Medicaid programs. These proposals are intended to conform the requirements to current standards of practice and support improvements in quality of care, reduce barriers to care, and reduce some issues that may exacerbate workforce shortage concerns	Review of the literature, consultations with CDC, and experience with hospitals suggests that the establishment and maintenance of a hospital antibiotic stewardship program as proposed here, for an average-size hospital (approximately 124 beds), would require the services of a physician (preferably one with training in infectious diseases) and **a clinical pharmacist**, and also a network data analyst, at the following proportions of full-time employee salaries respectively: 0.10, 0.25, and 0.05.	This article demonstrates the impact of pharmacist led ASP on public health as well as improving clinical and economic outcomes. This article provides evidence to support criterion A and B.	Clinical, Public Health, and Economic Outcomes	A, B

Miller K, McGraw MA, Tomsey A, et aL Pharmacist addition to the post-ED visit review of discharge antimicrobial regimens. *The American Journal of Emergency Medicine*. 2014;32(10):1270-1274.	The objective is to evaluate whether pharmacist addition to the post visit review of discharged adult emergency department (ED) visits' prescriptions/cultures would reduce the prevalence of revised antimicrobial regimen inappropriateness. The study compared the prevalence of revised antimicrobial regimen inappropriateness between the 2 cohorts.	In the prepharmacist cohort, there were 411 positive ED discharge cultures. Seventy-three (17.8%) required antimicrobial regimen revision; 34 of these met 1 or more level of inappropriateness (46.6%). In the postpharmacist cohort, there were 459 positive ED discharge cultures. Seventy-five (16.3%) required revision; 11 of these met 1 or more level of inappropriateness (14.7%; P < .0001). Pharmacist addition to the postvisit review of discharged adult ED patients' prescriptions/cultures reduced the prevalence of revised antimicrobial regimen inappropriateness.	This article showcases the role of pharmacists reviewing cultures and demonstrates positive clinical outcomes for patients when therapy is appropriate. This article provides evidence to support criterion A.	Clinical Outcome Pharmacist Role	A
Mohammad RA, Bulloch MN, Chan J, et al. Provision of clinical pharmacist services for individuals with chronic hepatitis C viral infection: Joint Opinion of the GI/Liver/Nutrition and Infectious Diseases Practice and Research Networks of the American College of Clinical Pharmacy. *Pharmacotherapy*. 2014;34(12):1341-54.	The objective of this opinion paper was to identify and describe potential clinical pharmacists' services for the prevention and management of patients infected with the hepatitis C virus (HCV). The goals of this paper are to guide the establishment and development of pharmacy services for patients infected with HCV and to highlight HCV research and educational opportunities.	The recommendations provided in this opinion paper define the areas of clinical pharmacist involvement and clinical pharmacy practice in the treatment and management of patients with HCV. Clinical pharmacists can promote preventive measures and education about reducing HCV transmission, improve medication adherence, assist in monitoring clinical and adverse effects, recommend treatment strategies to minimize adverse effects and drug interactions, and facilitate medication acquisition and logistics that positively improve patient outcomes and reduce the health care system costs.	This article demonstrates the knowledge, skills, and impact of pharmacist on improving adherence of antiretroviral agents in addition to improving public health and economic outcomes. This article provides evidence to support criterion A, B, D and E.	Role of the Pharmacist Public Health and Economic Outcomes	A,B,D,E

Murray C, Shaw A, Lloyd M, et al. A multidisciplinary intervention to reduce antibiotic duration in lower respiratory tract infections. *The Journal of Antimicrobial Chemotherapy*. 2014;69(2):515-518.	This study describes a multidisciplinary intervention to reduce antibiotic duration in lower respiratory tract infection (LRTI) patients. Antibiotic duration was recorded for 6 months for all LRTI admissions, followed by the introduction of an intervention intended to reduce the duration of antibiotic treatment. The intervention incorporated an antibiotic duration based on the CURB65 score, automatic stop dates and pharmacist feedback to prescribers.	Two hundred and eighty-one patients were included in the pre-intervention group and 221 in the post-intervention group. The intervention resulted in a reduction in the duration of antibiotic treatment from 8.3 to 6.8 days (P < 0.001, 18.1% relative reduction). The rate of antibiotic-related adverse effects reduced from 31% to 19% (P = 0.03, 39.3% relative reduction). There was no increase in mortality or length of stay. A simple intervention can significantly reduce antibiotic duration and antibiotic-related side effects.	This article demonstrates the impact of the pharmacist on reducing antimicrobial duration and adverse effects. This article provides evidence to support criterion A.	Clinical Outcomes Role of the Pharmacist	A
Nagel JL. Huang AM, Kunapuli A, et al. Impact of antimicrobial stewardship intervention on coagulase-negative Staphylococcus blood cultures in conjunction with rapid diagnostic testing. *Journal of Clinical Microbiology*. 2014;52(8):2849-54.	This study was conducted to analyze the impact of rapid diagnostic testing with matrix-assisted laser desorption ionization-time of flight (MALDI-TOF) plus antimicrobial stewardship team (AST) review and intervention for adult hospitalized patients with blood cultures positive for coagulase-negative Staphylococcus (CoNS). Antibiotic prescribing patterns and clinical outcomes were compared before and after implementation of MALDI-TOF with AST intervention for patients with CoNS bacteremia and CoNS contamination.	Patients with bacteremia were initiated on optimal therapy sooner in the AST intervention group (58.7 versus 34.4 h, P = 0.030), which was associated with a similarly decreased mortality (21.7% versus 3.1%, P = 0.023). Patients with CoNS-contaminated cultures had similar rates of mortality, lengths of hospitalization, recurrent bloodstream infections, and 30-day hospital readmissions, but the AST intervention group had a decreased duration of unnecessary antibiotic therapy (1.31 versus 3.89 days, P = 0.032) and a decreased number of vancomycin trough assays performed (0.88 versus 1.95, P < 0.001). In patients with CoNS bacteremia, rapid pathogen identification integrated with real-time stewardship interventions improved timely organism identification and initiation of antibiotic therapy. Patients in the AST group with blood cultures	This article demonstrates the impact of pharmacist led ASP on public health as well as improving clinical and economic outcomes. This article provides evidence to support criterion A and B.	Clinical Outcomes	A,B

		contaminated with CoNS had decreased inappropriate antimicrobial prescribing and decreased unnecessary serum vancomycin trough assays.			
National and State Healthcare Associated Infections Progress Report. The Centers for Disease Control and Prevention. 2014 National and State Healthcare-Associated Infections Progress Report. Published March, 2016. Available at www.cdc.gov/hai/progress-report/index.html.	Healthcare-associated infections (HAIs) are a major, yet often preventable, threat to patient safety The Centers for Disease Control and Prevention (CDC) is committed to helping all Americans receive the best and safest care The National and State Healthcare-Associated Infections Progress Report (HAI Progress Report) expands upon and provides an update to previous reports detailing progress toward the ultimate goal of eliminating HAIs The reports can serve as a reference for anyone looking for information about national and state HAI prevention progress	Together with health care and public health partners, CDC is working to bring increased attention to HAI prevention, and continue to decrease CAUTI and other infection types. CDC recommended infection prevention strategies for several infection types, including CAUTI, have proven effective in a variety of patient care locations. CDC also summarizes core elements of successful stewardship programs, which can help reduce rates of C. difficile infections and antibiotic resistant infections; improve individual patient outcomes; and save healthcare dollars.	This article demonstrates the impact of pharmacist led ASP on public health as well as improving clinical and economic outcomes. This article provides evidence to support criterion A, B, D, and E.	Role of the Pharmacist Clinical Outcomes Public Health Outcomes Economic Outcomes	A, B, D, E

Nevo ON, Lesko CR, Colwell B, et al. Outcomes of pharmacist-assisted management of antiretroviral therapy in patients with HIV infection: A risk adjusted analysis. *Am J Health Syst Pharm*. 2015; 72(17):1463-70.	This study was conducted to evaluate antiretroviral therapy (ART) outcomes in treatment-naive patients initiated on ART at an HIV clinic. Eligible patients enrolled in the clinic were classified into two groups: those referred to a clinic-based HIV pharmacist for initiation of ART (the PAM group) and those managed by a primary care provider (the control group). The primary study objective was the median time to viral suppression; secondary objectives included the durability of response to the first ART regimen.	Patients referred for PAM services (n = 819) typically had higher baseline viral loads and lower CD4+ cell counts than those in the control group (n = 436). The likelihood of viral suppression during the first two years after ART initiation was significantly higher in the PAM group versus the control group (hazard ratio, 1.37; $p < 0.0001$). The median durability of the first ART regimen was 100 months in the PAM group versus 44 months in the control group ($p > 0.05$). In treatment-naive patients, suppression of HIV viral load occurred earlier when pharmacists assisted with initiating ART than when ART was initiated without that assistance.	This article demonstrates the knowledge, skills, and impact of pharmacist on improving adherence of antiretroviral agents in addition to improving public health and clinical outcomes. This article provides evidence to support criterion A, B, D and E.	Role of Pharmacist Clinical Outcomes	A,B,D,E
O'Brien KA, Zhang J, Mauldin PD, et al. Impact of Stewardship-Initiated Restriction on Empirical Use of Ciprofloxacin on Nonsusceptibility Escherichia coli Urinary Isolates to Ciprofloxacin. *Pharmacotherapy*. 2015;35(5):464-9.	The objective of this study was to evaluate the impact of a stewardship-initiated restriction on empirical use of ciprofloxacin on the nonsusceptibility of Escherichia coli (E. coli) urinary isolates to ciprofloxacin over time while controlling for the use of other key antibiotics with gram-negative activity.	Ciprofloxacin use declined from 141.1-39.8 defined daily doses/1000 patient-days, and the percentage of E. coli isolates that were not susceptible to ciprofloxacin decreased from 41.5-32.8%. When nonsignificant variables were eliminated ($p>0.20$), ciprofloxacin use was found to be positively associated with the percentage of E. coli isolates nonsusceptible to ciprofloxacin ($p=0.037$), whereas ceftriaxone use was negatively associated ($p=0.045$). The restriction and subsequent reduction of ciprofloxacin use was found to have a positive effect on the susceptibility of E. coli urinary isolates to ciprofloxacin.	This article demonstrates the impact of pharmacist led ASP on public health outcomes. This article provides evidence to support criterion A and B.	Public Health Outcomes	A, B

Papaevangelou V, Rousounides A, Hadjipanagis A, et al. Decrease of antibiotic consumption in children with upper respiratory tract infections after implementation of an intervention program in Cyprus. *Antimicrobial Agents and Chemotherapy*. 2012;56(3):1658-1661.	The objective of this study was to assess the impact of intervention on antibiotic misuse in children, parents' and pediatricians' knowledge, attitudes, and practices (KAP) concerning antibiotic use were evaluated pre- and postintervention in Larnaca (Cyprus) and Limassol (Cyprus). Concurrently, pediatricians documented upper respiratory tract infection (URTI) visits and pharmacists provided antibiotic consumption data. Intervention was implemented for parents and pediatricians residing in Larnaca.	The consumption/URTI incidence index was significantly reduced in Larnaca but not in Limassol. Parental responses to a KAP questionnaire remained unchanged; therefore, antibiotic consumption reduction is attributable to pediatricians' education.	This article shows the impact of the pharmacist's role in treating antimicrobial infections accurately thus improving public health outcomes by reducing inappropriate use of antimicrobials. This article provides evidence to support criterion A.	Public Health Outcomes	A
Tice AD, Rehm SJ, Dalovisio JR, et al. IDSA Practice Guidelines for Outpatient Parenteral Antimicrobial Therapy. IDSA guidelines. *Clin Infect Dis.* 2004;38(12):1651-72.	These guidelines were formulated to assist physicians and other health care professionals with various aspects of the administration of outpatient parenteral antimicrobial therapy (OPAT).	Selection of antimicrobials for children generally follows the same guidelines as those for inpatient parenteral therapy. However, the number of US Food and Drug Administration– approved antibacterials, antivirals, and antifungals for children is substantially fewer than those for adults, usually because of lack of data on efficacy and safety in children. As with inpatient management of pediatric infections, the physician must select the safest and most effective antimicrobials for the child.	This article shows the impact of the pharmacist's role in treating antimicrobial infections accurately thus improving public health outcomes by reducing inappropriate use of antimicrobials. This article provides evidence to support criterion A.	Public Health and Clinical Outcomes	A

Wickens HJ, Farrell S, Ashiru-Oredope DA, et al. The increasing role of pharmacists in antimicrobial stewardship in English hospitals. *The Journal of Antimicrobial Chemotherapy*. 2013;68(11):2675-2681.	The objective of this study is to evaluate the development of pharmacist-led antimicrobial stewardship activities in English hospitals. The study included distribution of an electronic questionnaire to antimicrobial pharmacists or chief pharmacists in National Health Service hospitals in England.	Overall numbers of specialist antimicrobial pharmacists, and their levels of experience, had increased. Over 95% of hospitals provided empirical usage guidance, antimicrobial formularies and surgical prophylaxis guidelines. Two-thirds of pharmacy departments provided antimicrobial usage reports in terms of defined daily doses at least yearly, and over 80% conducted yearly antimicrobial point prevalence studies. The vast majority of pharmacy departments indicated a willingness to supply data and audit results to a national database for benchmarking purposes. The increasing role of specialist pharmacists and general pharmacists in antibiotic stewardship in acute care in England has enabled hospitals to deliver on the antibiotic stewardship agenda, although opportunity remains to expand this role further and ensure greater multidisciplinary engagement.	This article demonstrates the impact of pharmacist led ASP on public health as well as improving clinical outcomes. This article provides evidence to support criterion A and B.	Clinical, Public Health, and Economic Outcomes	A, B

Yu K, Rho J, Morcos M, et al. Evaluation of dedicated infectious diseases pharmacists on antimicrobial stewardship teams. *Am J Health Syst Pharm.* 2014;71(12):1019-28.	Patient care improvements and cost savings achieved by a large integrated health system through the implementation of antimicrobial stewardship programs (ASPs) at two hospitals are reported. A pre-post analysis was conducted to evaluate cost and quality outcomes at the two ASP sites and three similar sites within the same health system not included in the ASP initiative. The utilization of 15 targeted antimicrobials and associated costs at the five sites during designated preimplementation and postimplementation periods were compared; changes in Hospital Standardized Mortality Ratio (HSMR) values for specific infections among Medicare patients were also assessed.	In the year after ASP implementation, aggregate direct antimicrobial acquisition costs at the two study sites decreased 17.3% from prior-year levels and increased by 9.1% at the three comparator sites. Significant decreases in the consumption of targeted antimicrobial classes were observed at the ASP sites. Among the 2446 ASP interventions recorded, 72% involved discontinuing or narrowing the use of broad-spectrum antimicrobials. Although rates of health care-associated Clostridium difficile infection were little changed at both study sites after ASP implementation, HSMR data indicated substantial gains in combating sepsis and C. difficile and respiratory infections. After implementation of ASPs at two study sites, the utilization of all classes of antibiotics decreased and antimicrobial costs per 1000 patient-days decreased. While HSMR values for sepsis and respiratory infections improved, the rate of C. difficile infections stayed the same.	This article demonstrates the impact of pharmacist led ASP on public health as well as improving clinical and economic outcomes. This article provides evidence to support criterion A and B.	Clinical, Public Health, and Economic Outcomes	A, B

Zhang HX, Li X, Huo HQ, et al. Pharmacist interventions for prophylactic antibiotic use in urological inpatients undergoing clean or clean-contaminated operations in a Chinese hospital. *PloS One*. 2014;9(2)e88971.	The objective of this study is to evaluate the impact and cost-benefit value of pharmacist interventions for prophylactic antibiotic use in surgical patients undergoing clean or clean-contaminated operations. The pharmacist interventions included real-time monitoring of medical records and controlling of the prescriptions of prophylactic antibiotics against the criteria. A cost-benefit analysis was performed to determine the economic effects of implementing the pharmacist intervention on preoperative antibiotic prophylaxis.	After the pharmacist intervention, a significant decrease was found in the rate of no indications for prophylactic antibiotic use ($p = 0.004$), the rate of broad-spectrum antibiotic use ($p<0.001$), the rate of drug replacement ($p<0.001$) and the rate of prolonged duration of prophylaxis ($p<0.001$). Significant reductions were observed in the mean antibiotic cost ($p<0.001$), the mean duration of antibiotic prophylaxis ($p<0.001$) and the mean number of antibiotics used ($p<0.001$). A significant increase was observed in the rate of correct choice of antibiotics ($p<0.001$). The ratio of the net mean cost savings for antibiotics to the mean cost of pharmacist time was approximately 18.79:1. Real-time interventions provided by a clinical pharmacist promoted rational use of prophylactic antibiotics, with a significant reduction in antibiotic costs, thus leading to favorable economic outcomes.	This article demonstrates the impact of pharmacist led ASP on public health as well as improving clinical and economic outcomes. This article provides evidence to support criterion A and B.	Clinical, Public Health, and Economic Outcomes	A, B
Key: ID, infectious disease; ASP, antimicrobial stewardship program; AST, antimicrobial stewardship team					

Appendix G-4

ACPE P.L.A.N. Programming

PLAN Search Results: ID CPE Programs 2013-16

Accreditation Council for Pharmacy Education

135 S. LaSalle Street, Suite 4100 Chicago, IL 60603-4810 Phone (312) 664-3575 Fax (312) 664-7008
http://www.acpe-accredit.org

2016

Title	UAN	Hrs (CEUs)	City	Activity Type
2016 Immunization Update for Pharmacists and Pharmacy Technicians	0499-9999-16-010-L01-P	2 (0.2)	Florence	Knowledge
2016 Recent Drug Developments Pharmacy Law Update	0035-0000-16-017-L03-P	1 (0.1)	Missoula, Billings, Bozeman, etc.	Knowledge
2016 Wyoming Immunization Conference (Pharmacy)	0387-9999-16-103-L01-P	8.25 (0.825)	Casper	Knowledge
A Shot of Reality: Epidemiological Evidence for Immunization Recommendations	0006-0000-16-008-L04-P	1.5 (0.15)	Hotel Kabuki, San Francisco	Knowledge
Adolescent & Child Immunization Update	0036-9999-16-105-L01-P	1.5 (0.15)	Eugene	Knowledge
Adult Immunizations: A Guide for Pharmacists, Techs & NPs	0372-0000-14-016-L05-P	2 (0.2)	www.rxschool.com	Knowledge
Antifungal Agents: Past, Present and Future	0008-9999-16-031-L01-P	1 (0.1)	Aurora	Knowledge
Antimicrobial Stewardship: The Clock is Ticking - Establishing a Program at Different Practice Settings	0112-0000-16-132-L01-P	1.5 (0.15)	Detroit	Knowledge
Avoiding the “Ouch”: Updates in Vaccine Administration	0217-9999-16-074-L01-P	1 (0.1)	Philadelphia	Knowledge
Bioterrorism and Mass Prophylaxis: Anticipating Patient Needs and Questions to Facilitate an Effective Response	0165-0000-16-008-L03-P	1.5 (0.15)	Destin	Knowledge
Bugs and Drugs for Common Out-Patient Infections	0156-9999-16-006-L01-P	1 (0.1)	Aurora, CO (CPS - Jodie Malhotra)	Knowledge
Bugs and Drugs: Prevention of Blood Stream Infections	0016-9999-16-014-L01-P	1.5 (0.15)	Boston	Knowledge
Cdiff	0108-0000-16-009-L01-P	1 (0.1)	virginia Beach	Knowledge
CE Catch-Up: Defining the Antimicrobial StewaRdship Evolution (D.A.R.E.)	0062-9999-16-040-L04-P	1 (0.1)	Charleston	Knowledge
Chronic Pain in Patients With HIV: What Clinicians Need to Know	0022-0000-16-028-L02-P	0.75 (0.075)	Lexington	Knowledge
Clinician Outreach and Communication Activity	0387-0000-15-200-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Clinician Outreach and Communication Activity	0387-0000-16-075-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge

Clinician Outreach and Communication Activity	0387-0000-16-076-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Clinician Outreach and Communication Activity	0387-0000-16-077-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Clinician Outreach and Communication Activity	0387-0000-16-078-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Clinician Outreach and Communication Activity	0387-0000-16-083-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Clinician Outreach and Communication Activity	0387-0000-16-099-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Clinician Outreach and Communication Activity	0387-0000-16-102-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Clinician Outreach and Communication Activity	0387-0000-16-111-L04-P	1 (0.1)	ttp://emergency.cdc.gov/coca/callinfo.asp	Knowledge
Current Issues in Immunization Netconference: 2016 Immunization Schedule Update	0387-0000-16-096-L04-P	1 (0.1)	Atlanta	Knowledge
DCH Resident Research Roundup	0172-0000-16-018-L01-P	1 (0.1)	Tuscaloosa	Knowledge
EpiVac Pink Book Netconference Series: Hepatitis B	0387-0000-16-138-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: HPV	0387-0000-16-137-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Immunization Strategies	0387-0000-16-129-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Influenza	0387-0000-16-136-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Measles, Mumps, Rubella	0387-0000-16-135-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Meningococcal	0387-0000-16-133-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Pneumococcal	0387-0000-16-139-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Polio and Hib	0387-0000-16-134-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Rotavirus and Hepatitis A	0387-0000-16-130-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: DTaP /Tdap	0387-0000-16-131-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: General Recommendations -1	0387-0000-16-126-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: General Recommendations -2, and Vaccine Safety	0387-0000-16-127-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Principles of Vaccination	0387-0000-16-125-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
EpiVac Pink Book Netconference Series: Vaccine Storage and Handling; Vaccine Administration	0387-0000-16-128-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge

EpiVac Pink Book Netconference Series: Varicella and Zoster	0387-0000-16-132-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
From “Drug Holidays” to 100% Adherence- The Role of the Pharmacist in HIV Drug Therapy	0798-0000-15-057-L02-P	1 (0.1)	www.freeCE.com	Knowledge
Giving HOPE: Management of HIV+ Kidney Transplant Recipients	0857-9999-16-080-L04-P	1 (0.1)	Chicago	Knowledge
Group Case Discussions I	0022-0000-16-023-L02-P	0.25 (0.025)	Lexington	Knowledge
Group Case Discussions II	0022-0000-16-029-L02-P	0.25 (0.025)	Lexington	Knowledge
HCV Genotype 1	0022-0000-16-020-L01-P	0.75 (0.075)	Lexington	Knowledge
Hepatitis C Virus and HIV Co-infection- 2016 Update	0010-0000-16-007-L01-P	1 (0.1)	HU College of Pharmacy	Knowledge
HIV Clinical Update 2016: The New Jersey Statewide Symposium	0374-9999-16-009-L01-P	4.5 (0.45)	Iselin	Knowledge
HIV in 2016: An Update for Pharmacists	0036-9999-16-211-L02-P	1 (0.1)	Sunriver	Knowledge
HIV Outbreak Among Injection Drug Users in Rural Indiana	0022-0000-16-024-L02-P	0.75 (0.075)	Lexington	Knowledge
HIV Pharmacotherapy	0837-9999-16-044-L01-P	1 (0.1)	Freeport	Knowledge
HIV Update	0112-0000-16-105-L02-P	1.25 (0.125)	Detroit	Knowledge
HIV update-	0163-9999-16-033-L02-P	1 (0.1)	Weston	Knowledge
HIV Update 2016	0042-0000-16-006-L02-P	5 (0.5)	www.liu.edu/pharmce	Knowledge
HIV Update: Treatment as Prevention and Pre-exposure Prophylaxis	0347-0000-15-028-L01-P	1 (0.1)	Hermiston, Good Shepherd MC, 541-667-3506	Knowledge
HIV Update: Treatment as Prevention and Pre-exposure Prophylaxis	0347-0000-15-028-L01-P	1 (0.1)	Medical Lake, Eastern State Hospital, 509-565-4128	Knowledge
HIV Update: Treatment as Prevention and Pre-exposure Prophylaxis	0347-0000-16-006-L01-P	1.5 (0.15)	Ketchikan, Best Plus Western, 907-225-5166	Knowledge
HIV/AIDS Update	0165-0000-16-041-L02-P	1 (0.1)	Ft. Lauderdale	Knowledge
HPV Vaccine: Cancer Prevention Recommendations	0175-0000-16-021-L01-P	1 (0.1)	Madison	Knowledge
Immunization in the NICU: It’s Global Health	0263-0000-16-606-L01-P	1.25 (0.125)	Las Vegas/http://www.contemporaryforums.com	Knowledge
Immunization in the NICU: It’s Global Health	0263-0000-16-606-L01-P	1.25 (0.125)	www.contemporaryforumsonline.com	Knowledge
Immunization of Pediatric Patients	0119-0000-16-005-L04-P	1 (0.1)	St. George	Knowledge
Immunization Update 2016	0171-0000-15-096-L01-P	1 (0.1)	Asheville	Knowledge

Immunization Update 2016	0837-9999-16-029-L01-P	2 (0.2)	Freeport	Knowledge
Immunization Update 2016	0837-9999-16-061-L01-P	1 (0.1)	Bartlett	Knowledge
Immunization Update 2016	0845-0000-16-016-L04-P	1.5 (0.15)	Fort Worth	Knowledge
Immunization Update 2016	0845-0000-16-016-L04-P	1.5 (0.15)	Fort Worth	Knowledge
Immunization Update 2016: A Team Effort	0119-0000-16-009-L04-P	1 (0.1)	St. George	Knowledge
Immunization Update: A focus on Vaccine Administration	0100-9999-16-021-L01-P	1 (0.1)	Tucson	Knowledge
Immunization Update-2015	0100-0000-15-069-L01-P	1 (0.1)	Tucson	Knowledge
Immunization: Hows & Whys	0826-9999-16-003-L01-P	2 (0.2)	http://ceinternational.com/immunization.aspx	Knowledge
Immunizations: 2016 Immunization Update: From Information to Implementation	0104-9999-16-017-L01-P	3 (0.3)	San Antonio	Knowledge
Immunizations: HPV Cancer Prevention and the Role of the Health Care Professional	0104-0000-16-013-L04-P	2 (0.2)	Albuquerque	Knowledge
Immunizations: Pharmunize Part I - Vaccine Update and Review	0104-0000-16-007-L01-P	1 (0.1)	Albuquerque	Knowledge
Immunomodulation: IVIG and Azithromycin	0263-0000-16-605-L01-P	0.75 (0.075)	Las Vegas/http://www.contemporaryforums.com	Knowledge
Immunomodulation: IVIG and Azithromycin	0263-0000-16-605-L01-P	0.75 (0.075)	www.contemporaryforumsonline.com	Knowledge
Improving Antimicrobial Use - Communicating with Physicians, Supporting Facilities	0175-0000-16-006-L01-P	1.25 (0.125)	Waukesha	Knowledge
INFECTION CONTROL IN THE DENTAL SETTING	0751-0000-15-059-L01-P	3 (0.3)	WEBINAR WWW.INRSEMINARS.COM	Knowledge
INFECTION CONTROL IN THE DENTAL SETTING	0751-0000-15-059-L01-P	3 (0.3)	WEBINAR-WWW.INRSEMINARS.COM	Knowledge
Infections in Older Persons	0059-9999-15-025-L01-P	0.75 (0.075)	Beverly Hilton. LA 909-706-3826	Knowledge
Infections in the Nursing Home	0059-0000-15-026-L01-P	0.75 (0.075)	Beverly Hilton. LA 909-706-3826	Knowledge
Infections in the Nursing Home	0059-9999-16-010-L01-P	0.75 (0.075)	Beverly Hilton, LA, CA 909-706-3826	Knowledge
Infectious Conditions	0263-0000-16-622-L01-P	1.5 (0.15)	Las Vegas/http://www.contemporaryforums.com	Knowledge
Infectious Conditions	0263-0000-16-622-L01-P	1.5 (0.15)	Nashville/ http://www.contemporaryforums.com	Knowledge
Infectious Conditions	0263-0000-16-622-L01-P	1.5 (0.15)	San Francisco/http://www.contemporaryforums.com	Knowledge

Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	Chicago	Knowledge
Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	Half Moon Bay	Knowledge
Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	Las Vegas	Knowledge
Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	Orlando	Knowledge
Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	Palm Springs	Knowledge
Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	San Diego	Knowledge
Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	Savannah	Knowledge
Infectious Disease Medicine for Primary Care - 3 Day	0816-0000-16-008-L01-P	11 (1.1)	Sonoma	Knowledge
Infectious Disease Medicine for Primary Care - 4 Day	0816-0000-16-017-L01-P	14 (1.4)	Key West	Knowledge
Infectious Diseases Update from A(ntibiotics) to Z(ika): Federal mandates for antibiotic stewardship, newly approved and pipeline antibiotic drugs, Zika virus	0741-0000-16-023-L01-P	5 (0.5)	Las Vegas/www.universitylearning.com/8009405860	Knowledge
Infectious Diseases: EB Mgt of Common Infections in Otolaryngology & Pulmonary and Endocrinology and Metabolism: Weight Mgt	0741-0000-16-016-L01-P	4 (0.4)	Europe Cruise/ universitylearning.com/8009405860	Knowledge
Initial Evaluation with Special Emphasis on HIV/HCV Coinfection, Natural History and Assessment Differences	0022-0000-16-019-L02-P	0.75 (0.075)	Lexington	Knowledge
Internal Medicine for Primary Care: Cardio/ID/Psych/Vasc	0816-0000-16-024-L01-P	14 (1.4)	Florence, Italy	Knowledge
Internal Medicine for Primary Care: Derm/Endo/Gastro/Ophth	0816-0000-16-029-L01-P	14 (1.4)	Barcelona, Spain	Knowledge
Internal Medicine for Primary Care: Derm/Endo/ID	0816-0000-16-030-L01-P	11 (1.1)	Lake George	Knowledge
Internal Medicine for Primary Care: Derm/Gastro/ID	0816-0000-16-033-L01-P	11 (1.1)	Orlando	Knowledge
Internal Medicine for Primary Care: Derm/ID/Neuro/Psych	0816-0000-16-010-L01-P	17 (1.7)	Maui	Knowledge
Internal Medicine for Primary Care: Endo/Geri/ID/Psych	0816-0000-16-036-L01-P	14 (1.4)	St.Maarten, Sint Maarten	Knowledge
Internal Medicine for Primary Care: Geri/ID/Ophth/Rheum	0816-0000-16-039-L01-P	17 (1.7)	Maui	Knowledge
Internal Medicine for Primary Care: ID/Onc/Psych/Vasc	0816-0000-16-057-L01-P	14 (1.4)	Salzburg, Austria	Knowledge
IV Antibiotic Therapy - Tips for the Long Term Care Pharmacist	0175-0000-16-005-L01-P	1.25 (0.125)	Waukesha	Knowledge
Let’s Keep the Needle Moving: An Immunization Update	0060-0000-16-007-L01-P	1.25 (0.125)	Newport	Knowledge

Making an Impact on Immunization Rates - A Community Pharmacy Opportunity	0175-0000-16-019-L01-P	1 (0.1)	Madison	Knowledge
Management of HIV in 2016	0228-0000-16-004-L02-P	1.5 (0.15)	Albany	Knowledge
Mechanisms of Antimicrobial Resistance and Strategies for Treatment: Focus on Gram Negative Pathogens	0108-0000-16-024-L01-P	1 (0.1)	Charlottesville	Knowledge
MRSA for Pharmacists	0163-9999-16-072-L01-P	2 (0.2)	Tallahassee	Knowledge
New Drug Update - Part I	0741-0000-16-009-L01-P	5 (0.5)	Marco Island/www.universitylearning.com/8009405860	Knowledge
New Drug Update - Part I	0741-0000-16-012-L01-P	5 (0.5)	Las Vegas/www.universitylearning.com/8009405860	Knowledge
New Vaccine Schedules 2016	0136-0000-16-011-L04-P	1.5 (0.15)	Cherry Hill	Knowledge
NonCarbepenem Antimicrobials for the Treatment of Extended-Spectrum B-Lactamase (ESBL) Producing Gram-Negative Bacilli	0510-0000-16-005-L01-P	1 (0.1)	Detroit	Knowledge
Non-Genotype 1 Hepatitis C: Natural History and Treatment	0022-0000-16-021-L01-P	0.75 (0.075)	Lexington	Knowledge
NYSCHP Residency and Research Practice Forum: Session 1	0134-0000-16-083-L05-P	1 (0.1)	Saratoga Springs	Knowledge
NYSCHP Residency and Research Practice Forum: Session 1	0134-0000-16-085-L04-P	1 (0.1)	Saratoga Springs	Knowledge
NYSCHP Residency and Research Practice Forum: Session 2	0134-0000-16-084-L04-P	1.25 (0.125)	Saratoga Springs	Knowledge
NYSCHP Residency and Research Practice Forum: Session 3	0134-0000-16-086-L04-P	1.25 (0.125)	Saratoga Springs	Knowledge
O Candida! Overview of Antifungals and Management of Candidasis	0163-9999-16-061-L01-P	1 (0.1)	Tampa	Knowledge
Pharmacists on the Front Line: Responding to HIV	0120-0000-16-023-L02-P	1.5 (0.15)	Indianapolis	Knowledge
Pharmacy-based Point-of-Care Testing and Opportunities for Community Pharmacists	0113-0000-15-111-L04-P	1.25 (0.125)	San Francisco	Knowledge
Playing Your Best Hand Against Candida	0263-0000-16-600-L01-P	0.75 (0.075)	Las Vegas/http://www.contemporaryforums.com	Knowledge
Playing Your Best Hand Against Candida	0263-0000-16-600-L01-P	0.75 (0.075)	www.contemporaryforumsonline.com	Knowledge

Polypharmacy and Drug Utilization Review Trends: A provider Education Forum	0010-0000-16-018-L01-P	2.5 (0.25)	Providence Hosp. 1150 Varnum St., NE	Knowledge
Pre-Meeting Symposium 13: Child's Play: Infectious Risk After Transplant During Every-day Life	0453-9999-16-034-L04-P	2 (0.2)	Washington	Knowledge
Pre-Meeting Symposium 15: Achilles Heel: Infectious Complications in MCS	0453-9999-16-036-L04-P	2 (0.2)	Washington	Knowledge
PrEP Skills Building Workshop	0387-9999-16-012-L01-P	8 (0.8)	Baltimore	Knowledge
Preventing healthcare acquired infections and antibiotic stewardship	0163-9999-16-031-L01-P	1 (0.1)	Weston	Knowledge
Preventing Infection: Immunization Update	0175-0000-16-008-L01-P	1.25 (0.125)	Waukesha	Knowledge
Prior Authorization Processing for Hepatitis C Patients	0022-0000-16-022-L01-P	0.5 (0.05)	Lexington	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-001-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-002-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-004-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-005-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-006-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-105-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-106-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-107-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-108-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-109-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-16-110-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2018	0387-0000-16-003-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
SC Hepatitis C and HIV Symposium: Best Practices and Emerging Trends in 2016	0062-9999-16-079-L01-P	6 (0.6)	Columbia	Knowledge
See what's different about C. diff: A Clostridium difficile Review	0837-9999-16-045-L01-P	1 (0.1)	Portland	Knowledge
Skin Infections: Focus on Cellulitis & MRSA	0372-0000-16-034-L01-P	2 (0.2)	www.rxschool.com	Knowledge
Skin Issues in HIV	0022-0000-16-027-L02-P	0.75 (0.075)	Lexington	Knowledge

Tap that Belly! Pharmacotherapeutic Considerations in Spontaneous Bacterial Peritonitis	0163-9999-16-029-L01-P	1.5 (0.15)	Gainesville	Knowledge
Teaching old drugs new tricks:strategies for overcoming antimicrobial resistance	0172-0000-16-020-L01-P	1 (0.1)	Mobile	Knowledge
The 2016 NPA Continuing Education Symposium	0230-0000-16-007-L04-P	15 (1.5)	Tampa	Knowledge
The 2016 NPA Continuing Education Symposium	0230-9999-16-005-L04-P	7.5 (0.75)	Tampa	Knowledge
The Use of Penicillin Skin Testing as an Antimicrobial Stewardship Initiative	0228-0000-16-014-L01-P	1 (0.1)	Savannah	Knowledge
The White House and Antimicrobial Stewardship: How Coming Mandates Will Affect Your Practice	0228-0000-16-017-L01-P	1 (0.1)	Savannah	Knowledge
To Resist or Not to Resist: The Emergence of Gram-Negative Resistant Organisms	0163-9999-16-019-L01-P	1 (0.1)	Tallahassee	Knowledge
Treating Infections: Guidelines and Case Studies	0263-0000-16-631-L01-P	2.75 (0.275)	Las Vegas/http://www.contemporaryforums.com	Knowledge
Treating Infections: Guidelines and Case Studies	0263-0000-16-631-L01-P	2.75 (0.275)	Nashville/ http://www.contemporaryforums.com	Knowledge
Treating Infections: Guidelines and Case Studies	0263-0000-16-631-L01-P	2.75 (0.275)	San Francisco/http://www.contemporaryforums.com	Knowledge
Treating Skin & Soft Tissue Infections in Geriatric Patients and Long Term Care	0175-0000-16-007-L01-P	1.25 (0.125)	Waukesha	Knowledge
Treating UTI in Long Term Care	0175-0000-16-004-L01-P	1 (0.1)	Waukesha	Knowledge
Treatment of Clostridium difficile infection	0163-9999-16-064-L01-P	1 (0.1)	Ft. Lauderdale	Knowledge
Update and Review on the Management of Opportunistic Infections	0163-9999-16-023-L01-P	1 (0.1)	Tampa	Knowledge
Update in Infectious Diseases	0163-9999-16-010-L01-P	1 (0.1)	Jacksonville	Knowledge
Update on Antiretroviral Therapy	0022-0000-16-025-L02-P	0.75 (0.075)	Lexington	Knowledge
Updates in Epidemiology and Treatment of HCV	0045-0000-15-074-L01-P	1 (0.1)	Albany/www.acphs.edu/518-694-7231	Knowledge
Updates in Rapid Diagnostics and Antibiotic Stewardship	0045-0000-15-075-L01-P	1 (0.1)	Albany/www.acphs.edu/518-694-7231	Knowledge
Updates on Antimicrobial Safety	0045-0000-15-078-L01-P	1 (0.1)	Albany/www.acphs.edu/518-694-7231	Knowledge
Updates on Epidemiology and Treatment of HIV	0045-0000-15-073-L01-P	1 (0.1)	Albany/www.acphs.edu/518-694-7231	Knowledge
Updates on Epidemiology and Treatment of Infections Due to Gram-negative Pathogens	0045-0000-15-077-L01-P	1 (0.1)	Albany/www.acphs.edu/518-694-7231	Knowledge

Updates on Epidemiology and Treatment of Infections Due to Gram-positive Pathogens	0045-0000-15-076-L01-P	1 (0.1)	Albany/www.acphs.edu/518-694-7231	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	AUSTIN	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	COLUMBIA	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	DALLAS	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	EXTON	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	HARRISBURG	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	HOUSTON	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	KING OF PRUSSIA	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	LAS VEGAS	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	OKLAHOMA CITY	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	PORTLAND	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	SAN ANTONIO	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	SPRINGFIELD	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	TULSA	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	WEBINAR--INR WEBSITE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	WILKES-BARRE	Knowledge
What’s New for Antimicrobial Therapy in the NICU?	0263-0000-16-599-L01-P	0.75 (0.075)	Las Vegas/http://www.contemporaryforums.com	Knowledge
What’s New for Antimicrobial Therapy in the NICU?	0263-0000-16-599-L01-P	0.75 (0.075)	www.contemporaryforumsonline.com	Knowledge
A Case-Based Approach to Serious Gram-Negative Bacterial Infections: What's Now? What's New? What's	0468-9999-16-007-L01-P	1.5 (0.15)	Boston	Application
Ambulatory Care Pharmacy Preparatory Review and Recertification Course—Infectious Diseases, Nephrology, and Bone/Joint and Rheumatology	0217-0000-16-028-L01-P	4.5 (0.45)	Phoenix, www.updatesintherapeutics.com	Application
Beware: Clinically Significant Drug Interactions in the Treatment of HIV	0202-0000-16-010-L02-P	2 (0.2)	Baltimore	Application
Calling the Shots: Incorporating Vaccines for Children and Travel into Your Practice	0159-0000-15-067-L03-P	1.5 (0.15)	Harrisburg	Application
Calling the Shots: Incorporating Vaccines for Children and Travel into Your Practice	0159-0000-15-067-L03-P	1.5 (0.15)	Webinar	Application

Hospital Associated Infections: Definitions, Prevention and Management	0027-0000-16-009-L01-P	1 (0.1)	Dedham	Application
Immunization Delivery for Pharmacists - Live	0175-0000-15-035-L01-P	12 (1.2)	Madison	Application
Immunization Delivery for Pharmacists - Live	0175-0000-15-035-L01-P	12 (1.2)	Wisconsin Dells	Application
Immunization Training	0837-9999-16-030-L01-P	8 (0.8)	Freeport	Application
Immunization Update 2015	0202-0000-16-029-L01-P	2 (0.2)	Baltimore	Application
Immunization Update 2016	0154-0000-16-009-L01-P	3 (0.3)	Austin	Application
Immunizations Update 2016	0154-0000-16-003-L01-P	1 (0.1)	Grapevine	Application
Influenza and Pneumococcal Vaccines: A Breath of Fresh Air for Patients with Pulmonary Disorders	0165-0000-16-020-L01-P	1.5 (0.15)	Tampa	Application
Management of Antibiotic-Resistant Bacterial Infections in the Elderly	0009-9999-16-016-L01-P	1 (0.1)	Plantsville	Application
Ouch! Shoulder Injuries Related to Vaccine Administration (SIRVA)	0100-0000-16-002-L05-P	1 (0.1)	https://attendee.gotowebinar.com/register/4409992	Application
Pediatric Pharmacy Preparatory Review and Recertification Course—Pediatric Nephrology, Infectious Diseases, and Immunology	0217-0000-16-039-L01-P	3.5 (0.35)	Phoenix, www.updatesintherapeutics.com	Application
Pharmacists Prescribing Vaccines - The New Mexico Program	0104-0000-14-058-L01-P	8 (0.8)	Albuquerque	Application
Pharmacotherapy Preparatory Review and Recertification Course—Gastrointestinal Disorders, Infectious Diseases, and HIV/Infectious Diseases	0217-0000-16-035-L01-P	3 (0.3)	Phoenix, www.updatesintherapeutics.com	Application
Pharmacy Immunization Compliance is More than a Revenue Generator	0154-0000-16-012-L04-P	1 (0.1)	Austin	Application
Prevention of Opioid Overdose and HIV Transmission in At Risk Populations	0280-9999-16-031-L02-P	1.5 (0.15)	Melville	Application
Updates in HIV prevention, including pre and post exposure prophylaxis	0113-0000-15-134-L01-P	1.25 (0.125)	San Francisco	Application
Updates Plus in Ambulatory Care Pharmacy Webinar	0217-0000-16-078-L01-P	2 (0.2)	www.accp.com	Application
Vaccinating Adults & Adolescents: An Immunization Program Practicum Session	0130-0000-13-027-L01-P	3 (0.3)	Renton	Application
Vaccinating Adults & Adolescents: An Immunization Program Practicum Session	0130-0000-16-012-L01-P	3 (0.3)	Renton	Application

2015

Title	UAN	Hrs (CEUs)	Location	Activity
"Update on Management of Resistant Organisms and Emerging Hospital Acquired Infections"	0001-0000-15-017-L04-P	1 (0.1)	Auburn	Knowledge
"Update on Management of Resistant Organisms and Emerging Hospital Acquired Infections"	0001-0000-15-017-L04-P	1 (0.1)	Birmingham	Knowledge
"Update on Management of Resistant Organisms and Emerging Hospital Acquired Infections"	0001-0000-15-017-L04-P	1 (0.1)	Mobile	Knowledge
(#5212) Psychiatric and Behavioral Issues in our HIV Patients: How to Address their Clinical Needs	0797-9999-14-130-L04-P	2 (0.2)	Louisville	Knowledge
(#5212) Psychiatric and Behavioral Issues in our HIV Patients: How to Address their Clinical Needs	0797-9999-14-131-L04-P	3.25 (0.325)	Philadelphia	Knowledge
13th Annual UC Davis Clinical Pharmacotherapy Conference	0277-0000-14-003-L01-P	3.5 (0.35)	http://www.cme.ucdmc.ucdavis.edu	Knowledge
13th Annual UC Davis Clinical Pharmacotherapy Conference	0277-0000-15-003-L01-P	3.5 (0.35)	http://www.cme.ucdavis.edu	Knowledge
2015 Ambulatory Care Review/Recertification Course: Complex Case: Immunization	0204-9999-15-971-L01-P	0.5 (0.05)	Denver	Knowledge
2015 Child Health Immunization Learning Initiative (CHILI)	0104-9999-15-015-L04-P	2 (0.2)	Albuquerque	Knowledge
2015 Consultant Program-Afternoon sessions	0002-0000-15-038-L04-P	6 (0.6)	Birmingham	Knowledge
2015 Guidelines for Sexually Transmitted Diseases	0008-9999-15-048-L01-P	1 (0.1)	Aurora	Knowledge
2015 Immunization Update	0100-0000-15-012-L04-P	1 (0.1)	Tucson	Knowledge
2015 Immunization Update for Pharmacists	0401-9999-15-056-L01-P	2 (0.2)	www.drugstorenewsce.com	Knowledge
2015 Michigan Society of Health-System Pharmacists Annual Meeting	0112-0000-15-219-L04-P	6 (0.6)	Troy	Knowledge
2015 Recent Drug Developments	0035-0000-15-001-L01-P	5.5 (0.55)	Billings, Bozeman, Butte, etc.	Knowledge
2015--Immunization Update	0837-0000-15-138-L01-P	2 (0.2)	Portland	Knowledge
33rd Annual Infectious Diseases Conference	0277-0000-15-004-L01-P	4.5 (0.45)	http://www.cme.ucdmc.ucdavis.edu	Knowledge

33rd Annual Infectious Diseases Conference	0277-0000-15-005-L01-P	6.75 (0.675)	http://www.cme.ucdmc.ucdavis.edu	Knowledge
A Closer Look at First-Line Antiretroviral Therapy	0043-0000-15-090-L02-P	1 (0.1)	Jamaica	Knowledge
A Review and Update on the Management of MRSA Infections	0165-0000-15-006-L01-P	1.5 (0.15)	Destin	Knowledge
A Review, by Class, of HIV Treatments Indicated for Pediatric Population	0798-0000-15-055-L02-P	2 (0.2)	www.freeCE.com	Knowledge
Abdominal Pain and GI Issues in the Person Living with HIV	0022-0000-15-058-L02-P	0.83 (0.083)	Lexington	Knowledge
Acute Bacterial Skin and Skin Structure Infections: A Focus on Emerging Treatment Options to Fight Gram Positive Pathogens	0798-0000-14-176-L01-P	1 (0.1)	www.freeCE.com	Knowledge
Addressing the Role of Stigma, Discrimination, and Punitive Laws in Disrupting the HIV Care Continuum	0092-9999-15-035-L04-P	0.5 (0.05)	Miami	Knowledge
Adult Immunization Update	0104-0000-15-035-L01-P	1 (0.1)	Albuquerque	Knowledge
Adult Immunizations: A Case-based Approach to Using the Newest ACIP Immunization Schedules	0112-0000-15-101-L01-P	1.5 (0.15)	Detroit	Knowledge
Adult Immunizations: A Guide for Pharmacists, Techs & NPs	0372-0000-14-016-L05-P	2 (0.2)	www.rxschool.com	Knowledge
Adults Need Immunizations Too!	0510-0000-15-023-L01-P	1 (0.1)	Detroit	Knowledge
Advances in HIV Therapy	0043-9999-15-005-L01-P	5 (0.5)	Key West	Knowledge
Advances in HIV Therapy that Every Pharmacist should Know	0837-9999-15-129-L01-P	1 (0.1)	Bedford	Knowledge
Advances in the Treatment of HIV Infection	0255-0000-15-009-L02-P	1 (0.1)	www.primeinc.org	Knowledge
Advocating for Prevention: An Update in Adult and Pediatric Immunization Recommendations and Controversies	0228-0000-15-118-L01-P	1 (0.1)	Amelia Island	Knowledge
AIDS, Privacy & Your Practice	0136-0000-15-002-L03-P	1.5 (0.15)	Morristown	Knowledge
An Ounce of Prevention: Engaging Pharmacists in the Fight Against HIV/HCV	0217-9999-15-192-L02-P	1 (0.1)	Indianapolis	Knowledge
An update on Pneumococcal Vaccination in Adults	0837-9999-15-076-L01-P	1 (0.1)	Presque Isle	Knowledge
An Update on the Treatment of Skin and Soft Tissue Infections	0163-0000-15-181-L01-P	1 (0.1)	Orlando	Knowledge

Annual Health Odyssey: A Smorgasbord of Health Issues	0062-9999-15-022-L01-P	7.25 (0.725)	Spartanburg (SRMC-Tyler Auditorium)	Knowledge
Annual Infectious Diseases Symposium	0861-0000-15-002-L01-P	6 (0.6)	Springfield	Knowledge
Annual Update 2015-HIV/AIDS & CoInfection	0042-0000-15-003-L02-P	5 (0.5)	East Elmhurst , NY	Knowledge
Answers to Common Immunization Questions	0067-0000-15-022-L04-P	1 (0.1)	Austin, Texas	Knowledge
Antimicrobial Stewardship	0172-0000-15-008-L01-P	1 (0.1)	Pensacola	Knowledge
Antimicrobial Stewardship in an Era of Interdisciplinary Collaboration	0163-9999-15-043-L04-P	1 (0.1)	Hilton Head Island	Knowledge
Antiretroviral Medications as Prevention: Undetectable Viral Load, PrEP and PEP	0112-0000-15-128-L02-P	1.5 (0.15)	Detroit	Knowledge
APhA Immunization Update from the June 2015 ACIP Meeting	0202-0000-15-173-L04-P	1 (0.1)	webinar	Knowledge
APhA Immunization Update from the October 2015 ACIP Meeting	0202-0000-15-219-L04-P	1 (0.1)	Webinar	Knowledge
Are vaccines really as effective as we think they are?	0510-0000-15-007-L01-P	1 (0.1)	Detroit	Knowledge
Be Wise, Immunize: An Update on Immunization Practices	0798-0000-15-002-L04-P	1 (0.1)	www.freeCE.com	Knowledge
Care and Management Overview of HIV Infection	0032-9999-15-045-L02-P	15 (1.5)	Jackson	Knowledge
CE Catch-Up: The Pharmacist's Role in Vaccination	0062-9999-15-048-L04-P	1 (0.1)	Charleston	Knowledge
Child Health Immunization Learning Initiative (CHILI) 2015: What’s New In New Mexico Immunization Practice?	0104-0000-15-043-L04-P	2 (0.2)	Albuquerque	Knowledge
Chronic Disease Perspective: HIV	0011-0000-15-010-L04-P	1.5 (0.15)	Tallahassee/850.599.3240	Knowledge
CLIA-Waived Point-of-Care Testing for Managing Infectious Diseases	0202-0000-15-050-L04-P	2 (0.2)	San Diego	Knowledge
Closing Quality and Relevance Gaps - Harnessing Technology to Facilitate HIV Care Scale-Up	0092-9999-15-038-L01-P	0.5 (0.05)	Miami	Knowledge
Closing the Gaps: Overview of the 2015 IAPAC Guidelines on Optimizing the HIV Care Continuum	0092-9999-15-032-L04-P	2 (0.2)	Miami	Knowledge
Clostridium difficile – update and new therapies	0163-9999-15-015-L01-P	1 (0.1)	Weston	Knowledge
Clostridium difficile: How do we stop the flow?	0163-9999-15-220-L01-P	1 (0.1)	Jacksonville	Knowledge
Combination Prevention - Addressing Gaps Across the Continuum	0092-9999-15-039-L01-P	0.5 (0.05)	Miami	Knowledge

Communicable Disease Outbreaks: Community Impact and Methods of Control	0112-0000-15-221-L04-P	1.5 (0.15)	Troy	Knowledge
Co-morbidities in Aging HIV Patients	0036-9999-15-113-L02-P	1.5 (0.15)	Wilsonville	Knowledge
Considerations for Medication Use in the Geriatric Patient	0060-0000-15-035-L01-P	4 (0.4)	Warwick	Knowledge
Considerations for the management of Hepatitis C in patients with HIV co-infection	0100-0000-15-016-L01-P	1 (0.1)	Tucson	Knowledge
Consulting Pharmacist's Role in Antibiotic Stewardship in Long Term Care	0175-0000-15-012-L01-P	1 (0.1)	Waukesha	Knowledge
CPSL 2015 Annual COnference	0266-0000-15-006-L01-P	6 (0.6)	Danville/www.geisinger.org/570-271-6692	Knowledge
Current Issues in Immunization Netconference	0387-0000-15-138-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
Current Management of HIV/AIDS	0163-9999-15-069-L02-P	1 (0.1)	Tampa	Knowledge
Depression, Parkinson's Disease and C-Diff	0854-0000-15-016-L01-P	3 (0.3)	Lake Mary, FL/www.seniorcarece.com	Knowledge
Developing an antimicrobial stewardship program at your institution	0163-9999-15-224-L01-P	1.5 (0.15)	San Juan	Knowledge
Diabetes Medication Update	0053-9999-15-020-L01-P	1 (0.1)	Oklahoma City	Knowledge
Do the Right Thing! Work Up, Treatment and Follow Up of Staphylococcus aureus Bacteremia	0064-0000-15-064-L01-P	1 (0.1)	Columbia	Knowledge
Doing the Right Thing, in the Right Place, at the Right Time: Focusing HIV Efforts & Resources to End AIDS	0092-9999-15-034-L04-P	0.5 (0.05)	Miami	Knowledge
E13 Emergent diseases: Ebola - what pharmacists can do	0579-0000-15-025-L04-P	1.5 (0.15)	http://www.fip.org/dusseldorf2015/	Knowledge
EBOLA in the United States	0165-0000-15-005-L01-P	1.5 (0.15)	Destin	Knowledge
Ebola Outbreak: Facts & Actions	0826-9999-14-049-L01-P	2 (0.2)	http://ceinternational.com/ebola.asp	Knowledge
Elvitegravir for the Treatment of HIV	0414-0000-15-001-L02-P	0.75 (0.075)	Charlotte	Knowledge
Emerging Infectious Disease Outbreaks in Arizona, the U.S. and the World	0100-0000-15-017-L04-P	1.5 (0.15)	Tucson	Knowledge
Emerging infectious diseases near you: Understanding current threats to public health and their management	0510-0000-15-041-L01-P	1 (0.1)	Detroit	Knowledge
Emerging Insights in Viral Infections and Solid Organ Transplantation	0453-9999-15-045-L04-P	1.5 (0.15)	Philadelphia	Knowledge

Emerging Therapies in Infectious Diseases	0228-0000-15-159-L01-P	1.5 (0.15)	Young Harris	Knowledge
Epidemiology and Prevention of Vaccine-Preventable Diseases (Land Course)	0387-0000-15-001-L04-P	14 (1.4)	Lansing	Knowledge
Epidemiology and Prevention of Vaccine-Preventable Diseases (Land Course)	0387-0000-15-001-L04-P	14 (1.4)	Piscataway	Knowledge
Epidemiology and Prevention of Vaccine-Preventable Diseases (Land Course)	0387-0000-15-001-L04-P	14 (1.4)	Tacoma	Knowledge
Evidenced-Based Drug Therapy Update: Immunization Update	0062-9999-15-080-L01-P	1 (0.1)	N. Charleston	Knowledge
Evidenced-Based Drug Therapy Update: Updates in Infectious Disease	0062-9999-15-079-L01-P	1 (0.1)	N. Charleston	Knowledge
Flea and Tick Wars: The Next Generation	0201-9999-15-022-L04-P	1.5 (0.15)	Fort Lauderdale	Knowledge
From “Drug Holidays” to 100% Adherence- The Role of the Pharmacist in HIV Drug Therapy	0798-0000-15-057-L02-P	1 (0.1)	www.freeCE.com	Knowledge
Game-changing Publications of 2014-2015 in Cardiology, Infectious Disease and Critical Care	0112-0000-15-222-L04-P	1.5 (0.15)	Troy	Knowledge
Getting PrEP-ed: Clinical and Practical Updates in HIV Pre-exposure Prophylaxis	0255-0000-15-008-L02-P	1 (0.1)	www.primeinc.org	Knowledge
Getting to Zero: The Role of Community Pharmacies in HIV Pre-Exposure Prophylaxis (PrEP)	0113-0000-15-055-L04-P	1 (0.1)	www.cpha.com	Knowledge
Global Health Emergencies	0215-0000-15-904-L04-P	2 (0.2)	Detroit	Knowledge
Going Global: Travel Health Clinics	0201-0000-15-075-L04-P	1 (0.1)	Bartlett	Knowledge
Gram Negative Resistance: We all make a difference	0377-0000-15-021-L01-P	1 (0.1)	Columbia University Medical Center, NY	Knowledge
Gram Negative Resistance: We all make a difference	0377-0000-15-021-L01-P	1 (0.1)	Weill Cornell Medical Center NY	Knowledge
HAIs - Learning from Ebola	0845-0000-15-072-L04-P	0.75 (0.075)	ce.unthsc.edu	Knowledge
HAIs - Learning from Ebola	0845-0000-15-072-L04-P	0.75 (0.075)	Fort Worth	Knowledge
HCV 2015 Update	0043-0000-15-092-L02-P	1 (0.1)	Jamaica	Knowledge
Health Systems and the Cascade: Policy, National Programs, and Structural Strategies to Ease Transitions Between Pillars in the Cascade	0092-9999-15-036-L04-P	1 (0.1)	Miami	Knowledge

Hepatitis C in 2015: A Whole New World	0022-0000-15-061-L01-P	1 (0.1)	Lexington	Knowledge
High-Impact Technology: Closing the Gaps in the Contimuum of Care	0092-9999-15-031-L04-P	2 (0.2)	Miami	Knowledge
HIV and Hep C 101	0053-9999-15-049-L02-P	1 (0.1)	Overland Park	Knowledge
HIV Diagnosis and Management: 2015 Update	0010-0000-15-004-L02-P	1 (0.1)	Washington Howard U.Hosp.	Knowledge
HIV Management: Medicine in Motion Stays in Motion	0163-9999-15-088-L02-P	1 (0.1)	Orlando	Knowledge
HIV Medication Errors : 2015 Update	0010-0000-15-001-L02-P	1 (0.1)	HUHosp. Towers Auditorium	Knowledge
HIV Pre-exposure Prophylaxis (PrEP) and Implementing a PrEP Clinic	0022-0000-15-060-L02-P	1 (0.1)	Lexington	Knowledge
HIV PRN Focus Session—HIV Across the Ages	0217-0000-15-145-L02-P	1.5 (0.15)	www.accp.com/gc	Knowledge
HIV Today: Examining The Latest Treatment Advances and Barriers to Success	0136-0000-14-050-L01-P	2 (0.2)	Somerville	Knowledge
HIV Treatment and Prevention Update	0036-9999-15-304-L02-P	1 (0.1)	Portland	Knowledge
HIV Treatment and Prevention Update	0036-9999-15-305-L02-P	1 (0.1)	Portland	Knowledge
HIV Treatment Update with Emphasis on the Integrase Inhibitor Drug Class	0053-9999-15-018-L02-P	1 (0.1)	Oklahoma City	Knowledge
HIV Update 2015	0202-0000-15-060-L02-P	2 (0.2)	San Diego	Knowledge
HIV Update 2015 - Implication for the Pharmacist	0106-0000-15-054-L01-P	1 (0.1)	Farmington CT	Knowledge
HIV Update: Treatment as Prevention and Pre-exposure Prophylaxis	0347-0000-15-028-L01-P	1 (0.1)	Tacoma, Western State Hospital, 253-756-2769	Knowledge
HIV/AIDS Update	0165-0000-15-038-L02-P	1 (0.1)	St. Augustine	Knowledge
HIV/AIDS Update	0165-0000-15-055-L02-P	1 (0.1)	Tampa	Knowledge
HIV/AIDS Update	0165-0000-15-065-L02-P	1 (0.1)	Jacksonville	Knowledge
HIV/AIDS Update	0165-0000-15-088-L02-P	1 (0.1)	Ft. Lauderdale	Knowledge
HPV: The Good, the Bad and the Ugly	0008-9999-15-051-L01-P	1 (0.1)	Aurora	Knowledge
Human Immunodeficiency Virus and Opportunistic Infections	0165-0000-15-007-L01-P	1.5 (0.15)	Destin	Knowledge
Human Immunodeficiency Virus and Opportunistic Infections	0165-0000-15-069-L02-P	1.5 (0.15)	Destin	Knowledge
ID Update	0036-9999-15-308-L01-P	1 (0.1)	Portland	Knowledge

IDSA's 10 x '20 Initiative and the Newly Released Anti-Infectives	0032-9999-15-033-L01-P	1 (0.1)	Biloxi	Knowledge
Immunization and Travel Health Update 2015: Staying Well Locally and Internationally	0032-9999-15-013-L01-P	1 (0.1)	Destin	Knowledge
Immunization Certification for Pharmacists: Live Workshop	0035-0000-15-004-L01-P	4 (0.4)	Missoula	Knowledge
Immunization Nation: An Update on Pediatric Vaccines	0053-0000-15-068-L01-P	1 (0.1)	Oklahoma City	Knowledge
Immunization Nation: An Update on Pediatric Vaccines	0053-9999-15-064-L01-P	1 (0.1)	Tulsa	Knowledge
Immunization Review: Considerations for Older Adults	0175-0000-15-007-L01-P	1 (0.1)	Waukesha	Knowledge
Immunization Training Update	0837-9999-15-097-L01-P	2 (0.2)	Bangor	Knowledge
Immunization Update	0119-0000-15-007-L01-P	1 (0.1)	Saint George	Knowledge
Immunization Update	0171-0000-15-032-L01-P	1 (0.1)	Hilton Head Island	Knowledge
Immunization Update	0263-0000-15-573-L01-P	0.75 (0.075)	San Diego, CA	Knowledge
Immunization Update	0263-0000-15-573-L01-P	0.75 (0.075)	www.contemporaryforumsonline.com	Knowledge
Immunization Update	0479-0000-15-163-L04-P	1 (0.1)	Akron	Knowledge
Immunization Update	0479-0000-15-163-L04-P	1 (0.1)	Boardman	Knowledge
Immunization Update	0479-0000-15-163-L04-P	1 (0.1)	Cleveland	Knowledge
Immunization Update	0479-0000-15-163-L04-P	1 (0.1)	Columbus	Knowledge
Immunization Update	0479-0000-15-163-L04-P	1 (0.1)	Perrysburg	Knowledge
Immunization Update	0837-9999-15-021-L01-P	2 (0.2)	Freeport	Knowledge
Immunization Update 2014	0136-0000-14-003-L04-P	2 (0.2)	Morristown, NJ	Knowledge
Immunization Update 2015	0053-9999-15-042-L01-P	2 (0.2)	Overland Park	Knowledge
Immunization Update 2015	0062-0000-15-158-L01-P	1.5 (0.15)	Columbia (SCCP Campus)	Knowledge
Immunization Update 2015	0062-9999-15-132-L01-P	1 (0.1)	Columbia	Knowledge
Immunization Update 2015	0113-0000-15-038-L04-P	1.25 (0.125)	Anaheim	Knowledge
Immunization Update 2015	0136-0000-15-007-L04-P	2 (0.2)	Morristown	Knowledge
Immunization Update 2015	0171-0000-14-110-L01-P	2 (0.2)	Asheville	Knowledge
Immunization Update 2015	0179-9999-15-043-L04-P	1 (0.1)	ULM School of Pharmacy, Monroe	Knowledge

Immunization Update for Immunizers	0027-0000-15-078-L04-P	1 (0.1)	Boston	Knowledge
Immunization Update Sept 2015	0119-0000-15-024-L01-P	1 (0.1)	Layton	Knowledge
Immunization Update Smiths 2015	0119-0000-15-022-L04-P	1 (0.1)	Salt Lake City	Knowledge
Immunization Update-2015	0100-0000-15-069-L01-P	1 (0.1)	Chandler	Knowledge
Immunization Update-2015	0100-0000-15-069-L01-P	1 (0.1)	Tucson	Knowledge
Immunization: Update 2015	0009-0000-15-068-L01-P	1 (0.1)	Rocky Hill	Knowledge
Immunization: Update 2015	0009-0000-15-068-L01-P	1 (0.1)	www.pharmacy.uconn.edu/ce/cefinal	Knowledge
Immunizations Update 2015	0179-9999-15-034-L04-P	1 (0.1)	ULM, Baton Rouge	Knowledge
Immunizations: Outbreaks and Pearls	0171-9999-15-003-L01-P	1 (0.1)	Columbia	Knowledge
Immunocompromised Patients: Which Vaccines Should I Give?	0106-0000-15-056-L01-P	1 (0.1)	Farmington CT	Knowledge
Impact of Antimicrobial Stewardship on Multi-Drug Resistant Gram-Negative Organisms	0163-0000-15-182-L01-P	1 (0.1)	Orlando	Knowledge
Implementation Science: Identifying Real-World Strategies to Optimize the HIV Care Continuum	0092-9999-15-033-L04-P	0.5 (0.05)	Miami	Knowledge
Infections in Immunocompromised Hosts	0112-0000-15-230-L01-P	1.5 (0.15)	Traverse City	Knowledge
Infections in Older Persons	0059-9999-15-025-L01-P	0.75 (0.075)	Hyatt Regency LA 909-706-3826	Knowledge
Infections in the Nursing Home	0059-0000-15-026-L01-P	0.75 (0.075)	Hyatt Regency LA 909-706-3826	Knowledge
Infectious Conditions	0263-0000-15-498-L01-P	1.25 (0.125)	Las Vegas	Knowledge
Infectious Conditions	0263-0000-15-498-L01-P	1.25 (0.125)	Philadelphia	Knowledge
Infectious Conditions	0263-0000-15-498-L01-P	1.25 (0.125)	San Francisco	Knowledge
Infectious Conditions	0263-0000-15-568-L01-P	1.5 (0.15)	San Diego, CA	Knowledge
Infectious Conditions	0263-0000-15-568-L01-P	1.5 (0.15)	www.contemporaryforumsonline.com	Knowledge
Infectious Disease Disorders: Case Studies	0165-0000-15-013-L01-P	1.5 (0.15)	Destin	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	CAPE COD	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	JACKSON HOLE	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	LAS VEGAS	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	NAPA VALLEY	Knowledge

Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	NEW YORK CITY	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	ORLANDO	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	SAN DIEGO	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-15-039-L01-P	11 (1.1)	SCOTTSDALE	Knowledge
Infectious Disease Part 3	0163-9999-15-112-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 4	0163-9999-15-123-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 5	0163-9999-15-126-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 6	0163-9999-15-133-L04-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 7	0163-9999-15-137-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 8	0163-9999-15-139-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Diseases in Emergency Medicine	0163-9999-15-142-L01-P	1 (0.1)	Fort Myers	Knowledge
Infectious Diseases Part 1	0163-9999-15-093-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Diseases Part 2	0163-9999-15-106-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Diseases PRN Focus Session—Antimicrobial Stewardship in Unique Practice Settings	0217-0000-15-121-L01-P	1.5 (0.15)	San Fransico, www.accp.com/gc	Knowledge
Infectious Diseases Update 2015	0112-0000-15-210-L01-P	1 (0.1)	Bellaire	Knowledge
Infectious Diseases: An Update On Travel Medicine, C. Diff., MRSA, and Influenza	0043-9999-13-046-L01-P	5 (0.5)	Turks and Caicos	Knowledge
INFECTIOUS DISEASES: HIV, HEPATITIS, and OPPORTUNISTIC INFECTIONS	0043-9999-15-038-L02-P	5 (0.5)	Turks and Caicos	Knowledge
INFECTIOUS DISEASES: PNEUMONIA & CASE STUDY REVIEW	0043-9999-15-039-L01-P	5 (0.5)	Turks and Caicos	Knowledge
Influenza: Master of Identity Change	0826-9999-14-051-L01-P	2 (0.2)	http://ceinternational.com/influenza.aspx	Knowledge
Innovations in Biologic Drug Therapy: Part 2	0741-0000-15-014-L01-P	6 (0.6)	Colorado Springs/www.universitylearning.co	Knowledge
Internal Medicine for Primary Care Physicians: CV/Pulm/Neuro/Endo	0816-0000-15-018-L01-P	14 (1.4)	Barcelona, Spain	Knowledge
Internal Medicine for Primary Care Physicians: Derm/CV/Neuro/ID	0816-0000-15-002-L01-P	14 (1.4)	St. Marteen	Knowledge

Internal Medicine for Primary Care Physicians: ENT/Onc/ID/Geriatrics	0816-0000-15-029-L01-P	14 (1.4)	KEY WEST	Knowledge
Internal Medicine for Primary Care Physicians: Pulm/ID/Vascular/Oncology	0816-0000-15-013-L01-P	17 (1.7)	Maui	Knowledge
INVASIVE FUNGAL INFECTIONS TREATMENT STRATEGIES AND CONTINUING CHALLENGES	0043-9999-13-032-L01-P	5 (0.5)	South Beach Miami	Knowledge
iStewardship…Do you? Leveraging technology to enhance stewardship	0163-9999-15-221-L04-P	1 (0.1)	Jacksonville	Knowledge
It's Flu Season: Now What?	0798-0000-14-178-L01-P	1 (0.1)	www.freeCE.com	Knowledge
Late Breakers in Pharmacotherapy, II	0217-0000-15-148-L01-P	1.5 (0.15)	www.accp.com/gc	Knowledge
Lyme Disease Update	0837-9999-15-096-L01-P	1 (0.1)	Bangor	Knowledge
Manage Drug-Bug Questions with Confidence: A Refresher for Clinical Pharmacists	0618-0000-14-010-L04-P	1 (0.1)	West Palm Beach	Knowledge
Management of HIV Treatment Naive Patients - 2015 Update	0010-0000-15-013-L02-P	1 (0.1)	Washington/ 202-806-6551/0220	Knowledge
Management of Urinary Tract Infections	0008-9999-15-047-L01-P	1 (0.1)	Aurora	Knowledge
Managing Clostridium difficile: the bug posing an urgent threat	0163-9999-15-223-L01-P	1.5 (0.15)	San Juan	Knowledge
Managing Encounters of the Southwest	0100-0000-15-020-L04-P	1.5 (0.15)	Tucson	Knowledge
Misadventures in Neonatal IV Therapy: Extravasations, Occluded CVCs, and CLABSIs	0263-0000-15-580-L01-P	0.75 (0.075)	San Diego/www.contemporaryforums.co	Knowledge
Misadventures in Neonatal IV Therapy: Extravasations, Occluded CVCs, and CLABSIs	0263-0000-15-580-L01-P	0.75 (0.075)	www.contemporaryforumsonline.com	Knowledge
MTM, DEA Compliance, and Disease Initiatives	0215-0000-15-905-L04-P	4 (0.4)	Detroit	Knowledge
Multidrug-Resistant Gram-Negative Infections: Current and Emerging Therapy.	0510-0000-15-006-L01-P	1 (0.1)	Detroit	Knowledge
My Patients, Myself: Improving Clinical and Communication Skills for HIV Patient Management Under	0255-0000-15-010-L02-P	1 (0.1)	www.primeinc.org	Knowledge
Neonatal Abstinence Syndrome: Something Borrowed, Something New: Are There Best Therapies?	0263-0000-15-535-L01-P	1 (0.1)	http://www.contemporaryforumsonline.com	Knowledge
Neonatal Abstinence Syndrome: Something Borrowed, Something New: Are There Best Therapies?	0263-0000-15-535-L01-P	1 (0.1)	Scottsdale/http://www.contemporaryforums.com	Knowledge

New additions to the anti-infective arsenal: impact on the treatment of multi-drug resistant organisms	0053-9999-15-060-L01-P	1.5 (0.15)	Tulsa	Knowledge
New Antibiotics Available for the Treatment of MRSA Infections	0837-9999-15-068-L01-P	1 (0.1)	Augusta	Knowledge
New Antimicrobial Update	0217-9999-15-189-L01-P	1 (0.1)	Albany	Knowledge
New Antimicrobials and Challenges in Drug Development	0008-9999-15-046-L01-P	1 (0.1)	Aurora	Knowledge
New Drug Update - Part I	0741-0000-15-010-L01-P	5 (0.5)	Las Vegas/www.universitylearning.com/8009405860	Knowledge
New Drug Update - Part I	0741-0000-15-010-L01-P	5 (0.5)	Marco Island/www.universitylearning.com/8009405860	Knowledge
New Guidelines for Antiviral and Antifungal	0263-0000-15-577-L01-P	1.25 (0.125)	San Diego/www.contemporaryforums.co	Knowledge
New Guidelines for Antiviral and Antifungal	0263-0000-15-577-L01-P	1.25 (0.125)	www.contemporaryforumsonline.co	Knowledge
Newer Antimicrobials for Gram-positive Infections: A Critical Review	0112-0000-15-144-L01-P	1.5 (0.15)	Detroit	Knowledge
Non-Prescription Syringe Access in California Pharmacies: Making It Real	0113-0000-15-036-L05-P	1 (0.1)	www.cpha.com	Knowledge
Ohio Pharmacy Law Updates	0479-0000-15-164-L03-P	1 (0.1)	Akron	Knowledge
Ohio Pharmacy Law Updates	0479-0000-15-164-L03-P	1 (0.1)	Boardman	Knowledge
Ohio Pharmacy Law Updates	0479-0000-15-164-L03-P	1 (0.1)	Cleveland	Knowledge
Ohio Pharmacy Law Updates	0479-0000-15-164-L03-P	1 (0.1)	Columbus	Knowledge
Ohio Pharmacy Law Updates	0479-0000-15-164-L03-P	1 (0.1)	Perrysburg	Knowledge
Opportunistic Infections in Pediatric HIV/AIDS	0062-9999-15-038-L01-P	1 (0.1)	Columbia (PHR)	Knowledge
Optimal Management of Community- and Hospital-Acquired Methicillin-Resistant Staphylococcus aureus	0217-0000-15-147-L01-P	1.5 (0.15)	www.accp.com/gc	Knowledge
Optimization of the Pharmacist's Role within the Immunization Neighborhood with Emphasis on HPV	0202-0000-15-142-L01-P	1.5 (0.15)	webinar	Knowledge
OSHA Training Course	0202-0000-15-066-L03-P	1 (0.1)	San Diego	Knowledge

Pause for Possible Pandemics: Ebola, Chikungunya and Dengue	0163-0000-15-183-L01-P	1 (0.1)	Orlando	Knowledge
Pediatric Fundamental Critical Care Support	0230-0000-15-019-L05-P	12.25 (1.225)	Tampa	Knowledge
Pediatric Infections Update	0008-9999-15-049-L01-P	1 (0.1)	Aurora	Knowledge
Pediatric Vaccine Update 2015	0845-0000-15-103-L04-P	1 (0.1)	ce.unthsc.edu	Knowledge
Pediatric Vaccine Update 2015	0845-0000-15-103-L04-P	1 (0.1)	Fort Worth	Knowledge
Penicillin Allergies, Skin Testing & Antimicrobial Stewardship: Bridging the Gap Between Antibiotic Allergies and Optimizing Therapy	0217-9999-15-106-L01-P	1 (0.1)	Chapel Hill	Knowledge
Pharmacist-led Interventions to Improve Quality of Care	0060-9999-15-015-L04-P	4 (0.4)	Warwick	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Cherry Hill	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Kennewick	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	King of Prussia	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Langhorne	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Seattle	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Tacoma	Knowledge
Pharmacotherapy management of patients with neutropenic fever	0377-0000-15-008-L01-P	1 (0.1)	Columbia University Medical Center, NY	Knowledge
Pharmacotherapy management of patients with neutropenic fever	0377-0000-15-008-L01-P	1 (0.1)	Weill Cornell Medical Center NY	Knowledge
Pharmacy Immunization Compliance is More Than a Revenue Generator	0159-0000-15-057-L03-P	1 (0.1)	Grantville	Knowledge
Pharmacy Immunization Compliance is More Than a Revenue Generator	0159-0000-15-057-L03-P	1 (0.1)	Webinar	Knowledge
Pharmacy Resident Research Presentations - Missoula	0035-9999-15-012-L04-P	1.5 (0.15)	Missoula	Knowledge
Pre-Exposure Prophylaxis for HIV	0043-0000-15-093-L02-P	1 (0.1)	Jamaica	Knowledge

Pre-exposure Prophylaxis of HIV Infection (PrEP)	0100-0000-15-080-L02-P	1 (0.1)	Chandler	Knowledge
Preventing Antiretroviral Medication Errors in Patients with HIV Infection	0043-0000-15-091-L05-P	1 (0.1)	Jamaica	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-074-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-075-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-076-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-077-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-078-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-079-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-081-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-082-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-083-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-163-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-164-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-15-165-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Putting the cART before the horse: Appropriate Use of 2015 Recommended Antiviral Regimens	0179-9999-15-033-L02-P	1 (0.1)	Xavier University, New Orleans	Knowledge
Quality Management and Client Satisfaction in HIV/AIDS Care: Review and Workshop for Practicing Pharmacists	0010-0000-15-006-L02-P	3 (0.3)	Washington 240-554-0314	Knowledge
Quality Management and Client Satisfaction in HIV/AIDS Care: Review and Workshop for Practicing Pharmacists	0010-0000-15-006-L02-P	3 (0.3)	Washington 301-617-0555	Knowledge
Real World Applications of Care Continuums: HIV and HCV	0008-9999-15-050-L02-P	1 (0.1)	Aurora	Knowledge
Recent Advances in HIV Therapy	0228-0000-15-127-L02-P	1 (0.1)	Amelia Island	Knowledge
Recent Immunization Updates	0067-0000-15-005-L01-P	1 (0.1)	Austin, Texas	Knowledge
Recently Approved Drugs for Infectious Disease	0035-9999-15-045-L01-P	1 (0.1)	Big Sky	Knowledge
Reinforcing Adherence as a Touchstone to Achieving 90% Viral Suppression	0092-9999-15-037-L01-P	0.5 (0.05)	Miami	Knowledge
Review of Pediatric Immunizations	0798-0000-14-167-L01-P	1 (0.1)	www.freeCE.com	Knowledge

Role of Pharmacy in the Treatment of Human Immunodeficiency Virus	0163-9999-15-146-L02-P	1 (0.1)	Vero Beach	Knowledge
Roll Up Your Sleeves: Update on Immunizations for Long Term Care	0171-9999-15-027-L01-P	1 (0.1)	Highpoint	Knowledge
Seek and Destroy: General Principles and Antibiotic Choices in Treating Infections	0741-0000-15-026-L01-P	5 (0.5)	Bayonne/www.universitylearning.com/8009405860	Knowledge
Seminar by the Sea, Day One: Headline Topics in Pharmacy Practice	0060-0000-15-005-L04-P	6 (0.6)	Newport	Knowledge
Seminar by the Sea, Day Two: Headline Topics in Pharmacy Practice	0060-0000-15-007-L04-P	6.25 (0.625)	Newport	Knowledge
Skin and Soft Tissue Infections in the Pediatric Population: The role of Staph and Strep	0062-9999-15-036-L01-P	1 (0.1)	Columbia (PHR)	Knowledge
Speaker Panel Discussion	0022-0000-15-063-L02-P	0.67 (0.067)	Lexington	Knowledge
Switching HIV Therapy: Because Now We Can	0022-0000-15-059-L02-P	1 (0.1)	Lexington	Knowledge
TB Surveillance and Prevention in the Pharmacy	0022-0000-15-109-L01-P	1 (0.1)	Lexington	Knowledge
The 19th Annual Infectious Diseases & Critical Care Symposium: Session I	0510-0000-15-001-L02-P	1 (0.1)	Dearborn	Knowledge
The 2015 NPA Continuing Education Symposium	0230-9999-15-007-L04-P	7.5 (0.75)	Tampa	Knowledge
The Anti-Vaccine Movement and Vaccine Risks; What Every Pharmacist Needs To Know	0104-0000-15-009-L04-P	1 (0.1)	Albuquerque	Knowledge
The Changing Epidemiology and Treatment of Clostridium difficile Infections	0008-9999-15-045-L01-P	1 (0.1)	Aurora	Knowledge
The Ebola Epidemic of 2014-2015: What Happened, Lessons Learned and What's Next?	0008-9999-15-044-L01-P	1 (0.1)	Aurora	Knowledge
The Essential Role of Philadelphia Department of Public Health Pharmacy Staff in the HIV Care Continuum	0159-9999-15-033-L02-P	4 (0.4)	Philadelphia	Knowledge
The Graying of HIV	0798-0000-13-257-L02-P	1 (0.1)	www.freeCE.com	Knowledge
The Management of Hepatitis C Infection	0165-0000-15-010-L01-P	1.5 (0.15)	Destin	Knowledge
The Management of Hepatitis C Virus and HIV Co-Infection 2015 - Update	0010-9999-15-026-L02-P	1 (0.1)	Shady Grove	Knowledge

The Pharmacist as Immunizer: Impact of pharmacists on Vaccine Preventable Diseases	0022-0000-15-108-L01-P	1 (0.1)	Lexington	Knowledge
The Pharmacist's Role in Public Health - Part 1	0073-0000-15-041-L04-P	3 (0.3)	Brookfield	Knowledge
The Practice of Travel Medicine	0113-0000-15-060-L05-P	2 (0.2)	Irvine	Knowledge
The Practice of Travel Medicine	0113-0000-15-060-L05-P	2 (0.2)	San Francisco	Knowledge
The Rise and Fall of Gram Negative Organisms: Rising Resistance, Falling Number of Treatment Options	0163-9999-15-066-L01-P	2 (0.2)	Tallahassee	Knowledge
The Role of PrEP in HIV Prevention	0280-9999-15-002-L02-P	1 (0.1)	Rochester	Knowledge
The Role of the Pharmacist in the Immunization of Patients with Diabetes	0106-0000-15-062-L01-P	1 (0.1)	Trumbull, CT 06611	Knowledge
The Unique Role of Pharmacists in Providing Access to Sterile Syringes	0113-0000-15-025-L04-P	1.25 (0.125)	Anaheim, CA	Knowledge
Third Minority HIV and Health Disparities Conference	0032-9999-15-046-L02-P	6.5 (0.65)	Jackson	Knowledge
Treatment of Common Infectious Diseases	0217-9999-15-093-L01-P	1 (0.1)	Indianapolis	Knowledge
Trending: #VaccinePreventableDiseases	0067-0000-15-014-L01-P	1.25 (0.125)	Austin, Texas	Knowledge
Unraveling the Strands: A Closer Look at the Integrase Strand Transfer Inhibitors (INSTI)	0798-0000-14-055-L02-P	1 (0.1)	www.freeCE.com	Knowledge
Update on Hepatitis C Virus Infection	0136-0000-15-014-L01-P	2 (0.2)	Washington Township	Knowledge
Update on Pre-Exposure Prophylaxis Therapy for HIV Prevention	0280-9999-15-033-L02-P	1.5 (0.15)	Melville	Knowledge
Update on the Treatment of HIV Infection	0280-9999-15-076-L02-P	1.5 (0.15)	Flushing	Knowledge
Updates in Infectious Diseases	0073-0000-15-029-L01-P	12 (1.2)	ce.pharmacy.wisc.edu	Knowledge
Using Motivational Interviewing to Link and Keep Patients in Care And to Assist Patients with HIV Medications	0159-9999-15-035-L02-P	3.5 (0.35)	Philadelphia	Knowledge
Vaccines for Adolescents: An Immunization Update	0130-0000-15-053-L01-P	1.5 (0.15)	Coeur d'Alene	Knowledge
Vaccines in the Pipeline	0067-0000-15-023-L01-P	1 (0.1)	Austin, Texas	Knowledge
Vaccines: Friend or Foe?	0165-0000-15-011-L01-P	1.5 (0.15)	Destin	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	ALBANY	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P	6 (0.6)	BAYSIDE	Knowledge

Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	BELTSVILLE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	BIRMINGHAM	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	BOWIE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	BROOKLYN	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	BUFFALO	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	DENVER	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	EAST HANOVER	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	EAST PEORIA	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	FAIRFAX	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	FORT COLLINS	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	GARDEN GROVE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	GLASTONBURY	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	GREENBELT	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	HAGERSTOWN	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	INDIANAPOLIS	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	INR WEBSITE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	LITTLE ROCK	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	LOUISVILLE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	MCLEAN	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	MOBILE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	MT VERNON	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	MT. LAUREL	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	ONTARIO	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	OVERLAND PARK	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	PROVIDENCE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	RENTON	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	ROCHESTER	Knowledge

Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	ROCKVILLE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SADDLE BROOK	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SALT LAKE CITY	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SAN DIEGO	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SEATTLE-LYNNWOOD	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SILVER SPRINGS	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SKOKIE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SPOKANE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SPRINGDALE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SPRINGFIELD	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	ST LOUIS	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	SYRACUSE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	TACOMA	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	TINLEY PARK	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	TOPEKA	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	TOWSON	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	TUMWATER	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	VAN NUYS	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	WATERBURY	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	WEBINAR--INR WEBSITE	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	WESTPORT	Knowledge
Viruses & Germs: West Niles, Lyme Disease & Flu	0751-0000-15-021-L01-P 6 (0.6)	WICHITA	Knowledge
Wait...I'm an Adult; Why Do I Need Vaccines?	0032-9999-15-041-L01-P 1 (0.1)	Jackson	Knowledge
What is the POINT? The Unique Role of Pharmacists in Non-prescription Syringe Access	0113-0000-14-071-L04-P 1 (0.1)	www.cpha.com	Knowledge
What’s New in the Management of Pneumonia?	0165-0000-15-008-L01-P 1.5 (0.15)	Destin	Knowledge
What’s New with Flu and Pneumonia?	0104-9999-15-044-L04-P 1 (0.1)	Westminster	Knowledge

What's New in Medicine - Internal Medicine Infectious Diseases 2015 - Day 1	0347-9999-15-009-L01-P	9 (0.9)	Kennewick, Three Rivers Conv Ctr 509-737-3700	Knowledge
Where’s My Western Blot? Updated Testing Recommendations for the Diagnosis of HIV and HCV	0022-0000-15-062-L02-P	1 (0.1)	Lexington	Knowledge
WSPA Immunization Update 2015	0130-0000-15-077-L01-P	1.5 (0.15)	https://global.gotowebinar.com/pjoin /9224411455727	Knowledge
2015 Immunization Update	0112-0000-15-229-L01-P	1.5 (0.15)	Traverse City	Application
2015 Pediatric Pharmacy Specialty Review Course: Complex Case: Acute Lymphoblastic Leukemia and	0204-0000-15-966-L01-P	1.5 (0.15)	Denver	Application
2015 Pharmacotherapy Specialty Examination Review Course: Complex HIV Case	0204-0000-15-948-L02-P	1.5 (0.15)	Denver	Application
Adult Immunization Update: Influenza, Pneumococcal, and Hepatitis B Vaccines	0027-0000-15-016-L01-P	1 (0.1)	Boston	Application
All in with PCV13	0159-0000-15-042-L01-P	1 (0.1)	Grantville	Application
Ambulatory Care Pharmacy Preparatory Review and Recertification Course—Dermatologic & Eyes, Ears, Nose, and Throat, and Immunologic, Infectious Diseases, and Infectious Diseases II	0217-0000-15-027-L01-P	4.25 (0.425)	Rosemont	Application
Best practices in rheumatoid arthritis management	0455-0000-15-001-L01-P	3 (0.3)	Moab, UT /www.regonline.com/ther2015	Application
Best practices in rheumatoid arthritis management	0455-0000-15-001-L01-P	3 (0.3)	South Jordan, UT /www.regonline.com/ther2015	Application
Best Practices: Immunization Strategies and Monitoring (Focus on Vaccines)	0299-9999-15-014-L01-P	1 (0.1)	San Diego	Application
Critical Care Pharmacy Preparatory Review Course—Infectious Diseases	0217-0000-15-032-L01-P	3.5 (0.35)	Rosemont	Application
Drops of Knowledge: Infectious Disease	0009-9999-15-089-L01-P	1 (0.1)	Waterbury	Application
Fungus Among Us? Invasive Candidiasis in the Critically ...	0510-0000-15-005-L01-P	1 (0.1)	Detroit	Application
HCV/HIV Case Discussion	0106-0000-15-055-L01-P	1 (0.1)	Farmington CT	Application
Immunization Delivery for Pharmacists - Live	0175-0000-15-035-L01-P	12 (1.2)	Madison	Application
Immunization Delivery for Pharmacists - Live	0175-0000-15-035-L01-P	12 (1.2)	Milwaukee	Application
Immunization Training	0837-9999-15-001-L01-P	8 (0.8)	Brunswick	Application

Immunization Training	0837-9999-15-019-L01-P	8 (0.8)	Freeport	Application
Immunization Update 2015	0154-0000-15-034-L04-P	3 (0.3)	The Woodlands	Application
Immunization Update 2015	0202-0000-15-026-L01-P	2 (0.2)	San Diego	Application
Immunization Update 2015	0202-0000-15-146-L01-P	1.5 (0.15)	webinar	Application
Immunization Update: 2015	0159-0000-15-007-L01-P	1 (0.1)	Harrisburg	Application
Implementing Immunization Recommendations	0445-0000-15-031-L01-P	1 (0.1)	San Antonio	Application
Improving Immunization Rates: Focus on Children and Adolescents	0202-0000-15-045-L01-P	2 (0.2)	San Diego	Application
Infectious Disease 2015 Update	0130-0000-15-024-L01-P	1.5 (0.15)	Coeur d'Alene	Application
Infectious Disease Pearls-Hot Topics	0130-0000-15-027-L01-P	1.5 (0.15)	Coeur d'Alene	Application
Influenza and Pneumococcal Immunization Update	0154-0000-15-049-L01-P	1 (0.1)	www.rxcellence.org	Application
Influenza Updates	0445-0000-15-030-L01-P	1 (0.1)	San Antonio	Application
Integrating Leading and Collaborative Approaches to Advance the Care of HCV Patient Populations	0255-0000-15-031-L01-P	1 (0.1)	www.primeinc.org/webinars	Application
Last-Chance Ambulatory Care Pharmacy Review Webinar – Obstetrics and Gynecology and Infectious	0217-0000-15-168-L01-P	3 (0.3)	www.accp.com	Application
Last-Chance Pharmacotherapy Review Webinar – Infectious Diseases and Gastrointestinal Disorders	0217-0000-15-169-L01-P	3 (0.3)	www.accp.com	Application
Nephrology PRN Focus Session—Treatment and Complications of Chronic Kidney Disease in Special	0217-0000-15-122-L01-P	1.5 (0.15)	San Francisco, www.accp.com/gc	Application
Overview of immunosuppresion in kidney transplant	0156-9999-15-160-L01-P	1 (0.1)	Fort Worth, TX (THR - Margarita Taburyanskaya)	Application
Pediatric Pharmacy Preparatory Review Course—Infectious Diseases, Immunology, and Fluids,	0217-0000-15-039-L01-P	3.5 (0.35)	Rosemont	Application
Pharmacists Prescribing Vaccines - The New Mexico Program	0104-0000-14-058-L01-P	8 (0.8)	Albuquerque	Application
Pharmacotherapy Preparatory Review and Recertification Course—Nephrology, Infectious Diseases, and HIV/Infectious Diseases	0217-0000-15-016-L01-P	3 (0.3)	Rosemont	Application
Pneumococcal Updates	0445-0000-15-029-L01-P	1 (0.1)	San Antonio	Application

Single-Tablet Regimens for the Management of Treatment-Naïve Patients with HIV	0159-0000-15-021-L02-P	1 (0.1)	Harrisburg	Application
Single-Tablet Regimens for the Management of Treatment-Naïve Patients with HIV	0159-0000-15-021-L02-P	1 (0.1)	Webinar	Application
Treatment and Prevention of Skin and Soft Tissue Infections Including MRSA	0280-0000-15-086-L01-P	2 (0.2)	Westword	Application
Updates in the Management of Viral Infections	0217-0000-15-118-L01-P	1.5 (0.15)	San Francisco, www.accp.com/gc	Application
Vaccinating Adults & Adolescents: An Immunization Program Practicum Session	0130-0000-13-027-L01-P	3 (0.3)	Renton	Application

2014

Title	UAN	Hrs (CEUs)	Location	Activity Type
(#5212) Psychiatric and Behavioral Issues in our HIV Patients: How to Address their Clinical Needs	0797-9999-14-130-L04-P	2 (0.2)	New York	Knowledge
(#5212) Psychiatric and Behavioral Issues in our HIV Patients: How to Address their Clinical Needs	0797-9999-14-130-L04-P	2 (0.2)	Dallas	Knowledge
(#5212) Psychiatric and Behavioral Issues in our HIV Patients: How to Address their Clinical Needs	0797-9999-14-131-L04-P	3.25 (0.325)	Milwaukee	Knowledge
(ACHS #5098) Fundamentals of Caring for the HIV/HCV Co-infected Patient	0797-9999-13-138-L04-P	2 (0.2)	Charlotte	Knowledge
(ACHS #5098) Fundamentals of Caring for the HIV/HCV Co-infected Patient	0797-9999-13-138-L04-P	2 (0.2)	San Juan	Knowledge
(ACHS #5098) Fundamentals of Caring for the HIV/HCV Co-infected Patient	0797-9999-13-138-L04-P	2 (0.2)	San Antonio	Knowledge
(ACHS #5098) Fundamentals of Caring for the HIV/HCV Co-infected Patient	0797-9999-13-138-L04-P	2 (0.2)	Washington	Knowledge
(ACHS #5197) 24th Annual CCO HIV and Hepatitis C Symposium: Regional Workshops	0797-9999-14-001-L04-P	8 (0.8)	New York	Knowledge
(ACHS #5197) 24th Annual CCO HIV and Hepatitis C Symposium: Regional Workshops	0797-9999-14-001-L04-P	8 (0.8)	San Francisco	Knowledge
2014 Adult Immunization Update	0002-0000-14-027-L04-P	1 (0.1)	https://student.gototraining.com/r/195411179784325	Knowledge
2014 Northern Michigan Pharmacy Education and Suppliers Seminar	0112-0000-14-206-L04-P	8 (0.8)	Bellaire	Knowledge
2014 Update on HIV Prevention and Management	0043-0000-14-065-L02-P	1 (0.1)	Jamaica	Knowledge
2nd Annual Clinical Updates in Infectious Diseases: Bugs and Drugs: An Interactive Refresher	0074-0000-14-008-L01-P	1 (0.1)	Oak Brook/630-971-6417	Knowledge
2nd Annual Clinical Updates in Infectious Diseases: Emerging Therapies and Threats: Highlights form the ICAAC 2014 Annual	0074-0000-14-013-L01-P	0.5 (0.05)	Oak Brook/630-971-6417	Knowledge

2nd Annual Clinical Updates in Infectious Diseases: Keynote: The Infectious Diseases "Batman" needs to find its "Robin".	0074-0000-14-011-L01-P	1 (0.1)	Oak Brook/630-971-6417	Knowledge
2nd Annual Clinical Updates in Infectious Diseases: New Kids on the Block: An Update on Hepatitis C Management	0074-0000-14-012-L01-P	0.5 (0.05)	Oak Brook/630-971-6417	Knowledge
4th Generation Testing: Testing and Treating Adults with HIV-1 Infection	0010-0000-14-023-L02-P	1 (0.1)	H.U. Coll. of Medicine-Adams Bldg.	Knowledge
A Renaissance for Chronic Infections	0228-0000-14-124-L01-P	1 (0.1)	Young Harris	Knowledge
Adult Immunization	0113-0000-14-021-L04-P	0.75 (0.075)	Los Angeles	Knowledge
Adult Immunization Gets a Shot in the Arm!	0104-0000-14-010-L01-P	1 (0.1)	Albuquerque	Knowledge
Adult Immunization Update - Montana Pharmacy Association Winter CE & Ski Meeting	0035-9999-14-006-L01-P	1.5 (0.15)	Big Sky	Knowledge
Adult Immunizations: A Guide for Pharmacists, Techs & NPs	0372-0000-14-016-L05-P	2 (0.2)	www.rxschool.com	Knowledge
Advanced Concepts in Stewardship	0485-9999-14-010-L01-P	1.5 (0.15)	mad-id-org/2014-mad-id-annual-meeting	Knowledge
ADVANCES IN ANTIVIRAL THERAPY	0043-9999-14-025-L01-P	5 (0.5)	Aruba	Knowledge
Aging in the HIV Population and Question and Answer Session	0022-0000-14-033-L04-P	0.83 (0.083)	Lexington	Knowledge
An Overview of the Human Papillomavirus	0179-9999-14-006-L04-P	1 (0.1)	Xavier University, New Orleans	Knowledge
An Update on Adult Immunizations	0798-0000-14-003-L01-P	1 (0.1)	www.freeCE.com	Knowledge
An Update on Immunizations	0618-0000-13-041-L04-P	0.5 (0.05)	West Palm Beach, FL	Knowledge
An update on Influenza Disease and Prevention	0485-9999-14-015-L01-P	1.5 (0.15)	orlando	Knowledge
An Update on Polymyxin Use	0485-9999-14-004-L01-P	1 (0.1)	Orlando mad-id-org/2013-mad-id-annual-meeting	Knowledge
Ancillary Services - Opportunities to Improve the Bottom Line	0120-0000-14-214-L04-P	1 (0.1)	Indianapolis	Knowledge
Answers to Common Immunization Questions	0067-0000-14-031-L01-P	1.25 (0.125)	Austin, Texas	Knowledge
Antimicrobial Stewardship Across the Border	0134-0000-14-058-L01-P	1 (0.1)	Buffalo	Knowledge
Antimicrobial Stewardship: Primary Care Perspective	0008-9999-14-014-L01-P	0.75 (0.075)	www.regonline.com/PedsAP14	Knowledge
Appropriate Drug Therapy for Common Infectious Diseases	0741-0000-14-003-L01-P	5 (0.5)	Wailea/www.universitylearning.com/ 8009405860	Knowledge

Appropriate Drug Therapy for Common Infectious Diseases	0741-0000-14-003-L01-P	5 (0.5)	Naples/www.universitylearning.com/ 8009405860	Knowledge
Are the Bugs Winning? Antimicrobial Stewardship (P)	0112-0000-14-004-L04-P	1.5 (0.15)	Traverse City	Knowledge
Are there rough seas ahead? Immunization Update and Clinical Pearls	0163-0000-14-194-L01-P	1 (0.1)	Orlando	Knowledge
Assessing and Promoting Adherence in HIV Patients	0163-9999-14-076-L02-P	1 (0.1)	Jacksonville	Knowledge
Bad Bugs, New Drugs: New Antimicrobials for the Treatment of Gram-Positive infections	0163-9999-14-220-L01-P	1 (0.1)	Tampa	Knowledge
Building on Success: Expanding on Pharmacy Adult Immunization Services	0062-9999-14-049-L01-P	2 (0.2)	Charleston SCCP Campus-Baruch	Knowledge
C. difficile: Treatment and Management in Adults	0618-0000-13-039-L01-P	0.5 (0.05)	West Palm Beach, FL	Knowledge
Calling the Shots: Are Your Patients Up To Date with Vaccines?	0060-0000-14-023-L01-P	1 (0.1)	Bethel	Knowledge
Can We Stop Vancomycin? A Review of the New Rapid Diagnosis for Staphylococcus aureus Bacteremia	0163-9999-14-274-L01-P	1 (0.1)	Sarasota	Knowledge
Care and Management Overview of HIV Infection	0032-9999-14-052-L02-P	14.25 (1.425)	Jackson	Knowledge
Case-Based Approach to HIV-Related Drug Interactions	0043-0000-14-066-L02-P	1 (0.1)	Jamaica	Knowledge
Child Health Immunization Learning Initiative (CHILI)	0104-9999-14-013-L04-P	2 (0.2)	Albuquerque	Knowledge
Chronic Hepatitis C: Epidemiology & Updates on the New Wave of Medications	0053-9999-14-016-L01-P	1 (0.1)	Oklahoma City	Knowledge
COBTH Pharmacy Resident Clinical Pearls	0027-0000-14-092-L01-P	1.5 (0.15)	Boston	Knowledge
Common Psychiatric Disorders in HIV+ Patients and Question and Answer Session	0022-0000-14-036-L01-P	1 (0.1)	Lexington	Knowledge
Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Camp Hill	Knowledge
Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Omaha	Knowledge
Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Grand Rapids	Knowledge
Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Lansing	Knowledge

Co-Morbidities in Aging HIV Patients	0036-9999-14-121-L02-P	1 (0.1)	Portland	Knowledge
Contemporary HIV Practice Knowledge for all Pharmacists	0092-0000-14-025-L02-P	1 (0.1)	Fort Lauderdale	Knowledge
Current Issues in Immunization Netconference	0387-0000-14-178-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
Current Issues in Immunization Netconference	0387-0000-14-185-L04-P	1 (0.1)	www.cdc.gov/vaccines	Knowledge
Current Status of HIV Prevention	0159-0000-14-050-L02-P	1 (0.1)	Mars	Knowledge
Curricular Track II: Focus on Fungus	0217-0000-14-116-L01-P	1.5 (0.15)	Austin, www.accp.com/am	Knowledge
Curricular Track III: Clinical Controversies—Fast and Furious	0217-0000-14-102-L01-P	1.5 (0.15)	Austin, www.accp.com/am	Knowledge
Diagnosis & Treatment of Clostridium difficile Infection (CDI)	0510-0000-14-033-L01-P	1 (0.1)	Detroit	Knowledge
Don't Hesitate, Dedicate to Vaccinate: A Multidisciplinary Approach to Improving Pneumoccocal and Influenza Vaccination Rates	0009-9999-14-067-L01-P	1 (0.1)	Cromwell	Knowledge
Ebola and Enterovirus D-68: What the pharmacist needs to know	0401-0000-14-060-L01-P	1 (0.1)	www.cedrugstorenews.com	Knowledge
Ebola Outbreak: Facts & Actions	0826-9999-14-049-L01-P	2 (0.2)	http://ceinternational.com/ebola.aspx	Knowledge
Ebola: An Update for Healthcare Workers	0163-9999-14-284-L04-P	1 (0.1)	www.scshp.com	Knowledge
Effectively Searching the ID Literature	0485-9999-14-007-L04-P	1 (0.1)	Orlamdo mad-id-org/2014-mad-id-annual -meeting	Knowledge
Emerging and Re-Emerging Infectious Diseases	0741-0000-14-023-L01-P	5 (0.5)	Las Vegas, www.universitylearning.com / 8009405860	Knowledge
Emerging Evidence and New Guidelines in HIV	0255-0000-14-006-L02-P	1 (0.1)	www.primeinc.org	Knowledge
Enhancing Pharmacy-Based Immunization Delivery	0062-0000-14-161-L01-P	2 (0.2)	Columbia (SCCP/USC Campus)	Knowledge
Enterovirus D68: What Your Patients Need to Know	0154-0000-14-025-L01-P	0.75 (0.075)	www.rxcellence.org	Knowledge
Erasing Invasive Candidiasis from the ICU	0163-9999-14-242-L01-P	1.5 (0.15)	Gainesville	Knowledge
Evidence-Based Drug Therapy Update Part II	0062-9999-14-077-L01-P	3.75 (0.375)	N. Charleston	Knowledge
Facts Not Fear: Ebola & Enterovirus Etiology & Prevention	0372-0000-14-027-L04-P	1 (0.1)	www.rxschool.com	Knowledge
Fundamentals of Highly Active Antiretrovial Therapy 2014	0171-9999-14-001-L02-P	1 (0.1)	Columbia	Knowledge
Fungus	0043-9999-14-023-L01-P	5 (0.5)	Bahamas	Knowledge

Getting Prepped for PrEP: Clinical Updates on HIV Pre-Exposure Prophylaxis _	0217-9999-14-164-L02-P	1 (0.1)	Shady Grove	Knowledge
Getting to the Point: Influenza Immunization Update	0837-9999-14-033-L01-P	1 (0.1)	Bartlett	Knowledge
Getting to the Point: Influenza Immunizations 2014	0837-0000-14-047-L01-P	2 (0.2)	Portland	Knowledge
Getting to the Point: 2014 Immunization Update	0280-0000-14-015-L01-P	2 (0.2)	Portland	Knowledge
Have you herd the news?...Adult immunization update	0510-0000-14-024-L01-P	1 (0.1)	Detroit	Knowledge
HCV Update for Pharmacists	0043-0000-14-064-L02-P	1 (0.1)	Jamaica	Knowledge
Health Policy Changes and Strategies for Overcoming Barriers in HIV	0255-0000-14-007-L02-P	1 (0.1)	www.primeinc.org	Knowledge
Hepatitis C Update: Late 2014	0389-0000-14-001-L01-P	1 (0.1)	Waltham	Knowledge
HIV and Hepatitis C Coinfection and Question and Answer Session	0022-0000-14-035-L01-P	0.83 (0.083)	Lexington	Knowledge
HIV Guideline Update and New Antiretrovirals	0377-0000-14-006-L02-P	1 (0.1)	Columbia University Medical Center, NY	Knowledge
HIV Guideline Update and New Antiretrovirals	0377-0000-14-006-L02-P	1 (0.1)	Weill Cornell Medical Center, NY	Knowledge
HIV Immune Reconstitution Inflammatory Syndrome (IRIS)	0163-9999-14-080-L02-P	1 (0.1)	Orlando	Knowledge
HIV Infection: Challenges Along the HIV Continuum	0011-0000-14-042-L04-P	1.5 (0.15)	Tallhassee/850.599.3240	Knowledge
HIV Infection: Challenges Along the HIV Continuum	0011-0000-14-042-L04-P	1.5 (0.15)	Fort Lauderdale/850.599.3240	Knowledge
HIV- Is There an End in Sight?	0106-9999-14-035-L01-P	1 (0.1)	Mashantucket, CT	Knowledge
HIV Pharmacotherapy Update	0136-0000-14-004-L02-P	1 (0.1)	Mt. Laurel	Knowledge
HIV Statewide Clinical Update	0032-9999-14-068-L02-P	6 (0.6)	Jackson	Knowledge
HIV Today: Examining The Latest Treatment Advances and Barriers to Success	0136-0000-14-050-L01-P	2 (0.2)	Washington Township	Knowledge
HIV Treatment Update	0204-9999-14-402-L02-P	1 (0.1)	http://uncgrandrounds.org/	Knowledge
HIV Update	0163-0000-14-248-L02-P	1 (0.1)	www.fshp.org	Knowledge
HIV Update: Guidelines and Post-exposure Prophylaxis (PEP)	0163-9999-14-061-L01-P	1 (0.1)	Hilton Head Island	Knowledge
HIV/AIDS Update	0165-0000-14-029-L02-P	1 (0.1)	Tampa	Knowledge
HIV/AIDS Update	0165-0000-14-057-L02-P	1 (0.1)	Ft. Lauderdale	Knowledge
HIV/AIDS Update	0165-0000-14-068-L02-P	1 (0.1)	Jacksonville	Knowledge

HIV/AIDS Update	0165-0000-14-071-L02-P	1 (0.1)	Destin	Knowledge
HIV/AIDS Update	0165-0000-14-096-L02-P	1 (0.1)	Ft. Lauderdale	Knowledge
HIV/AIDS Update	0165-0000-14-110-L02-P	1 (0.1)	Orlando	Knowledge
HIV/AIDS Update	0165-0000-14-135-L02-P	1 (0.1)	Sarasota	Knowledge
HIV/AIDS UPDATE: Treatment, Prevention and Beyond	0042-0000-14-102-L02-P	5 (0.5)	liu.rxschool.com	Knowledge
HIV: Testing and Treatment	0104-0000-14-041-L02-P	1 (0.1)	Albuquerque	Knowledge
HIV: Review and Update on Treatment Strategies	0179-9999-14-024-L02-P	1 (0.1)	ULM Shreveport	Knowledge
HPV Vaccination: Current Uptake and Web-Based Solutions	0104-0000-14-012-L04-P	1 (0.1)	Albuquerque	Knowledge
Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome Update	0163-9999-14-091-L02-P	1 (0.1)	Ft. Myers	Knowledge
ID Pharmacotherapy Issues in Pediatrics	0485-9999-14-005-L01-P	1.5 (0.15)	orlando mad-id-org/2014-annual-meeting	Knowledge
IDSA & ICCAC: The Cliff Notes	0163-0000-14-182-L01-P	1 (0.1)	Orlando	Knowledge
IDSA 10 X ’20 Initiative: Where Do We Stand?	0163-9999-14-268-L01-P	1 (0.1)	Melbourne	Knowledge
Immunization for the Ages	0179-9999-14-054-L04-P	1 (0.1)	ULM School of Pharmacy, Monroe	Knowledge
Immunization Update	0130-0000-13-064-L01-P	1.5 (0.15)	https://www1.gotomeeting.com/register/169460857	Knowledge
Immunization Update	0837-9999-14-082-L01-P	1 (0.1)	Bangor	Knowledge
Immunization Update 2014	0010-0000-14-018-L01-P	2 (0.2)	E. Capitol St., 301-613-6377	Knowledge
Immunization Update 2014	0032-9999-14-021-L01-P	1 (0.1)	Destin	Knowledge
Immunization Update 2014	0136-0000-14-003-L04-P	2 (0.2)	Asbury Park	Knowledge
Immunization Update 2014	0136-0000-14-023-L04-P	2 (0.2)	Mt. Laurel	Knowledge
Immunization Update 2014	0136-0000-14-023-L04-P	2 (0.2)	Hamilton	Knowledge
Immunization Update 2014	0136-9999-14-012-L04-P	1 (0.1)	Dewey Beach	Knowledge
Immunization Update 2014	0171-0000-13-113-L01-P	2 (0.2)	Asheville	Knowledge
Immunization Update 2014	0171-0000-14-050-L01-P	1 (0.1)	Hilton Head Island	Knowledge

Immunization Update 2014	0179-0000-14-019-L01-P	1 (0.1)	Hyatt Regency, New Orleans	Knowledge
Immunization Update 2014	0837-9999-14-022-L01-P	2 (0.2)	Freeport	Knowledge
Immunization Update 2014 Webinar	0112-0000-14-207-L01-P	1.5 (0.15)	Lansing	Knowledge
Immunization Update 2014: Why do we still have vaccine-preventable diseases?	0106-9999-14-031-L01-P	1 (0.1)	Mashantucket.CT	Knowledge
Immunization Update and Review for Florida Pharmacists	0163-9999-14-221-L01-P	1 (0.1)	Tampa	Knowledge
Immunization Update: Let's Give it a Shot	0837-9999-14-095-L01-P	1 (0.1)	Manchester	Knowledge
Immunization Update: Straight to the Point	0106-0000-14-019-L01-P	1 (0.1)	Farmington, CT	Knowledge
Immunization Update: What's New with the Flu and Other Vaccines, too	0060-0000-14-036-L01-P	1 (0.1)	Newport	Knowledge
Immunization Updates	0113-0000-14-010-L04-P	1 (0.1)	Sacramento	Knowledge
Immunization Updates 2014	0179-9999-14-038-L04-P	1 (0.1)	Xavier University of LA, New Orleans	Knowledge
Immunization: Not Just for Kids	0134-9999-14-016-L01-P	1 (0.1)	Buffalo	Knowledge
Immunizations Resources and Basic Pharmacy Technician Training	0067-0000-14-032-L01-P	1 (0.1)	Austin, Texas	Knowledge
Immunizing Adolescents: Opportunities and Challenges	0175-0000-14-059-L01-P	1 (0.1)	Wisconsin Dells	Knowledge
Infection Control and Stewardship	0485-9999-14-008-L01-P	1 (0.1)	orlando mad-id-org/2014-mad-id-annual -meeting	Knowledge
Infectious Conditions	0263-0000-14-460-L01-P	1.5 (0.15)	Indianapolis/ http://www.contemporaryforums.com	Knowledge
Infectious Conditions	0263-0000-14-460-L01-P	1.5 (0.15)	Las Vegas/http://www.contemporaryforums.com	Knowledge
Infectious Conditions	0263-0000-14-460-L01-P	1.5 (0.15)	San Francisco/ http://www.contemporaryforums.com	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-14-049-L01-P	11 (1.1)	Sea Island	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-14-049-L01-P	11 (1.1)	Las Vegas	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-14-049-L01-P	11 (1.1)	New Orleans	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-14-049-L01-P	11 (1.1)	New York	Knowledge

Infectious Disease Medicine for Primary Care	0816-0000-14-049-L01-P	11 (1.1)	Toronto	Knowledge
Infectious Disease Medicine for Primary Care	0816-0000-14-049-L01-P	11 (1.1)	San Juan	Knowledge
Infectious Disease Part 1	0163-9999-14-102-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 2	0163-9999-14-108-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 4	0163-9999-14-120-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 5	0163-9999-14-121-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 6	0163-9999-14-132-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 7	0163-9999-14-140-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 8	0163-9999-14-144-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease Part 9	0163-9999-14-147-L01-P	1 (0.1)	Gainesville	Knowledge
Infectious Disease: Bad Bugs, No Drugs	0097-9999-14-007-L01-P	3 (0.3)	Scranton	Knowledge
Infectious Diseases and Antibiotic Therapy	0042-0000-14-006-L04-P	5 (0.5)	LaGuardia Marriott Hotel, East Elmhurst	Knowledge
Infectious Diseases PRN Focus Session—Infectious Diseases Rapid Diagnostic and Point-of-Care Tests Across Sites of Care	0217-0000-14-128-L04-P	2 (0.2)	Austin, www.accp.com/am	Knowledge
Infectious Diseases Update 2014	0112-0000-14-210-L01-P	1 (0.1)	Bellaire	Knowledge
Influenza Update 2013-2014	0372-0000-13-019-L04-P	2 (0.2)	www.rxschool.com	Knowledge
Influenza: Master of Identity Change	0826-9999-14-051-L01-P	2 (0.2)	http://ceinternational.com/influenza.aspx	Knowledge
Influenza: Master of Identity Change	0826-9999-14-051-L01-P	2 (0.2)	Live Online	Knowledge
Internal Medicine for Primary Care: ID/CV/Pulm/Neuro	0816-0000-14-047-L01-P	14 (1.4)	Paris	Knowledge
Intra-abdominal Infections (IAI): What Should A Pharmacist Know?	0510-0000-14-034-L01-P	1 (0.1)	Detroit	Knowledge
INVASIVE FUNGAL INFECTIONS TREATMENT STRATEGIES AND CONTINUING CHALLENGES	0043-9999-13-032-L01-P	5 (0.5)	Bahamas	Knowledge
Issues in Immigrant Health and Cross Cultural Communication	0845-0000-14-023-L04-P	1 (0.1)	Fort Worth	Knowledge
Issues in Immigrant Health and Cross Cultural Communication	0845-0000-14-023-L04-P	1 (0.1)	http://ce.unthsc.edu	Knowledge
It's Flu Season: Now What?	0798-0000-14-178-L01-P	1 (0.1)	www.freeCE.com	Knowledge
It's Positively Infectious	0389-0000-14-004-L01-P	0.5 (0.05)	Waltham	Knowledge

Last Chance 2014 Immunization Update	0837-0000-14-110-L01-P	2 (0.2)	Portland	Knowledge
Lyme Disease: Pharmacist Initiation of Post-Exposure Doxycycline for Lyme Prophylaxis	0106-9999-14-020-L01-P	1 (0.1)	Farmington CT	Knowledge
Management of Invasive MRSA Infections in the 21th Century	0134-9999-14-052-L01-P	1 (0.1)	Albany	Knowledge
Management of Osteoporosis and Vitamin D Deficiency in the HIV Infected Patient and Question and Answer Session	0022-0000-14-037-L01-P	0.83 (0.083)	Lexington	Knowledge
Managing C.difficile in the Long Term Care Setting	0837-9999-14-066-L01-P	1 (0.1)	Portland	Knowledge
Meds Rx Us	0119-0000-14-003-L04-P	1 (0.1)	Salt Lake City	Knowledge
Microbiology 101: What You Wish You Had Learned in Pharmacy School	0163-0000-14-180-L01-P	1 (0.1)	Orlando	Knowledge
Microbiology 101: What You Wish You Had Learned in Pharmacy School	0163-9999-14-230-L01-P	1 (0.1)	Sarasota	Knowledge
Microbiology Basics and Applications to Clinical Practice	0163-9999-14-219-L04-P	1 (0.1)	Tampa	Knowledge
Mixing it up with Polymyxins	0163-0000-14-181-L01-P	1 (0.1)	Orlando	Knowledge
New Anti-infective Agents	0112-0000-14-225-L01-P	1.5 (0.15)	Traverse City	Knowledge
New therapy options for the management of HIV and the possibility of a cure?	0163-9999-14-079-L02-P	1 (0.1)	Orlando	Knowledge
New Treatment Options for MRSA	0179-0000-14-042-L01-P	1 (0.1)	Hilton Garden Inn, Bossier City	Knowledge
New Treatment Options for Multidrug-resistant Gram-positive Infections	0510-0000-14-042-L01-P	1 (0.1)	Detroit	Knowledge
No Fever, No Infection?	0510-0000-14-016-L01-P	1 (0.1)	Detroit	Knowledge
Opportunistic infections in solid organ transplantation	0377-0000-14-012-L01-P	1 (0.1)	Weill Cornell Medical Center, NY	Knowledge
Opportunistic infections in solid organ transplantation	0377-0000-14-012-L01-P	1 (0.1)	Columbia University Medical Center, NY	Knowledge
OSHP Annual Meeting: Residency Project Pearls (2)	0053-9999-14-012-L01-P	1 (0.1)	Oklahoma City	Knowledge
Ouch! The Sting of a Vaccine: A review of current recommendations for pediatric immunizations	0104-9999-14-071-L04-P	1 (0.1)	El Paso	Knowledge
Pearls of Infectious Diseases Wisdom	0134-9999-14-022-L01-P	1.5 (0.15)	St Paul	Knowledge
Pediatric Vaccines: A 2014 Update	0159-0000-14-018-L01-P	1 (0.1)	Bedford	Knowledge
PEP, nPEP and PrEP: What do pharmacists need to know?	0280-0000-14-016-L02-P	1.5 (0.15)	Melville	Knowledge

Pharmacist Initiation of Post-Exposure Doxycyline for Lyme Prophylaxis	0837-9999-14-061-L01-P	1 (0.1)	Bedford	Knowledge
Pharmacist-Provided Immunization: 2014 Update and Key Opportunities New York	0430-0000-14-062-L01-P	1 (0.1)	https://event.webcasts.com/starthere.jsp?ei=104673	Knowledge
Pharmacist-Provided Immunization: 2014 Update and Key Opportunities Texas	0430-0000-14-064-L01-P	1 (0.1)	https://event.webcasts.com/starthere.jsp?ei=104675	Knowledge
Pharmacist-Provided Immunization: 014 Update and Key Opportunities Illinois	0430-0000-14-061-L01-P	1 (0.1)	https://event.webcasts.com/starthere.jsp?ei=104673	Knowledge
Pharmacist-Provided Immunization: 2014 Update and Key Opportunities Florida	0430-0000-14-063-L01-P	1 (0.1)	https://event.webcasts.com/starthere.jsp?ei=104675	Knowledge
Pharmacist-Provided Immunization: Update and Key Opportunities California	0430-0000-14-060-L01-P	1 (0.1)	https://event.webcasts.com/starthere.jsp?ei=104671	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-003-L01-P	6.3 (0.63)	Albany	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-003-L01-P	6.3 (0.63)	Cheektowaga	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	College Park	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Columbus	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Ellicott City	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Sioux Falls	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Bismarck	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Cincinnati	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Dayton	Knowledge

Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	South Bend	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Fargo	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Fort Wayne	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-005-L01-P	6.3 (0.63)	Indianapolis	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-006-L01-P	6.3 (0.63)	Greenville	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-006-L01-P	6.3 (0.63)	Marietta	Knowledge
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-006-L01-P	6.3 (0.63)	Norcross	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Livonia	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Nashville	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Grand Rapids	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Lansing	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Memphis	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Arlington Heights	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	LIVE WEBCAST	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Lisle	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Little Rock	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Tinley Park	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Asheville	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Madison	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Newton	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Woburn	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Brookfield	Knowledge

Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Hartford	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Providence	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Raleigh	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Appleton	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Charlotte	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	Dedham	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-14-108-L01-P	6.3 (0.63)	New Haven	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Burlington	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Cherry Hill	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Colorado Springs	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Denver	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	New Haven	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Parsippany	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Plainview	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Rocky Hill	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Anaheim	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Grand Rapids	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Irvine	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	King of Prussia	Knowledge

Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Livonia	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Manhattan	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Nanuet	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Portland	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Trevose	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Edison	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Honolulu	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Manchester	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	White Plains	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Cheyenne	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Providence	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Sterling Heights	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	Carlsbad	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	Phoenix	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	Albuquerque	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	Cedar Rapids	Knowledge

Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	San Diego	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	Davenport	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	Des Moines	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advanced Practice Clinicians	0289-0000-14-007-L01-P	6.3 (0.63)	Tucson	Knowledge
Pharmacy Practice Workshop: HIV/AIDS - (Part 3)	0010-9999-14-003-L02-P	3 (0.3)	Washington	Knowledge
Preventing Antiretroviral Medication Errors in Patients with Human Immunodeficiency Virus (HIV) Infection	0043-0000-14-067-L05-P	1 (0.1)	Jamaica	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-14-149-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-14-150-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-14-151-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Grand Rounds 2014-2016	0387-0000-14-152-L04-P	1 (0.1)	www.cdc.gov/about/grand-rounds/	Knowledge
Public Health Hot Topics 2014	0217-9999-14-154-L01-P	1 (0.1)	Rochester	Knowledge
Putting the microbes away: lock therapy for catheter related infections	0163-9999-14-213-L01-P	1 (0.1)	Orlando	Knowledge
Recent Drug Developments 2014	0035-0000-14-013-L01-P	6 (0.6)	Bozeman, Butte, Missoula, etc., MT	Knowledge
Recent Immunization Updates	0067-0000-14-030-L01-P	0.75 (0.075)	Austin, Texas	Knowledge
Recurrent Clostridium difficile: What are our options?	0134-9999-14-014-L01-P	1 (0.1)	Buffalo	Knowledge
Review of Pediatric Immunizations	0798-0000-14-167-L01-P	1 (0.1)	www.freeCE.com	Knowledge
SB493, Immunizations, and You	0113-0000-14-578-L04-P	2 (0.2)	Palm Desert	Knowledge
SB493, Immunizations, and You	0113-0000-14-578-L04-P	2 (0.2)	Sacramento	Knowledge
Second Minority HIV and Health Disparities Conference	0032-9999-14-035-L02-P	7 (0.7)	Biloxi	Knowledge
Speaker Panel Discussion	0022-0000-14-038-L04-P	0.67 (0.067)	Lexington	Knowledge

Staphylococcus aureus in 2014: an old bug with new data, new drugs and new dilemmas	0217-9999-14-174-L01-P	1 (0.1)	Memphis	Knowledge
Stewardship Outside of the Health System Setting	0485-9999-14-009-L01-P	1.5 (0.15)	orlando mad-id-org/2014-mad-id-annual-meeting	Knowledge
The 18th Annual Infectious Diseases & Critical Care Symposium: Session II	0510-0000-14-002-L04-P	2 (0.2)	Dearborn	Knowledge
The 18th Annual Infectious Diseases & Critical Care Symposium: Session III	0510-0000-14-003-L01-P	1 (0.1)	Dearborn	Knowledge
The Affordable Care Act and the Future for HIV Providers and Allied Health Workers	0797-9999-14-123-L04-P	3.5 (0.35)	Atlanta	Knowledge
The Affordable Care Act and the Future for HIV Providers and Allied Health Workers	0797-9999-14-123-L04-P	3.5 (0.35)	Chicago	Knowledge
The Affordable Care Act and the Future for HIV Providers and Allied Health Workers	0797-9999-14-123-L04-P	3.5 (0.35)	Denver	Knowledge
The Affordable Care Act and the Future for HIV Providers and Allied Health Workers	0797-9999-14-123-L04-P	3.5 (0.35)	Harrisburg	Knowledge
The Affordable Care Act and the Future for HIV Providers and Allied Health Workers	0797-9999-14-123-L04-P	3.5 (0.35)	Raleigh	Knowledge
The Affordable Care Act and the Future for HIV Providers and Allied Health Workers	0797-9999-14-123-L04-P	3.5 (0.35)	Miami	Knowledge
The Affordable Care Act and the Future for HIV Providers and Allied Health Workers	0797-9999-14-123-L04-P	3.5 (0.35)	Dallas	Knowledge
The Baddest Bug on the Block: A Focus on Resistance Mechanisms	0134-9999-14-017-L01-P	1 (0.1)	Buffalo	Knowledge
The Evolution of Antimicrobial Stewardship Programs: What's Working? What's Not? What are Optimal Strategies Moving Forward?	0062-9999-14-173-L01-P	1.5 (0.15)	Anaheim (ASHP Midyear)	Knowledge
The Graying of HIV	0798-0000-13-257-L02-P	1 (0.1)	www.freeCE.com	Knowledge
The HIV Diagnosis: Management of the HIV-Infected Patient in the Primary Care Setting	0120-0000-14-013-L02-P	1 (0.1)	Indianapolis	Knowledge
The MRSA Treatment Guidelines	0485-9999-14-012-L01-P	1.5 (0.15)	orlando mad-id-org/2014-mad-id-annual-meeting	Knowledge
The Pharmacist's Role in the Management of Inpatients with HIV	0120-9999-14-009-L02-P	1 (0.1)	Ft. Wayne	Knowledge
The Rising Tide of Gram-negative Resistance	0485-9999-14-003-L01-P	1 (0.1)	Orlando mad-id.org/2013-mad-id-annual meeting	Knowledge

The Role of PrEP in HIV Prevention	0280-9999-14-077-L02-P	1 (0.1)	Flushing	Knowledge
The simplicity and Complexity of Urinary Tract Infections	0228-0000-14-123-L01-P	1 (0.1)	Young Harris	Knowledge
The Stanley W. Chapman Infectious Disease Symposium	0032-9999-13-068-L01-P	6.5 (0.65)	Jackson	Knowledge
The Use of Social Media in Stewardship	0485-9999-14-001-L01-P	1 (0.1)	Orlando mad-id-org/2013-annual-meeting	Knowledge
To Test or Not to Test A Journal Club Discussion on the COAG Trial Polymyxin B: Are dosage adjustments necessary?	0134-0000-14-072-L01-P	1 (0.1)	Saratoga Springs	Knowledge
Tuberculosis in the 21st Century	0130-0000-14-034-L01-P	1.5 (0.15)	Coeur d'Alene	Knowledge
Two to Tango? Combination Antimicrobial Therapy for Children with Gram-Negative Infections	0510-0000-14-021-L01-P	1 (0.1)	Detroit	Knowledge
Unraveling the Strands: A Closer Look at the Integrase Strand Transfer Inhibitors (INSTI)	0798-0000-14-055-L02-P	1 (0.1)	www.freeCE.com	Knowledge
Update from the NYS Board of Pharmacy	0134-9999-14-038-L03-P	1.5 (0.15)	Syracuse	Knowledge
Update on HIV Treatment and Prevention	0280-9999-14-062-L02-P	1.5 (0.15)	Savana	Knowledge
Update on the Management of Skin and Soft Tissue Infections in the Era of MRSA	0280-0000-14-079-L01-P	1.5 (0.15)	Danbury	Knowledge
Update on the Management of Skin and Soft Tissue Infections in the Era of MRSA	0280-0000-14-097-L01-P	1.5 (0.15)	Randolph	Knowledge
Update on the Treatment of methicillin-resistant Staphylococcus aureus (MRSA) Infections	0136-0000-14-007-L01-P	2 (0.2)	Flemington	Knowledge
Update on the Treatment of methicillin-resistant Staphylococcus aureus (MRSA) Infections	0136-0000-14-010-L01-P	2 (0.2)	Somerville	Knowledge
Update on the Treatment of methicillin-resistant Staphylococcus aureus (MRSA) Infections	0136-0000-14-010-L01-P	2 (0.2)	Flemington	Knowledge
Updates in Infectious Disease	0163-9999-14-003-L01-P	1 (0.1)	Jacksonville	Knowledge
Urinary Tract Infections: What Should a Pharmacist Know?	0510-0000-14-036-L01-P	1 (0.1)	Detroit	Knowledge
Vaccination of the Immunocompromised Host	0180-0000-14-001-L01-P	1 (0.1)	St. Louis	Knowledge
Vaccinations: Are You Up To Date?	0104-0000-14-044-L04-P	1 (0.1)	Albuquerque	Knowledge
Vaccine Progress in Avian Influenza, PTSD and Hep C	0008-9999-14-032-L01-P	1 (0.1)	Denver	Knowledge
Vaccine Safety: Evidence, Opinion and YouTube	0140-0000-14-118-L05-P	0.75 (0.075)	Marshfield	Knowledge

Vaccine Update	0173-0000-14-013-L01-P	1 (0.1)	Sun Valley www.ishp.shuttlepod.org	Knowledge
Vancomycin: Making Sense of MICs in MRSA Isolates	0163-9999-14-163-L01-P	1 (0.1)	Tampa	Knowledge
What did you miss because there was no funding to attend Infectious Disease meetings?	0485-9999-14-006-L01-P	1 (0.1)	Orlando mad-id-org/2014-mad-id-annual-meeting	Knowledge
What's Hot in Infectious Diseases 2014	0036-9999-14-208-L04-P	1 (0.1)	Gleneden Beach	Knowledge
What's New in Medicine 2014 - Day 1	0347-9999-14-013-L01-P	9 (0.9)	Kennewick, Three Rivers Convention Center, 7:30am	Knowledge
Why HIV is Still Relevant in Hospital Care	0163-9999-14-265-L02-P	1 (0.1)	Melbourne	Knowledge
2014 From Theory to Bedside: Clinical Reasoning Series -- Health Care-Associated Infections	0217-0000-14-096-L01-P	6 (0.6)	www.accp.com/am	Application
2nd Annual Clinical Updates in Infectious Diseases: Getting Your Point Across: Effetive Communication with Patients and Health Care Professionals	0074-0000-14-009-L04-P	2 (0.2)	Oak Brook/630-971-6417	Application
2nd Annual Clinical Updates in Infectious Diseases: In Case You Forgot: Sharpening Your ID SOAPing Ability Using Patient Cases	0074-0000-14-010-L01-P	2 (0.2)	Oak Brook/630-971-6417	Application
Ambulatory Care Pharmacy Preparatory Review and Recertification Course--Infectious Diseases I, and Infectious Diseases II	0217-0000-14-019-L01-P	3 (0.3)	Rosemont/www.accp.com/ut	Application
Antimicrobial Management of Skin and Soft Tissue Infections	0165-0000-14-042-L01-P	1.5 (0.15)	Ft. Lauderdale	Application
C difficile: Overview and Management	0165-0000-14-043-L01-P	1.5 (0.15)	Ft. Lauderdale	Application
Caring for International Travelers: A Continuing Education Course for Pharmacists	0254-0000-14-028-L04-P	1 (0.1)	Hampton Inn, Flint	Application
Case Analysis I: Pregnancy and HIV/HCV Co-Infection	0011-0000-14-045-L04-P	1.5 (0.15)	Fort Lauderdale/850.599.3240	Application
Case Analysis I: Pregnancy and HIV/HCV Co-Infection	0011-0000-14-045-L04-P	1.5 (0.15)	Tallahassee/850.599.3240	Application
Case Studies: The Pre-Travel Consultation	0130-0000-14-078-L01-P	1.5 (0.15)	Cle Elum	Application
Changes and Challenges in the Management of Methicillin-Resistant Staphylococcal Aureus	0154-0000-14-011-L01-P	1 (0.1)	San Marcos	Application
Community Pharmacy-Based Point-of-Care Testing Certificate Course (live)	0112-0000-14-214-L01-P	8 (0.8)	Camp Hill	Application

Community Pharmacy-Based Point-of-Care Testing Certificate Course (live)	0112-0000-14-214-L01-P	8 (0.8)	Lansing	Application
Current and Emerging Therapies in the Management of Hepatitis C Viral Infection	0044-0000-14-032-L01-P	5 (0.5)	Buffalo	Application
Curricular Track II: Emerging Issues, Challenges, and Concepts in Infectious Diseases	0217-0000-14-101-L01-P	1.5 (0.15)	Austin, www.accp.com/am	Application
Curricular Track II: Infectious Diseases: Drugs and Bugs Return	0217-0000-14-131-L01-P	1.5 (0.15)	Austin, www.accp.com/am	Application
Ebola and Emerging Communicable Diseases: Fact vs. Fiction for Pharmacists	0027-0000-14-145-L04-P	1.5 (0.15)	Boston	Application
Focusing Interprofessional Antimicrobial Stewardship Team Efforts on Drug-Resistant Pathogens	0204-0000-14-472-L01-P	1 (0.1)	www.leadstewardship.org	Application
HIV / AIDS Update	0215-0000-14-903-L02-P	2 (0.2)	Kissimmee	Application
Immunization administration for adults and pediatric patients: A review for pharmacist immunizers	0401-9999-14-056-L01-P	1 (0.1)	www.cedrugstorenews.com	Application
Immunization Certification Program for Pharmacists: Live Workshop	0035-0000-14-018-L01-P	4 (0.4)	Missoula	Application
Immunization Certification Program for Pharmacists: Live Workshop	0035-0000-14-031-L01-P	4 (0.4)	Missoula, MT	Application
Immunization Delivery for Pharmacists - Live	0175-0000-14-002-L01-P	12 (1.2)	Madison, WI	Application
Immunization Delivery for Pharmacists - Live	0175-0000-14-002-L01-P	12 (1.2)	Milwaukee, WI	Application
Immunization Delivery for Pharmacists - Live	0175-0000-14-002-L01-P	12 (1.2)	Wisconsin Dells. WI	Application
Immunization Highlights of 2014	0009-0000-14-082-L01-P	1 (0.1)	Rocky Hill	Application
Immunization Highlights of 2014	0009-0000-14-082-L01-P	1 (0.1)	www.gotomeeting.com	Application
Immunization Training	0837-9999-13-091-L01-P	8 (0.8)	Bangor	Application
Immunization Training	0837-9999-14-084-L01-P	8 (0.8)	Bangor	Application
Immunization Training	0837-9999-14-091-L01-P	8 (0.8)	Bangor	Application
Immunization Training 2014	0837-9999-14-018-L01-P	8 (0.8)	Freeport	Application
Immunization Update	0106-0000-14-045-L04-P	1 (0.1)	Trumbull, CT	Application
Immunization Update	0130-0000-14-095-L01-P	1.5 (0.15)	Cle Elum	Application
Immunization Update 2014	0053-0000-14-084-L01-P	1 (0.1)	Oklahoma City	Application
Immunization Update 2014	0154-0000-14-023-L01-P	3 (0.3)	San Marcos	Application

Influenza and Pneumococcal Vaccines: A Breath of Fresh Air for Patients with Pulmonary Disorders	0165-0000-14-119-L01-P	1.5 (0.15)	Orlando	Application
Last-Chance Ambulatory Care Review Webinar – Infectious Diseases and Psychiatric Disorders	0217-0000-14-159-L01-P	3 (0.3)	www.accp.com	Application
Meds Rx Us	0119-0000-14-004-L01-P	3 (0.3)	Salt Lake City	Application
Novel Drug Delivery	0217-0000-14-119-L01-P	1.5 (0.15)	Austin, www.accp.com/am	Application
Pharmacists Prescribing Vaccines - The New Mexico Program	0104-0000-14-058-L01-P	8 (0.8)	Albuquerque	Application
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-019-L01-P	6.3 (0.63)	Berkeley	Application
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-019-L01-P	6.3 (0.63)	Oakland	Application
Pharmacology of Infectious Diseases & Immunizations for Advanced Practice Clinicians	0289-0000-14-019-L01-P	6.3 (0.63)	Sacramento	Application
Pharmacotherapy Preparatory Review and Recertification Course—Nephrology, Infectious Diseases, and HIV/Infectious	0217-0000-14-027-L01-P	3 (0.3)	Rosemont/www.accp.com/ut	Application
Pharmacy-Based Immunization Delivery Live Seminar	0202-9999-14-003-L01-P	8 (0.8)	"State College	Application
Pneumonia: The Captain of Death	0165-0000-14-040-L01-P	1.5 (0.15)	Ft. Lauderdale	Application
Providing Americans with Trustworthy Information on Ebola	0154-0000-14-028-L04-P	1 (0.1)	www.rxcellence.org	Application
The ABCs on ESBLs and CREs: A Pharmacist's Primer on Multi-Drug Resistant Gram-Negative Organisms	0159-0000-14-019-L01-P	1.5 (0.15)	Bedford	Application
The ABCs on ESBLs and CREs: A Pharmacist's Primer on Multi-Drug Resistant Gram-Negative Organisms	0159-0000-14-019-L01-P	1.5 (0.15)	Webinar	Application
The Judicious Use of Antimicrobial Agents	0165-0000-14-045-L01-P	1.5 (0.15)	Ft. Lauderdale	Application
Update in Immunization Practices and Recommendations	0159-0000-13-029-L04-P	1 (0.1)	Webinar	Application
Update on Infectious Diseases: New Bugs, New Drugs, New	0204-0000-14-121-L01-P	2.5 (0.25)	Las Vegas	Application
Updates in Immunizations 2014	0401-9999-14-057-L01-P	2 (0.2)	www.cedrugstorenews.com	Application
Updates in Management of Acute Bacterial Skin and Skin Structure Infections: A Review of 2014 IDSA Guidelines and Recent Drug	0130-0000-14-092-L01-P	1.5 (0.15)	Cle Elum	Application
Vaccinating Adults & Adolescents: An Immunization Program Practicum Session	0130-0000-13-027-L01-P	3 (0.3)	Pasco	Application

Vaccinating Adults & Adolescents: An Immunization Program Practicum Session	0130-0000-13-027-L01-P	3 (0.3)	Renton	Application
What's New in the World of Vaccination?: Updates for 2014	0053-9999-14-050-L01-P	2 (0.2)	Norman	Application
Women's Health PRN and Infectious Diseases PRN Focus Session—Infectious Disease Considerations in Women’s Health	0217-0000-14-125-L01-P	2 (0.2)	Austin, www.accp.com/am	Application

2013

Title	UAN	Hrs (CEUs)	Location	Activity Type
(ACHS #5098) Fundamentals of Caring for the HIV/HCV Co-infected Patient	0797-9999-13-138-L04-P	2 (0.2)	Denver	Knowledge
2013 HIV/STD Update: Advances in Care and Prevention	0120-9999-13-008-L02-P	5.5 (0.55)	Indianapolis	Knowledge
2013 Immunization Update	0107-0000-13-117-L01-P	2 (0.2)	Des Moines	Knowledge
2013 Immunization Update	0171-0000-13-046-L01-P	1 (0.1)	Hilton Head	Knowledge
2013 Immunization Update	0278-0000-13-028-L01-P	1.5 (0.15)	Virginia Beach	Knowledge
2013 Immunization Update	0401-9999-13-057-L04-P	2 (0.2)	www.cedrugstorenews.com	Knowledge
2013 Update on Antiretrovirals and HIV Treatment Guidelines	0043-0000-13-058-L02-P	1 (0.1)	Jamaica	Knowledge
2013 Update on Immunizations	0204-9999-13-411-L01-P	1 (0.1)	http://uncgrandrounds.org	Knowledge
AMMG - 14th Clinical Applications for Age Management Medicine	0347-9999-13-005-L01-P	27 (2.7)	Hollywood, The Westing Diplomat Resort & Spa, 3 da	Knowledge
AMMG - 14th Clinical Applications for Age Management Medicine	0347-9999-13-005-L01-P	27 (2.7)	Las Vegas, The Cosmopolitan	Knowledge
Antibiotic Stewardship	0088-9999-13-131-L01-P	1 (0.1)	Greensboro	Knowledge
Antimicrobial Resistance and the Treatment of Gram Negative Pathogens	0179-9999-13-020-L04-P	1 (0.1)	ULM College of Pharmacy, Shreveport	Knowledge
Antimicrobial Stewardship in Pediatrics	0485-0000-13-008-L01-P	1.5 (0.15)	Orlando	Knowledge
Antimicrobial Stewardship in the Emergency Department	0163-9999-13-130-L01-P	1 (0.1)	Indian River	Knowledge
Antimicrobial Stewardship: How to Survive Being Out Numbered	0107-0000-13-123-L01-P	1.5 (0.15)	Des Moines	Knowledge
Antimicrobial therapy for common upper respiratory tract infections	0837-9999-13-010-L01-P	1 (0.1)	Bartlett	Knowledge
APhA Immunization Update from the June 2013 ACIP Meeting	0202-0000-13-105-L04-P	1 (0.1)	Webinar	Knowledge
APhA Immunization Update from the October 2013 ACIP Meeting	0202-0000-13-106-L04-P	1 (0.1)	Webinar	Knowledge
Applying the Basics of Antiinfective Resistance to Clinical Practice	0204-0000-13-311-L01-P	1 (0.1)	Orlando	Knowledge

Bugs and Drugs	0107-0000-13-120-L01-P	1.5 (0.15)	Des Moines	Knowledge
Changing Guidelines for the Treatment of Patients with HIV	0280-9999-13-091-L02-P	1 (0.1)	Trumbull	Knowledge
Changing Guidelines for the Treatment of Patients with HIV	0280-9999-13-102-L02-P	1 (0.1)	Westford	Knowledge
Clinical pearls for the treatment of common outpatient infections	0455-9999-13-006-L01-P	1 (0.1)	NVSHP Annual Meeting, Reno	Knowledge
Clinical Pearls: Common ID Cases in Public Health	0011-0000-13-024-L04-P	1.5 (0.15)	Jaclsonville/850-599-3240	Knowledge
Clinical Pearls: Focus on Anti-infectives	0032-9999-13-047-L01-P	1 (0.1)	Jackson	Knowledge
Clinical Updates in Infectious Diseases - Bugs and Drugs: An Interactive Refresher	0074-0000-13-022-L01-P	1 (0.1)	Oak Brook/630-971-6417	Knowledge
Clinical Updates in Infectious Diseases - Keynote Address	0074-0000-13-023-L01-P	1 (0.1)	Oak Brook/630-971-6417	Knowledge
Clinical Updates in Infectious Diseases - Managing Infectious Diseases during Transitions in Care	0074-0000-13-020-L01-P	1 (0.1)	Oak Brook/630-971-6417	Knowledge
Clinical Updates in Infectious Diseases - What's New in ID? Highlights from the ICAAC 2013 Meeting	0074-0000-13-018-L01-P	1 (0.1)	Oak Brook/630-971-6417	Knowledge
Clinical Vaccination Course - Day 3	0798-9999-13-182-L01-P	6.25 (0.625)	Cambridge	Knowledge
Clinical Vaccinology Course - Day 1	0798-9999-13-180-L01-P	7.25 (0.725)	Cambridge	Knowledge
Clinical Vaccinology Course - Day 2	0798-9999-13-181-L01-P	8.25 (0.825)	Cambridge	Knowledge
Clostridium difficile Infection (CDI): Risk Assessment, Innovative Treatments and Alternative Therapies	0163-9999-13-221-L01-P	1 (0.1)	Ft.Lauderdale	Knowledge
Clostridium Difficile Infection: Updates and Alternative Therapies	0107-0000-13-121-L01-P	1.5 (0.15)	Des Moines	Knowledge
Common Infections Plaguing Our "Mature" Friends	0032-9999-13-067-L01-P	1 (0.1)	Jackson	Knowledge
Common Pathogenic Bugs in the Community	0011-0000-13-021-L04-P	1.5 (0.15)	Jacksonsville/850-599-3240	Knowledge
Community Acquired MRSA: Managing this Puzzling Bacteria	0011-0000-13-023-L04-P	1.5 (0.15)	Jaclsonville/850-599-3240	Knowledge
Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Baxter	Knowledge
Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Lansing	Knowledge
Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Okemos	Knowledge

Community Pharmacy-Based Rapid Diagnostic Testing Certificate Course (live)	0112-0000-13-234-L01-P	8 (0.8)	Omaha	Knowledge
Current Topics in Infectious Diseases:Methicillin Resistant Straphylococcus Aureus [MRSA]	0136-0000-13-034-L05-P	2 (0.2)	Atlantic City	Knowledge
Emerging Trends in Pharmaceutical Development	0215-0000-13-910-L04-P	2 (0.2)	Philadelphia	Knowledge
Evolving Advances in HIV Care	0280-9999-13-076-L02-P	1.5 (0.15)	Albany	Knowledge
Expanding Pharmacy-Based Pneumococcal Immunization Services	0202-0000-13-157-L04-P	1.5 (0.15)	webinar	Knowledge
Fundamentals of Highly Active Antiretroviral Therapy (HAART)	0280-9999-13-047-L02-P	1 (0.1)	Myrtle Beach	Knowledge
HCV Update for Pharmacist	0043-0000-13-060-L02-P	1 (0.1)	Jamaica	Knowledge
Hepatitis C and HIV Co-Infection: Challenges and Clinical Considerations in the Treatment of Genotype Patients	0010-0000-13-011-L02-P	1 (0.1)	Washington, 202-806-4206	Knowledge
HIV Management	0163-9999-13-185-L02-P	1 (0.1)	Orlando	Knowledge
HIV Post Exposure Prophylaxis: Occupational and Non-Occupational	0163-9999-13-239-L01-P	1 (0.1)	Sarasota	Knowledge
HIV Treatment Guidelines: Reviewing Essentials of Optimal Care	0215-0000-13-008-L02-P	1 (0.1)	New Orleans	Knowledge
HIV/AIDS Update	0165-0000-13-054-L02-P	1 (0.1)	Orlando	Knowledge
HIV/AIDS Update	0165-0000-13-087-L02-P	1 (0.1)	Ft. Lauderdale	Knowledge
HIV/AIDS Update	0165-0000-13-110-L02-P	1 (0.1)	Orlando	Knowledge
How-To of Antimicrobial Stewardship: Putting Guidelines into Practice	0163-0000-13-161-L01-P	1 (0.1)	Orlando	Knowledge
ICAAC/IDSA Update	0088-9999-13-132-L01-P	1 (0.1)	Greensboro	Knowledge
ID Conundrum: Tackling MDRO and C. difficile	0163-0000-13-163-L01-P	1 (0.1)	Orlando	Knowledge
ID Potpourri: Pneumonia and Upper Respiratory Tract, Urinary Tract, and Soft Tissue Infections	0013-0000-13-002-L01-P	1.5 (0.15)	Atlanta	Knowledge
Immunization of Pre-term Infants in the NICU	0263-0000-13-327-L01-P	0.75 (0.075)	LaJolla	Knowledge
Immunization Update	0036-9999-13-130-L01-P	1 (0.1)	Portland	Knowledge
Immunization Update	0130-0000-13-064-L01-P	1.5 (0.15)	Coeur d'Alene	Knowledge
Immunization Update	0179-0000-13-012-L01-P	1 (0.1)	Hyatt Regency, New Orleans	Knowledge
Immunization Update	0179-9999-13-036-L04-P	1 (0.1)	Monroe	Knowledge

Immunization Update	0741-0000-13-033-L01-P	5 (0.5)	Las Vegas/www.universitylearning.com/800-940-586	Knowledge
Immunization Update 2013	0837-0000-13-086-L01-P	2 (0.2)	Portland	Knowledge
Immunization Update 2013	0837-9999-13-055-L01-P	2 (0.2)	Bangor	Knowledge
Immunization Update 2013 Webinar	0112-0000-13-201-L01-P	1.5 (0.15)	Lansing	Knowledge
Immunization Update: All You Ever Wanted to Know (and More)	0027-9999-13-030-L01-P	1 (0.1)	Springfield	Knowledge
Immunization Updates 2013	0179-9999-13-041-L01-P	1 (0.1)	Xavier University, New Orleans	Knowledge
Immunizations for Women Throughout a Lifespan	0106-0000-13-038-L01-P	1 (0.1)	Farmington, CT	Knowledge
Immunizations: Routine and Travel What do Healthcare Experts Need to Know	0104-0000-13-036-L04-P	1 (0.1)	Albuquerque	Knowledge
Immunizations: Protecting the Public	0163-0000-13-149-L01-P	1 (0.1)	Orlando	Knowledge
Immunizations: Update 2013	0179-9999-13-019-L03-P	1 (0.1)	Woman's Hospital	Knowledge
Impact of New Technologies on Antimicrobial Stewardship: Is It Really Faster?	0485-0000-13-005-L01-P	1.5 (0.15)	Orlando	Knowledge
Improving HIV Adherence: A Pharmacists Approach	0113-0000-13-525-L04-P	1.5 (0.15)	www.gotowebinar.com	Knowledge
Infections in the Diabetic Patient	0834-0000-13-041-L01-P	1 (0.1)	Corpus Christi/361-992-0664	Knowledge
Infectious Conditions: Prevention	0263-0000-13-380-L01-P	1 (0.1)	San Francisco/www.cforums.com/925 828-7100	Knowledge
Infectious Conditions: Prevention	0263-0000-13-380-L01-P	1 (0.1)	Washington/www.cforums.com/925 828-7100	Knowledge
Infectious Conditions: Prevention	0263-0000-13-380-L01-P	1 (0.1)	Las Vegas/www.cforums.com/925 828-7100	Knowledge
Infectious Conditions: Treatment	0263-0000-13-375-L01-P	1.5 (0.15)	San Francisco/www.cforums.com/925 828-7100	Knowledge

Infectious Conditions: Treatment	0263-0000-13-375-L01-P	1.5 (0.15)	Washington/www.cforums.com/925 828-7100	Knowledge
Infectious Conditions: Treatment	0263-0000-13-375-L01-P	1.5 (0.15)	Las Vegas/www.cforums.com/925 828-7100	Knowledge
Infectious Disease Pharmacology	0263-0000-13-361-L01-P	3.75 (0.375)	Las Vegas/www.cforums.com/925 828-7100	Knowledge
Infectious Disease Pharmacology	0263-0000-13-361-L01-P	3.75 (0.375)	Washington/www.cforums.com/925 828-7100	Knowledge
Infectious Disease Pharmacology	0263-0000-13-361-L01-P	3.75 (0.375)	San Francisco/www.cforums.com/925 828-7100	Knowledge
Infectious Disease: Case Studies	0011-0000-13-029-L04-P	2 (0.2)	Jacksonville/850-599-3240	Knowledge
Infectious Diseases Stories of 2012: Did They Change Practice?	0011-0000-13-022-L04-P	1.5 (0.15)	Jaclsonville/850-599-3240	Knowledge
Infectious Diseases: An Update On Travel Medicine, C. Diff., MRSA, and Influenza	0043-9999-13-046-L01-P	5 (0.5)	Melville	Knowledge
Infectious Diseases: An Update On Travel Medicine, C. Diff., MRSA, and Influenza	0043-9999-13-046-L01-P	5 (0.5)	Staten Island	Knowledge
Influenza Update 2013-2014	0372-0000-13-019-L04-P	2 (0.2)	www.rxschool.com	Knowledge
Interesting Cases in ID: Beyond the Textbook	0163-9999-13-181-L01-P	1 (0.1)	Ft. Myers	Knowledge
Invasive Fungal Infections	0163-9999-13-204-L01-P	1 (0.1)	Tampa	Knowledge
INVASIVE FUNGAL INFECTIONS TREATMENT STRATEGIES AND CONTINUING CHALLENGES	0043-9999-13-032-L01-P	5 (0.5)	San Diego	Knowledge
Late Breakers in Pharmacotherapy, II	0217-0000-13-131-L01-P	1.5 (0.15)	Albuquerque, www.accp.com/am	Knowledge
Management of Infectious Disease in Pediatrics	0011-0000-13-026-L04-P	1 (0.1)	Jaclsonville/850-599-3240	Knowledge
Management of Infectious Disease in the Elderly	0011-0000-13-027-L04-P	1 (0.1)	Jaclsonville/850-599-3240	Knowledge
Managing Fungal Infections	0485-0000-13-015-L01-P	1.5 (0.15)	Orlando	Knowledge
Managing HIV to Improve Patient Care	0280-9999-13-103-L02-P	1 (0.1)	Westford	Knowledge

Meet the Professors	0485-0000-13-014-L01-P	1.5 (0.15)	Orlando	Knowledge
MRSA: Managing Treatment Options	0837-9999-13-057-L01-P	1 (0.1)	Manchester	Knowledge
Novel Treatment Strategies Against Persistent Multidrug-resistant Gram Positive Infections	0022-0000-13-108-L01-P	1 (0.1)	Lexington	Knowledge
Optimizing Antimicrobial use to Favorably Impact the Emergence of Resistance	0741-0000-13-017-L01-P	5 (0.5)	Las Vegas/www.universitylearning.com/800-940-5860	Knowledge
Optimizing the Treatment of Multidrug Resistant Gram Negative infections	0163-9999-13-238-L01-P	1 (0.1)	Sarasota	Knowledge
Pediatric Drug Disposition	0179-9999-13-043-L01-P	1 (0.1)	Xavier University College of Pharmacy, New Orleans	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Roseville	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Dedham	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Woburn	Knowledge
Pharmacology of Infectious Diseases and Immunizations	0289-0000-13-097-L01-P	6.3 (0.63)	Eagan	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Wauwatosa	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Westminster	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Appleton	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Eugene	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Cherry Hill	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Colorado Springs	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Denver	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Federal Way	Knowledge

Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	King of Prussia	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Portland	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Bellevue	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Langhorne	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Middleton	Knowledge
Pharmacology of Infectious Diseases and Immunizations for Advance Practice Clinicians	0289-0000-13-084-L01-P	6.3 (0.63)	Seattle	Knowledge
Pneumococcal Immunization Update	0202-0000-13-155-L04-P	1 (0.1)	Webinar	Knowledge
Pre- and Post-Exposure Prophylaxis for HIV	0175-0000-13-041-L02-P	1.25 (0.125)	Green Bay	Knowledge
PrEP: the ABC?s of HIV Pre-Exposure Prophylaxis	0022-0000-13-107-L02-P	1 (0.1)	Lexington	Knowledge
Preventing Antiretroviral Medication Errors in Patients with Human Immunodeficiency Virus (HIV) Infection	0043-0000-13-059-L05-P	1 (0.1)	Jamaica	Knowledge
Prevention of Perinata Human Immunodeficiency virus (HIV) transmission	0163-9999-13-240-L01-P	1 (0.1)	Sarasota	Knowledge
Promoting Immunizations Year Round In Your Pharmacy	0104-9999-13-050-L01-P	2 (0.2)	Westminster	Knowledge
Putting Adult Immunization Standards Into Action: Pharmacists' Role in the Immunization Neighborhood	0202-0000-13-216-L04-P	2 (0.2)	webinar	Knowledge
Rapid Identification of Pathogens from Blood Cultures	0088-9999-13-129-L01-P	1 (0.1)	Greensboro	Knowledge
Staying Sharp: Update on Immunization Guidelines and Practices	0064-0000-13-118-L04-P	2 (0.2)	Chattanooga	Knowledge
Stewardship Approach to Managing Patients with Acinetobacter baumannii infections	0485-0000-13-16-L01-P	1.5 (0.15)	Orlando	Knowledge
Stewardship from the Industry Perspective	0485-0000-13-009-L04-P	1.5 (0.15)	Orlando	Knowledge
Stewardship Metrics That Justify Your Job	0485-0000-13-006-L01-P	1 (0.1)	Orlando	Knowledge
Survival Strategies for Surgery and Sepsis	0107-0000-13-122-L01-P	1.5 (0.15)	Des Moines	Knowledge
TB Update: What Every Pharmacist Should Know about Tuberculosis	0011-0000-13-028-L04-P	1 (0.1)	Jacksonville/850-599-3240	Knowledge
The Art of the Antibiogram	0485-0000-13-001-L01-P	1 (0.1)	Orlando	Knowledge

The Marriage of Antimicrobial Stewardship and Informatics: Improving Patient Outcomes with Technology	0163-0000-13-162-L04-P	1 (0.1)	Orlando	Knowledge
The Stanley W. Chapman Infectious Disease Symposium	0032-9999-13-068-L01-P	6.5 (0.65)	Jackson	Knowledge
Top Shot! Recommendations to Increase Immunization Rates	0106-0000-13-042-L04-P	1 (0.1)	Trumbull CT	Knowledge
Top Shot: Recommendations to Increase Immunization Rates	0106-9999-13-031-L01-P	1 (0.1)	Mashantucket	Knowledge
Travel and Routine Vaccine Update	0113-0000-13-526-L04-P	1.5 (0.15)	www.gotomeeting.com	Knowledge
Tuberculosis: Utilizing the Pharmacist	0106-9999-13-026-L01-P	1 (0.1)	Mashantucket	Knowledge
Update on Clinical Management of Human Immunodeficiency Virus (HIV) and Antiretroviral (ARV) Medications	0165-0000-13-068-L02-P	1 (0.1)	Destin	Knowledge
Update on Immunizations	0837-9999-13-049-L01-P	1 (0.1)	Bedford	Knowledge
Update on Next Generation TB Drug and Vaccine Development	0215-0000-13-908-L01-P	1 (0.1)	Philadelphia	Knowledge
Update on Orthopedic Device Infections	0088-9999-13-130-L01-P	1 (0.1)	Greensboro	Knowledge
Updates from the MAD ID Research Network	0485-0000-13-013-L04-P	0.5 (0.05)	Orlando	Knowledge
Updates in Contemporary Pharmacy Practice-Infectious Disease Part I	0163-9999-13-078-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Contemporary Pharmacy Practice-Infectious Disease Part II	0163-9999-13-083-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Contemporary Pharmacy Practice-Infectious Disease Part III	0163-9999-13-088-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Contemporary Pharmacy Practice-Infectious Disease Part IV	0163-9999-13-089-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Contemporary Pharmacy Practice-Infectious Disease Part V	0163-9999-13-094-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Contemporary Pharmacy Practice-Infectious Disease Part VI	0163-9999-13-095-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Contemporary Pharmacy Practice-Infectious Disease Part VII	0163-9999-13-115-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Contemporary Pharmacy Practice-Pharmacy Informatics and Infectious Disease Part VII	0163-9999-13-119-L01-P	1 (0.1)	Gainesville	Knowledge
Updates in Infectious Disease: Treatment of Clostridium difficile Infection	0204-0000-13-123-L01-P	1.25 (0.125)	Minneapolis	Knowledge
Updates in Infectious Diseases	0163-9999-13-123-L01-P	1 (0.1)	Jacksonville	Knowledge
What Did You Miss Because there was no Funding to Attend the Infectious Disease Meetings?	0485-0000-13-011-L01-P	1 (0.1)	Orlando	Knowledge
What is New and Old with HIV-related Drug Interactions	0043-0000-13-061-L02-P	1 (0.1)	Jamaica	Knowledge

What's New in Medicine 2013 - Internal Medicine Infectious Diseases Workshop	0347-9999-13-009-L01-P	9 (0.9)	Kennewick, Three Rivers Conventions Center, 7:30 a	Knowledge
What's the Poop on Clostridium difficule infection in 2013?	0485-0000-13-004-L01-P	1 (0.1)	Orlando	Knowledge
11th Annual Rocky Mountain Hospital Medicine Symposium	0230-9999-13-010-L01-P	7.5 (0.75)	Denver	Application
19th Annual Pennsylvania Immunization Conference	0159-9999-13-057-L04-P	5 (0.5)	Wyomissing	Application
Adult Immunization Training	0053-9999-13-051-L01-P	8 (0.8)	Oklahoma City	Application
Adult Immunization Training Program for Pharmacists 2013 - Live Component	0027-0000-13-046-L01-P	6 (0.6)	Boston	Application
Antimicrobial Stewardship in the Emergency Department	0204-0000-13-122-L04-P	2 (0.2)	Minneapolis	Application
Childhood Immunizations & Pharmacist Prescribing Law	0104-0000-13-054-L04-P	2 (0.2)	Albuquerque	Application
Clinical Updates in Infectious Diseases - Implementing Stewardship in Community Health-Systems and Community Pharmacies	0074-0000-13-021-L01-P	1.25 (0.125)	Oak Brook/630-971-6417	Application
Clinical Updates in Infectious Diseases - Practical Applications of Antimicrobial Stewardship Principles	0074-0000-13-019-L01-P	1.5 (0.15)	Oak Brook/630-971-6417	Application
Immunization Delivery for Pharmacists - Live	0175-0000-13-056-L01-P	12 (1.2)	Madison	Application
Immunization Update 2013	0154-0000-13-101-L01-P	3 (0.3)	Frisco	Application
Immunization Update 2013: A review of policy and practice changes for immunization providers in Nevada	0455-9999-13-003-L01-P	2 (0.2)	St. Rose San Martin, Las Vegas, NV	Application
Immunization Update 2013: A review of policy and practice changes for immunization providers in Utah	0455-0000-13-004-L01-P	2 (0.2)	Roseman Univ. South Jordan Pkwy	Application
Infectious Diseases PRN Focus SessionDifficult to Treat Infections	0217-0000-13-117-L01-P	2 (0.2)	Albuquerque, www.accp.com/am	Application
Infectious Diseases Update: Using Guidelines to Optimize Treatment	0204-0000-13-232-L01-P	2 (0.2)	Orlando	Application
Influenza 2013-2014: Update for the Immunizing Pharmacist	0009-0000-13-097-L01-P	1 (0.1)	www.pharmacy.uconn.edu/academics/ce	Application
Influenza 2013-2014: Update for the Immunizing Pharmacist	0009-0000-13-097-L01-P	1 (0.1)	www.pharmacy.uconn.edu/academics/ce	Application
Medical Reserve Corps Smallpox Vaccination Workshop	0845-9999-13-003-L05-P	3 (0.3)	Lewisville	Application
MI Pharm ADD Summit: Alternative Antiviral Dispensing During a Delared Pandemic Event	0112-0000-13-211-L04-P	6 (0.6)	Lansing	Application

New Mexico Statewide Immunization Information System (NMSIIS) Use Required by NM State Law	0104-0000-13-043-L04-P	1 (0.1)	Albuquerque	Application
Pharmacy-Based Travel Health Services	0202-9999-13-117-L01-P	4 (0.4)	Deerfield	Application
Pharmacy-Based Travel Health Services	0202-9999-13-117-L01-P	4 (0.4)	Washington	Application
Sepsis Treatment Guidelines: A Review	0053-9999-13-055-L01-P	1 (0.1)	Tulsa	Application
The Relationship Between Bugs and Drugs	0053-9999-13-057-L01-P	1.5 (0.15)	Tulsa	Application
Update in Immunization Practices and Recommendations	0159-0000-13-029-L04-P	1 (0.1)	Gettysburg	Application
Update on Immunizations: Focus on Recent CDC/ACIP Recommendations	0159-0000-13-054-L04-P	1.5 (0.15)	Gettysburg	Application
Vaccinating Adults & Adolescents: An Immunization Program Practicum Session	0130-0000-13-027-L01-P	3 (0.3)	Renton	Application

Appendix G-5

Sample Education Program Materials

ProCE, Inc.
848 W. Bartlett Road
Suite 3E
Bartlett, IL 60103
www.ProCE.com

Antimicrobial Stewardship
A Certificate Program for Pharmacists

Certificate Program Description and Audience
The Antimicrobial Stewardship Certificate Program is an innovative and intensive practice-based activity for pharmacists focusing on the pharmacist's role in the area of appropriate use of antimicrobial agents. The program, which emphasizes a health care team approach, seeks to foster the development of a strong knowledgebase in microbiology, pharmacology and disease state management in order to successfully implement an antimicrobial stewardship program that will improve patient care, reduce healthcare expenditures and potentially reduce rates of resistance and prolong the longevity of the limited number of antimicrobial agents available to treat infections. Established in 2010, the SIDP Antimicrobial Stewardship Certificate Program has been a resource for pharmacists world-wide in meeting their educational needs for antimicrobial stewardship.

Antimicrobial Stewardship Certificate Program Development
The Antimicrobial Stewardship Certificate Program was developed by members of The Society of Infectious Diseases Pharmacists (SIDP). All members volunteered their time and knowledge in developing the content of this program. There was no outside financial support for developing this program.

Antimicrobial Stewardship Certificate Program Goals
The certificate program goals/learning objectives are the following:

1. Outline the essentials of clinical microbiology, pharmacology, pharmacokinetics, pharmacodynamics, and infectious disease state management necessary in Antimicrobial Stewardship.
2. Identify the skills needed to establish an antimicrobial stewardship program.
3. Implement interventions to improve patient care, minimize resistance and cost, and prolong the longevity of antimicrobials through a cap-stone project.
4. Explain how to evaluate the effectiveness of an antimicrobial stewardship program through the measurement of outcomes.
5. Define the interaction between pharmacy and infection control.

Antimicrobial Stewardship Certificate Program Structure
The Antimicrobial Stewardship certificate training program is conducted in three parts. Each part must be completed prior to starting the next one.

Phase 1. Self-study learning component available online (approx. 3 months)
Phase 2. Live webinars (approx. 5 months)
Phase 3. Skills component completed in the practice setting (approx. 4 months)

A Certificate of Achievement will be awarded to participants who successfully complete all three program components. Participants who successfully complete the program will be eligible for a 1 year free associate membership in SIDP.

<u>Self-Study Learning Component (Phase 1)</u>
The first component of the certificate training program consists of seven sections of self-study modules available for viewing online. Topics, learning objectives, and length of time to complete each self-study module are noted on the outline below.

Module 1 – Microbiology

1a - *Staphylococcus species* (ACPE UAN: 0221-9999-14-192-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/5/2014, Expiration: 12/5/2017)

- Explain the Gram-stain & morphology of various bacteria
- Discuss commensal flora in the body and where select organisms are pathogenic
- List agents with activity or should be considered for use against various organisms
- Discuss resistance issues associated with various organisms

1b-Streptococcus & Enterococcus (ACPE UAN: 0221-9999-14-193-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Explain the Gram-stain & morphology of various bacteria
- Discuss commensal flora in the body and where select organisms are pathogenic
- List agents with activity or should be considered for use against various organisms
- Discuss resistance issues associated with various organisms

1c-Non Fermenters (ACPE UAN: 0221-9999-15-103-H01-P, Knowledge-based, 0.5 contact hour, Release: 6/19/2015, Expiration: 6/19/2018)

- Explain the gram-stain and morphology of *Acinetobacter, Pseudomonas, and Stenotrophomonas maltophilia*
- Discuss the epidemiology of *Acinetobacter, Pseudomonas, and Stenotrophomonas maltophilia*
- List agents with activity or should be considered for use against *Acinetobacter, Pseudomonas, and Stenotrophomonas maltophilia*
- Discuss resistance issues associated with *Acinetobacter, Pseudomonas, and Stenotrophomonas maltophilia* and the roll of combination therapy

1d-Enterobacteriaciae (ACPE UAN: 0221-9999-14-195-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Discuss commensal flora in the body and where select organisms are pathogenic
- List agents with activity or should be considered for use against various gram-negative bacilli
- Discuss resistance issues associated with various organisms

1e-Haemophilus, Moraxella, Neisseria, Atypical Organisms (ACPE UAN: 0221-9999-14-196-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Explain the gram-stain and morphology of various bacteria.
- Discuss commensal flora in the body and where select organisms are pathogenic.
- Explain the various types of infections.
- List agents with activity or should be considered for use against various organisms.
- Discuss resistance issues associated with various organisms.

1f-Anaerobes (ACPE UAN: 0221-9999-14-197-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Explain the gram-stain and morphology of various bacteria
- Discuss commensal flora in the body and where select organisms are pathogenic
- Explain the various types of infections
- List agents with activity or should be considered for use against various organisms
- Discuss resistance issues associated with various organisms

1g-Fungi (ACPE UAN: 0221-9999-14-198-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/5/2014, Expiration: 12/5/2017)

- Recognize the differences between yeasts, molds, and dimorphic fungi
- Describe the activity of antifungals against key fungal pathogens
- Discuss challenges that are inherent to antifungal pharmacotherapy

Module 2 – Pharmacology

2a-*Antimicrobial Pharmacology I* (ACPE UAN: 0221-9999-14-199-H01-P, Knowledge-based, 0.75 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Explain the principals of anti-infective pharmacology
- Describe the classifications of anti-infectives including mechanisms of action, mechanisms of resistance, spectrum of activity, infections commonly treated, adverse effects (most common, very serious or unique), and drug interactions
- Select and discuss rationale for drugs of choice for various organisms

2b-*Antimicrobial Pharmacology II* (ACPE UAN: 0221-9999-14-200-H01-P, Knowledge-based, 1.0 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Explain the principals of anti-infective pharmacology
- Describe the classifications of anti-infectives including mechanisms of action, mechanisms of resistance, spectrum of activity, infections commonly treated, adverse effects (most common, very serious or unique), and drug interactions
- Select and discuss rationale for drugs of choice for various organisms

2c-*Antimicrobial Pharmacology III* (ACPE UAN: 0221-9999-14-201-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Explain the principals of anti-infective pharmacology
- Describe the classifications of anti-infectives including mechanisms of action, mechanisms of resistance, spectrum of activity, infections commonly treated,

adverse effects (most common, very serious or unique), and drug interactions
- Select and discuss rationale for drugs of choice for various organisms

Module 3 – Pharmacokinetics/Pharmacodynamics
3a-Pharmacokinetics Primer for Clinicians (ACPE UAN: 0221-9999-14-202-H01-P, Knowledge-based, 0.75 contact hour, Release: 11/24/2014, Expiration: 11/24/2017)
- Describe pharmacokinetics (PK) and the clinical application of PK parameters in daily clinical practice.
- Describe physiologic factors and disease states that affect drug disposition throughout the body.

3b-Introduction to Antimicrobial Pharmacodynamics (ACPE UAN: 0221-9999-14-203-H01-P, Knowledge-based, 1.0 contact hour, Release: 11/24/2014, Expiration: 11/24/2017)
- Discuss pharmacodynamics (PD) and the basic laws governing its application into clinical practice.
- Discuss the various *in vitro*, *in vivo*, and clinical testing methodologies used to derive PD breakpoints.
- Demonstrate knowledge of the PD parameters that optimize the efficacy of each antimicrobial agent and the published data used to derive the currently accepted PD breakpoints.
- Describe Monte Carlo Simulation (MCS), the rationale behind performing this analysis, interpretation of the results, and the limitations associated with these analyses.

3c-Applied Antimicrobial Pharmacodynamics (ACPE UAN: 0221-9999-14-204-H01-P, Knowledge-based, 0.75 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)
- Describe Monte Carlo simulation (MCS), the rationale behind performing this analysis, interpretation of the results, and the limitations associated with these analyses.
- Provide examples that correlate data generated from MCS analyses and clinical outcome data generated from real patients.
- Evaluate unconventional dosing strategies used to maximize the pharmacodynamics (PD) of currently available antimicrobials.

3d-Antifungal pharmacodynamics (ACPE UAN: 0221-9999-14-205-H01-P, Knowledge-based, 0.5 contact hour, Release: 10/6/2014, Expiration: 10/6/2017)
- Describe pharmacokinetics (PK) and the clinical application of PK parameters in daily clinical practice.
- Describe physiologic factors and disease states that affect drug disposition throughout the body.
- Discuss pharmacodynamics (PD) and the basic laws governing its application into clinical practice.
- Discuss the various *in vitro*, *in vivo*, and clinical testing methodologies used to derive PD breakpoints.
- Demonstrate knowledge of the PD parameters that optimize the efficacy of each antimicrobial agent and the published data used to derive the currently accepted PD breakpoints.
- Evaluate unconventional dosing strategies used to maximize the PD of currently available antimicrobials.
- Examine the rationale supporting therapeutic drug monitoring for available antifungal agents.

Module 4 – Disease States and Treatments
4a-Bone & Joint Infections (ACPE UAN: 0221-9999-15-075-H01-P, Knowledge-based, 1.0 contact hour, Release: 3/13/2015, Expiration: 3/13/2018)
- Categorize joint infections - septic arthritis and prosthetic joints
  - Identify patient presenting symptoms.
  - List common causative organisms
  - Describe correlation with osteomyelitis.
  - Define appropriate antimicrobial therapy.
- Differentiate classifications of osteomyelitis - hematogenous and contiguous osteomyelitis
  - List common causative organisms.
  - Suggest appropriate antimicrobial regimens for each category.
  - Identify criteria and appropriate candidates for oral therapy

4bc-Lower Respiratory Tract Infections (ACPE UAN: 0221-9999-14-208-H01-P, Knowledge-based, 3.0 contact hours, Release: 10/6/2014, Expiration: 10/6/2017)
- Review the national guideline recommendations for community-acquired (CAP), healthcare-associated (HCAP), hospital-acquired (HAP), and ventilator-associated (VAP) pneumonia
- List the most common bacterial pathogens associated with CAP, HAP, VAP, and HCAP
- Identify 5 risk factors for multidrug-resistant pathogens
- Discuss selection of empiric therapy and de-escalation for CAP, HCAP, HAP, and VAP
- Describe the role for antimicrobial stewardship in ensuring optimal management of pneumonia

4d-Skin/Soft Tissue Infections (ACPE UAN: 0221-9999-14-209-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)
- Describe pathophysiology / predisposing factors for skin/soft tissue infections (SSTIs).
- Recognize clinical presentation and monitoring considerations
- List primary pathogens associated with skin and soft tissue infections.
- Discuss appropriate antimicrobial therapy for SSTIs.

4e-*Clostridium difficile* Infection (ACPE UAN: 0221-9999-14-210-H01-P, Knowledge-based, 1.5 contact hours, Release: 10/6/2014, Expiration: 10/6/2017)
- Explain why CDI is a burden in both inpatient and outpatient settings.
- Identify major risk factors for CDI.
- Discuss rational approaches to the management of initial and recurrent symptomatic CDI.
- Compare and contrast strategies for preventing CDI.

4f-Management of Sepsis (ACPE UAN: 0221-9999-14-211-H01-P, Knowledge-based, 0.5 contact hour, Release: 10/6/2014, Expiration: 10/6/2017)

- Differentiate between systemic inflammatory response syndrome (SIRS), sepsis, severe sepsis, and septic shock.
- Describe and sequence the following interventions in the order they should be generally considered/implemented in the management of septic shock: antimicrobial therapy, fluid resuscitation, stress ulcer prophylaxis, glucose control, initiation of vasopressors, and anti-thrombosis

4g-Management of Invasive Candidiasis (ACPE UAN: 0221-9999-14-212-H01-P, Knowledge-based, 0.5 contact hour, Release: 10/6/2014, Expiration: 10/6/2017)

- Recommend an appropriate antifungal agent for a patient based on the species of *Candida* identified.
- Select the appropriate antifungal agent for a patient with candidiasis based on the pharmacokinetic, toxicity, and drug interaction profiles of the agents.

4h-Bacterial Endocarditis (ACPE UAN: 0221-9999-14-213-H01-P, Knowledge-based, 0.5 contact hour, Release: 12/12/2014, Expiration: 12/12/2017)

- Review the pathophysiology of endocarditis
- Identify endocarditis risk factors and the bacteria associated with each
- Recommend antibiotic therapy based on both empiric and culture confirmed microbiology data

4i-Meningitis (ACPE UAN: 0221-9999-14-214-H01-P, Knowledge-based, 0.75 contact hour, Release: 12/5/2014, Expiration: 12/5/2017)

- Review the epidemiology and microbiology of meningitis
- Describe the clinical presentation and diagnosis of meningitis
- Select appropriate antibiotic therapy for meningitis based on risk factors and the presumptive or culture confirmed microorganism
- Identify options for the prevention of meningitis

4j-Intravascular Catheter-Related Blood Stream Infections (ACPE UAN: 0221-9999-14-215-H01-P, Knowledge-based, 1.0 contact hour, Release: 11/24/2014, Expiration: 11/24/2017)

- Design an appropriate empiric treatment regimen for a patient with a suspected catheter-related blood stream infection (CRBSI) based on patient-specific risk factors.
- Develop a definitive treatment plan for CRBSIs caused by various common pathogens.
- Determine when catheter removal is an essential element of the treatment plan for treating a specific CRBSI.

4k-Intra-Abdominal Infections (ACPE UAN: 0221-9999-14-216-H01-P, Knowledge-based, 0.75 contact hour, Release: 12/5/2014, Expiration: 12/5/2017)

- List the common pathogens associated with primary, secondary, and tertiary peritonitis
- Design appropriate empiric treatment regimens for common intra-abdominal infections

4l-Urinary Tract Infections (ACPE UAN: 0221-9999-14-217-H01-P, Knowledge-based, 0.75 contact hour, Release: 11/24/2014, Expiration: 11/24/2017)

- Describe and define Urinary tract infections associated in the hospital setting
- Describe the epidemiology, microbiology and treatment of acute pyelonephritis, catheter associated UTI and asymptomatic bacteriuria

Module 5 - Interventions

(ACPE UAN: 0221-9999-14-218-H01-P, Knowledge-based, 1.5 contact hours, Release: 12/12/2014, Expiration: 12/12/2017)

- Describe the benefits and process of de-escalation interventions.
- Review data suggesting when shorter durations of antimicrobial therapy may be appropriate.
- Introduce the concept of rapid laboratory testing methods as an aid to antimicrobial stewardship interventions

Module 6 – Measuring Outcomes

(ACPE UAN: 0221-9999-14-219-H01-P, Knowledge-based, 2.25 contact hours, Release: 11/24/2014, Expiration: 11/24/2017)

Clinical Outcomes

- Identify the types of adverse drug events associated with indiscriminant antibiotic usage.
- List variables of interest that Stewardship Programs can impact and quantify.
- Categorize the types of studies utilized in measuring outcomes of Antimicrobial Stewardship Programs.
- Identify candidates for IV to PO conversion.

Economical Outcomes

- Compare and contrast different ways to present economical outcomes from a Stewardship Program.
- Determine the most appropriate economical outcomes to evaluate for a Stewardship Program.

Resistance Outcomes

- Describe the utility of measuring resistance for Antimicrobial Stewardship.

Prioritization of program components

- Discuss the common elements of stewardship programs.
- Prioritize program components based on available resources for smaller vs. larger institutions.

Module 7 – Infection Control

(ACPE UAN: 0221-9999-14-184-H01-P, Knowledge-based, 0.5 contact hour, Release: 7/28/2014, Expiration: 7/28/2017)

- Discuss the goals of infection control programs and the types of infection prevention efforts that are often employed.
- Indicate which types of Multiple Disease Resistant Organism (MDRO) infections are frequently identified in small hospitals.
- Describe a small hospital Infection Control program.

Live Webinar Sessions (Phase 2)

The second component of the certificate training program consists of completing a minimum of four of the six live webinar sessions (1.5 hours each) listed below. You may also attend all six live webinars and receive additional continuing pharmacy education credit for the other two topics. The live webinars will be offered quarterly and times for all sessions will be viewable after all Self-Study content is completed. We reserve the right to cancel a live webinar. In the event of a live webinar cancellation, each participant will be notified via e-mail along with the rescheduled date. Topics and learning objectives for each live webinar session are:

I. Implementation of an Antimicrobial Stewardship Program: Justification, Cost, and Challenges

(ACPE UAN: 0221-9999-15-265-L04-P Knowledge-based, Release: 10/15/2015, Expiration: 10/15/2018)

- Describe the resources necessary to initiate an antimicrobial stewardship program.
- Identify potential financial and institutional barriers to implementation of an antibiotic stewardship program.
- Describe how to justify the benefits of an antimicrobial stewardship program to administrative and clinical leadership.

II. Understanding the Hospital Antibiogram

(ACPE UAN: 0221-9999-15-266-L04-P Application-based, Release: 10/15/2015, Expiration: 10/15/2018)

- List the CLSI M39 guidelines for antibiogram development
- Discuss how to utilize a hospital antibiogram to guide empiric antibiotic selection and to detect bacterial resistance patterns
- Discuss how rates of MRSA, VRE, and other resistant organisms can be calculated using antibiogram data
- Describe how individual and hospital antibiograms may be used to foster prudent antimicrobial prescribing and optimize antimicrobial stewardship

III. Multidrug Resistant Organisms: Detection, Epidemiology, and Management

(ACPE UAN: 0221-9999-15-267-L01-P Knowledge-based, Release: 10/15/2015, Expiration: 10/15/2018)

- Discuss the mechanisms of resistance behind common multidrug resistant (MDR) pathogens.
- Describe the microbiology challenges associated with the identification of multidrug-resistant bacteria.
- Discuss the prevalence and epidemiology of multidrug resistant bacteria.
- Describe the current evidence-based strategies in the management of invasive multidrug resistant bacteria.

IV. Antimicrobial Stewardship and Microbiology: Focus on Rapid Diagnostic Tests

(ACPE UAN: 0221-9999-15-268-L04-P Knowledge-based, Release: 10/15/2015, Expiration: 10/15/2018)

- Discuss the various rapid diagnostic technologies
- Evaluate the use of rapid diagnostic technologies on patient outcomes
- Determine considerations during the pre-implementation, implementation, and post-implementation phases of rapid diagnostic technologies

V. Computer Support Systems and Technology in an Antimicrobial Stewardship Program

(ACPE UAN: 0221-9999-15-269-L04-P Knowledge-based, Release: 10/15/2015, Expiration: 10/15/2018)

- Discuss the role of computerized physician order entry in a stewardship program.
- Identify the different clinical decision support systems and their limitations.
- Describe information technology specialist role on the antimicrobial stewardship team.

VI. Optimizing Infectious Disease Outcomes in an Antimicrobial Stewardship Program

(ACPE UAN: 0221-9999-15-270-L04-P Knowledge-based, Release: 10/15/2015, Expiration: 10/15/2018)

- Discuss the impact of antimicrobial therapy and resistance on clinical outcomes
- Review components of antimicrobial stewardship programs and opportunities to improve patient care
- Recognize dosing strategies to optimize antimicrobial pharmacodynamics
- Describe the development of evidence-based guidelines to implement clinical pathways
- Outline novel concepts of antibiotic heterogeneity to address gram negative resistance

Skills Component in the Practice Setting

(ACPE UAN: 0221-9999-15-271-H04-P Application-based; 10 contact hours, Release: 10/15/2015, Exp: 10/15/2018) After completion of the self-study and live webinars, the participant is required to implement some aspect of antimicrobial stewardship at their facility. The participant should notify SIDP, in writing, of the implementation approximately 4 months after completion of the last live webinar. A panel will review the document and evaluate it for appropriateness within antimicrobial stewardship. If modifications are needed, SIDP will return the document with review comments for change and the participant will have 2 months to resubmit a modified document. After approval by the panel of the required documentation, an overall program evaluation must be completed online. A CE statement of completion for 10 hours of CE will be issued online and a certificate of completion of SIDPs accredited Antimicrobial Stewardship Program will be sent to the participant. If a time extension is needed, please submit the request in writing via email to info@proce.com. The request for extension will be reviewed and an email will be returned to you as to whether the extension was granted.

The learning objectives are the following:

- Implement at least one aspect of antimicrobial stewardship within your practice setting.
- Construct a documentation plan for an antimicrobial stewardship project.
- Identify barriers to implementing components of an antimicrobial stewardship project.
- Outline strategies to overcome barriers identified for an antimicrobial stewardship project.

Accreditation Statement and Continuing Education Credit
Practice Activity Number 0221-9999-15-073-B01-P
Initial Date of Release: March 15, 2015 | Date of Expiration: March 15, 2018

This CE activity is jointly provided by ProCE, Inc. and SIDP. ProCE is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. ACPE Practice Activity Number 0221-9999-15-073-B01-P has been assigned to this practice-based CE activity (initial release date 3-15-15). This CE activity is approved for 40.0 contact hours (4.0 CEUs) in states that recognize ACPE providers. The participant can elect to complete two additional webinars at no additional cost and earn 43.0 contact hours (4.3 CEUs). Statements of completion will be issued online as individual modules are completed with a post-test score of 80% or higher and completion of an online evaluation. UANs for the individual activity modules are listed above.

The self-study component is 24 contact hours or 2.4 CEUs of continuing pharmacy education credits. Statements of completion will be issued online upon completion of the activity evaluations and the post-tests with a score of 80% or higher. It is anticipated the participant will complete this component within 3 months of registration. *Content and CE hours are subject to change: modules are regularly reviewed and updated to reflect current clinical knowledge.*

The live webinar component will result in 6 to 9 contact hours of continuing pharmacy education credit (0.6 to 0.9 CEUs). Statements of completion will be issued online upon completion of the activity evaluations and passing the post-tests with a grade of 80% or higher for each of the live webinar sessions. It is anticipated the participant will complete this component within 8 months of registration.

A practice or skills component will be completed at your practice setting after completion of the home study component and at least four live webinars. This portion is worth 10 hours or 1.0 CEUs of continuing pharmacy education credit. This component consists of implementation of some aspect of antimicrobial stewardship at your facility. This could be an IV to PO switch program, development and clinical incorporation of an antibiogram, criteria for use, clinical protocol to treat one or multiple infectious diseases, etc. The information must be submitted either by email to info@proce.com or mail to: **SIDP c/o ProCE, Inc.**
848 W. Bartlett Rd, Ste 3E
Bartlett, IL 60103

After approval by SIDPs panel of the required documentation, a final program evaluation must be completed online to receive CE credit. It is anticipated the participant will complete this component within 12 months of registration, or 14 months of registration if project modifications are needed.

Participants will have access to the content for one year after purchasing the program, unless an extension is granted.

Antimicrobial Stewardship Certificate of Completion
Upon successful completion of all three components, a Certificate of Achievement will be issued to the participant from The Society of Infectious Diseases Pharmacists. The certificate will be mailed directly to participants 2-4 weeks following completion of the program. Participants who successfully complete the program will also be eligible for a 1 year free associate membership in SIDP.

Program Cost
Participant cost is $750 per pharmacist. This amount includes the self-study section, up to six live webinars, and the skills development/implementation at your practice site. For trainees (e.g., residents, fellows, and graduate students) the cost will be $550 per individual. For institutions or healthcare facilities with payment from the same institution, we provide the following discounts:
6-10 healthcare professionals = 5% discount
11-15 healthcare professionals = 10% discount
More than 15 healthcare professionals = 15% discount

If you wish to participate in only a portion of the Program, Phase 1 is available for $500 per pharmacist. Phases 1 and 2 are available for $688 per pharmacists. The above discounts apply for multiple healthcare professionals.

Cancellations received in writing prior to accessing any of the program content (fax: 630-540-2849 or e-mail info@proce.com) will receive a full refund minus a $150 cancellation fee.

Hardware/Software Requirement
PC: Microsoft Windows 7 or above
Internet Explorer (v9 or greater), Firefox, or Chrome
Adobe Acrobat Reader
Sound Card and Speakers
800 x 600 Minimum Monitor Resolution (1024 x 768 Recommended)
Flash Player Plug-in, Current Version
JavaScript, Java 1.6 or higher

MAC: Mac OS X
Chrome or Firefox
Adobe Acrobat Reader
Sound Card and Speakers
Flash Player Plug-in, Current Version
JavaScript

Contact for Technical support or CE questions: ProCE, Inc., e-mail info@proce.com or phone: 630-540-2848.

Conflict of Interest Disclosure
The Conflict of Interest Disclosure Policy of ProCE, Inc. requires faculty participating in a continuing pharmacy education activity to disclose any relationship(s) with a pharmaceutical, product or device company. Faculty disclosing relationships proven to create a conflict of interest with regard to their contribution to the activity will not be permitted to present. Faculty are also required to disclose during their presentation when discussing any unlabeled or investigational use of any commercial product or device not yet approved for use in the United States.

Faculty
John W. Ahern, Pharm.D.
Pharmacist Clinician-Infectious Disease
Pharmacy Department, Fletcher Allen Health Care
Burlington, VT
No conflict of interest reported

Ronda L. Akins, Pharm.D.
Clinical Specialist - Infectious Diseases
Methodist Charlton Medical Center
Dallas, TX
Received grant/research support from Cerexa, Inc.

Edina Avdic, Pharm.D., MBA, BCPS-ID
Clinical Pharmacist, Infectious Diseases
Associate Director, Antimicrobial Stewardship Program
The Johns Hopkins Hospital,
Baltimore, MD
Co-Investigator in grant supported by Pfizer and Joint Commission

Harrison Bachmeier, Pharm.D., BCPS
Clinical Pharmacist
Lee Memorial Health System
Fort Myers, FL
No conflict of interest reported

Karri A. Bauer, Pharm.D., BCPS {AQ-ID}
Speciality Practice Pharmicist Infectious Diseases
The Ohio State University Wexner Medical Center
Columbus, OH
Received grant/research support from Cepheid, Cubist and Merck. Consultant/speakers bureau for Astellas, Merck and Forest

James R. Beardsley, Pharm.D., BCPS
Assistant Director of Pharmacy
Wake Forest Baptist Medical Center
Winston-Salem, NC
No conflict of interest reported

David Burgess, Pharm.D., FCCP
Professor and Chair, Pharmacy Practice and Science
University of Kentucky College of Pharmacy
Lexington, KY
No conflict of interest reported

Elizabeth Dodds Ashley, Pharm.D., MHS, FCCP, BCPS
Associate Director of Clinical Pharmacy Services
University of Rochester Medical Center
Rochester, NY
Consultant/speakers bureau for Pfizer, Ortho-McNeil and Merck

Sharon Erdman, Pharm.D.
Clinical Professor of Pharmacy Practice, College of Pharmacy at Purdue University
Adjunct Professor, School of Medicine at Indiana University
Infectious Diseases Clinical Pharmacist, Wishard Health Svcs
Indianapolis, IN
Member of the CLSI Working Group on Antibiogram Development

Jason C. Gallagher, Pharm.D., FCCP, BCPS
Professor
Temple University
Philadelphia, PA
Received grant/research support from Merck. Consultant/speakers bureau for Astellas, Optimer and Forest

Alan Gross, Pharm.D., BCPS
Infectious Diseases Pharmacist, University of Illinois Hospital & Clinical Assistant Professor, Pharmacy Practice
University of Illinois at Chicago College of Pharmacy
Chicago, IL
No conflict of interest reported

Elizabeth D. Hermsen, Pharm.D., MBA, BCPS-ID
Clinical Outcomes Research Director
Cubist Pharmaceuticals
Omaha, NE
Employee of Cubist Pharmaceuticals

Rupali Jain, Pharm.D., BCPS
Clinical Associate Professor, School of Pharmacy
Antimicrobial Stewardship
University of Washington
Seattle, WA
No conflict of interest reported

Meghan N. Jeffres, Pharm.D., BCPS
Assistant Professor, Department of Clinical Pharmacy
University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences
Aurora, CO
Received grant/research support from Pfizer. Consultant/speakers bureau for Cubist

Alice M. Jenh Hsu, Pharm.D., BCPS, AQ-ID
Clinical Pharmacy Specialist, Pediatric Infectious Diseases
The Charlotte R. Bloomberg Children's Center at The Johns Hopkins Hospital
Baltimore, MD
No conflict of interest reported

Scott E. Kinkaid, Pharm.D., BCPS
Clinical Coordinator of Internal Medicine, UK HealthCare
Adjunct Assistant Professor, University of Kentucky College of Pharmacy
Lexington, KY
No conflict of interest reported

David W. Kubiak, Pharm.D., BCPS {AQ-ID}
Infectious Diseases Clinical Specialist
Brigham & Women's Hospital
Boston, MA
No conflict of interest reported

Joseph L. Kuti, Pharm.D.
Associate Director, Clinical and Economic Studies
Center for Anti-Infective Research & Development
Hartford Hospital
Hartford, CT
No conflict of interest reported

Russell Lewis, Pharm.D., FCCP, BCPS
Associate Professor, Department of Medical Sciences and Surgery
Alma Mater Studiorum Università di Bologna
Clinical Pharmacologist-Infectious Diseases Unit, S.Orsola-Malpighi Hospital
Bologna, Italy
Received grant/research support from Merck, Gilead, and Pfizer

Thomas P. Lodise, Pharm.D., Ph.D.
Associate Professor, Pharmacy Practice
Albany College of Pharmacy and Health Sciences
Albany, NY
Received grant/research support from Forest and Cubist. Consultant/speakers bureau for Forest and Cubist

Ben M. Lomaestro, Pharm.D.
Senior Clinical Pharmacy Specialist in Infectious Diseases
Albany Medical Center Hospital
Albany, NY
Consultant/speakers bureau for Optimer, Pfizer

Conan MacDougall, Pharm.D., M.A.S., BCPS
Associate Professor of Clinical Pharmacy
University of California San Francisco School of Pharmacy
Clinical Pharmacist, Infectious Diseases, University of California San Francisco Medical Center
San Francisco, CA
No conflict of interest reported

Karl Madaras-Kelly, Pharm.D., M.P.H.
Professor, College of Pharmacy
Idaho State University
Boise, ID
No conflict of interest reported

Craig Martin, Pharm.D., BCPS-ID
Associate Professor, Pharmacy Practice and Science
University of Kentucky College of Pharmacy
Lexington, KY
No conflict of interest reported

Dorothy McCoy, Pharm.D., BCPS-ID
Clinical Associate Professor, Ernest Mario School of Pharmacy
Clinical Pharmacist, Infectious Diseases
Hackensack University Medical Center
Piscataway, NJ
No conflict of interest reported

Mary Peace McRae, Pharm.D., PhD, BCPS
Department of Pharmacotherapy and Outcomes Science
Virginia Commonwealth University School of Pharmacy
Richmond, VA
No conflict of interest reported

Michael D. Nailor, Pharm.D., BPCS-ID
Clinical Associate Professor, University of Connecticut School of Pharmacy
Infectious Diseases Clinical Specialist, Hartford Hospital
Hartford, CT
Received grant/research support from Merck.
Consultant/speakers bureau for Astellas and Forest

Boris Nogid, Pharm.D., BCPS {AQ-ID}
Medical Science Liaison
Theravance Biopharma
South San Francisco, CA
No conflict of interest reported

Amy Pakyz, Pharm.D., MS
Associate Professor
Virginia Commonwealth University School of Pharmacy
Richmond, VA
Received grant/research support from Cubist.
Consultant/speakers bureau for Optimer.

Natasha N. Pettit, Pharm.D., BCPS, AQ-ID
Clinical Pharmacy Specialist, Infectious Diseases
University of Chicago Medicine
Chicago, IL
No conflict of interest reported

Michael Postelnick, RPh, BCPS-ID
Clinical Coordinator, Department of Pharmacy
Northwestern Memorial Hospital
Chicago, IL
No conflict of interest reported

Jessica Robinson, Pharm.D., BCPS
Assistant Professor of Pharmacy Practice
University of Charleston School of Pharmacy
Charleston, WV
No conflict of interest reported

Marc H. Scheetz, Pharm.D., MSc, BCPS-ID
Assistant Professor of Pharmacy Practice, Midwestern University Chicago College of Pharmacy
Infectious Diseases Pharmacist, Northwestern Memorial Hospital
Chicago, IL
No conflict of interest reported

Marisel Segarra-Newnham, Pharm.D., MPH, FCCP, BCPS-ID
Clinical Pharmacy Specialist, Infectious Diseases/HIV
Veterans Affairs Medical Center
West Palm Beach, FL
No conflict of interest reported

Antimicrobial Stewardship Certificate Program Registration Form

If you cannot complete payment online complete this form and mail it along with payment to:
SIDP c/o ProCE, Inc., 848 W. Bartlett Rd., Suite 3E, Bartlett, IL 60103

Please print or type: (One form per person)

First Name:_____ Middle Initial: _____ Last Name: _____

Address: _____ ❒ Work ❒ Home

City: _____ State: _____ Zip: _____

Place of Employment: _____

Home Phone:_____ Work Phone: _____

E-mail: _____

Program Fee per Participant: Pharmacist $750

For trainees (e.g., residents, fellows, and graduate students) the cost will be $550 per individual. For institutions or healthcare facilities with payment from the same institution, we provide the following discounts:
6-10 healthcare professionals = 5% More than 15 healthcare professionals = 15% discount
11-15 healthcare professionals = 10%

The self-study material will be accessible upon receipt of your registration fee. Directions to access the self-study materials will be e-mailed upon receipt of the registration form.
If you wish to participate in only a portion of the Program, Phase 1 is available for $500 per person. Phases 1 and 2 are available for $688 per person. The above discounts apply for multiple healthcare professionals.

Cancellations received in writing prior to accessing any of the program content (fax: 630-540-2849 or e-mail info@proce.com) will receive a full refund minus a $150 cancellation fee.

Payment Information
❒ Individual Pharmacist ($750) ❒ Trainee ($550 - *validation required*)
❒ Multiple Pharmacists #_____ *(Provide contact information as requested above for each participant)*

Payment by check (**Make check payable to ProCE, Inc.**): Check #: _____ Amount: $_____

Payment by Credit Card: ❒ Visa ❒ MasterCard ❒ Discover ❒ American Express

Card Number: _____

Expiration Date: _____ Card ID #/Security Code: _____

Name on Card: _____ Signature: _____

Billing Information (if different than above)

Address _____

City: _____ State: _____ Zip: _____

Pharmacy-Based Immunization Delivery

Begin Program. If you are currently registered for a class, please enter your enrollment code.

APhA Live Offerings

Organizations who offer this program locally

APhA Offerings of Immunization Train-the-Trainer Sessions

Pharmacy-Based Immunization Delivery is an innovative and interactive training program that teaches pharmacists the skills necessary to become a primary source for vaccine information and administration. The program teaches the basics of immunology and focuses on practice implementation and legal/regulatory issues.

There are three components to the certificate training program:

- 12 hour (1.2 CEU) self-study modules with case studies and assessment exam
- 8.0 hour (0.80 CEU) live seminar with final exam
- Hands-on assessment of intramuscular and subcutaneous injection technique

Self-Study Modules Description and Learning Objectives

The self-study learning activity is designed to ensure that all participants have an understanding of vaccine-preventable diseases and the role of pharmacists as vaccine advocates and administrators. There are five learning modules that present in-depth information on immunology, practice implementation, and legal and regulatory issues as noted below, with appropriate references to the Centers for Disease Control and Prevention (CDC) resource publication, Epidemiology and Prevention of Vaccine-Preventable Disease. The self-study program includes a self-assessment test and real-life case studies that are designed to help reinforce and evaluate participants' understanding of key information and concepts.

Module 1. Pharmacists, Vaccines, and Public Health

At the completion of this activity, participants will be able to:

- Describe the effects of immunizations on morbidity and mortality rates of vaccine-preventable diseases in the United States.
- Discuss Healthy People 2020 goals for vaccination rates in the United States.
- Explain the recent expansion of the role of pharmacists as vaccine providers and describe the status of pharmacists' authorization to administer vaccines throughout the United States.
- Describe strategies for pharmacists to advocate for pharmacy-based delivery of vaccines.
- Discuss the role of pharmacists as immunizers in emergency preparedness activities.
- Identify resources that are useful for immunization providers and educators.

Module 2. Overview of Immunology and Vaccine Development

At the completion of this activity, participants will be able to:

- Identify the differences between active and passive immunity and describe key elements of each process.
- Explain how vaccines elicit an immune response and provide protection from disease.
- Describe the characteristics of and distinctions among live vaccines, inactivated vaccines, polysaccharide vaccines, and recombinant vaccines.
- Discuss the rationale for timing of vaccine administration and intervals between doses, including vaccine-vaccine spacing and vaccine-antibody spacing.
- Describe principles of herd immunity.

Module 3. Vaccine-Preventable Diseases

At the completion of this activity, participants will be able to:

- Describe the epidemiology, clinical features, and potential complications of diseases that can be prevented with vaccines.
- Identify vaccines available in the U.S. market for each vaccine-preventable disease and describe their features.
- Identify the contraindications and precautions for the use of vaccines available in the United States.
- Use recommendations from the Advisory Committee on Immunization Practices to identify target groups for receipt of each vaccine.

Module 4. Patient Care Considerations for Immunizing Pharmacists

At the completion of this activity, participants will be able to:

- Identify patients with immunization needs.
- Given a patient case, select appropriate vaccines using an immunization schedule from the Advisory Committee on Immunization Practices, and identify appropriate timing, doses, and routes of administration.
- Discuss the rationale for timing for vaccine administration and intervals between doses, including vaccine-vaccine spacing and vaccine-antibody spacing.
- Recall recommended patient screening questions for vaccination and identify valid contraindications for vaccinations.
- Educate patients about the benefits of vaccines and address common concerns about vaccines.
- Provide accurate information that addresses common myths about vaccines.
- Describe the roles of the Vaccine Adverse Event Reporting System in managing vaccine safety.
- Educate patients about potential adverse reactions following the receipt of a vaccine and how to manage them.
- Explain appropriate techniques for intramuscular, subcutaneous, intradermal, and intranasal administration of vaccines.
- Describe the signs and symptoms of adverse reactions to vaccines and procedures that pharmacists should follow to manage various adverse reactions.
- Describe appropriate documentation and follow-up after vaccine administration.

Module 5. Operating a Pharmacy-Based Immunization Program

At the completion of this activity, participants will be able to:

- Describe important considerations when deciding which vaccines to offer.
- Describe physical space requirements for a vaccine service.
- Discuss Occupational Safety and Health Administration regulations for the prevention of employee exposure to bloodborne pathogens and needlestick injury at worksites where immunizations are administered.
- Outline principles and procedures for vaccine storage and handling.
- Discuss workflow options for administering vaccines in pharmacy practice.
- Identify marketing strategies that can be used to promote a pharmacy-based immunization service.
- Explain potential options for obtaining reimbursement and compensation for vaccines and vaccine administration.
- Describe liability issues related to vaccine administration, including the Vaccine Injury Compensation Program

Live Training Seminar Description and Learning Objectives

The second part of the certificate training program is an active learning seminar focusing on pharmacy practice implementation. The live training seminar is based on the experience of practitioners involved in immunization advocacy and administration. The training seminar reinforces and expands on the self-study program and addresses areas such as immunization needs, legal and regulatory issues, and injection-technique training. Participants will be expected to practice giving intramuscular and subcutaneous injections on each other.

After completing the live seminar, participants will be able to:

- Describe strategies for increasing immunization rates, including physician collaborations, community level activities, and immunization coalition activities.
- Review adult patient cases and make patient-specific recommendations based on the appropriate immunization schedule.
- Review a pediatric patient case and make patient-specific recommendations based on the appropriate immunization schedule.

- Demonstrate effective strategies for communicating with patients who have concerns about vaccines.
- Describe current evidence that explores the relationship between autism and vaccines.
- Describe a process for administering vaccines in a community pharmacy.
- Identify the signs and symptoms of adverse reactions that can occur after vaccination.
- Describe procedures for management of patients with adverse reactions to vaccination that constitute an emergency.
- List the steps for intranasal administration of the live attenuated influenza vaccine.
- Demonstrate appropriate intramuscular and subcutaneous injection techniques for adult immunization.

All participants are strongly encouraged to obtain CPR or BCLS certification. However, certification is not a prerequisite of the program. A Certificate of Achievement is awarded to participants who successfully complete all program requirements. The Certificate of Achievement is invalid, however, without written proof of current CPR or BCLS certification.

Continuing Pharmacy Education (CPE) Information

The American Pharmacists Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

The self-study learning portion of the Pharmacy-Based Immunization Delivery certificate training program is approved for 12 contact hours (1.2 CEUs) of continuing pharmacy education credit (UAN 0202-0000-14-002-H01-P). The live training seminar is approved for 8 contact hours (0.8 CEU) of continuing pharmacy education credit (UAN 0202-0000-14-003-L01-P).

Activity Type: Practice-based
Target Audience: Pharmacists in all practice settings
Release Date: April 15, 2014
Expiration Date: April 15, 2017

Completion Information: A Certificate of Achievement is awarded to participants who successfully complete all activity requirements, which include the self-study component, live training seminar, and the injection technique assessment. Successful completion is defined as a score of 70% or better on both the self-study and live seminar assessments.

Once credit is claimed, Statements of Credit will be available online within 24 hours on the participant's CPE Monitor profile at www.nabp.net. The Certificate of Achievement will be available online upon successful completion of the necessary activity requirements on the participant's "My Training" page on www.pharmacist.com

Technology requirements and suggestions for a better learning experience.

In order to participate in this activity, participants must have access to a computer with these minimum system requirements:

Hardware Requirements

- 128 MB of RAM
- 16-bit video card capable of 1024x768 screen resolution or better
- Speakers or headphones

Software Requirements

- **Microsoft Windows Users**
  - Microsoft Windows 98 SE, Windows NT 4.0 SP6a, Windows 2000 SP4, or Windows XP Service Pack 1,Service Pack 2, or Service Pack 3, Windows Vista, Windows 7, or Windows 8
  - Internet Explorer 8.0 or later, Firefox 1.5 or later, or Chrome
- **Apple Users**
- Mac OS X 10.3 or later
- Safari, Firefox, or Chrome
- Adobe Flash Player Version 10
- Adobe Acrobat Reader
- **Additional software** (for, Windows, Mac OS and all other operating systems, including mobile platforms)

APhA's learning activities are designed with multimedia which is best experienced while using a PC or Mac that is equipped with the hardware and software components described above. Although activities may also be viewed using portable devices, it is not recommended.

Looking for some additional resources? Try visiting our Pharmacist Immunization Center.

If your company or organization is interested in offering this certificate program to its pharmacists or student pharmacists, please contact our education department education@aphanet.org.

Share This Page

Appendix G-6

APhA Awards

In Recognition of Excellence

In Recognition of Excellence

The 2016 Awards and Honors Presented by the American Pharmacists Association and its Academies

APhA 2016

The American Pharmacists Association is pleased to recognize the following individuals and organizations for their significant contributions to the profession of pharmacy. Through its recognition program, APhA believes it can stimulate research, practice innovations, quality publications, and leadership development that will improve medication use and advance patient care. APhA would like to thank all of the volunteers who have contributed their time and expertise to ensure that these deserving individuals are recognized.

Awards and Honors Presentations
APhA2016 Annual Meeting

Baltimore, Maryland

Federal Pharmacy Forum Opening General Session

Friday, March 4, 2016, 8:30 am–12:15 pm

Hilton, Key Ballroom 7/8

APhA Distinguished Federal Pharmacist Award

APhA Political Leadership Reception: Pharmacists Driving Political Change

Friday, March 4, 2016, 5:30 pm–7:00 pm

Convention Center, 345/346

APhA Hubert H. Humphrey Award

APhA Good Government Pharmacist-of-the-Year Award

APhA Opening General Session

Saturday, March 5, 2016, 9:00 am–11:00 am

Convention Center, Level 400 Ballroom

Remington Honor Medal

APhA Linwood F. Tice Friend of APhA–ASP Award

APhA Daniel B. Smith Practice Excellence Award

APhA–APRS Research Achievement Award

APhA Fellows

APhA Hugo H. Schaefer Award

APhA Gloria Niemeyer Francke Leadership Mentor Award

APhA H.A.B. Dunning Award

Community Pharmacy Residency Networking Reception

Saturday, March 5, 2016, 6:00 pm–7:00 pm

Convention Center, 301/302

APhA Community Pharmacy Residency Excellence in Precepting Award

APhA–APPM Nuclear Pharmacists' Breakfast and Special Interest Group (SIG) Business Meeting

Sunday, March 6, 2016, 7:00 am–11:00 am

Convention Center, Room 349/350

APhA–APPM William H. Briner Distinguished Achievement Award in Nuclear Pharmacy Practice

APhA Second General Session

Sunday, March 6, 2016, 9:00 am–11:00 am

Convention Center, Level 400 Ballroom

APhA Honorary President

APhA Honorary Membership

APhA–APRS Ebert Prize

APhA–APRS Clinical Research Paper Award

APhA–APRS Wiederholt Prize

APhA Distinguished New Practitioner Award

Generation Rx Award of Excellence

APhA Pharmacy Management Excellence Award

APhA–APPM Distinguished Achievement Award in Pharmacy Practice

APhA–APPM Distinguished Achievement Awards in Service

APhA–ASP Awards Celebration

Sunday, March 6, 2016, 8:00 pm–10:00pm

Convention Center, Level 400 Ballroom

APhA Linwood F. Tice Friend of APhA–ASP Award

APhA Outstanding APhA–ASP Chapter Advisor Award

APhA–ASP Outstanding Dean Award

APhA Student Leadership Awards

APhA–ASP Chapter Achievement Awards

APhA–ASP National Patient Counseling Competition Award

APhA–ASP PharmFlix Awards

APhA–APPM MTM Open Forum: Medication Management Special Interest Group (SIG) Business Meeting and Awards Presentation

Monday, March 7, 2016, 10:00 am–12:00 pm

Convention Center, Room 342

APhA–APPM Presentation Merit Awards

Profession-Wide Awards and Honors

REMINGTON HONOR MEDAL

The Remington Honor Medal, named for eminent community pharmacist, manufacturer, and educator Joseph P. Remington (1847–1918), was established in 1918 to recognize distinguished service on behalf of American pharmacy during the preceding years, culminating in the past year, or during a long period of outstanding activity or fruitful achievement.

Leslie Z. Benet, PhD, was selected in recognition of the professional achievements, practice innovations, and entrepreneurial spirit he has contributed to the profession of pharmacy and pharmaceutical research. Benet is a Professor in the Departments of Bioengineering and Therapeutic Sciences at the University of California San Francisco Schools of Pharmacy and Medicine. Born into a family of pharmacists and listed among the most highly-cited pharmacologists world-wide, Benet's research introduced clearance concepts and rational approaches to pharmacokinetics that allow pharmacy clinicians today to take a primary role in drug dosing decisions in patients. Benet has mentored 54 PhD graduates and 122 postdoctoral and visiting scientists in his laboratory. He has served as President of the APhA Academy of Pharmaceutical Sciences, the American Association of Pharmaceutical Scientists, and the American Association of Colleges of Pharmacy. Benet received his BSPharm from the University of Michigan and his PhD from the University of California San Francisco.

HUGO H. SCHAEFER AWARD

The Hugo H. Schaefer Award was established by the American Pharmacists Association in 1964 to honor the long-time APhA Treasurer, Dr. Hugo H. Schaefer, for a lifetime of contributions to the profession of pharmacy and in particular for his service to APhA. The purpose of the award is to recognize an individual who has made outstanding voluntary contributions to society as well as to the profession of pharmacy and APhA.

Bruce R. Canaday, PharmD, FASHP, FAPhA, was selected in recognition of his many contributions to the profession of pharmacy. He is the Dean of Pharmacy and Professor at St. Louis College of Pharmacy. His professional accomplishments in teaching, service, research, and professional and community leadership demonstrate his unwavering commitment to the clinical practice of pharmacy and quality patient care. Canaday has held several positions in many leading pharmacies and pharmacy associations, including serving as President of APhA, the American Society of Health-System Pharmacists, and Accreditation Council on Pharmaceutical Education. Canaday's participation was integral to the development and completion of the recently approved revision of accreditation standards for the professional degree program in pharmacy, which will be implemented in July 2016. Canaday received his PharmD from the University of Tennessee.

HUBERT H. HUMPHREY AWARD

The Humphrey Award, named for the noted pharmacist, long-time APhA member, and public servant (senator from Minnesota and U.S. Vice President) was established in 1978 to recognize APhA members who have made major contributions in government and/or legislative service.

Larry D. Wagenknecht, RPh, FMPA, FAPhA, was selected for his contributions to the profession of pharmacy through service in legislative and regulatory arenas at local, state, and national levels. He is the CEO of the Michigan Pharmacists Association, a position that he has held since 1994 after being named executive director in 1986. He is a licensed pharmacist and preceptor in Michigan, as well as adjunct clinical faculty at the University of Michigan and Ferris State University Colleges of Pharmacy. Wagenknecht serves as the Chairman of the Michigan Health Information Network Shared Services Board of Directors in addition to being a member of the Michigan Medicaid Medical Care Advisory Council and the Governor's Prescription Drug and Opioid Abuse Task Force. He is also Board Chairman for the Michigan Health and Safety Coalition and Vice Chairman of the Board of Governors for the Pharmacy Technician Certification Board. He received his BSPharm from the University of Michigan.

GOOD GOVERNMENT PHARMACIST-OF-THE-YEAR AWARD

Supported by the APhA Political Action Committee Board of Governors

The award, established in 1990, recognizes an individual pharmacist who actively contributes to the community through his or her involvement in the political process.

Nicki L. Hilliard, PharmD, MHSA, BCNP, FAPhA, was selected for her contributions to advocating for the advancement of the pharmacy profession. Hilliard is a Professor of Pharmacy Practice at the University of Arkansas for Medical Sciences College of Pharmacy. She has advocated on both the state and national level for patient access to pharmacist services. In collaboration with the Arkansas Pharmacists Association, she has contacted legislators, chaired public policy committees, and testified before legislative committees. She has spoken to senators, congressmen, and their staff about issues that are critically important to the profession of pharmacy. Hilliard received her MHSA from the University of Arkansas at Little Rock and her PharmD from the University of Arkansas for Medical Sciences College of Pharmacy.

HONORARY MEMBERSHIP

Honorary membership in the American Pharmacists Association is conferred by the APhA Board of Trustees upon individuals, either within the profession of pharmacy or outside it, whose activities and achievements have had a significant impact on public health, the profession, and its practitioners.

Kristen G. Betts, BHS, was selected in recognition of her sustained contributions to communicating public health information at the federal, state, and local levels. Betts is the Director of Communications in CDC's Division of Nutrition, Physical Activity, and Obesity, where she manages teams responsible for internal and external communications, media relations, website development, and general promotions. She has been at CDC for 12 years, working in leadership positions in the Office on Smoking and Health, the Division of Heart Disease and Stroke Prevention, and the Office of the Associate Director of Policy. She has helped coordinate major national releases, including four Reports of the U.S. Surgeon General. She leads communication partnerships such as Team Up. Pressure Down—a campaign designed to engage pharmacists in blood pressure control in pharmacies across the nation. Betts received her BHS from the Medical University of South Carolina.

HONORARY PRESIDENT

Honorary President of the American Pharmacists Association is conferred by the Association upon a member who has made significant contributions to the Association.

Jean Paul Gagnon, PhD, was elected in recognition of his lifelong commitment as an advocate for the profession of pharmacy. He was employed by Sanofi-Aventis for 22 years, where he was involved with various health policy issues. He was the recipient of the company's Pinnacle Award in 2007 for his work on a biological properties initiative. Gagnon has held numerous leadership positions including serving as Treasurer of APhA and the U.S. Pharmacopeial Convention. He was a founder and served as a board member of the International Association of Pharmacoeconomics and Outcomes Research. Gagnon remains active in the pharmacy profession as a consultant to many organizations and businesses. He received his PhD in Pharmacy Administration from the Ohio State University.

GLORIA NIEMEYER FRANCKE LEADERSHIP MENTOR AWARD

This award recognizes an APhA member who has promoted and encouraged pharmacists to attain leadership positions within pharmacy through example as a role model and mentor. The pharmacist for whom the award is named—Gloria Niemeyer Francke, PharmD—personally exemplified the award's criteria. Dr. Francke, 1986 APhA Honorary President and 1987 Remington Honor Medalist, inspired and mentored future leaders throughout her illustrious pharmacy career.

Michael A. Moné, BSPharm, JD, FAPhA, was selected in recognition of his contributions to substance abuse education and his compassionate mentorship of pharmacists and student pharmacists. Moné is Vice President of Anti-diversion and Senior Regulatory Counsel at Cardinal Health. A licensed pharmacist and lawyer, Moné is a leader in the legal aspects and nuances of substance abuse education. He has mentored students and pharmacists through the University of Utah School on Alcoholism and Other Drug Dependencies and while serving as the parliamentarian for the APhA-ASP House of Delegates. Moné is dedicated to the wellness of student pharmacists and pharmacists, especially those recovering from alcoholism and drug dependences, while helping educate the profession and the public about addiction and related issues. Moné received his JD from the University of Florida College of Law and his BSPharm from the University of Florida College of Pharmacy.

DISTINGUISHED FEDERAL PHARMACIST AWARD

Endowed by the Roche Foundation

Established in 2002, the Distinguished Federal Pharmacist Award is the Association's premier award to recognize federal pharmacists who have distinguished themselves and the profession by outstanding contributions that have resulted in a significant improvement in the health of the nation and/or the population they serve.

Ronald A. Nosek Jr., RPh, MS, FASHP, was selected in recognition of his dedicated service to federal pharmacy. Nosek served more than 20 years as an Officer in the United States Navy, retiring at the rank of Commander in 2008. He then joined the Department of Veterans Affairs as Associate Chief Consultant-Pharmacy Benefits Management and has served as the National Director for the CHAMPVA Meds by Mail Program for more than 7 years. During his naval career, Nosek completed a variety of challenging assignments including tours in Rota, Spain; Bethesda, MD; and Washington, DC. He also held positions as Residency Program Director at a large tertiary care medical center and the Director of Ancillary Services aboard the Navy's 1,000 bed hospital ship, the USNS Comfort. Nosek received his BSPharm from Temple University and his MS in Pharmacy Administration from the University of Texas at Austin.

H.A.B. DUNNING AWARD

The purpose of the award is to recognize an exemplary contribution to APhA and the practice of pharmacy by a pharmaceutical manufacturer, provider of support products or service, or other entities such as wholesalers, chain corporations, etc. The H.A.B. Dunning Award was established in 1982 to honor the former Chairman of the Board of Hynson, Westcott and Dunning of Baltimore, Maryland, who as a longstanding APhA leader was instrumental in the funding and building of the APhA headquarters building in Washington, DC.

The Kroger Co., headquartered in Cincinnati, OH, is one of the world's largest food retailers and the fifth-largest pharmacy operator in the United States operating 2,122 retail pharmacies. Kroger has a longstanding history of supporting both APhA and efforts to advance the profession of pharmacy. Kroger's contributions range from an expansive community pharmacy residency program to pioneering patient care services. Kroger has trained many of its pharmacists using APhA education programs in immunizations, travel health services, diabetes care, and medication therapy management services. Kroger's pharmacists serve APhA in numerous capacities, including the Pharmacy Today Editorial Advisory Board and Academies, and they have engaged in American Pharmacists' Month activities.

COMMUNITY PHARMACY RESIDENCY EXCELLENCE IN PRECEPTING AWARD

The APhA Community Pharmacy Residency Excellence in Precepting Award was established to recognize a community pharmacy residency director or preceptor who has demonstrated excellence in precepting, mentoring, leadership, and community pharmacy residency program administration. The award, established in 2003, is intended to recognize pharmacy practitioners who excel as community pharmacy residency directors or preceptors.

Margie E. Snyder, PharmD, MPH, was selected in recognition of her leadership and mentorship of residents, and her commitment to the advancement of community pharmacy practice. Snyder is an Assistant Professor of Pharmacy Practice at Purdue University College of Pharmacy. She serves as the research/project management preceptor for the four community pharmacy residents, and a teaching mentor for many of them. She established a weekly research project development series that provided didactic instruction on research principles and a mechanism for peer review of all aspects of the residents' research projects. Under her mentorship, approximately half of the residents to date have received APhA Foundation Incentive Grants. She received her MPH from the University of Pittsburgh Graduate School of Public Health and her PharmD from the University of Pittsburgh School of Pharmacy.

DISTINGUISHED NEW PRACTITIONER AWARD

The Distinguished New Practitioner Award was established in 2010 to recognize an individual new practitioner who has demonstrated distinctive achievements in mentorship, service, and commitment to the profession of pharmacy.

Veronica Vernon, PharmD, BCPS, BCACP, NCMP, was selected in recognition of her commitment to the profession of pharmacy and the education and mentorship of student pharmacists and pharmacy residents. Vernon is currently a Clinical Pharmacy Specialist in women's health and endocrinology at the Richard L. Roudebush VA Medical Center (VAMC) in Indianapolis. She is the founder and creator of the Women's Health and Primary Care Clinic. Vernon works part-time as a Staff Pharmacist at Walgreens and is an Adjunct Assistant Professor at Butler University, where she teaches a women's health elective and directs case conferences consisting of meaningful discussions about disease states. Vernon received her PharmD from Purdue University. She is board certified in both pharmacotherapy and ambulatory care.

GENERATION Rx AWARD OF EXCELLENCE

Restricted endowment from the Cardinal Health Foundation

The Generation Rx Award of Excellence was established in 2011 to recognize a pharmacist who has demonstrated a commitment to the mission of substance abuse education.

Jeffrey Bratberg, PharmD, BCPS, was selected in recognition of his commitment to developing opioid overdose education and naloxone training programs. Bratberg is a Clinical Professor of Pharmacy Practice, at the University of Rhode Island College of Pharmacy. In 2012, Bratberg, along with a student pharmacist co-developed an overdose education and naloxone training program for pharmacists in the first-in-nation statewide Collaborative Pharmacy Practice Agreement for naloxone. In 2015, he was selected to serve as a member of the Rhode Island Governor's Overdose Prevention and Intervention Task Force to create and implement a plan that addresses prevention, treatment, overdose reversal, and recovery of citizens affected by opioid use disorders. Bratberg received his BSPharm and PharmD from North Dakota State University.

Fellows of the American Pharmacists Association

A Fellow of the American Pharmacists Association is a member of the APhA Academy of Pharmacy Practice and Management (APhA–APPM) or the APhA Academy of Pharmaceutical Research and Science (APhA–APRS) with a minimum of 10 years of professional experience and achievements in professional practice. An APhA Fellow has also rendered outstanding service to the profession through activities in APhA and other organizations. Examples of service to organizations may include an elected or appointed office; service on a committee, expert panel, or review board; or other relevant activities. The selection of members as APhA Fellows is made by their respective Academy.

SELECTED AS APhA FELLOWS BY APhA–APPM

Melissa Murer Corrigan, BSPharm, FASHP

Allegra DePietro, MS, RPh, BCNP

Leonard Edloe, PharmD

Nicole Gattas, PharmD, BCPS

Commander Heather D. Hellwig, MS, PharmD, BCPS

James E. Knoben, PharmD, MPH

Lisa A. Kroon, PharmD, CDE

Maria Marzella Mantione, PharmD, CGP

James A. Miller, BSPharm, MBA

Janelle F. Ruisinger, PharmD

SELECTED AS APhA FELLOWS BY APhA–APRS

Edward Bednarczyk, PharmD, FCCP

Patricia (Trish) Freeman, BSPharm, PhD

Eric J. Jarvi, PhD, MFS

Kimberly S. Plake, BSPharm, PhD

Zia Shariat-Madar, PhD

Salisa Westrick, BSPharm, MS, PhD

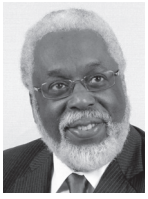
Marcia M. Worley, BSPharm, PhD, RPh

Robin Zavod, MS, PhD

SELECTED AS FELLOWS BY APhA–APPM

Melissa Murer Corrigan, BSPharm, FASHP, is the Vice President of Social Impact Strategy and Programs at ACT and Adjunct Assistant Professor of Pharmacy Practice at the University of Iowa College of Pharmacy. She currently serves on the Board of Directors for Corridor Women Connect. Prior to joining ACT, Corrigan was the founding Executive Director and CEO of the Pharmacy Technician Certification Board (PTCB), where she created strategic alliances with major pharmacy employers such as Walgreens, CVS, and Target. She received her BSPharm from Drake University College of Pharmacy and Health Sciences.

Allegra DePietro, MS, RPh, BCNP, is the Manager of Nuclear Pharmacy Services at Massachusetts General Hospital (MGH) in the Division of Nuclear Medicine and Molecular Imaging where she has been practicing since 1998. In her role at MGH, DePietro provides nuclear pharmacy services to multiple departments, participates in clinical trials, and trains and educates physicians, pharmacists, technologists and physicists. She received a BSPharm from Purdue University in 1997 and an MS in Administrative Studies from Boston College in 2000. DePietro has been active in professional organizations most recently completing 2 terms with the Board of Pharmacy Specialties serving as the Chair and Vice Chair of the Specialty Council on Nuclear Pharmacy.



Leonard Edloe, PharmD, is a retired pharmacist and CEO of Edloe's Professional Pharmacies. He currently serves as Pastor of New Hope Fellowship in Hartfield, VA, and is an Adjunct Professor of Christian Ethics at the John Leland Theological Center School of Ministry. During his 45 years of practice, Edloe was instrumental in caring for patients in underserved areas of Richmond, VA, where he helped them understand their medical conditions and identified ways to optimize medications. Edloe has mentored many students and served on the clinical faculties at the schools of pharmacy at Howard University, Virginia Commonwealth University, Hampton University, and the University of South Carolina. He received his PharmD from the University of Florida, a Master of Divinity from Virginia Union University, and a BSPharm from Howard University.

Nicole Gattas, PharmD, BCPS, is an Associate Professor of Pharmacy Practice and Assistant Director in the Office of Experiential Education at St. Louis College of Pharmacy. She is also the Residency Program Director for the College's American Society of Health-System Pharmacists–APhA accredited multisite community pharmacy residency. Gattas concentrates her teaching and research on community pharmacy rotations, patient-pharmacist communication, immunizations, and other areas related to community pharmacy. Gattas is board certified in pharmacotherapy and received her PharmD from the University of Iowa College of Pharmacy.

Commander Heather D. Hellwig, MS, PharmD, BCPS, is the Assistant Director for Clinical Support Services and the Pharmacy Division Head at Captain James A. Lovell. Federal Health Care Center, the only integrated Veterans Administration and Navy facility in the United States. She also serves as the Navy Pharmacy Advisory Board Chair and represents the Navy at the APhA House of Delegates. Cmdr. Hellwig received a PharmD from the University of Wisconsin and an MS in Pharmaceutical Outcomes and Policy from the University of Florida. She is a board certified pharmacotherapy specialist.

James E. Knoben, PharmD, MPH, began his career with the federal government at the National Center for Health Services Research. He has held a range of federal government leadership positions, including the Director of the Division of Drug Information Resources at FDA for 12 years. Knoben retired in 2005 with the rank of Captain after 33 years in the U.S. Public Health Service, and served as president of the PHS Commissioned Officers Foundation. He is the founder of the *Handbook of Clinical Drug Data* and served as co-editor for 10 editions. He received a PharmD from the University of California, San Francisco School of Pharmacy and an MPH from the Yale University School of Medicine.

Lisa A. Kroon, PharmD, CDE, is a Professor and Chair of the Department of Clinical Pharmacy in the School of Pharmacy at the University of California in San Francisco (UCSF). A member of the UCSF faculty since 1996, Kroon practices in the UCSF Medical Center's Adult Diabetes Clinic and Diabetes Teaching Center, where she cares for people with diabetes and chronic illnesses. She co-directs the UCSF Fontana Tobacco Treatment Center, where she has been a smoking cessation provider for more than 10 years. Kroon received her PharmD from the University of Michigan.

Maria Marzella Mantione, PharmD, CGP, is the Director of the Doctor of Pharmacy Program and an Associate Clinical Professor at St. John's University College of Pharmacy and Health Sciences in Queens, NY. She is a member of the NYS Board of Pharmacy and is active in the fields of community pharmacy, self-care, and safe medication use in seniors. Her clinical practice is at a supermarket chain pharmacy, King Kullen, where she precepts pharmacy students and performs medication management services. Mantione received her BSPharm and PharmD from St. John's University and completed a residency in community pharmacy practice at the University of Maryland School of Pharmacy.

James A. Miller, BSPharm, MBA, is a retired community pharmacist. He was previously the Director of Mercy Family Pharmacy in Dubuque, IA. He currently serves as Chairman for the Iowa Board of Pharmacy and as Treasurer for Crescent Community Health Center. Prior to retirement, Miller was a founder and board member of Outcomes MTM, an Assistant Professor at the University of Iowa College of Pharmacy, and a community pharmacy residency preceptor. Miller received his BSPharm from the University of Iowa College of Pharmacy and his MBA from the University of Dubuque.

Janelle F. Ruisinger, PharmD, is a Clinical Associate Professor at the University of Kansas (KU) School of Pharmacy and the Director of the KU PGY1 Community Pharmacy Residency Program. She is also a Clinical Pharmacist in the KU Medical Center's Atherosclerosis and LDL Apheresis Center. She currently serves on the American Society of Health-System Pharmacists Commission on Credentialing and the APhA Community Pharmacy Residency Program Advisory Panel. Ruisinger received her PharmD from KU.

SELECTED AS FELLOWS BY APhA–APRS

Edward Bednarczyk, PharmD, FCCP, is a Clinical Associate Professor and Chair at the University at Buffalo Department of Pharmacy Practice. He has demonstrated sustained excellence in research through the development of a well-defined, research program that supports the role of the pharmacist in collaborative medicine. He served as an advisor for more than 40 PharmD students. He received a PharmD from the Medical University of South Carolina College of Pharmacy and a BSPharm from the State University of New York at Buffalo School of Pharmacy.

Patricia (Trish) Freeman, BSPharm, PhD, holds several positions in the University of Kentucky College of Pharmacy, including Director of the Center for the Advancement of Pharmacy Practice (CAPP), and is a Clinical Associate Professor at the Institute for Pharmaceutical Outcomes and Policy. As Director of CAPP, she has advocated for advanced pharmacy practice in Kentucky, including establishing the Advancing Pharmacy Practice Coalition, which includes pharmacists from all major pharmacy organizations in the state working together to advance practice goals. Freeman received her BSPharm and PhD degrees from the University of Kentucky.

Eric J. Jarvi, MFS, PhD, is the Associate Dean of Academic Affairs and Professor at the Husson University School of Pharmacy. During Jarvi's 30-year professional career in pharmacy education, he generated more than $3 million in extramural funding. He (co)authored 25 publications, 41 abstracts, and gave six invited presentations. Jarvi spent 6 years as a medical laboratory technician in the U.S. Air Force. He received his PhD from Oregon State University and his MFS from George Washington University.

Kimberly S. Plake, BSPharm, PhD, is an Associate Professor of Pharmacy Practice at Purdue University College of Pharmacy. Her teaching and research interests focus on patient care, including medication safety, medication adherence, health literacy, and cultural issues in health care, as well as the evaluation of the instructional methods to teach these topics to students. She established and directs the Purdue University Academic and Ambulatory Care Fellowship program. Plake received her BSPharm from Butler University and her PhD from Purdue University.

Zia Shariat-Madar, PhD, is a Professor at the University of Mississippi School of Pharmacy, where he teaches courses in pharmacology and pathophysiology. He is internationally recognized as a leader in the area of plasma kallikrein-kinin system. His work has been published in major biochemical journals in the United States and around the world. Shariat-Madar received his PhD from the Medical College of Ohio.

Salisa Westrick, BSPharm, MS, PhD, is Associate Professor of Health Outcomes Research and Policy at Harrison School of Pharmacy at Auburn University. Her primary teaching responsibilities focus upon the U.S. health care system, pharmacy management, and research methods. Her research expertise includes organizational change in pharmacy, program evaluation and adoption and sustainability of pharmacy-based immunization services. She received her BSPharm from Chulalongkorn University in Thailand, MS from Illinois State, and PhD from the University of Wisconsin-Madison.

Marcia M. Worley, BSPharm, PhD, RPh, is Professor of Clinical Pharmacy at the Ohio State University College of Pharmacy. Worley served as Chair of the ESAS section of APhA-APRS and has served as the APhA-ASP Chapter Advisor. Her practice-based research focuses on investigating patient medication use behaviors and outcomes in the context of pharmacist-patient relationships. Worley has published results from her research in peer-reviewed and professional journals, and has presented her research at numerous professional and scientific meetings. Worley received two BS degrees from the University of Pittsburgh, an MS degree from The Ohio State University, and a PhD from the University of Minnesota.

Robin Zavod, MS, PhD, is a Professor of Pharmaceutical Sciences at Midwestern University Chicago College of Pharmacy. She teaches two medicinal chemistry courses, a reflective portfolio course, and two pharmacy-based electives. Her areas of research include measurement of student self-efficacy and the value of reflective practice in curricular design. She is the founding Editor-in-Chief of the bimonthly journal, Currents in Pharmacy Teaching and Learning. She received a PhD and MS from the University of Kansas.

Practitioner Awards and Honors, Administered by the APhA Academy of Pharmacy Practice and Management

DANIEL B. SMITH PRACTICE EXCELLENCE AWARD

Endowed by Bristol-Meyer Squibb Company

The Daniel B. Smith Award, established in 1964 to honor the first president of APhA, recognized outstanding performance and achievements of a community practitioner who had distinguished himself or herself and the profession of pharmacy in the recipient's community and professional practice setting. The award was merged with the APhA Practice Excellence Award in 1994 to recognize outstanding performance and achievements of a practitioner in any practice setting.

Jonathan G. Marquess, PharmD, CDE, FAPhA, was selected in recognition of his sustained contributions and commitment to the advancement of community pharmacy practice. He is the President and CEO of the Institute for Wellness and Education. Along with his pharmacist wife Pam, Marquess is the owner of 10 community pharmacies in Georgia. Marquess is a specialist in diabetes care, and is a certified diabetes educator and a certified insulin pump/sensor trainer. Marquess has been involved in many community-based research projects including APhA's Diabetes Ten City Challenge, where he continues to manage more than 100 patients with diabetes. He is co-author of the 16th and 17th editions of *DiabetesDek*. Marquess is a Past President of the Georgia Pharmacy Association and recently completed a 3-year term on the APhA Board of Trustees. Marquess received his PharmD from Mercer University Southern School of Pharmacy.

PHARMACY MANAGEMENT EXCELLENCE AWARD

This award recognizes APhA members in any practice setting who have distinguished themselves and the profession through outstanding performance in the area of pharmacy management.

William F. Sheridan II, BSPharm, was selected in recognition of outstanding management and leadership in community pharmacy practice. Sheridan retired from The Kroger Co. in 2014, after a long and successful career. Under his leadership, Kroger pharmacies in the Columbus Division grew from only 3 pharmacies in the late 1970s to 120 pharmacies in 2015. He made sure that every pharmacist in the Columbus Division of Kroger was certified to immunize and provide medication therapy management services at the pharmacy. The sites also provide wellness screenings, immunization programs, and diabetes coaching. Sheridan was instrumental in spearheading community residency partnerships between Kroger and Ohio Northern University and the University of Toledo. He led Kroger to become a strong APhA-ASHP community pharmacy residency site in collaboration with the Ohio State University College of Pharmacy. In 2015, Sheridan was the recipient of the Ohio Pharmacists Association Beal Award and the Next Generation Pharmacist Lifetime Leadership Award. Sheridan received his BSPharm from the Ohio State University College of Pharmacy.

DISTINGUISHED ACHIEVEMENT AWARDS IN SERVICE

This award recognizes the achievements of an individual who has made significant or sustained contributions in the area of service to their community, their state, or the national level. Service activities include community service, service to the profession, and service to APhA.

Kimberly Sasser Croley, PharmD, CGP, FASCP, FAPhA, was selected in recognition of her contributions to the advancement of community practice and the profession of pharmacy. She is a member of the University of Kentucky College of Pharmacy Center for Advancing Pharmacy Practice, whose mission is to promote pharmacy throughout the state. She has held numerous elected positions with the Kentucky Pharmacists Association (KPhA). A self-proclaimed "policy wonk," Croley has served on many APhA policy committees and is a vocal member of the APhA House of Delegates. She works tirelessly to promote the profession to other health care practitioners, patients, and the public

at large. She uses her career as a pharmacist as a springboard to mentor high school students by participating in career fairs and providing opportunities for shadowing experiences. She is the recipient of numerous awards including the Bowl of Hygeia and Pharmacist of the Year Award. Croley received her PharmD from the University of Kentucky College of Pharmacy.

Amy M. Lugo, PharmD, BCPS, BC-ADM, FAPhA, was selected in recognition of her outstanding service to the profession of pharmacy and her contributions to the advancement of managed care pharmacy practice. With experience in pharmacotherapy, internal medicine, family medicine, managed care, and formulary management, Lugo makes a dynamic difference in the lives of her patients, colleagues, students, and residents. Lugo is a Clinical Specialist and Formulary Manager at the Defense Health Agency Pharmacy Operations Division (TRICARE) and Director of the Managed Care Residency Program at the Department of Defense (DoD). Through didactic, experiential, and residency teaching, she has shared her expertise to groom future practitioners. She is the recipient of several awards including the Office of the Secretary of Defense Award for Excellence and the Navy Civilian Pharmacist of the Year. Lugo received her PharmD from the University of Florida.

DISTINGUISHED ACHIEVEMENT AWARD IN PHARMACY PRACTICE

This Award recognizes an individual who has developed and/or implemented an innovative, original pharmacy program or service, which is significant to their area of practice.

Richard J. Kowalsky, PharmD, received a BSPharm from the University of Connecticut School of Pharmacy and a PharmD from the University of Kentucky College of Pharmacy. He worked for six years in hospital pharmacy, two of those as Pharmacy Officer in the USPHS Indian Health Service. He served APhA on various committees and was Chair of the Section on Nuclear Pharmacy and the Specialty Council on Nuclear Pharmacy. He recently retired from the University of North Carolina (UNC) Eshelman School of Pharmacy where he practiced nuclear pharmacy for 42 years. At UNC, he mentored more than 100 students in nuclear pharmacy and directed an Authorized Nuclear Pharmacist training program. His diverse interests in applying radioactivity to solve clinical research problems led to several publications in professional journals and continuing education articles for nuclear pharmacists. Kowalsky has authored four textbooks, which are considered gold standard references for the nuclear pharmacy profession. Kowalsky was recognized by APhA as a Fellow in 1995, and in 2000 as a nuclear pharmacy pioneer and with the highest award in nuclear pharmacy, the William H. Briner Distinguished Achievement Award.

WILLIAM H. BRINER DISTINGUISHED ACHIEVEMENT AWARD IN NUCLEAR PHARMACY PRACTICE

Premier support provided by the National Association of Nuclear Pharmacies

This award, named in memory of Captain William H. Briner, a pioneer in the development of the nuclear pharmacy practice specialty, recognizes the achievements of an individual who has made a significant contribution or sustained contributions to the provision of pharmaceutical care within nuclear pharmacy practice.

Sally W. Schwarz, BSPharm, MS, BCNP, was selected in recognition of outstanding, sustained contributions to nuclear pharmacy practice. Schwarz is a Professor of Radiology at Washington University School of Medicine in St. Louis. She established the first positron emission technology (PET) nuclear pharmacy at Washington University and has developed and managed the PET production of radiopharmaceuticals for clinical and clinical research use for more than 15 years. Schwarz has served on the U.S. Pharmacopeial Convention Expert Committee for 10 years and was involved with writing the revised Chapter 823, which defined the production and quality control requirements of PET radiopharmaceuticals for research use. She has served as the nuclear pharmacy advocate on the Nuclear Regulatory Commission's Advisory Committee for the Medical Use of Isotopes for 6 years. Schwarz is currently the President Elect of the Society of Nuclear Medicine and Molecular Imaging and will become the organization's President in 2016. She is the first pharmacist to hold this position. She received a BSPharm from the University of Iowa and an MS in Radiopharmacy from the University of Southern California.

Scientific Awards and Honors, Administered by the APhA Academy of Pharmaceutical Research and Science

RESEARCH ACHIEVEMENT AWARD IN THE PHARMACEUTICAL SCIENCES

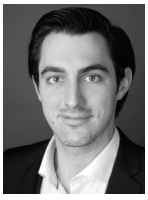
This award, administered by the APhA Academy of Pharmaceutical Research and Science (APhA–APRS), encourages and recognizes outstanding meritorious achievement in any of the pharmaceutical sciences. Contributions to be recognized are in the areas of basic pharmaceutical, clinical, and economic, social, and administrative sciences, which develop knowledge and integrate the process of science into the profession of pharmacy. The award rotates each year among the APhA–APRS Sections. In 2016, the award recognizes contributions in the area of basic sciences.

Myron (Mike) K. Jacobson, PhD, was selected in recognition of his outstanding contributions to pharmaceutical research and his educational leadership experience. Jacobson is the founding Dean and Professor of Pharmaceutical Sciences at the University of North Texas (UNT) System College of Pharmacy of the UNT Health Science Center in Fort Worth Texas. With a body of research that encompasses more than 40 years, Jacobson has published more than 170 papers and book chapters, has over 30 patents, and has formed three companies to further develop products in his area of expertise. His research focuses on the understanding and therapeutic development of nutrient and drug effects of vitamin B_3 and its major bioactive form, NAD. Jacobson has also made major contributions to pharmacy education as a teacher by leading the development and implementation of professional pharmacy curriculum innovations, training graduate students, and serving as an academic pharmacy administrator. He received his PhD from Kansas State University.

EBERT PRIZE

Endowed by the Ebert Legacy

The Ebert Prize, administered by APhA–APRS, was established in 1873. It recognizes the author(s) of the best report of original investigation of a medicinal substance published in the *Journal of Pharmaceutical Sciences* in the past year. Both the editorial advisory board of the journal and the APhA–APRS Awards Committee participate in the selection process.



Christoph Thiel, MS, was selected in recognition of his paper, A Systematic Evaluation of the Use of Physiologically Based Pharmacokinetic Modeling for Cross-Species Extrapolation," published in the November 12, 2014, online issue of *Pharmacokinetics, Pharmacodynamics, and Drug Transport and Metabolism*. Co-authors of the paper were Sebastian Schneckener; Markus Krauss; Ahmed Ghallab; Ute Hoffman; Tobias Kanacher; Sebastian Zellmer; Rolf Gebhardt; Jan G. Hengstler; and Lars Kuepfer. Thiel is a PhD student at the Institute of Applied Microbiology in Aachen, Germany. He received an MS in Bioinformatics from Saarland University.

CLINICAL RESEARCH PAPER AWARD

This award, established in 2006, is intended to promote and encourage high-quality clinical research or practice-based research in the clinical sciences by recognizing an original research article in this area published in the *Journal of the American Pharmacists Association*.

Heidi R. Luder, PharmD, was selected in recognition of her paper, "TransitionRx: Impact of community pharmacy postdischarge medication therapy management on hospital readmission rate," which was published in the May/June 2015 issue of the Journal of the American Pharmacists Association. Her co-authors are Stacey M. Frede; James A. Kirby; Kelly Epplen; Teresa Cavanaugh; Jill E. Martin-Boone; Wayne F. Conrad; Diane Kuhlmann; and Pamela C. Heaton. Luder is an Assistant Professor of Pharmacy Practice at the University of Cincinnati and she practices in the community pharmacy setting at Kroger Pharmacy in various clinical services. She received a PharmD from Drake University College of Pharmacy and is a board certified ambulatory care pharmacist.

WIEDERHOLT PRIZE

This award was established in 1996 as the APhA Best Published Paper Award for Economic, Social, and Administrative Sciences. In 2002, it was renamed the Wiederholt Prize in honor of Joseph B. Wiederholt, PhD (1949–2001). Dr. Wiederholt was the first recipient of the award and a professor at the University of Wisconsin–Madison. The purpose of the award is to recognize the best paper published in the *Journal of the American Pharmacists Association* within the past 2 calendar years, describing original investigation in the areas of economic, social, or administrative sciences.

Pamela C. Heaton, BSPharm, PhD, was selected in recognition of her paper, U.S. Emergency Departments Visits Resulting From Poor Medication Adherence: 2005–07, published in the September/October 2013 issue of the *Journal of the American Pharmacists Association.* Her co-authors are Namita L. Tundia and Heidi R. Luder. Heaton is Chair and Associate Professor of Pharmacy Practice and Administrative Sciences at the Winkle College of Pharmacy at the University of Cincinnati. She received her PhD from the University of Cincinnati.

Student Awards and Honors, Administered by the APhA Academy of Student Pharmacists

LINWOOD F. TICE FRIEND OF THE APhA ACADEMY OF STUDENT PHARMACISTS AWARD

Established in 1988, this award recognizes an individual whose long-term services and contributions have supported the APhA Academy of Student Pharmacists (APhA–ASP) and its members. Formerly known as the APhA Friend of ASP Award, the award was renamed in 1994 to honor University of the Sciences in Philadelphia Dean Emeritus and APhA Past-President Dr. Linwood F. Tice who, in his capacity as Chair of the APhA Committee on Student Branches from 1952 to 1955, was instrumental in the formation of the APhA organizational unit that evolved into APhA–ASP.

Stephanie J. Phelps, BSPharm, PharmD, BCPS, FCCP, FAPhA, was selected in recognition of her exceptional dedication and commitment to enriching the academic and leadership experiences of student pharmacists at The University of Tennessee Health Sciences Center College of Pharmacy. She joined the faculty of the University of Tennessee College of Pharmacy in 1982 and currently serves as the college's Associate Dean of Academic Affairs. Phelps has served as the college's APhA-ASP faculty advisor for 25 years, demonstrating her long term commitment to student pharmacists and her passion for excellence in their development as professionals. Under her guidance, the chapter received the national Chapter of the Year award three times and has had six students serve as APhA-ASP National Officers. Phelps received her PharmD from The University of Tennessee Health Sciences Center College of Pharmacy.

OUTSTANDING CHAPTER ADVISOR AWARD

The APhA–ASP Outstanding Chapter Advisor Award was established in 1988 to recognize advisors of APhA–ASP chapters who have promoted with distinction the welfare of student pharmacists through various professional activities.

Cherokee Layson-Wolf, PharmD, CGP, BCACP, FAPhA, was selected in recognition of her enthusiastic commitment to success and professional leadership development of student pharmacists at the University of Maryland School of Pharmacy. Layson-Wolf is currently the Associate Dean of Student Affairs and has served as a Chapter Advisor since 2002. She is an instructor in the Pharmacy-based Immunization Certificate Training Program at the school, and uses this expertise to help train and prepare students to deliver immunizations at countless health fairs and service events in the surrounding Baltimore community. Many of the students that she has advised have gone on to be respected mentors, continuing to propagate the values she instilled. Layson-Wolf received her PharmD from the University of Maryland School of Pharmacy.

OUTSTANDING DEAN AWARD

The APhA–ASP Outstanding Dean Award was established in 2005 to recognize the deans of the schools and colleges of pharmacy nationwide who have promoted with distinction the welfare of student pharmacists through various professional activities.

Larry Calhoun, PharmD, was selected in recognition of his outstanding contributions to the academic and professional leadership development of student pharmacists at the East Tennessee State University Bill Gatton College of Pharmacy. Calhoun has served as the college's Dean since the school's inception in 2005. Prior to serving in this role, Calhoun was President and CEO of a private healthcare corporation. He has spent more than 20 years in the hospital industry, where he held numerous roles including CEO, Vice President for Clinical Services, and Director of Pharmacy. Calhoun has worked tirelessly at ETSU to create a unique culture marked by student-centeredness and a family-like environment among student, faculty, alumni, and donors. He received his PharmD from the East Tennessee State University Bill Gatton College of Pharmacy.

GOOD GOVERNMENT STUDENT PHARMACIST-OF-THE-YEAR AWARD

Supported by the APhA Political Action Committee Board of Governors

This award, established in 2004, recognizes a student pharmacist who actively promotes the value of advocating for the profession and organizes student pharmacist grassroots activity within his or her chapter. Nominees must be active members of the APhA Academy of Student Pharmacists (APhA–ASP) and a state pharmacy association. The government affairs activity for which the recipient was nominated must have raised student pharmacists' awareness of current state and federal issues and made a positive impact on the pharmacy profession.

Hanna M. Burgin was selected in recognition of her commitment and dedication to promoting advocacy in the profession of pharmacy at the University of Cincinnati James L. Winkle College of Pharmacy. She has served as the college's APhA-ASP Policy Vice President for the past 2 years. Through this position, she has served as a Student Trustee on the Ohio Pharmacists Association Board of Trustees, organized voter registration, and prepared monthly legislative newsletters for pharmacy students. She has also drafted resolution proposals, discussed policy with legislators on a state and federal level, executed Call Your Legislator Day, and is planning a legislative dinner for local legislators. Burgin is currently a third-year student pharmacist at the University of Cincinnati James L. Winkle College of Pharmacy.

STUDENT LEADERSHIP AWARDS

Endowed by Procter & Gamble

Established in 1983, the APhA Student Leadership Award recognizes outstanding academic achievement and leadership ability of students entering their last year of pharmacy school. The recipients of the award for 2016 are:

Jordan Long
Cedarville University School of Pharmacy

Robert Monroe Crawley
The University of Tennessee Health Science Center College of Pharmacy

Evan Colmenares
UNC Eshelman School of Pharmacy University of North Carolina at Chapel Hill

Scott Brewster
East Tennessee State University Bill Gatton College of Pharmacy

ACADEMY OF STUDENT PHARMACISTS CHAPTER ACHIEVEMENT AWARDS

The APhA–ASP Chapter Achievement Awards were established in 1974 to recognize outstanding activities during the previous school year of chapters of APhA–ASP at schools and colleges of pharmacy in the United States. The recipients for 2014–2015 will be announced at the APhA–ASP Awards Ceremony on, Sunday, March 6, 2016, 8:00 pm – 10:00 pm, in the Convention Center, Level 400 Ballroom.

The American Pharmacists Association acknowledges the assistance of the following individuals who participated in the review and selection processes of the 2016 APhA Awards and Honors Program.

APhA BOARD OF TRUSTEES

Lawrence "L.B." Brown, President
Jean-Venable "Kelly" R. Goode, President-elect
Matthew C. Osterhaus, Immediate Past President
Metta Lou Henderson, Honorary President
Tery Baskin, Treasurer
Thomas E. Menighan, Executive Vice President/CEO
Theresa Tolle, Speaker of the House of Delegates
Wendy Weber, APhA-APPM President
Melody Ryan, APhA-APRS President
Lucy West, APhA-ASP President
Nancy A. Alvarez
Gregory A. Fox
Dennis Helling
Linda Garrelts MacLean
Ronald H. Small
Bradley P. Tice

APhA ACADEMY OF PHARMACEUTICAL RESEARCH AND SCIENCE EXECUTIVE COUNCIL

President: Melody Ryan
President-elect: Robert DiCenzo
Chair, Basic Sciences Section: Bill McLaughlin
Chair-elect, Basic Sciences Section: Anthony Di Pasqua
Chair, Clinical Sciences Section: Julie Oestreich
Chair-elect, Clinical Sciences Section: Darius Mason
Chair, ESAS Section: Joel Farley
Chair-elect, ESAS Section: Kevin Farmer
Postgraduate Officer: Jill Augustine

APhA ACADEMY OF PHARMACY PRACTICE AND MANAGEMENT EXECUTIVE COMMITTEE

President: Wendy Weber
Immediate Past President: Nicki Hilliard
Members-at-Large: Amber Beals, Amy Kennedy, Catherine Kuhn, Bella Mehta, Michael Schuh, Daniel Zlott
New Practitioner Officer: Phillip Lawrence

APhA ACADEMY OF STUDENT PHARMACISTS NATIONAL EXECUTIVE COMMITTEE

National President: Lucy West, Northeastern University
National President-elect: Kelsea Gallegos, The University of New Mexico
National Members-at-Large: Stephanie Garza, The University of Texas at Austin; Jeffrey Van Liew, University of the Incarnate Word
Speaker of the House: Lauren Bode, The University of Tennessee Health Science Center

APhA FORMER PRESIDENTS

Lowell J. Anderson
William F. Appel
Maurice Q. Bectel
Marialice S. Bennett
J. Lyle Bootman
Grover C. Bowles
Bruce R. Canaday
R. David Cobb
Robert E. Davis
George D. Denmark
James T. Doluisio
Janet P. Engle
Philip P. Gerbino
Robert D. Gibson
Harold N. Godwin
Charles R. Green
Ed L. Hamilton
Robert C. Johnson
Ronald P. Jordan
Gary W. Kadlec
Calvin H. Knowlton
Winnie A. Landis
Eugene M. Lutz
James A. Main
Thomas E. Menighan
Jacob W. Miller
Robert J. Osterhaus
Marily H. Rhudy
Steven T. Simenson
Jenelle L. Sobotka
Kenneth E. Tiemann
Lisa L. Tonrey
Timothy L. Tucker
Tim L. Vordenbaumen Sr.
William R. Whitten

REMINGTON HONOR MEDAL SCREENING AND SELECTION COMMITTEES

Cynthia Boyle
Sharon Clackum
Patricia Epple
Raulo Frear
Steven Gray
Jerome Greene
Metta Lou Henderson
Judith Jacobi
Col Loren Janke
Christene Jolowsky
Calvin Knowlton
Carleton Maxwell
Marilyn E. Morris
LTC Jeff Neigh
Ronald Nosek Jr.
CDR Olaitan Ojo
CDR Sheila Ryan
Steven Simenson
Edward Smosna
Pat Stephens
Christian Tadrus
C. Wayne Weart

APhA GLORIA NIEMEYER FRANCKE LEADERSHIP MENTOR AWARD SELECTION COMMITTEE

Cynthia Boyle
Julie Johnson
Douglas A. Miller
Ralph L. Saroyan
Todd Sorensen

DISTINGUISHED FEDERAL PHARMACIST AWARD SELECTION COMMITTEE

Chair: Ronald H. Small
LTC Tai Bolaji
Mario Franchi
CDR Heather Hellwig
Jon Schuchardt
COL J. Michael Spilker

GENERATION Rx AWARD OF EXCELLENCE SELECTION COMMITTEE

Charles J. Broussard
Melissa Duke
Brian Fingerson
Jake Nichols
Nathan Painter

APhA-PAC BOARD OF GOVERNORS

Chair: Steve Firman
Vice Chair: Susie Bartlemay
Edward M. Bednarczyk
Robin Cooke
Gregory A. Fox
Lauren Bode
Kem Krueger
Michael Moné
Norman Tomaka

APhA NEW PRACTITIONER NETWORK AWARDS STANDING COMMITTEE

Chair: David Steeb
Lauren Anderson
Michelle Carey
Cortney Mospan
Ashley Pugh

APhA COMMUNITY PHARMACY RESIDENCY EXCELLENCE IN PRECEPTING AWARD SELECTION COMMITTEE

Stefanie Ferreri
Sharon Gatewood
Cherokee Layson-Wolf
Melissa McGivney
Joe Moose

APhA ACADEMY OF PHARMACY PRACTICE AND MANAGEMENT AWARDS STANDING COMMITTEE

Chair: Dan Zlott
Katelyn Alexander
Jean Cottrell
Gretchen Garofoli
Nicole Gattas
Sara LaBella
Bella Mehta
Bridgette Nelson
Lalita Prasad-Reddy
Deanna Tran

APhA ACADEMY OF PHARMACY PRACTICE AND MANAGEMENT FELLOWS SELECTION SUBCOMMITTEE

Chair: Dan Zlott
Anthony Ball
Brandon Craig
Carole Hardin-Oliver
Chelsea Leeper
Sarah Parnapy
Valerie Prince
Susan Vos
Adam Welch
Kristina Wittstrom

APhA ACADEMY OF PHARMACEUTICAL RESEARCH AND SCIENCE AWARDS STANDING COMMITTEE

Chair: Joel Farley
Anthony Di Pasqua
Mary Gurney
Roger Lander
Eunjoo Pacifici
Lourdes Planas
Nate Rickles

SCREENING COMMITTEE FOR THE CLINICAL RESEARCH PAPER AWARD

Chair: Julie Oestreich
Darius Mason
Milap Nahata
Kimberly Scarsi

SELECTION COMMITTEE FOR THE EBERT PRIZE

Chair: Ronald T. Borchardt
Bruce Aungst
Jared Bee
Ben Boyd
Mino Caira
Hartmut Derendorf
Ken-ichi Hosoya
Yukio Kato
Fillipos Kesisoglou
Peter Kleinebudde
Gregg Knipp
Bill Lambert
Patrick McNamara
Miki Nakajima
Linda Narhi
Joseph Nicolazzo
Yvonne Perrie
Calvin Sun
Mikihisa Takano
Sasuma Uchiyama
David Volkin
Kouichi Yoshinari
Hiroaki Yuasa

SCREENING COMMITTEE FOR THE WIEDERHOLT PRIZE

Chair: Joel Franklin
Joshua Devine
David Holdford
Julie Urmie

APhA ACADEMY OF STUDENT PHARMACISTS AWARDS STANDING COMMITTEE

Vice Chair: Kelsea Gallegos, The University of New Mexico
Kaity Erickson, University of Minnesota
Allie Jo Shipman, Mercer University

American Pharmacists Association®
Improving medication use. Advancing patient care.
APhA 2215 Constitution Avenue, NW • Washington, DC 20037-2985

Signatures of Support

Infectious Diseases Pharmacists

Joshua Courter, PharmD
Pharmacy Clinical Specialist
Cincinnati Children's Hospital Medical Center
3333 Burnet Ave
Cincinnati, Ohio 45229

Amanda Binkley, PharmD, AAHIVP Clinical Pharmacist Specialist Infections Diseases
Penn Presbyterian Medical Center
658 Wagner Court
North Wales, Pennsylvania 19454

LeAnn Malone, PharmD,BCPS
Clinical Pharmacist
Christus St. Francis Cabrini Hospital
3330 Masonic Drive
Alexandria, Louisiana 71301

Julie Ann Justo, PharmD, MS, BCPS-AQ ID
Assistant Professor/ID Clinical Specialist
University of South Carolina
College of Pharmacy
715 Sumter St
Columbia, South Carolina 29208

Sarah Wisecup-Kubes PharmD, BCPS
Antimicrobial Stewardship and Infectious Disease Pediatric Clinical Pharmacist
The Children's Hospital of
San Antonio-Christus Health
333 N. Santa Rosa St
San Antonio, Texas 78207

Christo Cimino, PharmD
Clinical Pharmacy Specialist –
Infectious Diseases
Penn Presbyterian Medical Center

Clayton Boothe, RPh, MS
Clinical Pharmacy Manager
Christus St. Frances Cabrini Hospital
3330 Masonic Drive
Alexandria, Louisiana 71301

Karen Santa Cruz, RPh
Director of Pharmacy
Promise Hospital of Overland Park
6509 W. 103rd St.
Overland Park, Kansas 66212

Stephen Jankovich, PharmD
Clinical Staff Pharmacist
Presence Saint Joseph Medical Center
333 N Madison St
Joliet, Illinois 60435

Aileen Martinez, PharmD, BCPS
Clinical Pharmacy Specialist, Infectious Diseases
Martin Health System
200 SE Hospital Ave
Stuart, Florida 34994

Victoria McGruder, PharmD
909 111th street
Pleasant Prairie, Wisconsin 53158

Cameale Johnson, PharmD, MBA
Clinical Coordinator
South Peninsula Hospital
4300 Bartlett St
Homer, Alaska 99603

Jill Cowper, PharmD
Division infectious diseases pharmacist
Parallon Supply Chain Solutions
200 Wadsworth Drive
Richmond, Virginia

Robin Colon-Moreno, PharmD, BCPS, PRS
Pharmacy Operations Coordinator
Morton Plant Hospital
300 Pinellas Street
Clearwater, Florida 33756

Leigh Peek, PharmD, BCPS, BCPPS
Pediatric Clinical Pharmacy Specialist
OU Medical Center
1200 Everett Drive
Oklahoma City, Oklahoma 73104

Anna Kissell, PharmD, BCPPS
Children's Hospital of Wisconsin
9000 W Wisconsin Ave
Milwaukee, Wisconsin 53226

William Musick, PharmD, BCPS-AQID
Clinical Specialist in Infectious Diseases
Houston Methodist Hospital
6565 Fannin St, MB1-09
Houston, TX 77030

Zach Marty, PharmD
Inpatient Pharmacy Supervisor
HIS Belcourt, ND
1300 Hospital Loop
Belcourt, North Dakota 58316

Anna Meehan, PharmD
Mark Twain Medical Center
768 Mountain Ranch Rd
San Andreas, California 95249

Russell Benefield, PharmD, BCPS (AQ-ID)
Clinical Specialist, Infectious Diseases
University of Utah Hospitals and Clinics
50 N Medical Drive
Salt Lake City, UT 84105

Adam Brothers, PharmD
BMT/ASP Pharmacist
Seattle Children's Hospital
4800 Sand Point Way
Seattle, Washington 98105

Shannon Chan, PharmD
Coordinator of the Antimicrobial Stewardship Program
Nemours-AI duPont Hospital for Children
1600 Rockland Rd
Wilmington, Delaware 19802

David Cretella, PharmD
Infectious Disease Pharmacy Specialist
University of Mississippi Medical Center
2500 North State Street
Jackson, Mississippi 39216

Sophia Cardwell, PharmD, MPH, BCPS
Lead Pharmacist, Infectious Diseases/Antimicrobial Stewardship
Northern Arizona Healthcare
1200 N. Beaver St.
Flagstaff, Arizona 86001

David LaCoste, PharmD
Clinical Coordinator
Cheshire Medical Center
580 Court St
Keene, New Hampshire 03431

Bhavin Mistry, PharmD, BCPS
Infectious Diseases Pharmacotherapy Specialist
Cleveland Clinic Akron General
1 Akron General Ave
Akron, Ohio 44307

Victoria Adams, PharmD, BCPS
DR.
Johns Hopkins Bayview Medical Center
4940 Eastern Avenue
Baltimore, Maryland 21224

Greg Perry, PharmD, BCPS-AQID
Pharmacy Clinical Manager
1900 Pine Street
Abilene, TX 79601

Carla Kennedy, PharmD
Pharmacy Manager
Novant Health Rowan Medical Center
612 Mocksville Ave
Salisbury, North Carolina 28144

Kelli Cole, PharmD, BCPS
Antimicrobial Stewardship Pharmacist
University of Toledo Medical Center
3000 Arlington
Toledo, Ohio 43614

Ken Burleson, BS Pharm
Clinical Staff Pharmacist
Frye Regional Med Center
420 N. Center Street
Hickory, North Carolina 28601

Mia Barnes, PharmD, BCPS
Clinical Pharmacist Specialist
infectious Diseases
Hendrick Medical Center

Megan Bernabe, PharmD, MPH, BCPS
Clinical Pharmacist
Mercy Medical Center
701 10th St SE
Cedar Rapids, Iowa 52403

Daniil Pogosov, PharmD, BCPS
Clinical Pharmacy Coordinator,
Antimicrobial Stewardship Program
Pharmacist Leader
Northern Westchester Hospital
400 East Main Street
Mt. Kisco, New York 10549

Jeffrey Parsons, PharmD
Antimicrobial Stewardship Pharmacist
Henry County Medical Center
301 Tyson Ave.
Paris, Tennessee 38242

Ursula Patel, PharmD, BCPS AQ-ID
Infectious Diseases
Clinical Pharmacy Specialist;
Director, PGY2 ID Pharmacy Residency Program

Edward Hines, Jr. VA Hospital
5000 S. Fifth Ave.
Hines, Illinois 60141

Shahina Shaikh

Dustin Clark, PharmD
Clinical Pharmacist - Antimicrobial Stewardship
Harris Regional Hospital | A Duke Lifepoint Hospital
68 Hospital Drive
Sylva, North Carolina 28779

Wissam Kabbara, PharmD, BCPS-AQID
Clinical Assistant Professor
Lebanese American University
Byblos

Nathan Wirick, PharmD, BCPS
Clinical Specialist
Cleveland Clinic- Hillcrest Hospital
6780 Mayfield Road
Mayfield Heights, Ohio 44124

Ronald Smith, RPh
Clinical Pharmacy Specialist
Robley Rex VAMC
800 Zorn Ave
Louisville, Kentucky 40220

Zina Gugkaeva, PharmD
Infectious Disease Pharmacist
Maury Regional Hospital
M1224 Trotwood Av
Columbia, Tennessee 38401

Gina Harper, PharmD, BCPS
Clinical Coordinator
Poudre Valley Hospital
1024 S Lemay Ave
Fort Collins, Colorado 80524

Stephen Gagnon, PharmD, AAHIVP
839 Rat 146
Clifton Park, New York 12065

Daniel Farney, PharmD, BCPPS
PICU Lead Pharmacist
Miller Children's and Women's Hospital
Long Beach
2801 Atlantic Ave
Long Beach, California 90801

Nicholas Giller, PharmD, BCPS, BCOP
Clinical Pharmacist
FirstLight Health System - Hospital Pharmacy
301 South Highway 65
Mora, Minnesota 55051

Kimberly Couch, PharmD, MA, FIDSA, FASHP
Pharmacy Specialist, Infectious Diseases
Nanticoke Health System
801 Middleford Rd
Seaford, Delaware 19973

Eric Wombwell, PharmD
Clinical Associate Professor
University of Missouri
Kansas City School of Pharmacy
2464 Charlotte St
Kansas City, Missouri 64108

Matthew Lambie, PharmD, BCPS
Clinical Manager
Indian River Medical Center
1000 36th
Vero Beach, Florida 32960

Saira Rab, PharmD, BCPS (AQ-ID), AAHIVP
Infectious Diseases
Clinical Pharmacist Specialist
Grady Health System
80 Jesse Hill Jr Dr SE
Atlanta, Georgia 30303

Lindsey Buscemi, PharmD, BCPS
Infectious Diseases Clinical Pharmacist
University of Virginia Health System
Charlottesville, Virginia 22901

Minh Pham, PharmD, BCPS, AAHIVP
Clinical Infectious Disease Pharmacist
Cone Health Pharmacy Dept.
1200 N Elm St
Greensboro, NC 27401

Kendra Vermeulen, PharmD, AAHIVP
Clinical Pharmacy Specialist
New Jersey VAMC
385 Tremont Ave
East Orange, New Jersey 07018

Steven Dzierba, PharmD BCPS MS FASHP
Director Pharmacy Services
Plaza Medical Center of Fort Worth
900 Eighth Avenue
Fort Worth, Texas 76104

Kristy Scott, PharmD
Clinical Infectious Disease Pharmacist
Holy Cross Hospital

4725 North Federal Highway
Fort Lauderdale, Florida 33334

Randolph Fugit, PharmD, BCPS
Infectious Diseases Clinical Specialist
Director, Antimicrobial Stewardship Program
Denver VA Medical Center
1055 Clermont Street (119)
Denver, Colorado 80124

Adrienne Albrecht, RPh
Clinical Pharmacy Specialist
University Hospital
1350 Walton Way
Augusta, Georgia 30901

Maureen Connors, PharmD, BCPS, MPH
Clinical Pharmacist
MedSTar Union Memorial Hospital
201 E. University Parkway
Baltimore, Maryland 21093

Mark Chew, PharmD
Chief Pharmacist - Health Disaster Management
Public Health & Emergency Medical Services
County of Orange Health Care Agency
2228 Ritchey Street
Santa Ana, California 92705

Rachael Ours, PharmD
Clinical Pharmacy Specialist
Antimicrobial Stewardship
UPMC Hamot
201 State St
Erie, Pennsylvania 16506

Athena Hobbs, PharmD
Infectious Diseases Clinical
Pharmacy Specialist
Baptist Memorial Hospital Memphis
6019 Walnut Grove Road
Memphis, Tennessee 38120

Kelly Echevarria, BCPS, AQ-ID
Infectious Diseases Clinical Pharmacy Specialist
Specialty Acute Care Program Manager
South Texas Veterans Health Care System
7400 Merton Minter Blvd
San Antonio, Texas 78229

Kathryn Hernando, PharmD, BCPS
Infectious Diseases Pharmacist
North Florida Regional Medical Center
6500 Newberry Road
Gainesville, Florida 32606

Alyssa Doehrel, PharmD, BCPS
Antimicrobial Stewardship Pharmacist
Veterans Affairs
6439 Garners Ferry Rd
Columbia, South Carolina 29209

Jim Turley, PharmD
Director of Pharmacy
Vibra Hospital of Denver
8451 Pearl St.
Thornton, Colorado 80229

Kathryn O'Donnell, PharmD, BCPS
Pharmacy Clinical Coordinator
Greenview Regional Hospital Pharmacy
1801 Ashley Circle
Bowling Green, Kentucky 42104

Joseph Pardo, PharmD, BCPS, AAHIVP
Antimicrobial Stewardship Program Manager
North Florida/South Georgia
Veterans Health System
1601 SW Archer Road
Gainesville, FL

Jonathan Bradshaw, PharmD, BCPS

Paul Mattingly, PharmD
SVP Pharmacy Service
Vibra Healthcare, LLC
4550 Lena Drive Suite 225
Mechanicsburg, Pennsylvania 17055

Justin Wrin, PharmD, BCPS
Clinical Pharmacist - Infectious Diseases
Internal Medicine
Indiana University Health Arnett Hospital
5165 McCarty Ln
Lafayette, Indiana 47905

William Strozyk, PharmD
Clinical Specialist Internal Medicine
Infectious Diseases
Fort Sanders Regional Medical Center
1901 Clinch Avenue
Knoxville, Tennessee 37938

James Sims, PharmD, BCPS, NCPS
Advanced Practice Pharmacist I
Crow/Northern Cheyenne Hospital
10110 S 7650th E
Crow Agency, Montana 59022

Benjamin Daigler, PharmD
Clinical Pharmacist
Mercy Hospital of Buffalo,
Catholic Health System
565 Abbott Rd
Buffalo, New York 14220

Joshua Sawyer, PharmD, AAHIVP
Clinical Assistant Professor
University at Buffalo School of Pharmacy and
Pharmaceutical Sciences
701 Ellicott Street Room B2-138
Buffalo, NY 14203

Michael Kelsch, PharmD, BCPS
Vice Chair / Associate Professor of Practice
North Dakota State University
Sudro Hall 118N; Dept. 2660
Fargo, North Dakota 58108-6050

Sayo Weihs, PharmD, MBA, BCPS
Antimicrobial Stewardship Pharmacist
Truman Medical Center
2301 Holmes St.
Kansas City, Missouri 64108

Jared Smith, PharmD

Carrie Sorenson, PharmD
Clinical Pharmacist
CHI St. Alexius Health
900 E Broadway
Bismarck, North Dakota 58502

Amit Kapadia, PharmD, BCPS
Clinical Pharmacist
Aspen Valley Hospital
401 Castle Creek Rd
Aspen, Colorado 81611

Jennifer Cupo Abbott, PharmD, FASHP
Infectious Diseases Pharmacist Specialist
Keck Hospital of USC
1500 San Pablo Street
Los Angeles, California 90033

Katy Cooper, PharmD
Clinical Pharmacist
Aspen Valley Hospital
0401 Castle Creek Rd.
Aspen, Colorado 81611

Katie Namtu, PharmD
Pediatric Infectious Diseases Clinical Specialist
Johns Hopkins All Children's Hospital
501 6th Avenue South
St. Petersburg, Florida 33701

Jovino Hernandez, PharmD, BCPS
Pharmacy Clinical Coordinator
Winter Haven Hospital
200 Ave F NE
Winter Haven, Florida 33844

W. Bradley Nicholson, PharmD
Director of Pharmacy
Bothwell Regional Health Center
601 East 14th Street
Sedalia, Missouri 65301

Dora Wiskirchen, PharmD, BCPS
Assistant Professor
University of Saint Joseph, School of Pharmacy
229 Trumbull St
Hartford, Connecticut 06103

Brian Fung, PharmD, BCPS, MAD-ID
Medication Management Informaticist
Mayo Clinic
200 First Street SW
Rochester, Minnesota 55905

Alyssa Walker, PharmD, BCPS
Infectious Diseases Pharmacist
St. Anthony Hospital
11600 W. 2nd Place
Lakewood, Colorado 80228

Lindsay McDonnell, PharmD
Clinical Pharmacy Specialist in Infectious Diseases
Pennsylvania Hospital
800 Spruce Street
Philadelphia, Pennsylvania 19107

Ruth Korch,
Clinical Pharmacist
St Francis Hospital
114 Woodland Ave
Hartford, Connecticut 06105

Leah Cochran, PharmD, BCPS
Clinical Pharmacist
Piedmont Hospital
1968 Peachtree Rd NW
Atlanta, Georgia 30309

Kimberly Novak, PharmD, BCPS, BCPPS
Advanced Patient Care Pharmacist-Pediatric and Adult Cystic Fibrosis;
Residency Program Director, PGY2 Pharmacy Residency-Pediatrics
Nationwide Children's Hospital
700 Children's Drive
Columbus, Ohio 43205

Katherine Shihadeh, PharmD
Infectious Diseases Pharmacy Specialist
Denver Health Medical Center
790 Delaware St
Denver, CO

Karisma Patel, PharmD
Clinical Specialist, Infectious Diseases
Children's Mercy Hospital
2401 Gillham Road
Kansas City, Missouri 64108

Christina Caplinger, PharmD, BCPS
Truven Health Analytics
Colorado 80206

Phil Maletich, PharmD, BCPS
Ohio

Jeremy Frens, PharmD, BCPS-AQ ID
Clinical Pharmacist - Infectious Diseases
Cone Health
1200 N. Elm St.
Greensboro, North Carolina 27401

Kate Pleasants, PharmD
Clinical Infectious Disease Pharmacy Specialist
Ralph H. Johnson VA Medical Center
109 Bee Street
Charleston, South Carolina 29401

Brian Nelson, PharmD
Infectious Diseases Clinical Pharmacist
NewYork-Presbyterian Hospital/Columbia
University Medical Center
622 W 168th Street
New York, New York 10032

Dustin Carr, PharmD, BCPS

Linda Johnson, PharmD, BCPS
Clinical Infectious Diseases Specialist
CHI Memorial
2525 DeSales Avenue
Chattanooga, Tennessee 37402

Annie Stock, PharmD, BCPS
Antimicrobial Stewardship Program Coordinator
Clinical Pharmacy Specialist, Infectious Diseases
Columbus Regional Health
2400 E. 17th Street
Columbus

Jessica Cobian, PharmD, BCPS
Infectious Disease Clinical Specialist
Lakeland Regional Health
1324 Lakeland Hills Blvd
Lakeland, Florida 33805

LeAnne Moore, PharmD, BCPS
Clinical Pharmacist Specialist-
Pediatric Antimicrobial Stewardship
Rainbow Babies & Children's Hospital
11100 Euclid Avenue
Cleveland, Ohio 44106

Kathleen Haight, PharmD, BCACP, AAHIVP
Clinical Pharmacist/Staff II Pharmacist
UC Davis Health System/Cares Community
Health Clinic
2315 Stockton Blvd
Sacramento, California 95817

Mina Abdalla, PharmD, BCPS
Clinical Pharmacist
Mercy Hospital
3663 S Miami Ave
Miami, FL 33025

Nickie Greer, PharmD, BCPS
HCA TriStar Division
Infectious Diseases Pharmacist
HCA/Parallon
245B Great Circle Rd
Nashville, Tennessee 37228

Armisha Desai PharmD, BCPS
Clinical Infectious Diseases Pharmacist
ProMedica Toledo Hospital

Fay Chan PharmD.
Infectious Diseases Pharmacist
Plaza Medical Center
900 8th Ave.
Ft. Worth, Texas 76104

James Lewis, PharmD, FIDSA
Infectious Diseases Pharmacy Supervisor
Oregon Health and Science University
3181 SW Sam Jackson Park Road
Portland, Oregon 97239

Kara Clothier, PharmD, BCPS
PGY1 Residency Program Director
SwedishAmerican - A Division of UW Health
1401 E. State Street
Rockford, Illinois 61104

Sherri Jobin, BCPS
Clinical Pharmacy Coordinator
HealthEast St. Joseph's Hospital
45 West 10th Street
St. Paul. Minnesota 55112

Thamer Almangour, PharmD, BCPS
PGY2 Infectious Diseases Pharmacy resident
Midtown Medical Center, Columbus, GA
710 Center Street
Columbus, Georgia 31904

Amira Magdy
Egypt Cairo

Yasir Ibrahim, MS, PharmD, BCPS
Head of Pharmacy Practice Department
King Faisal University,
College of Clinical Pharmacy
P. O. Box 400
AlAhsa 31982

Andrea Weeks, PharmD
Clinical Pharmacist Infectious Disease
Paoli Hospital
255 west Lancaster Ave
Paoli, Pennsylvania 19301

Ohannes Kandilian, PharmD
Clinical Coordinator/ID Pharmacist
Henry Mayo Newhall Hospital
23845 McBean Parkway
Valencia, California 91355

Mary Lourdes Brundige, BS, PharmD
Clinical Specialist for Infectious Disease and
Antimicrobial Stewardship
Rochester General Hospital
1425 Portland Ave
Rochester, New York 14621

Shin-Pung Jen, PharmD
Clinical Pharmacy Specialist
University Hospital
150 Bergen Street, UH B134
Newark, New Jersey 07101

Chris Childress, PharmD
Antimicrobial Stewardship Pharmacist
Camden Clark Medical Center
800 Garfield Ave
Parkersburg, West Virginia 26102

John Phillips, PharmD
Antibiotic Stewardship Pharmacist
Mission Hospital
509 Biltmore Avenue
Asheville, North Carolina 28801

Shaina Doyen, PharmD
ID Pharmacist
Baptist Health Louisville
4000 Kresge Way
Louisville, Kentucky 40207

Alan Gross, PharmD, BCPS-AQ ID
Clinical Assistant Professor
University of Illinois at Chicago
College of Pharmacy
833 S. Wood St.
Chicago, Illinois 60612

John Zeuli, PharmD, BCPS
Clinical Pharmacist, Infectious Diseases/Ambulatory Care
Mayo Clinic
200 1st St SW
Rochester, Minnesota 55905

Trish Orland, PharmD
Associate Professor of Pharmacotherapy/Infectious Diseases Pharmacist (SLC VA)
University of Utah College of Pharmacy
Salt Lake City Veterans Affairs Medical Center
30 S 2000 E #4298
Salt Lake City, Utah 84112

Megan Patch, MS, PharmD, BCPS
Antimicrobial Stewardship Pharmacy Specialist
Baptist Health System
3333 Springhill Dr
North Little Rock, Arkansas 72117

Patricia Saunders-Hao, PharmD, BCPS AQ-ID
Clinical Pharmacist, Infectious Diseases
The Mount Sinai Hospital
1 Gustave Levy Place
New York, New York 10029

Megan Fleming, PharmD
Clinical Pharmacy Specialist
Antimicrobial Stewardship
Eskenazi Health
720 Eskenazi Ave
Indianapolis, Indiana 46202

Matthew Brown, PharmD, BCPS
Clinical Pharmacy Specialist
Princeton Baptist Medical Center
701 Princeton Ave SW
Birmingham, Alabama 35211

Larissa Coyle, PharmD, BCPS
Clinical Pharmacy Specialist – Infectious Disease
Winchester Medical Center
1840 Amherst Street
Winchester, Virginia 22601

Rob Daniels, PharmD
Pediatric ID Clinical Pharmacist
Director of Childrens Hospital Antimicrobial Stewardship Program
Palmetto Health Children's Hospital
5 Richland Medical Park
Department of Pharmacy
Columbia, South Carolina 29203

Benjamin Ereshefsky, PharmD, BCPS
Clinical Infectious Diseases Pharmacist
Kaweah Delta Health Care
400 W. Mineral King Ave
Visalia California, 93291

Velliyur Vviswesh, PharmD, BCPS
Assistant Professor, ICU Clinical Pharmacist
Valley Hospital Medical Center
11 Sunset Way
Henderson, Nevada 89014

Samuel Aitken, PharmD, BCPS
Clinical Pharmacy Specialist
Infectious Diseases
The University of Texas
MD Anderson Cancer Center
1515 Holcombe Blvd
Houston, Texas 77030

Bethanne Carpenter, PharmD
PGY-2 Infectious Diseases Pharmacy Resident (complete July 15, 2018)
University of Minnesota Medical Center
55455

Michael Holt
Methodist Specialty & Transplant Hospital
8026 Floyd Curl Drive
San Antonio, Texas 78229

Keith Olsen, PharmD
Dean and Professor
University of Arkansas for Medical Sciences
4301 W Markham
Little Rock, Arkansas 72205

John Boreyko, PharmD, BCPS
Infectious Diseases Pharmacist
Co-Director of Antimicrobial Stewardship
Duke Regional Hospital
3643 N. Roxboro Road
Durham, North Carolina 27704

Nicholas Torney, PharmD, BCPS
Infectious Diseases Clinical Pharmacist
Munson Medical Center
1105 6th St
Traverse City, Michigan 49684

Edoabasi McGee, PharmD, BCPS
Assistant Professor of Pharmacy Practice
Philadelphia College of Osteopathic Medicine-GA Campus

Eric Wenzler, PharmD, BCPS
Infectious Diseases
Pharmacotherapy Fellow
University of Illinois at Chicago
833 South Wood St
Chicago, Illinois 60612

Richard Lugar, PharmD, BCPS
Clinical Staff Pharmacist
IU Health Ball Memorial Hospital
2401 W University Ave
Muncie, Indiana 47303

Dominick Salvatore, PharmD, BCPS
Clinical Assistant Professor
UMKC School of Pharmacy at MU
815 Lewis Hall
Columbia, Missouri 65211

Radhika Polisetty, PharmD, BCPS, AQ-ID
Assistant Prof, Clinical Specialist ID
Northwestern Medicine Central
DuPage Hospital Winfield, Il
555 31St Street
Naperville, Illinois 60540

Shellee Grim, PharmD, MS-CTS, BCPS
Clinical Pharmacist,
Transplant Infectious Diseases
Loyola University Medical Center
2160 S. First Avenue
Maywood, Illinois 60153

Shannon Short, PharmD, BCPS
Director of Pharmacy
Brodstone Memorial Hospital
520 E 10th Street
Superior, Nebraska 68978

Andrea Brizee, BCPS

Travis King, PharmD, BCPS
Assistant Professor of Pharmacy Practice
University of Mississippi
School of Pharmacy
2500 North State Street
Jackson, Mississippi 39216

Tiffany Dickey, PharmD
Assistant Professor
University of Arkansas for Medical Sciences
College of Pharmacy
1125 N College Ave.
Fayetteville, Arkansas 72701

Karen Barton, RPh
Infectious Disease Pharmacist
Kaiser Permanente
9900 SE Sunnyside Road, ID clinic
Clackamas, Oregon 97015

Yvette Morrison, PharmD, BCPS, FASHP
Clinical Pharmacist
Oklahoma Heart Hospital South
5200 East I-240 Service Road
Oklahoma City , Oklahoma 73135

Elizabeth Neuner, PharmD, AQ-ID
Infectious Diseases
Clinical Pharmacy Specialist
Cleveland Clinic
9500 Euclid Ave
Cleveland, Ohio 44195

Jesse Sutton, PharmD, BCPS
Antimicrobial Stewardship Pharmacist
Salt Lake City VA Medical Center
500 Foothill Drive
Salt Lake City, Utah 84148

Julia Mims, PharmD
Pharmacy Clinical Coordinator
Palmetto Health Tuomey
129 N Washington Street
Sumter , South Carolina 29150

Anne Daniels, PharmD, BCPS, AAHIVP
Infectious Diseases Clinical Pharmacist
Froedtert Hospital
9200 W. Wisconsin Ave
Milwaukee, Wisconsin 53226

Ryan Dull, PharmD, BCPS
Assistant Professor of Pharmacy Practice
Creighton University
2500 California Plaza
Omaha, Nebraska 68178

Christine Cohn , PharmD, BCPS
Senior Clinical Content Specialist,
Infectious Diseases
Wolters Kluwer- Clinical Drug Information
77 Westport Plaza Suite 450
St. Louis, Missouri 63146

Melanie Hyte, PharmD
Antimicrobial Stewardship Coordinator
Baptist Medical Center South
2105 East South Boulevard
Montgomery, Alabama 36117

Jason Pogue, PharmD
Clinical Pharmacist, Infectious Diseases
Sinai-Grace Hospital; Detroit Medical Center
6071 W Outer Dr
Detroit, Michigan 48170

Brad Crane, PharmD, BCPS
Clinical Pharmacy Specialist, Antimicrobial
Stewardship
Blount Memorial Hospital
907 E. Lamar Alexander Pike
Maryville, Tennessee 37804

Jennifer Lukaszewicz, PharmD

David Collins, PharmD, BCPS
Critical Care Team Leader
UNC Rex Healthcare
4420 Lake Boone Trail
Raleigh, North Carolina 27514

Margaret Gray , BSP, FCSHP
Clinical Practice Manager, ID Pharmacist
Alberta Health Services
Edmonton, AB, Canada
8440 - 112 Street NW
Edmonton T6G 2B7

Natalie Schwarber, PharmD
ID Clinical Pharmacist
HSHS St. John's Hospital
800 E Carpenter St
Springfield, Illinois 62769

Jessica Michal, PharmD
Clinical Pharmacy Specialist in Infectious
Diseases/ Antimicrobial Stewardship
McLeod Regional Medical Center
555 East Cheves Street
Florence, South Carolina 29506

Minkey Wungwattana, PharmD
Infectious Diseases Clinical Pharmacist
Maine Medical Center
22 Bramhall Street
Portland, Maine 04102

Whitney Buckel, PharmD
Infectious Diseases
Antimicrobial Stewardship
Advanced Clinical Pharmacist
Intermountain Medical Center
5121 S Cottonwood Street
Murray, Utah 84107

William Parker, PharmD, BCPS, CGP
Director of Pharmacy Services
Parallon/HCA/Tampa Community Hospital
6001 Webb Road
Tampa, Florida 33615

Rebecca Cofsky, PharmD.
Clinical Pharmacist, Infectious Diseases
Reading Hospital
6th Avenue and Spruce Street
West Reading, Pennsylvania 19611

Kinjal Sidhpura, PharmD, BCPS
Clinical Pharmacy Specialist

Andrea Jarzyniecki, PharmD, BCPS
Clinical Pharmacy Manager
Cardinal Health
1000 Pine St
Texarkana, Texas 75501

Hoa Hoang, BCPS
Pharmacist
Desert Valley Hospital
16850 Bear Valley Road
Victorville, California 92392

Emily Ray, PharmD
Infectious Diseases Clinical Pharmacy Specialist
Henrico Doctors Hospital
1602 Skipwith
Henrico, Virginia

Kasey Hickman, PharmD, BCPS
Clinical Pharmacist
St. David's Georgetown Hospital
222 Scenic Drive
Georgetown, Texas 78626

Courtney Steinwachs, PharmD
Infectious Disease Pharmacist
Antelope Valley Hospital
1600 West Ave J
Lancaster, California 93534

Daniel Eidson PharmD, BCPS
Clinical Pharmacist,
Senior ASP Team Member
UNC Rex Healthcare
4420 Lake Boone Trail
Raleigh, North Carolina 27607

Stanley Moy, PharmD, BCPS
Antimicrobial Stewardship
Clinical Pharmacy
SUNY Downstate Medical Center
440 Lenox Road #1F
Brooklyn, New York 11203

Brandon Dionne, PharmD, BCPS, AAHIVP
Assistant Clinical Professor
Northeastern University
360 Huntington Ave
Boston , Massachusetts 02115

Kathleen Rottman Pietrzak, PharmD, BCPS, BCCP
Critical Care Pharmacist
PGY-2 Critical Care Program Director
St. Vincent’s Medical Center Riverside
1 Shircliff Road
Jacksonville, Florida 32204

Alyssa Gould, PharmD
PGY2 Infectious Diseases
Pharmacy Resident
Palmetto Health Richland/USC South Carolina
College of Pharmacy
5 Medical Park
Columbia, South Carolina 29203

Karen Ng, BSc, Pharm, PharmD, ACPR, BCPS
Antimicrobial Stewardship Clinical Pharmacy Specialist
British Columbia Children's Hospital

Diana Yu, PharmD
Clinical Specialist, Infectious Diseases
Children's Mercy
2401 Gillham Road
Kansas City, Missouri 64108

Sarah Green, PharmD, BCPS
Clinical Pharmacy Specialist –
Infectious Diseases
Novant Health

Nicholas Piccicacco, PharmD
Infectious Diseases Clinical Pharmacy Specialist
Morton Plant Hospital
300 Pinellas St, MS 51
Clearwater, Florida 33756

Michael Kirsch, PharmD, BCPS
Clinical Pharmacy Specialist,
Infectious Disease
Florida Hospital Tampa
3100 East Fletcher Avenue
Tampa, Florida 33613

Cyle White, PharmD, BCPS
Infectious Diseases Pharmacist
Erlanger
915 East 3rd St
Chattanooga, Tennessee 37403

Scott Harrison, PharmD, BCPS
Clinical Staff Pharmacist, Infectious Disease
Residency Preceptor
Yavapai Regional Medical Center
1003 Willow Creek Rd
Prescott, Arizona 86301

Jenna Swindler, PharmD
Pharmacy Clinical Coordinator & Stewardship
Pharmacist
McLeod Regional Medical Center
555 E Cheves St
Florence, South Carolina 29501

Erica Dobson, PharmD
HIV/ID Clinical Pharmacy Specialist
University of Rochester Medical Center
601 Elmwood Ave
Rochester, New York 14559

Julia Varvatsis, PharmD, BCPS
Clinical Pharmacy Specialist
AnMed Health
800 N. Fant Street
Anderson, South Carolina 29621

Marisa Mendez, PharmD, MPH, BCPS
Antimicrobial Stewardship Coordinator
Community Regional Medical Centers
2823 Fresno St
Fresno, California 93721

Colleen Terriff, PharmD, MPH, AAHIVP
Antimicrobial Stewardship Program Coordinator
Deaconess Hospital
800 West 5th Ave
Spokane, Washington 99204

Michael Tiberg, PharmD, BCPS AQ ID
Clinical Pharmacy Specialist
Infectious Diseases
Munson Medical Center
1105 Sixth Street
Traverse City, Michigan 49684

Frank Tverdek, PharmD BCPS
Clinical Pharmacy Manager
University of Texas MD Anderson
1400 Holcombe BLVD
Houston, Texas 77030

Elizabeth O'Gara, PharmD, BCPS
Infectious Diseases Clinical Specialist
PGY1 Pharmacy Residency Program Director
Lahey Hospital and Medical Center
41 Mall Rd
Burlington, Massachusetts 01805

Serena Von Ruden, PharmD, BCPS, RN, BSN
Clinical Pharmacist
St. Francis Hospital
34515 9th Ave S
Federal Way, Washington 98003

Claudine El-Beyrouty, PharmD, BCPS
Advanced Practice Pharmacist,
Infectious Diseases
Thomas Jefferson University Hospital
111 S. 11th St
Philadelphia, Pennsylvania 19107

Memar Ayalew, PharmD
Clinical Pharmacist-ID
Walter Reed Medical Center

Jacob Morton, PharmD, MBA, BCPS
Clinical Pharmacy Research Specialist
Wesley Medical Center
Wichita, Kansas

Alexandra Grochulski, BCPS, BCCCP
Pharmacist
Kaiser
6600 Bruceville Rd
Sacramento, California 95823

Jill Bennett, PharmD, BCPS
Clinical Coordinator
Antelope Valley Hospital
1600 W. Ave. J
Lancaster, California 93534

Heather Cox, PharmD, BCPS-AQID
Clinical Coordinator, Infectious Diseases
University of Virginia Health System
Box 800674
Charlottesville, Virginia 22908

Ralph Raasch, PharmD, FCCP, BCPS
211 Morningside Drive
Carrboro, North Carolina 27510

Steve Grapentine, PharmD, BCPS
Clinical Pharmacist
Children's Minnesota
2525 Chicago Ave. S.
Minneapolis, Minnesota 55404

Kati Shihadeh, PharmD
Infectious Diseases Pharmacy Specialist
Denver Health Medical Center
790 Delaware St
Denver, Colorado 80204

Elizabeth Hirsch, PharmD, BCPS
Assistant Professor
Northeastern University
360 Huntington Ave
Boston, Massachusetts 02115

Wesley Kufel, PharmD, AAHIVP
PGY2 Infectious Diseases
Pharmacy Resident
University of North Carolina Medical Center
101 Manning Drive
Chapel Hill, North Carolina 27514

Leena Myran, PharmD BCPS
Clinical Assistant Professor of
Pharmacy Practice
University of Wyoming Family Medicine
Residency at Cheyenne
821 E. 18th Street
Cheyenne, Wyoming 82001

Jessica Ortwine, PharmD, BCPS-AQ ID
Infectious Diseases
Clinical Pharmacy Specialist
Parkland Hospital
Dallas, Texas 75235

Diana Andrade, PharmD
Pharmacy Clinical Coordinator
Memorial Hospital West
703 N Flamingo Road
Pembroke Pines, Florida 33028

Bhavik Shah, PharmD, BCPS, AAHIVP
Associate Professor
Jefferson College of Pharmacy
901 Walnut St, Suite 901
Philadelphia, Pennsylvania 19107

Angie Christianson, PharmD, BCPS
Clinical Pharmacy Manager
PeaceHealth Sacred Heart Medical Center
3333 Riverbend Dr.
Springfield, Oregon 97477

Annie Brooks, BA, BScPhm, PharmD
Clinical Pharmacist, Infectious Disease and
Antimicrobial Stewardship
Hamilton Health Sciences
Juravinski Hospital
711 Concession St
Hamilton, Ontario, Canada L9G5A6

Chelsea Owen, PharmD, MPH, BCPS
Clinical Pharmacy Specialist
Continuing Care Hospital
150 N. Eagle Creek Drive
Lexington, Kentucky 40514

Jason Li, PharmD, BCPS
Pharmacist
South Nassau Community Hospital
1 Healthyway
Oceanside, New York 11572

Thomas Imhoff, BCPS, PharmD, BS Pharm
Clinical Pharmacy Specialist
Good Samaritan Hospital
375 Dixmyth Avenue
Cincinnati, Ohio 45220

Marianna Fedorenko, PharmD, BCPS
Clinical Pharmacy Specialist,
Infectious Diseases
Mount Sinai Beth Israel
First Avenue at 16th Street
NY, New York 10003

Jennifer Ott, PharmD, BCPS
Clinical Pharmacy Specialist
Infectious Diseases
Billings Clinic
2800 Tenth Ave North
Billings, Montana 50107

Tristan Timbrook, PharmD, MBA, BCPS
Post-Doctoral Outcomes Pharmacy Fellow
Antimicrobial Stewardship
Veterans Affairs Medical Center
830 Chalkstone Ave
Providence, Rhode Island 02908

Meredith Todd, PharmD, BCPS
Antimicrobial Stewardship Clinical Specialist
Charleston Area Medical Center
3200 MacCorkle Ave SE
Charleston, West Virginia 25304

Gary Fong, PharmD, BCPS
Infectious Diseases
Pharmacotherapy Fellow
CHI - Baylor St. Luke's Medical Center,
University of Houston College of Pharmacy
6720 Bertner Avenue
Houston, Texas 77030

David Nix, PharmD, BCPS, AQ-ID
Professor
University of Arizona College of Pharmacy
1703 E. Mabel Street
Tucson , Arizona 85721

Thy Le, PharmD, BCPS-AQ ID
Clinical Pharmacotherapy Specialist, Infectious
Diseases Residency Program Director,
PGY2 Infectious Disease
Pharmacy Residency
The Brooklyn Hospital Center
121 Dekalb Ave
Brooklyn, New York 11201

Marcus Kouma, PharmD, BCPS
Clinical Pharmacy Specialist—Infectious Diseases
VA
North Texas

Laura Lehman, PharmD, BCPS
Clinical Coordinator, Pharmacy
Carroll Hospital
200 Memorial Avenue
Westminster, Maryland 21157

Mary Alicia Beasley, PharmD
Clinical Pharmacy Manager
Lead AMP Pharmacist
Ocala Regional Medical Center/West Marion Community Hosp.
1431 SW 1st Ave
Ocala, Florida 34482

Jamie Sanders, PharmD, BCPS
Infectious Diseases Clinical Specialist
St. Luke's Hospital
232 South Woods Mill Rd
Chesterfield, Missouri 63017

James Davis, RPh
Antimicrobial Stewardship Pharmacist
Wheaton Franciscan Healthcare- All Saints
3801 Spring St
Racine, Wisconsin 53405

Lindsey Childs-Kean, PharmD, MPH, BCPS
Clinical Assistant Professor
University of Florida
9200 113th St N
Seminole, Florida 33772

Maria Osundele, PharmD, CGP, BCPS
Clinical Pharmacy Manager
Orange Regional Medical Center
707 E Main Street
Middletown, New York 10940

Roger Lesch, PharmD
Clinical Pharmacy Manager
Mountain View Hospital
3100 N Tenaya Way
Las Vegas, Nevada 89128

Kari McCracken, PharmD, BCPS
Clinical Pharmacy Specialist in Infectious Diseases/Antimicrobial Stewardship
St. John Medical Center
1923 South Delaware Court
Tulsa, Oklahoma 74104

Sue Nadeau, BCPS
Clinical Pharmacist
St Joseph's Health
1165 Montgomery St
Santa Rosa, California 95450

Brandon Bookstaver, PharmD, FCCP, BCPS, AAHIVP
Associate Professor
Infectious Diseases Pharmacist
SC College of Pharmacy, University of South Carolina & Palmetto Health
715 Sumter Street
Columbia, South Carolina 29208

Chris Destache, PharmD. FCCP
Professor
Creighton University School of Pharmacy & Health Professions
2500 California Plaza
Omaha, Nebraska 68178

John Wooldridge, PharmD
Infectious Disease Pharmacist
Kootenai Health
2002 Kootenai Health Way
Coeur d' Alene, Washington 83814

Mary Staicu, PharmD
Infectious Diseases
Clinical Pharmacy Specialist
Rochester General Hospital
1425 Portland Ave

Martin Tran, PharmD
Infectious Disease Pharmacist
CHOC Children's Hospital
1201 W La Veta Ave
Orange, California 92868

Nickie Greer, PharmD, BCPS
HCA TriStar Division
Infectious Diseases Pharmacist
Parallon Business Solutions
245B Great Circle Rd
Nashville, Tennessee 37228

Navaneeth Narayanan, PharmD
Clinical Assistant Professor
Infectious Diseases Clinical Pharmacist
Ernest Mario School of Pharmacy
Rutgers University/Robert Wood Johnson
University Hospital
160 Frelinghuysen Road
Piscataway, New Jersey 08854

Amy Wojciechowski, PharmD, BCPS-AQ ID,
BCCCP
Clinical Pharmacist - Infectious Diseases
Niagara Falls Memorial Medical Center
621 10th Street
Niagara Falls, New York 14301

Krista Gens, PharmD, BCPS-AQ ID
Infectious Diseases
Clinical Pharmacy Coordinator
Abbott Northwestern Hospital
Part of Allina Health
800 E 28th Street
Minneapolis, Minnesota 55423

Derek VanderHorst, PharmD
PGY2 Infectious Diseases
Pharmacy Resident
Munson Medical Center
1105 6th Street
Traverse City, Michigan 49684

Yuman Lee, PharmD, BCPS
Clinical Pharmacy Coordinator
SBH Health System
4422 3rd Ave
Bronx, New York 10457

William Truong, PharmD, BCPS

Lisa Avery, PharmD, BCPS
Associate Professor
Wegman School of Pharmacy
East Ave
Rochester, New York

Serina Tart, PharmD
Clinical Pharmacist
Cape Fear Valley Medical Center
1638 Owen Drive
Fayetteville, North Carolina 28302

Darrell Childress, PharmD, BCPS
Antimicrobial Stewardship Pharmacist

Stephanie Kuhn, PharmD, BCPS-AQ ID
Infectious Diseases Clinical Pharmacist
Wesley Medical Center
550 N. Hillside
Wichita, Kansas 67214

Joel Coon, PharmD
Assistant Clinical Professor
University of New England
College of Pharmacy
716 Stevens Avenue
Portland, Maine 04103

Katie Stumpff, PharmD
Mosaic Life Care
St. Joseph, Missouri

Daniel Fleischman, PharmD, BCPS
Hospital Pharmacy Manager
Monroe Clinic Hospital
515 22nd Ave
Monroe, Wisconsin 53566

Jessica Cottreau, PharmD
Associate Professor
Rosalind Franklin University
3333 N. Green Bay Road
North Chicago, Illinois 60064

Brian Hoff, PharmD, BCPS
Clinical Pharmacy Specialist
Infectious Diseases
University of Iowa Hospitals and Clinics
200 Hawkins Drive
Iowa City, Iowa 52242

Karima Waziri PharmD, BCPS, BCCCP
Virginia Hospital Center
1701 N. George Mason Drive
Arlington, Virginia 22205

Jay Pauly, PharmD
Pharmacy Clinical Manager
Health First
1350 South Hickory Street
Melbourne, Florida 32901

Nancy Bui, PharmD, BCPS
Infectious Diseases Pharmacology Fellow
University of Southern California
1985 Zonal Ave
Los Angeles, California

Shari Rosen, PharmD, BCPS
Infectious Disease Clinical Pharmacist
Regional Medical Center of San Jose

Amanda Barner, PharmD, BCPS
HIV/ID Clinical Pharmacist Specialist
Cambridge Health Alliance
1035 Cambridge St 2nd Floor Suite 23
Cambridge, Massachusetts 02141

Whitney Jones, PharmD, BCPS
Antimicrobial Stewardship Pharmacist
Vanderbilt University Medical Center
1211 Medical Center Dr
Nashville, Tennessee 37212

Jason Schafer, PharmD, MPH, BCPS, AAHIVP
Associate Professor
Department of Pharmacy Practice
Jefferson College of Pharmacy
Thomas Jefferson University
901 Walnut Street, Suite 901
Philadelphia, Pennsylvania 19147

Vasilios Athans, PharmD, BCPS
Infectious Diseases Clinical Pharmacy Specialist
Cleveland Clinic
9500 Euclid Avenue, Hb-105
Cleveland, Ohio 44195

Matthew Bondi, PharmD, BCPS
Clinical Pharmacist
Sparrow Hospital
1215 E. Michigan Ave
Lansing, Michigan 48909

Montgomery Williams, PharmD, BCPS
Assistant Professor of Pharmacy Practice
Belmont University
1900 Belmont Blvd
Nashville Tennessee 37212

Bradley Langford, BSc, Phm, PharmD, ACPR, BCPS
Lead Pharmacist, Antimicrobial Stewardship
St. Joseph's Health Centre
30 The Queensway
Toronto M6R 1B5

Jeff Brock, PharmD, MBA, BCPS AQ-ID
Pharmacy Specialist, Infectious Diseases
Mercy Medical Center
1111 6th Ave
Des Moines, Iowa 50314

David Ha, PharmD
Assistant Professor of Clinical Sciences/Infectious Diseases Pharmacist
KGI School of Pharmacy/Pomona Valley Hospital Medical Center
535 Watson Drive
Claremont, California 91711

Erin McCreary, PharmD
PGY2 Infectious Diseases Pharmacy Resident
University of Wisconsin
Hospitals and Clinics
600 Highland Ave, F6/162
Madison, Wisconsin 53792

Dusten Rose, PharmD, BCPS AQ-ID, AAAHIVP
Network ID Pharmacy Specialist
University Medical Center Brackenridge
601 E 15th St
Austin, Texas 78701

Jessica Gillon, PharmD, BCPS
Pediatric Infectious Diseases Pharmacist
Monroe Carell Jr
Children's Hospital at Vanderbilt
2200 Children's Way
Nashville, Tennessee 37232

John Hurst, PharmD, BCPS
Clinical Pharmacy Specialist
Infectious Diseases
St. Anthony Hospital, SSM Health
1000 N Lee Ave
Oklahoma City, Oklahoma 73101

Stephan Sadikian, BSc, PharmD
Staff Pharmacist
Grey Bruce Health Services
1800 8th Street East
Owen Sound

Tamara Trienski, PharmD
Clinical Pharmacy Specialist
Infectious Disease
Allegheny General Hospital
Allegheny Health Network
320 E. North Avenue
Pittsburgh, Pennsylvania 15212

Khalid Eljaaly, PharmD, CAPPS, BCPS
Faculty/Infectious Disease Pharmacist
King Abdulaziz University
Jeddah

Christopher Bland, PharmD, BCPS, FIDSA
Clinical Associate Professor
University of Georgia College of Pharmacy
5356 Reynolds St.
Savannah, Georgia 31405

Steven Smoke, PharmD, BCPS
Clinical Pharmacist,
Antimicrobial Stewardship
Jersey City Medical Center
355 Grand St
Jersey City, New Jersey 07032

Mike Broyles, PharmD
Director of Pharmacy and Laboratory Services
Five Rivers Medical Center
2801 Medical Center
Pocahontas, Arkansas 72455

Obioma Ubaka, PharmD, BCPS, Dr
Piedmont Henry Hospital
1133 Eagles Landing Pkwy
Stockbridge, Georgia 30281

Zhe Han, PharmD, BCPS AQ-ID
Clinical Pharmacy Specialist,
Infectious Diseases
University of Chicago Medicine
5841 S. Maryland Avenue MC0010
Chicago, Illinois 60637

Andrei Stashonak, MS, PharmD
Clinical Pharmacist
Northwell Health
Long Island Jewish at Forest Hills
102-01 66th Rd
Forest Hills, New York 11375

Edward Grace, PharmD, BCPS, AQ-ID, AAHIVP
Associate Professor
Presbyterian College School of Pharmacy
307 N. Broad Street
Clinton, South Carolina 29325

Dave Kanyer, PharmD
Clinical Coordinator
Community Hospital Monterey
23625 WR Holman Highway
Monterey, California 93942

Jamie Kisgen, PharmD, BCPS (AQ-ID)
Pharmacotherapy Specialist
Infectious Diseases
Sarasota Memorial Health Care System
1700 S. Tamiami Trail
Sarasota, Florida 34239

David Lourwood, PharmD, BCPS, FCCP
Clinical Pharmacy Specialist
Poplar Bluff Regional Medical Center
3100 Oak Grove Road
Poplar Bluff, Missouri 63901

Gregory Tallman, PharmD
Infectious Diseases
Epidemiology and Outcomes Fellow
OSU/OHSU College of Pharmacy
2730 SW Moody Ave. CL5CP
Portland, Oregon 97201

Sally Tice, PharmD, MHA, BCPS
Clinical Pharmacist
Geisinger Medical Center
100 N academy Ave
Danville, Pennsylvania 17822

Ronald Cloud, BCPS, PharmD
Mercy Medical Center Redding
2901 Clairmont Heights
Redding, California 96001

Sarah Jones, PharmD
Staff Pharmacist Level III
Boston Children's Hospital
300 Longwood Ave
Boston, Massachusetts 02115

Thomas Dilworth, PharmD, BCPS AQ-ID
Specialty Pharmacy Coordinator,
Infectious Diseases
Aurora St. Luke's Medical Center
Department of Pharmacy Services
2900 W. Oklahoma Ave
Milwaukee, Wisconsin

Wes Hoffmann, PharmD
PGY-2 Pharmacy Resident
Infectious Disease
UC Davis Medical Center
2315 Stockton Blvd
Sacramento, California 95817

Autumn Bagwell, PharmD, BCPS
Clinical Pharmacist
Vanderbilt University Medical Center
1211 Medical Center Dr.
Nashville, Tennessee 37232

Daniel Zlott, PharmD, BCOP
Clinical Pharmacy Specialist
National Institutes of Health
10 Center Drive
Bethesda, Maryland 20892

Shivani Patel, PharmD, BCPS
Clinical Pharmacy Specialist
Infectious Diseases
Memorial Hermann Southwest
7600 Beechnut, Houston, Texas 77074

Thomas Kleyn, PharmD, BCPS, AAHIVP
Clinical Pharmacy Specialist/HIV/
Infectious Diseases
Eskenazi Health
720 Eskenazi Ave
Indianapolis, Indiana 46202

David Leedahl, PharmD, BCPS-AQ ID, BCCCP
Pharmacy Clinical Manager
Sanford Health
801 Broadway N
Fargo, North Dakota 58078

Samuel Wornall, PharmD, BCPS
Infectious Diseases Pharmacist,
Assistant Pharmacy Director
Beaufort Memorial Hospital
955 Ribaut RD
Beaufort, South Carolina 29905

Andrew Gainey, PharmD
Pediatric Clinical Pharmacist/Antimicrobial
Stewardship/Infectious Diseases
Palmetto Health Children's Hospital
7 Medical Park
Columbia, South Carolina 29203

Amy Van Abel, PharmD, BCPS
Antimicrobial Stewardship Pharmacist
St. Mary's Hospital
700 S. Park Street
Madison, Wisconsin 53715

Stephen Vickery, PharmD, BCPS
Clinical Staff Pharmacist
Mission Health System
509 Biltmore Ave
Asheville, North Carolina 28801

Shawn Depcinski, PharmD, BCPS
Clinical Pharmacist
Antimicrobial Stewardship & Infectious Diseases
St. Luke's University Health Network
801 Ostrum St.
Bethlehem, Pennsylvania 18015

Dianeysis Avendano, PharmD, CPh. BCPS
Clinical Coordinator
Tenet Healthcare

Russell Dixon, PharmD, BCCCP
Trauma, Surgical, Neurological Critical Care
Clinical Specialist
St. John Medical Center
1923 South Utica Avenue
Tulsa, Oklahoma 74104

Lance Smith, PharmD
Infectious Disease/Antimicrobial Stewardship
Cinical Pharmacist
Owensboro Health Regional Hospital
1201 Pleasant Valley Road
Owensboro, Kentucky 42303

James Mauro, PharmD
Pharmacy Clinical Coordinator
Easton Hospital
250 S 21st St
Easton, Pennsylvania 18042

Jean Lee, PharmD, BCPS AQ-ID
System ID Clinical Specialist
LifeBridge Health
2401 W. Belvedere Ave
Baltimore, Maryland 21215

Laura Nelson, PharmD
Clinical specialist, Infectious Diseases
Integris Baptist Medical Center
3300 NW Expressway
Oklahoma City, Oklahoma 73071

Christine Yost, PharmD
Infectious Diseases Clinical Pharmacist
Beaumont Hospital
3601 W 13 Mile Rd
Royal Oak, Michigan 48073

Lucia Rose, PharmD
Clinical Pharmacy Specialist-
Infectious Diseases
Cooper University Hospital
One Cooper Plaza
Camden, New Jersey 08103

Bruce Jones, PharmD, BCPS
Infectious Diseases
Clinical Pharmacy Specialist
St. Joseph's/Candler Health System
5353 Reynolds St
Savannah, Georgia 31405

Adrienne Terico, PharmD, BCPS
Clinical Pharmacist - Infectious Diseases
Aria Health
10800 Knights Rd
Philadelphia, Pennsylvania 19114

Jill Cowper, PharmD
Division Infectious Diseases Pharmacist
Parallon Supply Chain Solutions
200 Wadsworth Drive
Richmond, Virginia 23236

Anastasia Knecht, Pharm D
Clinical Pharmacist, ID
Medical Center of Trinity
9330 St Rd 54
New Port Richey, Florida 34655

Carmen Faulkner-Fennell, PharmD, BCPS-AQ-ID
Clinical Pharmacy Specialist-Antimicrobial Stewardship Program/Infectious Diseases
Greenville Health System
701 Grove Road
Greenville, South Carolina 29605

Victoria Tate, PharmD
Clinical Pharmacy Specialist
VA Cincinnati
3200 Vine Street
Cincinnati, Ohio 45220

Wei Teng Chung, MClinPharm, BCPS
Senior Pharmacist Clinical
National University Hospital
5 Lower Kent Ridge Road
Singapore 119074

Jessica Sobnosky, PharmD, BCPS
Antimicrobial Stewardship/Infectious Diseases
Clinical Pharmacist
King's Daughters Medical Center
2201 Lexington Ave
Ashland, Kentucky 41101

Michael North, PharmD, BCPS
Infectious Disease Pharmacist
Porter Adventist Hospital (Centura Health)
2525 S Downing St
Denver, Colorado 80210

Alex Stephens, PharmD BCPS
Antimicrobial Stewardship Clinical Pharmacist
Tristar Summit Medical Center
5655 Frist Blvd
Hermitage, Tennessee 37076

Kimberly Carozzoni, BCACP
Clinical Pharmacist
Moses Taylor Hospital
700 Quincy Ave
Scranton, Pennsylvania 18501

Alisha Epperson, BCPS
Clinical Pharmacy Coordinator
Laughlin Memorial Hospital
1420 Tusculum Blvd
Greeneville, Tennessee 37745

Angela Hatter, PharmD, BCPS
Anti-Microbial Stewardship
Program Coordinator
Ephraim McDowell Health
217 S Third Street
Danville, Kentucky 40422

Tara Hoop, B.Sc. (Pharm), BCPS
Staff Pharmacist
Antimicrobial Stewardship Program
Brandon Regional Health Centre
150 McTavish Avenue East
Brandon

Natalie Ohrenberger, PharmD, BCPS
Clinical Pharmacist II
Baptist Health Medical Center
North Little Rock
3333 Springhill Dr.
North Little Rock, Arkansas 72117

Jaela Dahl, PharmD, BCPS
Clinical Pharmacy Specialist-
Infectious Diseases,
PGY-2 Director
Infectious Diseases Pharmacy Residency
James A. Haley Veterans' Hospital
13000 Bruce B. Downs Blvd (119)
Tampa, Florida 33647

Daniel Baker, PharmD, BCPS, BCCCP
Critical Care Clinical Pharmacist
AMP Chairman
Gulf Coast Regional Medical Center
449 W. 23rd St
Panama City, Florida 32405

Anna Drapkin, PharmD, BCPS
Abington Hospital
1200 Old York Rd
Abington, Pennsylvania 19001

Gabriel Abiola, PharmD, BCPS
Clinical Pharmacy Manager
University of Maryland Charles Regional
Medical Center
5 Garrett Avenue
La Plata, Maryland 20646

Kristin Wheatley, PharmD, BCOP
Clinical Pharmacy Specialist,
Pediatric Oncology/ID
Lehigh Valley Health Network
1200 S Cedar Crest Blvd
Allentown, Pennsylvania 18103

Phuongthao Nguyen, PharmD, BCPS
Antimicrobial Stewardship Pharmacist
Northwest Medical Center
6200 N La Cholla Blvd
Tucson , Arizona 85741

Elizabeth Chang, PharmD, BCPS
Antibiotic Stewardship Pharmacist
California Pacific Medical Center
2333 Buchanan Street
San Francisco, California 94115

Michael Schwartz, PharmD
Associate Professor
South University School of Pharmacy
Winn Army Community Hospital
709 Mall Blvd
Savannah, Georgia 31406

Jennifer Fernandez, PharmD
Clinical Pharmacy Specialist
South Shore Hospital
55 Fogg Rd
S Weymouth, Massachusetts 02382

Zachary Jenkins, PharmD, BCPS
Assistant Professor / Clinical Specialist -
Infectious Disease
Cedarville University / Premier Health Partners
251 N Main St
Cedarville, Ohio 45314

Riham Zein, PharmD, PhD, BCPS, BCCCP
Clinical Pharmacy Specialist
Critical Care and Infectious Diseases
Kaiser Permanente
277 Pleasant Street Unit 204
Pasadena, California 91101

Kristy Shaeer, PharmD, AAHIVP
Assistant Professor
University of South Florida
College of Pharmacy
12901 Bruce B Downs Blvd MDC 30
Tampa, Florida 33612

Mary Ullman, PharmD, BCPS
Clinical Pharmacist,
PGY-1 Residency Program Director
Regions Hospital
640 Jackson
St Saint Paul, Minnesota 55101

Yanina Pasikhova, PharmD BCPS AQID AAHIVP
Clinical Pharmacist, Infectious Diseases
PGY1 RPD
Moffitt Cancer Center
Tampa, Florida

Todd Walroth, PharmD, BCPS, BCCCP
Pharmacy Manager, Clinical Services
Eskenazi Health
720 Eskenazi Avenue, H2-300 Pharmacy Administration
Indianapolis, Indiana 46167

Dustin Waters, PharmD, BCPS-AQ ID
Infectious Diseases Clinical Pharmacist
McKay-Dee Hospital
Intermountain Healthcare
4401 S. Harrison Blvd
Ogden, Utah 84403

Eva Sullivan, PharmD
Infectious Diseases Pharmacist Specialist
Scripps Mercy Hospital
4077 Fifth Avenue, MER52
San Diego, California 92103

Abbey Breit, PharmD, BCPS
Clinical Pharmacist
Floyd Memorial Hospital
1850 State St
New Albany, Indiana 47150

Rod Quilitz, PharmD, BCOP
Clinical Pharmacy Coordinator,
Infectious Diseases
Antimicrobial Stewardship
Moffitt Cancer Center MCC-PHARM
12902 Magnolia Drive
Tampa, Florida 33612

Cody Babcock, Pharm D
Critical Care Clinical Pharmacist
Eisenhower Army Medical Center
300 E Hospital Rd
Ft. Gordon, Georgia 30905

Tyree Kiser, PharmD, BCPS
Associate Professor
University of Colorado
12850 E Montview Blvd, C238
Aurora, Colorado 80045

Andrew Hunter, PharmD, BCPS
Infectious Diseases
Clinical Pharmacy Specialist
Michael E. DeBakey VA Medical Center
2002 Holcombe Blvd
Houston, Texas 77030

Esther Fasanmi, PharmD, BCPS
HIV Clinical Pharmacist
John Peter Smith Health Network
1500 S Main Street
Fort Worth, Texas 76132

Zachary Smith, PharmD, BCPS, BCCCP
Clinical Pharmacist
Henry Ford Hospital
2799 West Grand Blvd
Detroit, Michigan 48202

Lynn Wardlow, PharmD, MBA, BCPS-AQ ID
Clinical Pharmacy Specialist,
Infectious Diseases
University of Louisville Hospital
530 S Jackson St
Louisville, Kentucky 40207

Thomas Richardson, PharmD, BCPS AQ-ID
Pharmacy Clinical Coordinator
St. Peter's Hospital
2475 Broadway St.
Helena, Montana 59601

Ramy Elshaboury, PharmD, BCPS AQ-ID
Clinical Pharmacy Coordinator
Mass General Hospital
55 Fruit Street
Boston, Massachusetts 02114

Mitch Marsh, PharmD, BCPS
PGY1 Residency Program Director,
Clinical Pharmacy Coordinator
CHI Health St. Elizabeth
555 South 70th St.
Lincoln, Nebraska 68510

Shawn Mazur, PharmD
Clinical Pharmacy Manager-
Infectious Diseases
New York-Presbyterian/
Weill Cornell Hospital
525 E 68th Street
New York, New York 10065

Somer Smith, PharmD, BCPS, AAHIVP
Clinical Pharmacist, Infectious Diseases
Emory University School of Medicine,
Department of Pediatrics,
Division of Infectious Diseases
2015 Uppergate Drive NE
Atlanta, Georgia 30322

Ann Lloyd, PharmD, BCPS, AQID
Assistant Professor
Clinical Pharmacy Specialist
The University of Oklahoma College of
Pharmacy/Saint Francis Hospital
4502 E 41st Street; Suite 1H28
Tulsa, Oklahoma 74135

Kiri Rolek, PharmD, BCPS
Antimicrobial Stewardship
Pharmacist Coordinator
Nebraska Medicine
981090 Nebraska Medical Center
Omaha , Nebraska 68198

Jennifer Lee, PharmD
ID Pharmacist Specialist
Scripps Health, Chula Vista
435 H Street
Chula Vista, California 91910

Katherine Lusardi, PharmD, BCPS-AQ ID
Clinical Specialist, Antimicrobial Stewardship
UAMS Medical Center
4301 W. Markham St. Slot 571
Little Rock, Arkansas 72205

Meghan Jeffres, PharmD
Assistant Professor
University of Colorado
Skaggs School of Pharmacy
12850 E Montview Blvd
Aurora, Colorado 80045

Wally Almuqbil
Clinical Pharmacist
Palms West Hospital
13001 Southern Blvd
Loxahatchee, Florida 33470

Riley Williams II, PharmD, BCPS
Clinical Pharmacy Specialist
Critical Care & Infectious Diseases
Oklahoma City VA Health Care System
921 NE 13th St, Pharmacy Service 119
Oklahoma City, Oklahoma 73104

Thaddus Wilkerson, PharmD, BCPS
Infectious Diseases Clinical Pharmacy Specialist
Antimicrobial Stewardship Program Manager
Alaska Native Tribal Health Consortium
4315 Diplomacy Drive
Anchorage, Alaska 99517

Noha Eltoukhy, PharmD, BCPS
Clinical Pharmacy Specialist
Infectious Diseases
St. Mary Medical Center
1201 Langhorne-Newtown Rd
Langhorne, Pennsylvania 08550

Rodney Brumbelow, PharmD, BCPS
Clinical Pharmacy Manager
United Regional Health Care System
1600 Eleventh St
Wichita Falls, Texas 76301

James Sanders, PhD, PharmD, BCPS, AAHIVP
Clinical Pharmacy Specialist
Infectious Diseases
JPS Health Network
1500 S. Main St
Fort Worth, Texas 76104

Christina Connel, PharmD, BCPS, AAHIVP
Clinical Pharmacist
Oklahoma State University Medical Center
744 W 9th St
Tulsa, Oklahoma 74127

Travis Weaver, PharmD
Inpatient Pharmacy Supervisor
US Army
4430 Missouri Ave
Fort Leonard Wood, Missouri 65473

Bryan Alexander, PharmD
Pharmacy Clinical Coordinator
Infectious Diseases
University of Virginia Health System
1215 Lee St.
Charlottesville, Virginia 22903

Caroline Gresham, PharmD, BCPS
Clinical Pharmacist
Athens Regional Medical Center
1199 Prince Ave
Athens, Georgia 30606

Brad Laible, PharmD, BCPS-AQ ID
Professor, Department of Pharmacy Practice
Antimicrobial Stewardship Pharmacist
South Dakota State University / Avera
McKennan Hospital
1325 S. Cliff Ave
Sioux Falls, South Dakota 57117

Kelly Percival, PharmD, BCPS
Assistant Professor of Pharmacy Practice
Drake University
College of Pharmacy and Health Sciences
2507 University Ave
Des Moines, Iowa 50311

Linda Khatchatourian, PharmD BCPS,ASP
Pharmacist
USC Verdugo Hills Hospital
1812 Verdugo Blvd
Glendale, California 91208

Jay Jaffess, PharmD, MS, BCPP, BCPS
Clinical Pharmacist
St Mary Medical Center Rehab Hospital
1208 Langhorne-Newtown Road
Langhorne, Pennsylvania 19047

Deanne Tabb, PharmD, MT (ASCP)
Infectious Disease Pharmacist,
Clinical Microbiologist
Midtown Medical Center
710 Center Street
Columbus, Georgia 31901

Mohammad Alshaer, PharmD, BCPS
Clinical Pharmacist
Hamad Medical Corporation

Kelley Lee, PharmD
Clinical Specialist
Antimicrobial Stewardship
Le Bonheur Children's Hospital
848 Adams
Memphis, Tennessee 38104

Dhara Mehta, PharmD. BCPS
Clinical Pharmacist-Infectious Disease
Bellevue Hospital Center
462 1st Ave
NY, New York 10016

Shaina Bernard, BCPS
Infectious Diseases Pharmacist
VCU Medical Center
Richmond, Virginia

Mirella Cole, PharmD, BCPS
Clinical Pharmacy Specialist,
Infectious Diseases
Louis A Johnson VA Medical Center
1 Med Center Drive
Clarksburg, West Virginia 26301

Kady Phe, PharmD
Clinical Pharmacist - Infectious Diseases
CHI St. Luke's Health – Baylor
St. Luke's Medical Center
6720 Bertner Avenue MC 2-230
Houston, Texas 77030

Ryan Kuhn, PharmD, BCPS-AQ ID
Clinical Pharmacist Specialist
Infectious Diseases
John D. Dingell VA Medical Center
4646 John R. Street
Detroit, Michigan 48201

Sean Burroughs, PharmD
Clinical Pharmacy Coordinator
Appalachian Regional Healthcare System
336 Deerfield Rd
Boone, North Carolina 28607

Lynn Matsukawa, BCPS, PharmD
The Queen's Medical Center
1301 Punchbowl
Honolulu, Hawaii 96813

Ryan Mynatt, PharmD, BCPS-ID
Clinically Pharmacist Specialist,
Infectious Diseases
Detroit Receiving Hospital,
Detroit Medical Center
4201 St. Antoine Blvd
Detroit, Michigan 48201

Tuong Diep, Pharm D, BCPS, BCCCP
Clinical Pharmacist, Lead
Unity Hospital
98 Strawberry Hill Rd
Rochester, New York 14626

Melissa Danek, PharmD
Clinical Coordinator – ID
Buffal General Medical Center
100 High St
Buffalo, New York 14203

Barry Barns, PharmD
Clinical Pharmacist Specialist
Infectious Diseases
Mary Hitchcock Memorial Hospital
One Medical Center Drive
Lebanon, New Hampshire 03756

David Cluck, PharmD, BCPS, AAHIVP
Clinical Assistant Professor
ETSU Gatton College of Pharmacy
Dept. of Pharmacy Practice
Box 70657
Johnson City, Tennessee 37614

Geoff Lockwood, PharmD, BCPS
Emergency Medicine Clinical Pharmacist
Elkhart General Hospital
600 East Blvd
Elkhart, Indiana 46514

R. Brian Wolfe, PharmD, BCPS
Coordinator, Clinical Pharmacy Services
Indiana University Health
Ball Memorial Hospital
2401 W. University Avenue
Muncie, Indiana 47303

Jennifer Bailey, PharmD, BCPS, AAHIVP
Assistant Professor
Clinical Pharmacy Specialist,
Medicine Infectious Disease
Notre Dame of Maryland University
University of Maryland Medical Center
4701 N. Charles Street
Baltimore, Maryland 21210

Pratish Patel, PharmD, BCPS
Therapeutic Drug Monitoring/Antimicrobial
Stewardship Pharmacist
Vanderbilt University Medical Center
1211 Medical Center Dr, VUH B131
Nashville, Tennessee 37232

Jacob Parker, PharmD, BCPS
Clinical Pharmacy Specialist
Birmingham VA Medical Center
700 South 19th Street
Birmingham, Alabama 35233

Jacob Schwarz, PharmD, BCCCP, BCPS
Pharmacy Clinical Coordinator
Yuma Regional Medical Center
2400 S Avenue A
Yuma, Arizona 85364

Emily Heil, PharmD, BCPS-AQ ID
Assistant Professor
University of Maryland School of Pharmacy
20 N Pine St, N413
Baltimore, Maryland 21201

Daniel Chastain, PharmD, AAHIVP
Clinical Pharmacy Specialist, Infectious Diseases
Phoebe Putney Memorial Hospital
417 Third Avenue W
Albany, Georgia 31706

Monica Donnelley, PharmD, BCPS-AQ ID, AAHIVP
Senior Pharmacist, Residency Program Director PGY2 Infectious Diseases
University of California Davis Medical Center
2315 Stockton Blvd.
Sacramento, California 95817

Olga DeTorres, PharmD, FASHP, BCPS-ID
Antibiotic Stewardship
Clinical Pharmacist,O'Connor Hospital
2105 Forest Avenue
San Jose, California 95128

Monica Mahoney, PharmD, BCPS (AQ-ID)
Clinical Coordinator
Beth Israel Deaconess Medical Center
1 Deaconess Road
Boston, Massachusetts 02215

Leslie Stach, PharmD, BCPS
Ann and Robert H Lurie
Children's Hospital of Chicago
225 E. Chicago Ave
Chicago, Illinois 60657

Gary Wu, PharmD
Clinical Pharmacy Coordinator
New York Methodist Hospital
506 6th Street
Brooklyn, New York 11215

Pamela Vickery, PharmD, BCPS
Assistant Professor of Pharmacy
Wingate University / Park Ridge Health
220 Fifth Ave East
Hendersonville, North Carolina 28792

Keith Teelucksingh, PharmD, BCPS AQ-ID
Division Infectious Disease Pharmacist
Parallon/HCA
115 Central Island Street, Suite 400
Charleston, South Carolina 29492

Holly Hamilton, PharmD, AAHIVP, BCPS
Clinical Pharmacist
Erie County Medical Center
462 Grider Street
Buffalo, New York 14215

Philip Chung, PharmD, MS
Clinical Pharmacy
Manager of Infectious Diseases
Montefiore Medical Center, Weiler Campus
825 Eastchester Road
Bronx, New York 10461

Sarah McClain, PharmD, BCPS
Infectious Diseases
Clinical Pharmacy Specialist
Boise Veterans Affairs Medical Center
500 W. Fort St.
Boise, Idaho 83702

Kristie Zappas, PharmD, BCPS (AQ-ID)
Pharmacy Clinical Coordinator
Florida Hospital Orlando
601 E Rollins St
Orlando, Florida 32803

Jamie Godin, PharmD, BCPS
Clinical Pharmacist, Co-Chair AMS Group,
PGYI Infectious Disease Preceptor
Elliot Hospital
One Elliot Way
Manchester, New Hampshire 03054

Grace Heyaime, PharmD, BCPS
Clinical Pharmacist
Infectious Diseases, BHMC
1600 S Andrews Ave
Fort Lauderdale, Florida 33316

Sharanie Sims, PharmD, BCPS (AQ-ID)
ID Clinical Pharmacy Specialist, Director, PGY-2
ID Pharmacy Residency Louis Stokes Cleveland
VA Medical Center
10701 East Blvd
Cleveland, Ohio 44106

Henry Freedy, BS Pharmacy, PharmD
Clinical Pharmacist, ID
UPMC Mercy Hospital
1400 Locust St
Pittsburgh, Pennsylvania 15219

Christina Andrzejewski, PharmD, BCPS
Clinical Pharmacist
UPMC Mercy
1400 Locust Street
Pittsburgh, Pennsylvania 15219

Bradley Shinn, PharmD
Professor of Pharmacy Practice
The University of Findlay College of Pharmacy
2037 Windsor Place
Findlay, Ohio 45840

Jamie Allman, PharmD, BCPS
Associate Chief VA
1540 Spring Valley Drive
Huntington, West Virginia 25704

Leann Turley, PharmD
Staff Pharmacist
Saint Claire Regional Medical Center
222 Medical Circle
Morehead, Kentucky 40351

John Muchka, PharmD, BCPS
Froedtert and the Medical College of Wisconsin
Community Memorial Hospital
W180N 8085 Town Hall Rd.
Menomonee Falls, Wisconsin 53051