Dear Mr. Ellis,

On behalf of the American College of Clinical Pharmacy and the American Society of Health-System Pharmacists, it is our privilege to submit the attached petition to the Board of Pharmacy Specialties requesting recognition of emergency medicine pharmacy practice as a specialty.

Emergency medicine pharmacists (EMPs) specialize in the delivery of direct patient care at the bedside and care for patients across diverse populations and acuity levels. These specialists are critical members of the interprofessional emergency medicine team, are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department (ED), and have expertise in the management of time-dependent emergencies, pre-hospital medicine, emergency preparedness, public health, and toxicology. Emergency medicine pharmacy practice focuses on rapid assessment of available patient data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts.

EMPs have the specialized knowledge and expertise needed to manage complex patient medication regimens unique to the emergency medicine population, support operational processes and systems within the ED to improve patient care and patient safety, provide support and education for health care professionals and trainees, and counsel patients and caregivers. These critical functions are delivered in a complex and chaotic environment where patient information is often unknown or incomplete.

The partnering associations believe there is strong evidence for support of this specialty through analysis of public health needs and trends; review of the role delineation study for pharmacists whose practice includes emergency medicine; survey results from EMPs and employers; evaluation of peer-reviewed literature; and discussions with association and practice leaders. Our profession, patients, and society would benefit through the specialty recognition and credentialing of EMPs.

We look forward to consideration of this petition by BPS and the profession of pharmacy. Each of us would be willing to answer questions or provide additional insights and information as needed.

Sincerely,
-Nicole M. Acquisto, PharmD, FCCP, BCCCP
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-Katelyn R. Dervay, PharmD, MPH, BCPS, FASHP
-Christopher Edwards, PharmD, BCPS
-Megan E. Musselman, PharmD, MS, BCPS, BCCCP
-Kathy Pham, PharmD, BCPPS
-Jann B. Skelton, RPh, MBA

A Petition to the Board of Pharmacy Specialties Requesting Recognition of Emergency Medicine Pharmacy Practice as a Specialty

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Sponsored by:

American College of Clinical Pharmacy (ACCP)

American Society of Health-System Pharmacists (ASHP)

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Disclosure: Jann B. Skelton 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 Emergency Medicine Pharmacists

Emergency medicine pharmacists specialize in the delivery of direct patient care at the bedside across diverse patient populations and acuity levels. These specialists are critical members of the interprofessional emergency medicine team, are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department, and have expertise in the management of time-dependent emergencies, pre-hospital medicine, emergency preparedness, public health, and toxicology. Emergency medicine pharmacy practice focuses on rapid assessment of available patient data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts.

American College of Clinical Pharmacy (ACCP)
American Society of Health-System Pharmacists (ASHP)

A Petition to the Board of Pharmacy Specialties (BPS) Requesting Recognition of Emergency Medicine Pharmacy Practice

Executive Summary

Definition of Emergency Medicine Pharmacists

Emergency medicine pharmacists specialize in the delivery of direct patient care at the bedside across diverse patient populations and acuity levels. These specialists are critical members of the interprofessional emergency medicine team, are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department, and have expertise in the management of time-dependent emergencies, pre-hospital medicine, emergency preparedness, public health, and toxicology. Emergency medicine pharmacy practice focuses on rapid assessment of available patient data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts.

—ACCP/ASHP Task Group

Background

By acquiring specialized knowledge and skills and creating a unique practice beyond the scope of pharmacy practice defined by licensure examination, an increasing number of pharmacists have distinguished themselves through the care of patients in emergency medicine practice settings according to the above definition of emergency medicine pharmacists (EMPs). In recognition of these efforts, the American College of Clinical Pharmacy (ACCP) and the American Society of Health-System Pharmacists (ASHP) have partnered to develop a petition to the Board of Pharmacy Specialties (BPS) to recognize emergency medicine pharmacy practice as a specialty.

Petition Overview

A 2006 report outlined the most important issues facing the nation's emergency departments (EDs) and included overcrowding, fragmented care, a lack of disaster preparedness, and deficiencies in pediatric emergency care.[1] EMPs can contribute to system improvements to address these complex issues that non-EMP specialists are not likely prepared to face. Services provided by pharmacists in the ED include traditional clinical pharmacy services; response to

medical emergencies; provision of consultations on medication issues; identification and reduction of medication errors; participation in medical, trauma, and toxicological emergencies; collection of medication histories; disaster preparedness; coordination of medication history activities; precepting students and residents; and engagement in research.

Unlike other clinical practice settings, EMPs are often highly visible and extremely accessible to the care team in their practice location. EMPs operate as part of a highly capable interdisciplinary team whose members are often working long hours with a heavy workload. EMPs are valued by other members of the ED team and are perceived to enhance patient care and safety. The ED team relies on EMPs clinical decision-making support with regard to medications, particularly high-risk medications, antimicrobial stewardship activities, monitoring recommendations, consultation regarding adverse drug events, support during team resuscitation activities, medication compatibility and procurement expertise, and patient medication consultation.

EMPs have the specialized knowledge and expertise needed to manage complex patient medication regimens unique to the emergency medicine population, support operational processes and systems within the ED to improve patient care and patient safety, provide support and education for health care professionals and trainees, and counsel patients and caregivers. These critical functions are delivered in a complex and chaotic environment where patient information is often unknown or incomplete.

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 and examined, in detail, the BPS *Board Certified Emergency Medicine Pharmacy Role Delineation Study* to support the development of this petition. We also conducted a web-based survey of EMPs and their employers, the *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification,* to provide additional, timelier data for the petition. The evidence presented in the petition for each of the BPS criteria is briefly 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 other health professionals. The petition establishes how emergency medicine pharmacists can effectively meet these needs.

EMPs provide services in a complex, fast-paced, crowded, and unpredictable environment with little time between the receipt of the medication order and the administration of medications. Because of the nature of the practice environment, the risks of medication errors are particularly high in an ED setting. Core functions of EMPs include patient care and management, design of pharmaceutical care plans, clinical decision-making, monitoring, and evaluation of patient response.

There is a need for a mechanism to identify, recognize, and provide access to EMPs who can meet patient needs for specialized medication management. Individuals who have obtained specialist recognition and have attained the additional training, experience, and expertise to lead patients, the profession, other health care providers, and society to better public health are necessary for managing diseases and reducing preventable conditions, complications, and sequelae. BPS recognition of emergency medicine pharmacy practice as a specialty would provide a mechanism through which pharmacists could attain voluntary certification that recognizes achievement of a focused and distinct level of specialized knowledge, experience, and skills in serving the unique medication needs of patients in the ED.

There is likely some potential level of overlap between the proposed EMP specialty and the existing BPS specialties in cardiology, critical care, geriatrics, infectious disease, pediatrics, and pharmacotherapy. However, the petitioning organizations feel strongly that the evidence presented in this petition will justify recognition of EMPs as a separate and distinct specialty. By any measure, the complex issues facing ED patients cannot be adequately addressed by pharmacists with entry-level knowledge and skills in general practice or other types of pharmacy specialties. BPS certification of EMPs will lay the groundwork for other committed and interested pharmacists to focus their professional development, training, and educational efforts on preparing themselves to fully meet this public health need.

Criterion B: Demand

The 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 emergency medicine pharmacists, 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.

EMPs deliver bedside care and manage medical emergencies; provide pharmacotherapy consultation to other health care professionals; provide prospective order review and procurement of medication; ensure successful transitions of care; and participate in administrative, education, and research-related tasks. Care of emergency medicine patients is

complex and unique due to the time-sensitive nature and intricacy of patient conditions with often little medical history and that require full engagement with an interprofessional care team.

As the role of the EMP has grown, so has the number of EMPs across the United States. Requirements for EMPs' involvement in the care team are well codified by practice standards, professional statements, and guidance. The American College of Emergency Physicians strongly supports and recognizes the value of EMPs on the care team in the ED, which is detailed in their Clinical Pharmacist Services in the Emergency Department position statement.[2] The value of EMPs is also recognized by the American College of Medical Toxicology in their position statement on the Role of Clinical Pharmacists in the Emergency Department.[3]

The demand for EMPs is demonstrated through sustained growth in employer demand and the increase in specialty training programs. Additionally, 21 individuals and organizations contributed letters of support that specifically attest to the demand for pharmacists with training and knowledge to provide specialized services in emergency medicine pharmacy practice.

The value of specialty recognition is becoming increasingly important to employers of EMPs. The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* included a subset of questions that were completed by individuals with direct responsibility for hiring pharmacists in emergency medicine practice. Hiring managers from 116 organizations that responded indicated they had recruited for 287.5 EMPs over the past 3 years and had filled more than 95% of these positions. These same employers estimate that they will fill an additional 227 positions over the next 3 years and currently report 30.8 vacant positions within their organizations. Employers also estimated the growth in the number of emergency medicine pharmacy positions within their organizations over the next 5 years, with 100% of respondents anticipating an increase in these positions.

Over 80% of employers responding to the *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* indicated that it was "highly likely," "likely," or "somewhat likely" that they would require a new specialty credential in emergency medicine if approved by BPS for newly hired pharmacists. Of those responses, over 75% indicated that it was "highly likely," "likely," or "somewhat likely" that they would require a new specialty credential in emergency medicine if approved by BPS for currently employed EMPs. The survey also showed that only 36% of EMP positions currently require BPS certification or another earned credential. These results imply that a credential more targeted to the specific needs of EMPs would be in demand in the marketplace.

Criterion C: Number and Time

This criterion quantifies that there are a reasonable number of individuals who devote time in their practice to emergency medicine pharmacy practice.

The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* was fielded to approximately 8,431 members of ACCP and ASHP who self-identified as EMPs, which received a 12.4% (1,043) response rate. Of the responding pharmacists, 98% indicated that they are practicing at a specialty level. Based on these survey results and the available literature, we draw the conclusion that 8,000 to 10,000 pharmacists are currently engaged as EMPs. Likely, this number is underestimated because not all EMPs are members of the partnering professional organizations. However, we believe that pharmacists who are engaged as members of professional associations are more likely than others to pursue specialty recognition.

Emergency medicine pharmacy practice has significantly grown over the past decade, as evidenced by the increased number of postgraduate year two (PGY2) specialty residency programs in emergency medicine pharmacy. In 2007, there were two ASHP-accredited specialty residency programs in emergency medicine. Today, these programs number 67, a 3,250% increase. Approximately 77 EMPs graduate annually from these programs.

Results from the role delineation study show that respondents are highly engaged in emergency medicine pharmacy practice, with 80.5% of respondents reporting 30 or more hours per week spent in emergency medicine pharmacy practice. The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* also showed that over 93% of respondents, or 727 pharmacists, indicated that they would be “highly likely,” “likely,” or “somewhat likely” to pursue specialty recognition in emergency medicine certification within 5 years if such recognition were made available.

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 emergency medicine pharmacists and represent the specialized tasks/skills of emergency medicine pharmacists, which are distinct from other BPS-recognized pharmacy specialties.

BPS has conducted a role delineation study for emergency medicine pharmacy practice and issued a call for petitions in this specialty area. Therefore, Criterion D and Criterion E are not required as part of the petition to BPS.

Criterion F: Education and/or Training

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

According to the Accreditation Council for Pharmacy Education's *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 program prepares graduates to:

- 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).[4]

Following licensure, pharmacists can acquire the differentiated knowledge and skills required for specialized emergency medicine pharmacy practice by a variety of methods. These methods may include, but are not limited to:

- Doctor of Pharmacy degree, clinical work experience, and self-study.
- Doctor of Pharmacy degree, postgraduate year one (PGY1) residency training, clinical work experience, and self-study.
- Doctor of Pharmacy degree, PGY1 residency training, clinical and/or research fellowship programs, clinical work experience, and self-study.
- Doctor of Pharmacy degree, PGY1 residency training, postgraduate year two (PGY2) specialty residency in emergency medicine, clinical work experience, and self-study.

The most effective way to prepare for a career as an EMP is to complete a PGY1 pharmacy residency and a PGY2 residency in emergency medicine. PGY2 emergency medicine residency programs provide the most comprehensive experiential learning opportunities in emergency medicine pharmacy practice. In the *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification*, fielded by the petitioning organizations, employers of EMPs were asked the desired level of training for pharmacists practicing in this specialty. Ranked highest was a PGY2 residency in emergency medicine. As of March 31, 2019, there were 67 PGY2 emergency medicine residency programs with 77 residency positions.

Criterion G: Transmission of Knowledge

The criterion establishes that there is adequate transmission of specialized knowledge through

professional, scientific, and technical literature directly related to specialized emergency medicine pharmacy practice.

Transmission and dissemination of specialized knowledge in emergency medicine pharmacy practice occurs through national standards and guidance, formal networking groups within professional practice associations, peer-reviewed publications and periodicals, live educational programming, and enduring educational resources in print- and web-based vehicles. National standards and guidance transmit knowledge through rules, regulations, standards, guidelines, and position papers authored by national organizations and government entities. Professional organizations and networking groups help EMPs practice at the top of their license by encouraging professional interactions and providing opportunities for practice advancement through educational programming, newsletters, research networks, and leadership. Each year, pharmacy and other health care organizations offer live and web-based continuing pharmacy education opportunities related to new developments and issues concerning emergency medicine pharmacy practice that facilitate the dissemination of knowledge and practice excellence. Enduring resources are also available through various methods. A significant number of articles pertaining to emergency medicine pharmacy practice are published annually and are detailed within the petition.

Conclusion

EMPs have been involved and focused on the care of patients in the ED for decades. Services provided by pharmacists in the ED include traditional clinical pharmacy services; response to medical emergencies; provision of consultations on medication issues; identification and reduction of medication errors; participation in medical, trauma, and toxicological emergencies; collection of medication histories; disaster preparedness; coordination of medication history activities; precepting students and residents; and engagement in research.[5,6] Unlike other clinical practice settings, EMPs are often highly visible and extremely accessible to the care team in their practice location.

In all areas of emergency medicine pharmacy practice, collaboration with other members of the health care team is critical to prevent medication errors, ensure appropriate medication use, and ensure that desired therapeutic outcomes are achieved. The highly variable needs of ED patients are sufficiently diverse to support recognition of EMPs as a separate and distinct specialty. Effective, successful, high-quality care for these patients will require the full application of specialized knowledge and skills of EMPs and those who would seek to achieve specialty recognition in emergency medicine pharmacy practice.

The ultimate goal of pharmacotherapy specialization is to ensure quality patient care and

improve therapeutic outcomes by optimizing medication use. As the public demand for emergency care continues to expand, the field of emergency medicine continues to expand in both scope and complexity. There is a clear need for highly trained specialists with expertise in emergency medicine. A stand-alone specialty in emergency medicine pharmacy practice would clearly identify for employers, physicians, patients, and the public those individuals with specialized competencies and expertise in emergency medicine.

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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.

Emergency medicine pharmacists (EMPs) have been involved and focused on the care of patients in the emergency department (ED) for decades. Services provided by pharmacists in the ED include traditional clinical pharmacy services; response to time-dependent emergencies; participation in medical, trauma, and toxicological resuscitations; disaster preparedness; collaboration with pre-hospital medical services; coordination of medication history activities; precepting students and residents; and engagement in research.[1,2] Unlike other clinical practice settings, EMPs are often highly visible and extremely accessible to the care team in their practice location.

EMPs are recognized as integral and respected members of the interprofessional team. These specialists are uniquely trained and positioned to contribute knowledge and skills to the management of highly complex patients. EMPs practice in a variety of settings, including adult and pediatric EDs, freestanding EDs, academic settings, pharmaceutical industry, and research institutions. EMPs possess specialized knowledge and experience in the care of emergency medicine patients.

Many EMPs have completed formal, postgraduate residency training in emergency medicine practice environments. They possess comprehensive knowledge of the epidemiology and pathophysiology of conditions seen in emergency medicine; the application of pharmacotherapeutics, pharmacokinetics, pharmacodynamics, and pharmacogenomics to emergency medicine patients; mastery of operational and clinical systems designed to assure medication safety and prevent medication errors; and professional skills that allow them to be effective at the bedside.

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.

The ED serves in a critical position between inpatient care and community-based settings. Within EDs, only 10% of patients are admitted with 90% treated and released.[3] In 2016, there were over 145.6 million visits to the ED in the United States.[4] At least one medication was administered during 117 million of these visits for a total of 358 million medications administered at ED visits and significantly more prescribed for discharge.

The ED provides services to all patients in need of care, regardless of their ability to pay, and the ED has become an important source of admissions for hospitals.[5,6] The rate of ED visits reached a 10-year high in 2015 for all age groups and increased the most for patients aged 45 to 64 years. Factors driving the increase in visits to the ED include those with Medicaid coverage being more likely to visit the ED than those without insurance or those with private insurance and an increase in visits to the ED by patients with nonurgent primary care problems.[7]

EMPs provide services in a complex, fast-paced, crowded, and unpredictable environment with little time between the receipt of the medication order and the administration of medications. Because of the nature of the practice environment, the risks of medication errors are particularly high in an ED setting. EMPs must simultaneously treat patients across the age continuum who may have conditions that are vastly different in complexity. Expectations within this environment include rapid treatment, with EMPs often operating with a lack of complete medical history and little continuity of care. There are frequent interruptions and limited time to spend with each patient. These pressures sit along a backdrop of fear of liability and pressures to meet Centers for Medicare and Medicaid Services (CMS) Core Measures across disease areas.

A 2006 report outlined the most important issues facing the nation's EDs and included overcrowding, fragmented care, a lack of disaster preparedness, and deficiencies in pediatric emergency care. Increased focus on the development of ED pharmacist services and increased involvement of EMPs can contribute to system improvements to address these complex issues that non-EMP specialists are not likely prepared to face.[8] As this petition will demonstrate, there is clear evidence showing that EMPs improve patient safety, enhance patient outcomes,

decrease medication errors, support other health care professionals in their role, and decrease health care costs.

Evolution of Emergency Medicine Pharmacists

The value that pharmacists could play in emergency settings became part of the professional literature in the mid-1970s. Early reports highlight the teamwork between a pharmacist and a pharmacy technician as they worked as part of the more comprehensive resuscitation team. Historically, the pharmacist served as a source of information regarding the choice of drug, dose, and possible incompatibilities, often preparing and administering these medications. The pharmacist coordinated and directed the flow of medications and supplies and provided advice and support regarding equipment for special procedures to the medical team.[9]

Robert M. Elenbaas, PharmD, FCCP, was the first to describe the role of a pharmacist in emergency medicine as a specialized practice and to report the attitudes of physicians and nurses toward this role. Dr. Elenbaas outlined the roles of the EMP in clinical practice, education, and research and described the various activities associated with each responsibility. This work also demonstrated that the value of the pharmacist was recognized, well-accepted, and considered a benefit to patient care, educational activities, and research activities.[10] In many cases, these early practice leaders served as practitioner-educator role models for student pharmacists and pharmacy residents interested in emergency medicine.[10,11]

As the number of patients routinely treated in the ED has increased across the United States, so have the roles and responsibilities for EMPs within direct patient care. The pioneers in this specialty served on the cutting edge of practice, establishing the value and role of pharmacists in the ED. Over the past 40 years, these roles have continued to expand and are supported by evidence of the benefits that EMPs provide as members of the interprofessional care team, which is outlined below.

Current Roles of the Emergency Medicine Pharmacist

According to a recent national survey of emergency pharmacy practice in the United States, there has been a shift in pharmacists' activities from inventory management to more clinical activities and direct patient care. EMPs spend approximately 25% of their time in clinical activities, 15% of time in emergency response, 15% of time in order processing, and the balance in activities such as administration, teaching, and medication management. The fundamental activities of EMPs include:[12,13,14,15]

- Direct patient care activities – management of critically ill patients, pharmacotherapy consultations, attendance on medical rounds, drug information requests, toxicology

recommendations, therapeutic drug monitoring, microbiological culture and susceptibility testing, patient counseling, and follow up for treatment of patients.

- Emergency response – responding to emergencies such as medical cardiopulmonary arrest, trauma resuscitation, myocardial infarction, toxicological emergencies, and stroke.
- Order processing – order review, verification, and order entry and medication procurement.
- Medication management – identification of medication-related problems, medication error reporting, and provision of medication information, including advice on drug selection, dosing, drug interactions, and medication history-taking activities.
- Administrative activities – accreditation activities, committee work, operations oversight, order set development, electronic medical record optimization, quality improvement initiatives, root cause analysis, failure mode and effects analysis, implementation of process changes, and development of medication guidelines for the ED.
- Scholarly activities – health professional education, precepting students or residents, teaching, and clinical research contributing to the body of literature.

The physical presence of a pharmacist in the ED has been shown to improve patient safety with one in three (32.7%) of intercepted medical orders being verbal orders.[16] In 2004, 16.4% of U.S. hospitals indicated that they routinely assigned pharmacists to patients in the ED, with a positive correlation between hospital size and the likelihood of having a pharmacist assigned to an ED.[12,17] The benefits of incorporating a clinical pharmacist into the ED team include:[18,19]

- ***Engagement With Other Members of the Health Care Team*** – Clinical pharmacy staff in the ED are at the bedside during patient evaluation with physicians and nurses and provide necessary consultation related to pharmacotherapy management. These include specific recommendations for drug treatment along with dose adjustments as necessary for renal function, age, or weight; antibiotic selection; dose recommendations; toxicology and pharmacology information; special instructions for administrations; substitution information; and any other advice regarding medication use or restrictions. The EMP can perform a prospective review of medication orders or clarify questionable orders in real time.
- ***Increased Medication Safety*** – EMPs have an in-depth knowledge of the medication use process and the system-based causes of error and work toward the avoidance of adverse events. EMPs have expert knowledge to improve and standardize medication use processes and the electronic medical record system, such as updating and creating order sets that allow for evidence-based standardization and appropriate medication selection. EMPs also play a major role in assuring the safety of medication use through

implementation and oversight of high-risk medication administration processes and storage. This storage oversight includes the stocking and retrieval of products from automated dispensing cabinets and refrigerated storage, as well as medications in emergency carts and other emergency kits. In particular, their attention is toward the avoidance of errors with look- and sound-alike medications and multiple concentrations, as well as standardizing the use of high-alert drugs such as neuromuscular blocking agents, insulin, heparin products, and commonly confused opioids such as morphine and hydromorphone. EMPs act as independent double checks for the selection and preparation of high-alert or weight-based medications where complex calculations are required, frequently as an emergent need. EMPs can also lead the effort to assure that all medication is labeled properly when removed from the original packaging.

- ***Participation in Emergency Situations*** – EMPs directly engage in supporting traumas, cardiac arrests, stroke, sepsis, myocardial infarction, pulmonary embolism response, rapid response, and other emergency situations and engage in supporting these teams within the ED. EMPs are responsible for ensuring algorithm compliance, making pharmacotherapy recommendations, optimizing medication regimens, and procuring and preparing medications. In some institutions, the pharmacist also participates in the documentation or administration of emergency medications.
- ***Interaction With Patients*** – The EMP has direct interaction with patients, particularly those with difficult and complex medication regimens, and coordinates and provides oversight of these activities with pharmacist extenders to obtain complete medication histories and conduct medication reconciliation. The pharmacist can directly assess the patient's understanding of each medication and may also directly counsel patients when a medication-related problem is identified.
- ***Education of Patients and Other Health Care Professionals*** – EMPs assist with discharge counseling of patients. They also educate the professional staff on changes to the formulary or new drugs on the market and emerging evidence relevant to emergency medicine, and they discuss lessons learned from recent errors in their department and as described in external literature. EMPs are able to facilitate integration of pharmacy trainees into the interdisciplinary emergency medicine team. EMPs teach didactically to pharmacy and medical students, are engaged with residency and fellowship programs, and are involved with student precepting. They also provide education to prescribers, nurses, other pharmacists, and other health care professionals through the development and delivery of disease state and patient case presentations, participation in provider in-services, responses to drug information questions, and participation in journal clubs. In addition, EMPs continually evolve their practice sites and further develop precepting skills to mentor future generations of practitioners.
- ***Service in Leadership Roles*** – EMPs use their unique expertise as both ED and pharmacy

representatives on various institution-specific committees (e.g., emergency preparedness committees, resuscitation/response team committees, quality improvement committees, pharmacy and therapeutics committees). Many EMPs participate in emergency medicine research and disaster planning and support system-based improvements to ensure safe medication use or to contribute toward quality improvement initiatives.

Value to Team-Based Care

EMPs operate as part of a highly capable interdisciplinary team whose members are often working long hours with a heavy workload. EMPs are valued by other members of the ED team and are perceived to enhance patient care and safety. The ED team relies on EMPs for clinical decision-making in regard to medications, particularly around high-risk medications, antibiotic stewardship, medication compatibility, support during patient codes, and patient medication consultation. [20,21,22,23,24,25,26,27] Documented contributions by EMPs are detailed in the following sections.

Preventing Medication Errors and Promoting Patient Safety

Within an ED, the environment is often chaotic and unpredictable. Frequent interruptions, the variable nature of patient cases, and the high stress level among health care providers creates an environment prone to medication errors.[28] In the report, *To Err Is Human*, the Institute of Medicine estimated that over 7,000 deaths in the United States each year are due to preventable medication errors.[29] In the United States, serious preventable medication errors occur in 3.8 million inpatient admissions with a cost of approximately $16.4 billion annually.[30] Overall, medication-related errors in the ED are 13.5 times more likely to occur in the absence of an EMP.[31] Research has shown that pharmacists decrease the number of medication errors in ED settings through consultative activities, collaboration with medical or nursing staff, and medication order review.[16,32,33]

ED personnel often do not have access to crucial patient information, such as medical history, medication lists, allergies, renal function, or overall health status. Off-hour admissions may make it impossible to contact physicians who may be familiar with an ED patient. Therefore, one of the most valuable roles of an EMP is decreasing medication errors in the ED. By reviewing both verbal orders at the bedside and written medication orders before they are administered to patients, pharmacists can provide guidance, information, and support to other members of the health care team in real time and make recommendations for improvements in selected medication therapies. Pharmacists can provide comprehensive assessments of a patient's medication regimen through review of patient charts and medication histories and be an invaluable consult on complex cases.[34,35,36,37,38]

ED crowding has been associated with increased risk for medication errors.[39,40,41,42] Other factors that raise the risk for error include the expanding pharmacopeia, the increasing complexity of patient drug regimens, and problems related to health information technology.[43,44,45,46,47]

The American College of Medical Toxicology (ACMT) position statement on the role of clinical pharmacists in the ED reinforces the part that EMPs play in medication error prevention. The statement outlines that EMPs provide real-time decision support and order verification and can intercept prescribing errors before patient harm occurs. Transitions of care are improved through medication reconciliation, thereby reducing errors and outpatient treatment failures. Pharmacists may also recognize adverse drug events that another provider has not identified. Finally, pharmacist-driven error reporting facilitates identification of safety deficits.[48] Numerous studies in the literature highlight the specific role of EMPs in the identification and prevention of medication errors. Examples of these studies include:

- A cross-sectional cohort study of 694 patients over a 3-month period compared a prospective analysis of patients during the time (10 hours/day) with pharmacists present and a retrospective review of the time on the same days (14 hours/day) with pharmacists absent. With pharmacists absent, over 13 times more errors were recorded in the ED than with pharmacists present. The authors concluded an on-site pharmacist in the ED may be helpful in reducing medical errors.[49]
- A retrospective chart review studied the frequency of medication errors in an ED before and after an EMP was assigned to check medication orders. A total of 490 medication orders written for 198 patients were evaluated for errors. A total of 37 and 14 medication errors were identified for the control and intervention groups, respectively. The rate of errors was 16.09 per 100 medication orders for the control group compared with 5.38 per 100 orders for the intervention group, a 66.6% difference (P = 0.0001). The EMPs made 183 recommendations, of which 98.6% were accepted. The rate of medication errors in the ED decreased significantly when pharmacists prospectively reviewed ED medication orders.[50]
- An observational study in four academic EDs assessed the impact of EMPs on reducing potentially harmful medication errors. The authors conducted 226 observation sessions spanning 787 hours and observed pharmacists reviewing 17,320 medications ordered or administered to 6,471 patients. The study identified 504 recovered medication errors or 7.8 per 100 patients and 2.9 per 100 medications. Ninety-percent of errors were intercepted before reaching the patient. The potential severities of the recovered errors were most often serious (47.8%) or significant (36.2%). The most common medication classes associated with recovered medication errors were antimicrobial agents (32.1%),

central nervous system agents (16.2%), and anticoagulant and thrombolytic agents (14.1%). The most common error types were dosing errors, drug omission, and wrong frequency errors. EMPs demonstrated that they could identify and prevent potentially harmful medication errors.[32]

- A prospective, multicenter cohort study determined the activities of pharmacists that lead to medication error interception in the ED. A total of 16,446 patients presented to the EDs during the study, resulting in 364 confirmed medication error interceptions by pharmacists. The pharmacists' activities that led to medication error interception were as follows: involvement in consultative activities (n = 187; 51.4%), review of medication orders (n = 127; 34.9%), and other (n = 50; 13.7%). The types of orders resulting in medication error interceptions were written or computerized orders (n = 198; 54.4%), verbal orders (n = 119; 32.7%), and other (n = 47; 12.9%). Most medication error interceptions occurred during the prescribing phase of the medication use process (n = 300; 82.4%), and the most common type of error was wrong dose (n = 161; 44.2%). Pharmacists' review of written or computerized medication orders account for only a third of medication error interceptions. Most medication error interceptions occur during consultative activities.[16]
- A retrospective evaluation of 237 medication error interceptions by the EMP evaluated the severity and probability of harm of medication errors. The final classification of medication errors by severity was as follows: minor (n = 42; 18%), significant (n = 160; 67%), and serious (n = 35; 15%). The final classification of medication errors by probability of harm was as follows: none (n = 13; 6%), very low (n = 96; 41%), low (n = 84; 35%), medium (n = 41; 17%) and high (n = 3; 1%). Inter-rater reliability for classification was as follows: error severity (agreement = 75.5%, kappa = 0.35) and probability of harm (agreement = 76.8%, kappa = 0.42). The medication errors were most likely to be intercepted during the prescribing phase of the medication use process (n = 236; 90.1%).[51]
- A retrospective review of 402 medication error reports for patients seen at a university's ED showed the effect of an EMP on medication error reporting in an ED. The addition of two EMPs resulted in 14.8 times as many medication error reports as were made when no EMP was in the ED. Pharmacy personnel captured significantly more errors than did other health care personnel (94.5% vs. 5.7%, P <0.001).[52]

Ensuring a complete medication history, performing formal medication reconciliation, and providing discharge counseling and ensuring successful transitions of care within the ED are critical to optimizing health outcomes and have been shown to reduce medication errors and mortality rates. Evidence that supports EMP roles in prospective order review, discharge prescription review, transitions of care, and medication history and reconciliation are detailed

below.

Prospective Order Review

- A multicenter, prospective study of 1,529 adults presenting to EDs over 12 months was conducted to validate clinical decision rules to identify patients presenting with adverse drug events so they could be prioritized for pharmacist-led medication review. Twelve percent of patients were diagnosed with an adverse drug events. Rule 1 contained the variables (1) having a preexisting medical condition or having taken antibiotics within 1 week, and (2) age greater than 80 years or having a medication change within 28 days. These rules had a sensitivity of 91.3% (95% confidence interval [CI], 86.3%–95.0%) and a specificity of 37.9% (95% CI, 35.3%–40.6%) for adverse drug events. This research demonstrates the value of EMPs and describes a validated tool to help allocate limited pharmacist resources in the ED most effectively.[53]
- A retrospective cohort study of 834 medication orders evaluated the feasibility and impact of prospective medication review in the ED. This research showed the median time for order verification, order verification to dispense, and dispense to administration were 3 minutes, 20 minutes, and 10 minutes, respectively. The median time interval for order verification was longer during the overnight pharmacy shift compared with the day and evening shifts. A total of 563 interventions were recommended by the pharmacists and accepted by ED clinicians. These interventions equated to $47,585 worth of cost avoidance.[54]

Discharge Prescription Review

- A retrospective, observational study demonstrated that pharmacists in the ED could provide a valuable service by reviewing discharge prescriptions. Pharmacist review of discharge prescriptions reduced medication errors, even when reviewed retrospectively. A small amount of time dedicated toward this service daily can lead to the detection of clinically significant, preventable medication errors that could lead to patient morbidity and even mortality.[55]
- A retrospective chart review for 89 patient charts was conducted to evaluate the effects of a discharge medication counseling service on readmission rates, ED visits, and days to first readmission or ED visit in patients deemed high risk for hospital readmission. Endpoints were compared between patients who received discharge counseling (study group) and those who did not (control group). There were no differences between the study and control groups in 30-day readmission rates (18.2% vs. 26.7%; $P = 0.45$) and in 30-day ED visits (4.6% vs. 11.1%; $P = 0.43$). The number of days to first readmission or ED visit between the study and control groups was 22 versus 12 ($P = 0.26$). Integration of an EMP as part of an interdisciplinary approach in the discharge medication process

resulted in numerical improvements in outcomes.[56]

- A prospective observational study determined the rate and details of interventions associated with EMP review of discharge prescriptions for patients discharged from the ED. The study evaluated 674 discharge prescriptions. EMPs intervened on 68 prescriptions, resulting in an intervention rate of 10.1% (95% CI, 8.0%–12.7%). The intervention rate was 8.5% (95% CI, 6.4%–11.1%) for adult prescriptions and was 23.6% for pediatric prescriptions (95% CI, 14.7% to–35.3%) (difference 15.1%, 95% CI 5.1–25.2%). There were a similar number of interventions categorized as error prevention and optimization of medication therapy, 37 (54%) and 31 (46%) respectively. Researchers concluded that EMP review of discharge prescriptions for discharged ED patients has the potential to significantly improve patient care associated with suboptimal prescriptions.[22]

Transitions of Care

- A systematic review examined the effectiveness of pharmacist-based transition of care interventions on the reduction of medication errors after hospital discharge. Thirteen randomized trials examining 3,503 patients were included in the final analysis. The aggregate conclusion of the 10 studies evaluating the effect of pharmacist intervention on the incidence of medication errors during transitions of care favored pharmacist over control with an odds ratio of 0.44 (95% CI, 0.31–0.63). The overall result of four studies evaluating the effect of a pharmacist intervention on the incidence of ED visits compared with control favored the pharmacist intervention, odds ratio of 0.42 (95% CI, 0.22–0.78), and number needed to treat of 6.2 (95% CI, 3.4–31.4). Pharmacist transition of care intervention is an effective strategy to reduce medication errors after hospital discharge. In addition, a pharmacist intervention also reduces subsequent ED visits. Hospitals should consider implementing this intervention to improve patient safety and quality during transitions of care.[57]
- A prospective, randomized, longitudinal study of 278 patients assessed the impact of pharmacist involvement in transitions of care as measured by decreased medication errors and adverse drug events, patients' knowledge related to communication about their medications as measured by improvement in the Hospital Consumer Assessment of Healthcare Providers and Systems scores, and 30-day all-cause inpatient readmissions and ED visits. This study demonstrated that pharmacist involvement in hospital discharge transitions of care had a positive impact on decreasing composite inpatient readmissions and ED visits. Patients with moderately complex medication regimens benefited from a continuity of care involving a pharmacy team during transitions in care.[58]

Medication History and Reconciliation

- A three-arm randomized controlled trial of 306 inpatients achieved quantified admission medication history error reduction when pharmacy staff obtained these histories before admission medication orders were placed. Among medically complex older adults, pharmacists and pharmacist-supervised pharmacy technicians reduced admission medication history errors and resultant admission medication order errors by over 80% by obtaining admission medication histories in the ED. This effect was robust to severity weighting and thus shows promise for reducing patient harm.[59]
- A retrospective analysis of 98 patients evaluated the number of medication discrepancies when a pharmacist was involved in the documentation and reconciliation of medications in the ED. Researchers determined that a pharmacist working in the ED identified discrepancies between home and admission orders in a timely manner and intervened to reduce the incidence of medication discrepancies.[60]
- Research that examined the accuracy of medication histories provided support for the presence of an EMP who can compile a comprehensive and accurate medication history to enhance medication management along the continuum of care. Medication histories recorded by medical staff were compared with those elicited by a pharmacy researcher. Of the 1,152 medications recorded as being used by the 100 patients, discrepancies were found for 966 medications (83.9%). There were 563 (48.9%) complete omissions of medications. The most common discrepancies were incomplete or omitted dosage and frequency information.[61]
- A retrospective descriptive study of 3,779 medication orders was conducted at a regional level I trauma center to quantify and demonstrate the impact of a 24-hour pharmacy service in an urban ED. The implementation of a 24-hour pharmacy service was an innovative practice that increased the role of pharmacists in the ED. The EMP conducted prospective medication reviews, procured intravenous admixtures from a sterile environment, and provided therapeutic recommendations for the ED interdisciplinary team.[62]
- Researchers analyzed the incidence of discrepancies in medication histories among elderly and non–English-speaking patients when pharmacist-elicited medication histories were compared with those taken by ED physicians. The study included 100 patients over the age of 70 years who take five or more regular medications, have three or more clinical comorbidities, and/or have been discharged from a hospital in 3 months prior to the study. This study highlights the positive contribution an EMP can make to enhance medication management along the continuum of care. The vulnerability of patients with a language barrier to medication misadventure and their need for interpreter services at all stages of their hospitalization, in particular at the point of ED presentation, was also confirmed in this study.[63]

- A retrospective chart review of 100 patients showed the effect of pharmacist-conducted medication reconciliation on compliance with a hospital's medication reconciliation policy. Pharmacist-conducted medication reconciliation in the ED increased compliance to the institution's medication reconciliation policy for admitted patients. Pharmacist-acquired medication histories had significantly fewer errors in documentation and had more documentation of patient allergies.[64]
- Researchers worked to identify discrepancies between medication histories taken by ED providers (i.e., physicians, nurses, and medical students) and medication histories taken by clinical pharmacists. Pharmacist-acquired medication histories in the ED were more complete than those acquired by other health professionals. Pharmacists identified 1,096 home medications versus 817 home medications documented by ED providers. Of the 817 home medications documented by the ED, the regimens of 637 (78%) were incomplete and were supplemented with dosing information by the pharmacists. Pharmacists reported 375 medication allergies versus 350 reported by ED providers. Immunization histories were obtained in 252 of the 252 (100%) pharmacist-acquired medication histories versus 45 of the 252 (18%) acquired by ED personnel.[65]

Improving the Use of Antimicrobial Agents

Antibiotic resistance is one of the biggest public health challenges around the world. Each year in the United States, at least 2 million people are treated for antibiotic-resistant infection, and at least 23,000 people die. Infections caused by resistant organisms are linked to overuse and inappropriate prescribing of antimicrobial therapies.[66] Within the ED, antibiotics are the fourth largest therapeutic drug class after analgesics, antiemetics, and minerals/electrolytes.[67] Antimicrobial-related adverse drug events have a direct effect on the number of ED visits and hospital admissions. In 2013–2014, 16% of all medication-related adverse events in adults presenting to the ED involved antimicrobials. Allergic reactions were most common (82%; 18% severe), followed by gastrointestinal, sensory/motor disturbances, neurological, and secondary infections, including candidiasis and *Clostridium difficile*.[68] EMPs play a critical role in addressing the public health crisis of antibiotic resistance and its impact on morbidity and mortality.

Antibiotic Stewardship

Focus on appropriate antibiotic prescribing has increased, and many institutions are implementing antimicrobial stewardship programs (ASPs) within their EDs. The benefits of antibiotic stewardship are multifaceted, including improved patient outcomes, reduced adverse events, improved rates of antibiotic susceptibilities, and optimized resource utilization.[69] With 33% to 50% of antibiotic prescriptions in the ED being assessed as inappropriate, there is a significant need to develop initiatives to improve antibiotic prescribing and prevent antibiotic-associated patient and community harms.[70,71,72]

ASPs benefit patients by decreasing readmission rates, shorten the length of stay, decreasing health care costs, and minimizing antibiotic resistance. Several guidelines and peer-reviewed publications recommend incorporating a clinical pharmacist into ASPs, including the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America.[73,74,75,76,77] Inpatient antimicrobial stewardship interventions associated with cost reductions include regular evaluation of broad-spectrum antimicrobial regimens, education, intravenous to oral conversion, guideline development, antimicrobial restriction policy, automatic stop orders, antibiotic cycling, and hospital antibiogram development.[78] These interventions equate to an associated decrease of $200,000 to $900,000 spent in institutions ranging from small community hospitals to large university teaching hospitals.[78]

The ED presents unique challenges to implementing effective antimicrobial stewardship measures, including patient acuity, diagnostic uncertainty, high turnover of patients and clinicians, and patient satisfaction concerns.[75] The ED serves as an interface between the inpatient and community settings. It is often the first place where patients present for medical care, including for common infections.[76] Traditional ASP interventions may not be possible in the ED because of the limited ability to follow patient progress over time. Therefore, EMPs must focus on ensuring accurate discharge and admission prescribing because decisions made in the ED are often continued in both the inpatient and the outpatient setting.

Evidence of positive clinical outcomes supported by EMPs through management of antimicrobial agents is detailed below:

- A retrospective cohort study of 320 patients was conducted evaluating adult patients admitted with community-acquired pneumonia (CAP) or intra-abdominal infections (CA-IAI). The primary outcome of this study was to determine the impact of an EMP on appropriate empiric antibiotic prescribing for CAP and CA-IAI. Overall empiric antibiotic prescribing was more likely to be guideline concordant when an EMP was present (78% vs. 61%, *P* = 0.001); this was true for both the CAP (95% vs. 79%, *P* = 0.005) and CA-IAI subgroups (62% vs. 44%, *P* = 0.025). Total guideline-concordant prescribing significantly increased between the early ASP and established ASP (60% vs. 82.5%, *P* = 0.001) and was more likely when an EMP was present (early ASP: 68.3% vs. 45.8%, *P* = 0.005; established ASP: 90.5% vs. 73.7%, *P* = 0.005). Patients receiving guideline-concordant antibiotics in the ED continued appropriate therapy upon admission 82.5% of the time versus 18.8% if the ED antibiotic was inappropriate (*P* <0.001).[79]
- A prospective cohort study of urine cultures from 457 encounters was reviewed to assess antibiotic appropriateness. The study evaluated antibiotic prescribing practices and assessed compliance with national guidelines, correlations with urine analysis

components, and opportunities for antimicrobial stewardship in the ED. Pharmacist interventions for these patients resulted in 29% of potential antibiotic days saved. Factors found to significantly increase the odds of antibiotic prescribing in asymptomatic patients included the presence of leukocyte esterase (odds ratio [OR], 4.5; 95% CI, 1.2–17.2; *P* = 0.03) or nitrites (OR, 10.8; 95% CI, 1.7–68.1; *P* = 0.01) in the urine and age greater than or equal to 75 years (OR, 3.5; 95% CI, 1.2–9.6; *P* = 0.02). Pharmacist intervention in discontinuing or modifying antibiotics for asymptomatic patients with urine cultures reduced unnecessary antibiotic exposure in the ED.[80]

- A retrospective review of 180 urine cultures determined whether an EMP could aid in the monitoring and correction of inappropriate empiric antibiotic selection for urinary tract infections in an outpatient ED population. A chart review of all urine cultures with greater than 100,000 CFU/mL performed by an EMP helped identify inappropriate treatment in 23% of patients discharged to home with the diagnosis of a urinary tract infection. Of these patients who had received inappropriate treatment, an EMP was able to intervene in 83% of cases. These data highlight the role of EMPs in improving patient care after discharge.[81]
- A retrospective cohort study of patients treated in a level I trauma center evaluated the appropriateness of antibiotic dosing when an EMP is physically present in the ED compared with when absent. Overall, 85% of 210 of the antibiotic orders were appropriate, with 95% appropriate when an EMP was present compared with 74% when an EMP was absent (OR, 6.9; 95% CI, 2.5–18.8). In a logistic regression model, antibiotic appropriateness was independently associated with the presence of the EMP and creatinine clearance. Antibiotics that require renal and/or weight dosing adjustments are 6.5 times more likely to be appropriate in the ED when an EMP is present. Prevalence of an antibiotic dosing error is related to both the presence of EMPs and the degree of renal impairment.[31]
- A retrospective case control study of patients discharged from the ED with subsequent positive cultures determined if integrating antimicrobial stewardship responsibilities into practice of the dedicated EMP decreased times to positive culture follow up, patient or primary care provider notification, and appropriateness of empiric or final antimicrobial therapy for patients discharged from the ED. Pre- and post-implementation groups of an EMP-managed ASP were compared. An EMP-managed ASP significantly reduced time to positive culture review and time to patient or primary care provider notification when indicated.[82]
- A retrospective chart review of adult patients with health care–associated pneumonia (HCAP) who presented to an academic medical center was conducted to evaluate the impact of EMPs on adherence of empiric antibiotic therapy to guideline recommendations. The control group included those patients with HCAP who presented

to the ED outside the EMP's hours, and the treatment group consisted of those patients who presented during the EMP's hours. Patients presenting inside the EMP's hours were significantly more likely to receive guideline adherent empiric antibiotics than the patients presenting outside the EMP's hours (49.38% vs. 25.7%, *P* = 0.005). Also, patients in the treatment group received antibiotics in a shorter amount of time (11.37 vs. 15.56 hours, *P* = 0.272) and at more appropriate doses (85.2% vs. 77.1%, *P* = 0.29), although these outcomes were not statistically significant. The presence of an EMP significantly increased the likelihood of at-risk patients receiving empiric antimicrobial therapy consistent with guideline recommendations.[83]

- A retrospective observational cohort study of 426 patients showed that during the hours the EMP was present, patients were significantly more likely to receive appropriate empiric antimicrobial therapy (58.3% vs. 38.3%; *P* <0.001). Regardless of pneumonia type, patients seen while an EMP was present were significantly more likely to receive appropriate antimicrobial therapy (CAP, 77.7% vs. 52.9%, *P* = 0.008; HCAP, 47.7% vs. 28.8%, *P* = 0.005).[84]
- A retrospective cohort study evaluated the potential impact of EMPs in trauma and evaluated a pharmacist's influence on antibiotic selection and timing for open fractures. Initial prophylactic antibiotic recommendations were met in 81% of trauma resuscitations when an EMP was present versus 47% without a pharmacist present (*P* <0.01). The median door-to-antibiotic time was 14 minutes in the pharmacist group versus 20 minutes in the no-pharmacist group (*P* = 0.02). The participation of an EMP during initial trauma resuscitation resulted in improved initial antibiotic selection and faster door-to-antibiotic administration times in trauma patients with open fractures.[85]
- Delay in appropriate antibiotic therapy is associated with an increase in mortality and prolonged length of stay. A retrospective, institutional review board–approved pre-implementation versus post-implementation study of 128 patients showed that time to appropriate antibiotic therapy was reduced in the post-group versus the pre-group (8.1 ± 8.6 hours vs. 15.2 ± 22.8 hours, respectively, *P* = 0.03). In addition, appropriate empiric antibiotics were initiated more frequently after the implementation (92% post-group vs. 66% pre-group, *P* = 0.0001). The impact of prospective verification of antibiotics by pharmacists led to significant improvement on both empiric selection of and time to appropriate antibiotic therapy.[86]

Culture Surveillance and Follow Up

There is often limited or inconsistent follow up of culture results to systematically assure appropriate therapy in patients discharged or transferred from the ED. The EMP has the knowledge and clinical assessment skills to manage an ASP focused on culture follow up for patients discharged from the ED. A common challenge for EMPs responsible for antimicrobial

stewardship is following up with patients who are discharged home or transferred to another health care facility. The majority of the time, this transition occurs before culture and sensitivity results are available.[87] Culture and serology reports reviewed by EMPs are similar among EDs with ASPs and include those for blood, skin and soft tissue, urinary tract, respiratory, genitourinary, nasopharyngeal, throat, cerebral spinal fluid, stool, Lyme, hepatitis, and syphilis.[87]

The inclusion of antimicrobial stewardship responsibilities through culture follow up into EMP practice leverages their focus on drug therapy and clinical knowledge of microbiology and antimicrobials. An EMP-managed ASP has been shown to improve the time to culture follow up, reduce 96-hour readmission rates for the same chief complaint, and reduce emergency medicine provider workload.[88,89,90,91]

Evidence of the EMP's role in culture review is as follows:

- A retrospective review of physician-managed cultures was compared with pharmacist-managed cultures. The total number of cultures that required adjustment was similar between groups (275 [12%] vs. 355 [15%]). However, in evaluating readmission rates within 96 hours for the same chief complaint, a greater proportion of patients presented to the ED in the physician-managed group than in the pharmacist-managed group (432 [19%] vs. 165 [7%], P <0.001). Reasons for readmission included treatment failure, noncompliance with medication regimen due to cost or otherwise, and allergic reactions to the antimicrobial prescribed. The EMP-managed program resulted in optimization of the antimicrobial regimen, and the workload of the emergency medicine physicians was reported to be reduced as well.[27,88]
- A retrospective evaluation of medical records determined the impact of an ED procedure requiring pharmacist review of all culture results as a way to improve use of antimicrobial therapies. In the 12 months before implementation of the pharmacist-managed ED culture review process, the medical center's ED physicians reviewed 2,278 culture reports and ordered antimicrobial regimen modifications in approximately 12% of cases; in approximately 19% of cases, patients were readmitted to the ED within 96 hours of discharge for treatment failure, patient noncompliance, allergy to medication, adverse drug reactions, and other reasons. In the 12 months after program implementation, pharmacists initiated antimicrobial regimen modifications in approximately 15% of cases; readmission to the ED occurred in approximately 7% of cases, with comparatively lower rates of readmission for treatment failure, noncompliance, and allergy to medication.[92]
- In a retrospective case-control study of all patients discharged from the ED with subsequent positive cultures, 212 positive cultures were identified: 132 in the pre-

implementation group and 80 in the post-implementation group. Of those, 104 in the pre-implementation group and 73 in the post-implementation group required follow up. The median time to positive culture review and follow up (2 days [range, 0–4] versus 3 days [range, 1–15], *P* = 0.0001) and median time to patient or primary care provider notification (2 days [range, 0–4] vs. 3 days [range, 1–9], *P* = 0.01) were shorter in the post-implementation group compared with the pre-implementation group. These data show that the EMP was able to perform culture review in a more timely fashion than the previous midlevel practitioner managed program.[89]

- A retrospective chart review was performed for all patients with positive cultures from specimens obtained in the ED during a 1-year period to measure the impact of a pharmacist-driven antimicrobial optimization service in the ED. During the period reviewed, 819 patients were discharged from the ED with ensuing positive cultures. Of these patients, 174 (21.2%) required additional intervention/follow up due to inappropriate antimicrobial coverage. An EMP intervened in all these cases. Of the 174 patients requiring follow up, 97 patients (56%) required an antibiotic change or addition, 24 patients (14%) were referred to their primary care provider or another specialist, 28 patients (16%) were doing fine on current therapy, and 25 patients (14%) were lost to follow up. Most positive cultures requiring outpatient follow up were urine specimens (50%), followed by wounds/abscesses (12%), sexually transmitted disease tests (9.2%), and throat cultures (8.6%).[93]
- A retrospective study assessed the impact of an EMP-facilitated review process of positive microbiological test results from patients discharged from the ED as measured by time to positive result review and number of indicated interventions completed; 178 positive microbiological test results were included. The median (interquartile range [IQR]) time to initial review was 3 (1.0–6.3) hours for the EMP and 2 (0.3–5.5) hours for the charge nurse group (*P* = 0.35). Four percent (1/25) of indicated interventions were not completed in the EMP group versus 47% (14/30) in the charge nurse group (*P* = 0.0004). An EMP was significantly less likely to miss an intervention when indicated with no difference in time to review positive microbiological results.[94]
- A quasi-experimental study comparing a retrospective standard of care group with a prospective culture follow up group to assess the impact of the culture follow up program on the frequency of ED revisits within 72 hours and hospital admissions within 30 days compared with the historical standard of care. ED pharmacists and physicians implemented the program. The rate of combined ED revisits within 72 hours and hospital admissions within 30 days was 16.9% in the standard of care group and 10.2% in the culture follow up group (*P* = 0.079).[95]
- A retrospective electronic chart review was performed for ED patients with positive cultures during two different 3-month periods. During period 1, ED nursing

management performed positive culture follow up. During period 2, EMPs performed this role. The primary objective was to determine the value of the pharmacist-driven antimicrobial optimization service as measured by the number of clinical interventions made when indicated. The pharmacist-driven ASP resulted in a 30% absolute increase in interventions for inappropriate therapy compared with the nursing-driven model.[96]

- A retrospective observational study evaluated whether the addition of a pharmacist to the post-visit review of discharged adult ED visits' prescriptions/cultures would reduce the prevalence of revised antimicrobial regimen inappropriateness. In the pre-pharmacist cohort, there were 411 positive ED discharge cultures. Seventy-three (17.8%; 95% CI, 14.1%–21.5%) required antimicrobial regimen revision; 34 of these met 1 or more levels of inappropriateness (46.6%; 95% CI, 35.1%–58.0%). In the post-pharmacist cohort, there were 459 positive ED discharge cultures. Seventy-five (16.3%; 95% CI, 13.0%–19.7%) required revision; 11 of these met 1 or more levels of inappropriateness (14.7%; 95% CI, 6.7%–22.7%; $z = 4.2$; $P < 0.0001$ for comparison). The addition of a pharmacist to the post-visit review of discharged adult ED patients' prescriptions/cultures reduced the prevalence of revised antimicrobial regimen inappropriateness.[97]

Management of Patients with Sepsis and Bacteremia

Patients presenting to the ED with sepsis, severe sepsis, or septic shock is an all too frequent event that carries with it significant mortality. According to a retrospective analysis, sepsis was present in 52.8% of hospitalizations leading to death or discharge to hospice. Suboptimal sepsis care, such as delay in initiating antibiotics, source control, or inappropriate initial antibiotic therapy, was found in 22.7% of sepsis-associated deaths.[98] An EMP has multiple roles in the early management of these patients, most commonly optimizing empiric antibiotic selection and dosing, thereby ensuring adequate antimicrobial coverage in this complex patient population.[99] Evidence demonstrating the role of EMPs in the management of patients with sepsis and bacteremia is as follows:

- A retrospective review of the clinical consultations documented by EMPs at an academic, teaching hospital over a 2-year period was conducted to describe the role that an EMP has on the management of patients presenting to the ED with sepsis, severe sepsis, or septic shock. Dosing recommendations were the most frequent consultations provided (n = 309, 53%), followed by the addition of appropriate empiric antibiotics (n = 131, 22%) and medication preparation (n = 108, 19%). Antibiotics (n = 307, 83%) and vasopressors (n = 31, 8%) were the medication classes regularly involved in EMP consultations. Vancomycin (n = 90, 28%) and norepinephrine (n = 15, 48%) were the most common agents involved in these consultations.[99]

- A retrospective cohort study determined whether pharmacist involvement in the management of bacteremia ED led to an increase in appropriate treatment of bacteremia as well as improvements in patient outcomes. All patients seen in the ED and subsequently discharged who had a positive blood culture determined not to be a contaminant were included in the study. Patients were analyzed in two cohorts: those who were physician-managed (107 patients) and those who were pharmacist-managed (138 patients). In the physician-managed cohort, 50 of 107 (47%) patients were treated appropriately compared with 131 of 138 (95%) patients in the pharmacist-managed cohort ($P < 0.0001$). There was also a decrease in attributable 90-day admission or readmission in pharmacist-managed patients, which occurred in 4 of 138 patients (2.9%) versus the physician-managed patient cohort in which 13 of 107 patients (12.1%) were readmitted ($P = 0.01$). There was no difference in mortality between the groups ($P = 0.8337$).[100]
- A retrospective review of 186 adult patients presenting to the ED determined whether the physical presence of an EMP would decrease antibiotic order to administration time in adult patients with sepsis, severe sepsis, or septic shock. When a pharmacist was present, patients received antibiotics sooner (median 0.61 vs. 0.88 hour, $P = 0.001$), Surviving Sepsis Campaign goals for antibiotic administration time were more likely to be met (88% vs. 72%, $P = 0.0097$), and initial antibiotics were appropriate more often (97% vs. 81%, $P = 0.0008$).[101]

Managing Cardiovascular Disorders

Almost 6% of visits to EDs indicate coronary artery disease, ischemic heart disease, or history of myocardial infarction on the medical record.[67] EMPs can serve as vital resources in caring for patients in need of cardiopulmonary resuscitation or patients with atrial fibrillation, acute ischemic stroke, myocardial infarction, and heart failure.

Cardiopulmonary Resuscitation

Cardiovascular disease is the leading cause of death in the United States, and receiving prompt medical care can increase survival rates.[102] The EMP has many potential roles as part of the resuscitation team during cardiopulmonary arrest, including providing recommendations for drug therapy, preparation of medications for administration, and documentation of drug administration.[103] A retrospective analysis of 74 patients assessed compliance with advanced cardiac life support (ACLS) guidelines during in-hospital cardiopulmonary arrest in a community teaching hospital and evaluated the association of compliance with the presence of a pharmacist on the resuscitation team. Noncompliance was noted in 58.1% of all documented arrests; of the 650 treatment interventions identified, 10.6% were noncompliant with ACLS guidelines. The reasons cited for noncompliance included an incorrect medication dosage

(20.3%), prolonged period of time between sequential interventions (26.1%), omission of an indicated treatment (17.4%), deviation from recommended treatment guidelines (26.1%), and incorrect energy for defibrillation (10.1%). A pharmacist was present at 36.5% of documented arrests. Compliance with ACLS treatment guidelines was more likely during resuscitations in which a pharmacist was present (59.3% vs. 31.9%; *P* = 0.03).[104] In a different study evaluating the effect of adherence to ACLS guidelines, adherence throughout the resuscitation attempt was associated with increased return of spontaneous circulation.[105]

Atrial Fibrillation

The annual cost of care for atrial fibrillation in the U.S. is estimated to be $6.65 billion, with nearly three-quarters of costs because of hospitalizations with 70% of admissions presenting through the ED.[106] A recent pilot study demonstrated the potential use of a structured care pathway, which risk stratifies ED patients with a primary diagnosis of atrial fibrillation and transitions appropriate patients to the outpatient setting. By introducing this novel care pathway, the likelihood of discharge was increased from 19% to 43%. This change in discharge rate was not associated with an increase in repeat ED presentations for atrial fibrillation. Exploratory analysis suggests that ED providers became more structured in their decisions for admission of patients with atrial fibrillation after implementation of the novel pathway of care, likely leading to the change in practice and demonstrating the potential for reducing unnecessary hospitalizations. The study demonstrated the potential role of clinical pharmacists who can serve as the receiving provider for these urgent atrial fibrillation clinic referrals.[107]

Acute Ischemic Stroke

Stroke is the fifth leading cause of death and the leading cause of disability in the United States.[108] Tissue plasminogen activator (tPA) is the drug of choice for the treatment of acute ischemic stroke with the benefit of tPA being time dependent, as earlier administration from the time of onset of symptoms is associated with improved outcomes, while delayed administration results in increased risk of harm.[109,110] The acute stroke team at one level I trauma center and comprehensive stroke center is composed of various health professionals who respond to stroke calls, but it does not formally include a pharmacist at this time. However, EMPs have been actively involved in patient evaluation and assessing stroke patients for contraindications. EMP involvement at the bedside can expedite the administration of tPA.[111] Examples of evidence that support patient outcomes associated with this role include:

- A retrospective, single-center, cohort study of 100 patients who received tPA was conducted to determine the impact of EMPs on door-to-needle (DTN) times and clinical outcomes in patients with acute ischemic stroke who receive tPA in the ED. EMP involvement was associated with a significant improvement in DTN time (median 46 [IQR, 34.5–67] vs. 58 [IQR, 45–79] minutes; *P* = 0.019) and with receiving tPA within 45

minutes of arrival (49% vs. 25%; OR, 2.81; 95% CI, 1.21–6.52). National Institutes of Health Stroke Scale (NIHSS) scores were significantly improved at 24 hours post-tPA in favor of the EMP group (median NIHSS 1 [IQR, 0–4] vs. 2 [IQR, 1–9.25]; *P* = 0.047). The EMP involvement in initial stroke care was associated with a significant improvement in DTN time.[112]

- A single-center, retrospective cohort study evaluated the potential impact of an EMP on time to thrombolytic administration in 97 acute ischemic stroke patients. The incorporation of a pharmacist within the stroke alert team was associated with significant improvements in both the proportion of patients receiving thrombolytics meeting the DTN goals and the overall mean time to thrombolytic administration. This study may support the integration of clinical pharmacists within stroke alert teams and adds to the literature supporting pharmacists on other clinical interdisciplinary teams within the ED.[113]
- A retrospective study of 105 patients who received tPA for acute ischemic stroke in the ED at a comprehensive stroke center compared the accuracy of tPA dosing, average door-to-tPA time, and identification of contraindications to tPA therapy when a pharmacist was present versus absent in the ED. Dosing accuracy was similar when a pharmacist was present versus absent (96.6% vs. 95.6%, *P* = 0.8953). The median door-to-tPA time when a pharmacist was present was statistically significantly shorter than when a pharmacist was absent (69.5 minutes vs. 89.5 minutes, *P* = 0.0027). When a pharmacist was present, a door-to-tPA time of less than 60 minutes was achieved 29.9% of the time compared with 15.8% in the pharmacist absent group (*P* = 0.1087). Pharmacist involvement on stroke teams may have a beneficial effect on door-to-tPA time and patient care in the ED.[111]

Myocardial Infarction and Heart Failure

Reduction of hospital readmissions is a major priority for most hospitals, likely due to the readmission penalty implemented by the CMS in October 2012. As a result of this legislation, hospitals are now penalized up to 1% of Medicare payments for excessive 30-day readmissions of patients with the primary diagnoses of acute myocardial infarction, heart failure, and pneumonia.[114] Evidence that supports EMPs in these roles includes:

- Current guidelines recommend door-to-balloon times of 90 minutes or less for patients presenting to the ED with ST-segment elevation myocardial infarction (STEMI). A retrospective observational cohort study of ED patients with STEMI requiring urgent cardiac catheterization was conducted to determine whether an EMP is associated with decreased door-/diagnosis-to-cardiac catheterization laboratory (CCL) time and decreased door-to-balloon time. A multivariate analysis of 120 patients, controlled for CCL staff presence and arrival by pre-hospital services, determined EMP presence is

associated with a mean 13.1 minute (95% CI, 6.5, 21.9) and 11.5 minute (95% CI, 3.9, 21.5) decrease in door-/diagnosis-to-CCL and door-to-balloon times, respectively. Patients were more likely to achieve a door-/diagnosis-to-CCL time of 30 minutes or less (OR, 3.1, 95% CI, 1.3, 7.8) and 45 minutes or less (OR, 2.9; 95% CI, 1.0, 8.5) and a door-to-balloon time of 90 minutes or less (OR, 1.9; 95% CI, 0.7, 5.5) when the EMP was present.[115]

- A multidisciplinary team including emergency medical service providers, emergency medicine providers, cardiologists, hospitalists, pharmacists, nurses, case managers, and outpatient physicians can be involved in the process of safely transitioning a patient between care settings. Small-scale studies in the geriatric population have shown improved transitions of care and decreased readmissions with these care teams. The ED is a key transition point for patients with acute myocardial infarction and heart failure, yet it is rarely identified and utilized as such in transitions of care interventions. Future research and implementation projects will need to refine and expand the role of the ED in the process.[116]

Economic Value of Emergency Medicine Pharmacists

The economic benefits of providing high-quality EMP services are demonstrated through a reduction in medication errors and adverse drug events, more effective medication use, and cost avoidance. The potential cost avoidance in reducing errors, eliminating antibiotic redundancies, meeting quality standards for reimbursement, improving patient satisfaction, and reducing ED revisits are important factors in the financial justification for dedicated ED staffing.[33,117] Examples of evidence in the literature that demonstrate the economic value of EMPs are as follows:

- A retrospective descriptive study determined cost savings from clinical activities performed by EMPs. The ED pharmacy team participated in a total of 4,106 clinical activities that resulted in a cumulative cost avoidance of $5,387,679 over a 2.5-year period.[118]
- An evaluation of all EMP interventions during the study period evaluated the clinical and cost implications generated of a newly integrated EMP in a university-affiliated tertiary care hospital; 421 interventions were assessed by a review panel for clinical significance and probability of harm had the intervention not occurred. Direct medication cost and cost avoidance as a result of interventions were calculated. After review, 53.9% of interventions were considered significant, and 52.9% were given a probability of patient harm of 50% or greater had the intervention not occurred. Interventions resulted in an increase in direct medication costs of $1,270 but generated a cost avoidance of $160,709. The projected direct medication cost estimate for 1 year was $13,208 with a cost avoidance of over $1.6 million.[119]

- Inclusion of a pharmacist as a member of the resuscitation team improved compliance with medications administered according to the ACLS guidelines and increased survival to hospital admission. The presence of a pharmacist in the ED was associated with approximately $320,000 in cost avoidance per year.[120]
- A prospective analysis was conducted of pharmacist interventions and resuscitation experiences, including pharmacist participation in a hospital ED and the potential cost avoidance associated with the interventions made by the pharmacists. During the study, 2,150 pharmacist interventions were documented. Pharmacists participated in the care of 1,042 patients triaged to the resuscitation area of the ED. The most commonly documented interventions made by pharmacists involved in the care of patients visiting the ED included provision of drug information, dosage adjustment recommendations, responses to questions from nursing staff, formulary interchanges, and suggestions regarding initiation of drug therapy. The potential cost avoidance attributable to the pharmacist interventions during the study period was over $1 million.[33]
- The assessment of the implementation of a comprehensive, 24-hour ED pharmacy program improved the quality of patient care, decreased medication errors and patient wait times, improved the medication reconciliation process, enhanced formulary management, and ensured prospective medication order review. The projected cost savings for the medical center during the first year of implementation was calculated as $1,691,185.[121]
- A retrospective analysis of clinical pharmacy activities and interventions was conducted to identify adverse drug events prevented by the clinical pharmacy team and to determine the net cost savings associated with their input on a multidisciplinary trauma service. A total of 2,574 pharmacy activity entries were documented in the Quantifi system. The total conservative estimate of cost savings associated with clinical pharmacy interventions amounted to $565,664. Considering the mean U.S. hospital pharmacist salary and the highest quoted cost associated with the Quantifi program, there was a net cost savings of $428,327 associated with the clinical pharmacist interventions on the trauma service. Most of the interventions (53%) fell under the category of pharmacotherapy improvement, with 21% in the category of quality/safety improvement and 18% as antibiotic stewardship. Prevention of 34 serious adverse drug events was documented. Antibiotic changes and discontinuing medications were other common interventions. Antimicrobial medications (668), anticoagulants (270), and gastrointestinal medications (231) were the most common medication classes involved in pharmacy interventions.[117]
- An analysis of 2,150 pharmacist interventions and resuscitation experiences that were documented over a 4-month period was conducted, including pharmacist participation in a hospital ED and the potential cost avoidance associated with the interventions

made by the pharmacists. Pharmacists participated in the care of 1,042 patients triaged to the resuscitation area of the ED. Cost avoidance during the study was determined to be $1,029,776. The most commonly documented interventions made by pharmacists involved in the care of patients visiting the ED included provision of drug information, dosage adjustment recommendations, responses to questions from nursing staff, formulary interchanges, and suggestions regarding initiation of drug therapy.[33]

With many ED patients, ensuring timely medication administration is a key part. Outlined by ACMT, published data demonstrate that the presence of an EMP is associated with a reduction in time to antibiotics administration for patients with sepsis, time to first analgesic in trauma patients, time to sedation and analgesia after rapid sequence intubation, time to thrombolysis for patients with acute ischemic stroke, and door-to-balloon time for patients with acute myocardial infarction.[83,101,113,115,122,123,124,125] EMPs also facilitate medication management for other time-sensitive situations such as cardiac resuscitations and mass casualty events.[49,126,,127,128,129,130] This frees clinicians from retrieval and medication preparation, allowing them to remain at the bedside to render care.[48]

An additional study described the impact on physician efficiency when an EMP is available to ED physicians while working under a collaborative care agreement. EMPs saved ED physicians an average of 75 minutes per shift, with the highest yield categories being general questions (25.2 minutes per shift [mps], standard error [SE] = 2.67), critically ill patient service (11.5 mps, SE = 2.66), and urine culture follow ups (11.3 mps, SE = 1.05). Time saved by physicians result in a cost saving to the health system and/or increased patient throughput.[131]

Other Clinical Services Provided by Emergency Medicine Pharmacists

Peer-reviewed literature also highlights EMP roles in services such as anticoagulation, asthma, immunizations, opioid management, pre-hospital and emergency preparedness, sedation and analgesia, trauma, and pediatrics.

Anticoagulation

Advancements in the treatment of warfarin-associated intracranial hemorrhage include the use of four-factor prothrombin complex concentrate (4F-PCC), which has demonstrated more rapid reversal of the international normalized ratio (INR) when compared with fresh frozen plasma. A pharmacist-driven protocol for 4F-PCC was implemented, which allows for pharmacist approval of 4F-PCC in patients diagnosed with warfarin-associated intracranial hemorrhage and an INR greater than or equal to 2. The pharmacist is responsible for determining the appropriate dose of 4F-PCC, preparation, bedside delivery, and order entry into the electronic medical record. A retrospective review of 48 consecutive patients who received 4F-PCC in a single ED evaluated

the impact of a pharmacist-driven protocol on time to 4F-PCC administration in warfarin-associated intracranial hemorrhage. The median time to administration of 4F-PCC in the pharmacist-driven protocol group was 35 minutes (IQR, 25–62; range, 11–133) compared with 70 minutes (IQR, 34–89; range, 14–244) in the pre-protocol group (*P* = 0.034). Implementation of a pharmacist-driven protocol for 4F-PCC in the ED at the institution significantly reduced time to administration in patients presenting with warfarin-associated intracranial hemorrhage.[132]

EMPs commonly provide patient education and help manage high-risk anticoagulant medications in inpatient and outpatient settings, but the evidence for these interventions in the ED is less established, especially in the era of direct-acting oral anticoagulants. A single center, retrospective analysis identified the impact of pharmacist education, defined as the need for intervention on callback, versus physician- and nurse-driven discharge measures on patient understanding and appropriate use of anticoagulant medications. Patients received follow-up phone calls from an EMP within 72 hours of discharge. One hundred seventy-four patients were evaluated in a per-protocol analysis. Patients who did not receive pharmacist education prior to discharge required an increased need for intervention during callback versus those who did receive pharmacist education (36.4% vs. 12.9%, *P* = 0.0005) related to adherence, inappropriate administration, and continued use of interacting medications or supplements, among other concerns. In addition, patients who had not received pharmacist counseling were more likely to be readmitted to a hospital or return to the ED within 90 days after their initial visit for an anticoagulation-related problem versus patients who had received pharmacist counseling (12.12% vs. 1.85%, *P* = 0.0069).[133]

Asthma

According to a recent national survey, asthma accounts for 1.7 million visits to the ED yearly, placing it among the top 20 reasons for ED visits.[134] EMPs can assure appropriate treatments and ensure compliance with clinical guidelines. EMPs can also provide information and support to physician colleagues. In a study to evaluate the impact of a simple educational intervention on the prescribing habits of internal medicine residents in the treatment of acute asthma in a busy ED, prescribing habits for 16 residents were documented for 4 months. The first 2 months served as a control period during which eight residents managed asthma patients without the benefit of any specific educational intervention beyond standard department protocols. A total of 129 patients treated by the residents during this initial phase were assessed. During the second 2-month period, a 10-minute verbal presentation and explicit written treatment protocol were provided to another eight residents, and their treatment of 83 patients was covertly evaluated. Increased prescribing of desired therapy was significantly improved in every area except that of prescribing a steroid-containing metered-dose inhaler for use as a discharge medication.[135]

Immunizations

The large number of patient visits to EDs affords opportunities for EMPs to vaccinate, educate appropriate individuals, and limit the number of missed opportunities against vaccine-preventable illnesses. In particular, influenza and pneumonia are easily targeted within the ED because of their severity and widespread recommendations for the immunization of a large number of patients who use the emergency care system as a substitute for regular health care. Every ED visit should be seen as an opportunity for vaccination. EMPs are well positioned and should embrace the opportunity to improve vaccination rates and potentially improve morbidity and mortality related to vaccine-preventable diseases.[136] Research has also demonstrated that a pharmacist-based influenza immunization program is feasible in the ED and has the potential to successfully and safely increase the percentage of adult patients receiving the vaccine.[137]

Opioid Overdose Prevention

In response to the opioid epidemic in the United States, EDs are racing to develop best practices to combat overdoses and overdose use disorder. Naloxone, the opioid antagonist and overdose reversal agent, is commonly distributed from community distribution programs and harm reduction agencies, but ED dispensing remains rare.[138]

A recent study describes an ED-based naloxone rescue kit (NRK) dispensing program which utilized a discharge follow-up questionnaire with targeted questions to assess patient demographics; the study evaluated effectiveness of educating laypersons on identification of overdose and outcomes of the program, including the number of NRKs used, enrollment in medication-assisted treatment for opioid dependence, and return visits to the ED for overdose. Patients were contacted via telephone call at least 30 days after their ED visit. A total of 141 patients were given an NRK during the study period, and 106 patients (75%) were reached for follow up. Patients were mostly male (74.4%), white (84%), and had Medicaid insurance (73%). The majority of patients (85.2%) were seen in the ED for an opioid overdose or related complication (e.g., abscess drainage, skin and soft tissue infection, somnolence). Overall, 26% self-reported overdose since receiving their NRK requiring hospitalization or ED visit (median = 1 overdose [range, 1–4]) and 8% (n = 9) stated they had used their NRK for someone else during an overdose situation that led to full reversal at time of follow up. Ten percent (n = 11) were enrolled in a medication-assisted treatment program at the time of follow up.[139]

Opioids are commonly prescribed within ED settings. Patients who are prescribed opioids may not be aware of how to store and dispose of opioids properly, and they may not be aware of the risks associated with nonmedical use of prescription opioids or accidental exposure to

children. A recent study provides preliminary evidence that student pharmacists and pharmacists are able to deliver opioid safety and overdose education in the ED. A convenience sample of 102 patients within a single community-based suburban ED received brief, in-person scripted counseling and educational brochures. All the patients were satisfied with the intervention, and 97.4% of them reported that the counseling improved their knowledge of opioid side effects. The majority of patients thought that their own risk of addiction was significantly less than the general public's risk of addiction when taking opioids.[140] In addition to providing overdose education, there are increasing reports of EDs working as a public health partner to provide naloxone.[139]

Pre-Hospital Medicine and Emergency Preparedness

Pharmacists with expertise in emergency medicine are ideally positioned to provide guidance on optimizing and standardizing medication use aspects of state and local emergency medical service protocols.[141] A study was conducted describing the EMP's role in helping Vermont health officials standardize pharmacotherapy-related protocols used by emergency medical service personnel to replace the existing patchwork of local protocols with statewide standards of care. Among the 92 draft protocols reviewed, 62 pertained to medication use. The pharmacist provided a wide range of suggestions on 33 protocols, including (1) evidence-based recommendations on use of vasopressor agents for septic shock, (2) recommendations to optimize medication ordering and preparation in the pre-hospital setting, (3) recommendations on pre-hospital management of pediatric shock and appropriate use of chemical restraints, and (4) recommendations to promote use of smart infusion pumps by emergency medical service personnel. All of the pharmacist's suggestions were incorporated into the final protocols and have helped standardize care for patients receiving emergency medical services throughout Vermont while reducing the potential for medication errors.

Several articles have described pharmacists' experiences in planning and responding to disasters.[142,143,144] In addition, pharmacy associations have recognized the responsibilities and duties of pharmacists to prepare and respond to disasters and to participate in the full range of issues related to pharmaceuticals in disaster response. In the disaster setting, the pharmacist must consider the crisis factor—a factor that is well known to EMPs. According to authors of a paper on pharmacist readiness for emergency preparedness, pharmacist responsibilities in disaster response is critical, and to support disaster readiness, pharmacists must:

- Maintain mental and physical fitness to mitigate the risk of injury to themselves, teammates, or patients.
- Maintain appropriate clothing, uniform, and protective equipment to protect themselves from exposure to environmental risks.
- Obtain current vaccinations for all available biological risks to which they may

potentially be exposed.

- Understand the National Response Framework, National Incident Management System, and Incident Command System.
- Appreciate the safety and security concerns and how to mitigate them in a disaster response.
- Make provisions for "continuity of operations" for home and primary work environments.
- Maintain appropriate personal equipment, such as a sleeping bag, a tent, and toiletries, to address basic necessities in a disaster.

Sedation and Analgesia

Procedures commonly performed in the ED that may require sedation include manipulation of fractures and dislocations, abscess drainage, laceration repair, synchronized cardioversion, and radiographic imaging. For some of these procedures to be carried out successfully, the patient must be at a suppressed level of consciousness in order to tolerate the associated pain and anxiety.[145] These procedures often involve the use of high-risk medications.[146] EMPs can provide preprocedure assessment, assist with drug selection and dosing, develop the pharmacologic plan, procure equipment and supplies, and perform sedation monitoring. Through the assessment process, EMPs risk stratify patients, determine how the patient's medical history may influence the response to analgesia and sedation, and avoid adverse outcomes.[145,147] EMPs select and dose sedatives and analgesics based on the type of procedure to be performed. They also obtain the anticipated number of medication vials; select appropriately sized syringes, needles, and alcohol swabs; and draw up medication doses as needed during the procedure. In some cases, EMPs are able to directly administer medications during procedural sedation under the supervision of a physician.[146]

During procedural sedation and analgesia, medication selection and dosing is critical and must be tailored to each patient and procedure. EMPs can reduce medication errors particularly during the ordering and administration steps of the medication use process. Common errors include drug-dosing, potential drug interactions, and administration of the wrong pharmacologic agent. Pharmacists in the ED can provide drug information and assist with drug selection and dosing; medication preparation; and monitoring of the patient and of the time intervals since medication administration is relative to the duration of the procedure.[145]

Trauma

EMPs must be familiar with the intricacies of treating life-threatening injuries in an emergent setting and be able to anticipate the direction of the patient's care. The ability to provide valuable pharmacological interventions throughout the resuscitation and stabilization process

requires familiarity with the process of resuscitation, including rapid sequence induction, analgesia and sedation, seizure prophylaxis, appropriate antibiotic and tetanus prophylaxis, intracranial pressure control, hemodynamic stabilization, and any other specific drug therapy that the clinical situation demands. The goals of an EMP during trauma resuscitation include reducing medication errors, providing safe and appropriate medications for patients in a timely matter, advocating for the patient, and ensuring medication guidelines are followed.[148] EMP involvement with trauma resuscitation increased significantly from 23% in 2007 to 70% in 2017.[149]

Rapid sequence induction is a process involving the administration of a sedative induction agent and a paralytic agent to facilitate endotracheal intubation. EMPs play an integral role in this procedure, especially in the steps of pretreatment, paralysis with induction, and postintubation management.[150] The presence of a pharmacist during rapid sequence intubation procedures was associated with decreased times to postintubation sedative and analgesic use, indicating that pharmacist participation in trauma resuscitation responses can facilitate appropriate drug therapy. Examples within the literature include:

- A retrospective cohort study of 82 patients who underwent rapid sequence intubation in the ED compared the rate of initiation of postintubation analgesia in the ED before and after intervention by EMPs. The overall rate of postintubation analgesia increased after pharmacist intervention, from 20% to 49% ($P = 0.005$). Analgesia initiation during EMP hours was 50% and 85% in the pre- and post-intervention groups, respectively. In the pre-intervention group, more patients received sedation without analgesia (73% vs. 51%, $P = 0.04$), and a small percentage (7%) received neither sedation nor analgesia. Time to initiation of postintubation analgesia decreased from 98 minutes to 45 minutes.[151]
- A retrospective chart review measured the impact of a pharmacist on time to first analgesic dose administered during trauma resuscitation. For inclusion, patients must have received intravenous fentanyl, morphine, or hydromorphone in the trauma bay. The time to medication administration was defined as the elapsed time from ED arrival to administration of first analgesic. There were 1,328 trauma response system activations during the study period, of which 340 patients were included. The most common analgesic administered was fentanyl (62% in both groups). When a pharmacist was participating, the mean time to first analgesic administered was decreased (17 minutes vs. 21 minutes, $P = 0.03$). Among the 78% of patients with documented pain scores, the overall mean reduction in pain scores from ED arrival to ED discharge was similar between the two groups. There was a 2.4-point reduction with a pharmacist versus 2.7 without a pharmacist, using a 0 to 10 numeric pain rating scale.[125]
- A retrospective cohort study was conducted at a level I trauma center to compare

medication use outcomes in consecutive cases in which trauma patients underwent rocuronium-assisted rapid sequence intubation and subsequent sedation and analgesia with or without a pharmacist's participation on the resuscitation team. Relative to resuscitation cases not involving a pharmacist, the presence of the pharmacist during rapid sequence intubation was associated with decreased mean times to provision of postintubation sedation (9 minutes vs. 28 minutes, *P* = 0.007) and analgesia (21 minutes vs. 44 minutes, *P* = 0.057). The cumulative proportions of patients receiving appropriate sedation 5, 10, and 15 minutes after intubation were 11%, 26%, and 41% in the pharmacist-absent group and 33%, 53%, and 63% in the pharmacist present group (*P* = 0.009, 0.008, and 0.045, respectively); for postintubation analgesic use, the corresponding figures were 9%, 14%, and 23% in the pharmacist-absent group and 17%, 30%, and 43% in the pharmacist-present group (*P* = 0.236, 0.066, and 0.039, respectively).[123]

Pediatrics

Adult trauma centers are major providers of medical management for pediatric trauma patients in the United States and also many EMPs practice within pediatric specific EDs. Medication administration in this patient population is complex and with significant opportunity for error. The Emergency Medical Services for Children program and the American Academy of Pediatrics Committee on Pediatric Emergency Medicine have formulated a policy statement on medication safety in the ED, which specifically recommends the use of pharmacist support within EDs.[152] Research has shown that interdisciplinary engagement in the ED, including an EMP, can reduce medication errors, improve treatment time, and decrease mortality in this patient population.[153,154,155,156]

Recognition of Emergency Medicine Pharmacists

National position statements and guidelines of other health professions have recommended that pharmacy services be provided in the ED to ensure safe and effective medication use, including the American College of Emergency Physicians (ACEP) and ACMT. ACEP's policy statement on Clinical Pharmacist Services in the Emergency Department states:[157]

> *The emergency department (ED) is a complex environment presenting unique challenges for medication selection, dosing, administration, and monitoring. In particular, caring for high-risk populations such as the critically ill, geriatric patients, pediatric patients, those with limited healthcare access, and those with multiple comorbidities often requires the use of high-risk medications and the need for time-sensitive medication decisions.*
>
> *The American College of Emergency Physicians (ACEP) believes that pharmacists serve a critical role in ensuring efficient, safe, and effective medication use in the ED and advocates for health systems to support dedicated roles for pharmacists within the ED.*

> *The emergency medicine pharmacist should serve as a well-integrated member of the ED multidisciplinary team who actively participates in patient care decisions including resuscitations, transitions of care, and medication reconciliation to optimize pharmacotherapy for ED patients. The exact delivery method for these services can vary among institution depending on size, financial resources, presence of academic programs, and other factors.*
>
> *ACEP encourages emergency medicine rotations for pharmacy residents and clinical research regarding pharmacist access in the ED.*

ACMT's position statement on The Role of Clinical Pharmacists in the Emergency Department says:[48]

> *Clinical pharmacists are integral to the care and safety of emergency department (ED) patients. Emergency department pharmacists positively impact time to critical therapies, including antibiotics for sepsis and door-to-balloon time for acute myocardial infarction. Pharmacists optimize pharmacotherapy regimens involving high-risk therapeutic classes, such as thrombolytics. Clinical pharmacists improve patient safety by intercepting prescription errors and recognizing adverse drug events. The potential cost avoidance of reducing errors and meeting standards for reimbursement provides financial justification for dedicated ED clinical pharmacist staffing. We support 24-hour staffing of emergency departments with dedicated ED pharmacists.*

EDs represent care environments that carry unique risks that may be addressed through the addition of specifically trained and/or experienced EMPs. Adult and pediatric patients present with undifferentiated medical, neurological, traumatic, psychiatric, and surgical complaints 24 hours a day, 7 days a week. Patients are generally unfamiliar to the emergency care providers and may be unable to communicate relevant medical information or may require time-sensitive interventions.[48]

ED patients have uniquely complex pharmacological needs. Pharmacists require extensive postdoctoral training to develop the expertise necessary to serve this vastly variable patient population. While many physicians, advanced nurse providers, and physician assistants certainly understand basic principles of pharmacology, ED patients have extremely broad pharmacotherapy needs that demand the skills of an EMP who has undergone specialized training and can function in a busy and highly stressful work environment where time is often critical to life or death. EMPs provide knowledge of pharmacology, pharmacotherapy optimal dosing, appropriate monitoring, management of drug interactions, and management of medication side effects across the spectrums of aging and acuity while contributing to program-wide initiatives and clinical program developments.

There is a need for a mechanism to identify, recognize, and provide access to EMPs who can meet patient needs for specialized medication management. Individuals who have obtained specialist recognition and have attained the additional training, experience, and expertise to lead patients, the profession, other health care providers, and society to better public health are necessary for managing diseases and reducing preventable conditions, complications, and sequelae. Board of Pharmacy Specialties (BPS) recognition of emergency medicine pharmacy practice as a specialty would provide a mechanism through which pharmacists could attain voluntary certification that recognizes achievement of a focused and distinct level of specialized knowledge, experience, and skills in serving the unique medication needs of patients in the ED.

A significant number of pharmacists have prepared themselves to meet public health needs by providing specialized care for ED patients that includes comprehensive medication management, collaborating with other health care providers, and addressing a broad range of other health-related needs. In addition, EMPs have provided leadership in the profession by establishing patient care services, precepting student pharmacists in required advanced pharmacy practice experiences (APPEs) and introductory pharmacy practice experiences (IPPEs), and training other pharmacists through residencies, and live and enduring educational programs. These pharmacists have also engaged in leadership positions within state and national associations that support EMPs and emergency medicine more generally.

By any measure, the complex issues facing ED patients cannot be adequately addressed by pharmacists with entry-level knowledge and skills in general practice or other types of pharmacy specialties. BPS certification of EMPs will lay the groundwork for other committed and interested pharmacists to focus their professional development, training, and educational efforts on preparing themselves to fully meet this public health need.

Overlap With Other BPS Specialties

There is likely some potential level of overlap between the proposed EMP specialty and the existing BPS specialties in cardiology, critical care, geriatrics, infectious disease, pediatrics, and pharmacotherapy. However, the petitioning organizations feel strongly that the evidence presented in this petition will justify recognition of emergency medicine pharmacy practice as a separate and distinct specialty.

EMPs must combine the domains of virtually every specialty to be effective members of the emergency medicine team. This includes optimization of pharmacotherapy across entire spectrums of age and acuity, disease or injury, and acute versus chronic condition. The versatility of an EMP, who may practice within different health systems and practice with different levels of specialty overlap, is unparalleled. For example, an EMP in a pediatric hospital

would likely overlap more frequently with a pediatric pharmacist specialist, whereas an EMP at a cardiac specialty hospital would overlap more frequently with a cardiac pharmacist specialist. Knowledge of drug delivery systems, pharmacoeconomics, drug information and drug literature evaluation, statistics, immunology, pharmacokinetics, pharmacology, pharmacogenomics, pathophysiology, pharmacotherapy, pharmacovigilance, regulatory standards, and medication safety is a necessity.

The *Board Certified Emergency Medicine Pharmacy Role Delineation Study* outlines three domains within the proposed emergency medicine specialty, with validation of 175 distinct and specialized knowledge bases underpinning these domains. There are distinct domains and nuanced functional areas for emergency medicine practice compared with each of the overlapping tasks within other recognized BPS specialties. Without additional training and experience, the knowledge, skills, training, and functions of cardiologist specialists, critical care, geriatrics, infectious disease, pediatrics, and pharmacotherapy lack the breadth of expertise required to provide care to ED patients. These significant differences between emergency medicine pharmacy practice and other recognized BPS specialties are reinforced by the nuanced complexity of managing medications for ED patients who may have conditions as routine as otitis media and as complex as trauma of an unknown cause. EMPs face additional pressures for urgent prioritization of the medication-related problems and heightened efficiency in providing recommendations from this broad body of knowledge. Appendix A-1 outlines the domains of a proposed emergency medicine specialty compared with the domains of existing and potentially overlapping BPS specialties.

It has long been recognized that the base of knowledge and skills in medicine far exceeds an individual's ability to master every facet of medicine. Currently, physicians may become certified in any of 24 medical specialties or 152 medical subspecialties.[158] Among the specialties in medicine, overlap is apparent in many areas. This overlap is unavoidable given the complexities and commonalities within patient care. In comparison with the potential EMP specialty, 10 separate and distinct medical subspecialties deal with emergency medicine. These subspecialties include:[158]

- Anesthesiology/Critical Care Medicine
- Emergency Medical Services
- Hospice and Palliative Medicine
- Internal Medicine/Critical Care Medicine
- Medical Toxicology
- Neurocritical Care
- Pain Medicine
- Pediatric Emergency Medicine

- Sports Medicine
- Undersea and Hyperbaric Medicine

Likewise, in pharmacy, the breadth and depth of knowledge exceed an individual's ability to master content and skills at an advanced level in all areas of practice and pharmacotherapy. A specialty in emergency medicine pharmacy practice is distinct from other BPS specialties in its emphasis on a complex, unique, and ever-changing patient population that requires substantially distinct specialized knowledge, skills, and abilities. It is in the best interest of both the profession and patients to recognize pharmacists with specialized training and expertise in emergency medicine.

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.

According to the *Board Certified Emergency Medicine Pharmacy Role Delineation Study*, EMPs have the specialized knowledge and expertise needed to manage complex patient medication regimens unique to the emergency medicine population, support operational processes and systems within the ED to improve patient care and patient safety, provide support and education for health care professionals and trainees, and counsel patients and caregivers.[159] These critical functions are delivered in a complex and chaotic environment where patient information is often unknown or incomplete.

Functions of Emergency Medicine Pharmacists

Patient care and management are core functions of EMPs. These professionals participate in the bedside management of medical emergencies (e.g., trauma, cardiac, neurologic, psychiatric, toxicological) and resuscitations to optimize the medication use process. They identify and prioritize ED patients by analyzing the relevant acuity indices and opportunities for optimization of pharmacotherapy. EMPs collect essential patient information by utilizing available resources and identify and evaluate medication-related problems based on clinical presentation, available history, point-of-care testing, or laboratory data. Collection of this information allows EMPs to contribute to the formulation of a differential diagnosis in the setting of limited information.[159]

EMPs design pharmaceutical care plans utilizing available patient-specific information and best available evidence to provide patient- and family-centered care and recommend and support implementation of the pharmaceutical care plan in the ED. They expedite the clinical decision-

making, often providing pharmacotherapy consultation at the bedside and making efficient and effective evidence-based recommendations during high acuity cases. EMPs order, prepare, procure, and administer time-sensitive therapeutic regimens and provide evidence-based recommendations for alternative routes of administration. Often, due to the required pace of care, EMPs must have an ability to anticipate pharmacologic needs of the patient, having the drug and dose ready, in preparation for the clinician making the order.

Monitoring and evaluating patient response to initial therapy and redesigning the treatment plan as necessary are also key responsibilities, and this process is accelerated in the ED. EMPs use medications where the onset of action and peak are fast and must recommend titration or regimen modications based on efficacy or adverse effect. EMPs serve as the primary source of drug information for all practitioners and patients within the ED. They ensure continuity of care during health care transitions and across levels of care, and they follow up as necessary to identify and seek appropriate outside resources available to assist in the management of the ED patient.[159]

The unique role of an EMP is illustrated by the following case study:[160]

> A 34-year-old man presents as a trauma alert after a motorcycle crash. The crash was high speed, 55 mph, and the patient was wearing a helmet. The helmet was cracked, and the patient, who lost consciousness at the scene, was found 30 feet from the motorcycle. Obvious injuries are a right lower-extremity deformity and fracture and several abrasions. The patient's vital signs are blood pressure 95/70 mm Hg, heart rate 70 beats/minute, respiratory rate 22 breaths/minute, arterial oxygen saturation (SaO_2) 98% on nasal cannula, and Glasgow Coma Scale (GCS) score of 13. How would an EMP prioritize the patient's needs?

Evaluation
First, evaluate the patient's airway, breathing, and circulation. He is confused and opens his eyes to speech. Follow changes in his GCS score throughout evaluation to identify worsening or improving neurologic status to evaluate the potential for a traumatic brain injury (before computed tomography [CT] scan) and anticipate his needs for rapid sequence intubation (RSI) if his neurologic status worsens and he needs to be intubated for airway protection. Have a plan for medication selection, dose, and procurement of medications, if needed.
Collection of Information
Determine a weight estimate together with the clinicians and nurses if it is not available for medication dose calculations. Ask the pre-hospital providers if the patient's GCS score improved or worsened during transport to identify a trend. The airway is patent (patient is moaning and answering some questions), and SaO_2 is appropriate. The patient's blood pressure is slightly hypotensive, and his heart rate is normal. Determine whether the patient is taking outpatient beta or calcium channel blockers that are blunting a reflex tachycardia to hypotension so that you can anticipate his need for fluids/blood and potentially vasopressors after appropriate volume resuscitation. Obtain allergy information and any other known medications from the pre-hospital providers or medical chart. Anticoagulants and antiplatelet medications are of specific interest in a trauma patient with hypotension and mental status changes. Determine a plan for reversing coagulopathy, if

necessary. Ask the pre-hospital providers about medications that were administered before the patient presented to the ED. This should include medication, dose, dose response, and last doses administered to help determine the medications needed and the doses that yield appropriate efficacy. Moreover, determine whether sedative agents were given that might explain his hypotension or altered mental status, and, if so, why they were given and what can be anticipated once the dose wears off and when (e.g., if patients were severely agitated before, they will likely be severely agitated again, and a treatment plan should be made).
Initial Treatment Recommendations and Monitoring
Because the patient has a lower-extremity deformity, he is likely in pain. You can make recommendations for analgesia, likely using fentanyl to decrease the likelihood of medication-induced hypotension because you do not yet know whether the patient has internal injuries or bleeding, and weight-based doses can be given. Monitor the patient's vital signs often to identify trends to evaluate this. During the secondary assessment, the patient is found to have minor abrasions on the head and abdomen, and the lower-extremity dressing is unwrapped. The patient has a type III open fracture. You can recommend antibiotic selection and dose and facilitate administration by procuring medications from the automated dispensing cabinet, admixing if necessary, setting up administration on the smart infusion pump, and ensuring documentation in the electronic medical record to meet American College of Surgeons criteria for antibiotics to be administered within 1 hour for open fractures (which you know from your quality assurance involvement with the emergency medicine and trauma team). If the patient's last tetanus vaccine is unknown, you can make a recommendation to administer Tdap (tetanus, diphtheria, and pertussis).
Plan
Ten minutes after arrival, the patient is being prepared for a CT scan. You should discuss with the provider team the plan for continued analgesia, with or without sedation, and close the loop on the medications that have been initiated. You should prepare a plan for RSI, intracranial hemorrhage, and decompensation treatments, if necessary, and continue analgesia.

Within practice management, EMPs anticipate, monitor, detect, report, and review adverse drug events and medication errors. They recognize trends, system failures, and gaps in the medication use process and perform quality assurance activities that promote safe and effective medication use. These specialized pharmacists ensure a process to maintain and optimize inventory and availability of medications essential to provide timely care in the ED and ensure an appropriate process exists for medication order review in the ED. EMPs develop, maintain, monitor, and support evidence-based medication use guidelines and pathways in order to assure safe and cost-effective medication use. They also identify and implement opportunities for practice advancement and growth within the ED (e.g., collaborative practice agreements, antimicrobial stewardship, public health initiatives, expanded coverage).[159]

Additionally, EMPs assist the organization in achieving compliance with accreditation, legal, regulatory, and safety requirements related to the medication use process. They advocate for and justify emergency medicine pharmacy services and serve as a liaison on committees to represent the interests of pharmacy and ED patients. EMPs also contribute to contingency planning that addresses limited availability of critical drugs that affect patients in the ED (e.g.,

drug shortages, emergency preparedness) and participate in emergency/disaster preparedness planning or response activities.[159]

Within education and research, EMPs provide emergency medicine–focused education, training, or mentoring for health care professionals and trainees. They educate patients and caregivers using appropriate techniques tailored to the audience, with a focus on high-risk medications or in which the visit resulted from an adverse drug event. Participation in continuous professional development related to emergency medicine pharmacy practice (e.g., professional organizations, continuing education, clinical pharmacy networks) is a core responsibility. EMPs retrieve and critically evaluate biomedical literature and other sources with regard to study design methodology, statistical analysis, and the applicability of study results to emergency medicine, as well as contribute to the body of knowledge in the field of emergency medicine.[159]

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 responsibilities of the profession:

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

Pharmacists have a responsibility to the American public to ensure that medications are used appropriately and desired medication outcomes are achieved. Most national pharmacy organizations, including the American Association of Colleges of Pharmacy, the American College of Clinical Pharmacy, the American Pharmacists Association, the American Society of Health-System Pharmacists, and BPS, support expanded credentialing of pharmacist specialists, similar to credentialing in other health professions, to meet the vision for the future of pharmacy practice and to improve patient care.

Achieving the vision of the Joint Commission of Pharmacy Practitioners will require recognized and credentialed EMPs with the knowledge, skills, and abilities to manage complex medication needs specifically for ED patients. EMPs provide comprehensive medication management at the bedside, develop and refine individualized patient care plans, work collaboratively as members of the interdisciplinary health care team, conduct and publish research, and support patients, families, and caregivers.

EMPs serve as practice leaders within their institutions, organizations, the profession of pharmacy, and the more expansive area of emergency medicine. They often serve as preceptors for APPEs, IPPEs, postgraduate year one and postgraduate year two residency experiences. A new specialty in emergency medicine pharmacy practice would be consistent with the BPS mission: "to improve patient care by promoting the recognition and value of specialized training, knowledge, and skills in pharmacy and specialty board certification of pharmacists."[161] BPS specialty certification is not only the pharmacist's path to advancement in contemporary medicine but also a roadmap for pharmacists who desire to gain additional training and knowledge to differentiate themselves from pharmacists in general practice or other specialty practices. By achieving certification, pharmacists acquire a tool that provides assurance of their specialized knowledge and skills to other health professionals, stakeholders, and society. Additionally, the complexities of care for emergency medicine patients continue to multiply. Advances in medications and technology are driving the need for specialized training to expand pharmacists' pharmacotherapy knowledge and patient care skills to manage highly complex medication regimens for the diverse population of patients treated within EDs.

All pharmacists perform important patient care functions in serving the public health needs of society. By definition, pharmacists who voluntarily choose to earn BPS certification are prepared to meet the needs of patients within their respective specialty areas more effectively than entry-level pharmacists because they have acquired specialized knowledge and training beyond the Doctor of Pharmacy degree and minimum standards for licensure. In all areas of emergency medicine pharmacy practice, collaboration with other members of the health care team is critical to prevent medication errors, ensure appropriate medication use, and ensure that desired therapeutic outcomes are achieved. The highly variable needs of ED patients are sufficiently diverse to support recognition of emergency medicine pharmacy practice as a separate and distinct specialty. Effective, successful, high-quality care for these patients will require the full application of specialized knowledge and skills of EMPs and those who would seek to achieve specialty recognition in emergency medicine pharmacy practice.

The ultimate goal of pharmacotherapy specialization is to ensure quality patient care and improve therapeutic outcomes by optimizing medication use. As the public demand for emergency care continues to expand, the field of emergency medicine continues to expand in both scope and complexity. There is a clear need for highly trained specialists with expertise in emergency medicine. A stand-alone specialty in emergency medicine pharmacy practice would clearly identify for employers, physicians, patients, and the public those individuals with specialized competencies and expertise in emergency medicine.

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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.

The demand for emergency medicine pharmacists (EMPs) can be expressed in terms of the value of interprofessional collaboration that is affirmed by other health professionals, health care leaders, organizations that recognize the value of EMPs, and patients through letters of support. Employment trends and surveys that document increased demand for EMPs also reflect a significant and clear health demand.

Demand for Emergency Medicine Pharmacist Specialists' Services

EMPs deliver bedside care and manage medical emergencies; provide pharmacotherapy consultation to other health care professionals; provide prospective order review and procurement of medication; ensure successful transitions of care; and participate in administrative, education, and research-related tasks. Care of emergency medicine patients is complex and unique due to the time-sensitive nature and intricacy of patient conditions with often little medical history and that requires full engagement with an interprofessional care team.

As the role of the EMP has grown, so has the number of EMPs across the United States. Requirements for EMPs' involvement in the care team are well codified by practice standards, professional statements, and guidance. The American College of Emergency Physicians (ACEP) strongly supports and recognizes the value of EMPs on the care team in the emergency department (ED). In their Clinical Pharmacist Services in the Emergency Department position statement, ACEP states, "The American College of Emergency Physicians (ACEP) believes that pharmacists serve a critical role in ensuring efficient, safe, and effective medication use in the ED and advocates for health systems to support dedicated roles for pharmacists within the ED. The emergency medicine pharmacist should serve as a well-integrated member of the ED multidisciplinary team who actively participates in patient care decisions including resuscitations, transitions of care, and medication reconciliation to optimize pharmacotherapy for ED patients."[1]

The American College of Medical Toxicology (ACMT) also recognizes the value of EMPs. Their position statement on the Role of Clinical Pharmacists in the Emergency Department states, "pharmacists are integral to the care and safety of emergency department (ED) patients. Emergency department pharmacists positively impact time to critical therapies, including antibiotics for sepsis and door-to-balloon time for acute myocardial infarction. Pharmacists optimize pharmacotherapy regimens involving high-risk therapeutic classes, such as thrombolytics. Clinical pharmacists improve patient safety by intercepting prescription errors and recognizing adverse drug events. The potential cost avoidance of reducing errors and meeting standards for reimbursement provides financial justification for dedicated ED clinical pharmacist staffing. We support 24-hour staffing of emergency departments with dedicated ED pharmacists."[2]

The inclusion of pharmacists as part of the clinical practice team for emergency medicine is also strongly reinforced in the literature. EMPs play a critical role in medication management, identifying and resolving drug therapy problems, supporting medication adherence, engaging and leading antimicrobial stewardship initiatives, and managing acute and chronic conditions commonly seen in EDs through direct bedside care. A review of available evidence regarding the role and impact of pharmacy services in the care of emergency medicine patients concluded that EMPs address significant unmet needs. EMPs serve as the medication expert on the health care team. The EM team relies on the EMP during the care of high acuity patients and/or those presenting with a time-dependent emergency to assist with appropriate medication selection, timely delivery and administration of potentially life-saving medication therapies, and as a medication safety check at the bedside as many times these are verbal orders for critical and potentially dangerous medications. The EMP optimizes medication selection and dose based on indication, contraindication, and other patient specific factors in an already stressed situation to enhance treatment goals. Importantly, EMPs provide a prospective review to medications that may previously have bypassed steps in the medication use process (prescribing, order processing, dispensing, administration, monitoring). For example, without a pharmacist at the bedside, a verbal order would bypass several safeguards in this process. The breadth and depth of literature supporting the role of the EMP can be found in Appendix G-1 and Appendix G-2.

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.

Appendix B-1 provides statements from the following individuals and organizations that specifically attest to the demand for pharmacists with training and knowledge to provide services in emergency medicine practice:

- **American Board of Applied Toxicology**
  Bryan D. Hayes, PharmD, DABAT, FAACT, FASHP
  President

- **American College of Emergency Physicians**
  Sandra Schneider, MD, FACEP
  Associate Executive Director, Clinical Affairs

- **Cleveland Clinic**
  Scott Knoer, MS, PharmD, FASHP
  Chief Pharmacy Officer

- **Emergency Nurses Association**
  Patricia Kunz Howard, PhD, RN, CEN, CPEN, TCRN, NE-BC, FAEN, FAAN
  2019 President

- **Florida Department of Health**
  Ryan J. Pedigo
  Director, Public Health Preparedness Division

  Hunter R. Zager
  Regional Emergency Response Advisor
  Regional Domestic Security Task Force IV

- **Institute for Safe Medication Practices**
  Allen J. Vaida, PharmD, FASHP
  Executive Vice President

- **MedStar Health**
  Rollin J. (Terry) Fairbanks, MD, MS, FACEP
  Vice President, Quality and Safety, MedStar Health

- **Monroe-Livingston Regional EMS Council**
  Reg Allen, BS, NREMT-P

Chair

Jeremy Cushman, MD, MS, EMT-P, FACEP, FAEMS
Regional Medical Director

- **New York American College of Emergency Physicians**
  Jeremy T. Cushman, MD, MS, EMT-P, FACEP, FAEMS
  President

- **Patient**
  [redacted]

- **Pediatric Pharmacy Advocacy Group – Board of Directors**
  Michael Chicella, PharmD, Secretary
  Lizbeth Hansen, PharmD, Director-At-Large
  Tara Higgins, PharmD, Director-At-Large
  Bob John, PharmD, Director-At-Large
  Chad Knoderer, Director-At-Large
  Shannon Manzi, PharmD, President-Elect
  Kelly Matson, PharmD, Director-At-Large
  Miranda Nelson, PharmD, Immediate Past-President
  Hanna Phan, PharmD, President
  Cathy Poon, PharmD, Treasurer
  Eloise Woodruff, PharmD, Director-At-Large

- **Society of Critical Care Medicine**
  Heatherlee Bailey, MD, FCCM
  President

- **Tampa General Hospital**
  Kelly A. Cullen, BSN, MBA
  Executive Vice President and Chief Operating Officer

- **University of Arizona – Arizona Poison and Drug Information Center**
  Steven Dudley, PharmD, DABAT
  Director

- **University of Arizona College of Medicine**

Albert Fiorello, MD, RDMS, FAAEM, FACEP
Associate Professor of Emergency Medicine
Residency Director

- **University of Rochester Medical Center**
  David H. Adler, MD, MPH
  Director, Emergency Medicine Research
  Professor of Emergency Medicine and Public Health Sciences

- **University of Rochester Medical Center**
  Michael J. Apostolakos, MD, FCCP
  Vice President and Chief Medical Officer

- **University of Rochester Medical Center**
  Curtis E. Haas, PharmD, FCCP, BCPS
  Director of Pharmacy

- **University of Rochester School of Medicine and Dentistry**
  Flavia Nobay, MD
  Associate Dean for Admissions
  Associate Professor of Emergency Medicine

- **University of Wisconsin School of Medicine and Public Health**
  BerbeeWalsh Department of Emergency Medicine
  Manish N. Shah, MD, MPH
  Professor of Emergency Medicine, Population Health Sciences, Geriatrics & Gerontology
  Vice Chair for Research
  The John & Tashia Morgridge Chair of Emergency Medicine Research
  Director, KL2 Program, Institute for Clinical and Translational Research

- **Virginia Commonwealth University**
  Courtenay Leahman, MD, FCCS, MSHA
  Neurointensivist, Medical Unit Director, Neuroscience ICU
  Assistant Professor, Division of Critical Care, Department of Anesthesiology
  Assistant Professor, Department of Neurology
  Medical Officer, Virginia-1 Disaster Medical Assistance Team, National

Disaster Medical System

Key points within these letters of support speak to the demand for EMPs. Some of the valuable points that underscore the demand for specialty recognition are outlined below, and the complete letters of support are attached as Appendix B-1:

Bryan D. Hayes, PharmD, DABAT, FAACT, FASHP, has practiced as an EMP since 2008, served as Chair of the American Society of Health-System Pharmacists (ASHP) Section Advisory Group on Emergency Care from 2017–2018, and is currently President of the **American Board of Applied Toxicology (ABAT).** In his letter of support, Dr. Hayes illustrates the growth of the emergency medicine field, the important role of EMPs, and the significance of EMPs in toxicology. *Emergency Medicine [EM] is a complex specialty in which pharmacists serve as front-line clinicians and a first point of contact for patients into the healthcare system. Their knowledge base is diverse, and their clinical acumen is crucial to caring for critical patients. Decisions are often guided by the best information available in a limited time frame. In addition to clinical care, EM pharmacists are integrated into all aspects of EM practice as described by the ASHP Guidelines on EM Pharmacist Services. As such, it is imperative that we have EM pharmacist experts practicing in Emergency Departments across the U.S. In the present-day environment, there are many EDs staffed with PGY-2 critical care and even PGY-1 trained pharmacists. In addition, current PGY-2 EM trained pharmacists have BCPS, BCCCP, DABAT, or other certifications because a focused EM certification is not available. It is time to have our own specialty certification that supports the unique skillset EM pharmacists possess.*

Sandra Schneider, MD, FACEP, Associate Executive Director of Clinical Affairs at the **American College of Emergency Physicians,** conveys the contributions of EMPs in reducing errors and cost in the ED. *[I]n 1993, I was 'given' a pharmacist to work in the emergency department. Although I had worked with several PharmDs in my prior role as a medical toxicologist, I had not encountered them in the emergency department. It took only a few short months for me to understand the invaluable role that the emergency pharmacist plays as a member of the emergency care team. They not only provide counsel on complex patients, they facilitate the care of time-sensitive conditions, anticipating the needs of the patients. They also reduce cost. Several of my faculty at Rochester studied the impact of the emergency pharmacist, proving scientifically that they reduced costs, reduced medication errors and were well accepted as members of the team by the nurses, attendings and residents. Most importantly, it was an emergency pharmacist who caught a potentially life-threatening medical error I personally made on Sept. 11, 2001, while I was distracted with the events that were unfolding.*

Dr. Schneider further discusses the value of specialty recognition for EMPs. *While invaluable as an active member of the team, is the expertise [of emergency medicine pharmacists] specialized enough to warrant recognition as a distinct specialty? This is nearly the same question that was raised by the American Board of Medical Specialties in the late 1970's as they debated the designation of emergency medicine as a defined specialty. Their finding then for physicians should be the same for emergency pharmacists. Emergency medicine is a unique blend of the initial treatment of all acute diseases, in all age groups and in all environments.*

Scott Knoer, MS, PharmD, FASHP, is the Chief Pharmacy Officer at **Cleveland Clinic** and his letter of support illustrates the growing role and value of the EMP. *The first emergency medicine pharmacist at Cleveland Clinic was introduced in 2011 based on departmental needs as well as emergency medicine physician leadership requests for dedicated pharmacists. Within the first year, several additional emergency medicine pharmacist positions were established to expand hours of coverage to 16 hours each day until continuous coverage for 24 hours per day was introduced in 2017 after continued physician leadership requests. At present in 2019, the emergency medicine pharmacy team has grown to include 31 dedicated emergency medicine pharmacists at 15 hospitals in the Cleveland Clinic Health-System (CCHS) with two sites providing continuous coverage for 24 hours per day.*

The demand for emergency medicine pharmacists at Cleveland Clinic has risen over the past several years in part due to recognized contributions to enterprise emergency medicine initiatives. Emergency medicine pharmacists have led numerous collaborative efforts with emergency medicine physicians to incorporate evidence-based medicine into protocol development and implementation at all CCHS emergency departments…. Additionally, emergency medicine pharmacists are uniquely positioned to lead medication safety initiatives with enterprise implications…. Emergency medicine pharmacists have provided invaluable insight and leadership with the development of several antimicrobial stewardship initiatives at Cleveland Clinic.

Patricia Kunz Howard, PhD, RN, CEN, CPEN, TCRN, NE-BC, FAEN, FAAN, 2019 **Emergency Nurses Association (ENA)** President, speaks to the role of the EMP, particularly in ensuring patient safety. *ENA members value Board Certification of Emergency Medicine Pharmacy Specialists as an enhancement to patient safety and quality care…. We believe the requisite knowledge and experience that reduces clinical errors and improves quality is well demonstrated by board certified specialists. Most hospitals document compliance with conditions of participation that hospitals and*

critical access hospitals must meet to participate in the Medicare and Medicaid Programs through accreditation and certification standards…. [T]he Centers for Medicare and Medicaid Services (CMS) specifically authorize pharmacists to perform all functions within their scope of practice as a component of the medical staff while requiring that medical staff examine the credentials of all eligible candidates to make recommendations for (hospital) privileges. ENA believes pharmacy specialty credentialing in emergency medicine by BPS would enhance opportunities for pharmacists and ultimately improve patient outcomes…. Pharmacy specialists work collaboratively with the patient care team to identify strategies that increase medication security, decrease the potential for errors, guide clinical decisions, resolve medication discrepancies, ensure proper medication administration, and reinforce adherence to medication administration protocols. Emergency pharmacists are indispensable in providing continuing education to other licensed professionals practicing in the ED. Establishing this credential would strengthen credibility, apply consistency in pharmacy recognition and education to positively impact patient outcomes, and further promote safe, effective health care practice.

Ryan J. Pedigo, Director of the Public Health Preparedness Division, and **Hunter R. Zager,** Regional Emergency Response Advisor and Regional Domestic Security Task Force IV, of the **Florida Department of Health** detail the significance of EMPs in emergency response situations. *The best example for the partnership of EMPs with health and medical system preparedness planners can be demonstrated in the results of the Tampa Bay Cities Readiness Initiative. In 2016, the Florida Department of Health in Hillsborough County and the Department of Health's Regional Emergency Response Advisor formed a team to develop new dispensing protocols that would both increase throughput at our public points of dispensing (PODs) as well as reduce medication errors. Katelyn Dervay, PharmD, Tampa General Hospital Emergency Management Pharmacist, participated as the sole Pharmacist on that team, and her expertise was critical to the success of the project. She spent countless hours researching and simplifying a complex algorithm into a single, easy-to-understand sheet. The results were incredible: an 18% increase in the throughput of the dispensing site while medication errors were reduced from an average of 3.2% to 0.03% per 20,000 population processed.*

Allen J. Vaida, PharmD, FASHP, Executive Vice President of the **Institute for Safe Medication Practices,** reinforces the need for increased and specialized training for EMPs. *[Emergency medicine] is a practice that is expanding and requires more advanced training and education that would lead to certification. It is also an area that isn't confined to hospital emergency departments. This type of pharmacist expertise is*

needed in outpatient standalone emergency and urgent care centers. Time and time again, the literature has substantiated that emergency departments and centers are areas that treat patients for errors related to the use of high-alert medications. These patients need the expertise of pharmacists to be involved in their care before they are sent back home.

Rollin J. (Terry) Fairbanks, MD, MS, FACEP, is the Vice President of Quality and Safety at **MedStar Health.** In this role, Dr. Fairbanks leads quality and safety for a $5.6 billion/year, 10 hospital, 280 outpatient site health system in the Baltimore and Washington, DC, region. He speaks directly to the demand for EMPs by institutions and other health care professionals. *After completing my master's degree in safety engineering and working in a safety research lab, I went to medical school and completed an emergency medicine residency, then started an academic career in applied safety engineering research within the healthcare environment. I focused on human factors engineering, which was an approach relatively undiscovered in healthcare. During my first year as an assistant professor, I looked at my primary clinical environment (the emergency department), to determine what the most powerful safety mechanism was…. It was clear immediately that this was the presence of our strong emergency medicine pharmacists—a group who were specialty trained, understood our environment and our patients, and made us safer every day. I then set out to study this topic, and over the next seven years, this led to multiple papers, funded research projects, and an ongoing ASHP mentorship program that kicked off at the midyear meeting and ended at the summer meeting each year. As a result of all this, I became deeply aware of the difference between a pharmacist without emergency medicine training and a pharmacist with emergency medicine training…. I have worked with several hospital pharmacists who have not been trained in the ED, and they are not aligned enough with the emergency physicians and emergency nurses to have credibility in their recommendations. This specialty training is critical to the credibility of the clinical pharmacist working in this environment, and cementing the pharmacist role by creating this board certification is essential to the future of this profession…. But the perception of emergency physicians and nurses should speak to this: After conducting a qualitative study using rigorous methods, in the 2007 paper referenced [in the letter], it is of value to restate the summary here: "A random sample of medical and nursing staff in an academic medical center ED with a dedicated emergency pharmacist (EPh) program received a 26-item survey (82% return rate). 99% of respondents felt the EPh improves quality of care, 96% feel they are an integral part of the team, and 93% had consulted the EPh at least a few times during their last five shifts. Staff felt that the EPh should be available for consults, attend resuscitations, and check orders. This study reinforced the*

value of many specific duties of the EPh program and found that doctors and nurses overwhelmingly favor the presence of an EPh in the ED, frequently seek their advice, and feel they improve quality of care."

Reg Allen, BS, NREMT-P, Chair of the MLREMS Council, and **Jeremy Cushman, MD, MS, EMT-P, FACEP, FAEMS,** Regional Medical Director, of **Monroe-Livingston Regional EMS Council,** share the impact that EMPs have on pre-hospital services. *Our emergency medicine pharmacist specialists participate in the development of EMS formulary decisions, guidelines, protocols, and processes. Originally novel a decade ago, the demand for such specialists continues to increase, and their expertise in not just clinical pharmacy but how it can be applied in the sometimes austere and resource-limited EMS environment is key to creating safe, evidence-based clinical care protocols…. [N]o protocol involving a medication in our system is approved without an emergency pharmacist reviewing it…. Our emergency pharmacists have been critical in identifying alternative formulary medications during inevitable shortage and backorder. They have been critical to patient safety and have participated in numerous EMS quality improvement activities, whether it be fentanyl use for pain management or sodium bicarbonate use in cardiac arrest. These activities uniformly result in tangible change to protocol or education nearly every time.*

Jeremy T. Cushman, MD, MS, FACEP, President of the **New York American College of Emergency Physicians,** shares the impact of EMPs in the ED. *These specialists…are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department…. They guide formulary decisions through their evidence-based practice. At many hospitals, they have played critical roles in reducing errors by streamlining electronic order entry or performing medication reconciliation. Further, these emergency medicine pharmacist specialists interconnect with the many subspecialties emergency medicine works with on a daily basis: prehospital medicine, emergency preparedness, public health, and toxicology. The emergency medicine pharmacist specialist focuses on rapid assessment of available data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts…. Their supply does not meet the demand across New York's hundreds of Emergency Departments where many lack access to such a specialist.*

[redacted] is an intensive care unit (ICU) nurse who credits the specialized knowledge of an EMP with saving her life following surgery to repair her injured anterior cruciate ligament. During routine family activities 2 weeks after surgery,

[redacted] experienced critical signs and symptoms of cardiac arrest and she was transported to the ED by emergency medical services. She stated, *I am strongly in **support** of **Emergency Medicine Pharmacist Specialists** for many professional reasons, as well as a huge personal reason. An ER pharmacist pushed for the life saving drug tPA, without which, April 28, 2018, would have been my date of death…. As an ICU nurse and [post anesthesia care unit] nurse...I work with pharmacists on a daily basis to correctly, effectively, and efficiently medicate patients with physician orders…. [P]harmacists that are able to work in a dedicated department with familiar medications daily increases their base of knowledge…. [ER pharmacists] are able to make better recommendations than pharmacists that cannot specialize and therefore work with a wide array of medications, patients, and diagnoses. Specialization allows these pharmacists to focus on front line studies of medications that save lives during cardiac arrest.*

In their letter, the **Pediatric Pharmacy Advocacy Group (PPAG) Board of Directors** speaks to the contributions and increasing demand of EMPs in the ED. *Emergency Medicine pediatric pharmacists are valued members of PPAG and have a strong EM Special Interest Group (SIG). Emergency Departments must be prepared to treat and stabilize any patient of any age that presents and therefore the EM pharmacist must be prepared to treat all patients, from the newly born to the elderly…. EM pharmacists are in a unique position to provide continual education to physicians, trainees, nurses, respiratory therapists and other disciplines throughout their daily practice. As with all evidence-based practices that include drug therapy, EM pharmacists are integral in the development of policies, protocols and guidelines for the Emergency Department. Refining the electronic health record to support safe and effective care is a core role for an EM pharmacist given the unique environment and the time pressures that often make routine institutional procedures for drug preparation and delivery impossible or even unsafe. These skills also allow the EM pharmacist to make strong contributions to emergency medicine based research…. As more hospitals and health-systems have recognized the value of pharmacists dedicated to the Emergency Department, the need for trained and competent pharmacists has continued to grow for the past 10 years and there is no indication the need will diminish. As the Accountable Care Organization (ACO) model moves forward, the emphasis on decreasing readmissions and hospitalizations has [resulted in] excellent medication reconciliation and patient education in the Emergency Department.*

Heatherlee Bailey, MD, FCCM, President of the **Society of Critical Care Medicine (SCCM),** indicates the value and growing demand of EMPs. *[T]he cost avoidance associated with EM pharmacist interventions is extensive. The benefit that an EM*

pharmacist adds to the team has been studied across a wide variety of settings, including the resuscitation of trauma and cardiac arrest patients, the treatment of acute stroke, and in antimicrobial stewardship, and is particularly apparent in the critically ill population. The need for EM pharmacists has expanded dramatically over recent years, and the number of EM pharmacy residency programs has grown with it. This trend is anticipated to increase in the future as the U.S. population ages and the complexity of care increases…. SCCM's critical care pharmacist members are almost all specialists in practice due to the complex needs of critically ill, emergently ill, and injured patients. In recognition of this important role, 127 pharmacists have attained the prestigious title of Fellow of the American College of Critical Care Medicine (ACCM), of which several practice in EM. Furthermore, five pharmacists have received the distinction of Master of ACCM. The lack of standardized board credentials for EM pharmacists is problematic. Although our EM pharmacist members may pursue board certification in critical care pharmacotherapy (BCCCP), there are substantial differences in practice, necessitating a separate credentialing process, as occurs in other healthcare professions (e.g., physicians and nurses). BCCCP certification is now required for ACCM fellowship; thus, EM pharmacists cannot be recognized without this distinction. Credentialing of EM pharmacists through the Board of Pharmacy Specialties is essential in recognizing the expertise possessed by these valuable members of the multiprofessional team.

Kelly A. Cullen, BSN, MBA, Executive Vice President and Chief Operating Officer of **Tampa General Hospital (TGH),** conveys the significance of board-certified pharmacists at TGH as well as the critical role EMPs play in their ED**.** Prior to her current roles, Ms. Cullen worked with EMPs as an Emergency Department Director and as a nurse. *Our emergency department team has included dedicated pharmacists since 2006. Their presence in the emergency department has grown from one full-time pharmacist to its current state of 9 dedicated [full-time equivalents] FTEs…. Because our ED team trusts our emergency pharmacists and knows how much they help patients, they are continually asked to be involved in patient care initiatives and to help educate our team. Recently, our pharmacy team has become engaged in reconciling culture and lab results for patients who have been discharged from the ED. They have been involved in contacting patients and collaborating with multiple providers. Their work further reinforces the current literature as a best practice, and we are working towards a collaborative practice agreement to further optimize the pharmacist's clinical capabilities. The TGH ED pharmacists currently educate our nurses and providers and support the emergence medicine residency program through bedside education and lectures during their grand rounds. Additionally, our pharmacists participate in quality*

improvement initiatives and research that continue to improve patient outcomes and operational efficiency.

Steven Dudley, PharmD, DABAT, Director of the **University of Arizona College of Pharmacy's Arizona Poison and Drug Information Center (AZPDIC),** details the unique skillset of EMPs. *The AZPDIC serves as a Toxicology consult service to over 60 hospitals in the state of Arizona and routinely deals with envenomations, drug of abuse overdoses, and suicide attempts with prescription medications. In each of these scenarios, prompt administration of an antidote or treatment is critical to the patient's likelihood of survival…. In toxicology, our arsenal included medications that are either rarely used for general therapeutic use or are used at doses that are not seen for any other indication. Our patients can present incredibly sick and resistant to conventional treatments, and any significant delay can mean the difference between life and death…. [T]ime from recommendation to administration of therapies is noticeably shorter in hospitals with EMPs compared to those without. Not only do EMPs directly improve patient care, but they serve as a clinical educator to physicians and central hospital pharmacists who do not routinely manage poisoned patients. In addition to their clinical roles, EMPs also directly help our center publish research and case reports regarding novel therapy approaches to treat critically ill poisoned patients…. EMPs have a unique role to not only suggest an intervention that physicians and other pharmacists would likely miss, but also contribute these rare experiences to the medical literature.*

Albert Fiorello, MD, RDMS, FAAEM, FACEP, Associate Professor of Emergency Medicine and Residency Director at the **University of Arizona College of Medicine,** illustrates the unique role of the EMP on the ED care team through his experience in a level I trauma center with an attached pediatric ED. He goes on to highlight the role that EMPs play in medical resident education. *The emergency department is a unique place with a unique patient population. We care for undifferentiated patients with complex illnesses, sometimes with very little background information. Decisions that can have significant impact on patient morbidity and mortality have to be made quickly and decisively. I believe that the best patient care provided in the emergency department is when it is delivered by a team with one of the team members being an EM pharmacist. Our EM pharmacists improve patient care by assuring timely administration of critical medications like tPA and anticoagulant reversal agents, by being part of the resuscitation team during cardiac arrests and traumas, and by promoting antibiotic stewardship. They assist our nurses with critically ill patients requiring the administration of multiple medications and drips. And more recently their knowledge has helped our ED providers deliver quality, non-opioid analgesia when appropriate. Our ED pharmacists*

also promote our academic environment. They provide both didactic and bedside teaching to our emergency medicine residents, as well as the nursing staff. They have become integral members of our research team, having been involved in many projects and publications with our EM residents and faculty.

David H. Adler, MD, MPH, Director of Emergency Medicine Research and Professor of Emergency Medicine and Public Health Sciences at the **University of Rochester Medical Center,** conveys the contributions EMPs make to research and scholarly efforts. *[O]ur EM pharmacists have provided Principal Investigator and co-investigator support on several research and quality improvement projects for our medical students, EM medical residents and junior EM faculty. These projects have been supervised solely by EM pharmacists to completion and have often resulted in publication in peer-reviewed journals…. They assist in identifying patients for study recruitment during bedside clinical activities, alert the emergency department research assistants for screening, and facilitate study drug preparation and delivery if necessary. During one EM resident research project, focused on obtaining thromboelastography for patients with a new pulmonary embolism, initial patient recruitment was poor…. The EM pharmacist team was able to build and operationalize an automated alert in the medical record during anticoagulation order review to alert the pharmacist of the research study during verification. After a brief screening, the EM pharmacists were then able to directly notify study investigators of possible patients for recruitment. Shortly after EM pharmacy team involve[ment], study recruitment was completed…. As a regular participant in national emergency medicine meetings, I can confirm that the value of EM pharmacy is recognized throughout my field in all geographic regions of the US and in heterogeneous EM settings. My colleagues who do not work in an environment with EM pharmacy colleagues wish they did.*

Michael J. Apostolakos, MD, FCCP, Vice President and Chief Medical Officer of the **University of Rochester Medical Center,** has worked with EMPs in the care of critically ill patients in the ED as well as with quality improvement initiatives. In his letter of support, Dr. Apostolakos reveals the leadership skills EMPs exercise. *Their skill with the pharmacotherapeutic management of anaphylaxis, angioedema, massive pulmonary embolism, overdose, severe sepsis and septic shock, as well as many other disease states, is unequaled. Not only do they improve patient safety, but Emergency Medicine Pharmacists assure cost-effective pharmacotherapy. Their expertise in this arena cannot be overstated. The immediacy of need in this environment shines light on the importance of assuring the right patient receives the right medication at the right time…. Our Emergency Medicine Pharmacists have led numerous quality improvement projects.*

Many of these I have personally been involved with. In our organization, these initiatives have led to more appropriate use of narcotics in the emergency department, leading to a 50% reduction in narcotic use. Emergency Medicine Pharmacists have been responsible for leading projects which have led to shortening the time to appropriate antibiotics for our patients with severe sepsis and septic shock. They have also led the way in developing a system for the emergency department to follow up on all positive cultures obtained there. In our organization, Emergency Medicine Pharmacists lead many root cause analyses related to situations in which near misses or harm has come to patients. They're crucial in improving our systems of medication administration leading to safe and effective use of such.

Curtis E. Haas, PharmD, FCCP, BCPS, Director of Pharmacy at the **University of Rochester Medical Center,** exemplifies the EMP's role on the interprofessional ED team, unique skillset, and the demand for EMPs. *Our EM pharmacists work in a fast-paced environment with over 120,000 ED admissions per year at our largest facility. We provide pharmacy services in the ED for at least 18 hours per day, 365 days per year. These pharmacists must be prepared to handle therapeutic issues that range from a treat-and-release case of pharyngitis to a trauma 500 case requiring full resuscitation and stabilization in the trauma bay. Our ED pharmacy team has implemented state-of-the-art programs that include an ED antimicrobial stewardship program that is responsible for following all microbiologic results and assuring that all patients seen in the ED have their treatment adjusted to cover identified pathogens. This often means calling patients at home and following up with community-based providers to adjust antibiotic therapy after leaving the ED, to achieve essentially 100% appropriate treatment (or discontinuation of treatment). Over the past year, our ED pharmacy team took the lead on an ED based opiate stewardship program that has resulted in a dramatic reduction in opiate use during an ED admission and 52% reduction in prescriptions for opiates at the time of discharge. These changes have been achieved without a detriment in pain scores or patient satisfaction.*

At Strong Memorial Hospital, we currently employ approximately 8 FTE pharmacists with expertise and training in emergency pharmacy and toxicology. We also have two PGY-2 emergency pharmacy residents that contribute to clinical coverage in the ED. Over the past 5 years, this has grown by several FTEs, and in the past year, we have added two additional FTEs of emergency pharmacy coverage at our Highland Hospital affiliate. With the plan to pursue 24/7 emergency pharmacy coverage, it is anticipated that we will be adding approximately 3 FTEs at Strong Memorial Hospital and also expect the hours of coverage to increase at Highland Hospital over the next few years (likely an

additional 2 FTEs). We have every reason to believe that our ED coverage will continue to expand. Over the next 5 years, Strong Memorial Hospital is building a new ED tower with an expansion of our ED and observation beds, which will necessitate additional emergency pharmacy FTEs to maintain our current level of clinical services. The exact numbers are not yet defined, but it will likely be in the 3-5 FTE range. As an organization, we fully support and encourage board certification for all pharmacists involved in direct patient care. Any pharmacist employed in our clinical specialist track is expected to be board certified in their area of specialty within 2 years of hire provided they meet BPS requirements. On our clinical staff pharmacist track, board certification is a requirement for advancement to Tier 3 on the career ladder…. While there is no direct salary remuneration linked to board certification, BPS certification is incorporated into the requirements for promotion on the career ladder.

Flavia Nobay, MD, Associate Dean for Admissions and Associate Professor of Emergency Medicine at the **University of Rochester School of Medicine and Dentistry,** explains the EMP contributions to physicians and patient care in the ED. *Physician providers are increasingly exceeding their bandwidth within the busy ED environments. Stroke alerts, AMI Alerts, Sepsis Alerts, Neutropenic fevers, etc., are just a few examples that underscore the need to administer therapeutics in an urgent and timely manner. EM Providers practices are significantly augmented when an EM trained Pharmacist is immediately available to consult on the myriad of nuances associated with these patients. Given our incredibly high rate of distractions and task switching, our environment is ripe for errors and near misses in delivering urgent and emergent therapeutics. Having an ED pharmacist as a safety net is critical for us to maximize safe and quality driven patient care for our populations. As practice panels expand beyond maximum and hospital beds exceed 100%, EM providers are increasingly required to manage inpatient type borders in our EDs. Having EM trained pharmacists supplement our limited therapeutic knowledge base in our observation level care is critical for our transitions in care for our patients.*

Manish N. Shah, MD, MPH, is Professor of Emergency Medicine, Population Health Sciences, and Geriatrics & Gerontology; Vice Chair for Research; Morgridge Chair of Emergency Medicine Research; and Director of the KL2 Program at the Institute for Clinical and Translational Research at the **University of Wisconsin's BerbeeWalsh Department of Emergency Medicine.** Dr. Shah has worked with EMPs since the early 2000s and speaks to the value and demand of EMPs. *At one point, one of my mentees had a significant federal grant to evaluate the care delivered by Emergency Medicine Pharmacists. As we performed the analysis, we clearly saw the incredible impact made*

by the Emergency Medicine Pharmacists. They were finding many near misses and adverse events that would have otherwise placed patients at risk; as a result, it became clear to us that Emergency Medicine Pharmacists were literally one of the more important patient safety interventions that could be implemented in the ED…. In the last 20 years, we have gone from a situation where EDs consider Emergency Medicine Pharmacists to be a luxury…to one where Emergency Medicine Pharmacists are considered as critical as the physician or nurse. In fact, I know many physicians who will not work in an ED without Emergency Medicine Pharmacists. This new attitude means that to staff the over 5,000 EDs in the United States, we will need a large number of Emergency Medicine Pharmacists; it is a demand that I do not see being fulfilled anytime soon. However, by becoming an area of specialty practice, we can hopefully work to address this critical patient safety and patient care need.

Courtenay Leahman, MD, FCCS, MSHA, Neurointensivist, Medical Unit Director, Neuroscience ICU; Assistant Professor, Division of Critical Care Department of Anesthesiology; and Assistant Professor, Department of Neurology at **Virginia Commonwealth University;** and Medical Officer, Virginia-1 Disaster Medical Assistance Team, National Disaster Medical System, has been deployed for emergencies in the field but also to the Secretary of Command in Washington, DC, as the Chief Medical Officer for Hurricanes Irma, Maria, Yutu, and Michael. Dr. Leahman indicates the benefit of employing the services of EMPs during natural disasters. *In July of 2018, I was recommended as a trainer for disaster management where I met and worked with Emergency Pharmacists for DMAT in training for mass casualty disasters. It is too understated to say that I would have been at a loss had I not had a trained emergency pharmacist during any of my deployments. At the higher levels, I spoke with pharmacists every day so that they could receive the appropriate medications for the volume of patients they were seeing. During the training session, the emergency pharmacists were consistently calm under pressure; they never made a mistake and their demeanor coupled with their analytic reasoning made a stressful situation seem nearly effortless.*

These statements are representative of the broad base of support and acceptance for recognition of EMPs and reflect the widespread and growing demand for specialized pharmacy services for emergency medicine patients. All letter writers indicated their support for the recognition of emergency medicine pharmacy practice as a specialty.

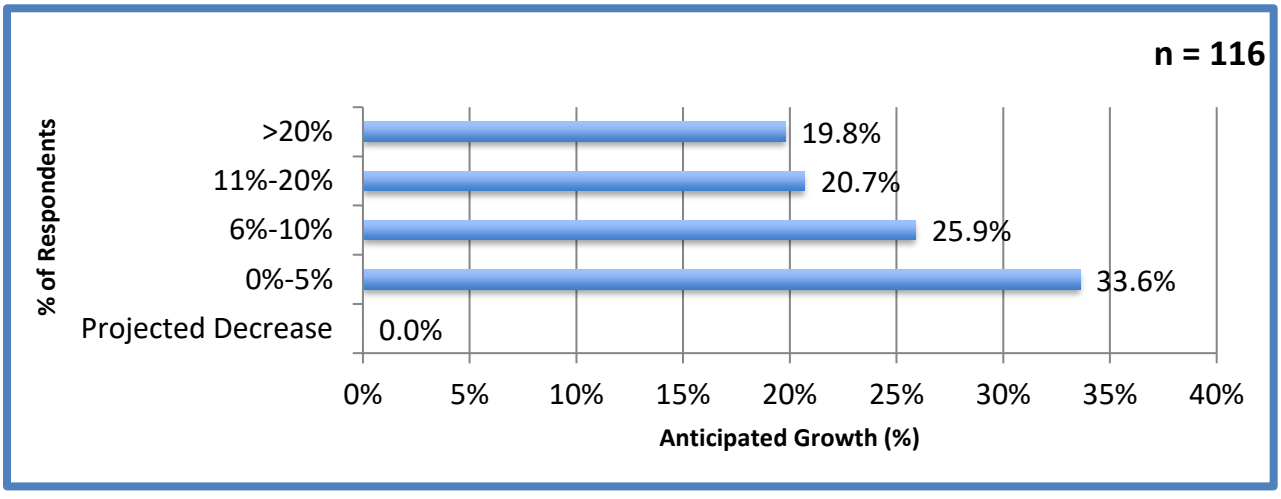
GUIDELINE 2. Include estimates of positions for pharmacists with specialized training and knowledge in the proposed specialty that are currently filled and those that are currently

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 emergency medicine practice, the petitioning organizations conducted a survey of EMPs. The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* included a subset of questions that were completed by individuals with direct responsibility for hiring pharmacists in emergency medicine. One hundred sixteen individuals completed that portion of the survey.

Responding employers were asked to provide the total number of full-time equivalent (FTE) EMPs allocated to serving emergency medicine patients within their organization. Although the number of positions varied (range, 1–20 allocated FTEs), the average number of FTEs across responding organizations was 4.3. Hiring managers from the 116 organizations that responded indicated they had recruited for 287.5 EMPs over the past 3 years and had filled more than 95% of these positions. These same employers estimate that they will fill an additional 227 positions over the next 3 years and currently report 30.8 vacant positions within their organizations. Employers also estimated the growth in the number of EMP positions within their organizations over the next 5 years. These results are provided in Figure B-1.

Figure B-1. Anticipated Growth in Emergency Medicine Pharmacist Positions Over the Next 5 Years



This information provided by employers of EMPs demonstrates a consistent and growing market for EMPs.

Notably, the value of specialty recognition is becoming increasingly important to employers of EMPs. Over 80% of employers responding to the *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* indicated that it was "highly likely," "likely," or "somewhat likely" that they would require a new specialty credential in emergency medicine if approved by the Board of Pharmacy Specialties (BPS) for newly hired pharmacists. Of those responses, over 75% indicated that it was "highly likely," "likely," or "somewhat likely" that they would require a new specialty credential in emergency medicine if approved by BPS for currently employed EMPs. The survey also showed that while a number of employer respondents encourage BPS certification or another earned credential, only 36% of EMP positions currently require BPS certification or another earned credential. These results imply that a credential more targeted to the specific needs of EMPs would be in demand in the marketplace.

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[1] American College of Emergency Physicians. Clinical pharmacist services in the emergency department. June 2015. Available at: https://www.acep.org/patient-care/policy-statements/clinical-pharmacist-services-in-the-emergency-department/#sm.00000sslbd7rvqf15y9ux56tqbhoo. Accessed May 2, 2019.

[2] American College of Medical Toxicology. ACMT position statement: the role of clinical pharmacists in the emergency department. August 4, 2017. Available at: https://www.acmt.net/_Library/Positions/ACMT_Position_Pharmacists.pdf. Accessed February 20, 2019.

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.***

The data sources for determining the number of emergency medicine pharmacists (EMPs) in practice and the proportion of time spent in this specialized area of practice include:

- The *Board Certified Emergency Medicine Pharmacy Role Delineation Study* conducted by the Board of Pharmacy Specialties (BPS).[1]
- Analysis of membership records of the American College of Clinical Pharmacy (ACCP) and the American Society of Health-System Pharmacists (ASHP).
- The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification*, administered March–April 2019 by the petitioning organizations.

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.

Emergency medicine pharmacy practice has significantly grown over the past decade, as evidenced by the increased number of postgraduate year two (PGY2) specialty residency programs in emergency medicine pharmacy. In 2007, there were two ASHP-accredited specialty residency programs in emergency medicine pharmacy. Today, the number of programs available is 67—a 3,250% increase. Approximately 77 EMPs graduate annually from these programs. The growth trend is toward expansion of specialty emergency medicine pharmacy residency programs. Comparatively, the numbers of current PGY2 programs for other BPS recognized specialties are:[2]

- Ambulatory care pharmacy – 172 programs.
- Cardiology pharmacy – 36 programs.
- Critical care pharmacy – 147 programs.
- Geriatric pharmacy – 24 programs.
- Infectious diseases pharmacy – 106 programs.
- Nutrition support pharmacy – 1 program.

- Oncology pharmacy – 108 programs.
- Pediatric pharmacy – 59 programs.
- Pharmacotherapy – 20 programs.
- Psychiatric pharmacy – 72 programs.

Analysis of the membership records from the petitioning organizations reveals 8,431 pharmacists who self-identify as having an interest in emergency medicine pharmacy practice. This number likely underestimates the actual number of practicing EMPs since, presumably, not all practicing EMPs are members of the petitioning organizations or have self-identified as practicing EMPs.

The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* was developed by the petitioning organizations to obtain additional quantitative data regarding workforce demand for EMPs, proportion of time spent in emergency medicine practice, and education and training pathways utilized. The survey was distributed to administratively identified ACCP and ASHP members in March–April 2019. The survey link was distributed through numerous membership communications, including newsletters, social media, and online networking groups within the petitioning organizations. External sources such as EMP Twitter accounts, Acurity, Vizient, the Tampa Bay Residency Forum, and the Indian Health Service also supported the development of the petition by distributing the survey link and encouraging EMPs to participate. A total of 1,043 respondents completed the survey. A majority of respondents (596) signed the online petition supporting specialty recognition for EMPs. A copy of the survey instrument is attached as Appendix C-1.

As the number of emergency medicine residency programs has increased and the role of EMPs has expanded, so has the number of pharmacists practicing in emergency medicine across the United States. There are over 6,210 hospitals in the United States, with the vast majority of these facilities offering emergency services.[3] EMPs also practice in freestanding emergency departments and urgent care centers, which represent almost 7,700 practice locations.[4,5]

Based on survey results, information from petitioning organizations, and available literature, we estimate that approximately 8,000 to 10,000 pharmacists are currently engaged as EMPs in the United States.

Of the pharmacists surveyed by the petitioning organizations, 98% indicated that they are practicing at a specialty level according to the following definition:

Definition of Emergency Medicine Pharmacists

Emergency medicine pharmacists specialize in the delivery of direct patient care at the bedside across diverse patient populations and acuity levels. These specialists are critical members of the interprofessional emergency medicine team, are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department, and have expertise in the management of time-dependent emergencies, pre-hospital medicine, emergency preparedness, public health, and toxicology. Emergency medicine pharmacy practice focuses on rapid assessment of available patient data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts.

The *Board Certified Emergency Medicine Pharmacy Role Delineation Study* depicts responding pharmacists' practice setting and their primary role within that setting. Over 52% of the respondents reported practicing in a not-for-profit community hospital, while 39.6% practice in a university-affiliated hospital. Another 4.4% reported practicing in a for-profit community hospital.[1] Similarly, for the *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification*, 48.6% of respondents reported practicing in a not-for-profit community hospital setting; 42.8% of respondents practice in an academic medical center/university-affiliated hospital; and approximately 3.7% of respondents practice in a for-profit community hospital setting.

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.

Results from the *Board Certified Emergency Medicine Pharmacy Role Delineation Study* show that respondents are highly engaged in emergency medicine practice, with 80.5% of respondents reporting 30 or more hours per week spent in emergency medicine pharmacy practice.[1] The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* also had 80.5% of respondents report spending at least 30 hours of their week practicing in an emergency medicine practice site.

The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* respondents indicated hours worked per week in their emergency medicine practice as well as the proportion of time devoted to providing direct patient care according to the Definition of Emergency Medicine Pharmacists. Figures C-1 and C-2 demonstrate that the vast majority of

EMPs practice full-time and provide direct patient care and services at the specialty level more than 50% of the time (89.3%).

Figure C-1. Hours Worked per Week in Emergency Medicine Practice Site

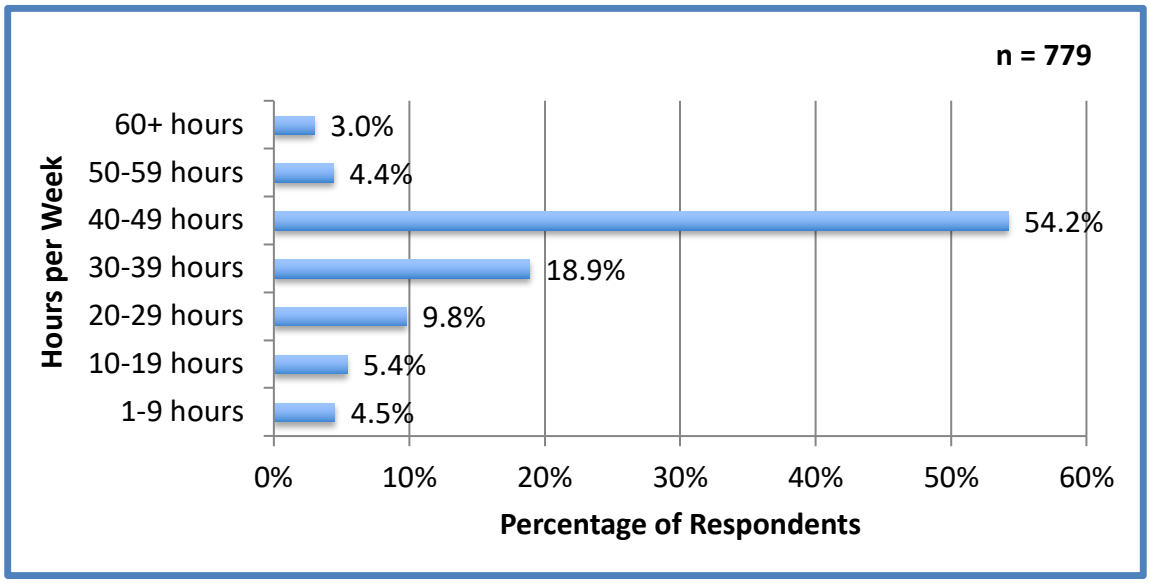
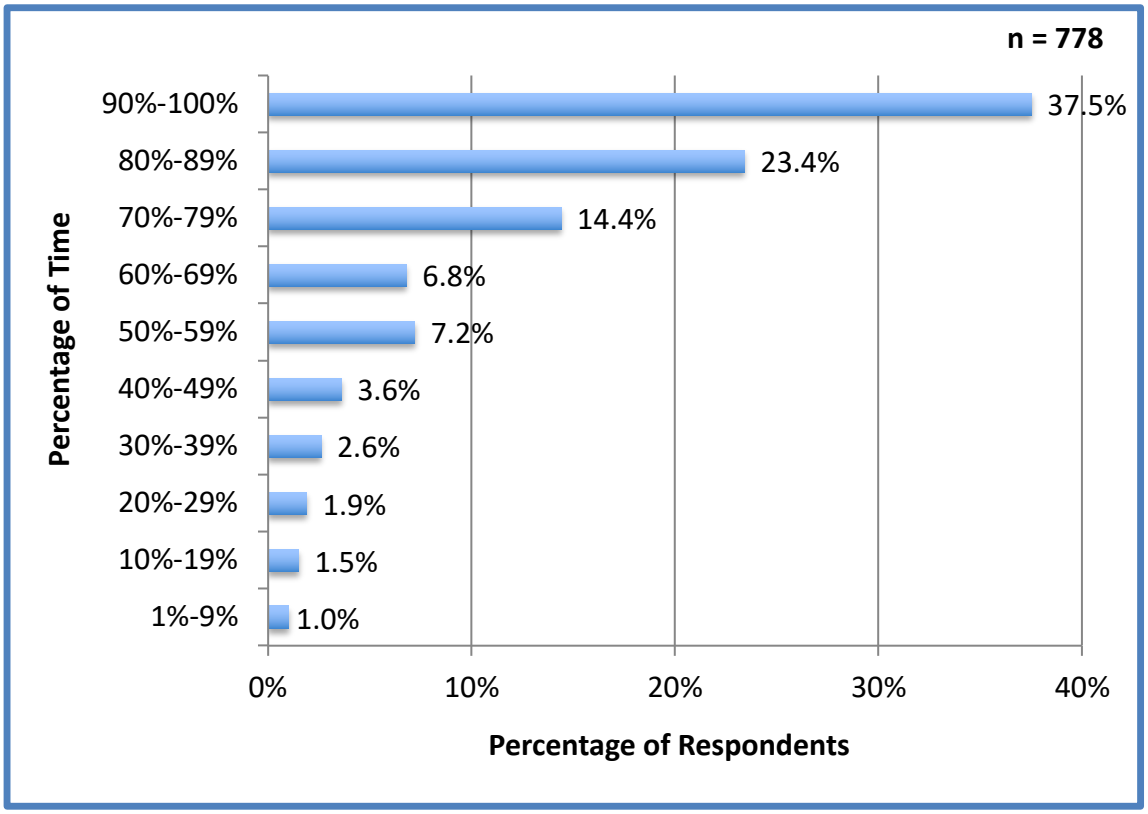


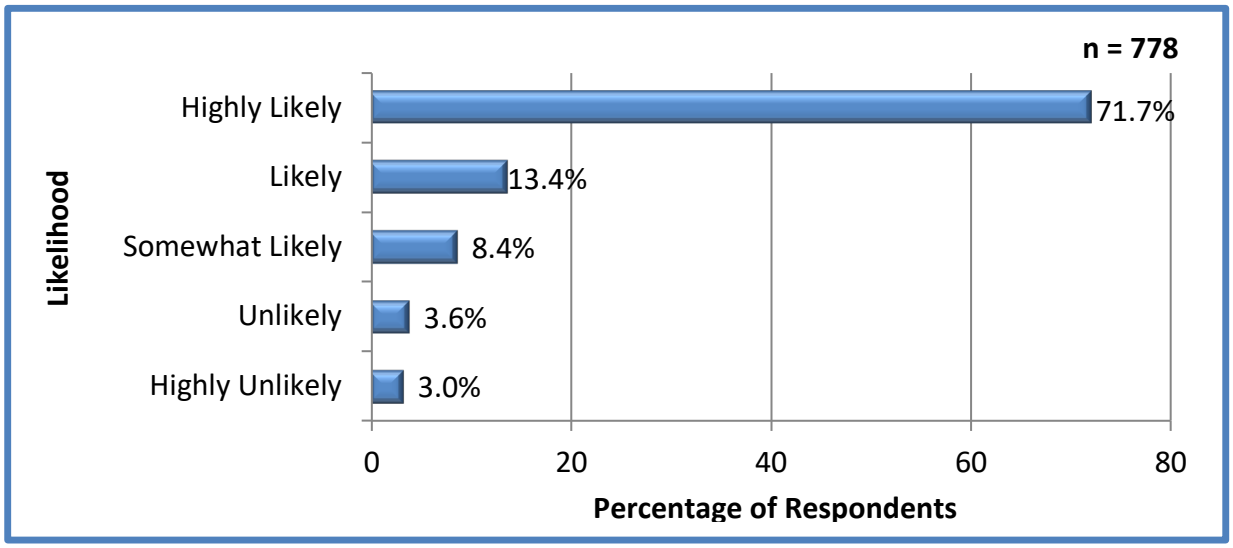
Figure C-2. Percent of Time Devoted Exclusively to Providing Direct Patient Care and Services According to the Definition of Emergency Medicine Pharmacists



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.

The *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* queried respondents on the likelihood they would pursue specialty certification within the next 5 years if the BPS petition to recognize EMPs were approved. Over 93% of respondents to this question, or 727 pharmacists, indicated that they would be "highly likely," "likely," or "somewhat likely" to pursue specialty recognition in emergency medicine pharmacy practice (Figure C-3).

Figure C-3. Likelihood of Pursuing Specialty Recognition as an Emergency Medicine Pharmacist Within the Next 5 Years



Since this survey presumably sampled only a portion of the individuals who may be engaged in emergency medicine pharmacy practice, the number of individuals who would seek certification is underrepresented. Recognition of emergency medicine pharmacy as a specialty has broad acceptance within the profession with an interest in emergency medicine, as evidenced by the petitioning organizations, and will drive the number of individuals who are likely to seek certification.

References

[1] Board of Pharmacy Specialties. *Board Certified Emergency Medicine Pharmacy Role Delineation Study Technical Report.* December 19, 2017.
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[3] American Hospital Association. Fast Facts on U.S. Hospitals, 2019. Available at: https://www.aha.org/statistics/fast-facts-us-hospitals. Accessed May 1, 2019.
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[5] Rechtoris M. 7 statistics on urgent care centers, EDs & retail clinics. *Clinical Leadership & Infection Control.* March 9, 2016. Available at: https://www.beckersasc.com/asc-quality-infection-control/5-statistics-on-urgent-care-centers-emergency-departments.html. Accessed May 1, 2019.

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.***

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 for emergency medicine pharmacy practice and issued a call for petitions in this specialty area. Therefore, Criterion D and Criterion E are not required as part of the petition to BPS.

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 the 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 program prepares graduates 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 pharmacy curriculum emphasizes optimal medication therapy outcomes and patient safety and satisfies the educational requirements for licensure. The curriculum also fosters development of knowledge, skills, attitudes, and values as well as the ability to integrate and apply learning both to the present practice of pharmacy and to the advancement of the profession. The pharmacy curriculum provides the basic education and training that graduates need to practice at a generalist level.

The ACPE standards and guidelines require a pharmacist 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 targeted populations,

including patients with acute and chronic disease.[1] Experientially, ACPE standards require students to complete introductory and advanced pharmacy practice experiences (IPPEs and APPEs, respectively). Furthermore, ACPE standards require that APPEs include primary, acute, chronic, and preventive care for patients of all ages and that these experiences promote practice competencies. ACPE standards *do not require* APPEs to specifically address the area of emergency medicine pharmacy practice. Schools and colleges of pharmacy do not typically require completion of an APPE or IPPE in emergency medicine practice. There are currently limited, optional opportunities for student pharmacists who seek experiences in emergency medicine. In 2015, approximately 21% of schools and colleges offered an emergency medicine IPPE for student pharmacists. APPE experiences were offered at 83% of schools and colleges.[2] When available, these experiences can improve confidence and knowledge regarding emergency medicine, provide direct exposure to unique patient populations, and help student pharmacists obtain valuable insights regarding clinical pharmacy services provided to emergency medicine patients.[2] When unavailable, emergency medicine pharmacy practice experience may be limited to brief encounters during required rotations in inpatient, ambulatory care, or acute care medicine.

Following completion of the Doctor of Pharmacy 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:[3]

- *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 emergency medicine pharmacy practice by a variety of methods. These methods may include, but are not limited to:

- Doctor of Pharmacy degree, clinical work experience, and self-study.
- Doctor of Pharmacy degree, postgraduate year one (PGY1) residency training, clinical work experience, and self-study.
- Doctor of Pharmacy degree, PGY1 residency training, clinical and/or research fellowship programs, clinical work experience, and self-study.
- Doctor of Pharmacy degree, PGY1 residency training, postgraduate year two (PGY2) specialty residency in emergency medicine, clinical work experience, and self-study.

The most effective way to prepare for a career as an emergency medicine pharmacist (EMP) is to complete a PGY1 pharmacy residency and a PGY2 residency in emergency medicine. PGY2 emergency medicine residency programs provide the most comprehensive experiential learning opportunities in emergency medicine pharmacy practice.[4]

The petitioning organizations conducted a *Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification* that asked employers of EMPs the desired level of training for pharmacists practicing in this specialty. In ranked order of preference, the responses from 115 individuals responsible for hiring within their organizations were as follows (from most desirable to least desirable):

- PGY2 Residency – Emergency Medicine.
- PGY2 Residency – Other.
- PGY1 Residency – Pharmacy.
- Fellowship training.
- Employer-provided training program.
- None required or desired.

The Doctor of Pharmacy degree alone does not provide knowledge of sufficient depth and breadth for EMPs to provide specialized care. Additional education and training, clinical work experience, and study are necessary. Because emergency medicine pharmacy practice is an evolving specialty, some EMPs may have obtained specialized knowledge and skills through mechanisms other than accredited residency training programs.

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

ASHP Emergency Medicine Programs

The American Society of Health-System Pharmacists (ASHP) offers several education and mentoring programs to support pharmacists in emergency medicine. Beginning in May 2019, ASHP offers a self-guided, online program designed for pharmacists in practice to increase the foundational knowledge and skills necessary to provide optimal patient care in emergency medicine. Through 11 modules, the program provides a comprehensive review of disease states and topics frequently encountered in the emergency department.[5] The program offers learners an opportunity to earn an ASHP Professional Certificate and 27 hours of continuing education credit.

In 2007, ASHP developed a patient care impact program, *Introducing an Emergency Pharmacist to Your Institution,* which provided experiential training and mentorship by EMPs and an emergency medicine physician during initiation of emergency medicine clinical pharmacy services. Over 80 participants completed this program and started emergency medicine pharmacy services at their institutions before the program was retired.[6]

Residency Training

As stated above, there are several ways in which pharmacists can acquire the knowledge and skills needed to provide a specialized practice in emergency medicine. The most efficient way is through an ASHP-accredited PGY2 specialty residency program in emergency medicine pharmacy practice. A copy of the current *Required Competency Areas, Goals, and Objectives for Emergency Medicine Postgraduate Year Two (PGY2) Pharmacy Residencies* for accreditation by ASHP is attached as Appendix F-1. Traditionally, completion of these goals and objectives would provide the education and training needed to sit for the Board of Pharmacy Specialties certification exam.

PGY2 specialty residency training is an organized, directed, and accredited program that builds upon the competencies established in PGY1 residency training. The PGY2 program increases the resident's depth of knowledge, skills, and abilities and is designed to promote accountability and best practices that prepare residents to provide comprehensive medication management and clinical leadership in a specialty area.[4]

PGY2 pharmacy residency programs build on Doctor of Pharmacy 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 situate them to be eligible for attainment of board certification in the specialized practice area (when board certification for the practice area exists).

The PGY2 specialty residency in emergency medicine is designed to transition PGY1 residency graduates from generalist practice to specialized practice, focused on the care of patients in need of emergency medicine. Residency graduates are equipped to participate as essential members of interdisciplinary teams caring for emergency medicine patients, assuming responsibility for the medication-related aspects of care. In that role, they provide the team with evidence-based, medication-related information and formulate that information into

expert recommendations to the team for the use of medications and other therapeutic approaches.

In addition to these direct patient care responsibilities, emergency medicine pharmacy residency graduates are trained to serve as authoritative resources in their health systems for the optimal use of medications in emergency medicine recipients. In that role, EMPs can be relied upon to lead the development and implementation of medication-related guidelines, protocols, and processes for emergency medicine patient care, meet the health system's needs for emergency medicine–related drug information, and provide the emergency medicine pharmacy perspective to organizations making technology, automation, and budgetary decisions regarding emergency medicine–related medications and patient care. Graduates are also highly skilled in the design and delivery of education and training related to emergency medicine for a wide spectrum of potential audiences, including the patient and/or caregiver as well as health care professionals in practice or in training.[4]

Because emergency medicine is such a rapidly developing field, graduates of emergency medicine pharmacy residencies are all skilled in supporting or conducting emergency medicine research and outcomes analyses. Required goals for PGY2 pharmacy residencies in emergency medicine include the following and are specifically related to the care of emergency medicine patients:[7]

- **Competency Area R1: Patient Care**
  - Goal R1.1: Provide comprehensive medication management to patients following a consistent patient care process.
  - Goal R1.2: Ensure continuity of care during transitions between care settings.
  - Goal R1.3: Manage and facilitate delivery of medications.
- **Competency Area R2: Advancing Practice and Improving Patient Care**
  - Goal R2.1: Demonstrate ability to manage formulary and medication-use processes, as applicable to the organization.
  - Goal R2.2: Demonstrate ability to conduct a quality improvement or research project to improve patient care or for advancing the pharmacy profession.
- **Competency Area R3: Leadership and Management**
  - Goal R3.1: Demonstrate leadership skills for successful self-development in the provision of patient care.
  - Goal R3.2: Demonstrate management skills in the provision of patient care.
- **Competency Area R4: Teaching, Education, and Dissemination of Knowledge**
  - Goal R4.1: Provide effective medication and practice-related education to patients, caregivers, health care professionals, students, and the public.

        - Goal R4.2: Effectively employ appropriate preceptor roles when engaged in teaching students, pharmacy technicians, or fellow health care professionals.
- **Competency Area R5: Management of Medical Emergencies**
    - Goal R5: Participate in and exercise leadership in the management of medical emergencies.
- **Competency Area R6: Management of Toxicology Patients**
    - Goal R6.1: Describe the role of the poison center or medical toxicologist in the care of the toxicology patient.
    - Goal R6.2: Demonstrate the ability to provide appropriate evidenced-based recommendations for the patient in need of toxicologic intervention.

Elective goals for PGY2 pharmacy residencies in emergency medicine include:[7]

- **Competency Area E1: Academia**
    - Goal E1.1: Demonstrate understanding of key elements of the academic environment and faculty roles within it.
    - Goal E1.2: Exercise case-based and other teaching skills essential to pharmacy faculty.
    - Goal E1.3: Develops and practices a philosophy of teaching.
- **Competency Area E2: Leadership and Practice Management Skills**
    - Goal E2.1: Exhibits additional skills of a practice leader.
- **Competency Area E3: Medication-Use Evaluation**
    - Goal E3.1: Lead a medication-use evaluation.
    - Goal E3.2: Develop communication strategies related to formulary restrictions.
    - Goal E3.3: Participate in the health system's formulary process for pharmacotherapeutic agents used in the emergency department setting.
- **Competency Area E4: Emergency Medicine Pharmacy Information**
    - Goal E4.1: Provide concise, applicable, comprehensive, and timely responses to formalized requests for drug information pertaining to emergency medicine from patients, health care providers, and the public.
    - Goal E4.2: Develop a core library of references appropriate for emergency medicine pharmacy practice.
- **Competency Area E5: Management of Mass Casualty Events**
    - Goal E5.1: Participate in the planning or management of mass casualty events.
- **Competency Area E6: Medical Writing**
    - Goal E6.1: Write and submit for publication an emergency medicine pharmacy-related article.
- **Competency Area E7: Pre-Hospital Care**
    - Goal E7.1: Demonstrates understanding of the various pre-hospital professionals in the provision of care of emergency medicine patients.

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

Table F-1 lists PGY2 emergency medicine pharmacy residency programs as of March 31, 2019, including 67 programs with 77 residency positions.

Table F-1. Postgraduate Year Two Emergency Medicine Pharmacy Residency Programs as of March 31, 2019

Sponsoring Organization	Status	City	State	Program Director	Number of Residency Positions
Advocate Christ Medical Center and Advocate Children's Hospital	Accredited	Oak Lawn	IL	Mary Hormese	1
Boston Medical Center	Accredited	Boston	MA	Natalija M. Farrell	1
CaroMont Regional Medical Center	Accredited	Gastonia	NC	Kristin H. Eginger	2
CHRISTUS Trinity Mother Frances Health System	Candidate	Tyler	TX	Craig Cocchio	2
Cleveland Clinic	Pre-candidate	Cleveland	OH	Matthew J. Campbell	1
Cleveland Clinic – Fairview Hospital	Candidate	Cleveland	OH	Maria Kahle	1
Denver Health Medical Center	Accredited	Denver	CO	Kevin Kaucher	1
Detroit Medical Center – Detroit Receiving Hospital	Accredited	Detroit	MI	Elizabeth A. Petrovitch	1
Duke University Hospital	Candidate	Durham	NC	Jennifer D. Mando-Vandrick	1
Florida Hospital Orlando – AdventHealth	Candidate	Orlando	FL	Lydia B. Fancher	1
Froedtert & Medical College of Wisconsin – Froedtert Hospital	Accredited	Milwaukee	WI	Cathyyen H. Dang	2
Grady Health System	Accredited	Atlanta	GA	John H. Patka	1
Hackensack University Medical Center	Accredited	Hackensack	NJ	Gabrielle L. Procopio	1
Indiana University Health	Candidate	Indianapolis	IN	Tara Holt	1
Inova Fairfax Hospital	Accredited	Falls Church	VA	Lorrie Leclair	1
Intermountain Medical Center	Accredited	Murray	UT	Jeremy D. Bair	1
Jackson Memorial Hospital	Accredited	Miami	FL	Daniel Yousef	2

Lakeland Regional Health	Accredited	Lakeland	FL	Brad Hall	1
Long Island University at The Brooklyn Hospital Center	Accredited	Brooklyn	NY	Christine Ciaramella	2
Maimonides Medical Center	Accredited	Brooklyn	NY	Jason M. Brady	1
Maricopa Integrated Health System	Candidate	Phoenix	AZ	Aimee Mishler	1
Massachusetts General Hospital	Accredited	Boston	MA	Bryan D. Hayes	1
Mayo Clinic Hospital	Accredited	Rochester	MN	Maria I. Rudis	1
Medical Center Health System	Candidate	Odessa	TX	Nathan Ehni	1
Medical University of South Carolina Medical Center and College of Pharmacy	Candidate	Charleston	SC	Kyle A. Weant	1
Mercy Medical Center – Des Moines	Accredited	Des Moines	IA	Jessica Nesheim	1
Methodist University Hospital	Accredited	Memphis	TN	Ana Negrete	1
Mission Health – Mission Hospital	Accredited	Asheville	NC	Adam D. Landers	1
Nebraska Medicine	Accredited	Omaha	NE	Krysta A. Baack	1
Northwestern Memorial Hospital/Rosalind Franklin University of Medicine and Science	Accredited	Chicago	IL	Abbie Lyden	1
Novant Health Presbyterian Medical Center	Pre-candidate	Charlotte	NC	Hannah Dills	1
OhioHealth Grant Medical Center	Accredited	Columbus	OH	Grant Walliser	1
Orlando Health	Candidate	Orlando	FL	Deba S. Rihani	1
Renown Regional Medical Center	Pre-candidate	Reno	NV	Heather Townsend	1
Rush University Medical Center	Candidate	Chicago	IL	Gary D. Peksa	1
Rutgers University/Robert Wood Johnson University Hospital	Accredited	Piscataway	NJ	Patrick J. Bridgeman	2
Sarasota Memorial Hospital	Pre-candidate	Sarasota	FL	Eileen Shomo	2
Southeastern Regional Medical Center	Accredited	Lumberton	NC	Roger M. Reeder	1
St. Joseph's Hospital – BayCare	Pre-candidate	Tampa	FL	Amanda Harmon	1

St. Joseph's/Candler Health System	Accredited	Savannah	GA	Erica Merritt	1
Stormont Vail Health	Candidate	Topeka	KS	Brooke Bitner	1
SwedishAmerican Hospital – A Division of University of Wisconsin Health	Accredited	Rockford	IL	Kirk Schubert	1
Tampa General Hospital	Accredited	Tampa	FL	Katelyn R. Dervay	1
The Johns Hopkins Hospital	Accredited	Baltimore	MD	Umbreen I. Murtaza	1
The Ohio State University Wexner Medical Center	Accredited	Columbus	OH	Erin M. Reichert	2
The University of Arizona College of Pharmacy/ Banner – University Medical Center Tucson	Accredited	Tucson	AZ	Daniel H. Jarrell	1
The University of Arizona College of Pharmacy/ Northwest Medical Center	Accredited	Tucson	AZ	Stephen J. Perona	1
The University of Iowa Hospitals and Clinics	Accredited	Iowa City	IA	Brett Faine	1
The University of Vermont Medical Center Inc.	Candidate	Burlington	VT	Kyle DeWitt	1
Touro College of Pharmacy/Saint Barnabas Hospital	Candidate	New York	NY	Andrew Smith	1
University Health System	Accredited	San Antonio	TX	Amanda Fowler	1
University of California, Davis Medical Center	Accredited	Sacramento	CA	Jeremiah J. Duby	1
University of Chicago Medicine	Candidate	Chicago	IL	Samantha Bastow	1
University of Colorado Hospital/University of Colorado School of Pharmacy	Accredited	Aurora	CO	Gabrielle Jacknin	1
University of Florida Health Jacksonville	Accredited	Jacksonville	FL	Joe P. Spillane	1
University of Illinois at Chicago College of Pharmacy	Accredited	Chicago	IL	Renee Petzel Gimbar	1
University of Kentucky HealthCare	Accredited	Lexington	KY	Abby M. Bailey	2
University of Louisville Hospital	Candidate	Louisville	KY	Lynn Lamkin	1
University of Maryland Medical Center	Accredited	Baltimore	MD	Ashley Martinelli	1
University of Massachusetts Memorial Medical Center	Pre-candidate	Worcester	MA	Robert K. Mokszycki	1
University of Michigan Health System	Pre-candidate	Ann Arbor	MI	Elizabeth M. Vanwert	1

University of New Mexico Hospital	Accredited	Albuquerque	NM	Preeyaporn Sarangarm	1
University of Rochester Medical Center	Accredited	Rochester	NY	Nicole M. Acquisto	2
University of Utah Health	Pre-candidate	Salt Lake City	UT	Colgan T. Sloan	1
University of Virginia Health System	Pre-candidate	Charlottesville	VA	Derek Burden	1
University of Wisconsin – University of Wisconsin Health	Candidate	Madison	WI	Joseph J. Halfpap	1
Yale New Haven Hospital	Accredited	New Haven	CT	Katarzyna M. Szablowski	1

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[4] American Society of Health-System Pharmacists. *ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs.* 2017. Available at: https://www.ashp.org/-/media/assets/professional-development/residencies/docs/pgy2-residency-accreditation-standard-June2017.ashx?la=en. Accessed January 17, 2019.

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[6] Witsil JC, Aazami R, Murtaza UI, et al. Strategies for implementing emergency department pharmacy services: results from the 2007 ASHP Patient Care Impact Program. *Am J Health Syst Pharm.* 2010;67(5):375-9.

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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.***

Transmission and dissemination of specialized knowledge in emergency medicine pharmacy practice occurs through national standards and guidance, formal networking groups within professional practice associations, peer-reviewed publications and periodicals, live educational programming, and enduring educational resources in print- and web-based vehicles.

National Standards and Guidance

For pharmacists in emergency medicine, one of the primary mechanisms for transmission of knowledge is through rules, regulations, standards, guidelines, and position papers authored by national organizations and government entities. Examples of these documents that are foundational for emergency medicine pharmacists (EMPs) include the following:

- *American College of Emergency Physicians Clinical Pharmacist Services in the Emergency Department* – This position statement, which was originally approved in June 2015, describes the role of pharmacists in the emergency department (ED), and encourages health systems to support roles for, and research around, pharmacists within the ED.[1]
- *American College of Medical Toxicology (ACMT) Position Statement: The Role of Clinical Pharmacists in the Emergency Department* – This position statement reinforces the role that pharmacists make to care and safety of patients within the ED and supports 24-hour staffing of EDs with dedicated emergency medicine pharmacists (EMPs).[2]
- *American Society of Health-System Pharmacists (ASHP) Guidelines on Emergency Medicine Pharmacist Services* – These guidelines were developed through the ASHP Section of Clinical Specialists and Scientists Advisory Group on Emergency Care and approved in July 2011. The guidelines are intended to define the role of the EMP, suggest goals for providing services to meet institution-specific needs, and establish a definition of best practices for the ED.[3] The *ASHP Guidelines* are currently under revision and should be publicly available by the end of 2019.
- *ASHP Statement on Pharmacy Services to the Emergency Department* – This statement shares the pharmacist's contributions to patients in the ED and suggests future roles for pharmacists in the ED.[4]

Formal Networking Groups

Major health care associations have formal networking sections and groups dedicated to EMPs. These groups foster professional interaction and provide opportunities for practice advancement through educational programming, newsletters, research networks, and leadership. As examples, emergency medicine networking groups that currently exist within pharmacy practice and other health care associations are shown in Table G-1.

Table G-1. Emergency Medicine Networking Groups

Organization	Networking Group	Description
American Academy of Clinical Toxicology (AACT)	Acute & Intensive Care (AIC) Special Interest Section	AACT's AIC section provides educational symposia and is a forum for members interested in acute care, emergency, and critical care toxicology. The AIC section includes approximately 30 emergency medicine pharmacists (EMPs) as members.
American College of Clinical Pharmacy (ACCP)	Emergency Medicine Practice and Research Network (PRN)	The members of the Emergency Medicine PRN are clinical pharmacists who primarily practice in an emergency department (ED) setting or have an interest in the treatment of patients in the ED. This PRN provides a means to network among members; provides educational opportunities; and uses the internet to facilitate information exchange. The ACCP Emergency Medicine PRN currently has more than 982 members.
American Society of Health-System Pharmacists (ASHP)	Connect	ASHP Connect allows pharmacists interested in emergency medicine to ask questions, exchange information, and share resources. There is a group specifically for emergency medicine, which hosts 575 members, as well as a group for Emergency Medicine PGY2 Residency Directors, which hosts 63 members.
ASHP	Section Advisory Group (SAG) on Emergency Care	ASHP's SAG provides a forum to participate with ASHP and colleagues who share similar interests. The SAG on Emergency Care is charged to the following: ▪ Assess current ASHP programs, tools, and resources related to emergency care and determine member needs related to this specialty. ▪ Identify and develop future

		programs/resources that enhance the ability of members to meet patient needs. ▪ Encourage and determine the extent of pharmacist integration into health care teams that provide patient care services in the ED setting. ▪ Identify opportunities for departments of pharmacy at hospitals and health systems in ensuring safe and effective use of medications in EDs. ▪ Develop an education session for the ASHP Midyear Meeting based on the work of the section's Educational Steering Committee or section educational needs. ▪ Review and update ASHP's Emergency Care Resource Center web content twice a year. The ASHP SAG on Emergency Care currently has approximately 30 members.
American Trauma Society (ATS)		ATS is a national association that serves critical players in trauma care. Excellent trauma care relies on an optimally functioning trauma system, including a coordinated, multidisciplinary approach to the care of the trauma patient. ATS serves its members through an environment that fosters leadership and professional development, innovation in prevention, and collaboration with trauma partners in the support and delivery of trauma care. Pharmacists can be general members of the ATS and are classified as other health care professionals.
Emergency Medicine Patient Safety Foundation (EMPSF)		EMPSF's nurses, residents, pharmacists, and mid-level provider membership provides best practices, research, and resources to help advance patient safety through its Resources Library, e-newsletters, printed newsletters, and an online forum.
Pediatric Pharmacy Advocacy Group (PPAG)	Emergency Medicine Special	The clinical environment in the ED is

	Interest Group (SIG)	considered high risk for adverse drug events. The main goal of practitioners who work in this environment is to help increase medication safety and provide drug information to staff. This is a rapidly growing practice area. The Emergency Medicine SIG brings together members who practice in pediatric EDs.
Society for Academic Emergency Medicine (SAEM)		SAEM is a national association dedicated to improving care of the acutely ill and injured patients through improved research and education. SAEM members are allowed to choose to be part of free academies and interest groups that allow members to network and collaborate in subspecialties of SAEM. Many of these groups are relevant to EMPs. Pharmacists who hold a university appointment or are actively involved in emergency medicine are eligible for individual membership in SAEM, are eligible to vote, and may hold office in SAEM.
Society of Critical Care Medicine (SCCM)	Emergency Medicine Section	The Emergency Medicine Section of SCCM promotes the interest of emergency medicine in the critical care field. The section encourages collaboration, education, and research activities. The Emergency Medicine Section, open to all emergency medicine professionals, provides excellent opportunities to network with colleagues, influence the profession, and develop leadership skills. Section membership presents additional opportunities to contribute to both the Emergency Medicine Section and SCCM at large.

In addition to formal networking groups through associations, many EMPs share information and engage in professional conversation electronically through Twitter (Table G-2) and podcasts, blogs, or websites (Table G-3).

Table G-2. Emergency Medicine Twitter Accounts

Account Holder	Twitter Handle	# of Followers (last reviewed 4/12/19)
Aimee Mishler, PGY2 Emergency Medicine Pharmacy Program Director at Maricopa	@EM_Pharm	443
American College of Clinical Pharmacy (ACCP)	@accpemedprn	1,932
American College of Emergency Physicians (ACEP)	@ACEPNow	13,300
American College of Emergency Physicians (ACEP)	@EmergencyDocs	17,600
American Society of Health-System Pharmacists (ASHP)	@ASHP_EMPharm	2,525
American Trauma Society (ATS)	@ATSTrauma	2,775
Best Evidence in Emergency Medicine (BEEM)	@BEEMcme	4,353
Bryan D. Hayes, emergency medicine pharmacist (EMP) and toxicologist	@PharmERToxGuy	14,600
Chris Edwards, EMP	@emergencypharm	347
Colgan Sloan, EMP	@DrugInfoGeek	489
Craig Cocchio, EMP	@iEMPharmD	1,837
David Zimmerman, EMP	@DEZ_EM_Pharm	828
Emergency Medicine/Critical Care Conference (EM/CCC)	@EMCCC2	373
Emergency Medicine Patient Safety Foundation (EMPSF)	@EMPSF	381
Emergency Medicine Residency at Maricopa Medical Center	@MaricopaEM	1,844
FOAMcast, free open access medical education	@FOAMpodcast	9,781
Katelyn Dervay, EMP	@Katelyn_EMPharm	495
Ken Milne, MD, Skeptics Guide to Emergency Medicine (SGEM)	@TheSGEM	12,500
Kyle DeWitt, EMP	@EmergPharm	1,495
Laura Celmins, EMP	@EMToxRx	915
Meghan Groth, EMP	@EMpharmgirl	1,995
Nadia I. Awad, EMP	@Nadia_EMPharmD	2,434
Robert S. Pugliese, EMP	@RSPugliese	2,689
Society for Academic Emergency Medicine (SAEM)	@SAEMonline	9,474
Society of Critical Care Medicine (SCCM)	@SCCM	23,100
The Tox & The Hound, toxicologists writing about toxicology	@ToxAndHound	2,324
Zlatan Coralic, EMP	@ZEDPharm	769

Table G-3. Emergency Medicine Podcasts, Blogs, and Websites

Organization	Description
Academic Life in Emergency Medicine (ALiEM)	ALiEM's website houses online educational platforms, virtual communities, and podcasts for practitioners in emergency medicine.
American College of Emergency Physicians (ACEP)	ACEP produces the podcast ACEP Frontline, which discusses current topics in emergency medicine.
American Society of Health-System Pharmacists (ASHP)	The ASHP Resource Center on Emergency Care compiles resources that pharmacists of all experience levels may find helpful for developing their practice, expanding

	their knowledge base, and keeping up-to-date on new developments within the specialty.
ASHP Emergency Preparedness	ASHP Emergency Preparedness provides information and resources related to preparing for and responding to the emergencies that can affect health systems and other acute and ambulatory centers. The documents found in this library help individuals plan for natural disasters and other emergencies.
Annals of Emergency Medicine	*Annals of Emergency Medicine* produces podcasts, which are available through the journal's website.
CanadiEM	This website offers an online community for emergency medicine health care providers and provides educational resources.
Core Emergency Medicine	This website for emergency medicine health care providers offers a podcast, core procedures videos, journal reviews, and a blog.
EM Basic	EM Basic has produced a series of podcasts that review the basics of emergency medicine through patient scenarios.
EMCrit	EMCrit brings evidence-based information from the fields of critical care, resuscitation, and trauma and translates it for bedside use in the emergency department and the intensive care unit. The website posts podcasts, blogs, and links. Continuing medical education (CME) credit is available for EMCrit Podcasts.
Emergency Medicine Cases	This is a free, online medical education podcast, medical blog, and website dedicated to providing online emergency medicine education and CME credit.
Emergency Medicine PharmD	Emergency Medicine PharmD publishes blogs and podcasts related to the practice of pharmacy within emergency medicine.
Emergency Medicine Reviews and Perspectives (EM:RAP)	EM:RAP is a monthly audio series for emergency medicine practitioners.
Erowid	Erowid provides access to reliable, nonjudgmental information about psychoactive plants, chemicals, and related issues.
Free Open Access Emergency Medicine-Core Content (FOAMcast)	Free Open Access Medical (FOAM) education includes podcasts, blogs, articles on PubMed Central, conferences streamed for free, and reviews and references.
Google FOAM Search	Links to Free Open Access Medical education.
Life in the Fastlane	This website provides links to online libraries, blogs, self-assessment questions, and podcasts related to emergency medicine.
The Bottom Line	This is a compendium of landmark papers shaping the way practitioners manage critically ill patients.

The NNT	The NNT (Number-Needed-to-Treat) Group provides Quick summaries of evidence-based medicine.
The Poison Review	The website offers updates and evaluations of recent scientific literature, news stories, and cultural events related to the field of medical toxicology.
The Skeptics' Guide to Emergency Medicine (SGEM)	SGEM uses social media to deliver valid, reliable, and unbiased global sources of currently clinically relevant, patient-centered emergency medicine information. It consists of a weekly podcast, blog, Facebook page, Twitter feed, and YouTube channel.
Taming the SRU (Shock Resuscitation Unit)	This website posts blogs and other resources for emergency medicine practitioners.
ToxNow	ToxNow hosts the ToxTalk podcast of the Division of Toxicology, Department of Emergency Medicine at the University of Massachusetts Medical School.
ToxTidbits	The University of Maryland School of Pharmacy Poison Center website provides up-to-date toxicology information and educational tools for patients and health care providers.

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

Journals

Issues of interest in emergency medicine pharmacy practice span many areas of pharmacy practice and topics in emergency medicine research, clinical care, and health promotion. Many emergency medicine pharmacy and primary care practice journals consistently publish articles highlighting evidence, outcomes, and contributions to patient care through emergency medicine pharmacy practice. Examples of such journals include:

- ***Academic Emergency Medicine*** – This monthly, peer-reviewed journal is the official publication of the Society for Academic Emergency Medicine and publishes articles, abstracts, commentaries, and other materials relevant to the practice, educational advancements, and investigation of emergency medicine.
- ***American Journal of Emergency Medicine*** – This monthly journal includes information to help increase the ability to understand, recognize, and treat emergency conditions. Issues contain clinical articles, case reports, review articles, editorials, international notes, book reviews, and other articles.
- ***Annals of Emergency Medicine*** – This monthly journal of the American College of Emergency Physicians is an international, peer-reviewed publication. Original research, clinical reports, opinion, and educational information related to the practice, teaching, and research of emergency medicine are published in the journal.

- ***Clinical Pediatric Emergency Medicine*** – This journal is devoted to helping pediatricians and emergency physicians provide the best possible care for their young patients. Each topical issue focuses on a single condition frequently seen. Review articles synthesize practical new advances in the field giving readers the authoritative guidance on disease process, diagnosis, and management needed to achieve the best results.
- ***Clinical Toxicology*** – This journal publishes peer-reviewed scientific research and clinical advances in clinical toxicology.
- ***Emergency Medicine Journal (EMJ)*** – This is an international peer-reviewed journal covering pre-hospital and hospital emergency medicine and critical care. *EMJ* publishes original research, evidence-based reviews, and commentaries. This journal is aimed at doctors, nurses, paramedics, and ambulance staff.
- ***Hospital Pharmacy*** – This peer-reviewed journal is published monthly. It promotes best practices and medication safety, including essential information on medication errors, adverse reaction reporting, formulary drug reviews, original research, current U.S. Food and Drug Administration–related drug information, off-label drug uses, and new technology.
- ***Journal of Emergency Medicine (JEM)*** – This is an international, peer-reviewed publication featuring original contributions of interest to both the academic and practicing emergency physician. Published monthly, *JEM* contains research papers and clinical studies as well as articles focusing on the training of emergency physicians and on the practice of emergency medicine. *JEM* is the official journal of the American Academy of Emergency Medicine.
- ***Journal of Medical Toxicology (JMT)*** – This international, peer-reviewed journal is dedicated to advancing the science and practice of medical toxicology, a medical subspecialty focusing on the diagnosis, management, and prevention of poisoning/toxicity and other adverse health effects resulting from medications, chemicals, occupational and environmental substances, and biological hazards. *JMT* publishes original articles, illustrative cases, review articles, and other special features.
- ***Journal of Trauma and Acute Care Surgery*** – This journal provides the scientific basis to optimize care of the severely injured and critically ill surgical patient. The journal includes basic and translational research, randomized prospective clinical studies, systematic reviews, guidelines, and algorithms. It is the official journal of the American Association for the Surgery of Trauma.
- ***Pediatric Emergency Care*** – This journal features clinically relevant original articles with an emergency medicine perspective on the care of acutely ill or injured children and adolescents. The journal is aimed at both the pediatrician who wants to know more about treating and being compensated for minor emergency cases and the emergency physicians who must treat children or adolescents.

- ***Resuscitation*** – This is the official journal of the European Resuscitation Council. It is a monthly international and interdisciplinary medical journal that deals with the etiology, pathophysiology, and prevention of cardiac arrest, resuscitation training, clinical resuscitation, and experimental resuscitation research.
- ***Western Journal of Emergency Medicine (WestJEM)*** – The official journal of the California American College of Emergency Physicians, American College of Osteopathic Emergency Physicians, and the California chapter of American Academy of Emergency Medicine focuses on how emergency care affects health and health disparities in communities and populations. Additionally, *WestJEM* focuses on how social conditions impact the composition of patients seeking care in EDs worldwide. *WestJEM* publishes six full-text online issues and four print issues per year.

Emergency medicine pharmacy columns and features are also published periodically in the *American Journal of Health-System Pharmacy (AJHP)*, *Annals of Pharmacotherapy, BMJ Quality & Safety, International Journal of Pharmacy Practice, Journal of the American College of Clinical Pharmacy (JACCP), Journal of Pharmacy Practice,* and *Pharmacotherapy,* as well as many other general medical journals.

- *AJHP* is the official publication of the American Society of Health-System Pharmacists (ASHP). It publishes peer-reviewed scientific papers on contemporary drug therapy and pharmacy practice innovations in hospitals and health systems.
- *Annals of Pharmacotherapy* is a peer-reviewed journal that publishes research articles, review articles, commentaries, and editorials around the most efficient, safe, and cost-effective pharmacotherapy for the treatment and prevention of various illnesses. Three EMPs are on the editorial panel.
- *BMJ Quality & Safety* is a publication based in the United Kingdom that provides news, opinion, debate, and research for academics, clinicians, health care managers, and policy makers with the overall goal of improving patient care.
- *International Journal of Pharmacy Practice* is a peer-reviewed, international journal publishing health services research in the context of pharmacy, pharmaceutical care, medicines, and medicines management. The journal features editorials, literature reviews, original research, personal opinion, and short communications.
- *JACCP* is an official journal of the American College of Clinical Pharmacy (ACCP) devoted to clinical pharmacy in all practice settings. *JACCP* publishes original research, review articles, editorials, letters to the editor, official ACCP statements and papers, ACCP abstracts, and Board of Pharmacy Specialties recertification modules.
- *Journal of Pharmacy Practice* is a peer-reviewed journal that offers practicing pharmacists reviews and research trials and surveys of new drugs and novel therapeutic approaches, pharmacotherapy reviews and controversies, pharmacokinetics, drug

interactions, drug administration, adverse drug events, medication safety, pharmacy education, and other pharmacy practice topics. Three EMPs are on the editorial panel.

- *Pharmacotherapy* is an official journal of ACCP. It publishes peer-reviewed, scientific, and professional information and knowledge to improve patient outcomes through optimal pharmacotherapy.

Newsletters and Online Periodicals

Professional pharmacy practice associations publish a variety of print and online media that disseminate emergency medicine practice information. The ACCP Emergency Medicine Practice and Research Network (PRN) and ASHP Connect for EMP members provide educational opportunities and promote information exchange. The ASHP Section Advisory Group on Emergency Care maintains an online resource center for pharmacists practicing in emergency care.

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

As of March 31, 2019, 188 relevant articles related to emergency medicine pharmacy practice have been published in the professional literature that support the tenets of this petition. The prevalence of articles in pharmacy and medical journals focusing on emergency medicine pharmacy practice and patient care by EMPs provides further evidence of this emerging specialty. A bibliography of all articles and resources published on specialized emergency medicine pharmacy practice and related issues is attached as Appendix G-1.

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

EMPs in a variety of settings are demonstrating and publishing positive clinical and economic outcomes resulting from effective management of emergency medicine patients. Their collective work provides support for the validity of this proposed specialty. A detailed overview of the top 45 pivotal articles, as determined by the emergency medicine experts from the petitioning organizations, is attached as Appendix G-2.

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

The specialized knowledge required for EMPs is transmitted through a variety of methods, including symposia, live and web seminars, interactive workshops, and enduring resources. Each year, national and state health care associations, schools and colleges of pharmacy, and for-profit educational companies offer live and enduring programming to disseminate the latest evidence for managing the unique needs of ED patients and share innovations in specialized emergency medicine pharmacy practice. Hundreds of hours of programs are available annually to EMPs through local, regional, and national meetings and events; web-based programs; and online learning.

According to the Accreditation Council for Pharmacy Education (ACPE) Pharmacists' Learning Assistance Network (PLAN) database, providers of ACPE-approved continuing pharmacy education (CPE) have collectively offered over 60 hours of emergency medicine programming over the past 3 years (March 31, 2016–March 31, 2019). This programming includes:

- 8 programs with 11.5 hours of live, knowledge-based programs. A complete listing of these ACPE-approved activities is provided as Appendix G-3.
- 14 programs with 17.5 hours of live, application-based programs. A complete listing of these ACPE-approved activities is provided as Appendix G-4.
- 9 programs with 16.13 hours of home study, knowledge-based programs. A complete listing of these ACPE-approved activities is provided as Appendix G-5.
- 3 programs with 17 hours of home study, application-based programs. A complete listing of these ACPE-approved activities is provided as Appendix G-6.

Sample program materials from select live educational activities are attached as Appendix G-7 and include programming from the following events:

- 2018 ASHP Midyear Clinical Meeting and Exposition provided 16 hours of relevant CPE credit. Presentations from the following sessions are included in Appendix G-7:
    - Break Free from the Cycle: Steps to Implementing an Opioid-Sparing Emergency Department
    - Drug Dosing in the Obese Emergency Department Patient: How High Can You Go?
    - Pharmacists in the Emergency Department: Heroes Antimicrobial Stewardship Needs
- 2018 ACCP Global Conference on Clinical Pharmacy provided 3 hours of relevant CPE credit:
    - A Pharmacist's Recipe for Disaster: How to Prepare for the Worst, Do Your Best, and Pick Up the Pieces When Disaster Strikes
    - Emergency Medicine PRN Focus Session – Expanding the Horizon of Emergency Medicine Pharmacy Practice in the United States and Abroad

- 2017 ACCP Annual Meeting
    - Emergency Medicine PRN Focus Session – Code Breakpoint: A Guide to Combat Stress and Burnout in the Acute Care Pharmacist
- 2016 ACCP Annual Meeting
    - Emergency Medicine PRN Focus Session – Got Evidence? Do Ketamine, NOAC Reversal Agents, and Icatibant Do the Body Good?

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.

Live, national events are one mechanism for dissemination of knowledge to EMPs. Over the last 3 years, national organizations that provide programming to advance the education and training of EMPs have collectively hosted 22 live educational events with approximately over 1,358 attendees across all programs. Recognizing that pharmacists attend multiple programs, the total number of attendees does not equate to the number of unique participants. Program participation reflects the strong interest in programming for EMPs. Table G-4 outlines these programs and attendance, where available.

Table G-4. Emergency Medicine Pharmacist Educational Programming and Attendance

Sponsoring Organization	Emergency Medicine Pharmacy Programming and Attendance
American College of Clinical Pharmacy	2016 – 1 program; 111 certificates of credit issued 2017 – 1 program; 121 certificates of credit issued 2018 – 2 programs; 141 certificates of credit issued
American Society of Health-System Pharmacists	2016 – 5 programs; 291 certificates of credit issued 2017 – 8 programs; 447 certificates of credit issued 2018 – 5 programs; 247 certificates of credit issued

Additional Mechanisms for Dissemination of Knowledge

In addition to the methods discussed in each of the guidelines above, enduring publications and professional award programs serve an important function in the dissemination of knowledge in the proposed specialty.

Nonperiodical Publications

Many enduring publications and resources have been developed to enhance the skills and knowledge of EMPs. Examples of such publications include:

- *Emergency Management of Infectious Diseases, 2nd edition* – This book provides detailed information about the diagnosis and management of infectious diseases frequently encountered by ED practitioners.
- *Emergency Medicine News* – This independent news magazine for emergency physicians provides advances, trends, and issues within emergency medicine. It features comprehensive special reports, profiles, and editorials.
- *Goldfrank's Toxicologic Emergencies, 10th edition* – This book is a source for poisoning and overdose; it provides information on every aspect of toxicologic emergencies, from pharmacology to clinical presentation to management.
- *Harwood-Nuss' Clinical Practice of Emergency Medicine, 6th edition* – This book provides a clinically focused and evidence-based summary of emergency medicine. The chapters guide the reader through clinical presentation, differential diagnosis, evaluation, management, and disposition of a full range of complaints and conditions seen in the ED with highlighted critical interventions and common pitfalls.
- *Marino's The ICU Book, 4th edition* – This book provides current and practical guidance in critical care. The text addresses both the medical and surgical aspects of critical care, delivering the guidance needed to ensure sound, safe, and effective treatment for patients in intensive care regardless of the specialty focus of the unit.
- *National Library of Medicine Chemical Hazards Emergency Medical Management (CHEMM)* – This web-based resource was created by the U.S. Department of Health and Human Services to enable first responders, first receivers, other health care providers, and planners to plan for, respond to, recover from, and mitigate the effects of mass-casualty incidents involving chemicals.
- *Poisoning and Drug Overdose, 7th edition* – This book was designed for speed of use during toxicologic emergencies. This instant-answer guide delivers information on the effective diagnosis and treatment of drug-related emergencies and chemical exposures.
- *Rosen's Emergency Medicine: Concepts and Clinical Practice, 9th edition* – This book provides comprehensive information to guide the clinical practice of emergency medicine.
- *Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8th edition* – This book provides coverage of emergency medicine that reflects the complexity and expertise needed to practice emergency medicine successfully in today's fast-paced environment.

Professional Awards

Professional awards have recognized EMPs for their contributions to the profession and advancing clinical practice in emergency medicine. These awards, and their recipients, are outlined in Table G-5.

Table G-5. Emergency Medicine Pharmacist Recipients of National Professional Awards

Organization/Award	Description	Year/Recipient
American College of Clinical Pharmacy (ACCP): Education Award	The Education Award recognizes an ACCP member who has shown excellence in the classroom or clinical training site, conducted innovative research in clinical pharmacy education, demonstrated exceptional dedication to continuous professional development, or shown leadership in the development of clinical pharmacy education programs.	2003 Joseph A. Barone
ACCP: New Clinical Practitioner Award	This award recognizes a new clinical practitioner who has made outstanding contributions to the health of patients and/or the practice of clinical pharmacy.	2015 Megan Musselman 2014 Nicole M. Acquisto 2012 Asad Patanwala
American Society of Health-System Pharmacists (ASHP): Best Practices Award	Since 1999, the Best Practices Award program recognizes outstanding practitioners in pharmacy who have successfully implemented innovative systems that demonstrate best practices in pharmacy practice.	2018 Pharmacists Led Emergency Department Opioid Task Force: 50% Reduction in Overall Use – University of Rochester Medical Center, Rochester, NY 2016 Optimizing the Management of Patients Presenting to the Emergency Department With Atrial Fibrillation: Pharmacists at the Center of a New Treatment Paradigm – University of North Carolina Health Care, Chapel Hill, NC 2009 Enhancing Antimicrobial Therapy Through a Pharmacist-Managed Culture Review Process in an Emergency Department Setting – Carolinas Medical Center – NorthEast, Concord, NC 2008 Pharmacists Enhancing the Time to Cardiac Catheterization Laboratory and Patient Safety During Acute Myocardial Infarction Presentation to the Emergency Department – University of Rochester Medical Center, Strong Health, Rochester, NY

		2008 Implementing a Comprehensive Emergency Department Pharmacist Program – VA San Diego Healthcare System, San Diego, CA 2008 Pharmacists in the Emergency Department Prove to Be an Integral Part of the Healthcare System – Advocate Christ Medical Center, Oak Lawn, IL 2006 A Prescription for Advancing Pharmacy Services in the Emergency Department – Advocate Christ Medical Center, Oak Lawn, IL 2005 Pharmacists Enhancing Patient Safety During Trauma Resuscitations – University of Rochester Medical Center – Strong Memorial Hospital, Rochester, NY 2003 Transcending Traditional Practice Boundaries: Providing Pharmaceutical Care in the Emergency Department – The Medical Center of Aurora, Aurora, CO
ASHP Research and Education Foundation Pharmacy Residency Excellence Awards: New Preceptor Award	The Pharmacy Residency Excellence Awards recognize excellence and leadership in the training and mentoring of pharmacy residents. The New Preceptor Award is specifically for an individual who has served 3 to 5 years as a preceptor.	2015 Suprat Saely Wilson 2013 Nicole Acquisto
ASHP Foundation: Award for Excellence in Medication Safety	This nationally acclaimed awards program recognizes outstanding pharmacist leadership, teamwork, innovation, and patient outcomes that demonstrate improvements in patient safety within a medication use system in a hospital or health system.	2018 Transitioning to an Opioid-Light Emergency Department – Baptist Memorial Hospital, Memphis, TN

		2012 The PILL Service: Enhancing Medication Safety After Hospital Discharge – VA Boston Healthcare System, West Roxbury, MA 2005 (Finalist) Use of Vasoactive Medications in Emergency Settings – Sutter Medical Center, Sacramento, CA
ASHP Foundation: Award for Innovation in Pharmacy Practice	This annual award is for outstanding contribution to the biomedical literature that describes an innovation in pharmacy practice in hospitals or health systems.	2014 Emergency Department Discharge Prescription Interventions by Emergency Medicine Pharmacists – Joseph L. Cesarz, Aaron L. Steffenhagen, James Svenson, and Azita Hamedani 2010 Implementing a Comprehensive, 24-Hour Emergency Department Pharmacy Program – Victoria E. Aldridge, Helen K. Park, Mark Bounthavong, and Anthony P. Morreale
ASHP Foundation: Pharmacy Practice Research Award	This annual award honors original, significant contributions to biomedical literature related to pharmacy practice in hospitals and health systems.	2013 A Prospective, Multicenter Study of Pharmacist Activities Resulting in Medication Error Interception in the Emergency Department – Asad E. Patanwala, Arthur B. Sanders, Michael C. Thomas, Nicole M. Acquisto, Kyle A. Weant, Stephanie N. Baker, Erica M. Merritt, and Brian L. Erstad

References

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[3] Eppert HD, Reznek AJ; American Society of Health-System Pharmacists. ASHP guidelines on emergency medicine pharmacist services. *Am J Health Syst Pharm*. 2011;68(23):e81-95.
[4] American Society of Health-System Pharmacists. ASHP statement on pharmacy services to the emergency department. *Am J Health Syst Pharm*. 2008;65(24):2380-3.

Appendix A-1

Domains of Practice for BPS Specialties

Appendix A-1. Domains of Practice for BPS Specialties

Emergency Medicine	Cardiology[1]	Critical Care[2]	Geriatric	Infectious Diseases[3]	Pediatrics[4]	Pharmacotherapy[5]
Domain 1: Patient Care/Management Task Statements Tasks include participating in the bedside management of medical emergencies (e.g., trauma, stroke, psychiatric, toxicological) and resuscitations to optimize the medication use process; identifying and prioritizing (triage) ED patients by analyzing the relevant acuity indices and opportunities for optimization of pharmacotherapy; collecting essential patient information (including patient history, medication use) by utilizing available resources (e.g., pre-hospital providers); identifying and evaluating medication-related problems based on clinical presentation, available history, or laboratory data;	*Domain 1: Patient Management and Therapeutics* Tasks include collecting and organizing both patient-specific and condition-specific data (e.g., patient history, comorbidities, pertinent physical findings, laboratory data, diagnostic testing) necessary to design a pharmacotherapeutic plan for a patient with or at risk for cardiovascular disease; performing targeted cardiovascular physical assessments (e.g., weight changes, presence of edema, breath sounds) to more fully assess patient conditions; interpreting, analyzing, and integrating all collected information, including patient-specific and data generated from cardiovascular	*Domain 1: Clinical Knowledge and Application* Tasks include collecting information about a patient's present illness, allergies, and past medical, surgical, social, and family histories by using interviews and medical records to ensure safe and effective use of medications; performing a comprehensive reconciliation of a patient's current and past medications by using data collected from interviews and medical records to determine the pharmacotherapy plan; integrating relevant data from physical examinations, vital signs, laboratory studies, imaging studies, procedures, advanced critical care monitoring, and other pertinent information by using clinical	*Domain 1: General Principles of Aging* Tasks include applying the knowledge of physiologic changes associated with aging to the clinical use of medications (e.g., pharmacokinetics, pharmacodynamics); evaluating the interrelationship between social issues and aging on health care decisions; assessing financial/reimbursement issues when making therapeutic recommendations; discussing the philosophy and practice of hospice and palliative care; integrating ethnic, racial, and cultural factors into health care decisions; identifying the impact of culture on care decisions and quality of life; identifying the impact of ageism on care decisions and quality of life; describing the	*Domain 1: Patient Care and Therapeutics* Tasks include collecting and organizing 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; identifying and recommending additional tests/procedures which need to be performed in order to design an infectious diseases pharmacotherapeutic plan; interpreting, analyzing, and integrating patient-specific information, disease-specific information and microbiologic and laboratory reports in order to design an infectious disease pharmacotherapeutic	*Domain 1: Patient Management* Tasks include collecting patient-specific information on which to base safe and effective medication therapy; analyzing and interpreting collected patient information; identifying and prioritizing current or potential patient-specific medical, medication, and nutrition related problems. Establish therapeutic goals with healthcare team and patient/caregivers; designing, recommending, implementing, and documenting age and developmentally appropriate cost-effective therapeutic regimen with healthcare team and patient/caregivers; designing and implementing a plan to monitor the safety and efficacy of a therapeutic regimen,	*Domain 1: Patient-Centered Pharmacotherapy* Tasks include developing patient-centered pharmacotherapy plans by assessing evidence and patient-specific information in order to optimize treatment; disseminating pharmacotherapy plans to patients, caregivers, and interprofessional team members using appropriate forms of communication and patient education strategies in order to optimize outcomes; implementing pharmacotherapy plans in order to optimize outcomes; monitoring pharmacotherapy plans by collecting and analyzing patient-specific data in order to assess patient response; and coordinating pharmacotherapy

contributing to the formulation of a differential diagnosis in the setting of limited information; designing a pharmaceutical care plan utilizing available patient-specific information and best available evidence to provide patient and family-centered care; recommending and supporting implementation of the pharmaceutical care plan in the ED; expediting the preparation/procurement and administration of time-sensitive therapeutic regimens; making evidence-based recommendations for alternative routes of administration; monitoring and evaluating a patient's response to initial therapy and re-designing treatment plan as necessary; serving as the primary source of drug information for all practitioners and patients within the ED; ensuring	diagnostic tests (e.g., ECG, echocardiogram), to assess and prioritize current or potential medical or medication-related problems; collaborating as a member of a multidisciplinary team to establish and prioritize patient-specific therapeutic goals and plans for the patient with or at risk for cardiovascular disease; designing/modifying, recommending, and implementing an individualized pharmacotherapeutic plan for a patient with or at risk for cardiovascular disease, based on patient- and condition-specific data and best available evidence; designing/modifying, recommending, and implementing a monitoring plan for a patient with or at risk for cardiovascular disease, to assess response to pharmacotherapeutic regimens, progress	reasoning to comprehensively assess a patient's physiological condition and severity of illness; developing therapeutic regimens by using patient-specific data and evidence-based medicine to implement a prioritized pharmacotherapy plan that ensures optimal resource utilization and patient outcomes; collaborating as a member of an interprofessional team by using effective strategies to establish patient- and family-centered goals of care; facilitating the administration of medications to patients by assessing availability, route, compatibility, stability, and medication delivery technology to ensure timeliness, safety, and effectiveness; monitoring a patient's response to therapeutic regimens by using appropriate data in order to	interrelationship between an older adult and their formal and informal caregivers; communicating medication information to older patients, their caregivers, and the interprofessional team; and educating older adults and caregivers according to their communication barriers.	plan; designing/modifying, recommending, and implementing an appropriate infectious disease pharmacotherapeutic plan based on patient-specific data, antibiogram data, and best available evidence; designing/modifying, recommending, and implementing a monitoring plan to assess patient's response to and potential adverse outcomes of infectious disease pharmacotherapeutic plan; developing preventative or a post-exposure therapy plan for patients with increased risk for infection; and educating and providing 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	and adjust as necessary; participating in the management of pediatric emergencies (e.g., NRP, PALS); reconciling medications as necessary across the continuum of care including on admission, transfer, discharge, and during outpatient encounters; identifying and managing barriers to successful transitions of care (e.g., social barriers, prior authorization, payment considerations); and identifying patients with needs beyond the scope of the pediatric pharmacy specialist and refer as appropriate (e.g., emergency department, urgent care, specialists).	plans with patients, caregivers, and interprofessional team members through ongoing collaboration and assessment of patient-specific information in order to ensure safe and effective transitions of care.

continuity of care during healthcare transition and across levels of care; and identifying and seeking appropriate outside resources available to assist in the management of the ED patient.	toward therapeutic goals and potential adverse outcomes; providing individualized education and counseling to patients and caregiver(s) regarding the cardiovascular pharmacotherapeutic plan, and assessing comprehension; facilitating access to care and treatment for the patient with or at risk for cardiovascular disease; and documenting direct patient care activities.	evaluate progress toward the goals of care, modify the plan of care as needed, and minimize adverse outcomes; and communicating pertinent information by using effective oral and written strategies to ensure continuous and quality care.		infectious disease pharmacotherapeutic plan.		
Domain 2: Practice Management Task Statements Tasks include anticipating, monitoring, detecting, reporting, and reviewing adverse drug events and medication errors; recognizing trends, system failures, and gaps in the medication use process, and performing quality assurance activities (e.g., MUE) that	*Domain 2: Information Management and Education* Tasks include evaluating and critiquing cardiovascular biomedical literature with regard to study design and methodology, statistical analysis, significance of reported data and conclusions, and applicability of study results to patients	*Domain 2: Practice Management, Policy, and Quality Improvement* Tasks include implementing operational and clinical pharmacy services consistent with best practices to promote appropriate and efficient medication use; promoting the role and optimal use of critical care pharmacists to key stakeholders by	*Domain 2: Person-Centered Care* Tasks include interpreting basic cognitive, mental, functional, physical, and safety assessments for common diseases and conditions; assessing a medication regimen and medical history for medication-related problems (e.g., potentially inappropriate medication, underuse, duplication,	*Domain 2: Education, Research and Scholarship* Tasks include providing infectious diseases education, training, and mentorship for pharmacy students, residents, and fellows; and pharmacists; providing education and guidance to professionals and/or trainees in other health professions concerning infectious diseases	*Domain 2: Practice Management and Medication Safety* Tasks include developing and implementing systems to ensure appropriate drug delivery throughout the medication use process; collaborating in the selection, implementation, and maintenance of equipment/technolog y and decision support involved in the medication use	*Domain 2: Drug Information and Evidence-Based Medicine* Tasks include retrieving information that addresses pharmacotherapy-related inquiries in order to optimize patient care; evaluating pharmacotherapy-related literature, databases, and health information in order to translate findings into practice;

promote safe and effective medication use; ensuring a process to maintain and optimize inventory and availability of medications essential to provide timely care in the ED; ensuring an appropriate process exists for medication order review in the ED; assisting the organization in achieving compliance with accreditation, legal, regulatory, and safety requirements related to the medication use process; contributing to contingency planning that addresses limited availability of critical drugs that affect patients in the ED (e.g., drug shortages, emergency preparedness); participating in emergency/disaster preparedness planning or response activities; developing, maintaining, monitoring, and supporting evidence-based medication use	with or at risk for cardiovascular disease; contributing to the cardiovascular body of knowledge (e.g., original research, review articles, case reports, abstracts); developing, modifying, and evaluating cardiovascular disease and medication education and training materials for specific learner groups; providing tailored cardiovascular disease and medication education and training to practicing pharmacists and pharmacy trainees (students, residents, and fellows); providing education and cardiovascular medication expertise to health professionals and other pertinent stakeholders.	documenting performance metrics, quality improvement, safety, and clinical interventions to demonstrate cost effectiveness and to maintain and expand services; perform quality improvement activities by reviewing current practices and conducting a needs analysis to enhance the safety and effectiveness of medication use processes; evaluating compliance with institutional policies, accreditation standards, and regulatory requirements by auditing current practices to ensure integrity and quality of care; collaborating with interprofessional groups by serving on committees and contributing to local, regional, and national initiatives to improve quality of care; developing formulary management strategies through the Pharmacy and Therapeutics Committee and other	affordability); interpreting clinical findings (e.g., physical assessment, review of systems, labs, imaging); incorporating functional status into therapeutic decision-making; prioritizing care based upon severity of illness, patient preference, quality of life, and time to benefit; identifying patients who need referrals to other health and non-health professionals; assessing the older adult for iatrogenic conditions (e.g., immobility, delirium, medication side effects, malnutrition, pressure injuries, procedures, hospital-acquired infections); evaluating self-care capacity (e.g., medication self-administration, drug delivery devices, adherence aids); identifying individuals who display signs or symptoms of common diseases and conditions in older adults; defining therapeutic goals	pharmacotherapy; 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; contributing to infectious diseases body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process); and participating in continuous professional development related to infectious diseases pharmacy practice.	process; developing and maintaining a preferred formulary and ensure appropriate pediatric dosing is incorporated in all formulary monographs; adopting, adapting or developing evidence-based practice guidelines and protocols for the management of pediatric patients in accordance with health system policies and procedures; anticipating, preventing, reviewing, and reporting medication use events (e.g., trigger review, root cause analysis, failure mode and effects analysis, MedWatch, Vaccine Adverse Event Reporting System [VAERS]) in order to assess need for system changes; performing continuous quality improvement activities aimed at enhancing safety and cost-effectiveness of medication us; and documenting the clinical and financial	conducting pharmacotherapy-related research using appropriate scientific principles in order to ensure optimal patient care; and disseminating pharmacotherapy-related information and/or research in order to educate healthcare professionals and trainees.

guidelines and pathways in order to assure safe and cost-effective medication use; identifying and implementing opportunities for practice advancement and growth within the ED (e.g., collaborative practice agreements, public health initiatives, expanded coverage); advocating for and justifying emergency medicine pharmacy services; serving as a liaison on committees to represent the interests of pharmacy and ED patients.		appropriate channels to improve cost effectiveness, resource utilization, and risk mitigation; and optimize health information technology by using clinical informatics to improve pharmacotherapeutic decision support and minimize patient harm.	incorporating person-specific principles (e.g., age, functionality, patient preference, culture); determining therapeutic options and the risk/benefit to the patient (e.g., no treatment, non-pharmacologic interventions, pharmacologic interventions); recommending a person-specific treatment plan (e.g., medication therapy management); resolving and/or prevent medication-related problems in the older adult; incorporating life expectancy and end-of-life issues in the decision-making of appropriate use of medications; developing a person-specific plan for monitoring safety, effectiveness, and quality of life; implementing a person-specific monitoring plan; revising therapeutic plans based upon changes in patient status; explaining		impact of pediatric pharmacy services.	

			appropriate use of self-monitoring devices; identifying educational needs specific to the patient/caregiver; recommending educational materials appropriate to the specific patient/caregiver needs; educating patient/caregiver regarding potential risk/benefit related to the medication regimen; educating the patient/caregiver on the importance of medication adherence; explaining appropriate use of drug delivery systems/devices; documenting care plan recommendations using standard techniques and formats (e.g., SOAP notes); and documenting rationale, interventions, and outcomes from medication therapies.			
Domain 3: Education and Research Task Statements	*Domain 3: Practice Development and Administration*	*Domain 3: Evidence-Based Medicine, Scholarship, Education, and*	*Domain 3: Population and Public Health* Tasks include	*Domain 3: Antimicrobial Stewardship and Practice Management*	*Domain 3: Information Management, Research, and*	*Domain 3: System-Based Standards and Population-Based Pharmacotherapy*

Tasks include providing emergency medicine-focused education, training, or mentoring for health care professionals and trainees; educating patients and caregivers using appropriate techniques tailored to the audience, with a focus on high risk medications or where the visit resulted from an adverse drug event; participating in continuous professional development related to emergency pharmacy practice (e.g., professional organizations, continuing education, clinical pharmacy networks); retrieving and critically evaluating biomedical literature and other sources with regard to study design methodology, statistical analysis, and applicability of study results to emergency medicine; and contributing to the body of knowledge in the field of emergency	Tasks include assisting the health system in achieving compliance with accreditation, legal, regulatory, and safety requirements related to the care of cardiovascular patients (e.g., The Joint Commission requirements, ASHP standards, Center for Medicare and Medicaid Services, National Committee for Quality Assurance, State Boards of Pharmacy, US Food and Drug Administration); performing or participating in quality improvement activities aimed at enhancing the safety and effectiveness of medication-use processes for patients with or at risk for cardiovascular disease; developing, reviewing, modifying and implementing policies, procedures, clinical pathways and protocols used in the care of patients with or at risk for cardiovascular disease; participating in the development	*Professional Development* Tasks include employing drug information skills by retrieving biomedical literature and evaluating design methodology, statistical analysis, and results to practice evidence-based medicine; contributing to the critical care body of knowledge by participating in research, delivering presentations, publishing, participating in the peer review process, or engaging in other scholarly activities to advance practice; providing interprofessional education through formal and informal methods of dissemination to improve awareness, understanding, and patient outcomes; educating patients and caregivers on medication therapy by using effective communication strategies to enhance	participating in interprofessional decision making regarding levels of care for individual patients; maintaining the continuity of treatment and communication across the spectrum of services and during transitions between care settings; facilitating medication reconciliation to improve transitions across the continuum of care and reduce readmissions; recommending resources to support older adults and caregivers; recommending evidence-based approaches for screening, immunizations, health promotion, and disease prevention for older adults; recommending interventions and behaviors that promote overall well-being of the person and caregiver (e.g., physical and mental health, nutrition, function, safety, social interactions,	Tasks include monitoring and evaluating institutional antimicrobial usage, susceptibility trends and/or infection rates; participating in the development of antibiogram(s) (e.g., institution-specific, unit-specific); developing/modifying institutional infectious disease treatment guidelines/pathways by incorporating national guidelines, surveillance data, and best available evidence; developing/modifying and recommending institutional policies to promote appropriate use of antimicrobials (e.g., formulary restrictions, criteria for use); collaborating in the development of institutional infection prevention policies; establishing collaborative relationships within the institution (e.g., microbiology, infection prevention, infectious diseases);	*Education* Tasks include educating healthcare professionals, trainees, and students concerning safe and effective use of medications and other issues related to the care of the pediatric patient; providing medication counseling to patients/caregivers regarding the safe and effective use of medications, adverse effects, and the importance of adherence to the treatment regimen; contributing to the pediatric body of knowledge (e.g., conduct or participate in research, deliver presentations, participate as a peer reviewer, publish); retrieving and interpreting biomedical literature with regard to study methodology, statistical analysis, study results, and applicability to pediatric pharmacy practice; and developing and maintaining a	Tasks include implementing effective medication use systems in order to improve system-based and population-based pharmacotherapy; incorporating health information technology within patient care processes in order to ensure effective medication use; employing safety systems in accordance with established standards in order to promote a safe medication use process; implementing public health initiatives that target recognized benchmarks in order to improve population health; implementing quality improvement programs in order to optimize system-based and/or population-based care; educating the public on the safe and effective use of medications in order to promote optimal pharmacotherapy; and educating healthcare

medicine.	and maintenance of the health system's formulary for medications used in the care of patients with or at risk of cardiovascular disease; participating in the establishment and modification of systems (i.e., technology and processes) to ensure the optimal use of cardiovascular medications; justifying and documenting clinical and financial value of cardiology pharmacy services as a means to continue current and advance future practice.	understanding; providing education for practicing pharmacists, post-graduate trainees, and students through didactic and experiential methods to promote best practice; mentoring pharmacists, post-graduate trainees, and students by using formal and informal methods to promote professional growth; and engaging in continuous professional development through activities such as self-assessment and service to professional organizations to maintain and enhance proficiency.	independence, quality of life); assessing specific risks to older adult safety; evaluating primary literature; evaluating the relevance of clinical practice guidelines, standards of care, and quality measures to geriatric care; applying the findings of research to the care of older adults; evaluating medication utilization at the system level to ensure safe, effective, and affordable drug therapy; disseminating results of research to target audience; assessing the level of an individual's health literacy; identifying educational needs for target audiences; developing educational programs/materials for target audiences; implementing educational programs for target audiences; evaluating the outcomes of an educational intervention; identifying reputable sources of	evaluating and fostering compliance with infectious diseases-related standards established by national accrediting and regulatory agencies (e.g., Joint Commission, CMS, NHSN); leading quality improvement initiatives (e.g., MUE, medication safety, timing of antibiotics) in the area of infectious diseases; and justifying and documenting clinical and financial value of infectious diseases pharmacy services.	pediatric-specific medical reference library.	professionals in accordance with regulations, standards, and best practices in order to ensure the safe and effective use of medications in systems and/or populations.

			information for the care of older adults; assessing formulary management protocols; conducting a cost-benefit analysis of medication therapy; developing systems to identify risk factors and prevention for adverse drug event or medication incidents/errors; applying systems to identify risk factors and prevention for adverse drug event or medication incidents/errors; developing protocols for managing high-risk medications; applying protocols for managing high-risk medications; developing strategies to prevent or resolve iatrogenic conditions.			
	Domain 4: Public Health and Patient Advocacy Tasks include providing information and guidance to the public regarding cardiovascular issues (e.g., risk factors, prevention,			*Domain 4: Public Health and Advocacy* Tasks include providing information to the public on infectious diseases, risk/benefits of antimicrobial therapy, and infection prevention;	*Domain 4: Public Health and Patient Advocacy* Tasks include advocating for public health initiatives to promote health, safety, and wellness; advocating for the availability of age-	

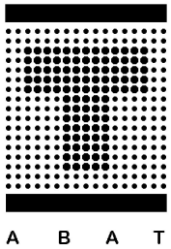
	treatment, screening); advocating for the role and contribution of cardiology pharmacists to the public, health care providers, health systems, and policy makers.			supporting public health services targeted at the prevention of infectious diseases (e.g., vaccines, HIV testing, STD education); advocating for adult and child vaccination; advocating for prudent antimicrobial use.	appropriate formulations, safety and efficacy studies, and product labeling; educating the public regarding the importance of health, safety, and wellness (e.g., poison prevention, vaccination, safe and effective medication use, antimicrobial stewardship, substance abuse/misuse); advocating for pediatric pharmacy practice and advanced training through professional organizations; and facilitating access to care and treatment in times of crisis (e.g., financial need, disaster, drug shortage, public health threat).	

[1] Board of Pharmacy Specialties. Content Outline for Cardiology Pharmacy Certification Examination. June 2017. Available at: https://www.bpsweb.org/wp-content/uploads/2017CardioContentOutline.pdf. Accessed January 7, 2019.
[2] Board of Pharmacy Specialties. Content Outline for Critical Care Pharmacy Certification Examination. September 2017. Available at: https://www.bpsweb.org/wp-content/uploads/CritCare_ContentOutlineForPublication20170913.pdf. Accessed January 4, 2019.
[3] Board of Pharmacy Specialties. Content Outline for Infectious Diseases Pharmacy Certification Examination. June 2017. Available at: https://www.bpsweb.org/wp-content/uploads/2017IDContentOutline.pdf. Accessed January 4, 2019.

[4] Board of Pharmacy Specialties. Content Outline for Pediatric Pharmacy Certification Examination. September 2017. Available at: https://www.bpsweb.org/wp-content/uploads/Pediatric_ContentOutlineForPublication20171017.pdf. Accessed January 4, 2019.
[5] Board of Pharmacy Specialties. Content Outline for Pharmacotherapy Certification Examination. September 2015. Available at: https://www.bpsweb.org/wp-content/uploads/bps-specialties/pharmacotherapy/pharma_fall.pdf. Accessed January 4, 2019.

Appendix B-1

Letters of Support



April 22, 2019

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

Dear Mr. Ellis:

On behalf of the American Board of Applied Toxicology (ABAT), I offer my support for recognition of Emergency Medicine (EM) Pharmacy Practice as a specialty certification through BPS. I have practiced as an EM pharmacist since 2008, served as Chair of the ASHP Section Advisory Group on Emergency Care 2017-2018, and am currently the president of ABAT.

When I was finishing my PGY-1 pharmacy residency year in 2006, I pursued a PGY-2 residency in EM. There were just four programs at the time. Though I chose a fellowship in clinical toxicology, EM pharmacy practice was always my passion. There are now over 60 PGY-2 EM residency training programs. Our specialty is endorsed by two major physician-led organizations, the American College of Emergency Physicians (ACEP) and the American College of Medical Toxicology (ACMT), through published position statements.

Emergency Medicine is a complex specialty in which pharmacists serve as front-line clinicians and a first point of contact for patients into the healthcare system. Their knowledge base is diverse, and their clinical acumen is crucial to caring for critical patients. Decisions are often guided by the best information available in a limited time frame. In addition to clinical care, EM pharmacists are integrated into all aspects of EM practice as described by the ASHP Guidelines on EM Pharmacist Services. As such, it is imperative that we have EM pharmacist experts practicing in Emergency Departments across the U.S. In the present-day environment, there are many EDs staffed with PGY-2 critical care and even PGY-1 trained pharmacists. In addition, current PGY-2 EM trained pharmacists have BCPS, BCCCP, DABAT, or other certifications because a focused EM certification is not available. It is time to have our own specialty certification that supports the unique skillset EM pharmacists possess.

The American Board of Applied Toxicology is a committee of the American Academy of Clinical Toxicology that was created to recognize non-physician clinical toxicologists. ABAT members are recognized as clinical toxicologists demonstrating exceptional knowledge, experience, and competence. Our board certification (DABAT) is held by several EM pharmacists and compliments the anticipated EM board certification based on our shared expertise and experience in the care of toxicology patients. We look forward to partnering with BPS on creating and maintaining toxicology components of the EM certification.

Sincerely,

Bryan D. Hayes, PharmD, DABAT, FAACT, FASHP

Bryan D. Hayes, PharmD, DABAT, FAACT, FASHP
President, American Board of Applied Toxicology
c/o American Academy of Clinical Toxicology
6728 Old McLean Village Drive
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Phone: 651-254-3563; Fax: 651-254-5216; Email: ABATPresident@clintox.org

April 1, 2019

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

Re: Petition to the Board of Pharmacy Specialties (BPS) for Recognition of Emergency Medicine Pharmacists (EMP) as Specialists

Dear Mr. Ellis:

I am very pleased to be able to support the petition for recognition of emergency medicine pharmacists (EMPs). I have a very personal history with emergency pharmacists. But first let me provide some background. I am the former chair of emergency medicine at the University of Rochester and a past president of the American College of Emergency Physicians (ACEP). I am currently the associate executive director for clinical affairs at ACEP. Soon after I assumed my chair position in 1993, I was 'given' a pharmacist to work in the emergency department. Although I had worked with several PharmDs in my prior role as a medical toxicologist, I had not encountered them in the emergency department. It took only a few short months for me to understand the invaluable role that the emergency pharmacist plays as a member of the emergency care team. They not only provide counsel on complex patients, they facilitate the care of time-sensitive conditions, anticipating the needs of the patients. They also reduce cost. Several of my faculty at Rochester studied the impact of the emergency pharmacist, proving scientifically that they reduced costs, reduced medication errors and were well accepted as members of the team by the nurses, attendings and residents. [redacted]

The American College of Emergency Physicians represents over 37,000 emergency physicians in the US and abroad. Emergency providers (nurses, PAs, NPs, and physicians) use a very wide spectrum of medications, many of them on a relatively rare basis. Because of the 24/7 nature of emergency departments, and because of the time-sensitive nature of our practice, it is impossible to have all our orders reviewed by a central pharmacy. This eliminates one of the important safeguards in medication administration. Even with access to digital resources (many of which don't work in the ED environment), errors can be made. In a study of graduating medical students at the University of Rochester, many students chose the wrong concentration and dose of epinephrine for a simulated patient in anaphylaxis because the cardiac dose generally comes up first on a google search. On my last clinical shift, the senior resident nearly made the same mistake on a real patient until stopped by the emergency pharmacist.

While invaluable as an active member of the team, is their expertise specialized enough to warrant recognition as a distinct specialty? This is nearly the same question that was raised by the American Board of Medical Specialties in the late 1970's as they debated the designation of emergency medicine as a defined specialty. Their finding then for physicians should be the same for emergency pharmacists. Emergency medicine is a unique blend of the initial treatment of all acute diseases, in all age groups and in all environments. It begins in pre-hospital, where we are beginning to understand that acute intervention in the first minutes or hours will not only determine the course of disease/injury, but in fact may be different than interventions provided hours later. No other group of pharmacists must understand these differences and the environment (extreme temperature, limited access) where care is provided. Care continues in the hospital where the number of time-sensitive diseases and injuries requires not only rapid and correct medication administration, but also operational design to facilitate flow within and outside the department. Our patients include some of the most complex and vulnerable patients. From the mechanical-assisted infant, to the frail elderly patient, to patients undergoing complex cancer treatments, to those who are at the end of life, to patients who have overdosed on multiple medications or chemicals, care must be provided rapidly, accurately and compassionately.

Sadly, we live in a time of mass casualty and terrorist events. The emergency pharmacist needs expertise in the area of emergency preparedness – its initial recognition and management, as well as public health. They must understand the distribution of resources and national plans for response. In recognition of their role, pharmacists now train with the national D-MAT teams who are deployed during times of disaster.

As I mentioned above, our team demonstrated that an emergency pharmacist could reduce errors and cost. They can also provide improved medication stewardship. While many pharmacists are trained in these areas, few are called upon to do them real-time and to provide interventions when the pharmacist is not at the bedside.

Finally, any area of specialty knowledge requires a rich research and scholarly base. Over the years, I have been asked to review research proposals provided by the American Society of Hospital-Based Pharmacists for their emergency department-based grants. The quality of the research has improved greatly over the years with a wide range of topics ranging from operations to comparative effectiveness. This, by itself, represents an excellent base of knowledge for the field.

ACEP has been strongly supportive of emergency pharmacists for many years. Our policy states:

> The emergency department (ED) is a complex environment presenting unique challenges for medication selection, dosing, administration, and monitoring. In particular, caring for high-risk populations such as the critically ill, geriatric patients, pediatric patients, those with limited healthcare access, and those with multiple comorbidities often requires the use of high-risk medications and the need for time-sensitive medication decisions.
>
> The American College of Emergency Physicians (ACEP) believes that pharmacists serve a critical role in ensuring efficient, safe, and effective medication use in the ED and advocates for health systems to support dedicated

roles for pharmacists within the ED. The emergency medicine pharmacist should serve as a well-integrated member of the ED multidisciplinary team who actively participates in patient care decisions including resuscitations, transitions of care, and medication reconciliation to optimize pharmacotherapy for ED patients. The exact delivery method for these services can vary among institutions depending on size, financial resources, presence of academic programs, and other factors.

ACEP encourages emergency medicine rotations for pharmacy residents and clinical research regarding pharmacist access in the ED.

In many hospitals, the observation unit is run by emergency medicine. We have additional policy that covers those settings.

From my personal background, to my role as an emergency physician leader, to my role now as the associate executive director of ACEP, I am personally very strongly in support of this petition. This petition is consistent with the policies of ACEP. In addition, I have spoken to the current president of ACEP, Vidor Friedman, MD, FACEP, who supports this petition and has approved this letter. Emergency pharmacists are our teammates in the ED. We value and require their specialized expertise to help us care for our patients.

Sincerely,

Sandra Schneider, MD, FACEP
Associate Executive Director, Clinical Affairs

cc: Evan Schwarz, MD, FACMT

Cleveland Clinic

Scott Knoer, M.S., Pharm.D., FASHP
Chief Pharmacy Officer

March 18, 2019

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

Dear Mr. Ellis:

I'm writing this letter in strong support for the recognition of emergency medicine pharmacy practice as a distinct specialized area of practice by the Board of Pharmacy Specialties. Emergency medicine pharmacists provide specialized care for a diverse patient population with medical needs that span multiple medical specialties and acuity levels. The provision of comprehensive bedside patient care in the emergency department requires a unique skill set and knowledge base to rapidly assess patient data to optimize patient outcomes and prioritize competing patient care needs. With increasing acuity and complexity of patient illness and associated pharmacotherapy regimens, the provider and patient demand for the clinical expertise of emergency medicine pharmacists has never been greater.

The first emergency medicine pharmacist at Cleveland Clinic was introduced in 2011 based on departmental needs as well as emergency medicine physician leadership requests for dedicated pharmacists. Within the first year, several additional emergency medicine pharmacist positions were established to expand hours of coverage to 16 hours each day until continuous coverage for 24 hours per day was introduced in 2017 after continued physician leadership requests. At present in 2019, the emergency medicine pharmacy team has grown to include 31 dedicated emergency medicine pharmacists at 15 hospitals in the Cleveland Clinic Health-System (CCHS) with two sites providing continuous coverage for 24 hours per day.

The demand for emergency medicine pharmacists at Cleveland Clinic has risen over the past several years in part due to recognized contributions to enterprise emergency medicine initiatives. Emergency medicine pharmacists have led numerous collaborative efforts with emergency medicine physicians to incorporate evidence-based medicine into protocol development and implementation at all CCHS emergency departments. For example, emergency medicine pharmacists have developed enterprise protocols for the use of multiple high-risk medication therapies ranging from fibrinolytic therapy in acute ischemic stroke and STEMI to uterotonic agents for emergent management of postpartum hemorrhage. Additional protocols and guidelines for the use of tranexamic acid in several hemorrhage scenarios, lipid rescue therapy for local anesthetic systemic toxicity, and neonatal alprostadil therapy for ductal-dependent cardiac anomalies were developed to optimize patient outcomes and patient safety with the use of high-risk medications in time-sensitive disease states.

Additionally, emergency medicine pharmacists are uniquely positioned to lead medication safety initiatives with enterprise implications. At Cleveland Clinic, emergency medicine pharmacists have proactively identified opportunities to optimize the safe use of epinephrine for hemodynamic support and anaphylaxis management through advanced clinical decision support and minimization of emergent bedside compounding. Emergency

medicine pharmacists also developed and implemented enterprise guidelines for the use of subdissociative-dose ketamine for analgesia and dissociative-dose ketamine for severe agitation with the intent of ensuring patient safety. Following implementation, usage was evaluated to ensure optimal patient outcomes and safety and additional protocol revisions were completed. Additional enterprise initiatives related to patient safety were completed to ensure each CCHS emergency department maintained a minimum inventory of critical medications and antidotes as part of a failure mode and effect analysis (FMEA) and to optimize medications available for emergent removal from automated dispensing cabinets prior to prospective order review by pharmacists.

Emergency medicine pharmacists have provided invaluable insight and leadership with the development of several antimicrobial stewardship initiatives at Cleveland Clinic. In 2017, enterprise pharmacists assumed responsibility of reviewing all positive microbiology results for discharged emergency department patients and subsequently collaborating with onsite physicians when changes to medication therapy are indicated. This responsibility was transitioned from advanced practice providers to emergency medicine pharmacists at CCHS emergency departments at the request of physician leadership in response to the recognition of pharmacist clinical expertise and contributions to antimicrobial therapy optimization. Additional stewardship efforts include introduction of treatment algorithms to guide rabies post-exposure prophylaxis treatment decisions and optimization of HIV post-exposure prophylaxis initiation and medication procurement for assault patients.

Recognition of the clinical expertise and contributions of emergency medicine pharmacists has led to several fundamental changes at the enterprise health-system level at Cleveland Clinic. Within the first few years of introducing dedicated emergency medicine pharmacists at several sites, physician leadership established an enterprise governance committee composed of emergency medicine physicians and pharmacists to standardize and optimize care at CCHS emergency departments. In 2019, an Emergency Medicine Specialty Panel comprised of emergency medicine pharmacists and physicians was formed as part of the existing enterprise Pharmacy and Therapeutics Committee to coordinate and review formulary requests. These enterprise changes are a direct result of health-system leadership demand for the clincal expertise of emergency medicine pharmacists.

The specialized knowledge and contributions of emergency medicine pharmacists are well-recognized at Cleveland Clinic. In closing, I fully support the national recognition of emergency medicine as a specialized practice area by the Board of Pharmacy Specialities based on significant demand for advanced clinical pharmacy services in emergency medicine. Recognition of emergency medicine pharmacy as a specialized practice by the Board of Pharmacy Specialties will undoubtedly help foster continued growth of emergency medicine pharmacy services nationally.

Best Regards,

Scott Knoer, M.S., Pharm.D., FASHP
Chief Pharmacy Officer
Cleveland Clinic

EMERGENCY NURSES ASSOCIATION

Committed to Care
ena.org

930 E. Woodfield Road
Schaumburg, Illinois 60173
847.460.4000

March 26, 2019

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

Dear Mr. Ellis:

On behalf of the Emergency Nurses Association (ENA) and our more than 43,000 members, I am pleased to add our support to the growing number of professional colleagues that believe the development of a pharmacist specialist board certification in Emergency Medicine through the Board of Pharmacy Specialties (BPS) will enhance patient outcomes.

ENA advocates for patient safety, develops industry-leading practice standards and guidelines, and guides emergency healthcare public policy. As such, ENA members value Board Certification of Emergency Medicine Pharmacy Specialists as an enhancement to patient safety and quality care, evidenced by robust participation in the Board of Certification for Emergency Nursing. We believe the requisite knowledge and experience that reduces clinical errors and improves quality is well demonstrated by board certified specialists. Most hospitals document compliance with conditions of participation that hospitals and critical access hospitals must meet to participate in the Medicare and Medicaid Programs through accreditation and certification standards.

What value would BPS-Certified Emergency Medicine Pharmacy Specialists bring to hospitals and patients seeking emergency care? Emergency departments (ED) have long been viewed as America's "safety net" for persons with resuscitative, acute, and chronic care needs and as such, Emergency Medicine Pharmacists are a highly respected member of the care team. They have specialized knowledge that is invaluable in an ED environment to rapidly oversee patient care to:

- Optimize clinical management at point of service
- Identify pharmacological advances and correct dosing practices,
- Provide insight into alternative therapies, and
- Support quality assessment and performance improvement programs essential to facility licensure.

Currently, emergency medicine pharmacists are essential during time sensitive emergencies such as acute stroke, trauma, and ST-elevation myocardial infarctions. Emergency medicine pharmacists play an integral role in the care of opioid overdoses and other toxicological emergencies, patients requiring cardio-pulmonary resuscitation, and mass casualty events. Inpatients with complex medical conditions boarding in the ED requiring ongoing pharmacological interventions over time and the emergency medicine pharmacist plays an important role in this on-going care coordination.

Pharmacy specialists work collaboratively with the patient care team to identify strategies that increase medication security, decrease the potential for errors, guide clinical decisions, resolve medication discrepancies, ensure proper medication administration, and reinforce adherence to medication administration protocols. Emergency pharmacists are indispensable in providing continuing education to other licensed professionals practicing in the ED. Establishing this credential would strengthen credibility, apply consistency in pharmacy recognition and education to positively impact patient outcomes, and further promote safe, effective healthcare practice.

EMERGENCY NURSES ASSOCIATION

Committed to Care
ena.org

930 E. Woodfield Road
Schaumburg, Illinois 60173
847.460.4000

A BPS-Certified Emergency Medicine Pharmacy Specialist would also be an incredible asset to the emerging subspecialty of Mobile Integrated Healthcare (MIH). MIH is the provision of healthcare using patient-centered, mobile resources in the out-of-hospital environment. MIH is provided by a wide array of healthcare entities and practitioners that are administratively or clinically integrated with Emergency Medical Services agencies and emergency medicine specialists.

In conclusion, the Centers for Medicare and Medicaid Services (CMS) specifically authorize pharmacists to perform all functions within their scope of practice as a component of the medical staff while requiring that medical staff examine the credentials of all eligible candidates to make recommendations for (hospital) privileges. ENA believes pharmacy specialty credentialing in emergency medicine by BPS would enhance opportunities for pharmacists and ultimately improve patient outcomes.

Thank you in advance for your consideration of this important request to improve emergency care by establishing a designation for Emergency Medicine Pharmacy Specialists.

Sincerely,

Patricia Kunz Howard, PhD, RN, CEN, CPEN, TCRN, NE-BC, FAEN, FAAN
2019 ENA President

March 22, 2019

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

Dear Mr. Ellis,

We are writing to support the petition to the Board of Pharmacy Specialties for recognition of Emergency Management Pharmacists (EMP) as specialists.

Reducing morbidity and mortality associated with any type of disaster, either natural or manmade, are the primary goals of all public health and medical preparedness and response activities. The Centers for Disease Control and Prevention (CDC) established the *Public Health Preparedness Capabilities: National Standards for State and Local Planning* in 2011. These standards established 15 public health and medical capabilities that provide a consistent framework for jurisdictions to plan, train and respond to disasters or events through a collaborative system of partnerships. The value of pharmacists participating in public health and medical system preparedness cannot be understated, and EMPs are particularly valuable as both planning partners and front-line responders when the health and medical system is significantly impacted.

Within these capabilities, Medical Countermeasure Dispensing and Administration was established as a Tier 1 strategy for all jurisdictions throughout the nation. While the CDC places the highest priority on this capability, the methodology for dispensing and administering prophylactic countermeasures, such as antibiotics, antivirals, antitoxins, antidotes and vaccines is developed by the local jurisdictions. Dispensing algorithms must be developed that are considerate of contraindications to specific medicines that would be dispensed based upon the threat. Emergency Management Pharmacists participate with state and local jurisdictional public health preparedness staff to plan, develop training and exercise this capability. The best example for the partnership of EMPs with health and medical system preparedness planners can be demonstrated in the results of the Tampa Bay Cities Readiness Initiative.

In 2016, the Florida Department of Health in Hillsborough County and the Department of Health's Regional Emergency Response Advisor formed a team to develop new dispensing protocols that would both increase throughput at our public points of dispensing (PODs) as well as reduce medication errors. Katelyn Dervay, PharmD, Tampa General Hospital Emergency Management Pharmacist, participated as the sole Pharmacist on that team and her expertise was critical to the success of the project. She spent countless hours researching and simplifying a complex algorithm into a single, easy-to-understand sheet. The results were incredible: an 18% increase in the throughput of the dispensing site while medication errors were reduced from an average of 3.2% to 0.03% per 20,000 population processed.

Other CDC Capabilities that directly involve EMPs – but can often be overlooked – are the Mass Care and Medical Surge Capabilities. This was clearly demonstrated in the aftermath of Hurricane Michael in October 2018. The storm quite literally collapsed the entire health and medical system in eight Florida counties. Access to medication was a tremendous problem, only surpassed by access to basic primary care. Many residents did not evacuate the area and could not fill or refill critical prescriptions for chronic illness and others could not receive new prescriptions for acute illnesses and injuries. The Health and Medical Planners who deployed to the area contacted the local hospital's EMPs to develop interim response plans to provide residents access to prescription medication until the area's pharmacies could come back on line. This was the same process used by Florida and North Carolina Health and Medical Incident Management Teams deployed to the southern health district of Mississippi during the aftermath of Hurricane Katrina in 2005. In both events, EMPs developed outreach strategies for shelters and neighborhoods for mobile medical teams that had deployed to the area. They also coordinated with local private pharmacies who were impacted to ensure wide access to services. The team recommended a basic formulary of commonly used medications and worked with the deployed planners to establish a logistics system to quickly obtain unique medications which were not routinely stocked. The actions of those EMPs established a framework for future planning and enhanced the resilience of the communities that they served.

While there are other CDC Capabilities that have pharmaceutical components, we strongly believe that the above examples clearly demonstrate the value of having emergency management pharmacists as a recognized specialty. From our experience in the Tampa Bay region, EMPs serve as key partners in both public health emergency planning and response to incidents that impact the health and medical system.

Respectfully,

Ryan J. Pedigo
Director, Public Health Preparedness Division
Florida Department of Health in Hillsborough County

Hunter R. Zager
Regional Emergency Response Advisor
Regional Domestic Security Task Force IV
Florida Department of Health

Institute for Safe Medication Practices
A nonprofit organization
200 Lakeside Drive, Suite 200 • Horsham, PA 19044-2321
Tel. 215.947.7797 • www.consumermedsafety.org • www.ismp.org

March 25, 2019

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

Dear Bill,

I am writing on behalf of the Institute for Safe Medication Practices (ISMP) to seek recognition by the Board of Pharmaceutical Specialties (BPS) for a new specialty in emergency medicine pharmacy practice.

ISMP has always advocated for pharmacists to practice in emergency departments and become active members of the interprofessional emergency department team. This area of patient care has become more important as a gateway for hospital admissions as well as outpatient care. The expertise of pharmacists is required at the front end of care while patients are evaluated for more intensive services and treatment, undergoing immediate trauma attention, or being treated for a condition and then sent home. Pharmacists provide:

- Knowledge about medications and can optimize pharmacotherapy management;
- Understanding of guidelines, protocols, formulary management, and technologies to increase efficiency and cost-effectiveness of care;
- Education and training to members of the healthcare team on the safe administration of medications and use of devices for medication administration;
- Expertise in educating patients on safe and error-free use of their medications.

The interdisciplinary staff at ISMP has become more familiar with the practice of emergency medicine due to several of our *ISMP Safe Medication Management Fellowship* graduates having come to us as emergency medicine pharmacists. This is a practice that is expanding and requires more advanced training and education that would lead to certification. It is also an area that isn't confined to hospital emergency departments. This type of pharmacist expertise is needed in outpatient standalone emergency and urgent care centers. Time and time again, the literature has substantiated that emergency departments and centers are areas that treat patients for errors related to the use of high-alert medications. These patients

need the expertise of pharmacists to be involved in their care before they are sent back home.

ISMP strongly supports Pharmacist Board Certification in Emergency Medicine. If there is any other information that you should need please do not hesitate to contact me.

Sincerely,

Allen J. Vaida, PharmD, FASHP
Executive Vice President

Rollin J (Terry) Fairbanks, MD, MS, FACEP
Vice President, Quality & Safety, MedStar Health
Professor of Emergency Medicine, Georgetown University
Founding Director, National Center for Human Factors in Healthcare

April 30, 2019

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

Dear Mr. Ellis,

I am writing to relay my strong support of the recognition of emergency medicine pharmacists as a specialist certification.

In order to fully convey my perspective on the impact of emergency medicine trained clinical pharmacists on the quality of care to our patients, I must briefly describe my background. In my current role, I lead quality and safety for a $6B/year 10 hospital, 280 outpatient site health system in the Baltimore and Washington DC region. My career has been based on my expertise in safety engineering, which was developed in a non-traditional route. After completing my master's degree in safety engineering and working in a safety research lab, I went to medical school and completed an emergency medicine residency, then started an academic career in applied safety engineering research within the healthcare environment. I focused on human factors engineering, which was an approach relatively undiscovered in healthcare. During my first year as an assistant professor, I looked at my primary clinical environment (the emergency department), to determine what the most powerful safety mechanism was--- I had the intention to study that topic.

It was clear immediately that this was the presence of our strong emergency medicine pharmacists—a group who were specialty trained, understood our environment and our patients, and made us safer every day. I then set out to study this topic, and over the next seven years this led to multiple papers, funded research projects, and an ongoing ASHP mentorship program that kicked off at the midyear meeting and ended at the summer meeting each year. As a result of all this, I became deeply aware of the difference between a pharmacist without emergency medicine training, and a pharmacist with emergency medicine training. This is analogous to specialty training for physicians—it now clear that without the specialty training of a residency trained, board certified emergency physician, there is inadequate preparation to be consistently successful in the ED. I believe the same is true with emergency medicine pharmacists. I have worked with several hospital pharmacists who have not been trained in the ED, and they are not aligned enough with the emergency physicians and emergency nurses to have credibility in their recommendations. This specialty training is critical to the credibility of the clinical pharmacist working in this environment, and cementing the pharmacist role by creating this board certification is essential to the future of this profession.

I thought a lot about this letter, and realized it would be long—There are so many reasons that it is essential to define emergency medicine as a clinical pharmacy specialty, and draw the line, so that specialists can be trained and deployed across the US in our emergency departments. But then I realized that the peer reviewed literature speaks for itself, and instead of reiterating the decade of writing that we did, based on research results that included representing the opinions and perceptions of nurses and doctors that worked along side our emergency medicine trained clinical pharmacists at the University of Rochester Medical Center, I should instead simply attach those papers. They speak for themselves, and many summarize the evidence for the need for specialty training, such as this summary paper, published in the 2008 AHRQ book summarizing the most impactful safety advances of the past 5 years: https://www.ncbi.nlm.nih.gov/books/NBK43767/

There is clearly strong support in the medical community for this clinical pharmacist specialty training. These papers are among the most highly referenced papers on my CV. The following links bring you these papers, several of which I have also attached:

- Clinical pharmacy services in an emergency department
  RJ Fairbanks, DP Hays, DF Webster, LL Spillane American journal of health-system pharmacy 2004; 61 (9), 934-937 (84 Citations)

- Medical and nursing staff highly value clinical pharmacists in the emergency department
  RJ Fairbanks, JM Hildebrand, KE Kolstee, SM Schneider, MN Shah. Emergency Medicine Journal 2007; 24 (10), 716-718 (83 Citations)

- Pharmacist-managed antimicrobial stewardship program for patients discharged from the emergency department
  SN Baker, NM Acquisto, ED Ashley, RJ Fairbanks, SE Beamish, CE Haas. Journal of pharmacy practice 2012; 25 (2), 190-194 (41 Citations)

- The outcomes of emergency pharmacist participation during acute myocardial infarction
  NM Acquisto, DP Hays, RJT Fairbanks, MN Shah, J Delehanty, F Nobay, … Journal of Emergency Medicine 2012; 42 (4), 371-378 (25 Citations)

- Survey of physicians regarding clinical pharmacy services in academic emergency departments
  JM Szczesiul, RJ Fairbanks, JM Hildebrand, DP Hays, MN Shah. American Journal of Health-System Pharmacy 2009; 66 (6), 576-579 (24 Citations)

- Emergency medical service attitudes toward geriatric prehospital care and continuing medical education in geriatrics
  LKN Peterson, RJ Fairbanks, AZ Hettinger, MN Shah. Journal of the American Geriatrics Society 2009; 57 (3), 530-535 (24 Citations)

- Strategies for implementing emergency department pharmacy services: Results from the 2007 ASHP Patient Care Impact Program
  JC Witsil, R Aazami, UI Murtaza, DP Hays, RJ Fairbanks. American Journal of Health-System Pharmacy 2010; 67 (5), 375-379 (15 Citations)

- Clinical pharmacists in emergency medicine
  RJ Fairbanks, RA Rueckmann, KE Kolstee, KH Dewar, HA Martin, ... Advances in patient safety: new directions and alternative approaches 2008 (12 Citations)

It has always been a gap in the clinical pharmacist profession to not have emergency medicine as a defined formal specialty. I am very pleased to see that we are moving in the right direction, and I hope this letter of support helps demonstrate the critical needs. The time is well overdue for this change. The following press release, from 2007, speaks to this: https://www.urmc.rochester.edu/news/story/1646/strong-mentors-pharmacists-seeking-to-fill-emergency-department-role.aspx

But the perception of emergency physicians and nurses should speak to this: After conducting a qualitative study using rigorous methods, in the 2007 paper referenced above, it is of value to restate the summary here:

“A random sample of medical and nursing staff in an academic medical center ED with a dedicated emergency pharmacist (EPh) program received a 26-item survey (82% return rate). **99% of respondents felt the EPh improves quality of care**, **96% feel they are an integral part of the team**, and **93% had consulted the EPh at least a few times during their last five shifts**. Staff felt that the EPh should be available for consults, attend resuscitations, and check orders. This study reinforced the value of many specific duties of the EPh program and found that doctors and nurses

overwhelmingly favor the presence of an EPh in the ED, frequently seek their advice, and feel they improve quality of care. Staff acceptance is clearly not a barrier to implementation of this program."

While I did not perform a comparison survey, I have interacted with pharmacists across the country who work in EDs but have NOT been specialty trained, including in my current clinical environment—the emergency department I staff, a level 1 trauma center and major tertiary care hospital, staffs their ED with pharmacists NOT trained in emergency medicine, and clinicians do not seek them out. They seem to have much less credibility, and they do not have the impact noted in the environments with specialty trained pharmacist. Needless to say, specialty training is critical to the credibility of this profession, in this setting.

In the early 1970s, the physician community recognized the need for board certification and specialty training in emergency medicine, and nursing has done the same. This is a critical part of the future of the clinical pharmacist profession. Making the same move in the pharmacy profession, while late, is essential. It would be a huge missed opportunity not to do so.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Rollin J (Terry) Fairbanks, MD MS FACEP
Vice President, Quality & Safety, MedStar Health
Professor of Emergency Medicine, Georgetown University
Founding Director, National Center for Human Factors in Healthcare

March 11, 2019

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

Mr. Ellis,

We are pleased to write this letter in support of the critical role emergency medicine pharmacist specialists play in our healthcare system and why it is so important to recognize Emergency Medicine Pharmacy as an area of specialty practice. Our prehospital Emergency Medical Services (EMS) system responds to more than 140,000 calls for service annually, and we have been fortunate to have emergency medicine pharmacist specialists who have improved the care delivered in our system. Our close relationship with emergency pharmacists has created a model in New York, and is increasingly becoming more common nationwide as the critical role these specialists have in emergency out-of-hospital care is recognized.

Our emergency medicine pharmacist specialists participate in the development of EMS formulary decisions, guidelines, protocols, and processes. Originally novel a decade ago, the demand for such specialists continues to increase and their expertise in not just clinical pharmacy but how it can be applied in the sometimes austere and resource-limited EMS environment is key to creating safe, evidence-based clinical care protocols. To demonstrate that importance, no protocol involving a medication in our system is approved without an emergency pharmacist reviewing it.

Education is critical to the role of the emergency pharmacist and the demand for their expertise in training EMS providers often exceeds their capacity. Locally, we have leveraged that through recorded lectures and distance education, however the expertise emergency pharmacists can offer is crucial to the advancement of EMS provider education and evidence-based medication use. In the last few years, that has included education on everything from tPA to nicardipine, hydroxycobalamin to ketamine. The educational impact on our EMS community is difficult to quantify but we can attest from experience the tremendous impact it has on patient care.

Our emergency pharmacists have been critical in identifying alternative formulary medications during inevitable shortage and backorder. They have been critical to patient safety and have participated in numerous EMS quality improvement activities whether it be fentanyl use for pain management or sodium bicarbonate use in cardiac arrest. These activities uniformly result in tangible change to protocol or education nearly every time. For example, recently we began to notice a series of adverse events associate with dexamethasone. After pulling together a team including the emergency pharmacist, an emergency medicine resident, a paramedic, and an EMS physician, the cases were reviewed and conclusions drawn, ultimately leading to a published manuscript as well as system change. Similarly, after a paramedic student noticed variability in the use of intravenous rate control devices, a similar

process occurred, an experiment designed, and another published manuscript and system change occurred.

As the field of Emergency Medical Services has grown – having itself been recognized as a subspecialty earlier this decade – so has the critical role that emergency medicine pharmacy specialists have in that subspecialty. Their impact on system improvement - whether through protocol, policy, education, quality improvement, or research – is tangible and profound. We are grateful for the expertise that these specialists offer our system which ultimately improves the care provided to hundreds of patients each and every day, and provide our strongest support in Emergency Medicine Pharmacy being recognized as an area of specialty practice.

Sincerely,

Reg Allen, BS, NREMT-P
Chair, MLREMS Council

Jeremy Cushman, MD, MS, EMT-P, FACEP, FAEMS
Regional Medical Director

New York
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March 12, 2019

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

Mr. Ellis,

On behalf of the New York American College of Emergency Physicians, I am pleased to write this letter in support of the critical role emergency medicine pharmacist specialists play in our healthcare system and strongly support Emergency Medicine Pharmacy as an area of specialty practice. Emergency medicine pharmacists specialize in the delivery of direct patient care at the bedside in emergency departments throughout New York. Emergency Departments, the healthcare safety net, treat every patient that walks through the door, reflecting a tremendous diversity of patient populations and acuity levels across nearly eight million visits in New York in 2018 alone.

These specialists are critical members of the emergency medicine team. They are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department. They have expertise in the management of time-dependent emergencies. They guide formulary decisions through their evidence-based practice. At many hospitals, they have played critical roles in reducing errors by streamlining electronic order entry or performing medication reconciliation. Further, these emergency medicine pharmacist specialists interconnect with the many subspecialties emergency medicine works with on a daily basis: prehospital medicine, emergency preparedness, public health, and toxicology.

The emergency medicine pharmacist specialist focuses on rapid assessment of available data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts. Their impact on care is palpable, and their supply does not meet the demand across New York's hundreds of Emergency Departments where many lack access to such a specialist.

Emergency medicine pharmacist specialists are valued partners in Emergency Department care. Whether through direct partnership with the clinician in selecting the most appropriate pharmacotherapy, developing clinical guidelines, providing education or improving safety and quality, their impact is significant. We are grateful for the expertise that these specialists offer the healthcare system which ultimately improves the care provided to millions each year. New York ACEP offers its strongest support in Emergency Medicine Pharmacy being recognized as an area of specialty practice.

Sincerely,

Jeremy T Cushman, MD MS FACEP
President

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

March 18, 2019

Dear Mr. Ellis,

My name is Kathryn "Mandy" Davis. I am a 34 year old ICU nurse that has had an intense, and life altering ER experience within the last year of my life. I am strongly in **support** of **Emergency Medicine Pharmacist Specialists** for many professional reasons, as well as a huge personal reason. An ER pharmacist pushed for the life saving drug tPA, without which, April 28, 2018 would have been my date of death. I am sharing my story and my professional thoughts and experiences on how an Emergency Medicine Pharmacist Specialist makes a difference in the patients' outcomes I have provided care in the ICU, as well as my personal outcome.

My ER story begins on March 10, 2018. I hurt my knee in a volunteer appreciation basketball game. 2 weeks later, an MRI showed I had torn my ACL in my right knee. I had previously torn my ACL, part of my MCL, and meniscus in my left knee in high school. I knew it would be a long recovery but necessary to return to my desired functioning baseline. I met with an orthopedic surgeon and ACL repair surgery was scheduled for April 10, 2018. My surgeon prescribed a daily baby aspirin for the first 2 weeks following surgery, which I took as prescribed. I also followed my orders for activity and eventually PT, as well as my PRN muscle relaxers and narcotic medications. I continued to take my oral birth control, as this had not been held during this time. My last dose of baby aspirin was on Tuesday, April 24. Wednesday, I increased my activity and had some knee swelling, but no pain, redness, or calf swelling. Thursday, my PT encouraged 1 crutch instead of both. I was slightly more short of breath with this change but attributed it to a month of less activity with my knee injury and recent surgery causing deconditioning. Friday, I felt my heart rate increase slightly, but thought I was dehydrated as well as deconditioned. Saturday proved all my thoughts wrong.

Saturday morning, April 28, 2018, I was able to shower and eat breakfast with no difficulty, as well as place my knee immobilizer. My husband dropped my daughters and myself off at the entrance to the flag football fields so I wouldn't have to walk as far. About 100-150 feet into the park, I began having tunnel vision and feeling weak and light headed. I called my 11 year old daughter over to assist me, thinking it would pass quickly. My husband saw me starting to sway side to side and told me to sit down, but I didn't hear him. My daughter was able to hold on to me hard enough that I sat down, then fell onto my back on the concrete, as I passed out. EMS was called and arrived. After they assessed and cleared me to move, getting onto the ambulance cot caused me to sweat profusely. An EKG was performed and I heard the EMTs mention ST elevation in V1. My immediate thought was, "I'm not having a heart attack, I'm having a PE!! They need to treat me for a PE!!" But I was unable to vocalize my thoughts. I was

able to respond to questions, but don't remember anything after the first 3-5 minutes in the ambulance. Once the EMTs arrived at the hospital, they got me into an ER bay, where I lost my pulse. CPR was initiated. The first round of CPR lasted 2 minutes. I woke up enough to know the bag valve mask off my face and scream, "I can't breathe!" then I passed out and lost my pulse again. This second code lasted for 7 minutes. I was intubated during the code. CT scans were completed. The CT chest with contrast showed a saddle PE with right middle lobe lung infarction per report to me as the patient. Between the second and third codes, my husband was told that family should be called and they needed to get to the ER right away. During the third code that lasted 15 minutes, I was later told I was declining rapidly and the staff was having a more difficult time resuscitating me. At this point, the ER pharmacist began pushing for tPA to be administered, due to my knee immobilizer and the lack of improvement. I was resuscitated long enough to have my husband and daughters come into the ER room to tell me goodbye, as the ER staff did not think they would be able to resuscitate me again if my heart again stopped. When I began coding for the fourth time, tPA was administered. I coded for 20 minutes the final and fourth code. High quality CPR and tPA saved my life. Per my pulmonologist, my saddle PE was so large that both the manual act of compressing my chest kept my heart beating but also broke the clots up enough that the tPA could work effectively. Only tPA or only CPR would not have worked. The ER pharmacist, by all reports and in my personal opinion, saved my life. Her recognition of my PE, with blue coloring from my nipple line up, my knee immobilizer, and my declining status, kept her strongly encouraging the doctor to prescribe tPA. Her knowledge and experience were and are invaluable. If there is the opportunity for pharmacists to specialize into emergency medicine, I strongly believe they will be able to focus on emergent needs and thus save lives with their experience and background.

As an ICU nurse for 9 years and PACU nurse for a year, I support the specialty practice of Emergency Medicine Pharmacist Specialists. I work with pharmacists on a daily basis to correctly, effectively, and efficiently medicate patients with physician orders. The pharmacists that are able to work in a dedicated department with familiar medications daily increases their base of knowledge. Dedicated ER pharmacists are able to make better recommendations than pharmacists that cannot specialize and therefore work with a wide array of medications, patients, and diagnoses. Specialization allows these pharmacists to focus on front line studies of medications that save lives during cardiac arrest. These situations require instantaneous decisions that can be the difference between life and death for a patient. By training these pharmacists into a specialty, they are prepared for these daily situations and will be competent in the most current evidence based practice as they enter the workforce.

Thank you very much for reading my story. I appreciate your consideration of this specialty.

Sincerely,

Kathryn "Mandy" Davis, BSN, CCRN
kathryn.davisrn@yahoo.com
785-383-2651

May 23, 2019

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

Dear Mr. Ellis,

On behalf of the Pediatric Pharmacy Advocacy Group (PPAG) we are lending our support to the petition to recognize Emergency Medicine (EM) pharmacists as a specialty board certification. Pediatric pharmacists who practice in Emergency Department settings are key members of a high functioning multidisciplinary team with direct impact decreasing patient morbidity and mortality. The rapidity with which specialized knowledge of resuscitation and critical therapeutic interventions is required is unrivaled in other disciplines of medicine. The Emergency Medicine pharmacist often starts with a paucity of information about the patient, limited to no previous interventions prior to presentation and little to no notice of patient presentation.

Emergency Medicine pediatric pharmacists are valued members of PPAG and have a strong EM Special Interest Group (SIG). Emergency Departments must be prepared to treat and stabilize any patient of any age that presents and therefore the EM pharmacist must be prepared to treat all patients, from the newly born to the elderly. For this reason, PPAG strongly encourages BPS to consider ensuring at least 20% of the questions on the exam to be directly relevant to the emergency care of newborns and children.

Several studies have demonstrated the benefit of EM pharmacists on both patient safety and contributions to the multidisciplinary team. A recent positon paper by Morgan and colleagues published in AJEM in 2018 eloquently outlines the history, duties, and contributions of EM pharmacists and was supported by American College of Emergency Physicians, American College of Medical Toxicology, American Society of Health-System Pharmacists, American College of Clinical Pharmacy, Agency of Healthcare Research and Quality, and the Emergency Nurses Association. The various duties include but are not limited to medication reconciliation, drug information provision, therapeutic recommendations, opioid and antibiotic stewardship, emergency preparedness and patient counseling. The American Academy of Pediatrics (AAP) also issued a statement on Pediatric Medication Safety in the Emergency Department in 2018 and advocated for a pharmacist to be present in the Emergency Department to reduce errors (Benjamin, 2018). A statement published in 2019 by Bonadio discussed the frequency of emergency medicine resident dosing miscalculations in pediatric patients and recommends a pharmacist to double check all IV medication order dosages prior to administration. EM pharmacists are in a unique position to provide continual education to physicians, trainees, nurses, respiratory therapists and other disciplines throughout their daily practice.

As with all evidence based practices that include drug therapy, EM pharmacists are integral in the development of policies, protocols and guidelines for the Emergency Department. Refining the electronic health record to support safe and effective care is a core role for an EM pharmacist given the unique environment and the time pressures that often make routine institutional procedures for drug preparation and delivery impossible or even unsafe. These skills also allow the EM pharmacist to make strong contributions to emergency medicine based research. A selection of published studies that demonstrate the wide range of pharmacist activities in the Emergency Department include prescription review programs designed to detect errors and prevent harm (Shah, 2018), antimicrobial stewardship impact on inappropriate antibiotic use in the ED (Davis, 2016), and the positive impact on the care of patients with ischemic stroke presenting to the ED (Gosser, 2016).

Emergency medicine pharmacists are sought consistently for established as well as emerging programs. As more hospitals and health-systems have recognized the value of pharmacists dedicated to the Emergency Department, the need for trained and competent pharmacists has continued to grow for the past 10 years and there is no indication the need will diminish. As the Accountable Care Organization (ACO) model moves forward, the emphasis on decreasing readmissions and hospitalizations has excellent medication reconciliation and patient education in the Emergency Department. The support for pharmacists in the ED is not unique to the US. Two recent publications by Spanish groups also highlighted the value and need for EM pharmacists (Garcia-Martin, 2017 and Perez-Moreno, 2017).

PPAG strongly supports recognition of Emergency Medicine pharmacists as a specialty. Due to the provision of care to pediatric patients regardless of setting, we are advocating for the inclusion of an appropriate number of pediatric based questions on the exam to ensure competency for this unique subspecialty population.

Sincerely,

PPAG Board of Directors

Michael Chicella, PharmD, Secretary
Lizbeth Hansen, PharmD, Director-At-Large
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April 1, 2019

William M. Ellis, BSPharm, MS
Executive Director
Board of Pharmacy Specialties
2215 Constitution Ave., NW
Washington, DC 20037
Via email to: jskelton@silverpennies.com

Dear Mr. Ellis:

Thank you for the opportunity to recognize and support a group of pharmacists that plays an active and important role within the Society of Critical Care Medicine (SCCM), as well as in the treatment of critically and emergently ill and injured patients.

SCCM is a multiprofessional organization that includes pharmacists from a variety of critical care practice settings, including emergency medicine (EM). These pharmacists are critical members of the EM multidisciplinary team; they provide pharmacotherapy recommendations in a time-dependent manner across a wide range of emergencies.[1] They have expertise in medication safety, emergency preparedness, public health, and toxicology. Additionally, EM pharmacists are essential members of the team in performing research and other scholarly activities, teaching physicians, nurses, residents, and students, and optimizing the electronic medical record.[1,2]

EM pharmacists are recognized by the American College of Emergency Physicians for their critical role in ensuring efficient, safe, and effective medication use in the emergency department.[2] SCCM shares this view and encourages EM pharmacists to actively engage in patient care decisions, including resuscitation, transitions of care, and medication reconciliation to optimize pharmacotherapy for EM patients.[3] They also acknowledge the EM pharmacists' roles as educators and researchers.[2] The benefit of an EM pharmacist is traditionally difficult to quantify given the lack of counterfactual evidence; however, the cost avoidance associated with EM pharmacist interventions is extensive.[4] The benefit that an EM pharmacist adds to the team has been studied across a wide variety of settings, including the resuscitation of trauma and cardiac arrest patients, the treatment of acute stroke, and in antimicrobial stewardship, and is particularly apparent in the critically ill population.[3] The need for EM pharmacists has expanded dramatically over recent years, and the number of EM pharmacy residency programs has grown with it. This trend is anticipated to increase in the future as the U.S. population ages and the complexity of care increases.[5]

SCCM has over 1800 critical care pharmacist members. Its Clinical Pharmacy and Pharmacology (CPP) Section is among the fastest growing within our overall membership, which exceeds 16,000 members. SCCM also has an Emergency Medicine Section with several pharmacist members. Since its inception, SCCM has included multidisciplinary professionals as full members. The CPP Section is extremely active. Our members perform multiprofessional research, sponsor a monthly online journal club, disseminate literature updates, and help to produce a research webinar series. Additionally, members are engaged in

a number of patient safety and quality improvement initiatives. Pharmacists serve as leaders across the Society in various capacities, including Judith Jacobi, PharmD, MCCM, who served as president of SCCM in 2010; and Sandra L. Kane-Gill, PharmD, MSc, FCCM, who will serve as president of SCCM in 2022.

SCCM's critical care pharmacist members are almost all specialists in practice due to the complex needs of critically ill, emergently ill, and injured patients. In recognition of this important role, 127 pharmacists have attained the prestigious title of Fellow of the American College of Critical Care Medicine (ACCM), of which several practice in EM. Furthermore, five pharmacists have received the distinction of Master of ACCM. The lack of standardized board credentials for EM pharmacists is problematic. Although our EM pharmacist members may pursue board certification in critical care pharmacotherapy (BCCCP), there are substantial differences in practice, necessitating a separate credentialing process, as occurs in other healthcare professions (eg, physicians and nurses). BCCCP certification is now required for ACCM fellowship; thus, EM pharmacists cannot be recognized without this distinction. Credentialing of EM pharmacists through the Board of Pharmacy Specialties is essential in recognizing the expertise possessed by these valuable members of the multiprofessional team.

In conclusion, the leadership of SCCM formally recognizes the important contribution that EM pharmacists bring to patient care, quality improvement, teaching and education, and scholarly activities within the emergency department. We support the recognition of EM pharmacists as specialists credentialed by the Board of Pharmacy Specialties.

Sincerely,

Heatherlee Bailey, MD, FCCM
SCCM President

cc: Jerry J. Zimmerman, MD, PhD, FCCM; Past President
Sandra L. Kane-Gill, PharmD, MSc, FCCM; SCCM Council
Amy L. Dzierba, PharmD, FCCM; SCCM Council
Anthony T. Gerlach, PharmD, FCCM; SCCM Council
Seth R. Bauer, PharmD, FCCM; CPP Section Chair

1. Eppert HD, Reznek AJ; American Society of Health-System Pharmacists. ASHP guidelines on emergency medicine pharmacist services. *Am J Health Syst Pharm*. 2011 Dec 1;68(23):e81-e95.
2. American College of Emergency Physicians Policy Statement. Clinical Pharmacist Services in the Emergency Department. June 2015. https://www.acep.org/patient-care/policy-statements/clinical-pharmacist-services-in-the-emergency-department/. Accessed April 1, 2019.
3. Roman C, Edwards G, Dooley M, Mitra B. Roles of the emergency medicine pharmacist: a systematic review. *Am J Health Syst Pharm*. 2018 Jun 1;75(11):796-806.
4. Hammond DA, Gurnani PK, Flannery AH, et al. Scoping review of interventions associated with cost avoidance able to be performed in the intensive care unit and emergency department. *Pharmacotherapy*. 2019 Mar;39(3):215-231.
5. Nguyen YL, Angus DC, Boumendil A, Guidet B. The challenge of admitting the very elderly to intensive care. *Ann Intensive Care*. 2011 Aug 1;1(1):29.

Kelly A. Cullen, BSN, MBA
Tampa General Hospital
1 Tampa General Circle
Tampa, FL 33606
5/20/2019

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

Dear Mr. Ellis:

I am writing to support the petition to the Board of Pharmacy Specialties by the American Society of Health-System Pharmacists/American College of Clinical Pharmacy to recognize emergency medicine as a pharmacy specialty. As the chief operating officer at Tampa General Hospital, and a previous emergency department director and nurse, I have had the privilege to work with emergency medicine pharmacists who strive to assure safe and optimal therapy to the patients in the emergency department.

At Tampa General Hospital, we have pharmacists who are board certified in many areas, including pharmacotherapy, ambulatory care, critical care, geriatrics, nutrition support, and oncology. We support our pharmacy team members though programs that provide bonuses for becoming board certified and educational funds to maintain their certification. These pharmacists work alongside our nurses, providers and other healthcare team members in the inpatient, outpatient and transitional settings, including the emergency department. We believe that board certification provides a critical step to assuring the highest level of care to our patients and their health outcomes.

Our emergency department team has included dedicated pharmacists since 2006. Their presence in the emergency department has grown from one full-time pharmacist to its current state of 9 dedicated FTEs. ED pharmacy services are unique in that they are the pharmacy first responders to pediatric and adult patients with diverse levels of need and acuity. Through their bedside response for patient care, clinical services, targeted prospective order verification, discharge patient education and service for drug information, our ED pharmacists prevent medication errors and improve appropriate medication use in an area recognized by the Institute of Medicine as high risk for medication errors.

Because our ED team trusts our emergency pharmacists and knows how much they help patients, they are continually asked to be involved in patient care initiatives and to help educate our team. Recently, our pharmacy team has become engaged in reconciling culture and lab results for patients who have been discharged from the ED. They have been involved in contacting patients and collaborating with multiple providers. Their work further reinforces the current literature as a best practice and we are working towards a collaborative practice agreement to further optimize the pharmacist's clinical capabilities. The TGH ED pharmacists currently educate our nurses and providers and support the emergence medicine residency program through bedside education and lectures during their grand rounds. Additionally, our pharmacists participate in quality improvement initiatives and research that continue to improve patient outcomes and operational efficiency.

I believe that board certification of emergency medicine pharmacists is critical to provision of the highest level of patient care and serves as the needed next step in pharmacy credentialing. This initiative follows in the steps of emergency medicine providers and nurses, who already can be recognized as EM specialists by their given organizations. I fully support this petition to BPS to recognize emergency medicine as a pharmacy specialty.

Sincerely,

Kelly A. Cullen, BSN, MBA
Executive Vice President & Chief Operating Officer
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William M. Ellis, BS Pharm, MS
Executive Director
Board of Pharmacy Specialties
2215 Constitution Ave., NW
Washington, DC 20037

Dear Mr. Ellis,

It is with great honor that I enthusiastically write this letter to express support of the petition to BPS to recognize Emergency Medicine Pharmacists (EMP) as specialists. As Director of the Arizona Poison and Drug Information Center (AZPDIC) and a Clinical Toxicologist, I cannot stress enough the value that having an Emergency Medicine Pharmacist brings to our service and ultimately to optimal patient care.

The AZPDIC serves as a Toxicology consult service to over 60 hospitals in the state of Arizona and routinely deals with envenomations, drug of abuse overdoses, and suicide attempts with prescription medications. In each of these scenarios, prompt administration of an antidote or treatment is critical to the patient's likelihood of survival and these patients are almost exclusively first treated in the Emergency Department. In toxicology, our arsenal includes medications that are either rarely used for general therapeutic use or are used at doses that are not seen for any other indication. Our patients can present incredibly sick and resistant to conventional treatments and any significant delay can mean the difference between life and death. Having an EMP who understands the therapeutic role of giving 5-10 units/kg IV of insulin for a beta-blocker overdose or a physostigmine drip to prevent an intubation of an extremely agitated anticholinergic patient or how to quickly reconstitute rattlesnake antivenom drastically improves patient care. At our center we frequently say "time is tissue" and time from recommendation to administration of therapies is noticeably shorter in hospitals with EMPs compared to those without. Not only do EMPs directly improve patient care, but they serve as a clinical educator to physicians and central hospital pharmacists who do not routinely manage poisoned patients.

In addition to their clinical roles, EMPs also directly help our center publish research and case reports regarding novel therapy approaches to treat critically ill poisoned patients. As mentioned earlier, due to the acute nature of poisonings, the vast majority of our consults occur in the ED. EMPs have a unique role to not only suggest an intervention that physicians and other pharmacists would likely miss, but also contribute these rare experiences to the medical literature. One example involving our center and an EMP is in regards to the use of meropenem for a valproic acid overdose. After AZPDIC published a case report involving the use of this class of drug to treat severe VPA overdoses, an EMP reached out to me directly to discuss a case he had at his institution that he would like to contribute for a case series publication. Most other healthcare providers, including pharmacists, would miss this therapeutic opportunity as it is flagged in EMRs as a significant drug-drug interaction (we receive resistance from inpatient pharmacists when recommending this for that very reason). Thanks to this particular EMP, we are now in the process of publishing a case series on a novel treatment strategy for a common overdose that could prevent intubation and further morbidity. It is important to note that in toxicology, case

reports and case series are held in high regard as it is very difficult to perform a randomized controlled trial because of the potential unethical nature of purposely deviating from standard treatments in critically ill patients even if these treatments are not associated with great outcomes.

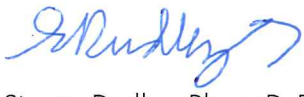
As a final point of support, EMPs have an influential role in the development of our toxicology fellows and the EM residents at our facility. EMPs serve as an invaluable resource by having the in-depth knowledge of not only proper pharmacotherapy selection, but also the understanding of what is pragmatic in such a high acuity setting. Our service practices in an academic setting and, every day, EMPs actively and directly teach resident physicians and nurses. The biggest complaint we hear is from these very healthcare providers who go on to practice in a setting without EMPs and how dramatically it affects their ability to optimally treat patients in a timely manner.

In summary, there is not a sliver of doubt in my mind that there is a significant and clear health demand for Emergency Medicine Pharmacists. They are an indispensable source of knowledge, they optimize therapy, they improve patient safety, and, ultimately, they save lives. Due to these truths, I give my full support for the petition to BPS to recognize Emergency Medicine Pharmacists as pharmacy specialists.

Please do not hesitate to contact me if you would like any other information to assist you in this decision making process.

Thank you for your time and consideration.

Sincerely,



Steven Dudley, PharmD, DABAT
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THE UNIVERSITY OF ARIZONA
College of Medicine

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May 1, 2019

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

I am writing to express my support for recognition of Emergency Medicine Pharmacists as specialists. I have been fortunate enough to work alongside emergency medicine trained pharmacists in our busy, academic emergency department, which is a Level 1 trauma center with an attached dedicated pediatric ED, for several years. Over that time a very successful emergency medicine pharmacy residency has been developed at our institution.

The emergency department is a unique place with a unique patient population. We care for undifferentiated patients with complex illnesses, sometimes with very little background information. Decisions that can have significant impact on patient morbidity and mortality have to be made quickly and decisively. I believe that the best patient care provided in the emergency department is when it is delivered by a team with one of the team members being an EM pharmacist. Our EM pharmacists improve patient care by assuring timely administration of critical medications like tPA and anticoagulant reversal agents, by being part of the resuscitation team during cardiac arrests and traumas, and by promoting antibiotic stewardship. They assist our nurses with critically ill patients requiring the administration of multiple medications and drips. And more recently their knowledge has helped our ED providers deliver quality, non-opioid analgesia when appropriate.

Our ED pharmacists also promote our academic environment. They provide both didactic and bedside teaching to our emergency medicine residents, as well as the nursing staff. They have become integral members of our research team, having been involved in many projects and publications with our EM residents and faculty.

Delivering quality care in the emergency department requires focused training in an environment that is very different than any other place in the hospital or outpatient environment. Just as emergency physicians are recognized as specialists, so too emergency medicine pharmacists, with a very unique skill set, should be recognized as specialists.

Sincerely,

Albert Fiorello, MD,RDMS,FAAEM,FACEP
Associate Professor of Emergency Medicine
Residency Director

DEPARTMENT OF EMERGENCY MEDICINE

David H. Adler, MD, MPH
Director, Emergency Medicine Research

March 12, 2019

Dear Executive Director Ellis:

I am writing to express my strong support for the recognition of Emergency Medicine (EM) Pharmacists as Specialists. I have been a practicing emergency physician since 1998 and currently serve as the Director for Emergency Medicine Research at the University of Rochester Medical Center (URMC) in Rochester, NY. The EM pharmacy program at URMC is a pillar of our patient care program. Our EM pharmacists are essential team members who enhance patient care, safety, quality, and learning in our challenging clinical environment.

I rely on my EM pharmacist colleagues to optimize pharmacotherapy for my patients and assist our department to practice evidence-based medication stewardship. This collaboration occurs in real-time, at the bedside, often under highly time-dependent circumstances. In our department, medication choice, dosing, route of administration, and alternatives are routinely discussed with EM pharmacists and this practice definitively improves the quality of our care.

Our faculty and resident trainees routinely learn from our pharmacist colleagues and collaborate with them on educational and scholarly projects. Throughout my time as Director of EM Research our EM pharmacists have provided Principal Investigator and co-investigator support on several research and quality improvement projects for our medical students, EM medical residents and junior EM faculty. These projects have been supervised solely by EM pharmacists to completion and have often resulted in publication in peer-reviewed journals. Our EM pharmacists also provide expert consultation during review of new medication-related prospective studies recruiting in the emergency department. They assist in identifying patients for study recruitment during bedside clinical activities, alert the emergency department research assistants for screening, and facilitate study drug preparation and delivery if necessary. During one EM resident research project, focused on obtaining thromboelastography for patients with a new pulmonary embolism, initial patient recruitment was poor. Brainstorming creative ways to improve recruitment led to the EM pharmacist team. The EM pharmacist team was able to build and operationalize an automated alert in the medical record during anticoagulation order review to alert the pharmacist of the research study during verification. After a brief screening, the EM pharmacists were then able to directly notify study investigators of possible patients for recruitment. Shortly after EM pharmacy team involved, study recruitment was completed. I have been particularly pleased that our EM pharmacists make substantial contributions to our research mission. Our EM pharmacists are regular participants and contributors to our EM research council and with department educational activities including journal clubs and weekly didactic conferences.

As a regular participant in national emergency medicine meetings I can confirm that the value of EM pharmacy is recognized throughout my field in all geographic regions of the US and in heterogeneous EM settings. My colleagues who do not work in an environment with EM pharmacy colleagues wish they did.

Emergency medicine pharmacists are specialists. The EM environment is unique in its pace, volume, and clinical diversity. Recognition of emergency medicine pharmacy as a specialty practice will promote further growth in this area and benefit patients.

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Please do not hesitate to contact me for further information regarding my experience with EM pharmacists.

Sincerely,

David Adler, MD, MPH

Professor of Emergency Medicine & Public Health Sciences

Michael J. Apostolakos, MD, FCCP
Vice President and Chief Medical Officer
University of Rochester Medical Center

UNIVERSITY of ROCHESTER MEDICAL CENTER

MEDICINE of THE HIGHEST ORDER

March 18, 2019

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

Dear Mr. Ellis,

Is with much enthusiasm that I write this letter in support of a petition for the Board of Pharmacy Specialties to recognize Emergency Medicine Pharmacy as an area of specialty practice. As a Board Certified Pulmonary and Critical Care physician, Director of Adult Critical Care for over 20 years, and now as Chief Medical Officer at University of Rochester Medical Center, I have been uniquely positioned to work directly with Emergency Medicine Pharmacists in the care of critically ill patients in the emergency department as well as with quality improvement initiatives. It is from this myriad of interaction that I'm able to author this letter.

The role of the Emergency Medicine Pharmacist in our organization is as a frontline clinician working in a team caring for patients with time-dependent emergencies. Their skill with the pharmacotherapeutic management of anaphylaxis, angioedema, massive pulmonary embolism, overdose, severe sepsis and septic shock as well as many other disease states is unequaled. Not only do they improve patient safety but Emergency Medicine Pharmacists assure cost-effective pharmacotherapy. Their expertise in this arena cannot be overstated. The immediacy of need in this environment shines light on the importance of assuring the right patient receives the right medication at the right time. Emergency Medicine Pharmacists are vital in this function.

Our Emergency Medicine Pharmacists have led numerous quality improvement projects. Many of these I have personally been involved with. In our organization, these initiatives have led to more appropriate use of narcotics in the emergency department leading to a 50% reduction in narcotic use. Emergency Medicine Pharmacists have been responsible for leading projects which have led to shortening the time to appropriate antibiotics for our patients with severe

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sepsis and septic shock. They have also led the way in developing a system for the emergency department to follow up on all positive cultures obtained there.

In our organization, Emergency Medicine Pharmacists lead many root cause analyses related to situations in which near misses or harm has come to patients. They're crucial in improving our systems of medication administration leading to safe and effective use of such.

Our organization walks the walk when it comes to Emergency Medicine Pharmacists in that we staff them here. They are of clear and unequivocal value to the care of our patients with time-dependent emergencies. I therefore wholeheartedly and without reservation support this petition for the Board of Pharmacy Specialties to recognize Emergency Medicine Pharmacy as an area of specialty practice. If further information regarding this recommendation is necessary, please don't hesitate to contact me

Sincerely,

Michael J. Apostolakos, MD, FCCP
Vice President and Chief Medical Officer
University of Rochester Medical Center

STRONG MEMORIAL HOSPITAL

Department of Pharmacy

UNIVERSITY of ROCHESTER MEDICAL CENTER

Curtis E. Haas, PharmD, FCCP, BCPS
Director of Pharmacy

April 13, 2019

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

Letter of Support: Emergency Pharmacy Petition

Dear Mr. Ellis,

I am writing this letter in strong support of the petition to recognize Emergency Pharmacy as a specialty in clinical pharmacy practice. We have been fortunate at the University of Rochester Medical Center to be a leader in Emergency Pharmacy, and have been training residents in Emergency Pharmacy for more than 12 years, being one of the first accredited PGY-2 residency programs in the United States.

There is no question in my mind that Emergency Pharmacy is a specialty area of practice separate and distinct from other defined specialties. Our EM pharmacists work in a fast-paced environment with over 120,000 ED admissions per year at our largest facility. We provide pharmacy services in the ED for at least 18 hours per day, 365 days per year. These pharmacists must be prepared to handle therapeutic issues that range from a treat-and-release case of pharyngitis to a trauma 500 case requiring full resuscitation and stabilization in the trauma bay. Our ED pharmacy team has implemented state-of-the-art programs that include an ED antimicrobial stewardship program that is responsible for following all microbiologic results and assuring that all patients seen in the ED have their treatment adjusted to cover identified pathogens. This often means calling patients at home and following up with community-based providers to adjust antibiotic therapy after leaving the ED, to achieve essentially 100% appropriate treatment (or discontinuation of treatment). Over the past year our ED pharmacy team took the lead on an ED based opiate stewardship program that has resulted in a dramatic reduction in opiate use during an ED admission, and 52% reduction in prescriptions for opiates at the time of discharge. These changes have been achieved without a detriment in pain scores or patient satisfaction. Our Emergency Medicine providers fully expect pharmacists, who are trained and experienced in emergency pharmacy, to be available in the ED. They rely upon our team as a resource to optimize all aspects of pharmacotherapy in ED patients. They are embraced as fully integrated members of the ED patient care team. Our emergency pharmacists respond to all trauma, stroke, sepsis, PERT (pulmonary embolism response team), and cardiopulmonary arrest (Blue) alerts for both pediatric and adult patients. They will also respond to alerts throughout the medical center as needed. Emergency pharmacists are credentialed for ACLS, ATS, and PALS. The emergency pharmacy team has been the recipient of two ASHP Best Practice Awards in recent years for their innovative, patient-focused programs.

In addition to the provision of direct patient care in emergent settings, our emergency pharmacists are very involved in the development of all protocols and guidelines that incorporate drug therapy and monitoring for

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emergent management. They work in a very interprofessional, collaborative manner to contribute to the development of these documents and shepherd them through the various relevant committees for approval. There are dozens of guidelines and protocols that are essentially owned by members of our emergency pharmacy team. The emergency pharmacists also work very closely with our pharmacy informatics team to assure that the content of guidelines and protocols are incorporated into the EMR workflow including the application of clinical decision support tools that help guide clinicians to order treatments consistent with our guidance documents. The workflow in an ED setting is much different than elsewhere in the hospital, and our emergency pharmacists work diligently to make sure the EMR build reflects the unique needs of the ED environment. What works in an ICU or an OR, will often not work in the ED. Our emergency pharmacists understand these unique needs and assure the workflows make sense.

The examples offered above are intended to illustrate the unique and separate role of the emergency pharmacist compared to other recognized specialties. Emergency pharmacists have knowledge and expertise in many different therapeutic areas including critical care, infectious diseases, cardiovascular medicine, pulmonary medicine, endocrine emergencies, ambulatory care, pharmacokinetics, trauma, obstetrical emergencies, and many more. Essentially anything can present to a busy ED in an academic medical center, and decisions often need to be made with an incomplete set of data. The goals of treatment are often stabilization and early treatment with a smooth handoff either to an inpatient our outpatient setting. This requires a unique knowledge base, training, experiences, and attitudes to be a successful emergency pharmacy specialist, and this is appropriate to be recognized as a BPS-certified specialty. As an aside, dedication to emergency pharmacy also often means working an eccentric schedule. The action of EDs don't get started often until the afternoon, and the evenings and early night hours (e.g. 1-2AM) are the busiest and most clinically demanding time periods in urban centers. Emergency pharmacists typically work difficult hours that may include sacrifices in work-life balance – this is not a trivial issue in this area of specialty practice.

Another important area of contribution is to the academy. Our emergency pharmacy specialists are actively and regularly involved in teaching across all health care professional disciplines including pharmacy, medicine, nursing, emergency medical technicians, and others. They are routinely invited to teach in both the experiential environment (e.g. emergency medicine teaching rounds and grand rounds) as well as formal didactic teaching in schools of pharmacy and medicine. Several of our emergency medicine specialists are cross-appointed in other departments including Emergency Medicine and Toxicology. Our specialists are also very engaged in the research enterprise with multiple grants awarded, research projects completed or in progress, manuscripts published, and abstracts presented. The emergency pharmacy research program is focused on multiple aspects of the emergency pharmacy specialty. Pharmacists serve as PIs, co-PIs, and co-investigators with many different collaborators in emergency medicine.

At Strong Memorial Hospital we currently employ approximately 8 FTE pharmacists with expertise and training in emergency pharmacy and toxicology. We also have two PGY-2 emergency pharmacy residents that contribute to clinical coverage in the ED. Over the past 5 years, this has grown by several FTEs, and in the past year we have added two additional FTEs of emergency pharmacy coverage at our Highland Hospital affiliate. With the plan to pursue 24/7 emergency pharmacy coverage, it is anticipated that we will be adding approximately 3 FTEs at Strong Memorial Hospital, and also expect the hours of coverage to increase at Highland Hospital over the next few years (likely an additional 2 FTEs). We have every reason to believe that our ED coverage will continue to expand. Over the next 5 years, Strong Memorial Hospital is building a new ED tower with an expansion of our ED and observation beds, which will necessitate additional emergency pharmacy FTEs to maintain our current level of clinical services. The exact numbers are not yet defined, but it will likely be in the 3-5 FTE range.

As an organization, we fully support and encourage board certification for all pharmacists involved in direct patient care. Any pharmacist employed in our clinical specialist track is expected to be board certified in their area of specialty within 2 years of hire provided they meet BPS requirements. On our clinical staff pharmacist track, board certification is a requirement for advancement to Tier 3 on the career ladder. The department does compensate pharmacists for the cost of initial board certification as well as annual BPS fees. While there is no direct salary remuneration linked to board certification, BPS certification is incorporated into the requirements for promotion on the career ladder. Board certification is central to our competency assessment.

Our emergency pharmacy specialists bring significant value to our department and institution. The accomplishments of this team are regularly recognized by our C-suite leadership as well as ED leadership. The research published by this team has repeatedly shown improved patient outcomes, cost savings, and overall improved quality of care. Emergency pharmacists have been the recipient of Board Quality Awards, and recently two members of the team were awarded a Rochester Business Journal Healthcare Achievement Award – these are some of the highest awards given in our greater Rochester Community and are considered a pinnacle of business and clinical achievement in the community. The emergency pharmacy specialists have a high profile in our institution and are often called upon to serve on many interdisciplinary committees and task forces. Most recently two of our emergency pharmacists were asked to chair organization-wide opiate task force committees due to their outstanding work with opiate management in the ED.

Emergency pharmacy is the fastest growing specialty practice area in pharmacy over the past decade, and there is a high demand for ED trained pharmacists as evidenced by the high degree of interest in our residency graduates. There is much greater demand out there than the current training programs can meet. In my opinion, based upon more than 12 years of watching and leading very dynamic and engaged emergency pharmacy specialists, the recognition of emergency pharmacy as a BPS designated specialty is a no-brainer. The practice needs and training are unique, and the demand on these professionals is much different than other specialty practice areas. They are truly clinical “jacks of all trades” in an often intense, fast-moving environment.

Bill, if you have any questions concerning this letter of support, or would like additional details please do not hesitate to contact me.

Sincerely yours,

Curtis E. Haas, Pharm.D., FCCP

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April 7, 2019

To: William M. Ellis, BSPharm, MS
Executive Director, Board of Pharmacy Specialties

Re: **Emergency Medicine Pharmacy Specialty**

Dear Dr. Ellis,

I am the Associate Dean of Admissions for the University of Rochester School of Medicine & Dentistry, Associate Professor of Emergency Medicine, Core Teaching Faculty member of the EM Residency Program and practicing EM physician for the past 19 years.

Emergency Medicine is a dynamic, fragile and intense ecosystem. Understanding the unique practice environment including rapid task switching, interruptions and crisis management in the setting of sick patients, is paramount to being successful in the ED. Added to this difficulty is the myriad of diseases for which we are responsible for recognizing and treating in the setting of urgent conditions and partial information. While many of the medical complaints are recognizable by name, the environment creates a semi-translucent lens in which to administer care. Given this daily environment, there is an audible "sigh of relief" to have an EM trained pharmacist integrated into our care team. There are few other milieus, where there is such a constant demand to provide care, educate and interact with others within a compressed time frame.

Physician providers are increasingly exceeding their bandwidth within the busy ED environments. Stroke alerts, AMI Alerts, Sepsis Alerts, Neutropenic fevers, etc., are just a few examples that underscore the need to administer therapeutics in an urgent and timely manner. EM Providers practices are significantly augmented when an EM trained Pharmacist is immediately available to consult on the myriad of nuances associated with these patients. Given our incredibly high rate of distractions and task switching, our environment is ripe for errors and near misses in delivering urgent and emergent therapeutics. Having an ED pharmacist as a safety net is critical for us to maximize safe and quality driven patient care for our populations. As practice panels expand beyond maximum and hospital beds exceed 100%, EM providers are increasingly required to manage inpatient type borders in our ED's. Having EM trained pharmacists supplement our limited therapeutic knowledge base in our observation level care is critical for our transitions in care for our patients.

Having an ED Pharmacist as an educator to our faculty, residents and medical students is invaluable in their understanding of therapeutics within our setting. An ED Pharmacist Specialist would focus educational expertise in our rapidly changing field; additionally, Specialty Pharmacists would add an element of consistency of education based on a firm foundation of basic science and therapeutic principles. Having access to this resource would undoubtedly create a higher quality experience for patients and without a doubt create a continuity of excellence for all learners and providers in the ED. Understanding the "why" of how we choose agents is as critical as the selection of the agent itself. Having Pharmacists immediately available is the only practical solution to our clinical environment. The cadence of our field is that we have to provide the answer within the "1st pass" of seeing the patient due to our lack of continuity of patient and provider. The patient's urgency and emergency are critical for making sure we have the correct selection of agent at the correct time, with the correct dose. So having a Specialty Pharmacist would allow for that immediate need to be met with reliable and consistent practice and with the ability to mentor all that they come across in the ED.

Finally, ED Specialists are not confined to teaching and mentoring within the confines of the ED. Mentorship and collaboration with scholarly projects, such as book chapters, short briefs and peer review publications benefit from an experienced and specialty trained provider. Additionally, faculty development and residency didactics benefit from a voice who is evaluating content from a therapeutic standpoint. Specialty trained pharmacists also would be able to have roles in residency evaluations, mentorship and medical student clerkships. The potential is limitless.

In my 19-year career, there has been no greater advancement in the care of the emergent patient than in the birth and development of the ED Pharmacist, I strongly endorse and encourage a Specialty track for ED Pharmacists.

Thank you for your time and consideration

Sincerely,

Flavia Nobay, MD
Associate Dean for Admissions
Associate Professor of Emergency Medicine
University of Rochester,
School of Medicine and Dentistry
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https://www.urmc.rochester.edu/education/md/admissions.aspx

BerbeeWalsh Department of Emergency Medicine
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

Manish N. Shah, MD, MPH
Vice Chair

March 14, 2019

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

Dear Mr. Ellis,

I am writing to provide my strongest support for the recognition of Emergency Medicine Pharmacists as an area of specialty practice. I am a Professor of Emergency Medicine and the John & Tashia Morgridge Chair of Emergency Medicine Research in the BerbeeWalsh Department of Emergency Medicine at the University of Wisconsin. Additionally, I Chair the Research Committee for the American College of Emergency Physicians and am a member of the Geriatric Emergency Department Accreditation Program Board of Governors. As a leading researcher in emergency medicine and a physician who cares for emergency department (ED) patients, I can attest to the critical role played by pharmacists trained in emergency medicine.

I consider myself as being one of the early emergency physician members who has participated in the development of Emergency Medicine Pharmacists. While at the University of Rochester Medical Center in the early 2000s, we focused heavily on developing the role of the Emergency Medicine Pharmacists to deliver direct patient care in the fast-paced ED environment while participating on an interprofessional team. The early Emergency Medicine Pharmacists, starting with Dan Hays, PharmD and Nicole Acquisto, PharmD, became critical members of the team. Their support is clearly invaluable as they deliver care to critically ill patients, ensuring that the best antibiotic, vasopressor, and other medications were chosen; educate patients, for instance as they were starting new medications; and help investigate the toxicological conundrums faced by us on a regular basis. The Pharmacists are particularly important in the vulnerable older adult patient population. I remember numerous patients that were directly benefitted through the efforts of our Emergency Medicine Pharmacists.

At one point, one of my mentees had a significant federal grant to evaluate the care delivered by Emergency Medicine Pharmacists. As we performed the analysis, we clearly saw the incredible impact made by the Emergency Medicine Pharmacists. They were finding many near misses and adverse events that would have otherwise placed patients at risk; as a result, it became clear to us that Emergency Medicine Pharmacists were literally one of the more important patient safety interventions that could be implemented in the ED.

The Emergency Medicine Pharmacists are critical to educating physicians and nurses at all levels. Through their presence, explaining the choice of one antibiotic over another, or one antihypertensive over another, they teach the physicians and nurses (especially the medical students, nursing students, and physician and nurse residents) what to prescribe and why, thereby altering their prescribing behaviors.

Finally, the Emergency Medicine Pharmacists have been highly integrated in scholarly activity, performing research in interdisciplinary teams to understand how to improve care. During the federal grant mentioned previously, we had Emergency Medicine Pharmacists assisting us, and I have assisted numerous pharmacists and pharmacy students and residents perform research.

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Madison, WI 53705

In fact, at the University of Wisconsin, the Emergency Medicine Pharmacy Resident sits on our Emergency Medicine Research Committee, which oversees all research activity in the Department.

In the last 20 years, we have gone from a situation where EDs consider Emergency Medicine Pharmacists to be a luxury (or do not care about having them present) to one where Emergency Medicine Pharmacists are considered as critical as the physician or nurse. In fact, I know many physicians who will not work in an ED without Emergency Medicine Pharmacists. This new attitude means that to staff the over 5,000 EDs in the United States, we will need a large number of Emergency Medicine Pharmacists; it is a demand that I do not see being fulfilled anytime soon. However, by becoming an area of specialty practice, we can hopefully work to address this critical patient safety and patient care need. It is due to these critical education, research, and patient care roles that I feel very strongly that Emergency Medicine Pharmacists must be recognized as an area of specialty practice.

Please contact me if you have any questions.

Sincerely,

Manish N. Shah, MD MPH
Professor of Emergency Medicine, Population Health Sciences, Geriatrics & Gerontology
Vice Chair for Research
The John & Tashia Morgridge Chair of Emergency Medicine Research
Director/KL2 Program, Institute for Clinical and Translational Research
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Courtenay E. Leahman, MD, FCCS, MSHA,
Medical Neurointensivist
Assistant Professor, Critical Care Medicine
Medical Unit Director of Critical Care, Neuroscience ICU
Department of Anesthesiology
Assistant Professor, Department of Neurology
Federal Medical Officer, VA-1 DMAT, NDMS

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

March 18, 2019

Dear Sir,

Over the past few years, I have been deployed for not only emergencies in the field but also to the Secretary of Command in Washington, DC as the Chief Medical Officer for Hurricanes Irma, Maria, Yutu, and Michael. I have received Bronze, Silver, and most recently, Gold Commendation for my work on all aforementioned disasters. In July of 2018, I was recommended as a trainer for disaster management where I met and worked with Emergency Pharmacists for DMAT in training for mass casualty disasters.

It is too understated to say that I would have been at a loss had I not had a trained emergency pharmacist during any of my deployments. At the higher levels, I spoke with pharmacists every day so that they could receive the appropriate medications for the volume of patients they were seeing. During the training session, the emergency pharmacists were consistently calm under pressure; they never made a mistake and their demeanor coupled with their analytic reasoning made a stressful situation seem nearly effortless.

My “day job” is as a Neurointensivist and Unit Director at VCUHS in Richmond, VA. My entire team could not be more thrilled to have the support of a fantastic pharmacist even when the days are occasionally not busy, so you can only imagine how integral a pharmacist is during an emergency. Thank you for taking the time to listen to my suggestions and the suggestions of others on this very important matter.

Sincerely,

Courtenay Leahman, MD, FCCS, Neurointensivist, MSHA
Medical Unit Director, Neuroscience ICU
Assistant Professor, Division of Critical Care
Department of Anesthesiology
Assistant Professor, Department of Neurology
Medical Officer, VA-1 DMAT, NDMS

Appendix C-1

Survey of Emergency Medicine Pharmacists Interested in Board Certification

Survey of Emergency Medicine Pharmacist Specialists Interested in Board Certification

Dear Emergency Medicine Pharmacist Specialist:

We are contacting you regarding the Board of Pharmacy Specialties' (BPS) call for petition to consider emergency medicine as a pharmacy specialty. The American College of Clinical Pharmacy (ACCP) and the American Society of Health-System Pharmacists (ASHP) have partnered to develop and submit a petition to BPS to recognize emergency medicine pharmacy practice as a specialty.

We kindly request that you complete this 5-10 minute survey to provide the organizations with essential data to support this petition *by Monday, April 8, 2019*. 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 a petition to the BPS.

Student pharmacists and residents whose clinical service has less than 50% of time spent in the provision of care to emergency medicine patients should not participate in the full survey but may still sign on to support the petition. At the end of the survey, all respondents will have an opportunity to add your signature to the petition. If questions arise, contact Jann Skelton at jskelton@silverpennies.com. Thank you for taking the time to provide this valuable information.

- Nicole M. Acquisto, PharmD, FCCP, BCCCP; Representing the American College of Clinical Pharmacy
- Katelyn R. Dervay, PharmD, MPH, BCPS, FASHP; Representing the American Society of Health-System Pharmacists
- Christopher Edwards, PharmD, BCPS; Representing the American Society of Health-System Pharmacists
- Megan E. Musselman, PharmD, MS, BCPS, BCCCP; Representing the American College of Clinical Pharmacy

Practicing Emergency Medicine Pharmacist Specialists

*Indicates response required

*How many years have you been a licensed pharmacist?

- < 3 years
- 3 - 5 years
- 6 - 8 years
- 9 - 11 years
- 12 - 14 years
- 15 - 17 years
- 18 - 20 years
- > 20 years

*How many years have you been in emergency medicine pharmacy practice?

- I do not currently practice in emergency medicine pharmacy practice
- < 3 years
- 3 - 5 years
- 6 - 8 years
- 9 - 11 years
- 12 - 14 years
- 15 - 17 years
- 18 - 20 years
- > 20 years

(If 'I do not practice…' link to the option to provide support for the EM petition)

*Please indicate your primary practice setting, where you spend the majority of your time in practice.

- Academic medical center/University-affiliated hospital
- Community hospital, for-profit
- Community hospital, not-for-profit
- Federal hospital or institution, including VA
- Free-standing emergency department
- School or college of pharmacy
- Urgent care center
- Other

*Please indicate your secondary practice setting, if you split your time between different practice locations.

- Not applicable
- Academic medical center/University-affiliated hospital
- Community hospital, for-profit
- Community hospital, not-for-profit

- Federal hospital or institution, including VA
- School or college of pharmacy
- Urgent care center
- Other

*Do you believe that you currently practice in the area of emergency medicine pharmacy practice as defined by the Task Group? For purposes of this petition, the definition of emergency medicine pharmacy practice is:

Emergency medicine pharmacists specialize in the delivery of direct patient care at the bedside across diverse patient populations and acuity levels. These specialists are critical members of the interprofessional emergency medicine team, are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department, and have expertise in the management of time-dependent emergencies, pre-hospital medicine, emergency preparedness, public health, and toxicology. Emergency medicine pharmacy practice focuses on rapid assessment of available patient data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts.

- Yes
- No

(If no, link to the option to provide support for the EM petition)

*Please check all types of residencies/fellowships completed.

- PGY1 Residency – Pharmacy (formerly Pharmacy Practice)
- PGY2 Residency – Critical Care
- PGY2 Residency – Emergency Medicine
- PGY2 Residency – Internal Medicine
- PGY2 Residency – Pediatrics
- PGY2 Residency – Other Specialty
- Fellowship – Toxicology
- Fellowship – Other (please specify)
- No residency or fellowship
- Other (please specify)

(If PGY2 – Emergency Medicine) Were you able to find a position in emergency medicine within 3 months of completing your Emergency Medicine Residency program?

- Yes, I was able to find a position with greater than/equal to 50% of practice time in an emergency department
- Yes, I was able to find a position with less than 50% of practice time in an emergency department
- No, I was not able to find a position practicing in an emergency department
- No, I decided not to pursue a position practicing in an emergency department

(*If PGY2 – Other Specialty*) What PGY2 Residency Program did you complete?

- Ambulatory Care Pharmacy
- Clinical Pharmacogenomics
- Corporate Pharmacy Leadership
- Critical Care Pharmacy
- Drug Information
- Geriatric Pharmacy
- Health-System Medication Management Pharmacy
- Health-System Pharmacy Administration and Leadership
- Health-System Pharmacy Administration and Leadership with Masters
- HIV Pharmacy
- Infectious Diseases Pharmacy
- Investigational Drugs and Research
- Medication-Use Safety
- Neonatology Pharmacy
- Nephrology Pharmacy
- Neurology Pharmacy
- Nuclear Pharmacy
- Nutrition Support Pharmacy
- Oncology Pharmacy
- Palliative Care/Pain Management Pharmacy
- Pediatric Pharmacy
- Pharmacotherapy
- Pharmacotherapy 24 Month
- Pharmacy Informatics
- Pharmacy Outcomes/Healthcare Analytics
- Psychiatric Pharmacy
- Solid Organ Transplant Pharmacy
- Specialized Area of Pharmacy
- Other (please specify)

*What BPS certifications do you currently hold? Please check all that apply.

- Ambulatory Care Pharmacy (BCACP)
- Cardiology Pharmacy (BCCP)
- Compounded Sterile Preparations Pharmacy (BCSCP)
- Critical Care Pharmacy (BCCCP)
- Geriatric Pharmacy (BCGP)
- Infectious Diseases Pharmacy (BCIDP)
- Nuclear Pharmacy (BCNP)
- Nutrition Support Pharmacy (BCNSP)
- Oncology Pharmacy (BCOP)
- Pediatric Pharmacy (BCPPS)
- Pharmacotherapy (BCPS)
- Psychiatric Pharmacy (BCPP)

- None

*What BPS certifications have you previously held? Please check all that apply.

- Ambulatory Care Pharmacy (BCACP)
- Cardiology Pharmacy (BCCP)
- Compounded Sterile Preparations Pharmacy (BCSCP)
- Critical Care Pharmacy (BCCCP)
- Geriatric Pharmacy (BCGP)
- Infectious Diseases Pharmacy (BCIDP)
- Nuclear Pharmacy (BCNP)
- Nutrition Support Pharmacy (BCNSP)
- Oncology Pharmacy (BCOP)
- Pediatric Pharmacy (BCPPS)
- Pharmacotherapy (BCPS)
- Psychiatric Pharmacy (BCPP)
- None

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

- 1 - 9 hours per week
- 10 - 19 hours per week
- 20 - 29 hours per week
- 30 - 39 hours per week
- 40 - 49 hours per week
- 50 - 59 hours per week
- 60+ hours per week

*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? (Note: This may be the same as reported in the previous question; however, it may also be different. For example, you may provide additional services at your emergency medicine practice that are unrelated to direct patient care.)

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

*What percentage of your time in emergency medicine is spent on the following activities?

(rating box ahead of each choice to list percentage)

- Deliver bedside care and management of medical emergencies
- Provide pharmacotherapy consultation to other health care professionals
- Conduct order verification and procurement of medication
- Perform medication history assessment/reconciliation
- Participate in administrative/education/research-related tasks

*Which activities do you participate in as part of your emergency medicine practice? Please check all that apply.

- Deliver bedside care and management of medical emergencies and other high-priority patients
- Make medication selection based on diagnosis
- Perform prospective medication order review
- Facilitate medication delivery and administration
- Investigate drug compatibility
- Perform drug identification
- Monitor medication therapy
- Conduct error and adverse drug event reporting
- Perform bedside toxicology management
- Perform medication therapy management
- Provide targeted disease state/medication counseling to patients
- Conduct culture and sensitivity testing follow-up
- Perform medication reconciliation/history taking
- Administer medications
- Administer immunizations
- Deliver education to the emergency medicine team
- Deliver education to pharmacists, pharmacy residents and student pharmacists
- Optimize electronic medical records
- Manage drug shortages affecting the emergency department
- Conduct discharge prescription review
- Participate in protocol/guideline/process development
- Participate in quality improvement initiatives
- Participate in research
- Other (please specify)

*What age group population do you serve in your emergency medicine practice setting?

- Adults only
- Pediatrics only
- Both

*How many ED visits are seen in your primary emergency medicine setting annually?

- 0 - 49,999
- 50,000 - 74,999
- 75,000 - 100,000

- >100,000

*If the petition to recognize emergency medicine 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 emergency medicine pharmacist specialists within your organization?
- Yes
- No

Emergency Medicine Pharmacist Specialist Employers

Definition of Emergency Medicine Pharmacist Specialists

Emergency medicine pharmacists specialize in the delivery of direct patient care at the bedside across diverse patient populations and acuity levels. These specialists are critical members of the interprofessional emergency medicine team, are able to anticipate pharmacotherapy needs in the fast-paced environment of the emergency department, and have expertise in the management of time-dependent emergencies, pre-hospital medicine, emergency preparedness, public health, and toxicology. Emergency medicine pharmacy practice focuses on rapid assessment of available patient data to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate medication stewardship, educate patients and health care clinicians, and contribute to research and scholarly efforts.

*What is the total number of clinical pharmacist FTEs allocated to serving patients in emergency medicine within your organization?

*What is the total number of administrative or management pharmacist FTEs allocated to serving patients in emergency medicine within your organization?

*What percentage of your employee 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 emergency medicine pharmacist positions currently require BPS specialty certification or other earned credentials?

*Do you have a credentialing and privileging program for pharmacists within your organization?

- Yes
- No

(*If yes*) * Is BPS Board Certification currently a requirement for your credentialing and privileging program?
- Yes
- No

(*If no*) * Do you anticipate that BPS Board Certification will become a requirement for your credentialing and privileging program within the next 3 years?
- Yes
- No

*How many emergency medicine pharmacist positions within your institution are currently vacant/unfilled?

*Please rank, in preferred order, the current desired level of training for pharmacists practicing in emergency medicine pharmacy in your organization. 1 = most desired; 6 = least desired
- PGY1 Residency – Pharmacy
- PGY2 Residency – Emergency Medicine
- PGY2 Residency – Other
- Fellowship training
- Employer-provided training program
- None required or desired

*If BPS recognizes emergency medicine pharmacy practice as a specialty, what is the likelihood that you would require this new specialty credential for newly hired pharmacists within your organization?
- Highly likely
- Likely
- Somewhat likely
- Unlikely
- Highly unlikely

*If BPS recognizes emergency medicine pharmacy as a specialty, what is the likelihood that you would require this new specialty credential for currently employed emergency medicine pharmacists within your organization?
- Highly likely
- Likely
- Somewhat likely
- Unlikely
- Highly unlikely

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

- Projected decrease
- 0%–5%
- 6%-10%
- 11%–20%
- >20%

*How many positions for emergency medicine pharmacists (as defined above) has your organization recruited over the past 3 years, from March 1, 2016 to March 1, 2019?

*What percentage of these positions were filled?

*How many positions for emergency medicine pharmacists (as defined above) do you estimate you will hire within the next 3 years?

Thank you for taking the time to share your experiences and insights.

OPTIONAL: If you would like to support this recognition effort by signing the petition to BPS, please add your signature in support of this proposed specialty by completing the following information:

First Name*
Last Name*
Credentials*
Place of Employment*
Title*
Work Address*
Work Address Line 2*
City *
State*
Zip Code*
Work Phone Number*
Work Email Address*

Appendix F-1

ASHP Required Competency Areas, Goals, and Objectives for Emergency Medicine Postgraduate Year Two (PGY2) Pharmacy Residencies

REQUIRED COMPETENCY AREAS, GOALS, AND OBJECTIVES FOR EMERGENCY MEDICINE POSTGRADUATE YEAR TWO (PGY2) PHARMACY RESIDENCIES

Introduction

The competency areas, goals, and objectives are to be used in conjunction with the *ASHP Accreditation Standard for Postgraduate Year Two (PGY2) Pharmacy Residency Programs.* The first six competency areas described herein are required, and the others are elective.

The required competency areas and all of the goals and objectives they encompass must be included in all programs. Programs may add one or more required additional competency areas from the elective competency area choices to meet program-specific needs. Programs selecting an additional competency area are not required to include all of the goals and objectives in that competency area. In addition to the potential additional competency areas described in this document, programs are free to create their own unique competency areas with associated goals and objectives based on the specific needs of their program. Each of the objectives associated with the goals encompassed by the program's selected program competency areas (required and additional) must be taught and evaluated at least once during the residency year. Elective competency area(s) may also be selected for specific residents when creating their residency development plan.

Each of the objectives listed in this document has been classified according to educational taxonomy (cognitive, affective, or psychomotor) and level of learning. An explanation of the taxonomies is available elsewhere.[1]

Competency areas for PGY1 residencies are available on the ASHP website. PGY2 competency areas, goals, and objectives in emergency medicine pharmacy are differentiated from those from PGY1 by specialization and the expectation of PGY2 residents for greater work competence and proficiency.

Definitions

Competency Areas: Categories of the residency graduates' capabilities.

Competency areas are classified into one of three categories:

Required: Six competency areas are required (all programs must include them and all their associated goals and objectives).

[1] Anderson, L. W. and Krathwohl, D. R., et al (Eds.) (2001) A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Allyn & Bacon. Boston, MA (Pearson Education Group).

Additional (for program): Competency area(s) that residency programs may choose to use (in addition to the four required areas) to meet program-specific program needs. Additional competency areas also include those developed by individual programs.

Elective (for specific residents): Competency area(s) or specific goals and objectives within the competency area(s) selected optionally for specific resident(s).

Educational Goals (Goal): Broad statement of abilities.

Educational Objectives: Observable, measurable statements describing what residents will be able to do as a result of participating in the residency program.

Criteria: Examples that describe competent performance of educational objectives. Since the criteria are examples, they are not all required but are intended to be used to give feedback to residents on how well they are doing and how they can improve on the skill described in educational objectives while they engage in an activity.

Activities: The Standard requires that learning activities be specified for each educational objective in learning experience descriptions. Activities are what residents will do to learn and practice the skills described in objectives. Activities are the answer to the question, "What can residents do in the context of this learning experience that will provide the kind of experiences necessary to achieve the educational objective?" (compare and contrast activities with criteria by referring to the definition of criteria immediately above). Specified activities should match the Bloom's Taxonomy learning level stated in parentheses before each objective.

Competency Area R1: Patient Care

(See the appendix for additional specific requirements.)

Goal R1.1: Provide comprehensive medication management to patients following a consistent patient care process.

Objective R1.1.1: (Applying) Interact effectively with health care teams to manage patients' medication therapy.

Criteria:

- Interactions are cooperative, collaborative, communicative, and respectful.
- Demonstrates skills in consensus building, negotiation, and conflict management.
- Demonstrates advocacy for the patient.
- Effectively contributes and communicates pharmacotherapy knowledge and patient care skills as an essential member of the health care team.

Objective R1.1.2: (Applying) Interact effectively with patients, family members, and caregivers.

Criteria:

- Interactions are respectful and collaborative.
- Shows empathy.
- Uses effective (e.g., clear, concise, accurate) communication skills.
- Communicates with family members and caregivers to obtain patient information when patients are unable to provide the information.
- Communicates with patient, family, and caregivers about initiation and changes of patient therapies.
- Empowers patients, family members, and caregivers regarding the patient's well-being and health outcomes.
- Demonstrates cultural competence.
- Demonstrates advocacy for patients, families, and caregivers.
- Maintains accuracy and confidentiality of patients' protected health information.

Objective R1.1.3: (Analyzing) Collect and analyze information to base safe and effective medication therapy.

Criteria:

- Collection/organization methods are efficient and effective.
- Collects relevant information about medication therapy, including:
    - History of present illness.
    - Pre-hospital course of care (e.g., medications given, vital sign trends, information from the scene, onset of illness/exposure/injury).
    - Relevant health data that may include past medical history, physical assessment findings, outside resources such as external medical records or pharmacy data.
    - Social history, including social-behavioral considerations that may impact medication management for the emergency medicine patient and preventative treatment of partners when appropriate.
    - Medication history, including prescription, non-prescription, illicit, recreational, and non-traditional therapies; other dietary supplements; immunizations; and allergies.
    - Patient assessment (e.g. physiologic monitoring, laboratory values, microbiology results, diagnostic imaging, procedural results, and scoring systems [e.g., Injury severity score (ISS), Glasgow Coma Scale (GCS), Richmond Agitation-Sedation Scale (RASS)/Sedation Agitation Scale (SAS), National Institutes of Health Stroke Scale (NIHSS), Emergency Severity Index (ESI), Rule of Nines, Lund and Browder chart]).
    - Pharmacogenomic and pharmacogenetic information, if available.
    - Allergy/Adverse drug reactions information.

    - Medication adherence and persistence.
    - Patient lifestyle habits, preferences and beliefs, health and functional goals, and socioeconomic factors that affect access to medications and other aspects of care.
- Consults most reliable sources of information available (e.g., electronic, face-to-face).
- Process for data collection, follow-up, and patient tracking is functional for subsequent problem solving and decision-making.
- Displays understanding of limitations of information in the emergency department and health records at the time of initial evaluation.
- Clarifies information with health care team, patient, or patient representative as needed.

Objective R1.1.4: (Analyzing) Analyze and assess information on which to base safe and effective medication therapy.

Criteria:

- Includes accurate assessment of patient's:
    - History of present illness.
    - Health and functional status at baseline.
    - Health data (e.g., vital signs, imaging, laboratory values, microbiology data).
    - Immunization status.
    - Cultural factors.
    - Access to medications.
    - Health literacy.
    - Other aspects of care, as applicable.
- Identifies medication therapy problems, including:
    - Benefit vs. risk factors of treatment options.
    - Medication omissions for present illness, symptoms, concomitant medication administration (e.g., sedation required with paralytics).
    - Lack of indication for medication.
    - Suboptimal medication regimen (e.g., dose, dosage form, route, method, duration of administration, frequency, duration of regimen).
    - Need for medication therapy modifications due to:
        - Suboptimal medication response.
        - Medication toxicity.
        - Adverse drug or device-related events or the potential for such events.
        - Abnormal lab values/imaging/microbiology.
    - Medication prescribed or continued inappropriately for a particular medical condition.
    - Discrepancy between prescribed medications and established care plan for the patient.
    - Therapeutic duplication.
    - Clinically significant drug–drug, drug–disease, drug–nutrient, drug–genotype interaction, drug–laboratory test interaction, or the potential for such interactions.
    - Use of harmful social, recreational, nonprescription, nontraditional, or other medication therapies.
    - Problems arising from the financial impact of medication therapy on the patient.
    - Patient not receiving full benefit of prescribed medication therapy.
    - Patient lacks understanding of medication therapy.
    - Patient not adhering to medication regimen and root cause (e.g., knowledge, recall, motivation, financial, system).
- Prioritizes patient's health care needs.
    - Triage based on severity of illness.
    - Manage multiple patients simultaneously.
    - Triage based on throughput as appropriate.
    - Delegate to other pharmacists as appropriate.

Objective R1.1.5: (Creating) Design, or redesign, safe and effective patient-centered therapeutic regimens and monitoring plans (care plans).

Criteria:

- Specify evidence-based, measurable, achievable therapeutic goals that include consideration of:
  - The patient's disease state(s).
  - Best evidence, including clinical guidelines and the most recent literature.
  - Effective interpretation of new literature for application to patient care.
  - Medication-specific information.
  - The goals of other interprofessional team members.
  - Relevant patient-specific information, including culture and preferences.
  - Ethical issues involved in the patient's care.
  - Quality-of-life issues specific to the patient.
  - End of life issues, when needed.
  - Integration of all the above factors influencing the goals of care.
- Designs/redesigns regimens that are appropriate for the disease state(s) being treated.
  - Reflect:
    - Clinical experience.
    - Evidence-based medicine.
    - Therapeutic goals established for the patient.
    - Patient's and caregiver's specific needs.
  - Consideration of:
    - Patient-specific factors, including physical, mental, emotional, patient preferences, culture, or language differences, and financial factors that might impact adherence to the regimen.
    - Any pertinent pharmacogenomic or pharmacogenetic factors.
    - Pharmacoeconomic components (patient, medical, and systems resources).
    - Pertinent ethical issues.
    - Drug shortages.
  - Adhere to the health system's medication-use policies.
  - Follow applicable ethical standards.
  - Address wellness promotion and lifestyle modification (e.g., appropriate hand hygiene and antibiotic adherence in *Clostridium difficile* positive patients, safe sex practices for patients diagnosed with sexually transmitted infections).
  - Support the organization's formulary or patient's insurance formulary.
  - Address medication-related problems and optimize medication therapy.
- Designs/redesigns monitoring plans that:
  - Effectively evaluate achievement of therapeutic goals.
  - Ensure adequate, appropriate, and timely follow-up.
  - Establish parameters that are appropriate measures of therapeutic goal achievement.
  - Reflect consideration of best evidence.
  - Have appropriate value ranges selected for the patient.
  - Have parameters that measure efficacy.
  - Have parameters that measure potential and actual adverse drug events.
  - Have parameters that are cost-effective.
  - Reflects consideration of compliance.
  - Anticipates future drug-related problems.
  - When applicable, reflects preferences and needs of the patient.

Objective R1.1.6: (Applying) Ensure implementation of therapeutic regimens and monitoring plans (care plans) for patients by taking appropriate follow-up actions.

Criteria:

- Effectively recommends or communicates patients' regimens and associated monitoring plans to relevant members of the interdisciplinary health care team.
- Poses appropriate questions as needed.

- Recommendation is persuasive.
- Presentation of recommendation accords patient's right to refuse treatment.
- If patient refuses treatment, resident exhibits responsible professional behavior.
- If the health care team refuses the resident's recommendation, exhibits responsible professional behavior.
- Creates an atmosphere of collaboration.
- Skillfully defuses negative reactions.
- Communication conveys expertise.
- Communication is assertive but not aggressive.
- Where the patient has been directly involved in the design of the plans, communication reflects previous collaboration appropriately.
- Ensures recommended plan is implemented effectively for the patient, including ensuring that the:
  - Plan represents the highest level of patient care.
  - Regimen is initiated at the appropriate time.
  - Patient receives their medication as directed.
  - Medications in situations requiring immediacy are effectively facilitated.
  - Medication orders are clear and concise.
  - Activity complies with the health system's policies and procedures.
  - Tests correspond with the recommended monitoring plan.
  - Tests are ordered and performed at the appropriate time.
- Takes appropriate action based on analysis of monitoring results (redesign regimen or monitoring plan if needed).
- Appropriately initiates, modifies, discontinues, or administers medication therapy as authorized.
- Responds appropriately to notifications and alerts in electronic medical records and other information systems that support medication ordering processes (based on factors such as patient weight, age, gender, comorbid conditions, drug interactions, renal function, and hepatic function).
- Provides thorough and accurate education to patients and caregivers, when appropriate, including information on medication therapy, adverse effects, adherence, appropriate use, handling, and medication administration.
- Addresses medication- and health-related problems and engages in preventive care strategies, including vaccine administration, as appropriate.

Objective R1.1.7: (Applying) Communicate and document direct patient care activities appropriately in the medical record, or where appropriate.

Criteria:

- Accurately and concisely communicates drug therapy recommendations to health care professionals representing different disciplines.
- Appropriately documents patient/caregiver communication and relevant direct patient care activities in a timely manner.

Objective R1.1.8: (Applying) Demonstrate responsibility for patient outcomes.

Criteria:

- Gives priority to patient care activities.
- Routinely ensures all steps of the medication management process are completed.
- Assumes responsibility for medication therapy outcomes.
- Actively works to identify the potential for significant medication-related problems.
- Actively pursues all significant existing and potential medication-related problems until satisfactory resolution is obtained.
- Communicates with patients and family members/caregivers about their medication therapy.
- Determines barriers to patient compliance and makes appropriate adjustments.

Goal R1.2: Ensure continuity of care during transitions between care settings.

Objective R1.2.1: (Applying) Manage transitions of care effectively.

Criteria:

- Provides accurate, pertinent, and timely follow-up information when patients transfer to another facility, level of care, pharmacist, or provider, as appropriate.
- Follows up on identified drug-related problems, additional monitoring, and education in a timely and caring manner.
- Participates in medication histories/reconciliation when necessary. Takes appropriate and effective steps to help avoid unnecessary hospital admissions or readmissions.

Goal R1.3: Manage and facilitate delivery of medications.

Objective R1.3.1: (Applying) Facilitate delivery of medications following best practices and local organization policies and procedures.

Criteria:

- Correctly interprets appropriateness of a medication order before preparing or permitting the distribution of the first dose, including:
  - Identifying, clarifying, verifying, and correcting any medication order errors.
  - Identifying existing or potential drug therapy problems.
  - Considering complete patient-specific information.
  - Determining an appropriate solution to an identified problem.
  - Securing consensus from the prescriber for modifications to therapy.
  - Ensuring that the solution is implemented.
- Prepares medication using appropriate techniques and follows the organization's policies and procedures and applicable professional standards in emergent and non-emergent situations, including:
  - Ensures intravenous solutions are appropriately concentrated, without incompatibilities; stable; and appropriately stored.
  - Adhering to appropriate safety and quality assurance practices.
  - Preparing labels that conform to the health system’s policies and procedures, as appropriate.
  - Ensuring that medication has all necessary and appropriate ancillary labels.
  - Inspecting the final medication before dispensing for accuracy.
- When dispensing medication products:
  - Follows the organization’s policies and procedures.
  - Ensures the patient receives the medication(s) as ordered.
  - Ensures the integrity of medication dispensed.
  - Provides any necessary information for the patient and support/education for relevant interdisciplinary staff (e.g., nursing, respiratory therapy).
  - Ensures the patient receives medication on time.
- Obtains agreement on modifications to medication orders when acting in the absence of, or outside, an approved protocol or collaborative agreement.
- Assesses appropriate contents of automatic dispensing cabinets and optimizes as necessary.
- References appropriate literature resources to ensure use of proper practices regarding compatibility and concentrations.

Objective R1.3.2: (Applying) Manage aspects of the medication-use process related to formulary management.

Criteria:

- Follows appropriate procedures regarding exceptions to the formulary in compliance with policy.
- Ensures non-formulary medications are evaluated, dispensed, administered, and monitored in a manner that ensures patient safety.

- Ensures that patients' own medications for use in the emergency department are in compliance with organization policy.

Objective R1.3.3: (Applying) Facilitate aspects of the medication-use process.

Criteria:

- Demonstrates commitment to medication safety.
- Makes effective use of technology to aid in decision-making and increase safety.
- Effectively prioritizes workload and organizes workflow.
- Checks accuracy of medications dispensed, including correct patient identification, medication, dosage form, label, dose, number of doses, and expiration dates; and proper repackaging and relabeling medications, including compounded medications (sterile and nonsterile).

Competency Area R2: Advancing Practice and Improving Patient Care

Goal R2.1: Demonstrate ability to manage formulary and medication-use processes, as applicable to the organization.

Objective R2.1.1: (Creating) Prepare or revise a drug class review, monograph, treatment guideline, or protocol.

Criteria:

- Displays objectivity.
- Effectively synthesizes information from available literature and applies evidenced-based principles for advancing pharmacotherapy knowledge.
- Consults relevant sources.
- Considers medication-use safety and resource utilization.
- Uses the appropriate format.
- Effectively communicates any changes in medication formulary, medication usage, or other procedures to appropriate parties.
- Demonstrates appropriate assertiveness and timeliness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.
- When appropriate, may include proposals for medication-safety technology improvements.

Objective R2.1.2: (Analyzing) Identify opportunities for improvement of the medication-use system.

Criteria:

- Identifies problems and opportunities for improvement.
- Analyzes relevant background data.
- Evaluates data generated by health information technology or automated systems to identify opportunities for improvement.
- Utilizes best practices to identify opportunities for improvements.
- When needed, makes medication-use policy recommendations based on a review of practice standards, guidelines, and other evidence (e.g., National Quality Measures, Institute for Safe Medication Practices alerts, Joint Commission sentinel alerts).

Goal R2.2: Demonstrate ability to conduct a quality improvement or research project to improve patient care or for advancing the pharmacy profession.

Ideally, objectives R2.2.1-R2.2.6 will be addressed through residents working on one quality improvement or research project. However, if this is not possible, all objectives must be addressed by the end of the residency year and can be addressed through work on more than one project.

Objective R2.2.1: (Analyzing) Identify and/or demonstrate understanding of specific project topic.

Criteria:

- Appropriately identifies or understands problems and opportunities for improvement or research projects.
- Uses best practices or evidence-based principles to identify opportunities for improvements.
- Conducts a comprehensive literature search and draws appropriate conclusions.
- Determines an appropriate research question or topic for a practice-related project of significance to patient care that can realistically be addressed in the desired time frame.
- Accurately evaluates or assists in the evaluation of data generated by health information technology or automated systems to identify opportunities for improvement.

Objective R2.2.2: (Creating) Develop a plan or protocol for the project.

Criteria:

- Develops specific aims, selects an appropriate study design, and develops study methods to answer the research question(s).
- Applies safety design practices (e.g., standardization, simplification, human factors training, lean principles, FOCUS-PDCA, STROBE other process improvement or research methodologies) appropriately and accurately.
- Considers who or what will be affected by the project.
- Plan for improvement includes appropriate reviews and approvals required by the department or organization and addresses concerns of all stakeholders.
- Applies evidence-based and/or basic pharmacoeconomic principles, if needed.
- Identifies and obtains necessary approvals (e.g., IRB, quality review board, funding) and responds promptly to feedback or reviews for a practice-related project.
- Acts in accordance with the ethics of research on human subjects, if applicable.
- Plan design is practical to implement.
- Develops and follows an appropriate research or project timeline.

Objective R2.2.3: (Evaluating) Collect and evaluate data for the project.

Criteria:

- Collects the appropriate types of data as required by project design.
- Uses appropriate electronic data and information from internal information databases, external online databases, appropriate Internet resources, and other sources of decision support.
- Uses appropriate methods for analyzing data.
- Considers the impact of the limitations of the project or research design on the interpretation of results.
- Accurately and appropriately develops plan to address opportunities for additional changes.
- Improvement plan, if applicable, is based on appropriate data.

Objective R2.2.4: (Applying): Implement an improvement project or conduct research activities.

Criteria:

- Implements the project as specified in its design.
- Follows established timeline.
- Effectively presents plan (e.g., accurately recommends or contributes to recommendation for operational change, formulary addition or deletion, implementation of medication guideline or restriction, or treatment protocol implementation) to appropriate audience.

- Demonstrates appropriate assertiveness in presenting pharmacy concerns, solutions, and interests to external stakeholders.
- Gains necessary commitment and approval for implementation.
- Effectively communicates any changes in clinical practice, medication formulary, medication usage, or other procedures to appropriate stakeholders.

Objective R2.2.5: (Evaluating) Assess changes or need to make changes related to the project.
Criteria:

- Correctly identifies need for additional modifications or changes based on outcome.
- Uses continuous quality improvement (CQI) principles to assess the success of the implemented change and sustainability if applicable.
- Accurately and appropriately develops plan to address opportunities for additional changes.

Objective R2.2.6: (Creating) Effectively develop and present, orally and in writing, a final project or research report suitable for publication at a local, regional, or national conference.
Criteria:

- Report includes implications for changes to or improvement in clinical care or pharmacy practice.
- Outcome of change is reported accurately to appropriate stakeholders(s) and policy-making bodies according to departmental or organizational processes.
- Oral presentations use effective communication and presentation skills and tools (e.g., handouts, slides) to convey points successfully.
- Report uses an accepted manuscript style suitable for publication in the professional literature.

Competency Area R3: Leadership and Management

Goal R3.1: Demonstrate leadership skills for successful self-development in the provision of patient care.

Objective R3.1.1: (Applying) Demonstrate personal, interpersonal, and teamwork skills critical for effective leadership in the provision of patient care.
Criteria:

- Demonstrates ability to lead interprofessional teams.
- Uses effective communication skills and styles.
- Demonstrates effective negotiation skills.
- Demonstrates understanding of perspectives of various health care professionals.
- Manages conflict effectively.
- Effectively expresses benefits of personal profession-wide leadership and advocacy.
- Effectively provides leadership in patient care related services, including interprofessional teams (e.g., cardiac arrest, rapid response, stroke teams).

Objective R3.1.2: (Applying) Apply a process of ongoing self-evaluation and personal performance improvement in the provision of patient care.
Criteria:

- Accurately summarizes own strengths and areas for improvement (in knowledge, values, qualities, skills, and behaviors).
- Effectively uses a self-evaluation process for developing professional direction, goals, and plans.
- Effectively engages in self-evaluation of progress on specified goals and plans.
- Demonstrates ability to use and incorporate constructive feedback from others.

- Effectively uses principles of continuous professional development (CPD) planning (reflect, plan, act, evaluate, record/review).

Goal R3.2: Demonstrate management skills in the provision of patient care.

Objective R3.2.1: (Applying) Contribute to departmental management.
Criteria:

- Helps identify and define significant departmental needs.
  - Staffing needs.
  - Scheduling and contingencies.
  - Staff qualifications.
  - Assesses and develops educational opportunities.
- Helps develop plans that address departmental needs.
  - Orientation.
  - Training and supervision.
  - Competency development.
  - Effectively participate in, or evaluate, strategic plan.
  - Regulatory compliance.
- Participates effectively on committees or informal work groups to complete group projects, tasks, or goals.
- Participates effectively in implementing changes, using change management and quality improvement best practices and tools, consistent with team, departmental, and organizational goals.

Objective R3.2.2: When presented with a drug shortage, identify appropriate alternative medications.
Criteria:

- States resources for identifying medications in short supply.
- Demonstrates understanding of strategies for making optimal choices for alternative medications.
- Demonstrates understanding of the organization's system for communicating information regarding drug shortages.

Objective R3.2.3: Participate in the organization's system for reporting medication errors and adverse drug events (ADEs).
Criteria:

- Appropriately and accurately determines, investigates, reports, tracks, and trends adverse drug events, medication errors, and efficacy concerns using accepted institutional resources and programs.
- Create an objective report of the medication error, ADE, or near miss event in the organization's reporting system.
- If applicable, analyze medication error, ADE, or near miss events to determine root cause.
- If applicable, develop a plan to improve process that led to medication error or near miss event in the emergency department.

Objective R3.2.4: (Applying) Manage one's own emergency medicine practice effectively.
Criteria:

- Evaluate clinical practice activities for potential contributions to scholarship.
- Accurately assesses successes and areas for improvement in managing one's own practice.
- Makes accurate, criteria-based assessments of one's own ability to perform practice tasks.
- Regularly integrates new learning into subsequent performances of a task until expectations are met.
- Demonstrates personal commitment to and adheres to organizational and departmental policies and procedures.
- Routinely seeks applicable learning opportunities.
- Demonstrates effective workload and time-management skills.

- Assumes responsibility for personal work quality and improvement.
- Is well prepared to fulfill responsibilities (e.g., patient care, presentations, projects, meetings).
- Sets and meets realistic goals and timelines.
- Demonstrates awareness of own values, motivations, and emotions.
- Demonstrates enthusiasm, self-motivation, and a “can-do” approach.
- Strives to maintain a healthy work–life balance.
- Works collaboratively within the organization’s political and decision-making structure.
- Demonstrates pride in and commitment to the profession through appearance and personal conduct.
- Develop a plan to pursue board certification.
- Demonstrates pride in and commitment to emergency medicine through membership in professional organizations related to emergency medicine pharmacy.

Competency Area R4: Teaching, Education, and Dissemination of Knowledge

Goal R4.1: Provide effective medication and practice-related education to patients, caregivers, health care professionals, students, and the public.

Objective R4.1.1: (Applying) Design effective educational activities.
Criteria:
- Accurately defines educational needs, including learning styles, with regard to target audience (e.g., individual versus group) and learning level (e.g., health care professional versus patient, student versus PGY1 resident).
- Selects topics of significance to emergency medicine pharmacy as outlined in the appendix.
- Defines educational objectives that are specific, measurable, at a relevant learning level (e.g., applying, creating, evaluating), and address the audiences’ defined learning needs.
- Plans use of teaching strategies that match learner needs, including active learning (e.g., patient cases, polling).
- Selects content that is relevant, thorough, evidence based (using primary literature where appropriate), timely and reflects best practices.
- Includes accurate citations and relevant references and adheres to applicable copyright laws.

Objective R4.1.2: (Applying) Use effective presentation and teaching skills.
Criteria:
- Demonstrates rapport with learners.
- Captures and maintains learner/audience interest throughout the presentation.
- Implements planned teaching strategies effectively.
- Effectively facilitates audience participation, active learning, and engagement in various settings (e.g., small or large group, distance learning).
- Presents at appropriate rate and volume and without exhibiting poor speaker habits (e.g., excessive use of “um” and other interjections).
- Body language, movement, and expressions enhance presentations.
- Summarizes important points at appropriate times throughout.
- Transitions smoothly between concepts.
- Effectively uses audio-visual aids and handouts to support learning activities.

Objective R4.1.3: (Applying) Use effective written communication to disseminate knowledge.
Criteria:

- Demonstrates thorough understanding of the topic.
- Writes in a manner that is easily understandable and free of errors.
- Includes critical evaluation of the literature and knowledge advancements or a summary of what is currently known on the topic.
- Develops and uses tables, graphs, and figures to enhance reader's understanding of the topic when appropriate.
- Writes at a level appropriate for the target readership (e.g., physicians, pharmacists, other health care professionals, patients, the public).
- Notes appropriate citations and references.
- Creates one's own work and does not engage in plagiarism.

Objective R4.1.4: (Applying) Appropriately assess effectiveness of education.
Criteria:
- Selects assessment method (e.g., written or verbal assessment or self-assessment questions, case with case-based questions, learner demonstration of new skill) that matches activity.
- Provides timely, constructive, and criteria-based feedback to learner.
- If used, assessment questions are written in a clear, concise format that reflects best practices for test item construction.
- Determines how well learning objectives were met.
- Plans for follow-up educational activities to enhance or support learning and ensure that goals were met.
- Identifies ways to improve education-related skills.
- Obtains, reviews, and applies feedback from learners and others to improve effectiveness as an educator.

Goal R4.2: Effectively employ appropriate preceptor roles when engaged in teaching students, pharmacy technicians, or fellow health care professionals.

Objective R4.2.1: (Analyzing) When engaged in teaching, select a preceptor role that meets learners' educational needs.
Criteria:
- Identifies which preceptor role is applicable for the situation (direct instruction, modeling, coaching, facilitating).
    - Selects direct instruction when learners need background content.
    - Selects modeling when learners have sufficient background knowledge to understand the skill being modeled.
    - Selects coaching when learners are prepared to perform a skill under supervision.
    - Selects facilitating when learners have performed a skill satisfactorily under supervision.

Objective R4.2.2: (Applying) Effectively employ preceptor roles (instructing, modeling, coaching, or facilitating).
Criteria:
- Instructs students, technicians, or others as appropriate.
- Models skills, including "thinking out loud," so learners can "observe" critical-thinking skills.
- Coaches, including effective use of verbal guidance, feedback, and questioning, as needed.
- Facilitates, when appropriate, by allowing learner independence and using indirect monitoring of performance.

Competency Area: R5: Management of Medical Emergencies

Goal R5: Participate in and exercise leadership in the management of medical emergencies.

Objective R5.1.1: (Applying) Demonstrate the essential role of the emergency pharmacist in the management of medical emergencies.

Criteria:

- Acts in accordance with the organization's policies and procedures for medical emergencies or emergency department surge capacity event.
- Effectively anticipates medication needs during medical emergencies.
- Proactively contributes to management of medical emergencies by making patient-specific, evidence-based recommendations to the interdisciplinary team.
- Accurately prepares medications and calculates doses during medical emergencies.
- Effectively addresses patient safety concerns that may arise when members of the interdisciplinary team are required to make complex care decisions under time constraints.
- Obtains certification in Advanced Cardiac Life Support. If available, obtains certifications in Pediatric Advanced Life Support, Advanced Trauma Life Support (audit), Advanced Burn Life Support, and Advanced HazMat Life Support.
- Participates in simulation activities as available at the organization.

Objective R5.1.2: (Applying) Exercise leadership as a team member in the management of medical emergencies.

Criteria:

- Quickly analyzes situation to identify potential causes of patient instability.
- Collaborates with interdisciplinary team to identify appropriate treatment during medical emergencies.
- Contributes to the success of the interdisciplinary team by tactfully assessing recommendations made by the team during medical emergencies or debriefing.
- Contributes to the success of the interdisciplinary team by tactfully offering suggestions for medications omitted by the team during medical emergencies.

Objective R5.1.3: (Complex Overt Response) When allowed by the organization, exercise skill in the administration of emergency medications.

Criteria:

- Ensure the five rights of medication administration including: right patient; right drug; right dose; right route; and right time.
- Perform aseptic technique (when time permits) when preparing and administering intravenous, intraosseous, or intramuscular medications.
- Ensure patency of intravenous or intraosseous lines prior to administration.
- When administering medications intramuscularly, select appropriate site of administration based on medication (volume, concentration) and patient specific factors (preferred sites based on age, patient's hemodynamic status, and predicted absorption of medication).
- Evaluate patient's ability to swallow prior to the administration of oral medication.

Competency Area R6: Management of Toxicology Patients

Goal R6.1: Describe the role of the poison center or medical toxicologist in the care of the toxicology patient.

Objective R6.1.1: (Understanding) Explain the collaboration between the medical toxicologist, poison center and emergency department.

Criteria:

- Demonstrates understanding of the role of poison centers in the care of toxicology patients.
- Demonstrates understanding of the role of the medical toxicologist in the care of toxicology patients.
- Demonstrates understanding of specific situations in which the emergency medicine clinical pharmacist/poison center may optimize patient care.
- Explains the pharmacy training requirements for board certification in clinical toxicology.

Goal R6.2: Demonstrate the ability to provide appropriate evidenced-based recommendations for the patient in need of toxicologic intervention.

Objective R6.2.1: (Evaluating) Assess patients in need of toxicologic intervention.

Criteria:

- Demonstrates understanding of the general approach to treating toxicology patients.
- Demonstrates understanding of common toxidromes and their presentation in the initial assessment of the patient.
- Effectively selects and recommends options for decontamination, as appropriate, for patients presenting to the emergency department.
- Demonstrates understanding of resources available to gather information related to toxic ingestions.
- Effectively uses medical references to gather information related to toxic ingestion or exposure management and treatment.
- Identifies and explains the most common exposures as specified by the American Academy of Clinical Toxicology (AACT).

Objective R6.2.2: (Applying) Participate in the management of a patient in need of toxicologic intervention.

Criteria:

- Effectively uses recommended physiologic monitoring and diagnostic testing options for specific ingestions or exposures.
- Demonstrates understanding of how to interpret physical exam, physiologic monitoring, laboratory data, and diagnostic testing results for specific ingestions or exposures.
- Explains the mechanism of action of toxins in acute and chronic poisoning or exposure.

Objective R6.2.3: (Creating) Prioritize and specify appropriate pharmacologic and supportive measures for the management of a patients in need of toxicologic intervention.

Criteria:

- Demonstrates understanding of the time sensitivity of antidote administration for specific toxins.
- Appropriately considers patient-specific data in determination of antidote or other supportive treatment.
- Explains the mechanism of action of antidote therapy in treating toxicologic ingestions or exposures.

- Determines appropriate dosing and administration of common antidotes.
- Uses appropriate monitoring during common antidote administration.
- Demonstrates understanding of exposures common to various geographic locations (e.g., envenomations in the South and West) and specific practice settings (rural versus urban versus industrial).
- Develops appropriate evidence-based plans for the care of toxicologic patients until hospital discharge.

Elective Educational Outcomes, Goals, and Objectives for Postgraduate Year Two (PGY2) Pharmacy Residencies in Emergency Medicine

Competency Area E1: Academia

Goal E1.1: Demonstrate understanding of key elements of the academic environment and faculty roles within it.

Objective E1.1.1: (Understanding) Demonstrates understanding of key elements of the academic environment and faculty roles within it.

Criteria:

- Accurately describes variations in the expectations of different colleges/schools of pharmacy for teaching, practice, research, and service, including public versus private colleges/schools of pharmacy and relationships between scholarly activity and teaching, practice, research and service.
- Accurately describes the academic environment, including how the decisions by university and college administration impact the faculty and how outside forces (e.g., change in the profession, funding source, accreditation requirements) that impact administrator and faculty roles.
- Accurately describes faculty roles and responsibilities.
- Accurately describes the types and ranks of faculty appointments, including the various types of appointments (e.g., non-tenure, tenure-track, and tenured faculty), various ranks of faculty (e.g., instructor, assistant professor, associate professor, full professor), and the role and implications of part-time and adjunct faculty as schools continue to expand and faculty shortages occur, and promotion and tenure process for each type of appointment, including types of activities that are considered in the promotion process and for tenure.
- Accurately explains the role and influence of faculty in the academic environment, including faculty in governance structure (e.g., the faculty senate, committee service) and faculty related to teaching, practice, research, and service roles (e.g., curriculum development and committee service).
- Accurately identifies resources available to help develop academic skills, including the role of academic-related professional organizations (e.g., AACP) and other resources to help develop teaching skills and a teaching philosophy.
- Accurately identifies and describes ways that faculty maintain balance in their roles.
- Accurately describes typical affiliation agreements between a college of pharmacy and a practice site (e.g., health system, hospital, clinic, community pharmacy).

Goal E1.2: Exercise case-based and other teaching skills essential to pharmacy faculty.

Objective E1.2.1: (Applying) Develop and deliver cases for workshops and exercises for laboratory experiences.

Criteria:

- Identifies the appropriate level of case-based teachings for small group instruction.
- Identifies appropriate exercises for laboratory experiences.
- Provides appropriate and timely feedback to improve performance.

Objective E1.2.2: (Evaluating) Compare and contrast methods to prevent and respond to academic and profession dishonesty and adhere to copyright laws.

Criteria:

- Accurately evaluates physical and attitudinal methods to prevent academic dishonesty.

- Accurately describes methods of responding to incidents of academic dishonesty.
- Accurately explains the role of academic honor committees in cases of academic dishonesty.
- Identifies examples and methods to address unprofessional behavior in learners.
- Accurately describes copyright regulations as related to reproducing materials for teaching purposes.
- Accurately describes copyright regulations as related to linking and citing on-line materials.

Goal E1.3: Develops and practices a philosophy of teaching.

Objective E1.3.1: (Creating) Develop or update a teaching philosophy statement.

Criteria:

- Teaching philosophy includes:
  - Self-reflection on personal beliefs about teaching and learning.
  - Identification of attitudes, values, and beliefs about teaching and learning.
  - Illustrates personal beliefs on practice and how these beliefs and experiences are incorporated in a classroom or experiential setting with trainees.
  - If updating, reflect on how one's philosophy has changed.

Objective E1.3.2: (Creating) Prepare a practice-based teaching activity.

Criteria:

- Develops learning objectives using active verbs and measureable outcomes.
- Plans teaching strategies appropriate for the learning objectives.
- Ensures activity is consistent with learning objectives in course syllabus.
- Uses materials that are appropriate for the target audience.
- Organizes teaching materials logically.
- Plans relevant assessment techniques.
- When used, develops examination questions that are logical, well-written, and test the learners' knowledge rather than their test-taking abilities.
- Participates in a systematic evaluation of assessment strategies (e.g., post-exam statistical analysis) when appropriate.

Objective E1.3.3: (Applying) Deliver a practice-based educational activity, including didactic or experiential teaching, or facilitation.

Criteria:

- Uses effective skills in facilitating small and large groups.
- Incorporates at least one active learning strategy in didactic experiences appropriate for the topic.
- For experiential activities:
  - Organizes student activities (e.g., student calendar).
  - Effectively facilitates topic discussions and learning activities within the allotted time.
  - Effectively develops and evaluates learner assignments (e.g., journal clubs, presentations, SOAP notes).
  - Effectively assesses student performance.
  - Provides constructive feedback.

Objective E1.3.4: (Creating) Effectively document one's teaching philosophy, skills, and experiences in a teaching portfolio.

Criteria:

- Portfolio includes:
  - Teaching philosophy.
  - Curriculum vitae.

- Teaching materials including slides and other handouts for each teaching experience.
- Documented self-reflections on one's teaching experiences and skills, including strengths, areas for improvement, and plans for working on the areas for improvement.
- Peer/faculty evaluations.
- Student/learner evaluations.

Competency Area E2: Leadership and Practice Management Skills

Goal E2.1: Exhibits additional skills of a practice leader.

Objective E2.1.1: (Creating) Develops an effective proposal for a new emergency medicine pharmacy initiative.

Criteria:

- Effectively employs clinical, humanistic, and economic outcome strategies to justify emergency medicine pharmacy services, as applicable.

Objective E2.1.2: (Applying) Implements an effective proposal for a new emergency medicine pharmacy service.

Criteria:

- Employs effective strategies to implement a new initiative
- Appropriately evaluates outcomes of the new initiative.
- Appropriately documents outcomes of new initiative.

Competency Area E3: Medication-Use Evaluation

Goal E3.1: Lead a medication-use evaluation.

Objective E3.1.1: (Evaluating) Lead a medication-use evaluation related to care of emergency medicine patients.

Criteria:

- Explain the medication-use processes and patients' vulnerability to medication errors or adverse drug events (ADEs).
- Utilizes best practices to identify opportunities for improvements.
- Evaluates data generated by health information technology or automated systems to identify opportunities for improvement.
- Identifies problems and opportunities for improvement and analyzes relevant background data.
- Demonstrates a systematic approach to develop medication-use evaluation.
- Analyze the structure and process and measure outcomes of the medication-use processes.
- When needed, makes medication-use policy recommendations based on a review of practice standards, guidelines, and other evidence (e.g., National Quality Measures, Institute for Safe Medication Practices alerts, Joint Commission sentinel alerts).
- Other examples include performing an MUE, or implementing some metric or measure in the practice setting, evaluating results, and suggesting a plan for improvement.
- Demonstrates appropriate confidence and assertiveness in presenting pharmacy concerns, solutions, and interests to internal and external stakeholders.
- Implements approved changes, as applicable.

Goal E3.2: Develop communication strategies related to formulary restrictions.

Objective E3.2.1: (Creating) Formulate effective strategies for communicating formulary restrictions to emergency medicine providers.

Criteria:

- Demonstrates understanding of types of communication to disseminate formulary information.
- Identifies instances when formulary changes should be communicated immediately.
- Develops communication related to formulary changes or restrictions.

Goal E3.3: Participate in the health system's formulary process for pharmacotherapeutic agents used in the emergency department setting.

Objective E3.3.1: (Creating) Prepare monographs for pharmacotherapeutic agents used in the emergency department setting to make formulary status recommendations.

Criteria:

- Applies evidenced-based principles in reviewing data on pharmacotherapeutic class.
- Consults sources relevant to the emergency department.
- Considers medication-use safety and resource utilization.
- Displays objectivity and relevance of agent(s).
- Effectively synthesizes information from the available literature.

Objective E3.3.2: (Creating) Make recommendations for pharmacotherapeutic class decisions based on comparative reviews concerning the patient populations within the emergency department setting.

Criteria:

- Demonstrates leadership and appropriate assertiveness in presenting pharmacy concerns, solutions, and interests.
- Considers impact of class decision on patient length of stay and revisit rates.
- Considers pharmacoeconomic impact to the health care system.
- Considers exceptions to the formulary, if applicable, in compliance with policy.

Competency Area E4: Emergency Medicine Pharmacy Information

Goal E4.1: Provide concise, applicable, comprehensive, and timely responses to formalized requests for drug information pertaining to emergency medicine from patients, health care providers, and the public.

Objective E4.1.1: (Analyzing) Discriminate between the requesters' statement of need and the actual drug information need by asking for appropriate additional information.

Criteria:

- Demonstrates understanding of the characteristics of a clearly stated clinical question.
- Understands the time-frame the requester requires a response.

Objective E4.1.2: (Creating) Formulate a systematic, efficient, and thorough procedure for retrieving drug information.

Criteria:

- Demonstrates understanding of the characteristics of each of the available resources for biomedical literature.
- Able to effectively use resources to obtain appropriate primary, secondary, and tertiary literature to answer the question.
- State sources of evidence-based meta-analysis reviews.

Objective E4.1.3: (Analyzing) Determine from all retrieved biomedical literature the appropriate information to evaluate.

Criteria:

- Demonstrates the ability to narrow the literature based on intended content and scope of search.
- Determines which references are most applicable based on publication date, desired article type for inclusion, and content.

Objective E4.1.4: (Evaluating) Evaluate the usefulness of biomedical literature gathered.

Criteria:

- Effectively assesses the potential for bias of the author or preparer of all forms of drug information.
- Determines whether a study's methodology is adequate to support its conclusions.
- Determines whether the endpoints established for a study are appropriate.
- Demonstrates understanding of:
  - Strengths and limitations of different study designs.
  - Methods used to test study end point.
  - Effects of various methods of patient selection (e.g., healthy volunteers, patients, or patients with different disease severity) on study outcomes.
  - Effects of various methods of blinding (e.g., double-blind, single-blind, open-label, observational research designs) on study outcomes.
  - Types of pharmacotherapy studies (e.g., pharmacokinetic, economic, dynamic) and the kind(s) of data analysis appropriate for each.
  - How the choice of statistical methods used for data analysis affects the interpretation of study results and conclusions.
  - Determines if a study's findings are statistically and/or clinically significant.

Objective E4.1.5: (Creating) Formulate responses to drug information requests based on analysis of the literature.

Criteria:

- Responds to drug information requests in a timely manner.
- Demonstrates the ability to utilize appropriate references when formulating a response.
- Communicates responses professionally.
- Tailors the response based on those requesting the information (e.g., pharmacist versus physician versus nurse).

Objective E4.1.6: (Evaluating) Assess the effectiveness of drug information recommendations.

Criteria:

- Provides timely, constructive, and criteria-based instructions and feedback to those executing recommendations.
- Determines how closely the recommendations were followed.
- Identifies ways to improve the delivery of drug information recommendations.
- Obtains, reviews, and applies feedback from others to improve effectiveness in delivering drug information recommendations.

Goal E4.2: Develop a core library of references appropriate for emergency medicine pharmacy practice.

Objective E4.2.1: (Applying) Develop and maintain a core library of primary, secondary, and tertiary references appropriate for emergency medicine pharmacy practice, education, and research.
Criteria:

- Includes references which may be current to clinical practice or historically significant.
- Demonstrates the ability to scrutinize references for inclusion into core library of references.
- Identifies methods learners are interested in using for application in educational activities (e.g., didactic lectures/cited references, blogs, podcasts, webinars, simulation training).
- Demonstrates ability to apply preferred learning methods into practice, education or research.

Competency Area E5: Management of Mass Casualty Events

Goal E5:1: Participate in the planning or management of mass casualty events.

Objective E5.1.1: (Creating) Participate in the development or revision of the emergency medicine elements of organizational plans for the management of mass casualty events.
Criteria:

- Include the essential emergency medicine-related components of an organization's plan for the management of mass casualty events.
- Ensure involvement of those who should participate in the development of an organization's plan for the management of mass casualty events.
- Participates effectively on committees or informal work groups to plan and prepare for mass casualty event response.

Objective E5.1.2: (Applying) Exercise skill in the training of staff or implementing programs as specified in the organization's emergency preparedness plans.
Criteria:

- Helps identify and define significant departmental needs related to preparation and training for mass casualty events.
  - Manpower/staffing.
  - Regulatory compliance.
- Identify or develops educational opportunities for mass casualty training including:
  - Didactic or small group review content.
  - Simulation training.
  - Training of pharmacy and non-pharmacy health care providers.

Competency Area E6: Medical Writing

Goal E6.1: Write and submit for publication an emergency medicine pharmacy-related article.

Objective E6.1.1: (Applying) Write an article for a publication on an emergency medicine pharmacy-related topic.

Criteria:

- Selects appropriate publication for the article (e.g., newsletter, abstract, or peer-reviewed).
- Writes in a style appropriate for the audience of the publication (e.g., health care professional or the public).

Objective E6.1.2: (Creating) Submit an article on an emergency medicine-related topic.

Criteria:

- Article is suitably formatted.
- Follows appropriate submission procedures.
- Effectively addresses reviewer comments, if applicable.

Competency Area E7: Pre-Hospital Care

Goal E7.1: Demonstrates understanding of the various pre-hospital professionals in the provision of care of emergency medicine patients.

Objective E7.1.1: (Applying) Demonstrates teamwork skills in collaborating with pre-hospital professionals during the care of emergency medicine patients.

Criteria:

- Appropriately identifies various pre-hospital team members.
- Understands pre-hospital protocols and medication formularies.
- Identifies interventions or treatments administered prior to hospital arrival.
- Participates in direct patient care experiences with different types of pre-hospital professionals as allowed by institutional policies and procedures.

Objective E7.1.2: (Applying) Demonstrates understanding of the organization's system for communicating to and receiving information from pre-hospital professionals.

Criteria:

- Understands the limitations of information given from pre-hospital professionals at the time of initial evaluation.
- Explains the pathways in which institutional providers receive or communicate with pre-hospital professional.

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The effective date for implementation of these educational outcomes, goals and objectives is July 1, 2018.

Appendix

Core Areas or Types of Patient Care Experiences

The list of topics below represents core therapeutic areas, disease states, and emergency medicine topics that graduates of PGY2 Emergency Medicine programs are expected to have adequate knowledge of to provide patient care and comprehensive pharmacotherapy management. PGY2 Emergency Medicine programs must provide sufficient experiences for residents to meet this requirement.

Residents are required to have direct patient care experience for topics listed in the first column, "**Required Direct Patient Experience"**. Topics in the second and third columns, **"Required Direct or Non-direct Patient Experience"** and **"Elective Direct or Non-direct Patient Experience"** may be covered by direct patient experience, case-based application, didactic instruction, topic discussion, simulation, or other alternative approach. Elective topics, in the third column, may be included if applicable to the patient population.

Programs should track progress on the topic areas throughout the residency year.

Topic Areas	Required		Elective
	Direct Patient Experience	**Direct or Non-direct Patient Experience**	**Direct or Non-direct Patient Experience**
Cardiovascular	• Acute coronary syndromes • Acute decompensated heart failure • Hypertensive urgency/emergency	• Acute aortic dissection • Arrhythmias (atrial or ventricular)	• Pericardial tamponade • Pericarditis • Pulmonary hypertension
Dermatology		• Burns (thermal, chemical, electrical) • Drug Reactions • Stevens Johnson Syndrome/Toxic Epidermal Necrolysis • Topical and local anesthesia	• Erythema multiforme • Gout exacerbation • Rash (e.g., poison ivy)
Endocrine	• Glycemic control • Hyperglycemic crisis	• Adrenal crisis/insufficiency • Myxedema coma • Thyroid storm	• SIADH
Emergency Preparedness		• Decontamination • Disaster preparedness/ National incident management system • Medical Surge Capacity and Capability	• Advanced HAZMAT life support • Bioterrorism • Nerve agents • Radiation exposure
Environmental		• Hyperthermia • Hypothermia	• Altitude illness • Carbon monoxide • Drowning/near drowning
Gastrointestinal and Hepatic	• Acute Upper and Lower Gastrointestinal bleeding	• Acute liver failure/cirrhosis	• Esophageal foreign body • Pancreatitis

Topic Areas	Required		Elective
	Direct Patient Experience	**Direct or Non-direct Patient Experience**	**Direct or Non-direct Patient Experience**
	• Nausea/vomiting	• Constipation /diarrhea • Peptic ulcer disease	
Hematology	• Reversal of anticoagulants • Thromboembolic disease (e.g., deep vein thrombosis, pulmonary embolism)	• Benign heme disorders (e.g., anemias, hemophilia, sickle cell disease) • Coagulopathies	• Hypercalcemia of malignancy • Tumor lysis syndrome
Infectious Diseases	• Bites (animal, human) • Influenza • Pneumonia • Sepsis • Sexual transmitted infections • Skin and soft tissue infections • Urinary tract infection • Vaccinations	• Conjunctivitis • Dental infections • Epiglottitis • Endocarditis • Intra-abdominal infections • Meningitis • Occupational/non-occupational antiretroviral post exposure prophylaxis • Sinusitis/otitis media • Streptococcal pharyngitis	• Bone/joint infections • Febrile neutropenia • Food and waterborne illness • Hepatitis • Parasites/worms • Toxic shock syndromes • Tuberculosis • Wilderness medicine
Neurology	• Acute hemorrhagic stroke • Acute ischemic stroke • Status epilepticus/ seizures	• Increased intracerebral pressure management • Migraine and headaches	• Neuroleptic malignant syndrome • Myasthenia gravis • Ventriculostomy
Obstetrics		• Ectopic pregnancy • Preeclampsia and eclampsia • Resuscitation in pregnancy	• Miscarriage/ spontaneous abortion
Pain and Sedation	• Acute agitation • Acute pain management • Post-intubation sedation/analgesia • Procedural sedation	• Psychosis and delirium	
Pulmonary	• Asthma exacerbation • Chronic obstructive pulmonary disease exacerbation • Rapid sequence intubation (RSI)	• Mechanical ventilation • Noninvasive airway management	• Acute respiratory distress syndrome (ARDS) • Pneumothorax
Renal and Genitourinary	• Acid base disorders • Acute kidney injury/End-stage renal disease • Fluids and electrolytes	• Priapism • Renal colic/ urolithiasis • Renal replacement therapy • Rhabdomyolysis	

Topic Areas	Required		Elective
	Direct Patient Experience	**Direct or Non-direct Patient Experience**	**Direct or Non-direct Patient Experience**
Resuscitation	• Advanced cardiac life support • Hemodynamic monitoring/management • Routes of medication administration • Shock states	• Pediatric advanced life support	• Mechanical devices (e.g., ECMO, ECLS, ventricular assisted devices) • Surgical airways
Special Populations		• Age-specific (pediatric and geriatric) dosing considerations • Angioedema (ACEI induced and hereditary) • Pediatric/ neonatal febrile seizures • Resuscitation in neonatal and pediatric	• Common infections in children (e.g., croup, meningitis, otitis media/externa, pertussis, RSV, sepsis)
Toxicology	• Acetaminophen Approach to the toxic patient • Gastric decontamination/elimination • Opioids • Salicylates • Withdrawal syndromes	• Antidepressants/Antipsychotics • Beta-blockers and calcium channel blockers • Occupational exposures • Sedatives	• Antiepileptics • Antihypertensives • Caustic ingestions • Cyanide • Digitalis • Heavy metals • Iron • Poisonous plants • Toxic alcohols
Trauma	• Antibiotic prophylaxis	• Coagulopathy of trauma • Open fractures • Spinal cord injury • Traumatic brain injury • Trauma resuscitation	• Massive transfusion • Thorocostomy/thoracotomy

Appendix G-1

Emergency Medicine Pharmacy Bibliography

Emergency Medicine Petition
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Appendix G-2

Annotated Literature Review

APPENDIX G-2
Annotated Literature Review
Emergency Medicine Pharmacists

Position Papers/Support Statements

Citation	Summary	Conclusion	Relevance to BPS Petition
American College of Emergency Physicians. Clinical pharmacist services in the emergency department. Mar 2018. Available at: https://www.acep.org/patient-care/policy-statements/clinical-pharmacist-services-in-the-emergency-department/#sm.00000sslbd7rvqf15y9ux56tqbhoo. Accessed January 4, 2019.	This position statement of the American College of Emergency Physicians (ACEP) in regard to pharmacist services in the emergency department (ED) is described.	ACEP believes that pharmacists serve a critical role in ensuring efficient, safe, and effective medication use in the ED and advocates for health systems to support dedicated roles for pharmacists within the ED.	This position statement provides support for Criterion A and Criterion G.
American College of Medical Toxicology. ACMT position statement: the role of clinical pharmacists in the emergency department. August 4, 2017. Available at: https://www.acmt.net/_Library/Positions/ACMT_Position_Pharmacists.pdf. Accessed February 20, 2019.	This position statement of the American College of Medical Toxicology (ACMT) in regard to the role of clinical pharmacists in the ED is described.	ACMT's position statement speaks in strong support of emergency medicine pharmacists (EMPs), supporting 24-hour staffing of EDs with dedicated ED pharmacists.	This position statement provides support for Criterion A and Criterion G.
American Society of Health-System Pharmacists. ASHP statement on pharmacy services to the emergency department. *Am J Health Syst Pharm*. 2008;65:2380-	This position statement of the American Society of Health-System Pharmacists (ASHP) in regard to pharmacy services in the ED is described.	Every pharmacy department should provide the ED with the pharmacy services required to ensure safe and effective patient care. These services must be tailored to match	This position statement within the profession of pharmacy provides support for Criterion A and Criterion G.

3.		each institution's needs and resources; therefore, pharmacy departments must decide the best way to safely provide medications to ED patients. ASHP supports the expansion of pharmacy education and postgraduate residency training to include emphasis on emergency care in order to develop an adequate supply of pharmacists who are trained to deliver these essential pharmacy services.	

Guidelines/Emergency Medicine Pharmacist Support

Citation	Summary	Conclusion	Relevance to BPS Petition
Eppert HD, Reznek AJ; American Society of Health-System Pharmacists. ASHP guidelines on emergency medicine pharmacist services. *Am J Health Syst Pharm*. 2011 Dec 1;68(23):e81-95.	These guidelines are intended to define the role of the EMP, to suggest goals for providing services to meet institution-specific needs, and to establish a definition of best practices for the ED.	These guidelines are based on the primary literature, therapeutic and practice guidelines, national standards, and the consensus of experts in the field of emergency medicine (EM) pharmacy practice.	These primary guidelines for EM pharmacy practice provide support for Criterion A and Criterion G.
Witsil JC, Aazami R, Murtaza UI, Hays DP, Fairbanks RJ. Strategies for implementing emergency department pharmacy services: results from the 2007 ASHP Patient Care Impact Program. *Am J Health Syst Pharm*. 2010 Mar 1;67(5):375-9.	In June 2007, the ASHP pharmacists developed a patient care impact program entitled, "Introducing an Emergency Department Pharmacist into Your Institution," to provide experiential training to practicing pharmacists seeking to establish ED services in their institutions. Under the guidance of four mentors, 19 pharmacists from a	Despite the diversity in practice settings, participants of the program faced similar challenges in implementing ED pharmacy services at their institutions. Various strategies toward solutions to these challenges were shared among participants and mentors.	Engagement in this specialized program to mentor and advance EMPs revealed high interest and provides support for Criterion A.

	variety of practice settings, including community-based hospitals and academic and tertiary-care-based institutions, were selected for participation in the six-month program. Participants were divided into two groups, and each group was assigned two mentors. During their initial meeting, participants identified anticipated challenges to implementation of pharmacy services in the ED and began to define strategies with their mentors for effectively managing the anticipated challenges. Each group participated in one-hour monthly teleconferences with their mentors. In addition to monthly teleconferences, participants regularly contacted their mentors for additional assistance and several visited their mentors' institutions. Participants developed job descriptions for an EMP, developed a rationale and justification for implementing pharmacy services in the ED, obtained approval and support from appropriate parties for the EMP's role, developed plans for introducing a pharmacist to the ED, and developed quality-assurance methods to monitor the effectiveness of the pharmacist's		

	role.		
Grill J, Bryant C, Markel K, Wisniewski SJ. A study of time saved by emergency medicine physicians through working with clinical pharmacists in the emergency department. *Am J Emerg Med*. 2018 Dec 18. pii: S0735-6757(18)30988-4. doi: 10.1016/j.ajem.2018.12.028. [Epub ahead of print]	This paper describes quantitatively the impact on physician efficiency when an EMP is available to ED physicians while working under a collaborative care agreement. EMPs saved ED physicians an average of 75 minutes per shift, with the highest yield categories being general questions (25.2 minutes per shift [mps], standard error [SE] = 2.67), critically ill patient service (11.5 mps, SE = 2.66), and urine culture follow-ups (11.3 mps, SE= 1.05).	EMPs in the ED save physicians a significant amount of time per shift, and categorically, the most time saved was in fielding general questions, time spent with critically ill patients, and following up on urine cultures.	This paper provides evidence to support the value of EMPs to ED physicians and provides evidence for both Criterion A and Criterion B.

Services Provided/Roles/Emergency Medicine Pharmacy Reviews

Citation	Summary	Conclusion	Relevance to BPS Petition
Sin B, Ciaramella C, Stein G, et al. Implementation of an advanced pharmacy practice model in the emergency department. *J Pharm Pract*. 2019 Jan 13: 897190018819412. doi: 10.1177/0897190018819412. [Epub ahead of print]	This retrospective descriptive study quantified clinical activities performed by pharmacists in an advanced pharmacy practice model in the ED. The ED pharmacy team participated in a total of 4,106 clinical activities that resulted in a cumulative cost avoidance of $5,387,679. Overall, the most common clinical activities that the pharmacy team provided included pharmacotherapy consult (63.3%) and response to medical emergencies (20.7%). A total of	An advanced practice model was created and implemented that was tailored to our institution's needs. The model maximized opportunities for pharmacists to provide direct patient care, practice at the top of their license, and encourage the safe and effective use of medications.	The reporting of expansion of responsibilities for EMPs demonstrates the value of the role and provides support for Criterion A.

	16,219 medication orders placed by ED clinicians were prospectively reviewed, and 379 interventions were accepted by emergency medicine (EM) clinicians. Turnaround times for medication verification in median (interquartile range [IQR]) for 2015, 2016, and 2017 were 2 minutes (1-6 minutes), 3 minutes (1-6 minutes), and 2 minutes (1-5 minutes), respectively. A total of 14 peer-reviewed publications, primarily based on pharmacy practice or use of pharmacotherapy for acute pain, were published by a research program led by the ED pharmacotherapist.		
Morgan SR, Acquisto NM, Coralic Z, et al. Clinical pharmacy services in the emergency department. *Am J Emerg Med*. 2018 Oct;36(10):1727-32.	EMPs work alongside emergency physicians and nurses at the bedside to optimize pharmacotherapy, improve patient safety, increase efficiency and cost-effectiveness of care, facilitate antibiotic stewardship, educate patients and clinicians, and contribute to scholarly efforts.	This paper examines the history of EMPs and associated training programs, the diverse responsibilities and roles of EMPs, their impact on clinical and financial outcomes, and proposes a conceptual model for EMP integration into ED patient care. Finally, barriers to implementing EM clinical pharmacy programs and limitations are considered.	The reporting of expansion of responsibilities for EMPs demonstrates the value of the role and provides support for Criterion A.
Roman C, Edwards G, Dooley M, Mitra B. Roles of the emergency medicine pharmacist: a systematic	This systematic literature review identifies roles for EMPs beyond traditionally reported activities	Three key emerging areas of practice for the EMP are associated with positive outcomes, including	The reporting of expanded responsibilities for EMPs demonstrates the value of the

review. *Am J Health Syst Pharm*. 2018 Jun 1;75(11):796-806.	and quantifies the benefits of these roles in terms of patient outcomes.	involvement in management of critically ill patients, antimicrobial stewardship roles, and ordering of home medications in the ED.	role and provides support for Criterion A.
Thomas MC, Acquisto NM, Shirk MB, Patanwala AE. A national survey of emergency pharmacy practice in the United States. *Am J Health Syst Pharm*. 2016 Mar 15;73(6):386-94.	This article reports the results of a survey to characterize pharmacy practice in the ED setting. A total of 187 survey responses were retained. The majority of respondents were from community hospitals (59.6%) or academic medical centers (36.1%). A pharmacist's presence in the ED of more than eight hours per day on weekdays and weekends was commonly reported (68.7% of respondents); 49.4% of institutions provided more than eight hours of coverage daily. Nearly one in three institutions (34.8%) provided no weekend ED staffing. The most frequently reported hours of coverage were during the 1 p.m.–midnight time frame. The distribution of EMP activities, by category, was as follows (data are median reported time commitments): clinical, 25% (IQR, 15–40%); emergency response, 15% (IQR, 10–20%); order processing, 15% (IQR, 5–25%); medication reconciliation/history-taking, 10% (IQR, 5–25%); teaching, 10% (IQR,	Pharmacists from academic and community EDs perform a variety of clinical, educational, and administrative activities.	This paper describes the roles and responsibilities of EMPs and provides support for Criterion A.

	5–15%); administrative, 5% (IQR, 3–10%); and scholarly endeavors, 0% (IQR, 0–5%).		
Aldridge VE, Park HK, Bounthavong M, Morreale AP. Implementing a comprehensive, 24-hour emergency department pharmacy program. *Am J Health Syst Pharm*. 2009 Nov 1;66(21):1943-7.	The implementation of a comprehensive, 24-hour ED pharmacy program is described. Among the many benefits realized, the program improved the quality of patient care, decreased medication errors and patient wait times, improved the medication reconciliation process, enhanced formulary management, ensured prospective medication order review, and increased overall patient safety, as evidenced by the documented interventions and staff satisfaction survey. The projected cost savings for the medical center during the first year of implementation was calculated as $1,691,185.	A tertiary care teaching hospital successfully implemented a 24-hour, comprehensive ED pharmacy service that enhanced the efficiency and delivery of patient care and resulted in significant cost savings.	This descriptive report demonstrates improvement in clinical outcomes and economic outcome and provides support for Criterion A.

Staff Perceptions

Citation	Summary	Conclusion	Relevance to BPS Petition
Coralic Z, Kanzaria HK, Bero L, Stein J. Staff perceptions of an on-site clinical pharmacist program in an academic emergency department after one year. *West J Emerg Med*. 2014 Mar;15(2):205-10.	An electronic survey was sent to ED providers and nurses. The qualitatively validated survey assessed staff's general perceptions of the EMP and their clinical work and received an 80% response rate. Overall, the ED	The EMP model of practice at this institution provides valuable perceived benefit to ED providers.	The results of this service provide evidence that supports both the need (Criterion A) and the demand for EMPs (Criterion B).

	staff strongly supported the presence of an EMP. All of the respondents consulted the EMP at least once in their previous five ED shifts. Most respondents (81%) felt the EMP's availability for general consultation and aid during resuscitations served as the major contribution to medication and patient safety. The participants also expressed that they were more likely to consult a pharmacist when they were located in the ED, as opposed to having to call the main pharmacy.		
Fairbanks RJ, Hildebrand JM, Kolstee KE, Schneider SM, Shah MN. Medical and nursing staff highly value clinical pharmacists in the emergency department. *Emerg Med J*. 2007 Oct;24(10):716-8.	This descriptive survey study aimed to assess staff perceptions of an EMP program. A random sample of medical and nursing staff in an academic medical center ED with a dedicated EMP program received a 26-item survey (82% return rate). 99% of respondents felt the EMP improves quality of care, 96% feel they are an integral part of the team, and 93% had consulted the EMP at least a few times during their last five shifts. Staff felt that the EMP should be available for consults, attend resuscitations, and check orders.	This study reinforced the value of many specific duties of the EMP program and found that doctors and nurses overwhelmingly favor the presence of an EMP in the ED, frequently seek their advice, and feel they improve quality of care.	The results of this service provide evidence that supports both the need (Criterion A) and the demand for EMPs (Criterion B).

Medication Safety

Citation	Summary	Conclusion	Relevance to BPS Petition
Ernst AA, Weiss SJ, Sullivan A 4th, et al. On-site pharmacists in the ED improve medical errors. *Am J Emerg Med*. 2012 Jun;30(5):717-25.	The objective of the study was to compare errors in the ED with pharmacists present for resuscitations and traumas vs. with pharmacists absent.	With pharmacists absent, over 13 times more errors were recorded in the ED than with pharmacists present. An on-site pharmacist in the ED may be helpful in reducing medical errors.	This evidence demonstrates the value of EMPs in decreasing medication errors and provides support for Criterion A.
Patanwala AE, Sanders AB, Thomas MC, et al. A prospective, multicenter study of pharmacist activities resulting in medication error interception in the emergency department. *Ann Emerg Med*. 2012 May;59(5):369-73.	This prospective, multicenter cohort study conducted in four geographically diverse academic and community EDs in the United States determined the activities of pharmacists that lead to medication error interception in the ED. A total of 16,446 patients presented to the EDs during the study, resulting in 364 confirmed medication error interceptions by pharmacists. The pharmacists' activities that led to medication error interception were as follows: involvement in consultative activities (n=187; 51.4%), review of medication orders (n=127; 34.9%), and other (n=50; 13.7%). The types of orders resulting in medication error interceptions were written or computerized orders (n=198; 54.4%), verbal orders (n=119; 32.7%), and other (n=47; 12.9%). Most medication error interceptions occurred	Pharmacists' review of written or computerized medication orders accounts for only a third of medication error interceptions. Most medication error interceptions occur during consultative activities.	This article demonstrated the activities that are provided by EMPs that result in decreased medication errors and provides support for Criterion A.

	during the prescribing phase of the medication use process (n=300; 82.4%), and the most common type of error was wrong dose (n=161; 44.2%).		
Weant KA, Humphries RL, Hite K, Armitstead JA. Effect of emergency medicine pharmacists on medication-error reporting in an emergency department. *Am J Health Syst Pharm*. 2010 Nov 1;67(21):1851-5.	A retrospective review of 402 medication error reports for patients seen at a university's ED showed the effect of an EMP on medication-error reporting.	The addition of two EMPs resulted in 14.8 times as many medication error reports as were made when no EMP was in the ED. Pharmacy personnel captured significantly more errors than did other health care personnel (94.5% vs. 5.7%, p<0.001).	This article provides evidence supporting the role of EMPs in identifying and resolving medication errors and provides support for Criterion A.
Rothschild JM, Churchill W, Erickson A, et al. Medication errors recovered by emergency department pharmacists. *Ann Emerg Med*. 2010 Jun;55(6):513-21.	This observational study in four academic EDs assessed the impact of EMPs on reducing potentially harmful medication errors. Authors conducted 226 observation sessions spanning 787 hours and observed pharmacists reviewing 17,320 medications ordered or administered to 6,471 patients. The authors identified 504 recovered medication errors, or 7.8 per 100 patients and 2.9 per 100 medications. Most of the recovered medication errors were intercepted potential adverse drug events (90.3%), with fewer mitigated adverse drug events (3.9%) and ameliorated adverse drug events (0.2%). The potential severities of the recovered errors	EMPs can identify and prevent potentially harmful medication errors.	This evidence speaks to the value of EMPs in the identification and prevention of medication errors and provides evidence for Criterion A.

	were most often serious (47.8%) or significant (36.2%). The most common medication classes associated with recovered medication errors were antimicrobial agents (32.1%), central nervous system agents (16.2%), and anticoagulant and thrombolytic agents (14.1%). The most common error types were dosing errors, drug omission, and wrong frequency errors.		
Fairbanks RJ, Rueckmann EA, Kolstee KE, et al. "Clinical pharmacists in the emergency department." Advances in Patient Safety: New Directions and Alternative Approaches. Vol. 4: Technology and Medication Safety. Rockville, MD: Agency for Healthcare Research and Quality (US); 2008 Aug.	This article describes the pilot test and implementation of an ED-based clinical pharmacist program, including the strategies used to overcome barriers and costs of the program.	Provision of clinical services in the ED by a pharmacist appears to have improved medical care, imparted knowledge to ED personnel, and reduced institutional expenditures.	This article outlines the roles and responsibilities of an EMP in a pilot program and provides support for Criterion A.
Brown JN, Barnes CL, Beasley B, Cisneros R, Pound M, Herring C. Effect of pharmacists on medication errors in an emergency department. *Am J Health Syst Pharm*. 2008 Feb 15;65(4):330-3.	A retrospective chart review studied the frequency of medication errors in an ED before and after an EMP was assigned to check medication orders. A total of 490 medication orders written for 198 patients were evaluated for errors. A total of 37 and 14 medication errors were identified for the control and intervention groups, respectively. The rate of	The rate of medication errors in the ED decreased significantly when pharmacists prospectively reviewed ED medication orders.	This article demonstrates the value of EMPs in decreasing the rate of medication errors and provides support for Criterion A.

	errors was 16.09 per 100 medication orders for the control group compared with 5.38 per 100 orders for the intervention group, a 66.6% difference (p=0.0001). The EMPs made 183 recommendations, of which 98.6% were accepted.		
Lada P, Delgado G Jr. Documentation of pharmacists' interventions in an emergency department and associated cost avoidance. *Am J Health Syst Pharm*. 2007 Jan 1;64(1):63-8.	A prospective analysis was conducted of pharmacist interventions and resuscitation experiences, including pharmacist participation in a hospital ED, and the potential cost avoidance associated with the interventions made by the pharmacists. During the study, 2,150 pharmacist interventions were documented. Pharmacists participated in the care of 1,042 patients triaged to the resuscitation area of the ED.	The most commonly documented interventions made by pharmacists involved in the care of patients visiting the ED included provision of drug information, dosage adjustment recommendations, responses to questions from nursing staff, formulary interchanges, and suggestions regarding initiation of drug therapy. The potential cost avoidance attributable to the pharmacist interventions during the study period was over $1 million.	This article demonstrates that EMP interventions in the ED result in improved clinical and economic outcomes and provide support for Criterion A.

Cardiac Arrest

Citation	Summary	Conclusion	Relevance to BPS Petition
McAllister MW, Chestnutt JG. Improved outcomes and cost savings associated with pharmacist presence in the emergency department. *Hosp Pharm*. 2017 Jun;52(6):433-7.	Cardiac arrest event records were evaluated for compliance with Advanced Cardiac Life Support (ACLS) guidelines, as well as for whether or not a pharmacist was involved as a member of the resuscitation team. Pharmacists documented all interventions performed while physically	Inclusion of a pharmacist as a member of the resuscitation team improved compliance with medications administered according to the ACLS guidelines and increased survival to hospital admission. The presence of a pharmacist in the ED was associated with approximately $320,000 in cost	The involvement of an EMP as a member of the resuscitation team improved clinical and economic outcomes and provides support for Criterion A.

	present in the ED, which were utilized to associate cost avoidance. When a pharmacist assisted as a member of the resuscitation team, a significant increase in the percentage of medications administered in compliance with the ACLS guidelines was noted (78% vs. 67%, p=0.0255). An increase in survival to hospital admission (25% vs. 17.8%, p=0.0155) was also noted, though no significant increase in survival to hospital discharge (15% vs. 4.4%, p=0.6392) was observed.	avoidance per year, if not more.	

Trauma

Citation	Summary	Conclusion	Relevance to BPS Petition
Harvey S, Brad Hall A, Wilson K. Impact of an emergency medicine pharmacist on initial antibiotic prophylaxis for open fractures in trauma patients. *Am J Emerg Med*. 2018 Feb;36(2):290-3.	This retrospective cohort study evaluates the potential impact of EMPs in trauma. Initial prophylactic antibiotic recommendations were met in 81% of trauma resuscitations when a pharmacist was present vs. 47% without a pharmacist present (p<0.01). The median door-to-antibiotic time was 14 minutes in the PHARM group vs. 20 minutes in the NO-PHARM group (p=0.02).	The participation of an EMP during initial trauma resuscitation resulted in improved initial antibiotic selection and faster door-to-antibiotic administration times in trauma patients with open fractures.	This article demonstrates the value of EMPs in supporting antibiotic use in trauma and provides support for Criterion A.
Montgomery K, Hall AB, Keriazes G.	This study measured the impact of	The participation of a clinical	EMP involvement improved time

Pharmacist's impact on acute pain management during trauma resuscitation. *J Trauma Nurs*. 2015 Mar-Apr;22(2):87-90.	a pharmacist on time to first analgesic dose administered during trauma resuscitation. For inclusion, patients must have received intravenous fentanyl, morphine, or hydromorphone in the trauma bay. The time to medication administration was defined as the elapsed time from ED arrival to administration of first analgesic. There were 1,328 trauma response system activations during the study period, of which 340 patients were included. The most common analgesic administered was fentanyl (62% in both groups). When a pharmacist was participating, the mean time to first analgesic administered was decreased (17 vs. 21 minutes; p=0.03). Among the 78% of patients with documented pain scores, the overall mean reduction in pain scores from ED arrival to ED discharge was similar between the 2 groups. There was a 2.4-point reduction with a pharmacist versus 2.7 without a pharmacist, using a 0 to 10 numeric pain rating scale.	pharmacist during trauma resuscitation significantly decreased the time to first analgesic administration in trauma patients. The results of this study supplement the literature supporting the integration of clinical EMPs on trauma teams.	to first analgesia dose administered for trauma patients in the ED and provides evidence for Criterion A.

Stroke

Citation	Summary	Conclusion	Relevance to BPS Petition

Jacoby JS, Draper HM, Dumkow LE, Farooq MU, DeYoung GR, Brandt KL. Emergency medicine pharmacist impact on door-to-needle time in patients with acute ischemic stroke. *Neurohospitalist*. 2018 Apr;8(2):60-5.	A retrospective, single-center, cohort study of 100 patients who received tissue plasminogen activator (tPA) was conducted to determine the impact of EMPs on door-to-needle (DTN) times and clinical outcomes in patients with acute ischemic stroke who receive tPA in the ED. EMP involvement was associated with a significant improvement in DTN time (median 46 [IQR: 34.5–67] vs. 58 [IQR: 45–79] minutes; p=0.019) and with receiving tPA within 45 minutes of arrival (49% vs. 25%, OR: 2.81 [95% CI: 1.21–6.52]). National Institutes of Health Stroke Scale scores were significantly improved at 24 hours post-tPA in favor of the EMP group (median NIHSS 1 [IQR: 0–4] vs. 2 [IQR: 1–9.25]; p=0.047).	The EMP involvement in initial stroke care was associated with a significant improvement in DTN time.	This article provides evidence of the role of EMPs in improving patient outcomes in stroke patients and provides support for Criterion A.
Gosser RA, Arndt RF, Schaafsma K, Dang CH. Pharmacist impact on ischemic stroke care in the emergency department. *J Emerg Med*. 2016 Jan;50(1):187-93.	A retrospective study of 105 patients who received tPA for acute ischemic stroke in the ED at a comprehensive stroke center compared the accuracy of tPA dosing, average door-to-tPA time, and identification of contraindications to tPA therapy when a pharmacist was present versus absent in the ED. Dosing accuracy was similar when a pharmacist was present versus	Pharmacist involvement on stroke teams may have a beneficial effect on door-to-tPA time and patient care in the ED.	This evidence supports the value of EMPs in management of stroke patients in the ED and provides support for Criterion A.

	absent (96.6% vs. 95.6%, p=0.8953). The median door-to-tPA time when a pharmacist was present was statistically significantly shorter than when a pharmacist was absent (69.5 minutes vs. 89.5 minutes, p=0.0027). When a pharmacist was present, a door-to-tPA time of less than 60 minutes was achieved 29.9% of the time, as compared to 15.8% in the pharmacist absent group (p=0.1087).		

Acute Myocardial Infarction

Citation	Summary	Conclusion	Relevance to BPS Petition
Acquisto NM, Hays DP, Fairbanks, RJ, et al. The outcomes of emergency pharmacist participation during acute myocardial infarction. *J Emerg Med*. 2012 Apr;42(4):371-8.	A retrospective observational cohort study of ED patients with ST-elevation myocardial infarction (STEMI) requiring urgent cardiac catheterization was conducted to determine if an EMP is associated with decreased door-/diagnosis-to-cardiac catheterization laboratory (CCL) time and decreased door-to-balloon time. Multivariate analysis of 120 patients, controlled for CCL staff presence and arrival by pre-hospital services, determined EMP presence is associated with a mean 13.1 minute (95% CI, 6.5, 21.9) and 11.5 minute (95% CI, 3.9, 21.5) decrease in door-	EMP presence during STEMI presentation to the ED is independently associated with a decrease in door-/diagnosis-to-CCL and door-to-balloon times.	This article demonstrates that EMPs improve patient care for patients with acute myocardial infarction and provides evidence for Criterion A.

	/diagnosis-to-CCL and door-to-balloon times, respectively. Patients were more likely to achieve a door-/diagnosis-to-CCL time ≤ 30 minutes (OR 3.1, 95% CI, 1.3, 7.8) and ≤ 45 minutes (OR 2.9, 95% CI, 1.0, 8.5) and a door-to-balloon time ≤ 90 minutes (OR, 1.9, 95% CI, 0.7, 5.5 when the EMP was present.		

Rapid-Sequence Intubation

Citation	Summary	Conclusion	Relevance to BPS Petition
Robey-Gavin E, Abuakar L. Impact of clinical pharmacists on initiation of postintubation analgesia in the emergency department. *J Emerg Med*. 2016 Feb;50(2):308-14.	A retrospective cohort study of 82 patients who underwent rapid sequence intubation (RSI) in the ED compared the rate of initiation of postintubation analgesia in the ED before and after intervention by EMPs. The overall rate of postintubation analgesia increased after pharmacist intervention, from 20% to 49% (p=0.005). Analgesia initiation during EMP hours was 50% and 85% in the pre- and post-intervention groups, respectively. In the pre-intervention group, more patients received sedation without analgesia (73% vs. 51%; p=0.04), and a small percentage (7%) received neither sedation nor analgesia. Time to initiation of postintubation analgesia	Analgesic use after RSI in the ED significantly increased after the implementation of ED pharmacy services. The large proportion of patients receiving analgesia during the EMP duty hours suggest the increase may be related to direct pharmacist involvement in postintubation management.	This article demonstrates that EMP involvement on RSI improves patient management and provided support for Criterion A.

	decreased from 98 minutes to 45 minutes.		
Amini A, Faucett EA, Watt JM, et al. Effect of a pharmacist on timing of postintubation sedative and analgesic use in trauma resuscitations. *Am J Health Syst Pharm*. 2013 Sep 1;70(17):1513-7.	A retrospective cohort study was conducted at a level 1 trauma center to compare medication-use outcomes in consecutive cases in which trauma patients underwent rocuronium-assisted RSI and subsequent sedation and analgesia with or without a pharmacist's participation on the resuscitation team. Relative to resuscitation cases not involving a pharmacist, the presence of the pharmacist during RSI was associated with decreased mean times to provision of postintubation sedation (9 minutes vs. 28 minutes, p=0.007) and analgesia (21 minutes vs. 44 minutes, p=0.057). The cumulative proportions of patients receiving appropriate sedation 5, 10, and 15 minutes after intubation were 11%, 26%, and 41% in the pharmacist-absent group and 33%, 53%, and 63% in the pharmacist present group (p=0.009, 0.008, and 0.045, respectively); for postintubation analgesic use, the corresponding figures were 9%, 14%, and 23% in the pharmacist-absent group and	The presence of a pharmacist during RSI procedures was associated with decreased times to postintubation sedative and analgesic use, indicating that pharmacist participation in trauma resuscitation responses can facilitate appropriate drug therapy.	Pharmacist participation in trauma resuscitation responses improved patient care and provides evidence for Criterion A.

	17%, 30%, and 43% in the pharmacist-present group (p=0.236, 0.066, and 0.039, respectively).		

Procedural Sedation

Citation	Summary	Conclusion	Relevance to BPS Petition
Patanwala AE, Thomas MC, Casanova TJ, Thomas R. Pharmacists' role in procedural sedation and analgesia in the emergency department. *Am J Health Syst Pharm*. 2012 Aug 1;69(15):1336-42.	Pharmacists have an important role on the procedural sedation and analgesia (PSA) team and can contribute to improved patient safety by performing key PSA functions: pre-procedure evaluation, drug selection and dosing, procurement of medications and supplies, and patient monitoring. This process involves interviewing patients, discussing potential drug therapy options with the PSA team, and helping to develop the pharmacologic plan, including the discussion of initial and subsequent doses of sedative agents to be used and the logistics of titration. In addition to being familiar with all medications commonly used in PSA, the pharmacist needs to be knowledgeable of PSA equipment and supplies and able to interpret monitoring parameters used to guide PSA and interventions during the procedure. As	Key components of the PSA process from the perspective of the pharmacist are discussed, including pre-procedure assessment, the pharmacologic plan, equipment and supplies, and PSA monitoring.	This article describes the role of EMPs in the provision of procedural sedation and provides support for Criterion A.

	permitted by applicable state law and institutional policy, the pharmacist can also play an important role in PSA by performing or assisting in drug administration.		

Antimicrobial Stewardship

Citation	Summary	Conclusion	Relevance to BPS Petition
Kulwicki BD, Brandt KL, Wolf LM, Weise AJ, Dumkow LE. Impact of an emergency medicine pharmacist on empiric antibiotic prescribing for pneumonia and intra-abdominal infections. *Am J Emerg Med*. 2018 Jul 29. pii: S0735-6757(18)30632-6. doi: 10.1016/j.ajem.2018.07.052. [Epub ahead of print]	A retrospective cohort study of 320 patients determined the impact of an EMP on appropriate empiric antibiotic prescribing for community-acquired pneumonia (CAP) and intra-abdominal infections (CA-IAI). Overall empiric antibiotic prescribing was more likely to be guideline concordant when an EMP was present (78% vs. 61%, p=0.001); this was true for both the CAP (95% vs. 79%, p=0.005) and CA-IAI subgroups (62% vs. 44%, p=0.025). Total guideline concordant prescribing significantly increased between the early-antimicrobial stewardship program (ASP) and established-ASP (60% vs. 82.5%, p=0.001) and was more likely when an EMP was present (early-ASP: 68.3% vs. 45.8%, p=0.005; established-ASP: 90.5% vs. 73.7%, p=0.005). Patients receiving guideline-concordant antibiotics	The presence of an EMP significantly improved guideline-concordant empiric antibiotic prescribing for CAP and CA-IAI in both an early and established ASP. Inpatient orders were more likely to be guideline concordant if appropriate therapy was ordered in the ED.	This evidence highlights the value of EMPs in antimicrobial stewardship and provides support for Criterion A.

	in the ED continued appropriate therapy upon admission 82.5% of the time vs. 18.8% if the ED antibiotic was inappropriate (p<0.001).		
Moussavi K, Nikitenko V. Pharmacist impact on time to antibiotic administration in patients with sepsis in an ED. *Am J Emerg Med*. 2016 Nov;34(11):2117-21.	A retrospective review of 186 adult patients presenting to the ED determined if the physical presence of an EMP would decrease antibiotic order to administration time in adult patients with sepsis, severe sepsis, or septic shock. When a pharmacist was present, patients received antibiotics sooner (median 0.61 vs. 0.88 hour, p=0.001), Surviving Sepsis Campaign goals for antibiotic administration time were more likely to be met (88% vs. 72%, p=0.0097), and initial antibiotics were appropriate more often (97% vs. 81%, p=0.0008).	Physical presence of a clinical pharmacist in the ED decreased time to administration and increased appropriateness of intravenous antibiotics for adult patients with sepsis, severe sepsis, or septic shock.	This article demonstrates positive patient outcomes associated with the involvement of an EMP in the management of sepsis, severe sepsis, or septic shock and provides support for Criterion A.
DeWitt KM, Weiss SJ, Rankin S, Ernst A, Sarangarm P. Impact of an emergency medicine pharmacist on antibiotic dosing adjustment. *Am J Emerg Med*. 2016 Jun;34(6):980-4.	This retrospective cohort study of patients evaluated the appropriateness of antibiotic dosing when an EMP is physically present in the ED compared to when absent. Overall, 85% of 210 of the antibiotic orders were appropriate, with 95% appropriate when an EMP was present compared to 74% when	Antibiotics that require renal and/or weight dosing adjustments are 6.5 times more likely to be appropriate in the ED when an EMP is present. Prevalence of antibiotic dosing error is related to both the presence of EMPs and the degree of renal impairment.	This article demonstrates the value of the physical presence of an EMP to reduce inappropriate use of antibiotics in the ED and provides support for Criterion A.

	an EMP was absent (odds ratio [OR], 6.9; 95% confidence interval, 2.5-18.8). In a logistic regression model, antibiotic appropriateness was independently associated with the presence of the EMP and creatinine clearance.		
Davis LC, Covey RB, Weston JS, Hu BB, Laine GA. Pharmacist-driven antimicrobial optimization in the emergency department. *Am J Health Syst Pharm*. 2016 Mar 1;73(5 Suppl 1):S49-56.	A retrospective electronic chart review was performed for ED patients with positive cultures during two different three-month periods. During Period 1, ED nursing management performed positive culture follow up. During Period 2, EMPs performed this role. The primary objective was to determine the value of the pharmacist-driven antimicrobial optimization service as measured by the number of clinical interventions made when indicated.	The pharmacist-driven antimicrobial stewardship program resulted in a 30% absolute increase in interventions for inappropriate therapy as compared to the nursing-driven model. This stewardship program has further demonstrated the value of EMPs. Pharmacist interventions should help to ensure that infections are resolved through modification of antimicrobial therapies for patients with bug-drug mismatches.	Engagement of EMPs resulted in improved identification and resolution of inappropriate antibiotic therapy and provides support for Criterion A.
DeFrates SR, Weant KA, Seamon JP, Shirakbari A, Baker SN. Emergency pharmacist impact on health care-associated pneumonia empiric therapy. *J Pharm Pract*. 2013 Apr;26(2):125-30.	A retrospective chart review of adult patients with health care-associated pneumonia (HCAP) who presented to an academic medical center was conducted to evaluate the impact of EMPs on adherence of empiric antibiotic therapy to guideline recommendations. The control group included those patients with HCAP who presented to the	The presence of an EMP significantly increased the likelihood of at-risk patients receiving empiric antimicrobial therapy consistent with guideline recommendations.	This article provides evidence that the presence of EMPs in an ED supported patients receiving drug therapy aligned with current guidelines and provides support for Criterion A.

	ED outside of the EMP's hours, and the treatment group consisted of those patients who presented during the EMP's hours. Patients presenting inside the EMP's hours were significantly more likely to receive guideline adherent empiric antibiotics than the patients presenting outside the EMP's hours (49.38% vs. 25.7%, p=0.005). Also, patients in the treatment group received antibiotics in a shorter amount of time (11.37 vs. 15.56 hours, p=0.272) and at more appropriate doses (85.2% vs. 77.1%, p=0.29); although, these outcomes were not statistically significant.		
Randolph TC, Parker A, Meyer L, Zeina R. Effect of a pharmacist-managed culture review process on antimicrobial therapy in an emergency department. *Am J Health Syst Pharm*. 2011 May 15:68(10):916-9.	A retrospective evaluation of medical records determined the impact of an ED procedure requiring pharmacist review of all culture results as a way to improve use of antimicrobial therapies. In the 12 months before implementation of the pharmacist-managed ED culture review process, the medical center's ED physicians reviewed 2,278 culture reports and ordered	During a one-year period, EMPs reviewed 2,361 culture reports and modified the antimicrobial regimens of 355 patients.	This article provides evidence of decreased re-admission rates when EMPs review culture results and provides evidence for Criterion A.

	antimicrobial regimen modifications in about 12% of cases; in about 19% of cases, patients were readmitted to the ED within 96 hours of discharge for treatment failure, patient noncompliance, allergy to medications, adverse drug reactions, and other reasons. In the 12 months after program implementation, pharmacists initiated antimicrobial regimen modifications in about 15% of cases; readmission to the ED occurred in about 7% of cases, with comparatively lower rates of readmission for treatment failure, noncompliance, and allergy to medications.		

Anticoagulation

Citation	Summary	Conclusion	Relevance to BPS Petition
Corio JL, Sin JH, Hayes BD, Goldstein JN, Fuh L. Impact of a pharmacist-driven prothrombin complex concentrate protocol on time to administration in patients with warfarin-associated intracranial hemorrhage. *West J Emerg Med*. 2018 Sep;19(5):849-54.	A retrospective review of 48 consecutive patients who received four-factor prothrombin complex concentrate (4F-PCC) in a single ED evaluated the impact of a pharmacist-driven protocol on time to 4F-PCC administration in warfarin-associated intracranial hemorrhage (ICH). The median time to administration of 4F-PCC in the pharmacist-driven protocol group was 35 minutes (IQR [25-	Implementation of a pharmacist-driven protocol for 4F-PCC in the ED at the institution significantly reduced time to administration in patients presenting with warfarin-associated ICH.	Evidence supported the role of EMPs in caring for patients with ICH and provides support for Criterion A.

	62]; range, 11-133) compared with 70 minutes (IQR [34-89]; range, 14-244) in the pre-protocol group (p=0.034). There were no differences for appropriate 4F-PCC dosing based on international normalized ratio (INR) and patient weight between the two groups.		
Zdyb EG, Courtney DM, Malik S, Schmidt MJ, Lyden AE. Impact of discharge anticoagulation education by emergency department pharmacists at a tertiary academic medical center. *J Emerg Med*. 2017 Dec;53(6):896-903.	A single center, retrospective analysis identified the impact of pharmacist education, defined as the need for intervention on callback, versus physician and nursing-driven discharge measures on patient understanding and appropriate use of anticoagulant medications. Patients received follow-up phone calls from an EMP within 72 hours of discharge. One hundred seventy-four patients were evaluated in a per protocol analysis. Patients who did not receive pharmacist education prior to discharge required an increased need for intervention during callback versus those who did (36.4% vs. 12.9%, p=0.0005) related to adherence, inappropriate administration, and continued use of interacting medications or supplements, among other concerns. In addition, patients who had not	Discharge education by ED pharmacists leads to improved patient understanding and appropriate use of anticoagulants.	The EMP role in educating patients taking anticoagulant medications is described within this article and provides support for Criterion A.

	received pharmacist counseling were more likely to be readmitted to a hospital or return to the ED within 90 days after their initial visit for an anticoagulation-related problem versus patients who had (12.12% vs. 1.85%, p=0.0069).		

Pediatric

Citation	Summary	Conclusion	Relevance to BPS Petition
Benjamin L, Frush K, Shaw K, et al. Pediatric medication safety in the emergency department. *Pediatrics*. 2018 Mar;141(3). pii: e20174066. doi: 10.1542/peds.2017-4066.	Pediatric patients cared for in EDs are at high risk of medication errors for a variety of reasons. A multidisciplinary panel was convened by the Emergency Medical Services for Children program and the American Academy of Pediatrics Committee on Pediatric Emergency Medicine to initiate a discussion on medication safety in the ED. Top opportunities identified to improve medication safety include using kilogram-only weight-based dosing, optimizing computerized physician order entry by using clinical decision support, developing a standard formulary for pediatric patients while limiting variability of medication concentrations, using pharmacist support within EDs, enhancing training of medical professionals, systematizing the dispensing and	The authors specifically recommend that hospitals implement and support the availability of pharmacists in the ED to improve pediatric medication safety in the emergency care setting.	Recommendations to support valuable EMPs to care for pediatric patients provides support for Criterion A.

	administration of medications within the ED, and addressing challenges for home medication administration before discharge.		

Naloxone Distribution

Citation	Summary	Conclusion	Relevance to BPS Petition
Kaucher KA, Acquisto NM, Broderick KB. Emergency department naloxone rescue kit dispensing and patient follow-up. *Am J Emerg Med*. 2018 Aug;36(8):1503-4.	This study describes an ED-based naloxone rescue kit dispensing program which utilized a discharge follow-up questionnaire with targeted questions to assess patient demographics, evaluate the effectiveness of educating laypersons on identification of overdose, and outcomes of the program, including the number of naloxone rescue kits (NRKs) used, enrollment in medication-assisted treatment for opioid dependence, and return visits to the ED for overdose. Patients were contacted via telephone call at least 30 days after their ED visit. A total of 141 patients were given an NRK during the study period, and 106 patients (75%) were reached for follow up. Patients were mostly males (74.4%), Caucasian (84%), and had Medicaid insurance (73%). The majority of patients (85.2%) were seen in the ED for an opioid	This study shows that dispensing NRKs from the ED is effective with reported lives saved and enrollment in medication-assisted treatment.	The role of EMPs in distributing NRKs and counseling patients on the use of naloxone is described and provides support for Criterion A.

	overdose or related complication (i.e., abscess drainage, skin and soft tissue infection, somnolence). Overall, 26% self-reported overdose since receiving their NRK requiring hospitalization or ED visit (median=1 overdose [range 1–4]), and 8% (n=9) stated they had used their NRK for someone else during an overdose situation that led to full reversal at time of follow-up. Ten percent (n=11) were enrolled in a medication-assisted treatment program at the time of follow up.		

Transitions of Care

Citation	Summary	Conclusion	Relevance to BPS Petition
Pevnick JM, Nguyen C, Jackevicius CA, et al. Improving admission medication reconciliation with pharmacists or pharmacy technicians in the emergency department: a randomised controlled trial. *BMJ Qual Saf*. 2018 Jul;27(7):512-20.	This three-arm randomized controlled trial of 306 inpatients achieved quantified admission medication history error reduction when pharmacy staff obtained these histories before admission medication orders are placed.	Among medically complex older adults, pharmacists and pharmacist-supervised pharmacy technicians reduced admission medication history errors and resultant admission medication order errors by over 80% by obtaining admission medication histories in the ED. This effect was robust to severity weighting, and thus shows promise for reducing patient harm.	This article outlines the value of EMPs in reduced admission medication history errors and resultant admission medication order errors, providing evidence to support Criterion A.
Hohner E, Ortmann M, Murtaza U, et al. Implementation of an emergency department-based clinical pharmacist transitions-of-	The intervention program consisted of collaboration between ED and ambulatory care pharmacists to provide patient-	A transitions of care pharmacist-led program targeting patients who ar-rived at the ED with the chief complaint of asthma exacerbation,	EMPs play an important and valuable role in transitions of care. This article provides support for Criterion A.

care program. *Am J Health Syst Pharm*. 2016 Aug 1;73(15):1180-7.	specific comprehensive medication review and education in the ED setting and to help ensure a coordinated transition to the ambulatory care setting by scheduling an ambulatory pharmacy clinic or home-based visit. Patients who sought care at an adult ED for an exacerbation of asthma, chronic obstructive pulmonary disease (COPD), or congestive heart failure (CHF) were assessed for issues with medication adherence or administration technique, patient-specific concerns regarding medication use, access to medications at discharge, the need for modification of chronic therapy, contraindicated medications, and vaccination status, if applicable. The pharmacist then referred the patient to follow up in an ambulatory care pharmacy clinic or with the home-based medication management (HBMM) program. Of the 18 program participants who were referred to follow-up care, five successfully followed up with a pharmacist after ED discharge. The mean time from the ED visit to follow up for these five patients was 16.6 ± 8.6 days. In addition, five patients	COPD, or CHF provided interventions from an EMP or ambulatory care pharmacist as well as follow-up opportunities at outpatient clinics or an HBMM program.	

	followed up with their primary care provider within 30 days of the initial ED visit; two of these patients also followed up with a pharmacist. Within 30 days of the initial ED encounter, four patients had ED revisits.		
Cesarz JL, Steffenhagen AL, Svenson J, Hamedani AG. Emergency department discharge prescription interventions by emergency medicine pharmacists. *Ann Emerg Med*. 2013 Feb;61(2):209-14.e1.	This prospective observational study determined the rate and details of interventions associated with EMP review of discharge prescriptions for patients discharged from the ED. The study evaluated 674 discharge prescriptions. EMPs intervened on 68 prescriptions, resulting in an intervention rate of 10.1% (95% confidence interval [CI], 8.0% to 12.7%). The intervention rate was 8.5% (95% CI, 6.4% to 11.1%) for adult prescriptions and was 23.6% for pediatric prescriptions (95% CI, 14.7% to 35.3%) (difference 15.1%, 95% CI 5.1 – 25.2%). There were a similar number of interventions categorized as error prevention and optimization of medication therapy, 37 (54%) and 31 (46%) respectively.	EMP review of discharge prescriptions for discharged ED patients has the potential to significantly improve patient care associated with suboptimal prescriptions and is highly valued by ED care providers.	This article highlights the value of EMPs in providing a review of discharge prescriptions and provides support for Criterion A.

Pre-Hospital Care/Emergency Preparedness

Citation	Summary	Conclusion	Relevance to BPS Petition
Groth ME, McMillian WD, Wolfson	A study describing the EMP's role	Pharmacists with expertise in EM	This article describes the role of

DL. Pharmacist input into statewide treatment protocols for emergency medical services. *Am J Health Syst Pharm*. 2015 Jan 1;72(1):61-3.	in helping Vermont health officials standardize pharmacotherapy-related protocols used by emergency medical services (EMS) personnel to replace the existing patchwork of local protocols with statewide standards of care. Among the 92 draft protocols reviewed, 62 pertained to medication use. The pharmacist provided a wide range of suggestions on 33 protocols, including (1) evidence-based recommendations on use of vasopressor agents for septic shock, (2) recommendations to optimize medication ordering and preparation in the prehospital setting, (3) recommendations on prehospital management of pediatric shock and appropriate use of chemical restraints, and (4) recommendations to promote use of smart infusion pumps by EMS personnel. All of the pharmacist's suggestions were incorporated into the final protocols and have helped standardize care for patients receiving EMS services throughout Vermont while reducing the potential for medication errors.	are ideally positioned to provide guidance on optimizing and standardizing medication use aspects of state and local EMS protocols.	the EMP in supporting prehospital care and provides support for Criterion A.
Pincock LL, Montello MJ, Tarosky MJ, Pierce WF, Edwards CW.	Pharmacist responsibilities in disaster response are critical, and	In the disaster setting, the pharmacist must consider the crisis	Preparing for disasters is an important role for EMPs. This

Pharmacist readiness roles for emergency preparedness. *Am J Health Syst Pharm*. 2011 Apr 1;68(7):620-3.	to support disaster readiness, pharmacists must: ▪ Maintain mental and physical fitness to mitigate the risk of injury to themselves, teammates, or patients ▪ Maintain appropriate clothing, uniform, and protective equipment to protect themselves from exposure to environmental risks ▪ Obtain current vaccinations for all available biological risks to which they may potentially be exposed ▪ Understand the National Response Framework, National Incident Management System, and Incident Command System ▪ Appreciate the safety and security concerns and how to mitigate them in a disaster response ▪ Make provisions for "continuity of operations" for home and primary work environments ▪ Maintain appropriate personal equipment, such as a sleeping bag, a tent, and toiletries, to address	factor, a factor that is well known to EMPs. Pharmacist readiness for emergency preparedness is a core responsibility.	article describes the roles and responsibilities of pharmacists in disaster settings and provides support for Criterion A.

	basic necessities in a disaster		

Training Opportunities

Citation	Summary	Conclusion	Relevance to BPS Petition
Vollman KE, Adams CB, Shah MN, Acquisto NM. Survey of emergency medicine pharmacy education opportunities for students and residents. *Hosp Pharm*. 2015 Sep;50(8):690-9.	This study determined the prevalence of EM pharmacy training available to pharmacy students and residents. Overall, 57/110 (52%) colleges or schools of pharmacy representatives and 286/831 (34%) residency program representatives completed the survey. Colleges or schools of pharmacy reported EM introductory pharmacy practice experiences (IPPEs) and advanced pharmacy practice experiences (APPEs) at 12/57 (21.1%) and 44/53 (83%), respectively. EM rotations were available for PGY1 and non-EM PGY2 residents at 212/286 (74.1%) and 83/157 (52.9%) of institutions, respectively.	Survey results represent the prevalence and characteristics of EM-related education opportunities for pharmacy students and residents.	Information on the prevalence and nature of EM pharmacy training available to pharmacy students and residents demonstrates evidence for Criterion F.

Appendix G-3

ACPE PLAN
Programming
Live Forum
Knowledge Activity

Title	UAN	Hrs (CEUs)	City	Activity Type	Provider
A Pharmacist's Recipe for Disaster: How to Prepare for the Worst, Do Your Best, and Pick Up the Pieces When Disaster Strikes	0217-0000-18-194-L04-P	1.5	Seattle	Knowledge	American College of Clinical Pharmacy
Emergency Medicine Pearls 2016	0204-0000-16-275-L01-P	1.75	Anaheim	Knowledge	American Society of Health-System Pharmcists
Emergency Medicine Pearls 2017	0204-0000-17-277-L01-P	1.5	Anaheim	Knowledge	American Society of Health-System Pharmcists
Emergency Medicine Pearls 2018	0204-0000-18-306-L01-P	1.75	Anaheim	Knowledge	American Society of Health-System Pharmcists
Emergency Medicine PRN Focus Session – Expanding the Horizon of Emergency Medicine Pharmacy Practice in the United States and Abroad	0217-0000-18-211-L04-P	1.5	Seattle	Knowledge	American College of Clinical Pharmacy
Emergency Medicine PRN Focus Session -- Got Evidence? Do Ketamine, NOAC Reversal Agents, and Icatibant do the Body Good	0217-0000-16-166-L01-P	1.5	Hollywood, Florida	Knowledge	American College of Clinical Pharmacy
Formulary Development for an Off-Site Freestanding Emergency Department	0204-000-18-354-L04-P	0.5	Anaheim	Knowledge	American Society of Health-System Pharmcists
Stop the Bloodshed: What a Pharmacist Needs to Know About Emergent Reversal of Anticoagulation	0204-0000-16-328-L01-P	1.5	Anaheim	Knowledge	American Society of Health-System Pharmcists
8 Programs		**11.5**	**hours**		

Appendix G-4

ACPE PLAN Programming Live Forum Application Activity

Title	UAN	Hrs (CEUs)	City	Activity Type	Provider
Brain Matters and Blood Splatters: Drug Therapy in the Emergency Trauma Patient	0204-0000-16-209-L01-P	1	Anaheim	Application	American Society of Health-System Pharmacists
Break Free from the Cycle: Steps to Implementing an Opioid-Sparing Emergency Department	0204-0000-18-315-L01-P	1.25	Anaheim	Application	American Society of Health-System Pharmacists
Emergency Medicine PRN Focus Session -- Code Breakpoint: A Guide to Combat Stress and Burnout in the Acute Care Pharmacist	0217-0000-17-138-L01-P	1.5	Phoenix	Knowledge	American College of Clinical Pharmacy
Current Controversies in the Management of Hyperkalemia	0204-0000-16-299-L01-P	1	Anaheim	Application	American Society of Health-System Pharmacists
Drug Dosing in the Obese Emergency Department Patient: How High Can You Go?	0204-0000-18-271-L01-P	1	Anaheim	Application	American Society of Health-System Pharmacists
Narcotics in the Emergency Room: Helpful or Harmful for Headaches?	0204-0000-17-297-L01-P	1	Anaheim	Application	American Society of Health-System Pharmacists
Opioids for Pain: Drug Seeking Behavior, Acute Pain Management, and Drug Monitoring Databases	0204-0000-17-305-L01-P	1.5	Anaheim	Application	American Society of Health-System Pharmacists
The Other Side of the Curtain: Transitions of Care in the Emergency Department	0204-0000-16-329-L04-P	1.25	Anaheim	Application	American Society of Health-System Pharmacists
Pain Relief and Analgesic Grief: From the ED to ICU	0204-0000-17-303-L01-P	1	Anaheim	Application	American Society of Health-System Pharmacists
Pharmacists in the Emergency Department: Heroes Antimicrobial Stewardship Needs	0204-0000-18-326-L01-P	1.5	Anaheim	Application	American Society of Health-System Pharmacists
Read My Lips: A Case-Based Approach to Managing Acute Angioedema	0204-0000-17-317-L01-P	1.5	Anaheim	Application	American Society of Health-System Pharmacists
Update on Anticoagulation Reversal	0204-0000-17-214-L01-P	1.5	Anaheim	Application	American Society of Health-System Pharmacists
When Good Hormones Go Bad: Acute Management of Endocrine Emergencies	0204-0000-17-215-L01-P	1	Anaheim	Application	American Society of Health-System Pharmacists
When the Unexpected Happens: Pharmacy's Role in Disasters	0204-0000-17-225-L01-P	1.5	Anaheim	Application	American Society of Health-System Pharmacists
14 Programs		**17.5**	**hours**		

Appendix G-5

ACPE PLAN Programming Home Study Knowledge Activity

Title	UAN	Contact Hours	Activity Type	Provider
Dispensing Emergency Contraception Through a Standing Order - 2017 Update	0026-0000-17-004-H04-P	1	Knowledge	MCPHS University
Parenteral Nutrition in the Critically Ill: Appropriate Administration of Intravenous Lipid Emulsions	0236-9999-18-018-H01-P	1.5	Knowledge	Society of Critical Care Medicine
Challenges of Using Antiplatelet and Anticoagulant Agents in the Critically Ill	0236-0000-18-017-H01-P	1.5	Knowledge	Society of Critical Care Medicine
Time Is of the Essence: Assessment and Management Updates for Patients Presenting With Snake Envenomation	0476-0000-18-002-H01-P	1	Knowledge	MED-IQ
CDC Training on Antibiotic Stewardship: Section 4, Module 8 – Antibiotic Stewardship in Emergency Departments & Hospitals	0387-0000-18-197-H05-P	1.13	Knowledge	Centers for Disease Control and Prevention
Acetaminophen Overdose and Management	0513-0000-18-155-H01-P	1	Knowledge	OnCourse Learning
Managing Opioid Overdose: Combating a National Epidemic	0513-0000-18-129-H03-P	1	Knowledge	OnCourse Learning
Pharmacologic Management of Hypertensive Emergencies	0513-0000-18-147-H01-P	1	Knowledge	OnCourse Learning
Advanced Knowledge Assessment in Pediatric Critical Care	0236-0000-19-230-H04-P	7	Knowledge	Society of Critical Care Medicine
9 Programs		**16.13**	**hours**	

Appendix G-6

ACPE PLAN Programming Home Study Application Activity

Title	UAN	Hrs (CEUs)	Activity Type	Provider Description
CCSAP 2018 BOOK 1 (Medical Issues in the ICU) – Medical Issues II	0217-0000-18-010-H01-P	5.5	Application	American College of Clinical Pharmacy
Select Topics in Pediatric Critical and Emergency Care	0204-0000-18-955-H01-P	1	Application	American Society of Health-System Pharmacists
Pediatric Fundamental Critical Care Support	0236-0000-18-202-H04-P	10.5	Application	Society of Critical Care Medicine
3 Programs		**17**	**hours**	

Appendix G-7

Sample Educational Program Materials

ASHP

2018 Midyear Clinical Meeting and Exhibition

- Break Free from the Cycle: Steps to Implementing an Opioid-Sparing Emergency Department

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Break Free from the Cycle: Steps to Implementing an Opioid-Sparing Emergency Department

Disclosures

All planners, presenters, reviewers, and ASHP staff of this session report no financial relationships relevant to this activity.

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Opium Wars Episode IV: A New Hope

Craig Cocchio, Pharm.D. BCPS
Emergency Medicine Pharmacist
RPD, PGY-2 Emergency Medicine
CHRISTUS Mother Frances Health System
Tyler, TX

Objectives

- Interpret and apply current evidence regarding acute pain management

Case 1

44 year old male, **left femur fracture**

Refusing opioids – former heroin user (10 years sober)

What can we do for his pain?

Case 2

17 year old female, peritonsillar abscess

Requiring needle aspiration

"Deathly afraid of needles"

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~~Pain: The Fifth Vital Sign~~

Opioid prescribing among specialties, 2015

Specialty	Opioid Rx - n, millions (%)	Opioid Rx/Total Rx (%)
Family medicine	52.5 (18.2)	5.6
Internal medicine	43.6 (15.1)	4.8
Non-physician prescriber	32.2 (11.2)	7.2
General practice	32.2 (11.2)	7.5
Surgery	28.3 (9.8)	36.5
Dentistry	18.5 (6.4)	29.0
Pain medicine	14.5 (5.0)	48.6
Emergency medicine	12.5 (4.3)	20.7
Physical med and rehab	9.3 (3.2)	35.5
All others	45.3 (15.7)	3.6

PMID: 25896191

Treat 'em and street 'em

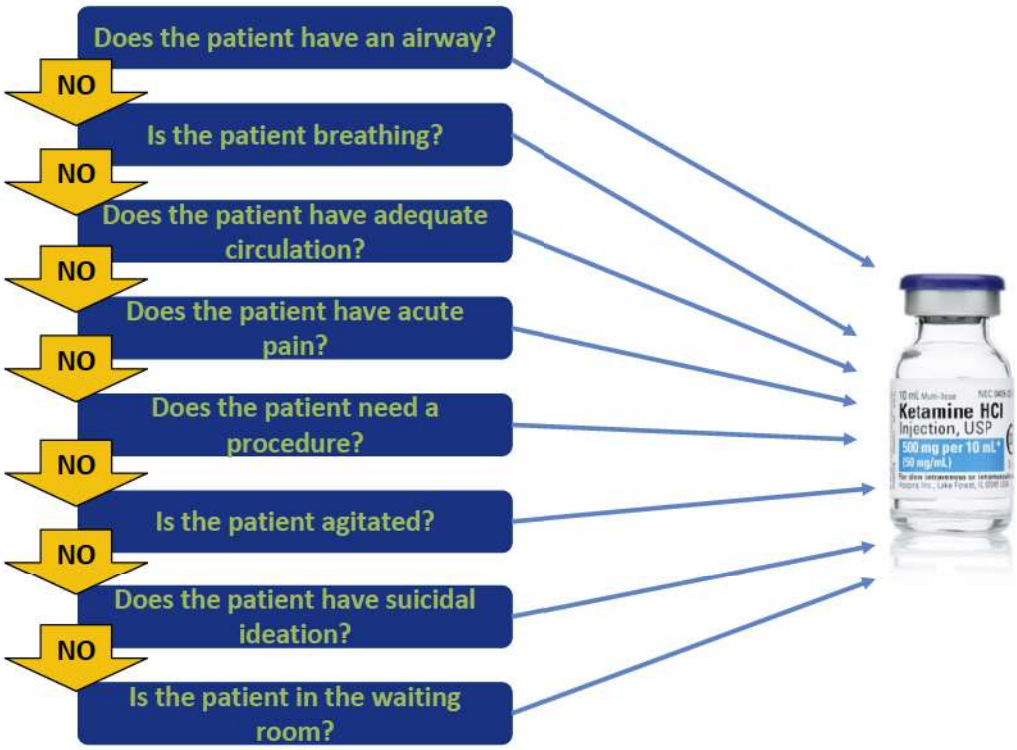
- Top ED medications
  - 0.9% sodium chloride
  - Acetaminophen
  - Ondansetron
  - ***Morphine***
  - Aspirin
- Top ED discharge Rx
  - Acetaminophen
  - Ondansetron
  - ***APAP/oxycodone***
  - ***Tramadol***
  - Cephalexin

CTMFH data

ALTO^{SM} Program

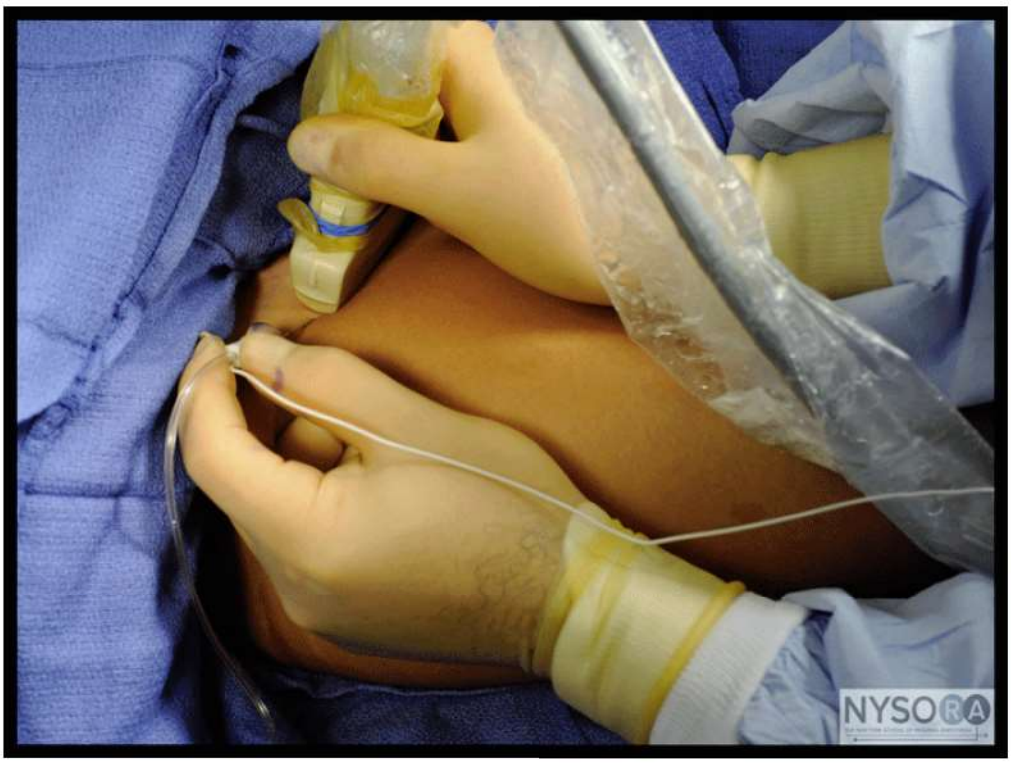
Extremity fracture or dislocation	• **Nitrous oxide + intranasal ketamine** • **Ultrasound-guided regional anesthesia**
Musculoskeletal pain	• **Ibuprofen + acetaminophen** • **Lidocaine or diclofenac patches** • **Cyclobenzaprine or diazepam** • **Trigger-point or other soft tissue injection**

St. Joseph's Regional Medical Center in Paterson, New Jersey
Alternatives to Opiates (ALTO)



Hocus POCUS

University of Calgary Emergency Medicine. Ultrasound guided Femoral Nerve Block. Available at https://youtu.be/G3BVx8Tynnw



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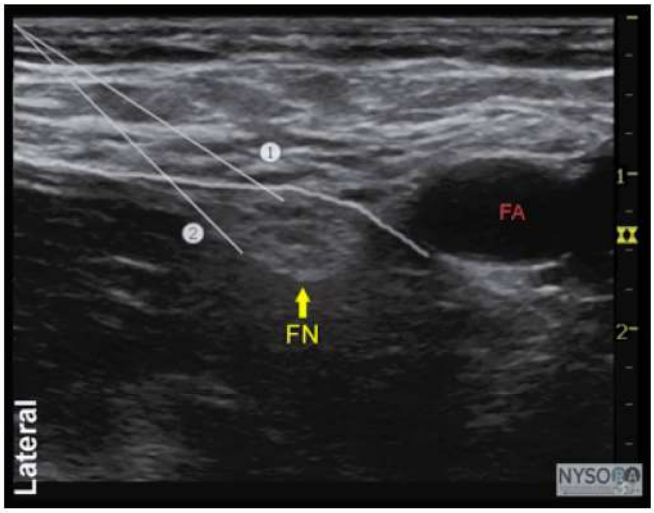
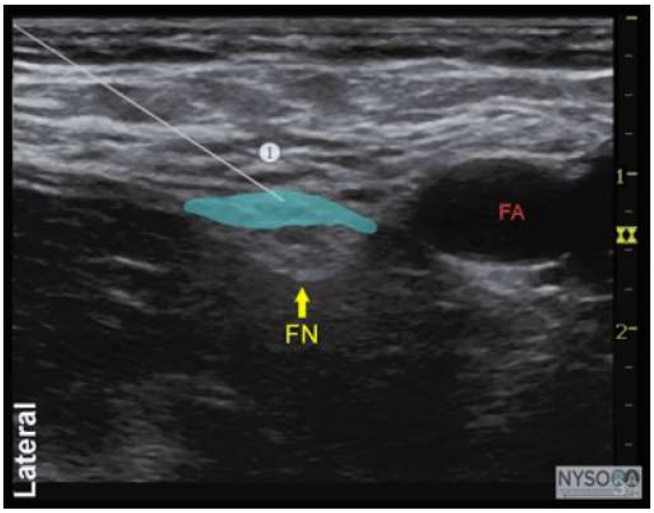
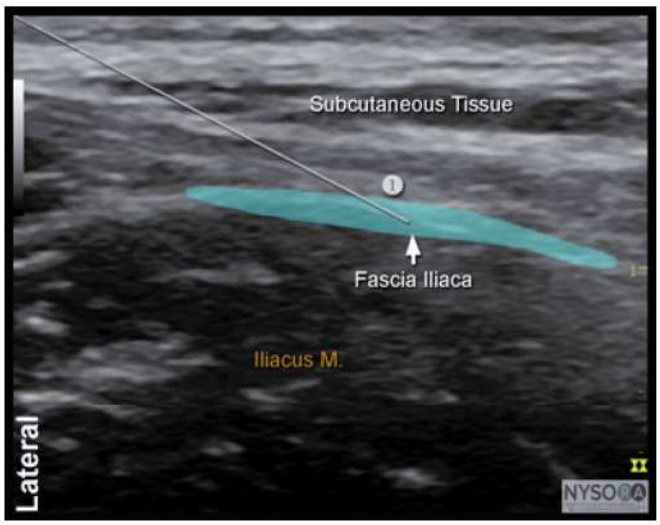
Femoral Nerve Block - FNB

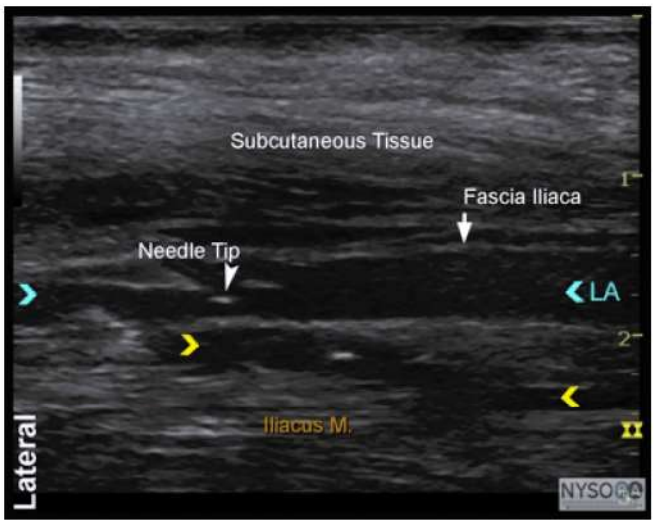




Ultrasound-Guided Femoral Nerve Block.
https://www.nysora.com/ultrasound-guided-femoral-nerve-block

Fascia Iliaca Block - FINB





Ultrasound-Guided Fascia Iliaca Block.
https://www.nysora.com/ultrasound-guided-fascia-iliaca-block

New Kid On The (regional) Block

- Indications (too many to list)

- Contraindications
  - Allergies to anesthetic agent
  - Infection at the site
  - Therapeutic anticoagulation (relative)
  - Previous femoral bypass (relative)

Systematic review

9 RCTs, N= 547

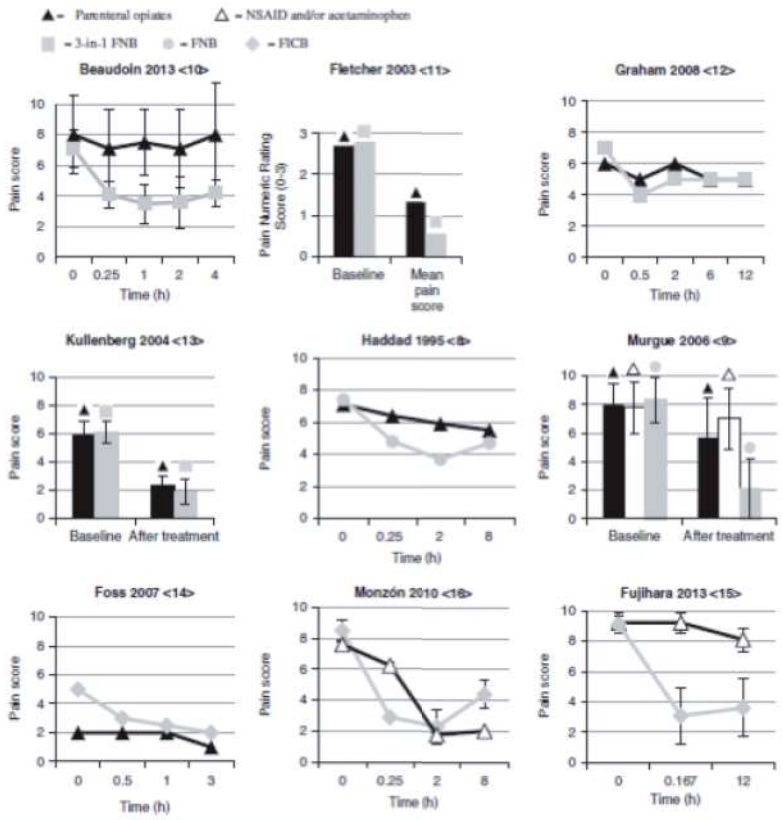
Emergency physician in 5 studies

Ultrasound guidance = 1

Bupivacaine / Mepivacaine(±epi) / Ropivacaine

Primary outcome - reduction in pain

PMID: 26330019



PMID: 26330019

Ultrasound Guided FNB

- Blinded, RCT (N=33)
- Femoral neck or intertrochanteric fractures

FNB- 25 mL of 0.5% bupivacaine plus morphine

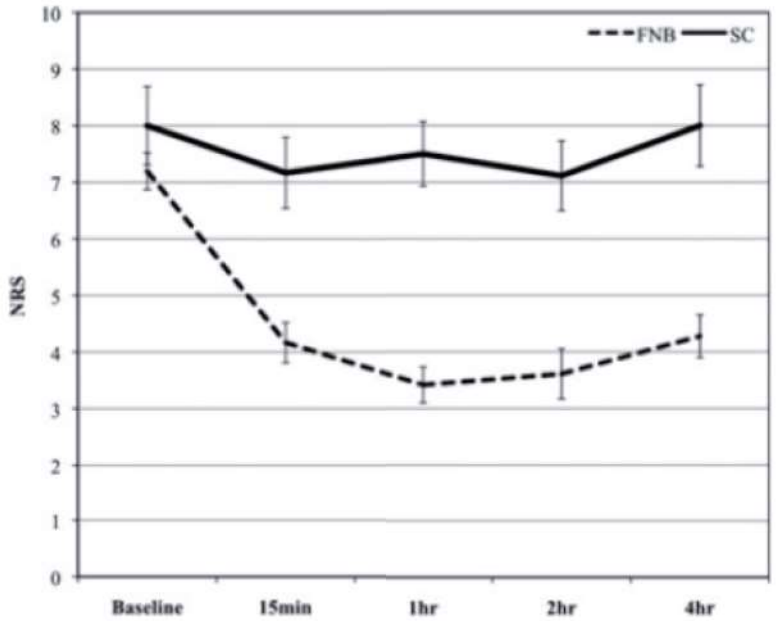
SC- Morphine alone plus sham nerve block

PMID: 23758305

Outcome	FNB Group	SC Group	p-value
Pain scores			
NRS			
Baseline	8.3 (5 to 10)	8.0 (5 to 10)	0.300
4 hours	4.0 (0 to 10)	8.0 (6 to 10)	<0.001*
SPID	11.0 (–4.0 to 44.0)	4.0 (–7.0 to 11)	0.001*
%SPID (%)	36.9 (–25 to 100)	13.4 (–25 to 27.5)	0.001*
33%SPID, *n* (%)	12 (67)	0 (0)	<0.001*
Parenteral analgesia			
Preprocedure morphine (mg)	3.0 (0.0 to 20.0)	5.5 (0.0 to 16.0)	0.489
Rescue morphine (mg)	0.0 (0.0 to 6.0)	5.0 (0.0 to 21.0)	0.028*
Adverse events			
Hypotension, *n* (%)	0 (0)	3 (17)	0.229
Respiratory depression, *n* (%)	4 (22)	9 (50)	0.164
Nausea/vomiting, *n* (%)	5 (28)	5 (28)	1.000

Unless otherwise specified, data are presented as median (range).
FNB = femoral nerve block; NRS = numeric rating scale; SC = standard care; SPID = summed pain-intensity difference.
Hypotension defined as systolic BP < 100 mm Hg at any time during study period; respiratory depression defined as hypoxia (room air O_2 sat < 92% or need for supplemental O_2 any time during study period) or hypopnea (respiratory rate < 10 breaths/min)
*Statistically significant ($p < 0.05$).

PMID: 23758305



PMID: 23758305

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LAST but not least

- LAST – Have lipid in the department
  - Blunt tip needles / epinephrine mixtures
- Neuropathy/nerve damage
- Fall risk

Bottom Line

- At least as effective as opioids
- Decrease opioid use/adverse effects?
- Supports safety and feasibility in most EDs (as fast as 4 minutes)
- Drug shortages
  - Liposomal bupivacaine / diphenhydramine not options

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Nitrous Oxide - Analgesia

N_2O → CRF → Endogenous opioids (midbrain)

Inhibits GABAergic interneuron (pons)

Increased NE → α_1 and α_{2B} (spinal chord)

<u>Reduces ascending pain impulses</u>

PMID: 18813051

CRF, corticotropin-releasing factor; NE, norepinephrine

Why Nitrous Oxide?

Rapid onset / short duration

Patient controlled analgesia

PMID: 27073749 PMID: 19464612 PMID: 28190665
PMID: 11593469 PMID: 23406077 PMID: 26585197

Indications / Uses

- Laceration
- Lumbar punctures
- Venipuncture
- Incision and drainage
- Wound care
- Orthopedic injuries
- Musculoskeletal pain
- Abdominal pain

PMID: 27073749

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Nitrous oxide contraindications

- "Trapped air"
  - Pneumothorax
  - COPD
  - Pneumocephalus
  - Intraocular air bubbles
  - Middle ear effusions
  - Air embolism
  - Bowel obstruction
  - Decompression sickness
- Laryngospasm

PMID: 27073749

Nitrous Oxide complications

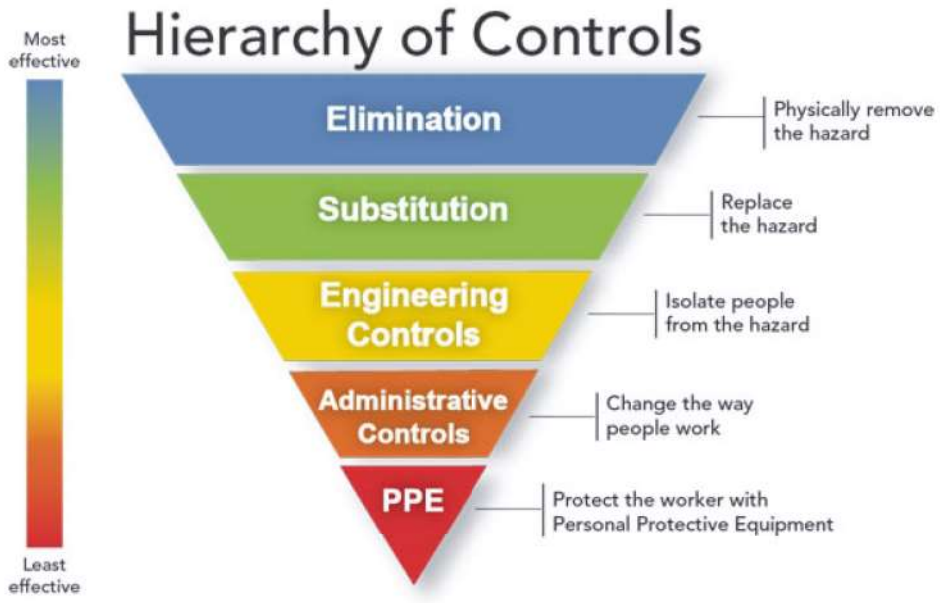
- Abuse
- Workplace health hazard
- B12 deficiency
  - Chronic use of nitrous oxide → hematologic problems, bone marrow suppression, and CNS toxicity
- Impact on opioid prescriptions?

PMID: 27073749

Effective analgesia that disappeared

Prevalent in EDs in the 80's and 90's

What happened?



CDC, https://www.cdc.gov/niosh/topics/hierarchy/default.html

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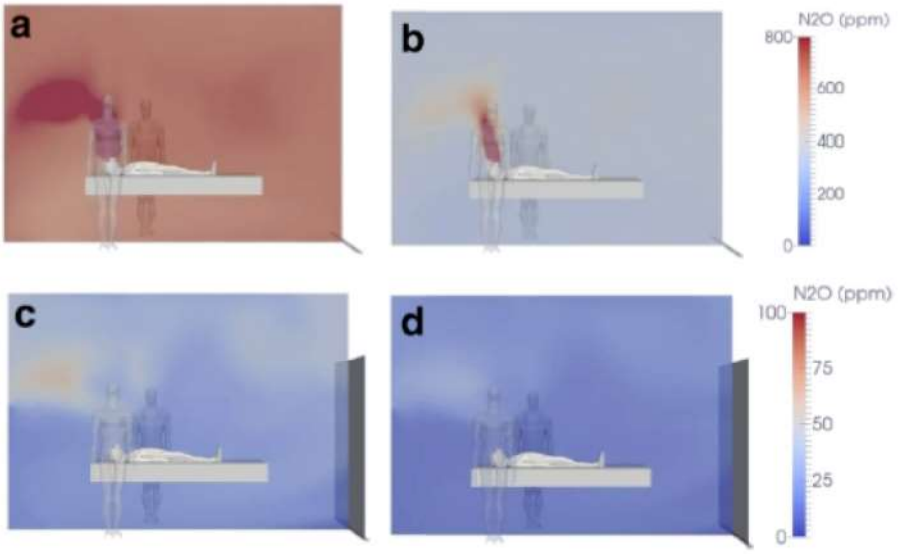
It's complicated…



PMID: 27390620

Nitrous oxide – Bottom Line

- Effective analgesia and sedation (patient controlled)
- Impact on opioid prescriptions at discharge (similar to every other opioid sparing program)
- Workplace safety / abuse potential

Case 1

44 year old male, **left femur fracture**

Refusing opioids – former heroin user (10 years sober)

What can we do for his pain?

Case 2

17 year old female, peritonsillar abscess

Requiring needle aspiration

"Deathly afraid of needles"

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KEY TAKEAWAYS

1) MULTIMODAL PAIN MANAGEMENT

2) OPIOIDS HAVE A PLACE IN CARE, JUST NOT AS DEFAULT ANALGESIA

3) THOROUGH CONSIDERATIONS OF NOVEL/REINTRODUCED THERAPIES

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Opium Wars Episode VI: Return of the Protocols

David E. Zimmerman, Pharm.D., BCPS, BCCCP
Assistant Professor of Pharmacy at Duquesne University
Emergency Medicine Clinical Pharmacist-UPMC Mercy Hospital
@DEZ_EMPharmD

Objective

- Design a non-opioid treatment regimen for patients with acute pain presenting to the emergency department
- Recommend strategies for the development and successful implementation of an opioid sparing emergency department

I just learned about non-opioid strategies from this guy…now what?

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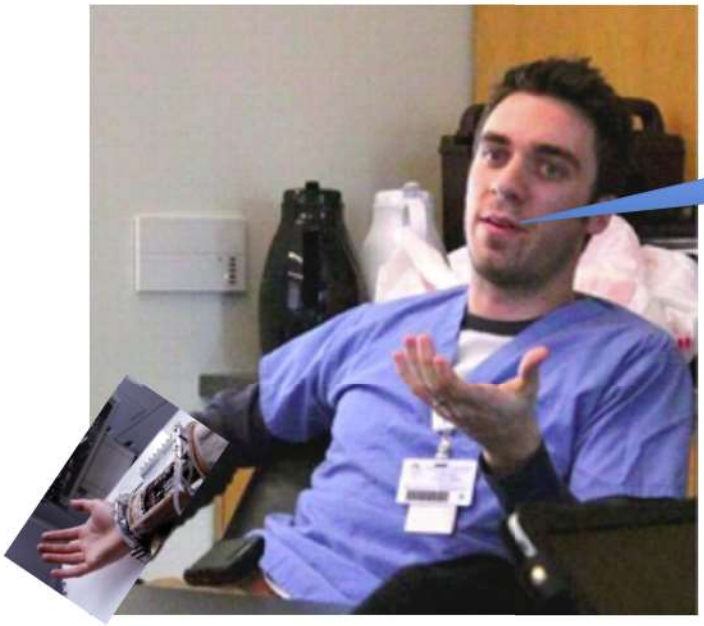
I just learned about non-opioid strategies from this guy…now what?



@iEM_PharmD

Clinical Situation

- As the ED pharmacist at a well-staffed hospital located on a tropical island, LotsOfKeta General, you recognize the opioid epidemic is affecting your hospital. You would like to implement alternatives to opioid (ALTO) regimen to the ED but unsure of what to do. So you attended this talk…action….

http://www.noaa.gov/educational-resources

Rally the troops

- Emergency medicine administration
- Nursing administration
- Pharmacy administration
- Hospital administration
- Pain/anesthesia team

Implementation Discussion Points

- What current protocols and order sets do we have?
- What committees/groups does this have to go through?
- Do I have to evaluate state laws and scope of practice?
- How are we going to educate?
- Pharmacy considerations
  - Stocking
  - Preparation

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How are you going to implement ALTO?

- A single drug protocol (ketamine, lidocaine, etc.)
- Disease state protocol (headache/migraine, renal colic, etc.)
- Orderset

IT Considerations

- Protocol/order set built in CPOE
- Infusion pumps update (if applicable)
- Implementing monitoring
  - Documentation of metrics (vitals, pain scores, etc…)

CPOE, computer-physician order entry

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Educate & Reeducate

- Don't just educate once or in one format
  - Emails
  - Presentations
  - Signs
  - Orientation
- Be open to suggestions/input

I don't know…I'm worried about my patient satisfaction scores

- Following ALTO Implementation at Swedish Medical Center
- > 20% reduction in opioid use per day (per morphine equivalents)
- No change in Press-Ganey patient satisfaction scores related to pain

Am J Emerg Med. April 22 2018. [epub ahead of print]. doi: 10.1016/j.ajem.2018.04.043

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Clinical Situation

- You have gotten the team together and have agreed to implement something…a team member says "can't we just ask someone on a listserv for protocols"?"…Fear not!!

Implementing Lidocaine

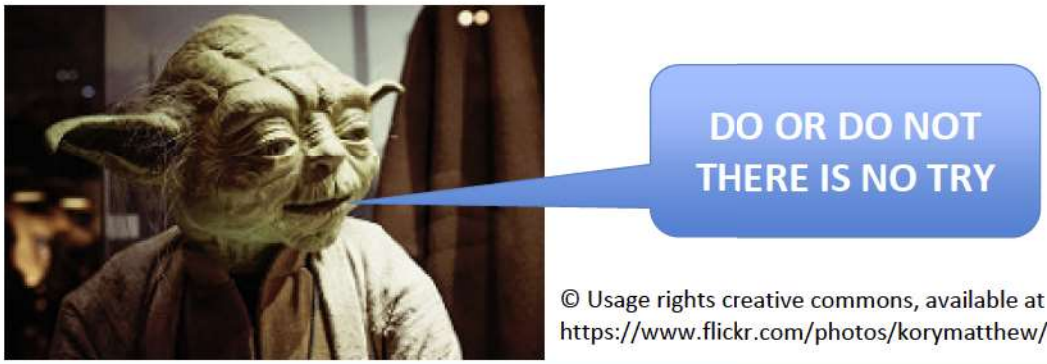
- Dosing/concentration
- Preparation
- Monitoring
- Repeat dosing/continuous infusions

Implementing Ketamine

- Legal & policy considerations
- Dosing/concentration/administration
- Repeat dosing/continuous infusions
- Monitoring

Evaluate Current Order Sets

- How many give the option of an opioid?
- Discharge prescriptions
- Incorporating prescription drug monitoring program (PDMP)



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Creating Disease State Protocols

- Assess agents commonly used and formulary/dispensing locations
- Don't forget about non-pharmacologic therapies!!!
- Opt-in or opt-out of choices?
- Make sure to re-evaluate/update when new data is released

Migraine/Headache

1st Line
- Prochlorperazine 10 mg IV + diphenhydramine 25 mg IV
- Ketorolac 10 mg IV
- 0.9% NaCl 1000 mL

2nd Line
- Metoclopramide 10 mg IV
- Acetaminophen 1 gm PO
- Trigger point injection with lidocaine

3rd Line
- Haloperidol 5 mg IV
- Magnesium 2 gm IV
- Valproic acid 500 mg IV

https://coacep.org/docs/COACEP_Opioid_Guidelines-Final.pdf
https://www.aliem.com/2018/01/prochlorperazine-metoclopramide-diphenhydramine-acute-migraine-headache/

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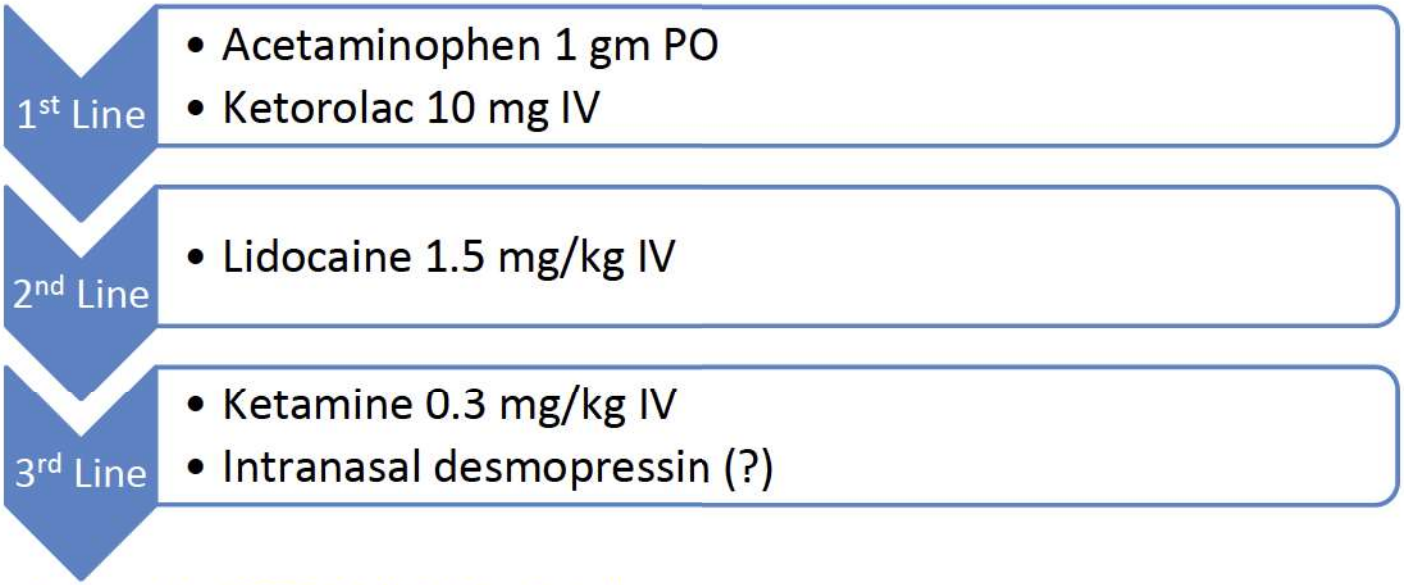
Renal Colic



https://coacep.org/docs/COACEP_Opioid_Guidelines-Final.pdf

Musculoskeletal Pain

- Non-IV Options
  - Acetaminophen, ibuprofen
  - Lidocaine 5% patch
  - Diclofenac topical
  - Ketamine intranasal
  - Trigger-point injection
- IV Options
  - Ketamine
  - Ketorolac
  - Diazepam

https://coacep.org/docs/COACEP_Opioid_Guidelines-Final.pdf

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Clinical Situation

- Now we return to LotsofKeta General where you and the team have successfully implemented ALTO regimens into your ED…now what??

Monitor

- Follow-up on use
  - Being used? Is there less opioid use?
  - Adequately treating pain?
  - Has there been any ADR or medication safety issues?

ADR, adverse drug reaction

@iEM_PharmD

Key Takeaways

1) **TEAM WORK WILL MAKE THE DREAM WORK**

2) **ORDERSETS & PROTOCOLS ARE KEY TO IMPLEMENTING ALTO INTO THE ED**

3) **IMPLEMENTING ALTO TAKES TIME, BE PATIENT & DON'T GET**

References & Further Reading

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Question 1

- Which of the following is a common adverse effect seen with IV lidocaine?

A. Dizziness
B. Cardiac dysrhythmia
C. Hypertension
D. Respiratory depression

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Question 2

- Which of the following is/are important to consider when implementing a ketamine protocol in the ED?

A. Hospital protocols and state laws should be evaluated as ketamine is labeled as an anesthetic and a controlled substance
B. There are several commercially available concentrations of ketamine
C. Diluting and administering over 15 minutes reduces unreality
D. All of the above

Question 3

- Patient Yo Da is a 900 year old male presenting today with left sided flank pain and reports his pain score at a "10/9 pain is". Patient states "meditate I have, but still in pain I am". He reports no allergies and has no past medical history. The medical team has a strong suspicion for renal colic. Which of the following would you recommend as a first line agent for his pain?

A. Hydromorphone 0.5 mg IV
B. Ketorolac 30 mg IV
C. Lidocaine 1.5 mg/kg IV
D. Ketorolac 10 mg IV

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- Drug Dosing in the Obese Emergency Department Patient: How High Can You Go?

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Drug Dosing in the Obese Emergency Department Patient: How High Can You Go?

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Disclosures

- **David E. Zimmerman:** ASHP: Author
- All planners, presenters, reviewers, and ASHP staff of this session report no financial relationships relevant to this activity.

Objectives

- Describe principles of pharmacokinetics that are involved for medication dosing in the obese patient in the emergency department.
- Evaluate the published literature that supports dosing recommendations.
- Given a clinical situation, recommend the appropriate dosing weight and dose for the medication dose.

EM Pharmacist's PK Guide to the Galaxy

Drug Examples

Sedative A

- F = 1 (being given IV)
- Vd = 4 L/kg
- Protein Binding = 60%
- Clearance = hepatic
- Elimination = renal

Sedative B

- F = 1 (being given IV)
- Vd = 2 L/kg
- Protein binding = minimal
- Clearance = hepatic
- Elimination = renal

F, bioavailability; Vd, volume of distribution

ADME

- Absorption (F)
- Distribution (Vd)

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ADME

- Different weights for Vd parameters
  - Total body weight (TBW)
  - Ideal body weight (IBW)
  - Adjusted body weight (AdjBW)
  - Lean body weight (LBW)
    - LBW (female) = [1.07 x TBW(kg)] – [0.0148 x BMI x TBW (kg)]
    - LBW (male) = [1.1 x TBW(kg)] – [0.0128 x BMI x TBW (kg)]

Br J Clin Pharmacol. 2004;58(2):119-33.

ADME

- Metabolism???
- Excretion/Clearance
  - Estimating renal clearance
  - Cockcroft-Gault
- Evaluate concomitant disease states affecting clearance

Demystifying Drug Dosing in Obese Patients. 2016;5-13.

Drug Examples

Sedative A

- F = 1 (being given IV)
- Vd = 4 L/kg
- Protein Binding = 60%
- Clearance = hepatic
- Elimination = renal

Sedative B

- F = 1 (being given IV)
- Vd = 2 L/kg
- Protein binding = minimal
- Clearance= hepatic
- Elimination = renal

F, bioavailability; Vd, volume of distribution

RSI N'At

Rapid Sequence Intubation (RSI) Goals

- Adequately sedate and then paralyze for optimal intubating conditions
- Secure airway
- Prevent iatrogenic injury

Weight, hold up…we need a starting point

- How are we getting the patient's weight?
  - Looking at the chart from last admission?
  - Weigh bed?
  - Asking them?
  - Estimating (i.e. guessing)
    - ED health care providers have been shown to underestimate obese patient's weight

Am J Emerg Med. 2007;25(3):307-12.

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We know we under dose obese patients in RSI

- Obese patients were more likely to be underdosed with:
  - Succinylcholine (OR 63.7; 95% CI: 17.8-228.1)
  - Etomidate (OR 178.3; 95% CI, 37.6-844.7)

Am J Emerg Med. 2016;34:2423-25.

Etomidate

- Volume of distribution (Vd): 3-5 L/kg
- Protein binding: ~75% to albumin
- Rapid distribution from the central compartment

Clin Pharmacokinet. 1977;2(5): 344-72.

Etomidate

- Prospective "study" in obese patients undergoing laparoscopic surgery
- Received etomidate via syringe pump until goal bispectral index
- Obese vs. normal body weight patients required ~21 mg ($p > 0.05$)

Eur J Anaesthesiol. 2014; 31: 713-714.

Etomidate

- What happens if I give too much etomidate….waiting…waiting…still waiting…
- Use TBW until more evidence arrives

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Ketamine

- Typical RSI dosing: 1.5-2 mg/kg
- Currently recommended dosing weight: TBW vs. LBW????
- PK parameters

J Crit Care. 2016;35:145-9.

Ketamine

	Ectomorph n = 7	Mesomorph n = 5	Endomorph n = 10
Percent Fat	12.1 ± 3.3	22 ± 3.5	43.8 ± 12
Weight, kg	53.9 ± 7.6	71.8 ± 8.6	91.7 ± 15.4
Lean body mass, kg	47.1 ± 6.6	56 ± 7.5	50.5 ± 9.2
Dose, mg	90 ± 12.6	105 ± 17	98 ± 18.6
Male/female	2/5	4/1	5/5
Dose/TBW, mg/kg	1.67	1.46	1.07
Dose/LBW, mg/kg	1.91	1.88	1.94

Kg, kilogram; LBW, lean body weight; mg, milligram, TBW; total body weight

Table adapted from: *Anesth Analg*. 1972;51(2):299-305

Clinical Considerations of Ketamine

- What happens if I do not give enough?
- What happens if I give too much?
- Dosing weight to use: TBW
  - Until further evidence is published

Propofol

- Clearance and Vd are better correlated with TBW than AdjBW
- Concerns with hemodynamic consequences
- Avoid unless hypertensive or available use of vasopressors
- Dosing weight to use: TBW

Anesthesiology. 1993;78(4): 657-65.
Demystifying Drug Dosing in Obese Patients. 2016;77-96.

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Succinylcholine

- In one study, comparing LBW vs. IBW vs. TBW
  - No difference in time of onset
  - Longer duration of action in TBW vs. IBW (8.5 vs. 5 mins)
  - 1/3 of patients in IBW group had intubating conditions rated as poor vs. none in TBW group

Anesth Analg. 2006;102(2): 438-42.
Demystifying Drug Dosing in Obese Patients. 2016;77-96.

Succinylcholine

- In a retrospective review of 891 patients who received RSI in the ED:
  - Decrease first-pass success in patients > 120 kg
  - Under dosing of succinylcholine in patients > 120 kg
  - Bottom line: Use TBW

Emerg Med J. 2017;34(11): 739-43.

Rocuronium

- Onset: similar when dosed on TBW vs IBW
- Longer duration of action with TBW dosing
- If I give too much…what happens?
- Bottom line: IBW

Anesth Analg. 2009;109(3): 787-92. *Eur J Anaesthesiol Suppl*. 1995;11:107-110.
Eur J Anaesthesiol. 1999;16(8):507-10. *Acta Anaesthesiol Belg*. 2001;52(3):293-95.
Anesth Analg. 2004;99(4):1086-89.

Rocuronium Dosing: 0.6 vs. 1.2 mg/kg

Height	IBW Female, kg	Dose Female, mg (0.6 mg/kg)	Dose Female, mg (1.2 mg/kg)	IBW Male, kg	Dose Male, mg (0.6 mg/kg)	Dose Male, mg (1.2 mg/kg)
5'	45.5	27.3	54.6	50	30	60
5'6"	59.3	35.6	71.2	63.8	38.3	76.6
6'	73.1	43.9	87.8	77.6	46.6	93.2
6'6"	86.9	52.1	104.2	91.4	54.8	109.6

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Fentanyl

- Pharmacokinetics
- Fentanyl doses based upon TBW overestimates
  - PK mass (kg) = 52 / [1 + (196.4 x $e^{-0.025(TBW)}$ – 53.66)/100]
  - A 200 kg person would have a PK mass of 109 kg
  - You would then use this "PK mass" for weight-based dosing
- In case you cannot do this math in your head (I can't)….use fixed/capped doses and reassess

Anesthesiology. 2004;101(3):603-613.
Br J Anaesth. 2005; 95(3):377-383.

Morphine

- Pharmacokinetics
- Retrospective review, evaluated analgesic response following fixed dose of 4 mg IV
  - Analgesic response was not influenced by BMI
- Fixed, non-weight based!!

Emerg Med J. 2014;31(2):139-42.

Hydromorphone

- Pharmacokinetics
- A secondary analysis of a previous prospective clinical trial failed to find any strong correlation between body weight and decrease in reported pain
- Guess what…Fixed, non-weight based!!

Am J Emerg Med. 2015;33(10):1522-1523.

Summary of Agents for RSI

Agent	Dosing Weight	Dosing
Etomidate	TBW	0.3 mg/kg
Ketamine	TBW	1.5-2 mg/kg
Propofol	TBW	1.5-2 mg/kg
Succinylcholine	TBW	1.5 mg/kg
Rocuronium	IBW	1-1.2 mg/kg

IBW; ideal body weight; kg, kilogram; mg, milligram; TBW, total body weight

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Summary of Agents

Agent	Dosing Weight	Dosing
Morphine	--------	Fixed, non-weight based
Hydromorphone	--------	Fixed, non-weight based
Fentanyl	--------	Fixed, non-weight based

Drug Examples

EMS brings in an unresponsive male who is not protecting his airway and RSI is needed. You reach into your RSI kit for a sedative and you remove Sedative A (or B). The patient is normotensive and in normal sinus rhythm. You estimate him to be 140 kg and his height to be 5'9". Of course you are estimating because the patient is lying down on a stretcher, so you do not actually know the correct weight/height of the patient.

Drug Examples

Sedative A

- F = 1
- Vd = 4 L/kg
- Protein Binding = 60%
- Clearance = hepatic
- Elimination = renal

Sedative B

- F = 1
- Vd = 2 L/kg
- Protein binding = minimal
- Clearance = hepatic
- Elimination = renal

Drug Examples

Sedative A-Which weight to use?

A) TBW
B) IBW
C) AdjBW
D) LBW

Sedative B-Which weight to use?

A) TBW
B) IBW
C) AdjBW
D) LBW

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KEY TAKEAWAYS

1) **ALWAYS USE CLINICAL JUDGEMENT WHEN MAKING DOSING DECISIONS**

2) **ASSESS RISK VS. BENEFIT OF UNDER- OR OVERDOSING FOR EACH DRUG**

3) **FOR RSI, IT'S BETTER TO GIVE MORE!**

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Mississippi Mud Redux

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CHRISTUS Trinity Mother Frances Hospital
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Male, mid 40s, LLE purulent cellulitis.

125 kg.

No comorbidities (currently diagnosed)

Choose your vancomycin dose

- A) Guideline based
- B) Two compartment
- C) Allometric dosing
- D) A gram q12

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The ugly truth about vancomycin

Institutional dose limits/caps

Vd and Cl

Comorbidities limit penetration to sites of infection

Not all obese patients are equal

AUC:MIC ratio at the site of infection

Mississippi Mud

Not the formulation… it's the pharmacokinetics

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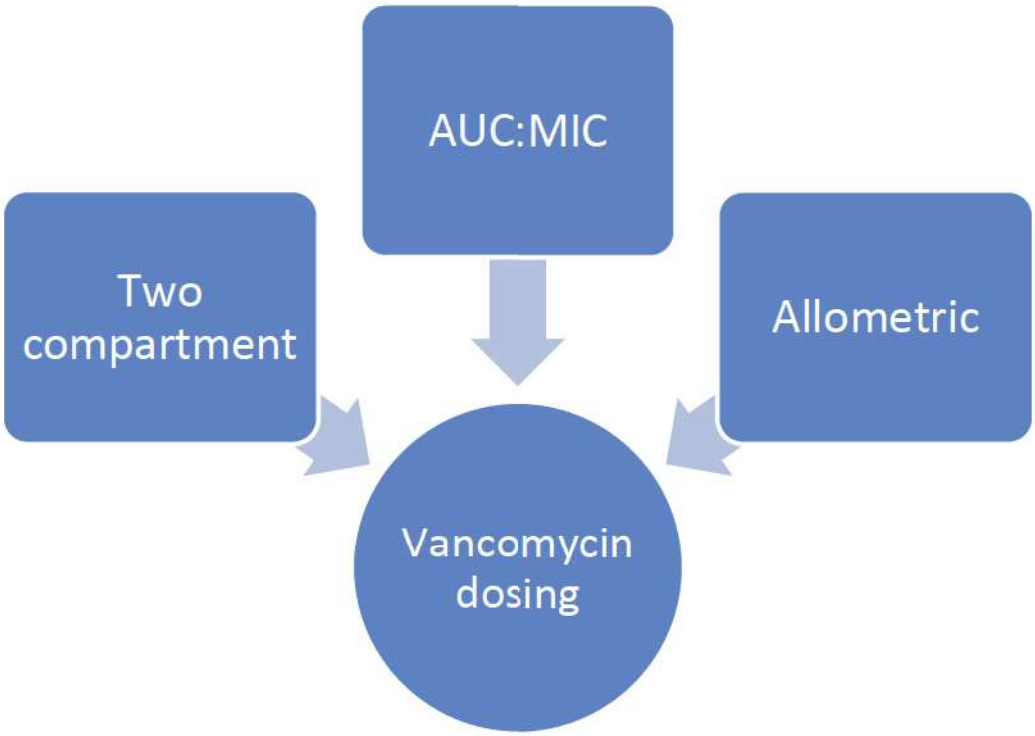

A dose divided cannot stand… or can it?

Single center, uncontrolled, prospective study

54 consecutive obese patients (>137% IBW)

Two compartment model loading dose

PMID: 25986008

Divided loading dose

IBW (Kg)	Percent IBW	CrCl (mL/min*)	Dosing
≤ 83	≥ 137	> 60	1 g q6h Max 20 mg/kg/dose
≤ 83	≥ 137	21-60	1 g q6h Max 17 mg/kg/dose
> 83	≥ 137	≥ 21	15 mg/kg/dose q6h Max 1.5 g/dose

Level check prior to 3rd and 5th dose
*Based on IBW

PMID: 25986008

Who was included

58 year old male, 111 kg (± 31)

TBW 171% (± 37) of IBW

Normal renal function (SCr ~ 0.9 mg/dL)

PMID: 25986008

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What they found

- 89% between 10 – 20 mcg/mL within 12 hours
  - 3 patients > 20 mcg/mL
- 97% between 10 – 20 mcg/mL within 24 hours
  - 1 patient > 20 mcg/mL
- All AUC:MIC > 400
- No kidney injury

PMID: 25986008

We thought it was a good idea

- Retrospective chart review
  - Patients > 18 years of age
  - No missing data
- N=51
  - Vancomycin 2000 mg IV once
  - Vancomycin 1000 mg IV Q6H x 5 doses
- Study approved by CHRISTUS Institutional Review Board

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What we looked at

Primary Endpoint

- Proportion of patients with a post loading dose trough between 10 – 20 mcg/mL

Secondary Endpoints

- Nephrotoxicity
- Time from order verification to administration

	Divided Loading Dose, (n=22)	Traditional Loading Dose (n=29)
Age (mean, ±SD)	55 years, ± 12.0	60 years, ± 12.6
Gender (males, %)	17, 77%	20, 68%
Actual body weight (mean, ± SD)	146.75 kg, ± 53.6	120.46 kg, ± 31.8
BMI (mean, ± SD)	46.8 kg/m^2, 16.58	40.12 kg/m^2, 15.58
Baseline SCr (mean, ± SD)	1.19 mg/dL, ±0.5	1.25 mg/dL, ± 0.7
Indication (n, %)	Cellulitis- 17, 77% Pneumonia- 5, 23%	Cellulitis- 12, 41% Pneumonia- 16, 55% Bacteremia- 1, 3%
Vancomycin dose (mean, ± SD)	N/A	17.6 mg/kg, ± 4.1

What we found

- Primary outcome - troughs between 10 - 20 mcg/mL
- Divided loading dose 72.7 %, 16/22
- Traditional loading dose 58.6 %, 17/29
- Time to 1st dose of vancomycin
- 92.48, ± 90.7
- 173.93, ± 187.9
- Change in SCr from baseline
- 0.06, ± 0.48
- 0.18, ± 0.9

Results

	Divided Loading Dose, (n=22)	Traditional Loading Dose, (n=29)	p-value
Troughs between 10 - 20 mcg/mL	72.7 %, 16/22	58.6 %, 17/29	0.533
Time to 1st dose of vancomycin	92.48, ± 90.7	173.93, ± 187.9	0.049
Change in SCr from baseline	0.06, ± 0.48	0.18, ± 0.9	0.59

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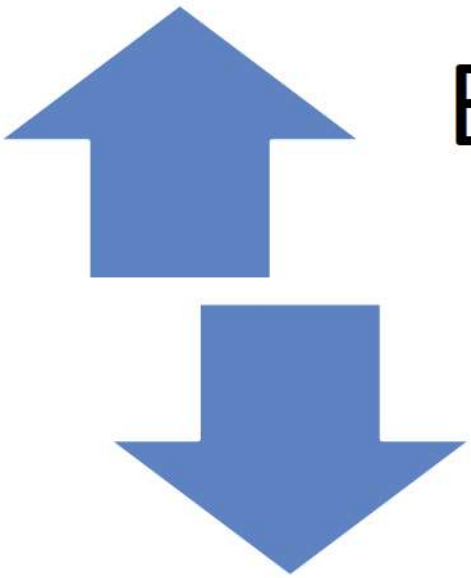
Divide and conquer

Feasible in real world practice

Improved time to first dose antibiotics

Change in practice NOT protocol

Allometry – Body Size and Physiology



Body weight

mg/kg dose

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Est CL_v (L/h)	LD (mg)	MD (mg)	$AUC_{0-24} \geq 400$ at 24 hr (%)	$AUC_{24-48} \geq 400$ at 48 hr (%)	Toxicity ($AUC_{48-72} \geq 700$) (%)
1	2500	500 q24h	100	100	23
2	2500	1000 q24h	98	100	1
3	2500	1500 q24h	93	100	0
4	2500	1000 q12h	99	100	0
5	2500	1250 q12h	98	100	0
6	2500	1500 q12h	96	100	0
7	2500	1750 q12h	94	100	0
8	3000	2000 q12h	99	100	0
9	3000	2250 q12h	98	100	0
10	3000	2250 q12h	92	100	0

$CL_V = 9.656 - 0.078 \times AGE - 2.009 \times SCR + 1.09 \times SEX + 0.04 \times TBW^{0.75}$

AGE (years), SEX is 1 if male 0 if female

PMID: 30203073

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Back to the methods

- What they did
  - Population PK study using per protocol data
  - Monte Carlo simulation to ↑ efficacy and ↓ toxicity
- How it's translated
  - Empiric dosing nomogram for obese and super obese
  - CL_V described using a linear combination of age, serum creatinine, sex and allometrically scaled body weight

PMID: 30203073

Vancomycin TDM Protocol

- Patient-specific PK via Sawchuk–Zaske
- Steady state vancomycin peak and trough
- Loading dose target peak 30–40 mg/L, max 3000 mg
- Volume
  - 0.8 L/kg (BMI 30-39.9 kg/m^2)
  - 0.52 L/kg (BMI 40–49.9 kg/m^2)
  - 0.42 L/kg (BMI ≥50 kg/m^2)
- Matzke nomogram

PMID: 30203073

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Study Population

- n = 346 obese and super obese adults
- Body weight (69.6–293.6 kg) and BMI (30.1–85.7 kg/m^2)
- Average were middle aged (range 19–88 years), male
- Normal renal function average 1.0 mg/dL

PMID: 30203073

Monte Carlo Simulation

- 1000-subject Monte Carlo simulations within Pmetrics™
- First run, no LD
  - TDDs from 500 to 5000 mg in 1000 simulated subjects per patient in the original dataset
- Second run with LD
- CL rounded to nearest whole number

PMID: 30203073

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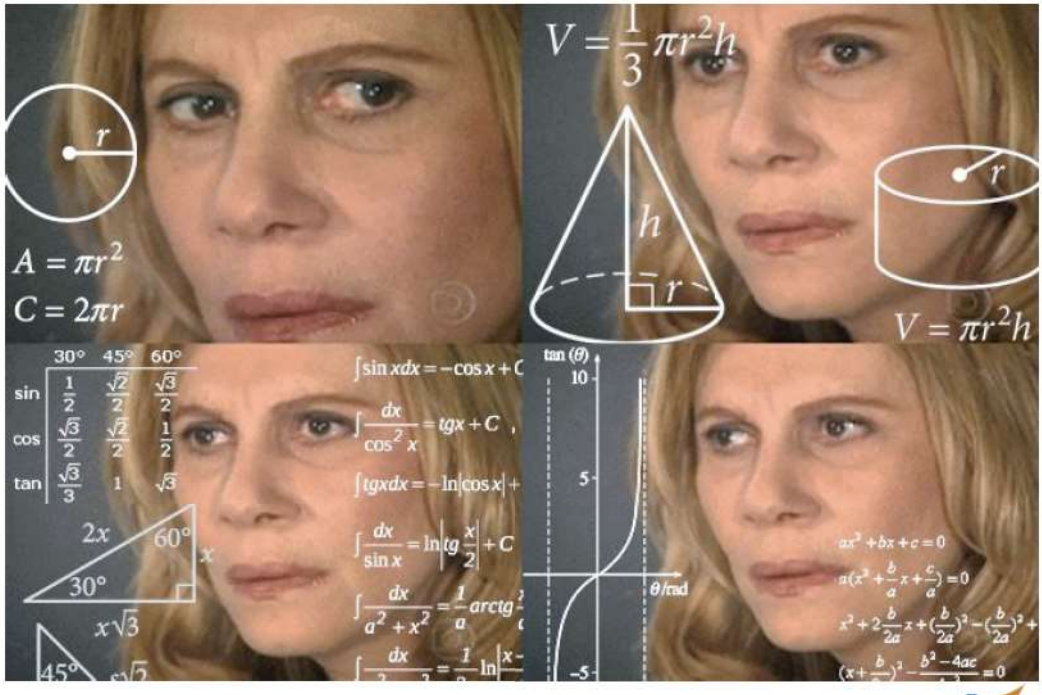
Est CL_v (L/h)	LD (mg)	MD (mg)	$AUC_{0-24} \geq 400$ at 24 hr (%)	$AUC_{24-48} \geq 400$ at 48 hr (%)	Toxicity ($AUC_{48-72} \geq 700$) (%)
1	2500	500 q24h	100	100	23
2	2500	1000 q24h	98	100	1
3	2500	1500 q24h	93	100	0
4	2500	1000 q12h	99	100	0
5	2500	1250 q12h	98	100	0
6	2500	1500 q12h	96	100	0
7	2500	1750 q12h	94	100	0
8	3000	2000 q12h	99	100	0
9	3000	2250 q12h	98	100	0
10	3000	2250 q12h	92	100	0

$CL_V = 9.656 - 0.078 \times AGE - 2.009 \times SCR + 1.09 \times SEX + 0.04 \times TBW^{0.75}$

AGE (years), SEX is 1 if male 0 if female

PMID: 30203073

TL;DR



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Male, mid 40s, LLE purulent cellulitis.

125 kg.

No comorbidities (currently diagnosed)

KEY TAKEAWAYS

Reality:

- Low quality data – no patient oriented outcomes

Solutions:

- Divided loading dose plus Crass Nomogram?
- Approach each patient individually
- We need more researchers

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References

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Further Reading

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2018 Midyear Clinical Meeting and Exhibition

- Pharmacists in the Emergency Department: Heroes Antimicrobial Stewardship Needs

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Pharmacists in the Emergency Department: Heroes Antimicrobial Stewardship Needs

Meghan E. Groth, Pharm.D., BCPS @EMpharmgirl
Jenny Koehl, Pharm.D., BCPS @jlkoehl
Erin K. McCreary, Pharm.D., BCPS @erinmccreary

Disclosures

All planners, presenters, reviewers, and ASHP staff of this session report no financial relationships relevant to this activity.

Spread the Word

- Please use **#IDintheED** and **#ASHP18** for tweets during this session

Thank you!

SIDP | SOCIETY OF INFECTIOUS DISEASES PHARMACISTS

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Pharmacists in the Emergency Department: Heroes Antimicrobial Stewardship Needs

Meghan E. Groth, Pharm.D, BCPS
Respiratory Medical Science Liaison
GlaxoSmithKline
@EMpharmgirl

Learning Objectives

- Describe the current state of antimicrobial stewardship in the ED
- Evaluate the role of the ED pharmacist in antimicrobial stewardship
- Discuss the utility and implementation of rapid diagnostic technologies and beta-lactam allergy testing in the ED
- Determine ED stewardship opportunities for patients presenting with community-acquired pneumonia, skin and soft tissue infection, and urinary tract infection
- Evaluate the impact of the ED on outpatient stewardship

Learning Objectives

- **Describe the current state of antimicrobial stewardship in the ED**
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Pharmacists: Heroes in Disguise?

- Why should we care?
- Why pharmacists?

PRACTICE RESEARCH REPORTS

Roles of the emergency medicine pharmacist: A systematic review

Cristina Roman, B.Pharm. (Hons), M.PharmPrac., Pharmacy Department and Emergency and Trauma Centre, The Alfred Hospital, Melbourne, Australia.

Gail Edwards, B.Pharm., Pharmacy Department, The Alfred Hospital, Melbourne, Australia.

Michael Dooley, B.Pharm., Grad.Dip.Hosp.Pharm., Ph.D., FISOPP, FSHPA, FAAQHC, Pharmacy Department, The Alfred Hospital, Melbourne, Australia, and Faculty of Pharmacy and Pharmaceutical Sciences, Monash University, Melbourne, Australia.

Biswadev Mitra, M.B.B.S., M.H.S.M., Ph.D., FACEM, Emergency and Trauma Centre, The Alfred Hospital, Melbourne, Australia, and Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia.

Purpose. Results of a systematic literature review to identify roles for emergency medicine (EM) pharmacists beyond traditionally reported activities and to quantify the benefits of these roles in terms of patient outcomes are reported.

Summary. Emergency department (ED)–based clinical pharmacy is a rapidly growing practice area that has gained support in a number of countries globally, particularly over the last 5–10 years. A systematic literature search covering the period 1995–2016 was conducted to characterize emerging EM pharmacist roles and the impact on patient outcomes. Six databases were searched for research publications on pharmacist participation in patient care in a general ED or trauma center that documented interventions by ED-based pharmacists; 15 results satisfied the inclusion criteria. Six reported studies evaluated EM pharmacist involvement in the care of critically ill patients, 5 studies evaluated antimicrobial stewardship (AMS) activities via pharmacist review of positive cultures, 2 studies assessed pharmacist involvement in generating orders for nurse-administered home medications and 2 reviewed publications focused on EM pharmacist involvement in management of healthcare-associated pneumonia and dosing of phenytoin. A diverse range of positive patient outcomes was identified. The included studies were assessed to be of low quality.

Conclusion. A systematic review of the literature revealed 3 key emerging areas of practice for the EM pharmacist that are associated with positive patient outcomes. These included involvement in management of critically ill patients, AMS roles, and ordering of home medications in the ED.

Keywords: emergency medicine, pharmacists, pharmacy service hospital, resuscitation, trauma centers

Am J Health-Syst Pharm. 2018; 75:796-806

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One Hero's Humble Beginnings

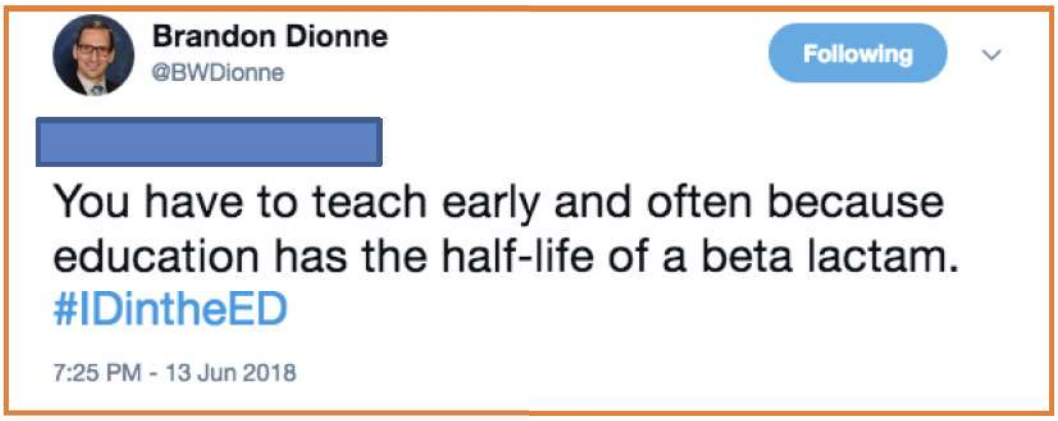
Why me?

A Hero Is Tested

- Challenges:
  - Guidelines
  - Pathways
  - Order Sets

Current State and Challenges

- Education alone insufficient



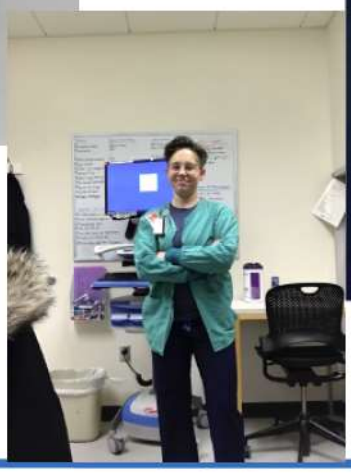
Logistics

- Physical location?
- Are antibiotics in cabinets?
  - ALL antibiotics?
  - Restricted ABX?
- Second doses
  - Boarder patients
- Culture review

What does stewardship look like?

- High-risk conditions
  - Sepsis alerts
- Restricted ABX
- Culture review

A Day in the Life of a Hero



Case 1

- 65 yo F
- 40 pack year smoker
- COPD
- Uncontrolled HTN
- NKDA

Case 1

- Fever, tachycardia, cough
- Sepsis alert
- Vanco, pip/tazo
- Thoughts?

Case 2

- 34 yo M, 120 kg
- Takes creatine supplements
- Uncomplicated abscess
- PCN allergy (rash)

Case 2

- I&D in ED
- 1 gram vanco, discharge with cephalexin 500 QID + SMX/TMP 1 DS tab BID
- Thoughts?

Case 3

- 21 yo F pw syncope
- No PMH, UPT (-), UA (+)
- Latex allergy
- DC with cipro

Case 3

- C/S returns after d/c
- Amp >/= 32 (R)
- Cipro </= 0.25 (S)
- Nitrofurantoin </=16 (S)
- TMP-SMX = 32 (I)
- Thoughts?

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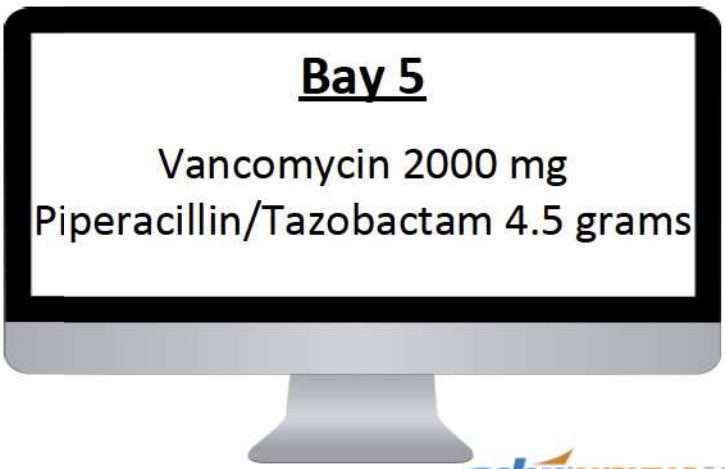
Pharmacists in the Emergency Department: Heroes Antimicrobial Stewardship Needs

Jenny Koehl, Pharm.D., BCPS
Emergency Medicine Clincial Pharmacist
Massachusetts General Hospital
Boston, MA
@jlkoehl

Patient Case 1

Patient: 65 YO female with COPD and uncontrolled HTN

CC: Fever, tachycardia, increased shortness of breath, and cough



Do we even need antibiotics?

YES	NO
What antibiotics do we need?	1. Do not verify 2. Educate provider

Diagnostic Uncertainty!

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CMS 3 – Hour Sepsis Bundle

Labs	• Lactate • **Blood Cultures → before antibiotics**
Broad-Spectrum Antibiotics	• **<u>Tailored</u> to local (ED) susceptibility patterns** • **<u>Individualized</u> to patient/infection/bacteria**
Fluids (if shock)	• 30 mL/kg crystalloid

Every 1 hour delay in antibiotics = 7.6% decrease in survival

Adjusted Mortality		
Time to antibiotics	OR	P-value
< 1 hr	1	
1 – 2 hrs	1.07	0.165
2 – 3 hrs	1.14	0.021
3 – 4 hrs	1.19	0.009
> 6 hrs	1.52	<0.001

Kumar A, Roberts D, Wood KE, et al. Crit Care Med. 2006 June;34:1589–96. PMID: 16625125
Ferrer R, Martin-Loeches I, Phillips G, et al. Crit Care Med 2014 Aug; 42(8):1749-55. PMID: 24717459

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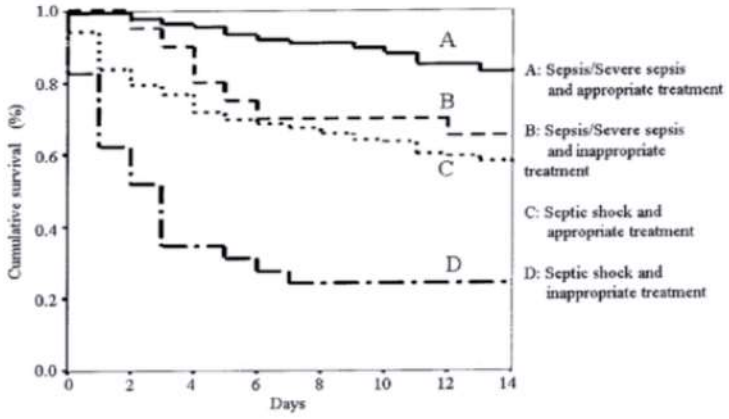
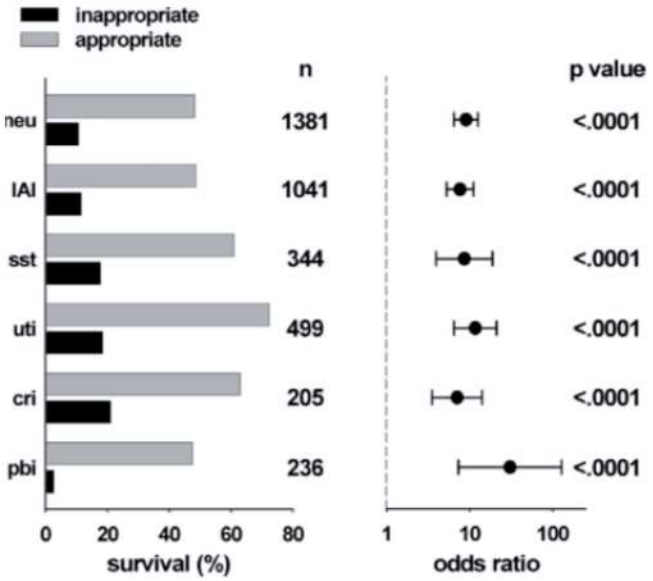
Right Time, or Right Drug?

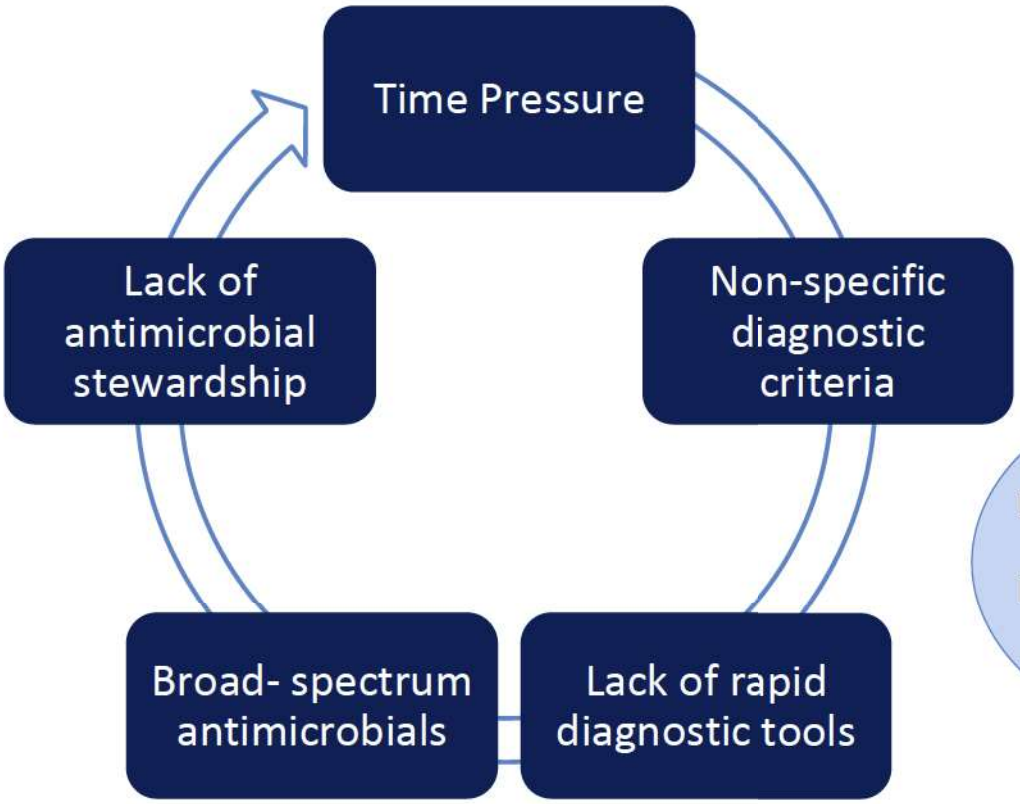




- Inappropriate Therapy: 14.5%
- Survival rate: 79.4% vs 51.7%

- Inappropriate Therapy: 19.9%
- Survival rate: 52.0% vs 10.3%

Kumar A, Ellis P, Arabi Y. et al. Chest. 2009 Nov;136(5):1237-1248. PMID: 19696123
Valles J, Rello J, Ochagavia A. et al. Chest. 2003 May;123(5):1615-24. PMID: 12740282



"SEP-1 (reporting) will promote the overuse of the antibiotics that are our last line of defense against drug -resistant bacteria"
-AHA

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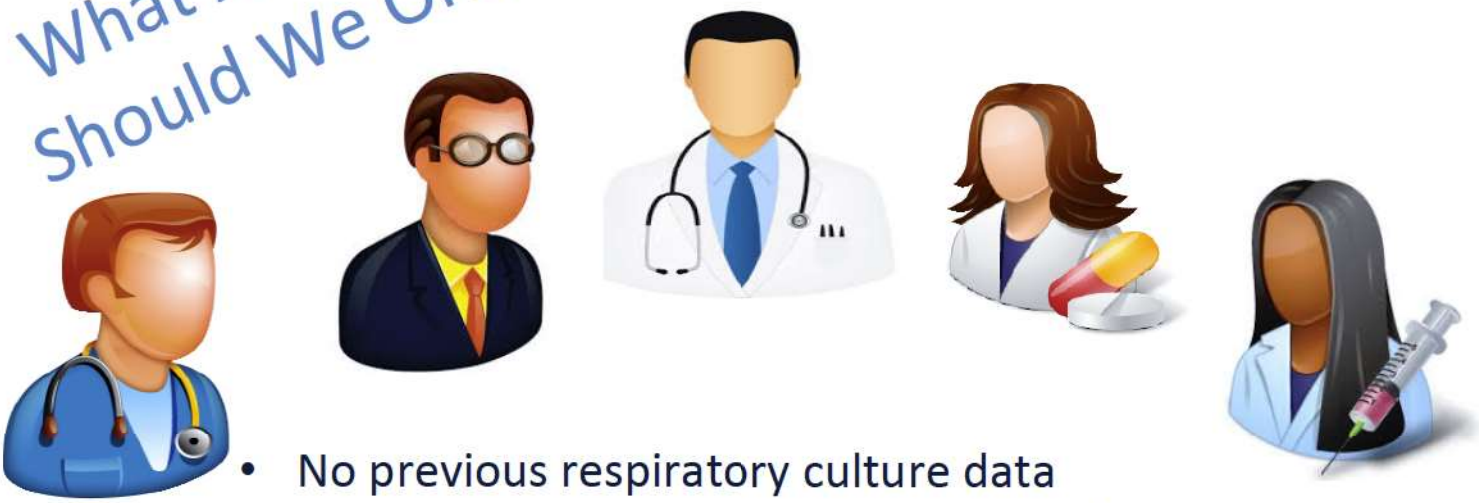
So what are we doing about this?

What Antibiotics Should We Order?



- No previous respiratory culture data
- No hospital or antibiotic exposure in the last 90 days

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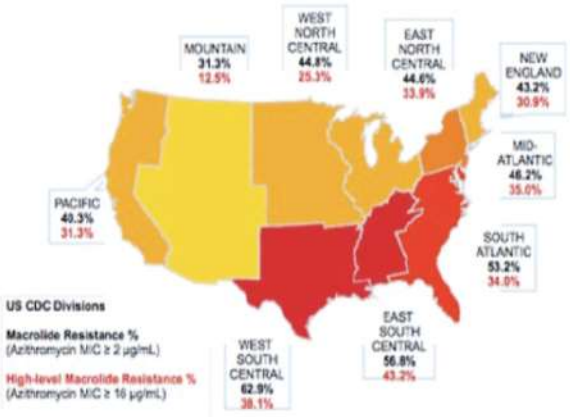
Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults

Lionel A. Mandell, Richard G. Wunderink, Antonio Anzueto, John G. Bartlett, G. Douglas Campbell, Nathan C. Dean, Scott F. Dowell, Thomas M. File, Jr., Daniel M. Musher, Michael S. Niederman, ... Show more

Clinical Infectious Diseases, Volume 44, Issue Supplement_2, 1 March 2007, Pages S27–S72, https://doi.org/10.1086/511159

Published: 01 March 2007



Cetriaxone + Azithromycin

Blondeau JM, Theriault N. J Infect Dis Ther. 2017 Feb;5(1)

Questions

1. Is the patient infected?
2. What is the patient infected with?
3. What will treat the infection?

Blood Cultures

Low Sensitivity

- Severity
- Duration
- Microbial growth

Sputum Cultures

Low Specificity

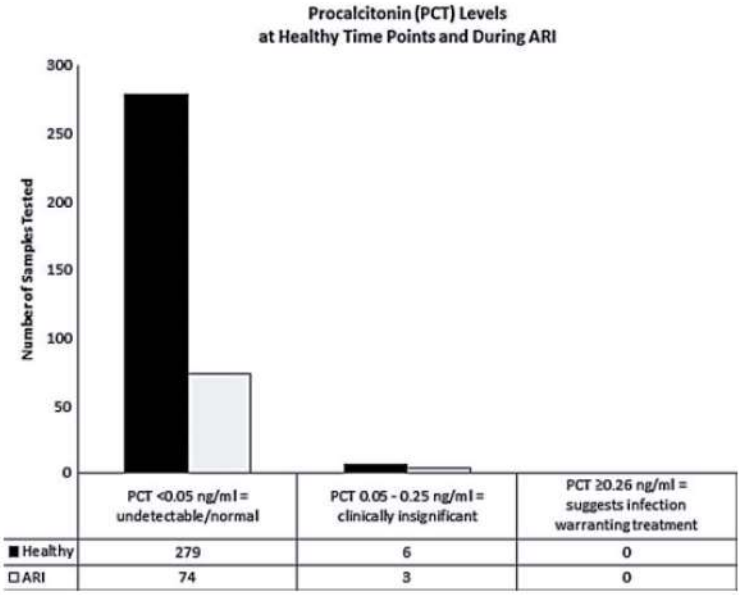
- Colonization
- Contamination

Rapid Molecular Diagnostic Testing

Questions	Answers
1. Is the patient infected?	• PCT
2. What is the bug?	• Respiratory panel; influenza/RSV PCR; MRSA PCR; urinary antigens
3. What will treat the infection?	• Rapid genotypic and phenotypic results

Green DA, StGeorge K. J Clin Microbiol. 2018 Sep 25;56(10). PMID: 29899007

Procalcitonin:
High NEGATIVE predictive value



Diagnosis	PCT	Usual Care
Asthma	**37.7%**	**40.8%**
COPD	**32.2%**	**31.5%**
Bronchitis	**25.3%**	**23.1%**
CAP	20.3%	19.6%
Other LRTI	5.1%	5.1%

	PCT (N=826)	Usual Care (N=830)
PCT Median level	**0.05 µg/L**	**0.05 µg/L**
Antibiotic-days	4.2±5.8	4.3±5.6
Received any antibiotics by day 30	471 (57.0%)	513 (61.8%)

Huang DT, Yealy DM, Filbin MR, et al. N Engl J Med. 2018 Jul 19;379(3):236-249. PMID:29781385
Henriquez KM, Hayney MS, Rakel DP, et al. Viral Immunol. 2016 Mar;29(2):128-31. PMID: 26741515

Cochrane Library

Procalcitonin to initiate or discontinue antibiotics in acute respiratory tract infections (Review)

	Control group	PCT group	
Initiation of antibiotics n (%)	2894 (86.3%)	2351 (71.5%)	P < 0.001
Duration of antibiotics (days), mean (±SD)	9.4 ± 6.2	8.0 ± 6.5	P < 0.001
Total exposure (days), mean (±SD)	8.1 ± 6.6	5.7 ± 6.6	P < 0.001
Mortality	10%	8.6%	P = 0.037
Treatment failure	24.9%	23%	P = 0.068
Antibiotic-related side effects	22.1%	16.3%	P < 0.0001

Schuetz P, Wirz Y, Sager R, et al. Cochrane Database Syst Rev. 2017 Oct 12;10:CD007498. PMID: 29025194

Expert Consensus

PCT use is **appropriate for antibiotic de-escalation and discontinuation**. However, **initiation or escalation of antibiotic therapy in specific scenarios, including acute respiratory infections, should not be based solely on PCT serum levels**. Clinical and radiological findings, evaluation of severity of illness and of patient's characteristics should be taken into account

Bartoletti M, Antonelli M, Bruno Biasi FA, et al. Clin Chem Lab Med. 2018 Jul 26;56(8):1223-1229. PMID:29874192

Diagnostic Stewardship: bacterial detection

Test	Organism(s) Detected	Resistance Marker(s)	Time to Result
Multiplex array panel			
FilmArray BCID (Biofire)[24,31]	*Acinetobacter baumannii, Candida albicans, C. glabrata, C. krusei, C. parapsilosis, C. tropicalis, Escherichia coli, Enterobacter cloacae* complex, *Enterobacteriaceae, Enterococcus* spp., *Haemophilus influenzae, Klebsiella oxytoca, K. pneumoniae, Listeria monocytogenes, Proteus* spp., *Pseudomonas aeruginosa, Neisseria meningitidis, Serratia marcescens, Staphylococcus* spp., *S. aureus, Streptococcus* spp., *S. agalactiae, S. pneumoniae, S. pyogenes*	KPC, *mecA, vanA/B*	1 hr
Verigene BC-GN (Nanosphere)[25]	*Acinetobacter* spp., *Citrobacter* spp., *E. coli, Enterobacter* spp., *K. oxytoca, K. pneumoniae, P. aeruginosa, Proteus* spp.	CTX-M, IMP, KPC, NDM, OXA, VIM	2.5 hr
Verigene BC-GP (Nanosphere)[25]	*Enterococcus faecalis, E. faecium, Listeria* spp., *Staphylococcus* spp., *S. aureus, S. epidermidis, S. lugdunensis, Streptococcus* spp., *S. agalactiae, Streptococcus anginosus* group, *S. pneumoniae, S. pyogenes*	*mecA, vanA/B*	2.5 hr
Polymerase chain reaction			
StaphSR (GeneOhm)[26,32]	*S. aureus*	SCC *mec*	2 hr
Xpert MRSA/SA BC (Cepheid)[23,33]	*S. aureus*	*mecA*	1 hr
MALDI-TOF			
MALDI-TOF (bioMerieux)[34,35]	Bacterial and fungal organisms	None	30 min
MALDI-TOF (Bruker)[36]	Bacterial and fungal organisms	None	30 min
PNA-FISH			
*Staphylococcus Quick*FISH (AdvanDx)[27,37]	Coagulase-negative staphylococci, *S. aureus*	None	20 min
*Enterococcus Quick*FISH (AdvanDx)[27,37]	*E. faecalis, E. faecium, Enterococcus* spp.	None	20 min
Gram-negative *Quick*FISH (AdvanDx)[27,37]	*E. coli, K pneumoniae, P. aeruginosa*	None	20 min
Yeast Traffic Light (AdvanDx)[27,37]	*C. albicans, C. glabrata, C. kreusei, C. parapsilosis, C. tropicalis*	None	90 min
*mecA Xpress*FISH (AdvanDx)[27,37]	None	*mecA*	20 min

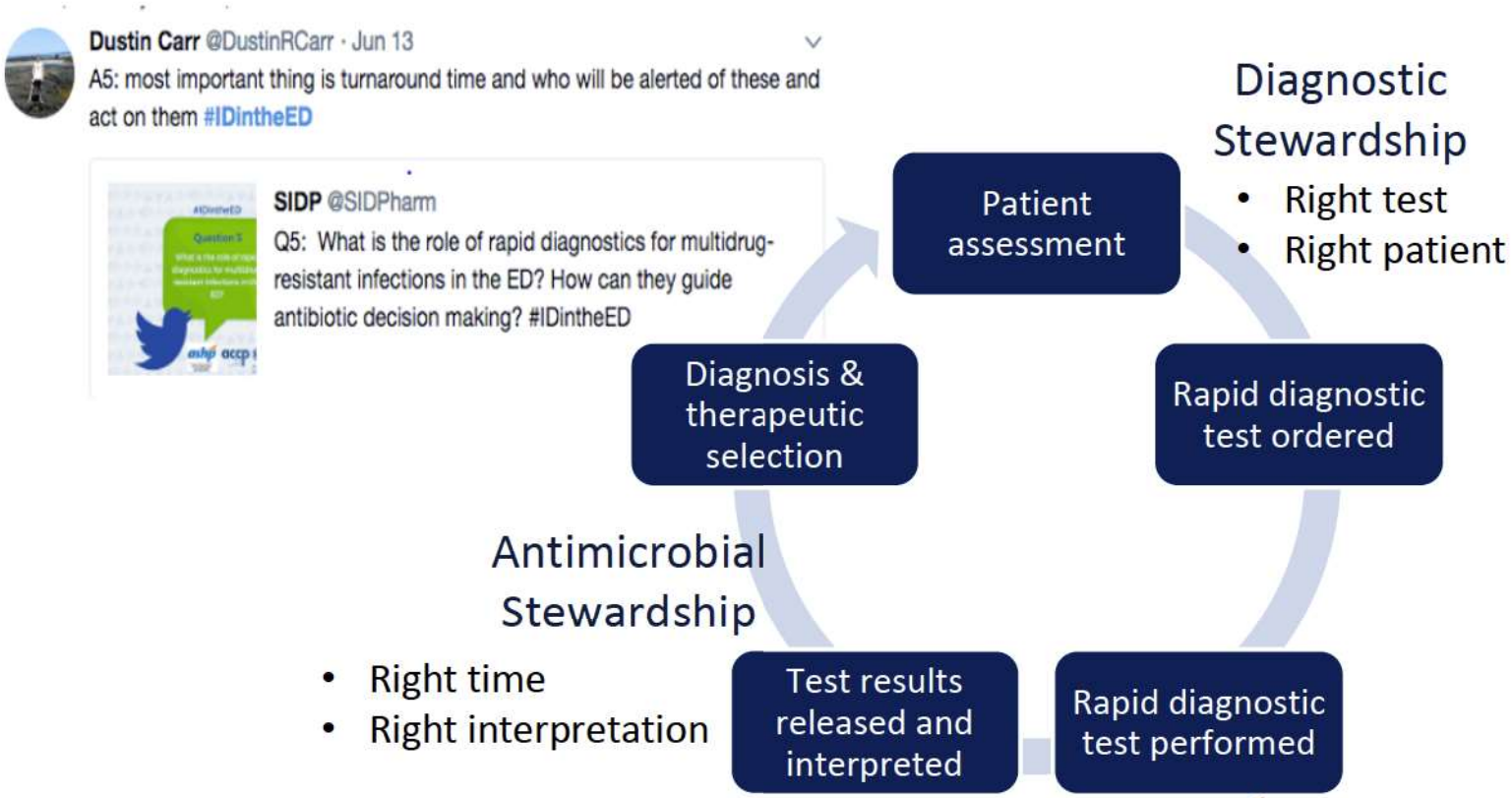
Wenzler E, Timbrook TT, Wong JR, et al. Am J Health Syst Pharm. 2018 Aug 15;75(16):1191-1202. PMID: 29970407

MRSA PCR

- Surrogate marker for MRSA lower respiratory tract infections
- **95-99% negative predicted value**

Pharmacist-ordered MRSA PCR testing				
Parameter	Pre-PCR (n=27)	PCR (n=30)	Difference	P value
Duration of Anti-MRSA Therapy				
Hours	74 ± 48.9	27.4 ± 18.7	46.6	<0.0001
Days	4.0 ± 2.0	2.13 ± 0.86	1.9	<0.0001

Tilahun B, Faust AC, McCorstin P, et al. 2015. Am J Crit Care 24:8–12. PMID: 25554549
Baby N, Faust AC, Smith T, et al. Antimicrob Agents Chemother. 2017 Mar 24;61(4). PMID: 28137813
Dangerfield B, Chung A, Webb B, et al. Antimicrob Agents Chemother. 2014;58(2):859-64. PMID: 24277023



Messacar K, Parker SK, Todd JK. J Clin Microbiol. 2017 Mar;55(3):715-723. PMID: 28031432

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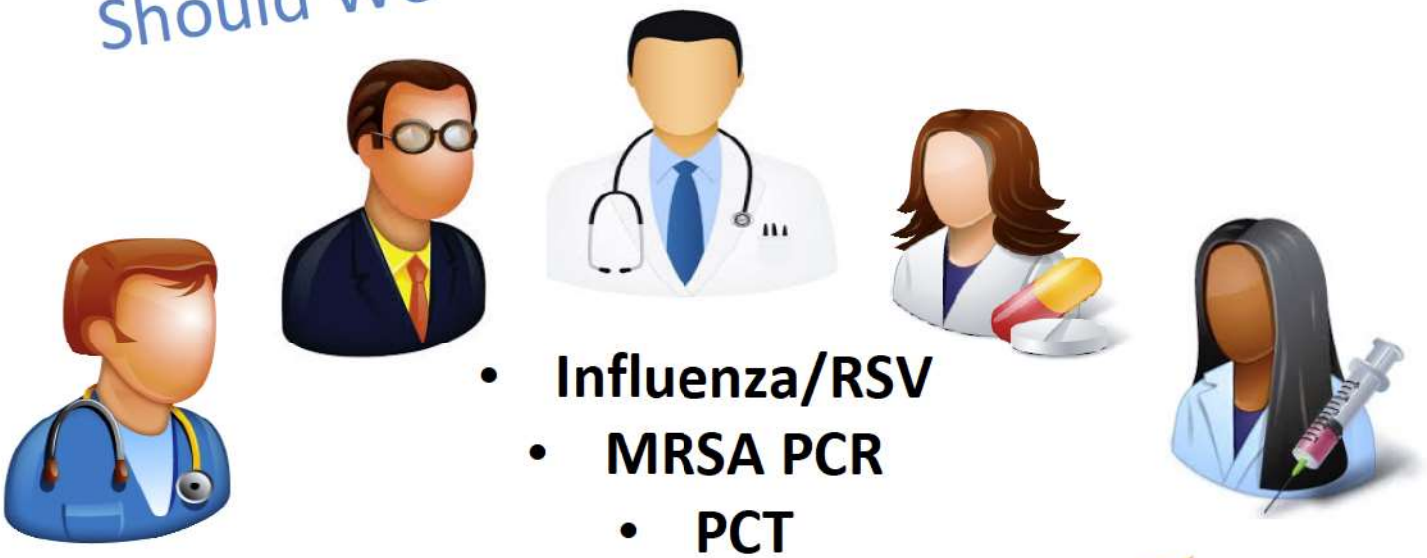
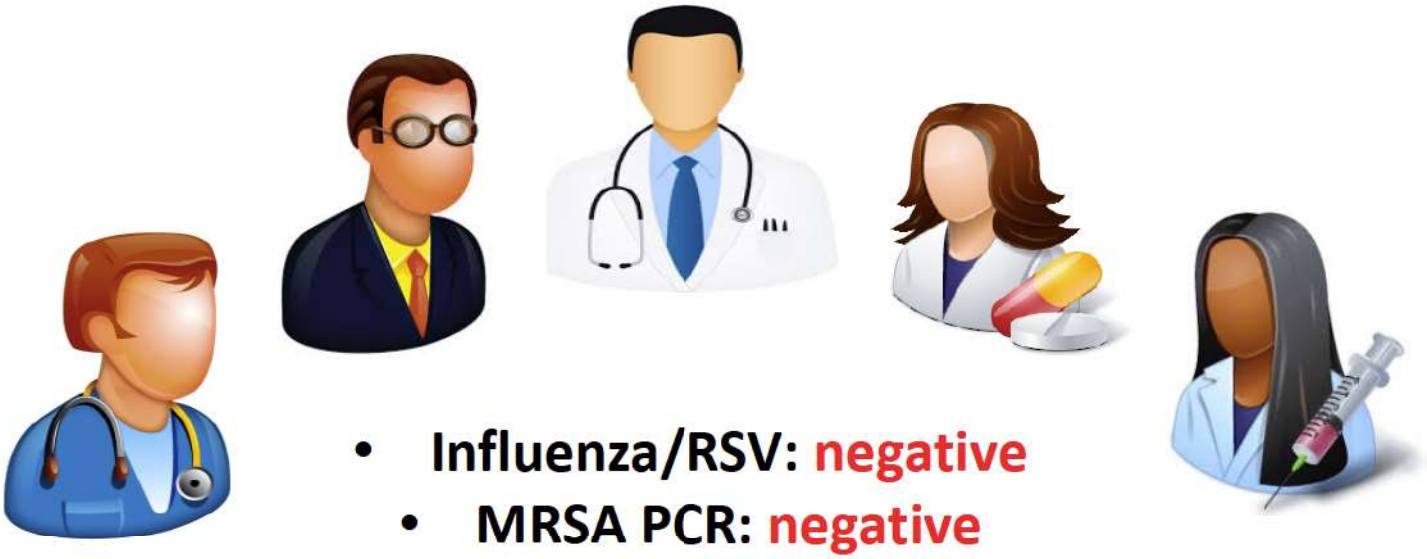
What Cultures and RDTs Should We Order?



- Influenza/RSV
- MRSA PCR
- PCT



- Influenza/RSV: negative
- MRSA PCR: negative
- PCT: 0.2 µg/L

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Antibiotic Acquisition

- Pharmacist verification
- Liaison with central pharmacy

- Restricted antibiotics
  - Infectious diseases consultation
  - First dose approval

We Can Mix Meds and Prime Lines Too!

	Pre-ADC Group		Post-ADC Group		
	n	Mean ± S.D. Time (min)	*n*	Mean ± S.D. Time (min)	*p*
Ward	37	302 ± 265	33	172 ± 128	0.013
Intensive care unit	15	236 ± 193	13	110 ± 84	0.039
Step-down unit	13	223 ± 228	10	247 ± 245	0.81
Sepsis or concern for sepsis	12	283 ± 283	28	128 ± 123	0.020

Lo A, Zhu JN, Richman M. Am J Health Syst Pharm. 2014 Oct 1;71(19):1663-7. PMID: 25225451

Antibiotic Administration

- IV to PO
- Administration order
- Compatibility
- Push-dose antibiotics

Which ABX first?!

Cephalosporin	Carbapenem	Aminoglycoside	Lipopeptide
Cefazolin Cefepime Cefotetan Cefoxitin Ceftazidime Ceftriaxone Cefuroxime Aztreonam	Meropenem Ertapenem	Gentamicin Tobramycin	Daptomycin

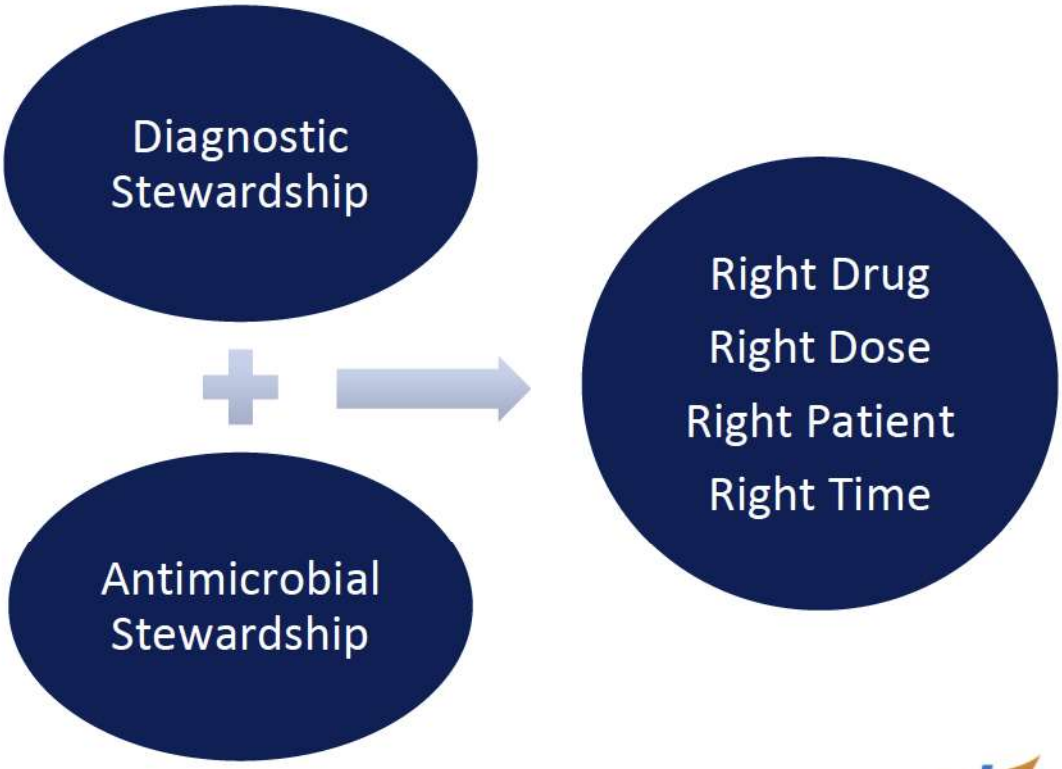
Second-dose antibiotics

- **One-third** of patients had a delay in 2nd antibiotic dose
  - 72% with q6 hour antibiotics
  - 47% with q8 hour antibiotics
- More frequent for inpatients boarding and **3-hour sepsis bundle compliance**
- Delayed 2nd dose antibiotics associated with increased mortality

Solutions:

- Course out antibiotics
- Pharmacist-to-pharmacist handoff
- Select antibiotics with less frequent dosing if appropriate

Leisman D, Huang V, Zhou Q, et al. Crit Care Med. 2017 Jun;45(6):956-965. PMID: 28328652



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Pharmacists in the Emergency Department: Heroes Antimicrobial Stewardship Needs

Erin K. McCreary, Pharm.D., BCPS
Antimicrobial Stewardship/Infectious Diseases Clinical Pharmacist
University of Pittsburgh Medical Center
Pittsburgh, PA
@erinmccreary

The Truth About Penicillin Allergies

- **They are bad**
  - More FQ, clindamycin, vancomycin, aztreonam use
  - More *C. difficile,* MRSA, VRE infection and colonization
  - More surgical site infections
- **They are… questionable**
  - >95% of patients with reported allergies have negative skin tests
  - Rates of true anaphylaxis
    - 1/207,191 (0.00048%) → oral penicillin exposure
    - 1/95,298 (0.00105%) → parental penicillin exposure
    - No fatalities in over 100,000,000 oral amoxicillin courses
- **They are not forever**
- **Med chem matters….**

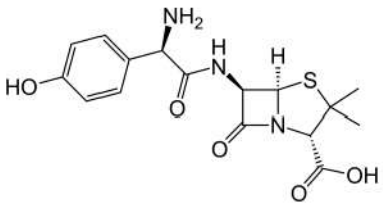
Heil EL, et al. Open Forum Infect Dis. 2016;23:3.
Macy E, Chen LH. J Allergy Clin Immunol. 2017;139 (2 Suppl):AB3.
Lee P, Shanson D. J Antimicrobial Chemotherapy. 2007;60:1172-9.
Blumenthal KG, et al. Clin Infect Dis. 2018;66(3):329-36.
Sakoulas G, et al. Clin Infect Dis. 2018.

5.1. Cefazolin does not share a common side chain with any other beta-lactams

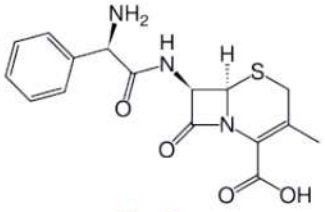
Table 1. FDA-approved Beta-lactam Antibiotics with Similar Side Chains[a]

Agent	Agents with Similar Side Chains				
Amoxicillin	Ampicillin	Cefaclor	Cefadroxil[c]	Cefprozil[c]	Cephalexin
Ampicillin	Amoxicillin	Cefaclor[c]	Cefadroxil	Cefprozil	Cephalexin[c]
Aztreonam[b]	Ceftazidime[c]	Ceftolozane			
Cefaclor	Amoxicillin	Ampicillin[c]	Cefadroxil	Cefprozil	Cephalexin[c]
Cefadroxil	Amoxicillin[c]	Ampicillin	Cefaclor	Cefprozil[c]	Cephalexin
Cefdinir	Cefixime[d]				
Cefditoren	Cefepime[c]	Cefotaxime[c]	Cefpodoxime[c]	Ceftriaxone[c]	
Cefepime	Cefditoren[c]	Cefotaxime[c]	Cefpodoxime[c]	Ceftriaxone[c]	Ceftaroline
Cefixime	Cefdinir[d]				
Cefotaxime	Cefditoren[c]	Cefepime[c]	Cefpodoxime[c]	Ceftriaxone[c]	Ceftaroline
Cefoxitin	Cefuroxime[d]	Penicillin G			
Cefpodoxime	Cefditoren[c]	Cefepime[c]	Cefotaxime[c]	Ceftriaxone[c]	Ceftaroline
Cefprozil	Amoxicillin[c]	Ampicillin	Cefaclor	Cefadroxil[c]	Cephalexin
Ceftaroline	Cefepime	Cefotaxime	Cefpodoxime	Ceftriaxone	Ceftazidime
Ceftazidime	Aztreonam[c]	Ceftolozane			
Ceftolozane	Aztreonam	Ceftazidime			
Ceftriaxone	Cefditoren[c]	Cefepime[c]	Cefotaxime[c]	Cefpodoxime[c]	Ceftaroline
Cefuroxime	Cefoxitin[d]				
Cephalexin	Amoxicillin	Ampicillin[c]	Cefaclor[c]	Cefadroxil	Cefprozil
Penicillin G	Cefoxitin				

[a]Agents not listed are either not approved for use in the United States (ceftizoxime, ceftibiprole) or do not share common side chains (e.g. piperacillin, ticarcillin, nafcillin, dicloxacillin)
[b]Aztreonam cross-reacts with ceftazidime and ceftolozane, with which it shares an identical side-chain
[c]Identical R1 side chain
[d]Identical R2 side chain



amoxicillin



cephalexin

University of Wisconsin Health. 2016.

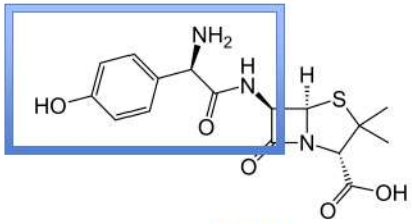
5.1. Cefazolin does not share a common side chain with any other beta-lactams

Table 1. FDA-approved Beta-lactam Antibiotics with Similar Side Chains[a]

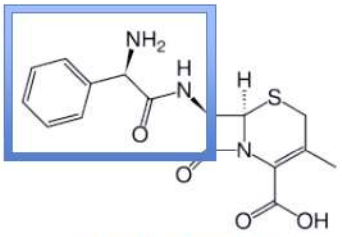
Agent	Agents with Similar Side Chains				
Amoxicillin	Ampicillin	Cefaclor	Cefadroxil[c]	Cefprozil[c]	Cephalexin
Ampicillin	Amoxicillin	Cefaclor[c]	Cefadroxil	Cefprozil	Cephalexin[c]
Aztreonam[b]	Ceftazidime[c]	Ceftolozane			
Cefaclor	Amoxicillin	Ampicillin[c]	Cefadroxil	Cefprozil	Cephalexin[c]
Cefadroxil	Amoxicillin[c]	Ampicillin	Cefaclor	Cefprozil[c]	Cephalexin
Cefdinir	Cefixime[d]				
Cefditoren	Cefepime[c]	Cefotaxime[c]	Cefpodoxime[c]	Ceftriaxone[c]	
Cefepime	Cefditoren[c]	Cefotaxime[c]	Cefpodoxime[c]	Ceftriaxone[c]	Ceftaroline
Cefixime	Cefdinir[d]				
Cefotaxime	Cefditoren[c]	Cefepime[c]	Cefpodoxime[c]	Ceftriaxone[c]	Ceftaroline
Cefoxitin	Cefuroxime[d]	Penicillin G			
Cefpodoxime	Cefditoren[c]	Cefepime[c]	Cefotaxime[c]	Ceftriaxone[c]	Ceftaroline
Cefprozil	Amoxicillin[c]	Ampicillin	Cefaclor	Cefadroxil[c]	Cephalexin
Ceftaroline	Cefepime	Cefotaxime	Cefpodoxime	Ceftriaxone	Ceftazidime
Ceftazidime	Aztreonam[c]	Ceftolozane			
Ceftolozane	Aztreonam	Ceftazidime			
Ceftriaxone	Cefditoren[c]	Cefepime[c]	Cefotaxime[c]	Cefpodoxime[c]	Ceftaroline
Cefuroxime	Cefoxitin[d]				
Cephalexin	Amoxicillin	Ampicillin[c]	Cefaclor[c]	Cefadroxil	Cefprozil
Penicillin G	Cefoxitin				

[a]Agents not listed are either not approved for use in the United States (ceftizoxime, ceftibiprole) or do not share common side chains (e.g. piperacillin, ticarcillin, nafcillin, dicloxacillin)
[b]Aztreonam cross-reacts with ceftazidime and ceftolozane, with which it shares an identical side-chain
[c]Identical R1 side chain
[d]Identical R2 side chain

University of Wisconsin Health. 2016.



amoxicillin



cephalexin

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You can ask these questions (or students, residents, doctors, nurses…)

- **What** age reaction occurred
- **When** reaction occurred in relation to taking the antibiotic
- **What** reaction looked like
- **Where** reaction occurred (localized v. whole body)
- **How** reaction was treated (did they need to seek urgent medical care?)
- Was the medication was ever **re-challenged?**
- Have they have tried **similar antibiotics?**
  - E.g. Augmentin, Amoxicillin, Keflex/Cephalexin

Don't forget the most important part…

- **Educate the patient** why your questions are important
- **DOCUMENT your findings** – do not delete allergies from profiles

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Don't forget the most important part…

- **Educate the patient** why your questions are important
- **DOCUMENT your findings** – do not delete allergies from profiles

	Reaction	Severity	Reaction Type
Allergies			
Penicillins	HIVES		

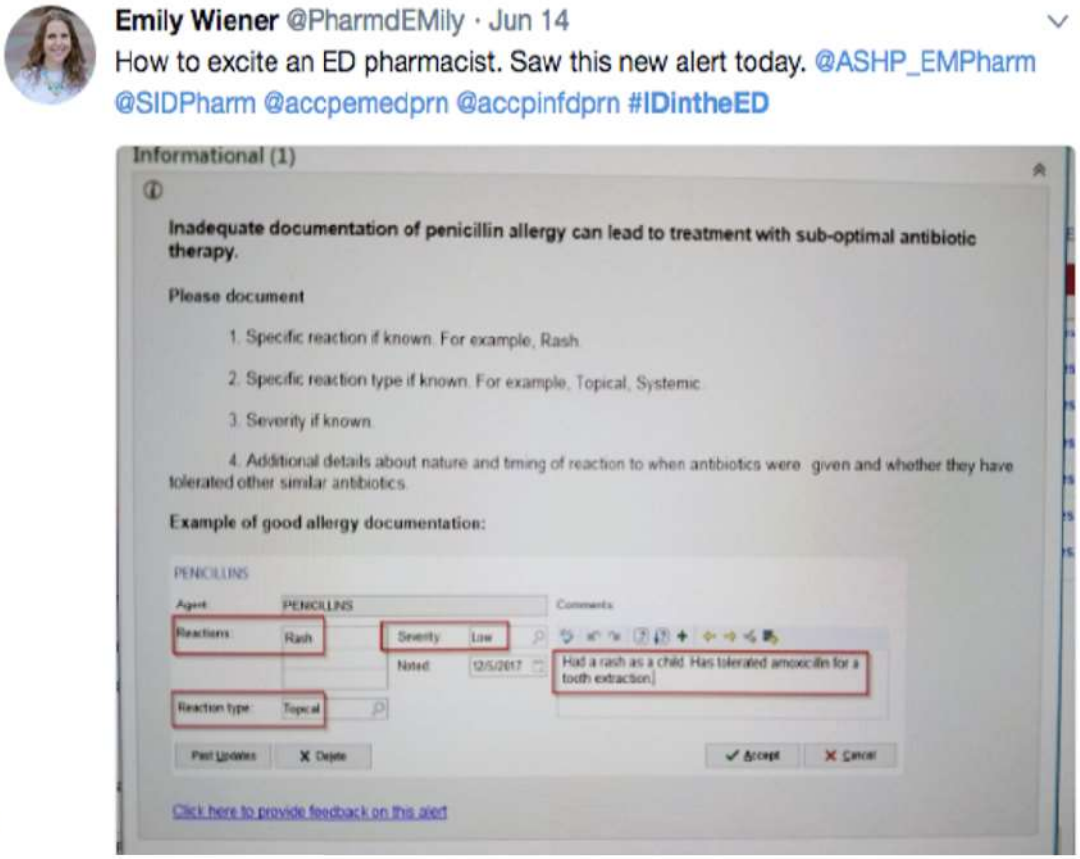
This is not helpful

	Reaction	Severity	Reaction Type	Noted	Valid U
Allergies					
Penicillins	HIVES			5/31/2017	

Occurred 40+ years ago 2-4 hours after receiving IM injection. Hives were localized to arm. Patient reports she has tolerated amoxicillin in the past. Also tolerated cefazolin

The person who completed this documentation is an amazing human

ED pharmacists think this is cool too, I promise.



What if you CAN'T get a reliable patient history?

- Medication history (inpatient, outpatient records)
- Oral antibiotic challenge
- Test doses / Graded challenge
- Penicillin skin testing
- Desensitization

What if you CAN'T get a reliable patient history?

- **Medication history (inpatient, outpatient records)**
- **Oral antibiotic challenge**
- **Test doses pathway**
- **Graded challenge order set**
- ~~Penicillin skin testing~~
- ~~Desensitization~~

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Oral antibiotic challenge

History of any benign, acute rash
Delayed-onset rash
Unknown history >12 months ago

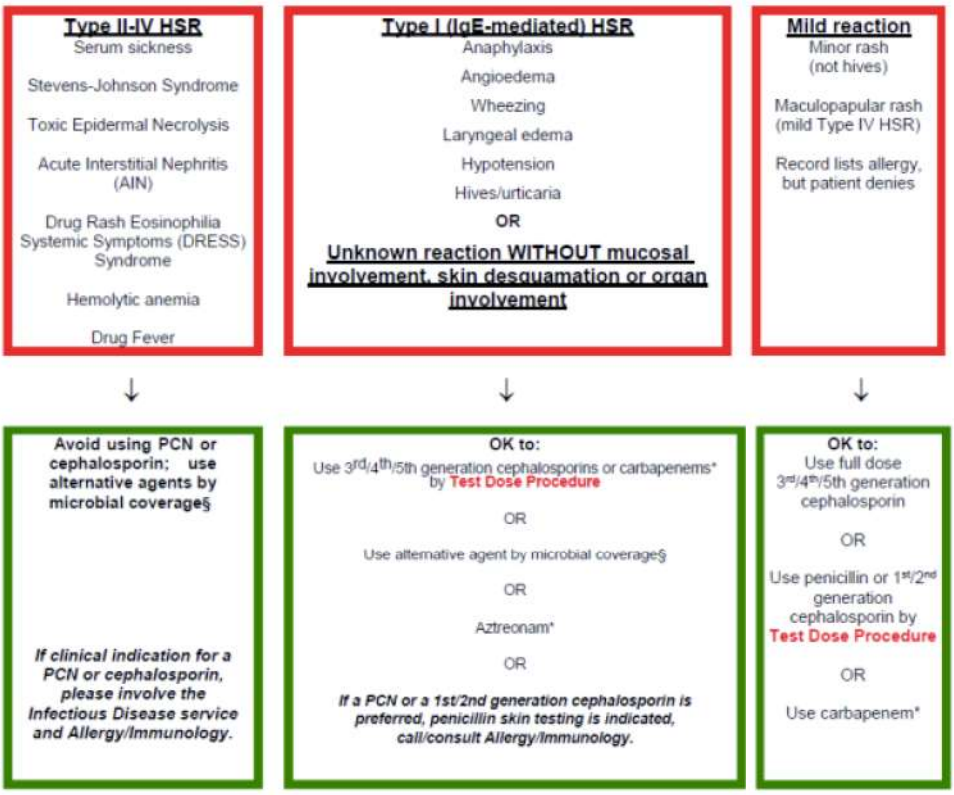
→ 250 mg oral amoxicillin + 1 hour observation

Reaction ≤ 12 months ago
History of shortness of breath
Anaphylaxis

→ PCN Skin Test → Oral challenge

Aberer W, Macy E. J Allergy Clin Immunol Pract. 2017;5:684-5.

Figure 1. Penicillin Hypersensitivity Pathway.[2-5]

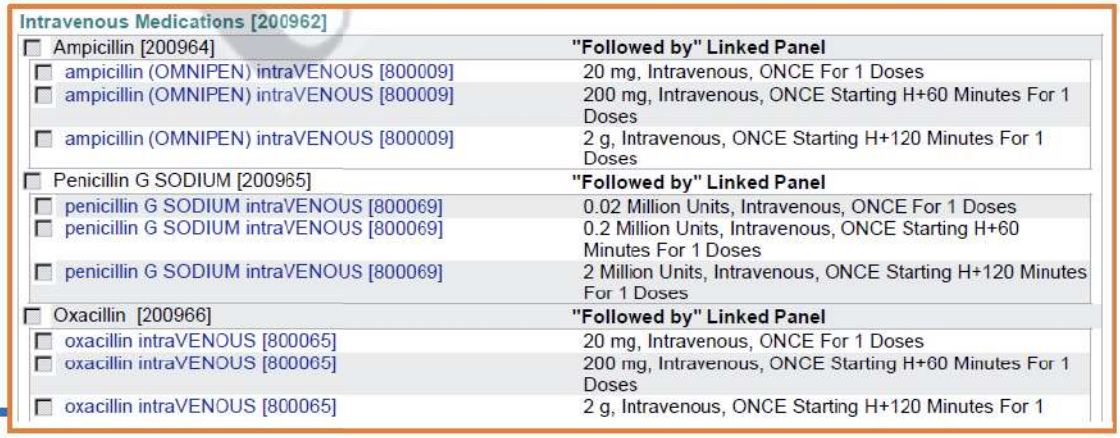


Test dose: Harvard style

Blumenthal KG. Ann Allergy Asthma Immunol. 2015;115(4):294-300.

Graded Challenge Order Set

- Education / clinical decision support
- Link to guideline
- Nursing communication orders and monitoring parameters
- Oral and intravenous challenges
- Rescue medication orders



Intravenous Medications [200962]

Ampicillin [200964]	"Followed by" Linked Panel
ampicillin (OMNIPEN) intraVENOUS [800009]	20 mg, Intravenous, ONCE For 1 Doses
ampicillin (OMNIPEN) intraVENOUS [800009]	200 mg, Intravenous, ONCE Starting H+60 Minutes For 1 Doses
ampicillin (OMNIPEN) intraVENOUS [800009]	2 g, Intravenous, ONCE Starting H+120 Minutes For 1 Doses
Penicillin G SODIUM [200965]	"Followed by" Linked Panel
penicillin G SODIUM intraVENOUS [800069]	0.02 Million Units, Intravenous, ONCE For 1 Doses
penicillin G SODIUM intraVENOUS [800069]	0.2 Million Units, Intravenous, ONCE Starting H+60 Minutes For 1 Doses
penicillin G SODIUM intraVENOUS [800069]	2 Million Units, Intravenous, ONCE Starting H+120 Minutes For 1 Doses
Oxacillin [200966]	"Followed by" Linked Panel
oxacillin intraVENOUS [800065]	20 mg, Intravenous, ONCE For 1 Doses
oxacillin intraVENOUS [800065]	200 mg, Intravenous, ONCE Starting H+60 Minutes For 1 Doses
oxacillin intraVENOUS [800065]	2 g, Intravenous, ONCE Starting H+120 Minutes For 1

University of Wisconsin Health. 2016.

Sometimes allergies are real

- Serum sickness
- Stevens-Johnson syndrome
- Toxic epidermal necrolysis
- Acute interstitial nephritis
- Drug rash eosinophilia systemic symptoms (DRESS) syndrome
- Hemolytic anemia
- Drug fever
- Anaphylaxis*

Patient Case 2

- 34 yo M, 120 kg

- PMH: unremarkable
- PCN allergy (rash)
- Home medications: creatine supplements

- Diagnosis:
  - Uncomplicated abscess

- Treatment:
  - I&D in ED
  - 1 gram vancomycin, discharge with cephalexin 500 QID + SMX/TMP 1 DS tab BID

The infection we love to hate

- Common infection, common challenge

- Questions we will address today…
  - Is combination therapy (cephalexin + TMP/SMX) necessary for abscess with cellulitis?
    - Do abscesses need antibiotics?
  - That gram of vanco…
    - Does anyone know what to do with oritavancin or dalbavancin yet?

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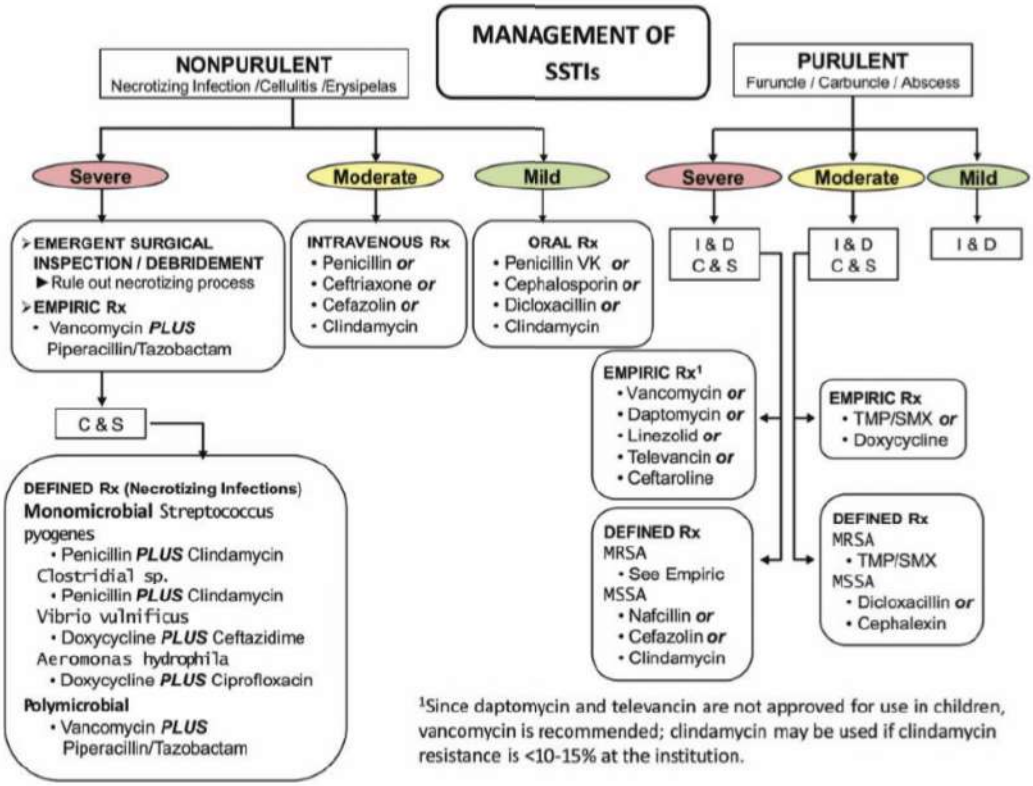

Stevens DL, et al. Clin Infect Dis. 2014;59(2):e10-52.

Open Forum Infectious Diseases
MAJOR ARTICLE

Guidelines vs Actual Management of Skin and Soft Tissue Infections in the Emergency Department

Rahul S. Kamath,[1] Deepthi Sudhakar,[1] Julianna G. Gardner,[1] Vagish Hemmige,[1] Hossam Safar,[4] and Daniel M. Musher[1,2,3]

- Patients receiving non-recommended antibiotics
  - 71% nonpurulent infections
  - 68% purulent infections
- Mild abscess treatment
  - 44% I&D
  - 88% antibiotics
- 29% patients with mild cellulitis had blood cultures drawn
- 21% patients with mild disease admitted
- 34% patients with severe disease discharged

What if I told you…

TABLE 2 (Continued)

Organism (no. of isolates) and drug[g]	MIC_{50} (μg/ml)	MIC_{90} (μg/ml)	MIC range (μg/ml)	% of isolates with breakpoint according to[a]: CLSI S	CLSI I	CLSI R	EUCAST S	EUCAST I	EUCAST R
Beta-hemolytic streptococci (1,493)[h]									
Solithromycin	0.015	0.03	0.004–0.5	—	—	—	—	—	—
Telithromycin	0.015	0.12	0.008–>32	—	—	—	96.9	0.7	2.4
Azithromycin	0.12	>32	0.03–>32	75.2	0.4	24.4	75.0	0.2	24.8
Clindamycin	≤0.25	>2	≤0.25–>2	84.9	1.1	14.0	86.0	—	14.0
Penicillin	≤0.06	≤0.06	≤0.06–0.12	100.0	—	—	100.0	—	0.0
Amoxicillin-clavulanate	≤1	≤1	≤1–2	—	—	—	100.0	—	0.0
Ceftriaxone	≤0.06	0.12	≤0.06–0.5	100.0	—	—	100.0	—	0.0
Linezolid	1	1	≤0.12–1	100.0	—	—	100.0	0.0	0.0
Moxifloxacin	≤0.12	0.25	≤0.12–4	—	—	—	99.5	0.0	0.5
Tetracycline	≤0.5	>8	≤0.5–>8	53.5	1.7	44.8	52.5	1.0	46.5
TMP-SMX	≤0.5	≤0.5	≤0.5–>4	—	—	—	98.9	0.3	0.9
Vancomycin	0.25	0.5	≤0.12–1	100.0	—	—	100.0	—	0.0

[g] TMP-SMX, trimethoprim-sulfamethoxazole.
[h] Organisms include *Streptococcus pyogenes* (689 isolates), *Streptococcus agalactiae* (579), and *Streptococcus dysgalactiae* (225).

Farrell D, et al. AAC. 2016;60(6):3662-3668.

And what if I told you…

TABLE 2 (Continued)

Organism (no. of isolates) and drug[g]	MIC_{50} (μg/ml)	MIC_{90} (μg/ml)	MIC range (μg/ml)	% of isolates with breakpoint according to[a]: CLSI S	CLSI I	CLSI R	EUCAST S	EUCAST I	EUCAST R
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Amoxicillin-clavulanate	≤1	≤1	≤1–2	—	—	—	100.0	—	0.0
Ceftriaxone	≤0.06	0.12	≤0.06–0.5	100.0	—	—	100.0	—	0.0
Linezolid	1	1	≤0.12–1	100.0	—	—	100.0	0.0	0.0
Moxifloxacin	≤0.12	0.25	≤0.12–4	—	—	—	99.5	0.0	0.5
Tetracycline	≤0.5	>8	≤0.5–>8	53.5	1.7	44.8	[illegible]	1.0	46.5
TMP-SMX	≤0.5	≤0.5	≤0.5–>4	—	—	—	98.9	0.3	0.9
Vancomycin	0.25	0.5	≤0.12–1	100.0	—	—	[illegible]	—	0.0

[g] TMP-SMX, trimethoprim-sulfamethoxazole.
[h] Organisms include *Streptococcus pyogenes* (689 isolates), *Streptococcus agalactiae* (579), and *Streptococcus dysgalactiae* (225).

Farrell D, et al. AAC. 2016;60(6):3662-3668.

TOP 10 MYTHS REGARDING THE DIAGNOSIS AND TREATMENT OF CELLULITIS

Erin K. McCreary, PHARMD, BCPS,* Melissa E. Heim, PHARMD, BCCCP,† Lucas T. Schulz, PHARMD, BCPS (AQ-ID),* Robert Hoffman, MD,‡ Jeffrey Pothof, MD,§ and Barry Fox, MD||

2. For patients who warrant MRSA coverage but do not need intravenous antibiotics, TMP-SMX, doxycycline, or linezolid can be initiated. Providers should note that while studies have demonstrated the activity of TMP-SMX against β-hemolytic streptococci, overall the activity of TMP-SMX and doxycycline against β-hemolytic streptococci is largely unknown (8,47).
   a. If TMP-SMX or doxycycline is initiated, it is reasonable to consider combination therapy with a β-lactam antibiotic for the treatment of possible mixed MRSA/streptococcal infection (8).

McCreary EK, et al. J Emerg Med. 2017;53 (4):485-492.

Open Forum Infectious Diseases
REVIEW ARTICLE
IDSA Infectious Diseases Society of America · hivma hiv medicine association · OXFORD

Sulfamethoxazole-Trimethoprim (Cotrimoxazole) for Skin and Soft Tissue Infections Including Impetigo, Cellulitis, and Abscess

Asha C. Bowen,[1,2,3] Jonathan R. Carapetis,[1,2] Bart J. Currie,[3,4] Vance Fowler Jr.,[5] Henry F. Chambers,[6] and Steven Y. C. Tong[3,7]

- Early studies did not control thymidine content of test media
  - ↑thymidine ↓sulfa inhibitory effect
- Nonpurulent cellulitis → β-lactam monotherapy
- Impetigo, purulent cellulitis, abscess, wound → TMP/SMX monotherapy
  - Talan 2016
    - 2 DS TMP/SMX PO BID x 7 days = 80% cure of drained abscess
  - Miller 2015
    - 2 SS TMP/SMX PO BID x 10 days = 76.4% cure (abscess, cellulitis, & mixed)

Miller LG, et al. N Engl J Med. 2015;372:1093-103.
Talan DA, et al. N Engl J Med. 2016;374:823-32.

Speaking of that bad-looking abscess patient

- Oritavancin and dalbavancin FDA-approved in 2014
  - Dalbavancin updated to one-time dose in 2016
- ED administration to avoid hospital admission sounds dreamy…

Table 1. Oritavancin Exclusion Criteria

1. Sepsis or Septic shock

2. ABSSSI including:
   - Orbital cellulitis
   - Diabetic foot infections
   - Burn related infection
   - Bite wound
   - Osteomyelitis
   - Necrotizing fasciitis
   - Catheter/device related infection
   - Environmental/polymicrobial source

3. Severe allergy to:
   - Oritavancin
   - Dalbavancin
   - Vancomycin
   - Daptomycin
   - Telavancin

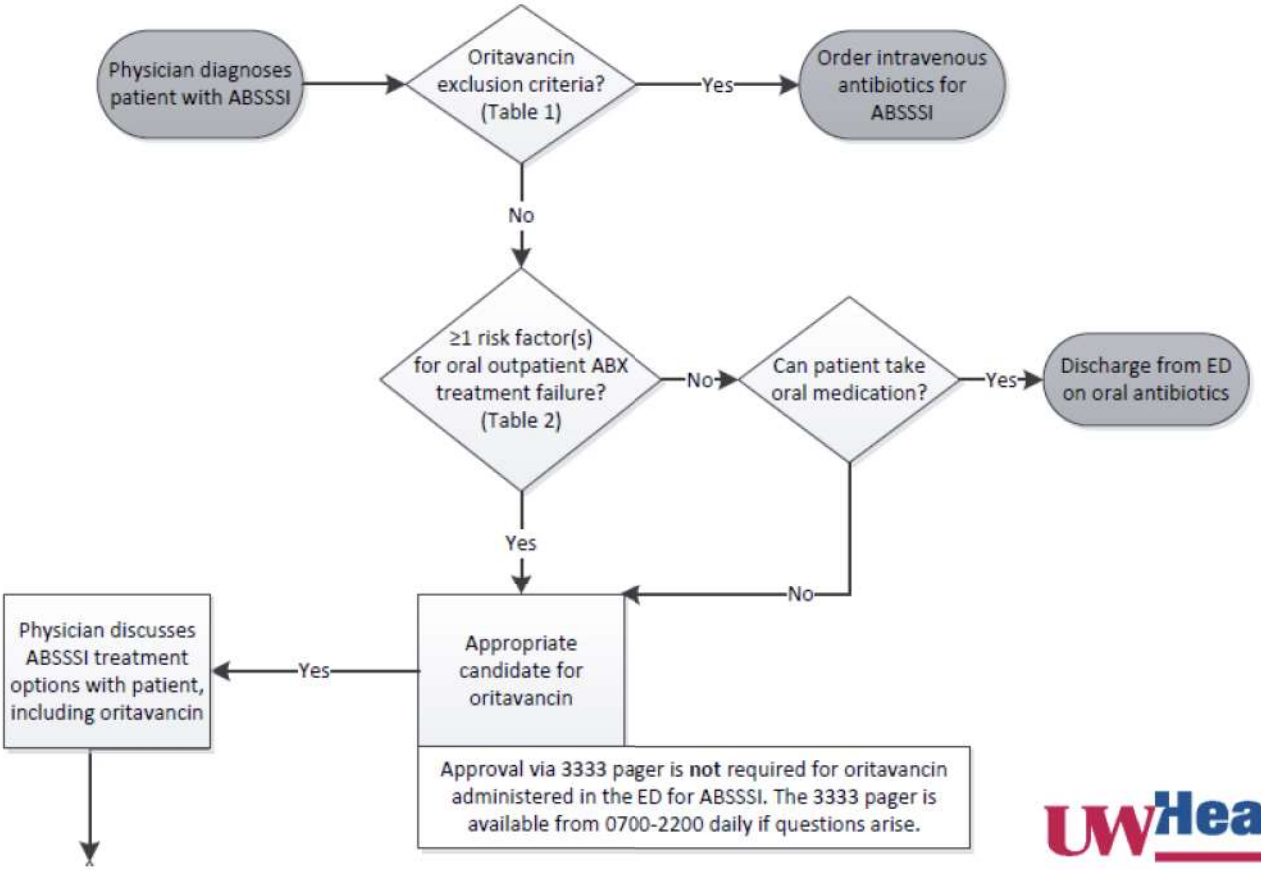
4. CDU or inpatient admission planned

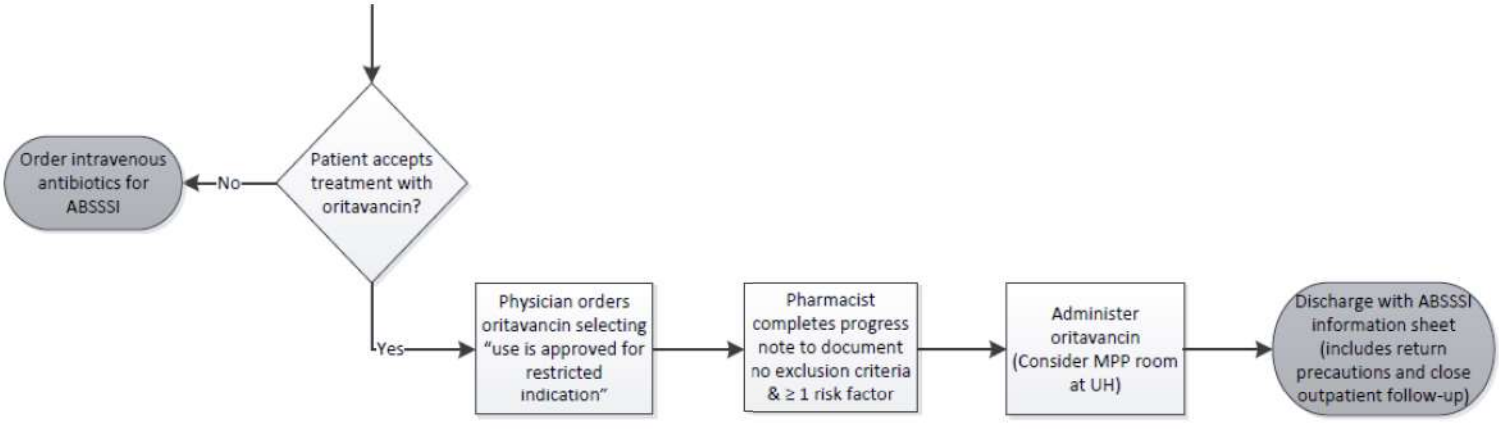
5. Age < 18 years old

Table 2. Risk Factors for Oral Antibiotic Outpatient Treatment Failure

1. Psychosocial concern for adherence
2. Acquired Immunodeficiency Syndrome
3. Intravenous Drug User
4. Cognitively impaired
5. Chronic edema
6. Lymphedema
7. Chronic leg ulcers
8. Cirrhosis
9. Duration of infection greater than 7 days
10. History of ABSSSI at same site within last 3 months
11. Oral treatment failure (>24 hours of appropriate therapy)*
12. Incarcerated
13. Diabetes mellitus
14. Immunosuppression

*Expanding redness does not necessarily mean treatment failure


Physician diagnoses patient with ABSSSI
Oritavancin exclusion criteria? (Table 1)
Yes
Order intravenous antibiotics for ABSSSI
No
≥1 risk factor(s) for oral outpatient ABX treatment failure? (Table 2)
No
Can patient take oral medication?
Yes
Discharge from ED on oral antibiotics
Yes
No
Physician discusses ABSSSI treatment options with patient, including oritavancin
Yes
Appropriate candidate for oritavancin
Approval via 3333 pager is not required for oritavancin administered in the ED for ABSSSI. The 3333 pager is available from 0700-2200 daily if questions arise.


Order intravenous antibiotics for ABSSSI
No
Patient accepts treatment with oritavancin?
Yes
Physician orders oritavancin selecting "use is approved for restricted indication"
Pharmacist completes progress note to document no exclusion criteria & ≥ 1 risk factor
Administer oritavancin (Consider MPP room at UH)
Discharge with ABSSSI information sheet (includes return precautions and close outpatient follow-up)

UPMC LIFE CHANGING MEDICINE

Treatment Pathway

Patient presents to Emergency Department (ED)

↓

Assess for criteria for use (Table 1) and absence of exclusion criteria

↓

Contact Infectious Diseases to discuss patient and obtain approval code

↓

Order oritavancin 1,200mg IV ONCE (single dose treatment)

↓

Patient discharged from ED with instructions to 1) Present to ED should symptoms worsen or fail to improve within 3 days, and 2) Follow-up with PCP and/or ID in 3-7 days

Table 1. Criteria for Use

1) Cellulitis, erysipelas, wound infection, and/or major cutaneous abscess of a minimum surface area of 75cm^2 with at least two of the following:

- Purulent drainage or discharge
- Erythema
- Fluctuance
- Heat or localized warmth
- Edema/induration
- Pain or tenderness to palpation

Including patients who present with any of the following signs of systemic inflammation:

- Elevated WBC > 12,000 cells/mm^3
- Bandemia >10%
- Fever ≥ 38.0ºC
- Swollen proximal lymph node

AND/OR

2) Documented failure / non-compliance of outpatient oral antibiotic therapy for ABSSSI

Exclusion criteria

Septic shock, known or suspected bacteremia, diabetic wound infections, catheter-site infections, infections involving prosthetic device, suspected Gram negative pathogens including animal bites, concomitant infection at a secondary site, burns, end-stage renal disease, evolving or necrotizing process, infections caused by pathogens known to be vancomycin resistant, receiving chronic systemic immunosuppressive therapy, prednisone use > 15 mg/day, CD4 <200, neutropenia with ANC <500, LFT >/= 3 times the ULN, total bilirubin >/= 2 times the ULN, hyperuricemia, requiring aPPT monitoring, allergy to vancomycin, preganant/nursing

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Nothing is as good as it seems

- Who owns the process?
- Who is the perfect candidate?
- Insurance verification?
- Patient-provider discussions on cost of care
  - Our first patient requested admission…
- Infusion time
- Discharge instructions
- Monitoring/follow-up
- Resistance development?

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Patient Case 3

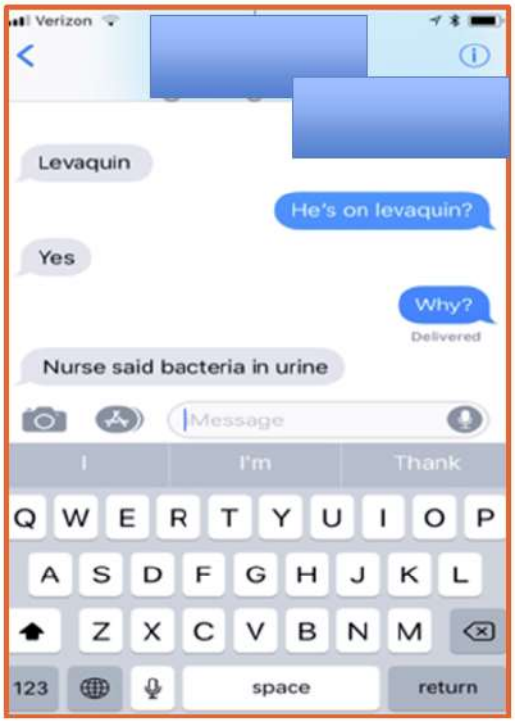
- 21 yo F presents syncope
- No PMH, UPT (-), UA and culture sent
  - UA "positive"
- Discharge with cipro
- C/S returns after discharge
  - Amp >/= 32 (R)
  - Cipro </= 0.25 (S)
  - Nitrofurantoin</=16 (S)
  - TMP-SMX = 32 (I)

This is my 83 yo grandfather.

He was in a car crash.

UA done in routine trauma workup.

My father sends me this text a few hours later…



What's the problem? It matches…

- Does this patient(s) have a UTI?
- Who is performing culture review?
  - Case manager
  - Pharmacist
  - Nurse
  - Etc…
- Are you calling on every culture?
- When is this occurring?
- Need MD collaboration to change therapy

Oh, "UTI"s

- ASP-bundles
  - Pre-implementation review of prescribing (people LOVE data)
  - Multidisciplinary work group (AS is a team sport)
  - Empiric treatment algorithm
    - Broad range of patients
    - Autonomy in decision-making
  - Education, audit, feedback (education alone is not sufficient)
  - ↑nitrofurantoin use (associated w/ ↓ 30d return visit)
  - ↓ cephalosporin use
- Pharmacist + MD culture-call back program
  - ↓ 30d return ED visits and hospital readmissions
  - 25% patients had modified therapy

Jorgensen SCJ, et al. Open Forum Infect. Dis. 2018.
Dumkow LE, et al. Infect Dis Ther. 2014;3(1):45-53.

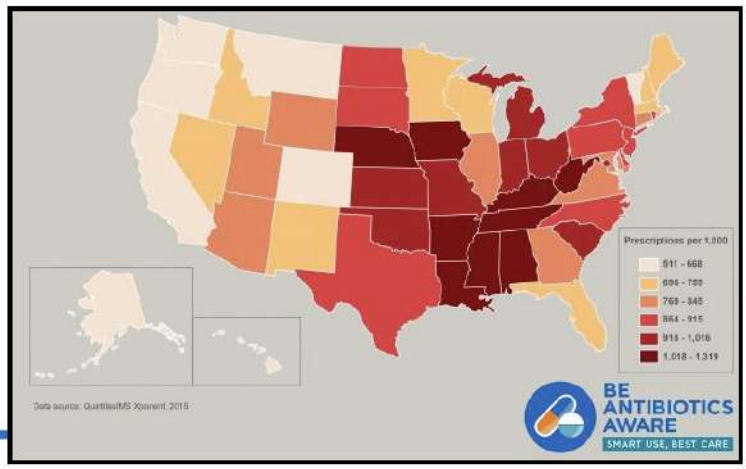
Culture follow-up isn't just for UTIs!

- Culture follow up **with symptom assessment** for pharyngitis
  - ↓ antibiotic prescribing: 97% to 71.3% ($p < 0.001$)
  - ↑ appropriateness of therapy: 6% to 81.5% ($p < 0.001$)
- Discharge instructions **for symptom assessment** for URTIs
  - Nurse practitioner-driven initiative in primary care clinic
  - Prescribe full Rx with detailed instructions
    - Stopping / Disposing
    - Completing
    - Changing

Dumkow LE, et al. Diagn Microbiol Infect Dis. 2018;92:136-142.

Discharge Prescription Review?

- Majority of ABX use occurs <u>outside</u> the hospital
- Providers prescribed **269.4 million** <u>outpatient</u> ABX in 2015
  = 838 ABX Rx per 1000 persons
- ED MDs prescribed
  14.8 million outpatient ABX
  = 457 Rx per ED MD
- 3rd highest rate of prescribing
  (1. Derm 2. PCPs)



Centers for Disease Control and Prevention, "Outpatient Antibiotic Prescriptions—United States, 2015"

"The antibiotic course has had its day"

- "Always complete the full prescription, even if you feel better"
  - Not supported by evidence
- Prolonged ABX exposure does increase risk of ABX resistance
- Taking any ABX for any reason disrupts normal flora → bigger problem in peds?
- Should we be more concerned with underdosing or using the wrong regimen?
  Shorter courses seem okay….
  - Pharyngitis (3 vs 10)
  - CAP (5 vs 10)
  - Cellulitis (5 vs 14)
  - Pyelonephritis (7 vs 14)
  - HAP/VAP (8 vs 15)
  - Intraabdominal infections (4 vs 7-14)

Llewelyn MJ, et al. The antibiotic course has had its day. BMJ. 2017.
Spellberg B. The new antibiotic mantra – "Shorter is Better." JAMA Intern Med. 2016.

A little thing that made a big difference

- 25 bed critical access hospital with ED + PCP clinics
- Viral respiratory illnesses
- Launched Wellness Bag initiative in January 2017
  - Cough drops
  - Tissues
  - Hand sanitizer
  - Choosing Wisely patient education flyer
- Decreased ABX prescribing by 84% (!!!!)
- "Extremely rewarding" to all healthcare team members

http://www.mayohospital.com/mayo-regional-hospital-to-launch-second-year-of-antibiotic-stewardship-project/. Accessed August 2018.

KEY TAKEAWAYS

1. ED pharmacists can have a significant impact on antibiotic use by
   - Getting the right antibiotics, faster in patients with sepsis
   - Recommending cultures and RDT
   - Following up on cultures and RDT
   - Engaging in system-level committees for ASP efforts
   - Allergy assessment and medication history
   - Common infection treatment protocols
   - Culture call back
   - Discharge prescription review
2. Emergency Department engagement is essential for successful stewardship efforts across the continuum of care
3. Little things go a long way to make a huge difference

And we didn't even touch on…

- Post-exposure prophylaxis
- Infection control efforts
- Antibiotic indications on orders
- Disease-state specific order sets for ED
- Guideline or clinical pathway development
- Community-acquired intraabdominal infections
- Outpatient fever & neutropenia protocols
- Pediatrics (mostly)
- And more….

Stewardship opportunities in the ED are endless!!!

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Additional Resources for ED Stewardship

- Roman C, et al. Am J Health-Syst Pharm. 2018;75:796-806.
- Bishop BM. J Pharm Pract. 2016;29:556-563.
- May L, et al. Ann Emerg Med. 2013;62.
- Kaufman AJ, et al. CJEM. 2017;19(6):441-449.
- Dinh A, et al. J. Hosp. Infect. 2017;97:288-293.
- Losier M, et al. Annals of Pharmacotherapy. 2017;51:774-790.
- Mistry RD, et al. Infect Control Hosp Epidemiol. 2017;38:469-475.

We want to hear from YOU

- What are you doing in your practice?
- What questions do you have for us?
- How can we overcome barriers together?
- Work to disseminate our successes (and failures!)

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Pharmacists in the Emergency Department: The Heroes Antimicrobial Stewardship Needs

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ACCP

2018 Global Conference on Clinical Pharmacy

- A Pharmacist's Recipe for Disaster: How to Prepare for the Worst, Do Your Best, and Pick Up the Pieces When Disaster Strikes

A Pharmacist's Recipe for Disaster: How to Prepare for the Worst, Do Your Best, and Pick Up the Pieces When Disaster Strikes

Sunday, October 21, 2018 from 4:00 PM to 5:30 PM PDT at Washington State Conference Center: Level Two, Chelan 4

Available for 1.50 hours of CPE credit
Activity Number: 0217-0000-18-194-L04-P
Activity Type: A Knowledge-Based Activity

This session will provide education and tools for attendees to develop appropriate preparedness plans for the management of disaster events affecting pharmacists and the patients they care for, both within and outside the United States. This topic will explore lessons learned from a pharmacy team member working through a true disaster scenario and will investigate management techniques for addressing the indirect medication-related implications of a disaster event such as drug shortage and delivery interruption, shifting health care worker roles, and disruption in chronic disease care.

Speakers

Moderator: Donna Shuler Truoccolo, Pharm.D., BCPS
Clinical Pharmacist - Emergency Medicine, University of Virginia Health System, Charlottesville, Virginia

View Biography

This Is Not a Drill: How to Remain Ready for Any Disaster
4:00 PM to 4:30 PM

Speakers

Speaker: Kyle A. Weant, Pharm.D., FCCP, BCPS
Emergency Medicine Clinical Pharmacy Specialist

View Biography

Learning Objectives
1. Describe the standard approach to disaster management in the United States and compare this to the approach to disaster management in other countries.
2. Examine the benefit of pharmacist involvement in disaster response and interpret the role of the pharmacist in emergency preparedness.
3. Evaluate the resources available to pharmacists for use in preparedness and disaster response.
4. Design a pharmacist-specific plan to maintain preparedness for management of unexpected scenarios.

Functioning on the Front Line: Lessons from a Pharmacist
4:30 PM to 5:00 PM

Speakers

Speaker: Sharon See, Pharm.D., FCCP, BCPS
Clinical Professor and Assistant Chair, Department of Clinical Health Professions, St. John's University College of Pharmacy and Health Sciences, Queens, New York; Clinical Faculty, Brookdale Department of Geriatrics & Palliative Medicine, New York, New York

View Biography

Learning Objectives
1. Describe the specific disaster event and summarize the related effects on the pharmacist workflow in the speaker's practice area.
2. Distinguish the challenges presented by major disaster response and identify the approaches utilized to overcome these challenges.
3. Evaluate the benefits and limitations of post-response debriefing.
4. Describe lessons learned from the management of the event and identify future directions for the role of the pharmacist in disaster response.

When the Damage Spreads Like Wildfire: Managing Medication-Related Repercussions of Disaster
5:00 PM to 5:30 PM

Speakers

Speaker: Erin R. Fox, Pharm.D.
Senior Director, Drug Information & Support Services, University of Utah Health, Salt Lake City, Utah

View Biography

Learning Objectives

1. Summarize national and international public health implications resulting from a disaster event.
2. Interpret the role of the pharmacist in the management of medication-related repercussions of disaster.
3. Evaluate literature describing potential approaches to medication supply disruptions and interruptions to patient access to medications for both inpatient and outpatient areas.
4. Develop a plan to mitigate the medication-related aftermath of disaster events.

Add to Itinerary + | Back to Schedule

ACCP

2018 Global Conference on Clinical Pharmacy

- Emergency Medicine PRN Focus Session – Expanding the Horizon of Emergency Medicine Pharmacy Practice in the United States and Abroad

Emergency Medicine PRN Focus Session – Expanding the Horizon of Emergency Medicine Pharmacy Practice in the United States and Abroad

Tuesday, October 23, 2018 from 1:15 PM to 2:45 PM PDT at Washington State Conference Center: Level Three, Tahoma 5

Available for 1.50 hours of CPE credit
Activity Number: 0217-0000-18-211-L04-P
Activity Type: A Knowledge-Based Activity

Speakers

Moderator: Craig Cocchio, Pharm.D., BCPS
Emergency Medicine Clinical Pharmacist, Trinity Mother Frances Hospital, Tyler, Texas

View Biography

A Decade of Accomplishments and Expansion of Practice in the World of EM Pharmacy
1:15 PM

Speakers

Speaker: Michael C. Thomas, Pharm.D., FCCP, BCPS
Professor, Department of Pharmacy Practice, Samford University McWhorter School of Pharmacy, Birmingham, Alabama

View Biography

Learning Objectives
1. Describe the accomplishments of the EMED PRN in its first 10 years.
2. Review key position statements and publications that have advanced the specialty of emergency medicine pharmacy.
3. Report on the expansion of emergency medicine pharmacy from urban academic to rural medical centers.

Opportunities and Knowledge Sharing from Pharmacists Abroad
1:45 PM

Speakers

Speaker: Mark McIntyre, Jr., Pharm.D.
Pharmacotherapy Specialist, Antimicrobial Stewardship Program, University Health Network; Adjunct Lecturer, Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Ontario, Canada

View Biography

Learning Objectives
1. Describe the role of emergency medicine pharmacists in Canada/UK/abroad.
2. Evaluate the opportunities for pharmacists in the USA to learn from obstacles, solutions and achievements.
3. Demonstrate opportunities for collaboration in advancement of pharmacy practice and research.

Global Clinical Controversies in Sepsis
2:15 PM

Speakers

Speaker: Kyle M. DeWitt, Pharm.D., BCPS
Emergency Medicine Pharmacist Clinician; Residency Program Director - PGY2 Emergency Medicine; University of Vermont Medical Center, Burlington, Vermont

View Biography

Learning Objectives

1. Debate the risks versus benefits and discuss global management of large volume crystalloid resuscitation in the broad population now meeting a diagnosis of sepsis.
2. Evaluate novel vasoactive pharmacologic agents and their impact on sepsis care in emergency departments across the globe.
3. Describe the role of alternative administration methods (IV push) and locations (pre-hospital) for antimicrobial therapy.

Add to Itinerary +

Back to Schedule

ACCP

2017 Annual Meeting

- Emergency Medicine PRN Focus Session – Code Breakpoint: A Guide to Combat Stress and Burnout in the Acute Care Pharmacist

Emergency Medicine PRN Focus Session -- Code Breakpoint: A Guide to Combat Stress and Burnout in the Acute Care Pharmacist

Saturday, October 07, 2017 from 3:30 PM to 5:00 PM MST at Phoenix Convention Center North Building Street Level: North Ballroom 120D

Available for 1.50 hours of CPE credit
Activity Number: 0217-0000-17-138-L01-P
Activity Type: An Application-Based Activity

Speakers

Moderator: Nadia I. Awad, Pharm.D., BCPS
Emergency Medicine Pharmacist, Robert Wood Johnson University Hospital, New Brunswick, New Jersey

View Biography

The Ins and Outs of Stress and Burnout in the Acute Care Setting
3:30 PM

Speakers

Speaker: Renee Petzel Gimbar
Clinical Pharmacist, Emergency Medicine, University of Illinois at Chicago Medical Center, Chicago, Illinois

Learning Objectives
1. Identify areas of vulnerability that lead to stress and burnout in the academic and clinical career of the healthcare professional in the acute care setting.
2. Appraise the literature surrounding stress and burnout among academic and healthcare professionals in the acute care setting.
3. Apply methods for identification of sources of stress and burnout among academic and clinical pharmacists in the acute care setting.

Promotion of Wellness in Learners and New Practitioners: Being a Healthy Role Model
4:00 PM

Speakers

Speaker: Frank P. Paloucek, Pharm.D., DABAT, FASHP
Clinical Professor in Pharmacy Practice, University of Illinois at Chicago College of Pharmacy, Chicago, Illinois

View Biography

Learning Objectives
1. Evaluate literature related to stress and burnout among trainees and new practitioners in the acute care setting.
2. Discuss the impact of stress and burnout of acute care practitioners on trainees and new practitioners in the acute care setting.
3. Identify methods for fostering wellness in trainees and new practitioners in the acute care setting.

Strategies to Mitigate Stress and Burnout Among Health Care Professionals in the Acute Care Setting
4:30 PM

Speakers

Speaker: Ashley Liebig, RN, CCRN
Travis County STAR Flight, Austin, Texas

View Biography

Learning Objectives

1. Discuss methods to create a positive work environment among healthcare practitioners in the acute care setting.
2. Identify practical techniques to foster physical health and wellness among healthcare practitioners in the acute care setting.
3. Describe strategies in handling work-related and emotional stress related to high acuity situations in the healthcare setting.

Add to Itinerary ✚ Back to Schedule ↺

ACCP

2016 Annual Meeting

- Emergency Medicine PRN Focus Session – Got Evidence? Do Ketamine, NOAC Reversal Agents, and Icatibant do the Body Good?

ACTIVITY DETAILS

Emergency Medicine PRN Focus Session -- Got Evidence? Do Ketamine, NOAC Reversal Agents, and Icatibant do the Body Good?

Tuesday, October 25, 2016 from 3:15 PM to 4:45 PM EDT at Great Hall 6

Available for 1.50 hours of CPE credit
Activity Number: 0217-0000-16-166-L01-P
Activity Type: A Knowledge-Based Activity

Speakers

Moderator: Megan E. Musselman, Pharm.D., BCPS, BCCCP
Clinical Pharmacy Specialist, Emergency Medicine/Critical Care, North Kansas City Hospital, Kansas City, Missouri
View Biography

Ketamine for Excited Delirium
3:15 PM to 3:45 PM

Speakers

Speaker: Suprat Saely, PharmD, BCPS

View Biography

Learning Objectives
1. Evaluate evidence to support or refute the use of ketamine for excited delirium in the emergency department.
2. Describe ketamine's role in the treatment of excited delirium.
3. Discuss dosing strategies for the use of ketamine for excited delirium.

Safety, Efficacy and Practicality of New Oral Anticoagulant Reversal Strategies
3:45 PM to 4:15 PM

Speakers

Speaker: J. Michael Boyd, Pharm.D.
Specialty Practice Pharmacist- Cardiology and Electrophysiology, The Ohio State University Wexner Medical Center, Columbus, Ohio
View Biography

Learning Objectives
1. Evaluate evidence to support or refute the use of specific reversal strategies for new oral anticoagulants, including those recently approved or pending approval by the FDA.
2. Identify patient specific circumstances when reversal agents for new oral anticoagulants would be appropriate or inappropriate versus current practices.
3. Discuss dosing strategies for the use of reversal agents for new oral anticoagulants.

Icatibant Versus Standard Treatment for ACEi-induced Angioedema
4:15 PM to 4:45 PM

Speakers

Speaker: Jeremy P. Hampton, Pharm.D.
Associate Clinical Professor, University of Missouri-Kansas City School of Pharmacy, Kansas City, Missouri Emergency Medicine Clinical Specialist, Truman Medical Center, Kansas City, Missouri
View Biography

Learning Objectives

1. Evaluate evidence to support or refute the use of icatibant for ACEi-induced angidoedema.
2. Identify patient specific circumstances when the use of icatibant for ACEi-induced angidoedema would be appropriate or inappropriate versus standard treatment.

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