

Position Paper on Critical Care Pharmacy Services (Executive Summary): 2020 Update

Ishaq Lat, PharmD, FCCM, FCCP,
Department of Pharmacy Services, Shirley
Ryan Ability Lab, Chicago, IL

**Christopher Paciullo, PharmD, FCCM,
FCCP, BCCCP,** Shields Health Solutions,
Stoughton, MA

Mitchell J. Daley, PharmD, FCCM, BCPS,
Dell Seton Medical Center at the University of
Texas, Austin, TX, and Dell Medical School at
the University of Texas, Austin, TX

**Robert MacLaren, PharmD, MPH,
FCCM, FCCP,** Department of Pharmacy
Practice, Skaggs School of Pharmacy,
University of Colorado, Aurora, CO

**Scott Bolesta, PharmD, FCCM, FCCP,
BCPS,** Department of Pharmacy Practice,
Nesbitt School of Pharmacy, Wilkes
University, Wilkes-Barre, PA

Jennifer McCann, PharmD, BCCCP,
Department of Pharmacy Practice, School
of Pharmacy and Health Sciences, Butler
University, Indianapolis, IN

**Joanna L. Stollings, PharmD, FCCM,
FCCP, BCCCP, BCPS,** Department
of Pharmaceutical Services, Vanderbilt
University Medical Center, Nashville, TN,
and Critical Illness, Brain Dysfunction, and
Survivorship (CIBS) Center, Nashville, TN

Kendall Gross, PharmD, BCPS, BCCCP,
Department of Pharmacy, UCSF Health, San
Francisco, CA

Sarah A. Foos, PharmD, BCCCP,
Department of Pharmacy Services,
OhioHealth Doctors Hospital, Columbus, OH

**Russel J. Roberts, PharmD, FCCM,
BCCCP, BCPS,** Department of Pharmacy,
Massachusetts General Hospital, Boston, MA

**Nicole M. Acquisto, PharmD, FCCP,
BCCCP,** Department of Pharmacy, University of
Rochester Medical Center, Rochester, NY, and
Department of Emergency Medicine, University
of Rochester Medical Center, Rochester, NY

Scott Taylor, PharmD, MS, BCPS,
Steward Health Care, Dallas, TX

**Michael Bentley, PharmD, FCCM,
FCCP,** Virginia Tech Carilion School of
Medicine, Roanoke, VA, and AstraZeneca
Pharmaceuticals, Wilmington, DE

**Judith Jacobi, PharmD, MCCM, FCCP,
BCCCP,** Visante Inc., St. Paul, MN

**Tricia A. Meyer, PharmD, MS, FASHP,
FTSHP,** Baylor Scott and White Health-
Temple Region, Temple, TX, and Department
of Anesthesiology, Texas A&M College of
Medicine, Temple, TX

For information regarding this article,
email: ilat@sralab.org.

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the *Journal of the American College
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DOI 10.1093/ajhp/zxaa217

Objectives: Provide a multiorganizational statement to update the statement from a paper in 2000 about critical care pharmacy practice and make recommendations for future practice.

Design: The Society of Critical Care Medicine, American College of Clinical Pharmacy Critical Care Practice and Research Network, and the American Society of Health-System Pharmacists convened a joint task force of 15 pharmacists representing a broad cross-section of critical care pharmacy practice and pharmacy administration, inclusive of geography, critical care practice setting, and roles. The Task Force chairs reviewed and organized primary literature, outlined topic domains, and prepared the methodology for group review and consensus. A modified Delphi method was used until consensus (>66% agreement) was reached for each practice recommendation. Previous position statement recommendations were reviewed and voted to either retain, revise, or retire. Recommendations were categorized by level of ICU service to be applicable by setting, and grouped into five domains: patient care, quality improvement, research and scholarship, training and education, and professional development.

Main Results: There are 82 recommendation statements: forty-four original recommendations and 38 new recommendation statements. Thirty-four recommendations were made for patient care, primarily relating to critical care pharmacist duties and pharmacy services. In the quality improvement domain, 21 recommendations address the role of the critical care pharmacist in patient and medication safety, clinical quality programs, and analytics. Nine recommendations were made in the domain of research and scholarship. Ten recommendations are in the domain of training and education and eight recommendations regarding professional development.

Conclusions: The statements recommended by this taskforce delineate the activities of a critical care pharmacist and the scope of pharmacy services within the ICU. Effort should be made from all stakeholders to implement the recommendations provided, with continuous effort toward improving the delivery of care for critically ill patients.

Key Words: collaborative medication management; credentialing; critical care; pharmacy; professional development

Am J Health-Syst Pharm. 2020;77:1619-1624

Beginning in the 1940s, hospital pharmacists have increasingly assumed a clinical role to compliment the dispensing function of pharmacy practice (1). In parallel, hospital pharmacists began participating in critical care interdisciplinary rounds as hospital practice and clinical care became increasingly complex, to assist in providing multiprofessional care for the critically

ill and injured (2). As the subspecialty of critical care pharmacy formed into a distinct area of practice for pharmacists, so too did the need for standards of practice.

The first position paper on critical care pharmacy services was published in 2000 (3). This position paper helped to institute the field of critical care pharmacy, by establishing standard pharmacy services as fundamental to

the care of critically ill patients. The original position paper served a necessary function in delineating standard practices for collaborative medication management in critical care, while also serving an aspirational function by describing pharmacy services that may be desirable and optimal.

As the practice of critical care has continued to advance in the intervening 2 decades, a joint task force of pharmacy leaders in clinical, academic, and administrative practices was formed by the Society of Critical Care Medicine (SCCM), American College of Clinical Pharmacy Critical Care Pharmacy and Research Network, and the American Society of Health-System Pharmacists, to review the original position paper and identify which statement recommendations were current, while identifying which statements no longer held true and making recommendations for current and future critical care pharmacy practice.

Readers will find 82 total recommendation statements, encompassing five distinct domains of critical care pharmacy services. Recommendations were simplified to “essential” and “desirable” from the original categories of “fundamental,” “desirable,” and “optimal.” Furthermore, recommendations were made in consideration for the various types of hospitals and critical care practice environments, in alignment with the SCCM guidelines for critical care services, in an effort to make relatable to the diversity of practice environments (4).

A separate article with a detailed description of methodology and supporting discussion has been published. This executive summary highlights the full recommendations for critical care pharmacists, critical care team members, and hospital administrators.

STATEMENTS AND RECOMMENDATIONS

Patient Care

- 1) The critical care pharmacist regularly makes rounds as a member of the interdisciplinary critical care team to provide comprehensive medication management (CMM) for all ICU patients.
Level I: Essential
Level II: Essential
Level III: Desirable
- 2) As part of the interdisciplinary team, the critical care pharmacist assists healthcare professionals in discussions with patients and/or family members to help make informed decisions regarding pharmacotherapy options.
Level I: Essential
Level II: Essential
Level III: Desirable
- 3) The critical care pharmacist provides pertinent, comprehensive drug information to the critical care team.
Level I: Essential
Level II: Essential
Level III: Essential
- 4) The critical care pharmacist provides drug therapy related education to critical care team members.
Level I: Essential
Level II: Essential
Level III: Desirable
- 5) The pharmacist collaborates with the healthcare team to prevent potentially inappropriate drug therapy.
Level I: Essential
Level II: Essential
Level III: Essential
- 6) The critical care pharmacist provides clinical consultation to the care team, both within and outside the ICU, for pharmacotherapeutic issues related to critical illness.
Level I: Essential
Level II: Essential
Level III: Essential
- 7) Medication-related consults (i.e., pharmacotherapeutic, pharmacokinetic, and nutrition patient counseling) are available 24 hr/d, 7 d/wk to all critically ill patients.
Level I: Essential
Level II: Desirable
Level III: Desirable
- 8) The critical care pharmacist provides pharmacokinetic monitoring and therapeutic adjustments when a targeted drug is prescribed.
Level I: Essential
Level II: Essential
Level III: Essential
- 9) The critical care pharmacist reviews the medication history to determine which maintenance medications should be continued during the acute illness.
Level I: Essential
Level II: Essential
Level III: Desirable
- 10) The pharmacist assists with medication reconciliation for ICU patients at the time of ICU admission, transfer from the ICU to the ward, or discharge to home or facility.
Level I: Essential
Level II: Essential
Level III: Essential
- 11) When reviewing orders for verification, the critical care pharmacist prospectively evaluates all drug therapy for appropriate indication, dose, drug interactions, drug allergies, and monitors the patient's pharmacotherapeutic regimen for effectiveness and adverse drug events (ADEs), and intervenes as needed.
Level I: Essential
Level II: Essential
Level III: Essential
- 12) The critical care pharmacist educates patients and/or patients' caregivers regarding medication therapies used to treat patients during and after acute illness, as appropriate.
Level I: Essential
Level II: Essential
Level III: Desirable
- 13) The pharmacist performs independent patient assessment (e.g., pain/agitation/delirium, nutrition).
Level I: Essential
Level II: Desirable
Level III: Desirable
- 14) A pharmacist certified in advanced cardiac life support (ACLS) (or pediatric advanced life support [PALS]) responds to all resuscitation events in the hospital 24 hr/d, 7 d/wk.
Level I: Essential
Level II: Essential
Level III: Desirable

- 15) The pharmacist responds or coordinates pharmacist response to all resuscitation and time-dependent emergencies in the hospital including, but not limited to cardiac arrest, rapid response, trauma response, hemorrhagic shock, sepsis response, and acute neurologic life support.
Level I: Essential
Level II: Essential
Level III: Desirable
- 16) The pharmacist provides routine stewardship activities targeted at anti-infectives and other medications, including those that may be high risk for adverse events, high cost concerns, and inappropriate utilization (e.g., factor products, anticoagulants, sedatives, acid-suppressive therapies).
Level I: Essential
Level II: Essential
Level III: Essential
- 17) The critical care pharmacist collaborates with other pharmacists (e.g., emergency medicine, infectious diseases, transplant, oncology), as needed, to address patient and disease-specific therapeutic issues.
Level I: Essential
Level II: Essential
Level III: Essential
- 18) In conjunction with the clinical dietitian, the critical care pharmacist reviews the nutrition therapy plan and recommends modifications as indicated to optimize the nutritional regimen.
Level I: Essential
Level II: Desirable
Level III: Desirable
- 19) The critical care pharmacist uses the medical record as one means to communicate with other healthcare professionals and/or to document specific pharmacotherapeutic recommendations or activities.
Level I: Essential
Level II: Essential
Level III: Essential
- 20) The critical care pharmacist uses appropriate documentation tools to demonstrate their impact on patient care and economic value.
Level I: Essential
Level II: Essential
Level III: Essential
- 21) Critical care pharmacists document pertinent collaborative medication management problems and progress notes daily.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 22) The critical care pharmacist documents clinical activities that include, but are not limited to, disease state management, general pharmacotherapeutic monitoring, pharmacokinetic monitoring, ADEs, education and other patient care activities.
Level I: Essential
Level II: Essential
Level III: Essential
- 23) The critical care pharmacist acts as a liaison between the pharmacy department and the interdisciplinary team to educate health professionals regarding current drug-related policies, procedures, guidelines, and pathways.
Level I: Essential
Level II: Essential
Level III: Essential
- 24) The critical care pharmacist uses pharmacoeconomic analyses in conjunction with the interdisciplinary team to evaluate existing/new pharmacy services and the place of new drugs in critical care pharmacotherapy.
Level I: Essential
Level II: Essential
Level III: Desirable
- 25) The critical care pharmacist is proactive in designing, prioritizing, and promoting new clinical pharmacy programs and services.
Level I: Essential
Level II: Essential
Level III: Desirable
- 26) Pharmacy administrators evaluate clinical programs/services for stakeholder satisfaction, significance, and economic value.
Level I: Essential
Level II: Essential
Level III: Essential
- 27) The critical care pharmacist prepares and presents drug therapy monographs and formulary reviews to the Pharmacy and Therapeutics committee for medications used in the care of critically ill patients.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 28) The pharmacist should participate in planning and implementation of processes for disaster, or mass casualties, scenarios as applicable to the critically ill patient.
Level I: Essential
Level II: Essential
Level III: Desirable
- 29) The majority of the critical care pharmacist's time is dedicated to critical care services, with few commitments, outside of critical care activities.
Level I: Essential
Level II: Essential
Level III: Desirable
- 30) Critical care pharmacists will have the majority of their clinical activity focused in the care of the critically ill population.
Level I: Essential
Level II: Essential
Level III: Desirable
- 31) Decentralized clinical pharmacy services in the ICU should include routine and consistent patient care coverage, inclusive of day, evening, and weekend coverage.
Level I: Essential
Level II: Essential
Level III: Desirable
- 32) Critical care pharmacy services are developed as "teams," with multiple critical care pharmacists available, to deliver consistent and quality collaborative medication management.
Level I: Essential
Level II: Essential
Level III: Desirable
- 33) In the absence of an onsite critical care pharmacist, CMM may be supplemented through telemedicine.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 34) The ICU pharmacist-to-patient ratio is defined based on patient acuity and complexity in addition to the scope of clinical and operational services provided.
Level I: Essential
Level II: Essential
Level III: Desirable

Quality Improvement

- 1) The critical care pharmacist serves as the medication safety leader for critically ill patients by identifying potential ADEs, resolving existing ADEs, and improving medication use practices.
Level I: Essential
Level II: Essential
Level III: Essential
- 2) The critical care pharmacist assists with the management of ADEs as well as develops process improvements to reduce and/or prevent medication errors.
Level I: Essential
Level II: Essential
Level III: Essential
- 3) The critical care pharmacist participates in reporting ADEs to institutional committees and national programs (e.g., the Food and Drug Administration MedWatch program).
Level I: Essential
Level II: Essential
Level III: Essential
- 4) The critical care pharmacist is involved in continual evaluation of the availability of critical medications through optimization of automated dispensing cabinets.
Level I: Essential
Level II: Essential
Level III: Essential
- 5) The critical care pharmacist should be involved as a team member in the design process for building a new or remodeling critical care area.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 6) The critical care pharmacist implements and maintains departmental policies and procedures related to safe and effective use of medications in the ICU.
Level I: Essential
Level II: Essential
Level III: Essential
- 7) The critical care pharmacist coordinates the development and implementation of ICU-focused drug therapy protocols, guidelines, order sets, and/or care pathways to maximize benefits of pharmacotherapy.
Level I: Essential
Level II: Essential
Level III: Desirable
- 8) The pharmacist independently investigates or collaborates with other critical care healthcare team members to evaluate the impact of drug therapy protocols, guidelines, order sets, and/or care pathways used in the ICU (e.g., drug administration, disease state management algorithms).
Level I: Essential
Level II: Desirable
Level III: Desirable
- 9) The critical care pharmacist leads or provides consultation to hospital committees when critical care pharmacotherapy issues are discussed.
Level I: Essential
Level II: Essential
Level III: Desirable
- 10) The critical care pharmacist serves on and provides consultation to hospital committees when critical care pharmacotherapy issues are discussed.
Level I: Essential
Level II: Essential
Level III: Essential
- 11) The critical care pharmacist contributes to the hospital newsletter and drug monographs, on issues related to medication use in the ICU.
Level I: Essential
Level II: Essential
Level III: Desirable
- 12) The critical care pharmacist identifies and evaluates drug cost minimization opportunities and implements cost containment measures.
Level I: Essential
Level II: Essential
Level III: Desirable
- 13) The critical care pharmacist is involved in identifying local quality metrics for continuous quality improvement (e.g., risk-adjusted mortality, medication errors per medications ordered/dispensed, mechanical ventilation duration, delirium, mobilization).
Level I: Essential
Level II: Desirable
Level III: Desirable
- 14) The critical care pharmacist participates in quality assurance programs to enhance collaborative medication management, minimize costs, provide ongoing evaluation of current processes, and identify the need for new programs/processes.
Level I: Essential
Level II: Essential
Level III: Desirable
- 15) The critical care pharmacist shares responsibility for hospital performance for quality and process measure compliance, such as core measures and other hospital metrics (e.g., *Clostridium difficile* infection rates, vaccinations, patient satisfaction surveys), as it relates to critical care patients.
Level I: Essential
Level II: Essential
Level III: Desirable
- 16) The critical care pharmacist collaborates with medical staff, nursing, other members of the healthcare team, and hospital administration to prepare the ICU for accreditation and to address any deficiencies identified.
Level I: Essential
Level II: Essential
Level III: Desirable
- 17) Pharmacy space and facilities in the ICU are regularly assessed to determine whether efficiency can be improved, where applicable.
Level I: Essential
Level II: Desirable
Level III: Desirable
- 18) Real-time dashboard, or analytics monitoring, of quality metrics and drug utilization are available for the pharmacist to review for patient care and research.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 19) Safety technology is implemented, inclusive of bedside barcode scanning, clinical decision support systems, and intelligent IV infusion devices in the routine care of critically ill patients.
Level I: Essential
Level II: Essential
Level III: Essential
- 20) Medication use systems have the ability to:
 - a) Create and maintain patient medication profiles
 - b) Interface with patient laboratory data and other relevant test results
 - c) Interface with patient charts (medication profiles) from other health-systems and outpatient clinics

- d) Alert users to drug allergies
- e) Alert users to medication maximum dose limits
- f) Alert users to medications prior to admission
- g) Alert users to diagnoses
- h) Alert users to drug-drug and drug-food/nutrient interactions
- i) Alert users to formulary and nonformulary medications as well as approved substitutions
- j) Alert users to pertinent medication shortages
- k) Provide live, real time data that can be incorporated in pharmacotherapy decision-making
Level I: Essential
Level II: Essential
Level III: Essential

- 21) The hospital information management system is computerized, is able to comply with those requirements listed for medication use processes, and has the ability to:

- a) Allow direct provider order entry
- b) Interface with bedside clinical information systems in real-time
- c) Alert users to disease state-drug and drug-drug interactions
- d) Provide intravenous admixture information (e.g., compatibility, stability, preparation)
- e) Provide medication information via references or internal guidelines/documents
- f) Allow documentation of pharmacy patient care interventions
- g) Provide benchmarking and quality data
- h) Access to policies and procedures related to medications
- i) Interface with mobile devices
- j) Provide patient-specific treatment algorithms
Level I: Essential
Level II: Essential
Level III: Essential

Research/Scholarship

- 1) The pharmacist is actively involved in critical care pharmacotherapy research including, but not limited

to, developing and reviewing study proposals, screening and/or enrollment of patients, publication of study results, and serving as a Principal Investigator, coinvestigator, study coordinator, or contact person, where applicable.
Level I: Desirable
Level II: Desirable
Level III: Desirable

- 2) The pharmacist contributes to the pharmacy and medical literature (e.g., case reports, letters to the editor, and therapeutic, pharmacokinetic, and pharmacoeconomic reports).
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 3) The pharmacist reports research results to the pharmacy and medical community at regional, national, and international meetings.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 4) The pharmacist participates in research design and data analysis.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 5) The pharmacist secures funds for conducting research.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 6) The critical care pharmacist participates as a key investigator for critical care research.
Level I: Essential
Level II: Desirable
Level III: Desirable
- 7) Critical care pharmacists are actively involved in collaborating in multicenter research projects.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 8) The profession of pharmacy is represented on the Institutional Review Board and/or Scientific Review Board, as applicable.
Level I: Essential
Level II: Desirable
Level III: Desirable
- 9) The pharmacist contributes to the medical literature as a peer reviewer.
Level I: Desirable
Level II: Desirable
Level III: Desirable

Training/Education

- 1) The critical care pharmacist provides an interprofessional experience in training and mentoring pharmacy students, residents, and fellows through experiential critical care rotations.
Level I: Essential
Level II: Essential
Level III: Desirable
- 2) The critical care pharmacist supports postgraduate residencies and/or fellowship training in critical care pharmacy practice.
Level I: Essential
Level II: Essential
Level III: Desirable
- 3) Critical care pharmacy trainees should be evaluated on educational outcomes and documented experiences in order to demonstrate competence for a given subject.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 4) The pharmacist participates in the education of pharmacy students, residents, and/or fellows by serving as a project advisor.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 5) The critical care pharmacist provides education to health professional students and trainees pertinent to critical care pharmacotherapy.
Level I: Essential
Level II: Essential
Level III: Desirable
- 6) The critical care pharmacist provides formal accredited interprofessional educational sessions (such as medical grand rounds or intensive care rounds).
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 7) The pharmacist has an active role in interdisciplinary simulation activities.
Level I: Desirable
Level II: Desirable
Level III: Desirable
- 8) The critical care pharmacist is a certified instructor and provides certification classes to other healthcare providers (ACLS, PALS, emergency neurologic life support [ENLS], as applicable).

Level I: Desirable
Level II: Desirable
Level III: Desirable

- 9) The pharmacist develops and implements training programs for personnel working in the ICU.

Level I: Essential
Level II: Desirable
Level III: Desirable

- 10) The pharmacist identifies and educates medical and community groups about the role of pharmacists as part of the interdisciplinary healthcare team in the ICU.

Level I: Desirable
Level II: Desirable
Level III: Desirable

Professional Development

- 1) The pharmacist maintains a mastery of knowledge related to current resources and primary literature pertinent to critical care pharmacotherapy.

Level I: Essential
Level II: Essential
Level III: Desirable

- 2) The pharmacist maintains certification in available life-support courses (e.g., ACLS, PALS, ENLS, advanced trauma life support—audit), advanced burn life support), as applicable to practice.

Level I: Essential
Level II: Essential
Level III: Desirable

- 3) Pharmacists practicing extensively in critical care will seek board certification in critical care when eligible.

Level I: Essential
Level II: Essential
Level III: Desirable

- 4) The pharmacist is involved in nonpatient care activities including interdisciplinary committees and educational lectures.

Level I: Essential
Level II: Essential
Level III: Desirable

- 5) The pharmacist provides formal accredited educational sessions at local, regional, state, and national meetings.

Level I: Essential

Level II: Essential
Level III: Desirable

- 6) The critical care pharmacist is a member of a professional critical care organization, in addition to pharmacy organizations.

Level I: Essential
Level II: Essential
Level III: Desirable

- 7) Pharmacy administrators should provide protected time for critical care pharmacists to facilitate education, administrative, research and scholarly activities.

Level I: Essential
Level II: Desirable
Level III: Desirable

- 8) Pharmacy administrators should create mechanisms for critical care pharmacists to develop their career and professional role within a health-system.

Level I: Essential
Level II: Essential
Level III: Desirable

Conclusions

The updated guideline recommendations are inclusive of pharmacy services across the continuum of care and addresses activities of the individual critical care pharmacist and functions served by pharmacy administrators to best meet the pharmacotherapy needs of the critically patient. The multiprofessional critical care model relies on leadership support and collaborative engagement in service delivery design, while promoting the needs of patients and staff to improve institutional performance. With an increasing emphasis placed on value in healthcare, a secondary objective of the position paper is to provide the means to demonstrate the value of a critical care pharmacist by describing activities that can be used by pharmacy administrators and hospital executives to measure and report.

Critical care pharmacists have been leaders in defining their roles and provided the framework for these statements. This document is an important tool that critical care practitioners and administrators should use to evaluate progress toward the highest levels of activity within the realms of patient care, quality improvement, research and scholarship, training and education, and professional development. Although limited resources may impact optimal implementation within any setting, these statements can serve as a roadmap to the highest level of care. It is hoped that practitioners will continue to document their roles and impact on patient outcome to make this an ongoing process.

Disclosures

Dr. Foos received reimbursement for travel to meetings. Dr. Jacobi received funding from Merck (advisory board) and Visante (consulting). Dr. Meyer received funding from Acacia and Neumentum, and she belongs to the APSF Anesthesia Patient Safety group but does not receive any financial gain. The other authors have declared no potential conflicts of interest.

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