Practice Standards, Training, and Professional Development

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Rochester, New York
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Learning Objectives

1. Identify the elements of fundamental, desirable, and optimal pharmacist practice and pharmacy service components.

2. Apply the standards of practice for clinical pharmacy to the critical care practice environment using a standard process of care.

3. Develop an approach to conducting a gap analysis relative to the principles and values of team-based care in a local critical care practice environment.

4. Differentiate between the conventional and nonconventional pathways of training to obtain knowledge, skills, and attitudes for critical care pharmacy practice.

5. Define the key features of a mentor-mentee (protégé) relationship and the important role of mentoring in developing and training critical care clinical pharmacists.

6. Develop an approach to lifelong professional learning to maintain competency in critical care pharmacy practice using the principles of continuing professional development.

7. Identify the many educational components or techniques that can be incorporated into a personal development plan.

8. Identify the avenues and processes for contributing to the critical care body of knowledge as a presenter, author, or peer reviewer.

Self-Assessment Questions

Answers and explanations to these questions may be found at the end of this chapter.

1. Which best reflects the current conventional or preferred postgraduate training pathway to clinical pharmacy practice in an intensive care unit (ICU) providing level I services?
   A. PGY1 residency with focused critical care rotations.
   B. PGY1 residency followed by on-the-job mentored training.
   C. PGY1 and PGY2 critical care residency.
   D. PGY1 and critical care traineeship.

2. Which element would best be considered a differentiator between the provision of an optimal level of pharmacy practice and a desirable level of practice as defined in the 2000 American College of Clinical Pharmacy/Society of Critical Care Medicine (ACCP/SCCM) position paper?
   A. Publishes research and program evaluations.
   B. Participates in experiential training of pharmacy students and residents.
   C. Participates in interdisciplinary patient care rounds.
   D. Maintains advanced cardiac life support (ACLS) certification and participates in code responses.

3. When considering the five principles of team-based health care delineated in the Institute of Medicine discussion paper, which of the other four principles is effective communication most tightly linked to?
   A. Shared goals.
   B. Clear roles.
   C. Mutual trust.
   D. Measurable processes and outcomes.

4. Which statement is most accurate concerning the mentor-mentee relationship as it pertains to the training and development of critical care pharmacists?
   A. Formal mentoring relationships are restricted to residency and fellowships.
   B. Voluntary relationships that evolve and develop through mutual interests have the greatest likelihood of success.

Abbreviations in This Chapter

ACCP American College of Clinical Pharmacy
ACLS Advanced cardiac life support
ASHP American Society of Health-System Pharmacists
CE Continuing education
CPD Continuing professional development
CPE Continuing pharmacy education
ICU Intensive care unit
PDP Personal development plan
SCCM Society of Critical Care Medicine
C. Mentored training programs are the only reliable pathway for the nonconventional training of critical care pharmacists.

D. Most successful critical care pharmacists have a single relevant mentor-mentee relationship during their training and development.

5. Which is the most accurate description of the relationship between the continuing pharmacy education (CPE) and the continuing professional development (CPD) of clinical pharmacists?

A. CPE and CPD are two distinctly different processes for continuing development.

B. CPD is an individualized, self-directed, and iterative process of development that replaces traditional CPE.

C. CPE is strictly a didactic process, whereas CPD incorporates many different learning strategies and techniques.

D. CPD is an individualized, self-directed process that typically incorporates relevant CPE as one of the learning strategies.

6. Which statement is most accurate relative to the recently published standards of care and standardized process of care for clinical pharmacy when considering critical care pharmacy practice?

A. ICUs are highly individualized, unique practice environments that cannot easily conform to broad-based, discipline-wide standards.

B. Critical care pharmacists have unique knowledge and skill sets that are specific to their practice style and environment and are not consistent with the standards.

C. The standards of care and standardized process of care are very consistent with critical care pharmacy practice standards and expectations.

D. The standard process of care, which has evolved around the “provider status” efforts, is primarily applicable to the ambulatory, primary care environment of practice.

7. Which is the best example of an audience that has not traditionally been an important focus of critical care pharmacists’ educational and teaching efforts?

8. As part of the reflection stage of the CPD process, which would be the best example of an episodic opportunity for self-assessment?

A. An annual 360-peer evaluation provides feedback that your coworker does not believe you contribute adequately on departmental initiatives.

B. Recognition that the usual approach to training and assessing a challenging student on rotation was ineffective.

C. A self-evaluation of the past year’s accomplishments for your direct supervisor.

D. An annual performance evaluation with specific goals for the coming year.

9. Which would be considered the most valid reason for recommending the rejection of a manuscript as a scientific reviewer?

A. Poor syntax and word choices.

B. A methodological flaw that results in incorrect data.

C. A disagreement concerning the statistical analysis presented in the manuscript.

D. Results presented in the abstract that are inconsistent with results presented in a table.
I. PRACTICE STANDARDS FOR CRITICAL CARE PHARMACY

A. Standards of Practice for Clinical Pharmacy (Pharmacotherapy 2014;34:794-7): The standards of practice for clinical pharmacy were recently published by ACCP, incorporating a standardized process of care endorsed by all major pharmacy organizations. This document defines expectations of clinical pharmacists delivering comprehensive medication management in team-based, collaborative practice settings, including the ICU.

1. Qualifications
   a. Licensed pharmacists
   b. Advanced education, training, and experience
      i. Advanced, accredited residency in critical care pharmacy (PGY2);
      ii. Fellowship in critical care research; or
      iii. Equivalent, relevant clinical experience
   c. Clinical and personal competencies to practice in a team-based collaborative environment
   d. Board certification

2. Process of care
   a. Assess the patient.
   b. Evaluate medication therapy.
   c. Develop and implement therapeutic plan.
   d. Follow-up evaluation and monitoring
   e. Documentation
      i. Medication history
      ii. Problem list and assessment
      iii. Plan of care and follow-up

3. Collaborative, team-based care and privileging

4. Professional development and maintenance of competence
   a. Board certification and recertification
   b. Continuing professional development
   c. Maintenance of licensure
   d. Participation in formal and informal development activities

5. Professionalism and ethics – Demonstrate the traits of:
   a. Responsibility
   b. Commitment to excellence
   c. Respect for others
   d. Honesty and integrity
   e. Care and compassion for others
   f. High ethical standards
   g. Legal and regulatory compliance

6. Research and scholarship

7. Other
   a. Education and training
   b. Mentorship
   c. Management and leadership
   d. Policy and service development and implementation
   e. Consultation
B. Scope of Critical Care Pharmacy Services (Crit Care Med 2000;28:3746-50): Almost 15 years ago, the Task Force on Critical Care Pharmacy Services (a joint effort of SCCM and ACCP) published a position paper defining the scope of pharmacy practice that should be provided in the ICU. Pharmacy practice in the ICU was categorized into three gradations of services labeled fundamental, desirable, and optimal.

1. The task force defined parameters within six domains:
   a. Clinical activities
   b. Drug distribution
   c. Education
   d. Research
   e. Documentation
   f. Administration

2. Recommendations were further organized into two areas:
   a. Pharmacist activities: This referred to the activities of clinical pharmacists with training and/or experience in providing for the unique pharmaceutical care needs of complex ICU patients in a team-based environment, with the pharmacist taking shared responsibility and accountability for patient outcomes.
   b. Pharmacy services: This referred to the departmental and institutional infrastructure to support and facilitate the pharmacist, including systems, operations, and personnel to provide safe and effective pharmacy care in the ICU.

3. Gradations of pharmacy practice (see Table 1 for details)
   a. Fundamental: Practice and operation recommendations that are considered vital to the safe provision of care to ICU patients
   b. Desirable: Offers clinical practice and service expectations that are more specialized and specific to the ICU beyond the fundamental recommendations
   c. Optimal: Represents an integrated, highly specialized, and dedicated model of pharmacy practice that is focused on optimizing outcomes through incorporating education, research, and advanced pharmacy practice into the ICU

4. Commentary/updates
   a. Many of the pharmacy service expectations are increasingly outdated because meaningful use requirements and other incentives for the modernization of technology are introducing integrated or interoperable information systems in most institutions. Optimal characteristics are becoming fundamental.
   b. Alternatives to traditional unit-of-use distribution systems using decentralized, automated dispensing are reasonable today, but not included in these guidelines. In addition, the need to maintain dispensing ICU pharmacy satellites may be negated by the use of technology.
   c. There is no mention of important “sharp-end” patient safety technologies like bar-code medication administration and smart pumps with medication libraries or profiles. These should be considered at least desirable now.
   d. Several of the fundamental recommendations are not practical or likely for small institutions with level III ICUs. For example, it is unlikely that having dedicated ICU pharmacists with limited commitment outside the ICU will be possible.

C. Critical Care Pharmacist as Educator: The critical care pharmacist has several educational missions and obligations, and teaching methods and techniques vary depending on intended audience and content. The clinical pharmacist needs to develop comfort and expertise with a wide range of teaching styles and techniques to be successful as an educator in the ICU setting.
1. Pharmacy students and residents: Content has to be at a level appropriate to learners who may or may not have a primary interest in critical care. Active learning strategies must be incorporated with didactic approaches that are more traditional. For this audience, the clinical pharmacist has primary responsibility for assessment/grading.
   a. Clinical practice training
      i. Role modeling (I do, you watch)
      ii. Coaching (I do, you help…then…You do, I help)
      iii. Mentoring (You do, I watch)
   b. Case-based teaching (point-of-care teaching)
   c. Hands-on demonstrations of equipment, technology, and devices used in the ICU
   d. Clinical conferences/topic discussions
   e. Assigned readings
   f. Journal club
   g. Quality improvement projects
   h. Writing assignments
      i. Case reports
      ii. Guideline/protocol development
      iii. Pharmacy and Therapeutics (P&T) monographs

2. Critical care team: More heavily focused on the specifics of critical care therapeutics. Content and sophistication will vary depending on audience (e.g., physicians vs. nurses). Audience is assumed to have a primary interest in critical care.
   a. Case-based, point-of-care teaching (bedside rounds)
   b. Didactic teaching
      i. Teaching rounds/conferences
      ii. In-service education
      iii. Grand rounds
      iv. Basic science lectures
   c. Critical care–specific journal club
   d. Collaboration on guidelines/protocols
   e. Quality improvement projects

3. Pharmacist colleagues: May not have a primary focus or interest in critical care. Content may be focused on specific pharmacotherapeutic issues (e.g., pharmacokinetic principles in the critically ill) that often arise during cross-coverage. May include pharmacists taking a nonconventional path to critical care practice
   a. Didactic lectures (e.g., clinical conferences, topic-specific lectures)
   b. Hands-on demonstration of equipment, technology, and devices used in the ICU
   c. Case-based, point-of-care teaching
   d. Journal club
   e. Competency based programs – Lead to credentialing according to demonstrated skills

4. Other trainees: Often includes a mix of backgrounds and interests (e.g., critical care fellows, anesthesia residents, medicine residents, ED [emergency department] residents, fourth-year medical students, nursing students, PA [physician assistant] students). Content needs to be appropriate for the predominant audience and baseline understanding of the topic.
   a. Didactic lectures
      i. Teaching rounds
      ii. Clinical conferences
   b. Point-of-care teaching – Bedside rounds
5. Patients and families: Education of patients and family members has not been a traditional realm of clinical pharmacist involvement in the ICU because of an assumption that patients were not awake and alert enough and that patients were almost never discharged from the ICU. However, with an increasing emphasis on patient and family satisfaction and a greater involvement of the patient and family in decision-making, the need to educate around pharmacotherapy in the ICU has increased.
   a. Techniques
      i. Simple language, basic content
      ii. Teach-back technique to assess understanding
      iii. Frequent reinforcement
      iv. Motivational interviewing techniques
      v. Open-ended questions to understand what is important to the patient and family
   b. Content
      i. Medications being initiated in the ICU
      ii. Why the medication is being used – Have goals different from home medications
      iii. What to expect – Effects, adverse effects, changes in patient interaction, and so forth
      iv. Expected duration of new medications
      v. What factors are monitored to see whether medications are helping or hurting

D. Critical Care Services (Crit Care Med 2003;31:2677-83): In 2003, the American College of Critical Care Medicine published an updated guideline defining recommended critical care services and personnel according to the level of care being provided. ICUs were defined as levels I, II, and III.
   1. Levels of ICU services
      a. Level I
         i. Comprehensive critical care for a wide variety of patient populations with a high level of specialization
         ii. Requires broad range of comprehensive support, including pharmacy services, respiratory therapy, clinical nutrition, pastoral care, and social services
         iii. Often fulfills an academic mission
      b. Level II
         i. Comprehensive critical care but may not provide care for certain patient populations
         ii. Must have transfer protocols in place for patients with special needs
         iii. Comprehensive support services must be available.
         iv. May or may not have an academic mission
      c. Level III
         i. Provides stabilization, but has limited ability to provide comprehensive critical care
         ii. Must have transfer protocols in place for patients requiring level I and II critical care services
         iii. Support services are often limited in scope.
   2. Critical care pharmacy services (level I and II ICUs)
      a. Reiterates pharmacist and pharmacy services defined in 2000 guideline
      b. Emphasizes the importance of clinical pharmacists as required members of the patient care team
      c. Qualifications and competence of the critical care pharmacist in ICU therapeutics are defined as essential. Acknowledges several pathways, including advanced degrees, residency, fellowship, and other specialized practice experiences
      d. ICUs with an academic mission should provide protected time for pharmacist participation in scholarly activities and appropriate knowledge and skills to provide education to critical care nurses, physician trainees, and physicians.
      e. Non-academic centers should provide time for maintenance of competence and maintain current certification.
E. Principles and Values of Team-Based Health Care

1. SCCM and ACCP have long promoted the team-based care model for critical care as a standard, including clinical pharmacists as essential staff.

2. A recent Institute of Medicine discussion paper delineated the core principles and values of highly functioning interprofessional health care teams.
   a. Definition of team-based care: *Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively with patients and their caregivers—to the extent preferred by each patient—to accomplish shared goals within and across settings to achieve coordinated, high-quality care.*
   b. Five personal values of effective members of high-functioning teams:
      i. Honesty: Includes effective, transparent communication. Essential to building mutual trust
      ii. Discipline: Each team member carries out roles and responsibilities in a highly disciplined approach, even when inconvenient or difficult.
      iii. Creativity: Maintains excitement around addressing new and difficult challenges. Sees opportunity in both successes and failures
      iv. Humility: Equal respect of all members, regardless of level of training or role – Not tied to traditional hierarchical thinking in health care. Recognizes that all members of the team are susceptible to mistakes
      v. Curiosity: Dedicated to reflection and continuous improvement
   c. Five principles of team-based health care
      i. Shared goals: Clearly articulated, understood, and supported goals are established by the team that are consistent with the patient and family wishes. The patient and family are actively involved in establishing the goals of care as members of the team.
      ii. Clear roles: Each team member’s functions, responsibilities, and accountabilities are clearly established and understood by the team. Efficiency and logical division of labor are achieved. Although autonomy is important, flexibility of roles and collaboration exist as needed.
      iii. Mutual trust: Establishing and maintaining trust, as well as openness to address questions about or breaches of trust, are essential. Mutual trust permits individual team members to function to their highest potential and rely on other team members to follow-through on their commitments.
      iv. Effective communication: Tightly linked to mutual trust. The team has consistent channels for candid and complete communication by all team members and in all situations.
      v. Measurable processes and outcomes: The team develops and implements accurate and timely measures of successes and failures and uses the results to track and improve performance. Measures fall into two categories: process/outcome measures and measures of team function.

3. Critical care teams – Gap analysis: When considering the core principles of team-based care, critical care team members should evaluate their team structure and performance against these five principles. Effective teams are much more than patient care rounds by a mix of health care professionals. Common questions to consider when evaluating potential gaps should include:
   a. Shared goals
      i. Are the patient and family goals for critical care routinely incorporated into the care plan?
      ii. Are the patient and family viewed as active members of the team during the establishment of goals?
      iii. Are there clearly articulated and understood goals agreed on by all members of the team during the provision of care to all ICU patients and the work of the team in the care of that patient?
      iv. Is progress toward the goals reevaluated in light of the changing course of the patient and family? Are goals adjusted or refined throughout the dynamic course of the critical care admission as needed?
      v. Are there adequate organizational resources and commitments to permit effective establishment of shared goals in the management of ICU patients?
b. Clear roles
   i. Are each team member’s functions, responsibilities, and accountabilities clearly defined? Can each team member articulate and understand the role of the other team members?
   ii. Are the roles and responsibilities of each team member focused on the shared goals of the team and patient?
   iii. Is there clear respect for the contributions of each team member from a non-hierarchical, interdependent perspective?
   iv. Is each team member introduced (and reintroduced) to the patient and family, including a lay description of each member’s role and responsibility?
   v. Does each team member go about his or her responsibilities with a reasonable degree of autonomy?
   vi. Is there a clear team leader? Does the leadership role vary according to individual circumstances, problems, or environment?
   vii. Does the team have a reasonable balance between autonomous functions and collaboration?
   viii. Are there adequate organizational resources and commitments for professional development, team education, facilitating communication, and restructuring care processes to support the effective division of labor?

c. Mutual trust
   i. Does an environment of mutual trust and support exist among the ICU team? Can breaches of trust be openly discussed and addressed between team members without a detrimental impact on professional or personal relationships?
   ii. Does the hiring process include a focus on the personal and professional values that support an environment of mutual trust? Do members of the ICU team participate in the hiring process across traditional departmental siloes?
   iii. Is the team effective at establishing and maintaining mutual trust with patients and families? Are effective communication skills used to explain the process of establishing goals, sharing information on progress, and incorporating effective negotiation and conflict resolution skills?
   iv. Does the team regularly participate in non–patient care activities that allow team members to develop greater trust and know each other at many levels?
   v. Is there adequate organizational support of the elements necessary to establish mutual trust among teams?

d. Effective communication
   i. Has the team established a high priority for open, direct, clear, consistent, professional communication between team members?
   ii. Does communication take advantage of all potential modes and technologies of communication for efficiency and convenience?
   iii. Do members of the team use effective listening skills, recognizing that deep listening to the input of all team members, including patients and families, is an essential component of effective communication?
   iv. Are signs of tension and unspoken conflict in the communication process regularly recognized and addressed to improve team communication skills and effectiveness?
   v. Does effective communication occur across the team regardless of traditional hierarchical structures in health care?
   vi. Are the organizational elements for effective communication available to the team?

e. Measurable processes and outcomes
   i. Has the team identified and implemented reliable, timely, and ongoing measures of team performance?
   ii. Are these measures focused on both process/outcomes of care provision and team function or effectiveness?
iii. Are measures of patient and family satisfaction included in the assessment process?
iv. Are measures of team member satisfaction included in the team assessment?
v. Does the team regularly report its measures of success and failure, both internally to the team and to others in the organization?
vi. Are performance data regularly used for process improvement with respect to both patient care and team function?
vii. Does the team use any standardized tools to assess team function and quality?
viii. Are organizational resources and commitment adequate to permit teams to adequately measure quality of patient care and team function?

F. Other Standards
1. The Joint Commission
   a. Medication management chapter
      i. High-alert, hazardous medication standards
      ii. Look-alike/sound-alike medications
      iii. Monitoring of medication response
      iv. Adverse drug event detection, evaluating, and reporting
   b. National Patient Safety Goals
      i. Two-factor patient identification
      ii. Medication reconciliation
      iii. Safe medication use and labeling
      iv. Anticoagulation management and education
2. CMS (Centers for Medicare & Medicaid Services) conditions for participation (42 CFR 482)
   a. Quality assurance and performance improvement programs (§482.21)
      i. Medical errors
      ii. Adverse events
   b. Preparation and administration of medications (§482.23)
   c. Medical records requirements (§482.24)
   d. Pharmaceutical services (§482.25)
      i. Policies and procedures to minimize drug errors
      ii. Adverse drug reaction and medication error detection and reporting
      iii. Drug information standards

II. TRAINING OF CRITICAL CARE PHARMACISTS

A. Positions and Policy
1. ACCP position
   a. ACCP clarified its position concerning qualifications of clinical pharmacists providing direct patient care in a 2013 Board of Regents Commentary (Pharmacotherapy 2013;33:888-91): Clinical pharmacists providing direct patient care “should possess the education, training, and experience necessary to function effectively, efficiently, and responsibly in this role. Therefore, ACCP believes that clinical pharmacists engaged in direct patient care should be board certified (or board eligible if a BPS certification does not exist in their area of practice) and have established a valid collaborative drug therapy management (CDTM) agreement or have been formally granted clinical privileges by the medical staff or credentialing system within the health care environment in which they practice.”
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b. Board certification
   i. ACCP considers BPS (Board of Pharmacy Specialties) certification the cornerstone of eligibility for direct patient care.
   ii. Eligibility
       (a) Graduate of an accredited school of pharmacy
       (b) Pharmacy licensure
       (c) Postgraduate residency training in area of specialization or 3–4 years of relevant experience with at least 50% of time practicing in the specialty area
   iii. ACCP has expressed that postgraduate residency training is the preferred training pathway for clinical pharmacists providing direct patient care in previous position statements and a white paper.

2. American Society of Health-System Pharmacists (ASHP) policy
   a. Policy 0701: “By the year 2020, the completion of an ASHP-accredited postgraduate-year-one residency should be a requirement for all new college of pharmacy graduates who will be providing direct patient care.”
   b. ASHP has no policy directly related to the provision of direct patient care in a specialty practice area.

B. Potential Workforce Demands

1. Hospital data
   b. Around 71,400 adult and pediatric ICU beds (2007 survey data) – Excludes 20,500 neonatal ICU beds (www.sccm.org/Communications/Pages/CriticalCareStats.aspx)

2. Critical care pharmacists
   a. No accurate database to indicate the number of pharmacists spending 50% or more of time in critical care
   b. Direct patient care by pharmacist provided in 62.2% of ICUs in the United States in 2006, essentially unchanged from 20 years earlier. Primarily fundamental-level services (Ann Pharmacother 2006;40:612-8)
   c. A review of ACCP, SCCM, ASHP, and APhA (American Pharmacists Association) membership records identified 2928 unique pharmacists indicating specialization in critical care at the time of the petition for recognition of critical care as a specialty (https://www.accp.com/docs/positions/petitions/Final_CRITICAL_CARE_PETITION_For_BPS_Post.pdf)
      i. 476 responded that they practice in critical care (94%).
      ii. 91% of the 476 responded that their practice met the definition of critical care pharmacy as a specialty.
      iii. 74% of respondents indicated they spend at least 50% of their time practicing in the ICU.
      iv. More than 80% of respondents completed residency or fellowship training in critical care.
      i. Collectively employed 1034 FTE (full-time equivalent) critical care pharmacists
      ii. Recruited 256 critical care pharmacists during the previous 3 years
      iii. Estimated a need to hire 234–243 critical care pharmacists in the next 3 years
      iv. 99.5% of respondents estimated the demand for critical care pharmacists to grow or remain stable at their site during the next 5 years.
f. Critical Care Societies Collaborative (CCSC) – http://ccsconline.org/workforce
   i. Collaborative effort of several stakeholder organizations in critical care to define the workforce shortage in critical care and advocate for federal action to address the problem
   ii. Most of this work has focused on intensivist and ICU nurse shortages, but there is also recognition of shortages of other professionals, including critical care pharmacists

g. Current and objective quantification of critical care pharmacist shortage or demand is unavailable.

C. Training Recommendations and Capacity
1. Minimum requirements for all levels of service (I–III)
   a. Graduate of ACPE-accredited school or college of pharmacy
   b. Licensure and registration by a state board of pharmacy
2. Conventional or preferred postgraduate training
   a. PGY1 pharmacy practice residency
   b. PGY2 critical care residency or fellowship
3. Nonconventional or alternative paths: There is no widely accepted or clearly defined alternative pathway to specialty experience and competence in critical care pharmacy. Following are detailed some potential pathways and components of a self-directed training program. The extent and variety of experiences needed may be determined by the practice setting and level of care to be provided, baseline knowledge, availability and willingness of qualified mentors, and other personal and professional skills of the individual. Although many potential paths are defined later, those that provide continued, practical experience over a prolonged period in a supervised or mentored environment are considered of greatest value in developing competency in the ICU setting.
   a. Mentored or supervised clinical practice experience without residency
      i. Clinical practice experience must be hands-on, team-based under supervision
      ii. Mentors may be PGY2- or fellowship-trained critical care pharmacists, clinical pharmacists with equivalent experience, critical care faculty from affiliated schools of pharmacy, intensivist physicians, and/or other critical care professionals.
      iii. Several mentors may best meet the variety of needs of the mentee pharmacist.
      iv. Reinforced by frequent reading and analysis of the critical care primary and secondary literature, journal club participation, and frequent critical discussions of the clinical implications of the primary literature
      v. Normally, expect at least 3–4 years of mentored/supervised experience to gain competency for independent clinical practice (optimal services) in level I and II ICUs. Shorter periods may be adequate to provide lower levels of service to level II and III ICUs.
   b. PGY1 with supervised/mentored ICU clinical practice experience
      i. Mentored clinical experiences similar to those described earlier
      ii. PGY1 with critical care experiences during residency may be adequate to provide fundamental and desirable services to level II and III ICUs.
      iii. Normally, expect 2–3 years of mentored/supervised experience to gain competency for independent clinical practice (optimal services) in level I and II ICUs.
   c. Critical care traineeship (www.ashpfoundation.org/criticalcare)
      i. Offered through the ASHP Foundation
      ii. 4-month distance education component – Independent reading, Web-based education, and teleconference case studies
      iii. 2-week on-site experiential training
      iv. Post-experiential training activities
      v. Is not a comprehensive training program, but can be a valuable component of a training program for nonconventional-path clinical pharmacists
d. Other potential components of a nonconventional training program: Actual program structure will vary depending on the available resources, practice environment, baseline knowledge and skills of the pharmacist, and institutional support.
   i. Graduate degree (e.g., master’s degree)
   ii. Continuing education (CE) programming – Live, Web based, print
   iii. Attendance at national and regional critical care meetings – CE, networking, research presentations
   iv. Fundamentals in Critical Care course completion
   v. ACLS, advanced trauma life support (ATLS), and/or pediatric advanced life support (PALS) training and certification
   vi. Regular participation in the SCCM Clinical Pharmacy and Pharmacology Section national journal club
   vii. SCCM Clinical Pharmacy and Pharmacology Section mentor program – Long-distance mentoring program
   viii. Self-arranged experiential rotations at peer institutions under the supervision of a qualified critical care pharmacist
   ix. Visiting professor or scholar programs to bring specialized expertise to the clinical site for on-site experiential training and didactic teaching
   x. Policy, guideline, and protocol development for critical care pharmacotherapy–related issues under the supervision of qualified peers
   xi. Critical care pharmacy service or program development, implementation, and outcome measurement under the supervision of qualified peers

4. PGY2 residency and fellowship programs
   i. For the 2014–2015 academic year, the ASHP residency directory lists 116 critical care PGY2 programs, offering up to 145 resident positions.
   ii. The ACCP fellowship directory lists four fellowship programs with a primary or secondary focus on critical care.
   iii. Full capacity in these training programs is unlikely to meet the current demand for clinical pharmacists with critical care training, emphasizing the need for continued reliance on nonconventional training for “home-grown” critical care pharmacists.

D. Mentoring
1. Mentor-protégé relationship
   a. Symbiotic, nurturing relationship between two adults
   b. Assist each other in meeting shared career objectives
   c. Attributes of a successful mentor-protégé relationship (see Box 1)
   d. Mentor typically 15–20 years older than protégé, predominantly male

2. Mentor should fulfill five functions:
   a. Teaching – New knowledge, skills, and attitudes
   b. Sponsoring – Helps protégé reach career goals, assists in networking, vouches for abilities, offers protection from threats
   c. Encouraging – Affirming, challenging, inspiring
   d. Counseling – Listening, probing, advising during difficult challenges
   e. Befriending – Acceptance, understanding, and trust

3. Phases of the mentor-protégé relationship:
   a. Initiation phase
      i. Weeks to months in duration
      ii. Begin work together.
      iii. Mentor coaches protégé, and protégé may provide technical assistance.
b. Cultivation phase
   i. 2–5 years in duration
   ii. Both individuals realize personal and professional benefits.
   iii. Deeply intimate and personal bonds are formed.

c. Separation phase
   i. Typically months in duration
   ii. Protégé no longer requires guidance and begins to seek more autonomy.
   iii. Mentor may feel deserted, whereas protégé may feel held back.
   iv. Resentment or hostility may lead to end of relationship.

d. Transformation
   i. Years in duration (lifelong)
   ii. Peer relationship evolves.
   iii. Mutual sense of gratitude and appreciation

4. Voluntary vs. arranged relationships
   a. Increasingly, organizations are establishing mentoring programs with assigned mentors.
   b. Successful mentoring relationships are voluntary and based on mutual respect.
   c. Successful and powerful people are not necessarily good mentors.
   d. The factors that lead to mentor-protégé relationships are unclear and may be difficult to create through assignment of mentors.
   e. Factors that contribute to successful mentorship:
      i. Common interests
      ii. Common purpose
      iii. Desire on the part of the mentor to participate
      iv. Mentor and protégé must be able to spend time together.
      v. Persistent and regular interaction between mentor and protégé
   f. Formal mentoring programs can be successful, but less so than voluntary relationships

5. Mentoring and critical care training
   a. Beyond formal residency/fellowship programs, mentor-protégé relationships are essential to the formal development of critical care pharmacists.
   b. Developing critical care pharmacists should seek out mentors with similar interests and purpose who can help the pharmacists fill gaps in their knowledge, skills, and attitudes relative to critical care practice.
   c. Over time, critical care pharmacists may have several mentor-protégé relationships to meet evolving educational and experiential needs.
   d. Experienced and successful critical care pharmacists should volunteer to mentor junior pharmacists, residents, and students and take their role as a mentor seriously by being kind, helpful, supportive, and encouraging.

III. CONTINUING PROFESSIONAL DEVELOPMENT

A. General Considerations
   1. Lifelong learning by health care professionals is both a necessity and an obligation to several stakeholders.
   2. CPD is a multifaceted, self-directed, holistic, outcomes-focused approach to lifelong learning.
   3. Career-long iterative process – Has continuous cycles, rather than a start and a finish
   4. Sustained career growth and success are more dependent on CPD than on early-career education and training.
   5. CPD should be closely integrated into daily practice and the work environment for success and sustainability.
B. Stakeholders in CPD: Stakeholders may have a role in contributing to lifelong learning, benefiting from the sustained competency of the clinical pharmacist, or both.

1. Pharmacist-learner (self)
   a. Most at stake
   b. Primarily responsible for developing a self-directed, structured approach to learning and assessment
   c. Must develop an approach that is flexible, integrated, and capable of being sustained over decades of practice
   d. Must be prepared to commit personal time to CPD

2. Employer
   a. Has both an obligation to and expectation of the clinical pharmacist relative to CPD
   b. Provision of resources
      i. Travel funding
      ii. Access to electronic databases and literature
      iii. Environment that promotes sharing and learning (clinical conferences, journal club, open discussion and debate among colleagues, etc.)
      iv. Protected time to pursue educational opportunities
   c. Establish a credentialing and privileging process that incorporates CPD expectations.
   d. Alignment of personal development goals with institutional priorities is mutually beneficial and may increase employer support.
   e. Employer benefits from sustained and expanded competencies of clinical pharmacist and should incorporate into hiring, retention, and promotion decisions

3. Colleagues
   a. Contribute to lifelong learning of the clinical pharmacist
      i. Case-based discussion and debate on daily rounds
      ii. Drug-related questions
      iii. Interdisciplinary teaching rounds
      iv. Clinical conferences, journal clubs
      v. Inclusion in collaborative scholarly activities
   b. Benefit from lifelong learning of the clinical pharmacist
      i. Greater quality and sophistication of contributions to team-based care of critically ill patients
      ii. Educational offerings by the clinical pharmacist
      iii. Collaboration around scholarly activities
      iv. ICU-related treatment guidelines and protocols developed by or in collaboration with the clinical pharmacist

4. Students, residents, and fellows
   a. Contribute to lifelong learning of the clinical pharmacist
      i. Assisting in identifying gaps in their own knowledge
      ii. Creating incentive to maintain competency through CPD
      iii. Regularly challenging applicability and relevance of professional knowledge and skills
   b. Benefit from current, relevant knowledge and skills being incorporated into:
      i. Teaching
      ii. Role modeling/coaching
      iii. Mentoring
   c. CPD is a lifelong obligation of pharmacists who accept responsibility for training future clinical pharmacists.
   d. The best trainees seek out the most competent teachers, preceptors, and mentors.
5. Patients
   a. Greatest beneficiary of clinical pharmacist CPD
   b. Providing the best possible care to ICU patients should be the biggest motivator for the clinical pharmacist to pursue CPD.
   c. Well-informed patients will seek out the most competent and capable health care professionals.

C. CPD Process: The CPD process is structured around four essential steps. A potential fifth step is documentation of the process, but that should be an integral part of each step, not a separate process.
   1. Reflection
      a. Self-assessment process
      b. Evaluation and feedback from others
         i. Coworkers
         ii. Colleagues
         iii. Employer
      c. Personal SWOT (strengths, weaknesses, opportunities, and threats)
         i. Assessment of internal strengths and weaknesses related to knowledge, skills, experiences, and behaviors
         ii. Assessment of external environmental factors for opportunities and threats
         iii. Goal is to identify learning needs and opportunities that exist to address those needs.
      d. Reflection should be both scheduled and episodic.
         i. Annual performance evaluation/self-evaluation (scheduled)
         ii. Some set or chosen anniversary date (scheduled)
         iii. Following the care of a complex or difficult patient (episodic)
         iv. Following an interaction with a challenging student or resident (episodic)
      e. Result of reflection is to identify two or three specific, well-defined, and achievable learning needs.
   2. Plan
      a. Develop a personal development plan (PDP) to address the needs and opportunities identified during reflection.
      b. Includes learning objectives that are SMART (specific, measurable, achievable, relevant, timed)
      c. Identifies resources needed to address the PDP
      d. Evaluates the availability and access to needed resources and modifies plan accordingly
      e. The PDP should be regularly reassessed and adjusted as needed.
   3. Act
      a. Develop an action plan to implement the PDP.
      b. The action plan will need to incorporate a variety of learning strategies and methods (see text that follows).
      c. Incorporating the action plan into the daily practice activities is key to success and sustainability. CPD should not be considered an “additional burden.”
   4. Evaluate
      a. Evaluate the effectiveness of the action plan for achieving the learning objectives of the PDP.
         i. Did the activities provide adequate content, depth, and hands-on experiences to truly address the learning objectives and meet the needs identified during reflection?
         ii. Did the activities stay focused on the learning objectives, and were timelines adhered to adequately?
         iii. Were all competencies adequately addressed?
         iv. How did the CPD activities affect the pharmacist-learner and possibly the patient (often very challenging to measure)?
      b. Evaluation is expected to lead to the next round of reflection and restart the continuous and iterative process of CPD.
5. **Portfolio**
   a. Process of documenting the CPD process
   b. Although the format may be standardized by employer, regulatory authorities, CE providers, or others, the content should be individualized to reflect the needs, actions, and assessments of the pharmacist-learner.
   c. Is a dynamic, living document that reflects the continuous, iterative nature of CPD
   d. Examples of CPD portfolio formats/templates:
      i. [https://www.acpe-accredit.org/pdf/CPD_Portfolio.pdf](https://www.acpe-accredit.org/pdf/CPD_Portfolio.pdf)
      ii. [www.ncbop.org/CE/CPDLearningPortfolio.pdf](http://www.ncbop.org/CE/CPDLearningPortfolio.pdf)

D. **CPD Learning Strategies and Methods**

1. Continuing pharmacy education (CPE)
   a. CPD is not a replacement for CPE, but CPE should be one component of a PDP.
   b. ICU pharmacists should focus on CPE programming that meets their defined educational needs and incorporates several different techniques that will help meet the full range of competencies needed for clinical practice in the ICU.
   c. Accreditation standards maintain minimum quality assurance of CPE activities.
   d. CPE credits are the most widely used “currency” by regulatory bodies, accrediting agencies, and other organizations as a proxy for professional competency, and this is unlikely to change in the near or intermediate term.
   e. Traditional didactic lecture-style CPE activities have several limitations toward achieving CPD learning objectives.
      i. Often non-curricular
      ii. Limited influence on changing practice
      iii. Educational outcomes may not align with the individual’s needs.
      iv. Content is sponsor or speaker driven.
      v. Opportunity for bias (or perception of bias), depending on source of support
      vi. CE efforts are often fragmented across professions (not interdisciplinary).
   f. CPE providers are expanding the diversity of educational methodologies and techniques to include interaction, experiential learning, simulation, discussion and debate, and role playing, among others.
   g. Limited evidence suggests that live CE over print, multimedia format, and a series of programs on a curricular theme may be the most effective CE method.

2. Short courses or seminars
   a. Certificate or credentialing programs
      i. ACLS
      ii. ATLS
      iii. PALS
   b. Structured curricular programs
      i. ACCP Academies
      ii. FCCS (Fundamental Critical Care Support) course

3. Membership and participation in national organizations
   a. ACCP; Critical Care PRN
   b. SCCM; Clinical Pharmacy and Pharmacology Section
   c. ASHP
   d. Several specialty organizations related to critical care (American College of Chest Physicians, American Trauma Society, Neurocritical Care Society, etc.)
4. Primary and secondary literature
   a. Reading, analyzing, and applying the relevant literature should be central to any strategy of professional development.
   b. No gold standard strategy for staying current with the literature
   c. Many “foraging” strategies will need to be considered and employed.
      i. Review table of contents of high-impact journals in critical care (e-mail or rich site summary [RSS] push technology) (e.g., Critical Care Medicine, Intensive Care Medicine, Chest, American Journal of Respiratory and Critical Care Medicine, Journal of Trauma and Acute Care Surgery, Journal of Critical Care).
      ii. Topic alerts (e-mail or RSS) for critical care articles from high-impact multispecialty journals (e.g., New England Journal of Medicine, Annals of Internal Medicine, JAMA, British Medical Journal, Lancet)
      iii. Scan high-impact pharmacy specialty journals for critical care articles (e.g., Pharmacotherapy, Annals of Pharmacotherapy, American Journal of Health-Systems Pharmacy).
      iv. Use of saved search strategies with automatic e-mail alerts on a scheduled interval (e.g., PubMed, PubCrawler, Ovid Medline)
      v. Subscribe to a medical information alert service with high and transparent standards for validity, relevance, and contextual interpretation of the data (e.g., Essential Evidence Plus, FPIN (Family Physicians Inquiries Network) Clinical Inquiries, BMJ Clinical Evidence, Cochrane for Clinicians).
      vi. Scan review journals relevant to critical care (e.g., Critical Care Clinics).
      vii. Identify high-quality, relevant, and contemporary clinical practice guidelines for critical care therapeutics (e.g., National Guideline Clearinghouse, PubMed Clinical Queries, MD Consult).
      viii. Use up-to-date systematic reviews (e.g., Cochrane Database of Systematic Reviews, AHRQ Evidence-Based Practice Center Evidence Reports)
      ix. Selective use of other resources (e.g., evidence-based summaries such as Bandolier, Clinical Evidence), critically appraised topics, point-of-care review services (e.g., UpToDate, Medscape), and meta-search engines (e.g., TRIP database)
   d. The tools and resources available for staying current with the literature is a rapidly evolving, dynamic market. The individual pharmacist will need to stay current to maximize use of the literature and will need to adapt his or her strategy over time.
5. Discussion and debate with colleagues, mentors, and other content experts
   a. Therapeutic dilemmas
   b. Complex cases
   c. Primary literature
   d. Guidelines
6. Journal clubs/clinical conferences
7. Interdisciplinary, patient care rounds – Daily interactive discussions of diagnostics, disease states, therapeutics, monitoring, technology in the ICU, ethics, communication with patients and families, etc.
8. Guideline and protocol development for the ICU
   a. Translation of evidence to best practices
   b. Benchmarking with peer institutions
   c. Consensus building
   d. Project management – Implementation and measurement of outcomes
9. Point-of-care learning
   a. Refers to day-to-day learning opportunities
   b. Uncommon disease state or unexpected adverse drug reaction prompts reading and learning.
   c. Complex drug information questions from colleagues
IV. DISSEMINATION OF CRITICAL CARE KNOWLEDGE

A. Reasons to Disseminate Knowledge
   1. Recognition by peers
   2. Promotion and tenure
   3. Ethical obligation of research
   4. Grantsmanship success
   5. Giving back to the discipline – Critical care pharmacy is a new and evolving specialty.
   6. Travel support

B. Venues for Disseminating Knowledge
   1. Peer-reviewed publications (see text that follows for greater detail)
      a. Traditional, print journals
      b. Open-access (electronic) journals
   2. Non–peer-reviewed publications
      a. Textbook chapter
      b. Commentary/editorial
      c. Newsletter
      d. Guideline
      e. Compendia
      f. CE material
   3. Abstract (see text that follows for greater detail)
      a. Poster
      b. Platform
      c. Regional, national, international meetings
      d. Virtual poster sessions
   4. Presentation
      a. Continuing education
         i. Live/lecture – Local, regional, national, international venues
         ii. Webinar
         iii. Recorded/archived
      b. Seminar or conference

C. Publication and Peer-Review Process
   1. Categories of publications (will vary by journal)
      a. Original research
      b. Systematic review (e.g., meta-analysis)
      c. Expert review
      d. Brief reports (e.g., preliminary or pilot data)
      e. Case reports
      f. Practice or educational insights (typically must include assessment of outcomes)
   2. Selecting a target journal
      a. Quality and importance of the publication
         i. First-tier journals – Highly important, innovative, and/or high quality
         ii. Second- and third-tier journals – To be considered when unlikely to be accepted in first tier, or
            rejection by first-tier journal
      b. Target audience and scope of the journal relative to content of publication – Looking for good
         match on both
      c. Seek input from coauthors, peers, colleagues concerning appropriate journal to target
3. Preparation of the manuscript
   a. Comply with journal requirements.
      i. Historically published with first issue of each volume
      ii. Today, easiest to access online
      iii. Manuscript format
      iv. Margins, font, type size
      v. Abstract format
      vi. Word limits
      vii. Reference style and limits
      viii. Figures and tables
   b. Succinct, focused, nonrepetitive – Economy of words
   c. Common weaknesses to avoid (original research) – In manuscript preparation, not underlying research
      i. Abstract does not match body of manuscript
      ii. Introduction fails to sell the importance and relevance of the objective(s)
      iii. Poorly worded or unclear study objective(s)
      iv. Methods without results; results without methods
      v. Unnecessary duplication of results in tables and body of manuscript
      vi. Rambling, unfocused discussion
      vii. Failure to adequately address weaknesses of the study (they all have them)
      viii. Conclusions that reach beyond the data
      ix. Several tables that can be consolidated
      x. Unneeded figures (usually, simplistic presentations of data that can be presented parenthetically)
     xi. Failure to cite the literature correctly or according to journal’s requirements
     xii. Exceeding word count limits – Both in abstract and in manuscript
4. Citation manager software (EndNote, Reference Manager, RefWorks, etc.)
   a. May contain templates consistent with many biomedical journal requirements
   b. Actively cite the literature while writing
   c. Automatically resort the references during revisions
   d. Direct download of citations during literature searches
   e. Can include PDF files and your notes in citation file
   f. Develop libraries of commonly used citations
   g. Overall, can ease the writing and formatting process for publication
5. Submission of the manuscript
   a. Greatly simplified by Web-based submission
   b. Follow download instructions carefully.
   c. Cover letter
      i. Communication to the editor
      ii. Declare category of publication (though now part of submission template).
      iii. Indicate corresponding author (also part of template).
      iv. Some journals encourage a brief explanation of why paper is being submitted to the journal – relevance, importance, target audience. However, this is declining.
   d. Copyright release
      i. Electronic methods are increasingly used.
      ii. Each author must sign/submit.
      iii. Provide assurance that part or all of content has not been previously published and is not currently under consideration by another publisher. Usually excludes abstracts
6. Conflicts of interest: All authors must provide conflict of interest statements.

7. Review and revision process
   a. Editorial review
      i. The editor or a member of the editorial board may review initially.
      ii. Looking for relevance to journal, general quality of the manuscript, composition, and readability
      iii. Failure to get past the editor’s desk results in rejection.
   b. Peer or scientific review
      i. Sent to peers with content expertise for review and critique
      ii. Typically, sent to two to five reviewers (varies by journal and internal criteria)
      iii. Most journals request a review to be returned in 10–30 days.
      iv. Reviewers are asked to focus on the quality of the research or content and importance (including relevance to the journal’s audience), not copyediting details.
      v. Typical recommendation categories are as follows: Accept, Minor Revision, Major Revision, or Reject.
      vi. Reviewers provide detailed comments and critique to be shared with the authors, and often, comments to the editor that are not shared with the authors
   c. Editor response
      i. The editor (or designee) uses reviewer input to formulate a response to the authors.
      ii. If minor or major revision is requested, details of the required revisions are provided, often including the reviewers’ specific comments. The editor often adds requests for revision.
      iii. A timeline for response is included. If not resubmitted by deadline, opportunity to publish is usually surrendered.
      iv. A rejection decision is usually final.
   d. Revision process
      i. The authors need to respond to each request. The authors need not agree with each request, but each must be responded to and defended if not revised as advised.
      ii. Common format is a letter to the editor restating each request, with the response to the request immediately following.
      iii. A manuscript incorporating all revisions is submitted with the letter. Some journals request a “track changes” version of the manuscript to ease the re-review process.
      iv. All authors must review the revisions and indicate their agreement with all changes.
      v. Revised manuscripts are often returned to the original peer reviewers for a second review, especially with major revisions. That may result in another round of revision and review.

8. After acceptance
   a. At some point (timelines vary by journal), the corresponding author will receive the galley proof. This is a copyedited, typeset version of the paper that will look like the final publication.
   b. The galley proof will come with comments that must be addressed.
   c. Deadline for galley submission may be as short as 48 hours.
   d. The galley proof must be read very carefully and compared with the manuscript to make sure copyediting changes do not affect the meaning, tables are formatted as intended, figures and legends are correct, and the references are in the correct order and format (there are frequent errors with references – better with electronic confirmation).
   e. Ideally, all authors should review the galley proof; however, that may not be practical. All authors should approve a review by the corresponding author.

9. Timelines (highly variable by journal)
   a. Important competitive metric for biomedical journals
   b. From submission to response – Can be 2–4 months
c. Reply to decision – Can be 1 week to 3 months (depends on whether re-review occurs)
d. Decision to publication – Can be another 3–6 months
e. Sometimes an important consideration when selecting a journal – Manuscript can be tied up
   for long periods.
f. Open-access and e-journals have a speed advantage – May have fees

D. Abstracts and Scientific Presentations
   1. Selecting a meeting
      a. Quality and relevance of presentation
      b. Prestige of the meeting relative to authors’ career goals
      c. Membership and desire to support an organization
      d. Availability of travel funding
      e. Priorities of key coauthors
      f. Location of the meeting (unfortunate but true…)
      g. “Encore” presentations permitted
   2. Developing the abstract
      a. Succinct and effective
         i. Greatest impact in the least space – No unnecessary words
         ii. Use of identifiable abbreviations, but not to excess
         iii. If allowed, use of tables to present results (many disallow)
      b. Title must be brief, be on point, and capture the reader.
      c. Clearly stated purpose/objective (minimize introductory material). May need to limit to
         primary objective
      d. Methods and analysis are concise but of adequate detail to permit review.
      e. Results may need to be limited to the primary end point.
      f. Conclusion is a single brief sentence directly tied to the objective(s).
      g. Must meet word count limit (tricks and tips depend on organization)
      h. Revise, revise, revise with input from all authors – Eliminate unnecessary words and content.
         i. Some organizations may permit students or residents to submit abstracts without data, but that is
            uncommon (and not advisable).
   3. Abstract submission
      a. Greatly simplified by electronic submission
      b. Must meet deadline – Most Web sites shut down after deadline.
      c. Must carefully follow online instructions
      d. Word limit usually controlled by software – Difficult to cheat
      e. If platform presentations are an option, usually need to indicate consideration for platform, if that
         is the goal
   4. Platform versus poster
      a. Platform slots are intended for presentations that have high-quality content and that are relevant
         and effective.
      b. Usually based on reviewer scores
      c. Many organizations may accept a platform submission as a poster presentation if it was not scored
         high enough to be accepted as a platform; others may just reject it.
      d. Authors must be realistic concerning the quality of their abstract when considering submission for
         a platform, given the meeting, audience, and likely competing research.
   5. Review process
      a. Typically reviewed by three to five reviewers
      b. Review uses relatively limited scoring criteria, given the brevity of an abstract, combined with
         a recommendation of accept or reject.
c. Reviews are compiled into an overall score, and recommendation is provided to the authors.
d. There is no opportunity or time for revision and resubmission. Decisions are final.
e. Reviewer comments may or may not be shared with the authors.
f. Platform versus poster decisions may also be an outcome of the review process.
g. Review process may also be used for determining abstracts to be considered for awards.

6. Poster presentation
   a. Format (size and/or style) is often specified by the organization.
   b. Many tips and tricks are available for developing effective posters. Some key issues are:
      i. Avoid wordy posters – Nobody wants to read them.
      ii. Use tables, figures, and concise bullet lists as much as possible.
      iii. Use a font size that can be easily read from about 5–6 feet (e.g., 24 point or greater).
      iv. Ease of readability is more important than aesthetics – Consider dark letters on a white background.
      v. Use a logical flow from left to right and from the introduction to the conclusions.
      vi. Unless required, do not reprint an abstract on a poster – It is unnecessary and uses valuable space.
      vii. Most institutions have requirements to use logos – Comply with the “logo police” or run into last-minute challenges with printing.
      viii. Big print formats have eased the production and transport of posters; however, review proofs carefully for content changes before printing.
      ix. Commercial printers who will ship to the meeting site are a great alternative if last-minute challenges develop.
   c. If there are walk-rounds, be fully prepared to present the key points of your poster in about 5 minutes to allow time for questions. It is important to confirm the time allotment set by each organization because this may vary.
   d. Consider having small, legible versions of poster at the poster session for those who want a copy to review. In addition, have business cards available.
   e. Plan to have at least one author stay for the duration of the poster session.
   f. Virtual poster sessions are very similar in submission, review, and acceptance process. Presentations are virtual and may involve the abstract only or a more detailed “poster,” with interactive sessions scheduled with either random viewers or scheduled peer reviewers.

7. Platform presentation
   a. Considered an honor of recognition for high-quality, innovative, or impactful work
   b. Presentation is usually limited to 10 minutes, with 5–10 minutes left for questions.
   c. Typical format is a brief slide presentation focused on the most important aspects of the work. Time does not allow a detailed description of all aspects of the project.
   d. May involve peer review/judging if awards are involved
   e. Feedback in verbal or written format is often provided to the presenter.
   f. May also require a poster presentation during one of the poster sessions (varies by organization)
   g. Repeated practice with coauthors, peers, and colleagues, followed by critique and revision, is highly recommended.

E. Participation in the Peer-Review Process
   1. Reasons to participate
      a. Professional obligation
         i. Authors “take” from the process, so they should “give back.”
         ii. Contribute expertise to improving the biomedical literature.
      b. Professional service to an organization or journal
c. Recognition, tenure, and promotion – Professional service
d. Some enjoy reviewing the “raw” product of the biomedical literature.
e. Educational opportunity for trainees

2. Reasons to decline invitation to participate
   a. Conflict of interest
      i. Former trainee is author
      ii. Collaborator or coworker is author
      iii. Financial conflict of interest with the subject
   b. Lack of expertise in the subject matter
   c. Lack of time to meet the deadline because of other commitments

3. Getting on the list of potential reviewers
   a. Publishing in the journal
   b. Being recommended by a peer to the editor
   c. Being a recognized expert (nationally, internationally) in a relevant field
   d. Publishing in the field in peer journals
   e. Volunteering through the journal’s Web site or a general call for reviewers – Not an option for all journals

4. Review process
   a. Invitation
      i. Normally sent by e-mail with a response link
      ii. Includes an abstract of the paper and often identifies the authors and institution
      iii. Deadline for submission of review is provided so that reviewer can gauge availability of time.
      iv. Usually a short timeline to respond to invitation
      v. If decline, most journals ask for recommendation of a peer to review (building their reviewer database)
      vi. Once accepted, online access to content is provided (manuscript, review form, instructions to reviewers, etc.).
   b. Tips for the review
      i. Biomedical literature review skills are beyond the scope of this chapter.
      ii. Review is expected to focus on scientific quality and importance of the paper.
      iii. Grammar, sentence structure, and word choices are normally better handled by the copyeditors because of their greater expertise, unless it is critical to the scientific meaning of the paper.
      iv. Connect the dots to find common errors (original research and systematic reviews).
         (a) Objective/purpose and conclusions must match.
         (b) Methods must be directly related to the objective/purpose.
         (c) Methods must be valid, widely accepted, and/or state-of-the-art, including statistical handling of the data.
         (d) Compliance with widely accepted guidelines according to study design should be present (e.g., CONSORT, STROBE, PRISMA, STARD).
         (e) Every method described must have results reported.
         (f) Every result reported has to be tied to a method description.
         (g) Conclusions must be limited to and supported by the study results.
         (h) A fair and complete discussion of study weaknesses must be presented.
   c. Recommendation to editor
      i. Reason for rejection
         (a) Fatal flaw – No amount of rewriting or reanalysis of the data will make it worthy of publication – Poor-quality research or serious errors in methods
         (b) Extent of revision required is so extensive that it is equivalent to starting over
(c) Valid research that is not important, either because of lack of relevance to the target journal or because reporting a well-known finding with no new information
(d) Re-publication of all or an extensive portion of the content (may be justifiable [e.g., portions of the methods section when it is a legitimate secondary publication of a previously published study])
(e) Serious ethical violations

ii. Revision (minor or major revision)
   (a) Usually for publications believed to have adequate quality and importance, but there are weaknesses that need to be corrected or addressed
   (b) Major revisions usually require a second review – The journal may ask whether you will serve as a continuing reviewer, or it may be assumed.
   (c) Minor revisions may not require re-review; depends on reasons for revision
   (d) Most journals will share the recommendation to the authors, together with the other reviewers’ comments to author – Can be very instructive for future reviews

iii. Accept (without revision)
   (a) Unusual with first submission and review
   (b) Is a truly exceptional manuscript

d. Submission of the review
   i. Electronic submission according to the journal
   ii. Format is often dictated by the journal.
   iii. Meet the deadline – Delayed reviews prolong the timeline and create workflow challenges for the journal.

iv. Comments to the authors
   (a) Should be clear, concise, and factual. Should not be abrasive or a personal attack
   (b) Comments should be clearly referenced to the location in the manuscript (e.g., line number, page/paragraph/sentence).
   (c) Are usually anonymous, but some journals provide option to be identified
   (d) For manuscripts with a fatal flaw, comments can be limited to that flaw.

v. Comments to the editor
   (a) Should not require extensive comments beyond those to the authors
   (b) Is an opportunity to further explain the rationale for the recommendation or ethical concerns
   (c) Are attributed to the reviewer, but not shared with the authors

vi. Miscellaneous
   (a) Journal may ask whether you believe an editorial is needed, and a proposed author
   (b) There may be a question about concerns with ethics, animal treatment, or human subjects’ protection.

5. Re-review process
   a. Response content
      i. Cover letter detailing response to comments/requests of editor and reviewers
      ii. Revised manuscript (with or without “track changes”)
   b. Review process
      i. Should restrict comments to responses in first review. Finding an entirely new set of criticisms to original content is considered “not playing fair.”
      ii. Confirm that the revisions have not materially altered the meaning of other parts of the manuscript.
      iii. If the authors have argued not to make a recommended revision, evaluate the validity of the response.
iv. Recommendations are the same options as for the primary review.

v. If major revisions are still needed, the editor may decide to reject, or it may undergo another round of reply and review.

vi. Deadline for the review is often shorter than for the primary review.

Table 1. Critical Care Pharmacy Services

<table>
<thead>
<tr>
<th>Critical Care Pharmacist Activities</th>
<th>Desirable</th>
<th>Optimal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fundamental</strong></td>
<td>In addition to providing fundamental activities, the ICU pharmacist:</td>
<td>In addition to providing fundamental and desirable activities, the ICU pharmacist:</td>
</tr>
<tr>
<td>• Dedicates time to ICU patients with few commitments outside the ICU</td>
<td>• Regularly participates in multidisciplinary patient care rounds</td>
<td>• Assists physicians and other team members during family discussions concerning treatment options</td>
</tr>
<tr>
<td>• Prospectively reviews all medication orders for appropriateness</td>
<td>• Maintains knowledge of primary literature relevant to ICU therapeutics</td>
<td>• Provides accredited educational programming for medical, nursing, and pharmacy professionals and students on ICU-related drug therapy topics</td>
</tr>
<tr>
<td>• Prospectively reviews all nutritional orders in collaboration with clinical dietitians</td>
<td>• Completes a comprehensive medication reconciliation for all ICU admissions, including identification and management of potential medication-related admissions</td>
<td>• Participates in teaching ACLS</td>
</tr>
<tr>
<td>• Leads process improvement to identify, prevent, and manage ADEs</td>
<td>• Provides formal nutritional consultation in collaboration with clinical dietitians</td>
<td>• Develops residencies and fellowships in critical care pharmacy</td>
</tr>
<tr>
<td>• Uses the medical record for communication and documentation</td>
<td>• Maintains ACLS (or PALS) certification and participates in code team responses</td>
<td>• Develops and delivers critical care training programs for pharmacists and pharmacy technicians</td>
</tr>
<tr>
<td>• Pharmacokinetic monitoring of targeted drugs</td>
<td>• Provides didactic education to health care students on ICU pharmacotherapeutic topics</td>
<td>• Promotes and educates concerning the importance of critical care pharmacists as members of the ICU team to several audiences, including the lay public and other health care providers</td>
</tr>
<tr>
<td>• Provides drug information, including IV compatibilities, and maintains current tertiary drug references</td>
<td>• Participates in experiential education and training for pharmacy students, residents, and fellows as applicable</td>
<td>• Evaluates the impact of guidelines and protocols related to critical care drug therapy on patient outcomes</td>
</tr>
<tr>
<td>• Provides drug therapy education to ICU team members</td>
<td>• Coordinates the development and implementation of guidelines and protocols for ICU drug therapy</td>
<td>• Incorporates pharmacoeconomic principles into the evaluation of pharmacy services and new drugs in the ICU</td>
</tr>
<tr>
<td>• Participates in ADE reporting internal and external (e.g., the FDA) to the institution</td>
<td>• Documents the value of clinical pharmacist activities using accepted methods to quantify clinical significance and cost</td>
<td>• Proactively develops, prioritizes, and promotes new pharmacy programs or services in the ICU</td>
</tr>
<tr>
<td>• Documents clinical activities</td>
<td>• Coordinates the development and implementation of guidelines and protocols for ICU drug therapy</td>
<td>• Secures funding for research</td>
</tr>
<tr>
<td>• Serves as a liaison to the ICU team as it pertains to drug use policies, procedures, and standards</td>
<td>• Develops residencies and fellowships in critical care pharmacy</td>
<td></td>
</tr>
<tr>
<td>• Contributes to internal communications (e.g., newsletters, monographs) related to ICU drug use</td>
<td>• Provides didactic education to health care students on ICU pharmacotherapeutic topics</td>
<td></td>
</tr>
<tr>
<td>• Develops, implements, and maintains drug use policy related to the ICU</td>
<td>• Participates in experiential education and training for pharmacy students, residents, and fellows as applicable</td>
<td></td>
</tr>
<tr>
<td>• Collaborates with other ICU team members &amp; hospital and departmental administration to meet regulatory and accreditation compliance standards</td>
<td>• Coordinates the development and implementation of guidelines and protocols for ICU drug therapy</td>
<td></td>
</tr>
<tr>
<td>• Serves as a consultant to hospital committees (e.g., P&amp;T) on ICU drug therapy–related issues</td>
<td>• Documents the value of clinical pharmacist activities using accepted methods to quantify clinical significance and cost</td>
<td></td>
</tr>
<tr>
<td>• Identifies and implements measures to ensure cost-effectiveness and cost-containment for drug therapy in the ICU</td>
<td>• Coordinates the development and implementation of guidelines and protocols for ICU drug therapy</td>
<td></td>
</tr>
</tbody>
</table>
Table 1. Critical Care Pharmacy Services (continued)

<table>
<thead>
<tr>
<th>Critical Care Pharmacist Activities</th>
<th>Desirable</th>
<th>Optimal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fundamental</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Participates in quality assurance and quality improvement initiatives related to ICU pharmaceutical care</td>
<td>• Contributes to the critical care pharmacy and medical literature</td>
<td>• Reports results of research and program analyses at regional and national meetings</td>
</tr>
<tr>
<td>• Pharmacy information system that maintains medication profile with basic decision support tools (allergy checking, drug interactions, dosing, etc.) and interfaces with laboratory results reporting</td>
<td>• Provides non–patient care service on hospital committees and through the provision of educational in-services</td>
<td>• Publishes in peer-reviewed pharmacy and medical literature</td>
</tr>
<tr>
<td>• If manual medication records, appropriate quality assurance standards must be in place</td>
<td>• Computerized hospital information system that includes medication use system fundamental requirements and additional integrated functions</td>
<td>• Hospital information system that includes computerized physician order entry and interfaces with clinical information system</td>
</tr>
<tr>
<td>• Unit-of-use drug distribution system</td>
<td>• Computerized medication administration records</td>
<td>• ICU satellite pharmacy is operational 24/7</td>
</tr>
<tr>
<td>• Large- and small-volume sterile products prepared by pharmacy</td>
<td>• ICU satellite dispensing pharmacy operational at least 40 hours/week</td>
<td>• Clinical pharmacy services are available 24/7</td>
</tr>
<tr>
<td>• Pharmacy-managed investigational drug service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pharmacy is represented on the institutional review board or scientific review committee</td>
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</table>

ACLS = advanced cardiac life support; ADE = adverse drug event; FDA = U.S. Food and Drug Administration; ICU = intensive care unit; IV = intravenous; PALS = pediatric advanced life support.

Box 1. Attributes of Successful Mentor-Protégé Relationships

<table>
<thead>
<tr>
<th>Mentor Qualities</th>
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<tbody>
<tr>
<td>Strong interpersonal skills</td>
</tr>
<tr>
<td>Technical competence/expertise</td>
</tr>
<tr>
<td>Knowledge of organization and profession</td>
</tr>
<tr>
<td>Status/prestige within the organization and profession</td>
</tr>
<tr>
<td>Willingness to be responsible for someone else’s growth and development</td>
</tr>
<tr>
<td>Ability to share credit</td>
</tr>
<tr>
<td>Patience</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Protégé Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-perceived growth needs</td>
</tr>
<tr>
<td>A record of seeking/accepting challenging assignments</td>
</tr>
<tr>
<td>Receptivity to feedback and coaching</td>
</tr>
<tr>
<td>Willingness to assume responsibility for own growth and development</td>
</tr>
<tr>
<td>Ability to perform in more than one skill area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relationship Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary</td>
</tr>
<tr>
<td>Mutual benefits perceived and derived from the relationship</td>
</tr>
<tr>
<td>No conflicts of interest/competition between mentor and protégé</td>
</tr>
<tr>
<td>Not confined to professional or business interests</td>
</tr>
</tbody>
</table>

REFERENCES

Standards

Training

Continuing Professional Development
Dissemination of Knowledge in Critical Care
ANSWERS AND EXPLANATIONS TO SELF-ASSESSMENT QUESTIONS

1. **Answer: C**
The preferred and recommended pathway to training in critical care pharmacy is a PGY1 pharmacy practice residency, followed by a PGY2 critical care residency. This is especially true for the provision of desirable-to-optimal pharmacy services in ICUs providing level I and II services. Critical care fellowship training is an option that would also be considered preferred; however, the intent is for a greater research and academic focus. The demands of the workplace often exceed the supply of PGY2-trained critical care pharmacists. And although several alternative pathways are available to gaining experience, knowledge, and skills in critical care pharmacy have been successful, these are not considered preferred pathways, given the high degree of variability and inconsistency of resources to support these pathways.

2. **Answer: A**
According to the position paper prepared and published by ACCP and SCCM defining pharmacy practice elements for fundamental, desirable, and optimal services, the publication of research and program evaluations in the medicine and pharmacy literature is an expectation of the clinical pharmacist providing optimal services. The other elements listed as options for this question would be considered desirable, but they are not uniquely preferred to meet the definition of an optimal critical care pharmacy practice.

3. **Answer: C**
Effective communication by teams is most tightly linked to mutual trust. Open and frank communication and the willingness to state your beliefs and challenge those of your teammates require a high level of mutual trust to keep the relationship and conversation professional and non-personal. Without mutual trust, communication can be more guarded, ineffective, and political. Even though the principles of team-based health care are all interdependent, effective communication is most tightly linked to mutual trust.

4. **Answer: B**
Although structured mentor-mentee programs can be successful, there is a greater probability of success with relationships that are voluntary and that evolve from mutual interests and a perceived opportunity to have a mutually beneficial relationship. Mentors must be willing to serve in this role, which can require a great deal of time and effort; they wish to work with mentees who are highly motivated with a track record of accepting challenges. Moreover, mentees must be responsive to feedback and teaching. Mentees seek out mentors with shared interests, a record of sharing their time and expertise, and the necessary prestige and position in the organization to promote and create opportunities for them. In an arranged relationship, it is less likely that all of these factors will come together to lead to a highly productive relationship. Mentoring relationships can exist both within and outside formal training programs like residencies and fellowships, and clinical pharmacists will often have several mentors through the different stages of their career to address different and evolving needs as they mature in their practice and scholarly activities. Finally, although mentored training programs are a viable option for the nonconventional training of critical care pharmacists, they are not an exclusive pathway.

5. **Answer: D**
Continuing pharmacy education should be included as an important strategy in a CPD PDP. The self-directed learner should select CPE programs that are relevant to their PDP, incorporate active learning strategies, are preferably curricular based, and are free of commercial or other bias. Continuing professional development is not an alternative to CPE; rather, it is an individualized, self-directed, continuous, and iterative process intended to address specific learning objectives developed over time by the pharmacist-learner. Continuing pharmacy education is an important component of this process, but it should not be the only learning strategy.

6. **Answer: C**
The recently published *Standard of Care for Clinical Pharmacy*, which includes a standardized process of care endorsed by all major pharmacy practitioner organizations, is intended to be applicable to any practice environment, regardless of acuity or complexity. Like other professions (e.g., medicine, nursing, physical therapy), clinical pharmacy must define and apply standards of care to create consistent expectations by all stakeholders. It is often argued that clinical pharmacists
in different complex or unique practice environments cannot possibly conform to a standard of care; however, a thoughtful review of the *Standard of Care for Clinical Pharmacy* reveals that it can be easily incorporated into any practice environment.

7. **Answer: A**

Clinical pharmacists practicing in the ICU have long had a broad educational role that includes students and residents in their own profession, residents and students in other professions, and colleagues on the critical care team, as well as coworkers in the pharmacy department among the target audiences. Clinical pharmacists have employed many different strategies and techniques to teach these diverse audiences across different learning environments. Although there are exceptions, the frequent or regular inclusion of patients and families in their educational activities is a more recent development. Many factors have led to this change, including a greater focus on patient- and family-centered care, greater inclusion of patients and families as members of the team, increased demand for inclusion by patients and families, inclusion of patient satisfaction scores in pay-for-performance metrics (including pain control and understanding of medications), and patients being more awake and interactive in the ICU with changes in sedation goals. It is expected that clinical pharmacists in the ICU will increasingly be directly involved in patient and family discussions and education.

8. **Answer: B**

In the context of CPD, episodic opportunities for reflection refer to spontaneous, unscheduled events that contribute to the self-assessment of learning and training needs that can be incorporated into the overall PDP. Scheduled reflection usually involves a predictable cycle like performance evaluations, annual self-evaluations, peer feedback as part of annual assessment, or a decision to schedule reflection around some set anniversary (e.g., hire dates, birthdays, end of academic year). Examples of opportunity for episodic reflection may include the challenges of managing a very difficult case, post-event debriefings for code responses, experiences with a difficult student or resident, or a request to develop a treatment guideline that is outside your usual area of expertise.

9. **Answer: B**

A methodological flaw that results in the collection and reporting of incorrect data would be considered a “fatal flaw” that no amount of rewriting or reanalysis could correct. Poor writing can be corrected with revision by the authors or during copyediting, but if the study were well conducted and had value, it would not necessarily be a reason to recommend rejection. Disagreements concerning statistical analysis are not uncommon; however, the authors may have a valid explanation or can revise the statistical analysis if it is not a major departure from the original intent of the study. It is also not uncommon that the abstract disagrees in some way with the body of the manuscript, and there is an opportunity to correct that during revisions.