

## **CONTENT OUTLINE FOR THE CRITICAL CARE PHARMACY CERTIFICATION EXAMINATION**

The following domains, tasks and knowledge statements were delineated by the BPS Critical Care Practice Analysis Taskforce and validated through a role delineation study. The proportion of examination items allotted to each domain was determined through analysis and discussion of the results of the role delineation study by the BPS Critical Care Practice Analysis Taskforce and approved by the BPS Board of Directors.

Each of the major areas/domains of Critical Care Pharmacy practice noted below will be tested. Questions will not be grouped by domain on the exam. Rather, items testing each domain are distributed throughout the total examination. Please note this examination will **SAMPLE** a candidate's knowledge rather than trying to test all of his/her knowledge. Examination items will address problems and situations reflective of the full range of practice.

### **Domain 1: Clinical Skills and Therapeutic Management (66% of exam)**

#### **Tasks**

*Tasks related to the comprehensive management of a critically ill patient including collecting, interpreting, and integrating pertinent clinical data; and designing, implementing, monitoring, and modifying patient-specific plans of care for critically ill patients in collaboration with the healthcare team.*

- 1.1 Collect and organize the medical history of a critically ill patient including history of present illness, past medical history, past surgical history, social history, family history, and allergies.
- 1.2 Perform comprehensive review and assessment of a critically ill patient's current and past medications, including prescription, over the counter (OTC), and complementary and alternative medicines.
- 1.3 Perform or obtain physical examination results and other pertinent assessments (e.g., pain, sedation, delirium) to comprehensively assess a critically ill patient's physiological condition and severity of illness.
- 1.4 Collect and organize relevant patient vital signs and physical exam findings for a critically ill patient.
- 1.5 Collect and organize relevant data from laboratory studies (e.g., chemistry, microbiology, pathology, hematology, serum drug concentration), imaging studies, procedures (e.g., biopsies, drain placements, therapeutic taps, bronchoscopy), and advanced critical care monitoring (e.g., ICP measurements, hemodynamic monitoring parameters, mechanical ventilator settings, ECGs).
- 1.6 Interpret, analyze, and integrate collected information for a critically ill patient.
- 1.7 Identify and prioritize current or potential patient-specific medical, medication, and nutrition-related problems for a critically ill patient.
- 1.8 Design, recommend and implement therapeutic regimens for a critically ill patient utilizing patient-specific data and best available evidence.
- 1.9 Collaborate as a member of a multidisciplinary team to establish and prioritize patient-specific therapeutic goals and plans for a critically ill patient.
- 1.10 Design and recommend a monitoring plan to assess a critically ill patient's response to therapeutic regimens and progress toward therapeutic goals.
- 1.11 Monitor a critically ill patient and evaluate therapeutic and adverse outcomes.
- 1.12 Modify plans of care for a critically ill patient based on therapeutic and adverse outcomes, and progress toward therapeutic goals.

- 1.13 Facilitate the administration of medications to critically ill patients including assessment of available administration routes, intravenous compatibilities, stabilities, and available medication delivery technologies (e.g., smart pumps, patient controlled analgesia, nebulizers).
- 1.14 Participate in the management of the medical emergencies and resuscitation events.
- 1.15 Facilitate continuity of care by communicating pertinent patient information to healthcare professionals within the ICU and when transitioning into or out of the ICU.
- 1.16 Document direct patient care activities as appropriate.

**Knowledge of:**

- k1.1 Diagnosis, pathophysiology, epidemiology, risk factors, and treatment of conditions in critically ill patients in the following therapeutic areas:
  - a) Pulmonary
  - b) Cardiovascular
  - c) Neurology and Neurological Injuries
  - d) Psychiatry
  - e) Renal
  - f) Hepato-Gastrointestinal
  - g) Immunology
  - h) Endocrine
  - i) Hematology
  - j) Infectious diseases
  - k) Toxicology
  - l) Surgery
- k1.2 Sedation, analgesia, delirium, and neuromuscular blockade
- k1.3 Nutrition support in the critically ill patient
- k1.4 Alterations of pharmacodynamics and pharmacokinetics in the critically ill (e.g., effects of hypothermia, mechanical ventilation, volume resuscitation, organ dysfunction)
- k1.5 Drug interactions and adverse drug events common in critical care
- k1.6 Pharmacoeconomics (e.g., cost effectiveness, cost minimization)
- k1.7 Sepsis/SIRS
- k1.8 Advanced Cardiac Life Support (ACLS) principles
- k1.9 Devices commonly utilized in critical care (e.g., balloon pump, left ventricular assist device [LVAD], cooling devices, extracorporeal membrane oxygenation [ECMO])
- k1.10 Procedures commonly performed in critical care (e.g., bronchoscopy, central line placements, intubation, therapeutic hypothermia)
- k1.11 Renal replacement therapy
- k1.12 Mechanical ventilation principles and monitoring techniques
- k1.13 Critical care monitoring techniques (e.g., hemodynamic, neurologic, cardiovascular)
- k1.14 Impact of alterations in anatomy and physiology due to trauma, surgery or congenital causes on medication therapy
- k1.15 Routes of administration for medications in critically ill patients
- k1.16 Routes of administration for nutrition (enteral vs. parenteral) and alterations in absorption of nutrients in critically ill patients
- k1.17 Preventative and supportive care measures used in the care of critically ill patients
- k1.18 Fluid, electrolyte, and acid/base management in ICU patients
- k1.19 Agents used for acute volume resuscitation and hemostasis (e.g., crystalloids, colloids, blood products, hemostatic agents)

k1.20 Parenteral vasoactive and inotropic agents k1.21

End of life care

k1.22 Impact of critical illness on pre-existing conditions (e.g. endocrine disorders, cardiovascular diseases, infectious diseases, respiratory diseases)

k1.23 Application of evidence-based critical care literature and clinical practice guidelines in designing a patient-specific plan of care

k1.24 Outcome indicators for pharmacotherapy of disease states common to ICU patients k1.25

Documentation processes used for critical care pharmacy services

**Domain 2: Practice Administration and Development. (15% of exam)**

**Tasks**

*Tasks related to advancing critical care pharmacy practice establishing implementing, and monitoring systems and policies to optimize the care of critically ill patients.*

- 2.1 Develop, promote and expand pharmacy services to optimize drug-related outcomes for critically ill patients.
- 2.2 Develop and implement institutional policies and guidelines (including disease and drug therapy protocols, critical care pathways, formulary proposals) to meet identified needs and facilitate the care of critically ill patients.
- 2.3 Monitor and evaluate compliance with, and impact of, policies and guidelines (e.g., institutional, evidence based).
- 2.4 Establish and sustain collaborative professional relationships with other members of the interdisciplinary critical care team.
- 2.5 Justify and document clinical and financial value of critical care pharmacy services.
- 2.6 Perform quality improvement activities aimed at enhancing the safety and effectiveness of medication-use processes in the critical care area.
- 2.7 Promote the role and optimal use of critical care pharmacists to key stakeholders.

**Knowledge of:**

- k2.1 Needs assessment techniques (e.g., gap analysis, medication use survey, best practices survey)
- k2.2 Metrics for evaluating quality of critical care pharmacy services (e.g., lengths of ICU stay, mortality, cost-effectiveness)
- k2.3 Quality assurance and process improvement methods
- k2.4 Evidence-based literature supporting the value of critical care pharmacy
- k2.5 Application of evidence-based critical care literature in designing institutional guidelines k2.6  
Communication strategies
- k2.7 Resources (e.g., financial, technological, human) necessary to care for critically ill patients
- k2.8 Medication safety principles pertinent to patients requiring care in the ICU

**Domain 3: Information Management and Education. (19% of exam)**

**Tasks**

*Tasks related to retrieval, generation, interpretation, and dissemination of knowledge related to critical care pharmacy, and the education of healthcare providers and trainees.*

- 3.1 Educate healthcare professionals and other stakeholders concerning issues related to the care of critically ill patients.
- 3.2 Educate critically ill patients and caregivers on issues related to medications and nutrition support.
- 3.3 Provide critical care education and training for practicing pharmacists, fellows, residents, student pharmacists, or students in other health professions.

- 3.4 Mentor pharmacists, fellows, residents, or students in critical care pharmacy practice.
- 3.5 Participate in continuous professional development related to critical care pharmacy practice (e.g., professional organizations, continuing education, clinical pharmacy networks).
- 3.6 Retrieve and critically evaluate biomedical literature with regard to study design methodology, statistical analysis, and applicability of study results in the critical care population.
- 3.7 Contribute to the critical care body of knowledge (e.g., participate in research, deliver poster/platform presentations, publish, participate in the peer review process).

**Knowledge of:**

- k3.1 Principles and methods of educating pharmacists, fellows, residents, students, and other healthcare professionals
- k3.2 Techniques for educating critically ill patients/caregivers
- k3.3 Published documents from professional societies (e.g., American Society of Health- System Pharmacists [ASHP], American College of Clinical Pharmacy [ACCP], Society of Critical Care Medicine [SCCM]) regarding the education and training of critical care pharmacists
- k3.4 Research design, methodology, and statistical analysis
- k3.5 Clinical application and limitations of published data and reports
- k3.6 Regulatory/IRB requirements relative to conducting critical care research
- k3.7 Continuing professional development opportunities in critical care (e.g., professional organization membership, committee involvement, sources of continuing education, mentorship)
- k3.8 Mentorship principles, techniques, and strategies
- k3.9 Medical literature publication and review process
- k3.10 Opportunities for disseminating critical care knowledge and scholarly activity (e.g., presentations, manuscripts, newsletters, abstracts, posters)