

# ***Exam Blueprint and Specialty Competencies***

## **Introduction – Blueprint for the Critical Care (Adult) Nursing Certification Exam**

The primary function of the blueprint for the CNA Critical Care (Adult) Nursing Certification Exam is to describe how the exam is to be developed. Specifically, this blueprint provides explicit instructions and guidelines on how the competencies are to be expressed within the exam in order for accurate decisions to be made on the candidates' competence in critical care (adult) nursing.

The blueprint has two major components: (1) the content area to be measured and (2) the explicit guidelines on how this content is to be measured. The content area consists of the list of competencies (i.e., the competencies expected of fully competent practising critical care (adult) nurses with at least two years of experience), and the guidelines are expressed as structural and contextual variables. The blueprint also includes a summary chart that summarizes the exam guidelines.

### **Description of Domain**

The CNA Critical Care (Adult) Nursing Exam is a criterion-referenced exam.<sup>1</sup> A fundamental component of a criterion-referenced approach to testing is the comprehensive description of the content area being measured. In the case of the Critical Care (Adult) Nursing Certification Exam, the content consists of the competencies of a fully competent practising critical care (adult) nurse with at least two years of experience.

This section describes the competencies, how they have been grouped and how they are to be sampled for creating an exam.

### **Developing the List of Competencies**

The final list of competencies was updated and approved by the Critical Care (Adult) Nursing Certification Exam Committee.

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<sup>1</sup> Criterion-referenced exam: An exam that measures a candidate's command of a specified content or skills domain or list of instructional objectives. Scores are interpreted in comparison to a predetermined performance standard or as a mastery of defined domain (e.g., percentage correct and mastery scores), independently of the results obtained by other candidates (Brown, 1983).

## **Assumptions**

In developing the set of competencies for critical care (adult) nurses, the following assumptions, based on current national standards for nursing practice, were made:

### **Environment**

- The health-care facility provides a designated physical environment conducive to the 24-hour delivery of safe and comprehensive care of critically ill adult patients and their families.
- The critical care (adult) environment may exist outside the specifically designated area to adapt to the dynamic needs of the patient population.
- The critical care (adult) environment is characterized by complexity, unpredictability, ambiguity and ethical challenges.
- The critical care (adult) environment necessitates teamwork, interprofessional collaboration, use of technology, quality improvement and safety.
- The critical care (adult) environment promotes culturally sensitive care and social justice.

### **Nurse**

- The critical care (adult) nurse practises according to the current Standards for Critical Care Nursing Practice from the Canadian Association of Critical Care Nurses.
- The critical care (adult) nurse is a knowledgeable, educated and skilled health-care professional who provides care to a critically ill adult population in collaboration within the interprofessional team.
- The critical care (adult) nurse is a leader and pivotal member of the interprofessional health-care team who coordinates and provides timely assessment, care, education, discharge and follow-up.
- The critical care (adult) nurse possesses and uses clinical reasoning to recognize and respond in a timely manner to rapidly changing patient, family and environmental situations.
- The critical care (adult) nurse is an advocate for the patient, family and health-care team in ethically, emotionally and morally challenging situations.
- The critical care (adult) nurse maintains professional competence by engaging in reflective practice, self-assessing learning needs and participating in educational activities and research.
- The critical care (adult) nurse prioritizes and incorporates evidence-informed interventions in order to ensure patient safety in all aspects of critical care.

**Patient and Family**

- The patient is the person experiencing an actual or potential life-threatening illness.
- The family is defined by the patient.
- The patient's and family's experience with critical illness is significantly influenced by their environment, culture, spirituality, and lived and learned experience.
- The patient's and family's ability to communicate is often compromised by the health situation or intervention.
- The patient and family are viewed within the biological, psychological, social, cultural, developmental, environmental, experiential and spiritual dimensions.
- The patient and family are entitled to dignity and respect, information sharing, collaboration and participation in the plan of care and decision-making.

**Health**

- Health includes biological, psychological, social, cultural, developmental, environmental and spiritual well-being. Health is a resource for living and is not merely the absence of disease.
- Health exists within chronic illness, disability, frailty and aging.
- Health is the extent to which an individual, group or community is able to realize aspirations and to function in his, her or their environment.
- Health is a personal concept and is viewed within the context of the patients' and families' personal, cultural, ethnic and spiritual value system.
- Health behaviour may be directed toward promotion, prevention, maintenance, rehabilitation and restoration or palliation.
- Health is affected by social determinants, such as education, food insecurity, social safety network, gender, housing, income and income distribution.

**Competency Categories**

The competencies are classified under an eleven-category scheme commonly used to organize critical care (adult) nursing.

Some of the competencies lend themselves to one or more of the categories; therefore, these eleven categories should be viewed simply as an organizing framework. Also, it should be recognized that the competency statements vary in scope, with some representing global behaviours and others more discrete and specific nursing behaviours.

## Competency Sampling

Using the grouping and the guideline that the Critical Care (Adult) Nursing Certification Exam will consist of approximately 165 questions, the categories have been given the following weights in the total examination.

**Table 1: Competency Sampling**

Categories	Approximate weights in the total examination
Neurologic System	15-20%
Cardiovascular System	20-25%
Respiratory System	20-25%
Gastrointestinal System	5-10%
Renal System	2-8%
Endocrine System	2-6%
Immunology and Hematology Systems	5-10%
Musculoskeletal and Integument Systems	2-8%
Patient and Family Centred Care	1-5%
End of Life	1-4%
Professionalism	1-5%

## Technical Specifications

In addition to the specifications related to the competencies, other variables are considered during the development of the Critical Care (Adult) Nursing Certification Exam. This section presents the guidelines for two types of variables: structural and contextual.

**Structural Variables:** Structural variables include those characteristics that determine the general appearance and design of the exam. They define the length of the exam, the format and presentation of the exam questions (e.g., multiple-choice format) and special functions of exam questions (e.g., case-based or independent questions).

**Contextual Variables:** Contextual variables specify the nursing contexts in which the exam questions will be set (e.g., patient culture, patient health situation and health-care environment).

## Structural Variables

**Exam Length:** The exam consists of approximately 165 multiple-choice questions.

**Question Presentation:** The multiple-choice questions are presented in one of two formats: case-based or independent. Case-based questions are a set of approximately four questions associated with a brief health-care scenario (i.e., a description of the patient's health-care situation). Independent questions stand alone. In the Critical Care (Adult) Nursing Certification Exam, 60 to 65 per cent of the questions are presented as independent questions and 35 to 40 per cent are presented within cases.

**Taxonomy for Questions:** To ensure that competencies are measured at different levels of cognitive ability, each question on the Critical Care (Adult) Nursing Certification Exam is aimed at one of three levels: knowledge/comprehension, application and critical thinking.<sup>2</sup>

### 1. Knowledge/Comprehension

This level combines the ability to recall previously learned material and to understand its meaning. It includes such mental abilities as knowing and understanding definitions, facts and principles and interpreting data (e.g., knowing the effects of certain drugs or interpreting data appearing on a patient's record).

### 2. Application

This level refers to the ability to apply knowledge and learning to new or practical situation. It includes applying rules, methods, principles and theories in providing care to patients (e.g., applying nursing principles to the care of patients).

### 3. Critical Thinking

The third level of the taxonomy deals with higher-level thinking processes. It includes the abilities to judge the relevance of data, to deal with abstraction and to solve problems (e.g., identifying priorities of care or evaluating the effectiveness of interventions). The critical care (adult) nurse with at least two years of experience should be able to identify cause-and-effect relationships, distinguish between relevant and irrelevant data, formulate valid conclusions and make judgments concerning the needs of patients.

The following table presents the distribution of questions for each level of cognitive ability.

<sup>2</sup> These levels are adapted from the taxonomy of cognitive abilities developed in Bloom (1956).

**Table 2: Distribution of Questions for Each Level of Cognitive Ability**

<b>Cognitive Ability Level</b>	<b>Percentage of questions on Critical Care (Adult) Nursing Exam</b>
Knowledge/Comprehension	20-30%
Application	25-35%
Critical Thinking	40-50%

### **Contextual Variables**

**Patient Age and Gender:** In the development of the Critical Care (adult) Exam, questions will include only adult patients (i.e., 16 years and older). The age of the patient will be determined by the presented health situations. The questions will represent all genders.

**Patient Culture:** Questions measuring awareness, sensitivity, and respect for different cultural values, beliefs, and practices, without introducing stereotypes, are included on the exam.

**Patient Health Situation:** In the development of the Critical Care (Adult) Nursing Exam, the patient is viewed holistically. The patient health situations presented also reflect a cross-section of health situations encountered by critical care (adult) nurses.

**Health-Care Environment:** It is recognized that critical care (adult) nursing is practised primarily in the hospital setting. However, critical care (adult) nursing can also be practised in other settings. Therefore, for the purposes of the Critical Care (Adult) Exam, the health-care environment is specified only where it is required for clarity or in order to provide guidance to the examinee.

## **Conclusions**

The blueprint for the Critical Care (Adult) Nursing Certification Exam is the product of a collaborative effort between CNA, ASI and a number of critical care (adult) nurses across Canada. Their work has resulted in a compilation of the competencies required of practising critical care (adult) nurses and has helped determine how those competencies will be measured on the Critical Care (Adult) Nursing Certification Exam. A summary of these guidelines can be found in the summary chart Critical Care (Adult) Nursing Certification Development Guidelines.

Critical Care (adult) nursing practice will continue to evolve. As this occurs, the blueprint may require revision so that it accurately reflects current practices. CNA will ensure that such revision takes place in a timely manner and will communicate any changes in updated editions of this document.

# Summary Chart

## Critical Care (Adult) Nursing Exam Development Guidelines

Structural Variables		
Exam Length and Format	Approximately 165 multiple-choice questions	
Question Presentation	60-65% independent questions 35-40% case-based questions	
Cognitive Ability Levels of Questions	Knowledge/Comprehension:	20-30% of questions
	Application:	25-35% of questions
	Critical Thinking:	40-50% of questions
Competency Categories	Neurologic System	15-20% of questions
	Cardiovascular System	20-25% of questions
	Respiratory System	20-25% of questions
	Gastrointestinal System	5-10% of questions
	Renal System	2-8% of questions
	Endocrine System	2-6% of questions
	Immunology and Hematology Systems	5-10% of questions
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	Patient and family centred care	1-5% of questions
	End of Life	1-4% of questions
	Professionalism	1-5% of questions
Contextual Variables		
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Patient Culture	Questions are included that measure awareness, sensitivity and respect for different cultural values, beliefs and practices, without introducing stereotypes.	
Patient Health Situation	In the development of the Critical Care (Adult) Exam, the patient is viewed holistically. The patient health situations presented also reflect a cross-section of health situations encountered by critical care (adult) nurses.	
Health-Care Environment	It is recognized that critical care (adult) nursing is practised primarily in the hospital setting. However, critical care (adult) nursing can also be practised in other settings. Therefore, for the purposes of the Critical Care (Adult) Exam, the health-care environment is specified only where it is required for clarity or in order to provide guidance to the examinee.	



# ***The Critical Care (Adult) Nursing Exam List of Competencies***

## **Neurologic System**

The critical care (adult) nurse:

- 1.1 interprets data (initial and ongoing assessment or response to interventions) related to the neurologic system, including:
  - 1.1a physical assessment (e.g., vital signs, level of consciousness, Glasgow Coma Scale, cranial nerve assessment, motor and sensory assessment, pupils, peripheral nerve stimulation [TOF]);
  - 1.1b pain, agitation, delirium assessment (PAD) (e.g., pain scale, agitation/sedation scale, delirium score);
  - 1.1c laboratory results (e.g., osmolality, cerebral spinal fluid [CSF], sodium, arterial blood gases [ABGs], glucose);
  - 1.1d intracranial waveforms and pressures (e.g., troubleshooting inaccurate results, interpreting abnormal findings); and
  - 1.1e cerebral perfusion pressure (e.g., calculation).
- 1.2 understands the rationale for and clinical implications of diagnostic results (e.g., computed tomography [CT or CT angio], magnetic resonance imaging [MRI], electroencephalogram [EEG], transcranial Dopplers [TCD]).
- 1.3 recognizes actual or potential life-threatening alterations in neurologic function, including:
  - 1.3a ineffective thermoregulation (e.g., hyperthermia, hypothermia);
  - 1.3b motor and sensory dysfunction related to neuromuscular transmission, (e.g., Guillain-Barré syndrome, spinal cord injury, myasthenia gravis, amyotrophic lateral sclerosis [ALS], critical illness polyneuropathy);
  - 1.3c motor and sensory dysfunction related to brain injury (e.g., stroke, traumatic brain injury);
  - 1.3d cerebral tissue perfusion (e.g., seizures, stroke, altered cerebral metabolism, hypoxic brain injury);
  - 1.3e intracranial hypertension (e.g., traumatic brain injury, hepatic failure, stroke, herniation); and
  - 1.3f overdose (e.g., accidental or intentional).
- 1.4 selects the appropriate evidence-informed nursing interventions to minimize or prevent motor or sensory deficits, such as:
  - 1.4a maintaining spinal cord integrity (e.g., positioning, immobilization devices); and

- 1.4b intervening in spinal cord crises: spinal shock, neurogenic shock, autonomic dysreflexia (e.g., alleviating cause, pharmacological agents, positioning, fluids).
- 1.5 selects the appropriate evidence-informed nursing interventions to optimize cerebral tissue perfusion, such as:
  - 1.5a using techniques to prevent obstruction and promote venous and cerebral spinal fluid (CSF) drainage (e.g., positioning, neck alignment, head-of-bed elevation, proper application of collars, tracheostomy ties);
  - 1.5b optimizing PaCO<sub>2</sub>;
  - 1.5c optimizing autoregulation;
  - 1.5d administering pharmacological agents (e.g., diuretics, analgesics, sedatives, neuromuscular blocking agents, steroids, vasopressors);
  - 1.5e managing invasive intracranial pressure monitoring or ventricular drainage devices (e.g., set-up, drainage, troubleshooting, positioning of device);
  - 1.5f using techniques that control intrathoracic pressures (e.g., minimizing airway stimulation, pharmacological agents, minimizing positive end-expiratory pressure [PEEP], gastric decompression);
  - 1.5g managing vasospasm (e.g., calcium channel blockers, positioning);
  - 1.5h managing metabolic rate (e.g., cooling devices or fluids, pharmacological agents, reduced stimulation);
  - 1.5i managing seizure activity (e.g., pharmacological agents, correcting hypoglycemia, correcting electrolytes);
  - 1.5j preventing secondary injury (e.g., maintaining adequate oxygenation, preventing hypercarbia, fluid management, blood pressure management); and
  - 1.5k managing stroke (e.g., thrombolytics, blood pressure control, thermoregulation, blood glucose control).
- 1.6 selects appropriate evidence-informed nursing interventions to prevent and manage pain, agitation and delirium (PAD), such as:
  - 1.6a pain strategies (e.g., intermittent or continuous analgesia, epidural, patient-controlled analgesia [PCA], multimodal approach, alternative therapies, spiritual care, promoting sleep);
  - 1.6b agitation strategies (e.g., selection and titration of sedatives, distraction, communication); and
  - 1.6c delirium strategies (e.g., manipulation of the environment, promoting sleep, pharmacological agents, consideration of causes, early mobilization, family presence).
- 1.7 selects appropriate evidence-informed nursing interventions to manage substance withdrawal (e.g., minimal use of restraints, alleviation of seizures and delirium tremens, referral to mental health services).

- 1.8 selects appropriate evidence-informed nursing interventions to promote recovery and rehabilitation for the patient with alterations in mental health and/or cognition (e.g., addictions, dementia, suicidal ideation, post-traumatic stress disorder [PTSD]).

## Cardiovascular System

The critical care (adult) nurse:

- 2.1 interprets data (initial and ongoing assessment or response to interventions) related to the cardiovascular system, including:
- 2.1a physical assessment (e.g., vital signs, pulses, skin temperature and colour, heart sounds, lung sounds, work of breathing, jugular venous distention [JVD]);
  - 2.1b laboratory results (e.g., cardiac enzymes and troponin, complete blood count [CBC], coagulation, arterial blood gases [ABGs], electrolytes, digoxin levels, lactate);
  - 2.1c ECG rhythm (e.g., cardiac rhythm, ectopy, continuous ST segment monitoring, QT interval);
  - 2.1d 12-lead ECG (e.g., ischemia, infarction, bundle branch blocks);
  - 2.1e right atrial or mixed venous oxygen saturation measurements (e.g., oxygen delivery and consumption);
  - 2.1f information from technological supports (e.g., pacemakers [sensing and capture], implantable cardioverter defibrillator [ICD]);
  - 2.1g arterial pressures and waveforms (e.g., radial, femoral); and
  - 2.1h hemodynamic parameters (e.g., cardiac output [CO] and index [CI], systemic vascular resistance [SVR], pulmonary vascular resistance [PVR], right atrial pressure [RAP], pulmonary artery pressure [PAP], pulmonary artery wedge pressure [PAWP]).
- 2.2 understands the rationale for advanced diagnostics (e.g., 15-lead ECG, transesophageal echocardiogram [TEE], transthoracic [2-D echocardiogram], coronary angiography).
- 2.3 intervenes based on observation of manifestations of the following actual or potential life-threatening alterations in cardiac output and perfusion:
- 2.3a cardiogenic shock (e.g., myocardial infarction, cardiomyopathy);
  - 2.3b hypovolemic shock (e.g., hemorrhage, third space loss);
  - 2.3c distributive shock (e.g., sepsis, neurogenic shock, anaphylactic shock);
  - 2.3d acute coronary syndrome: myocardial infarction (e.g., STEMI, non-STEMI, unstable angina);
  - 2.3e cardiac tamponade (e.g., cardiac surgery, trauma, pericardial effusion);
  - 2.3f acute cardiac pulmonary edema;

- 2.3g dysrhythmias;
- 2.3h valvular disease (e.g., stenosis, regurgitation, papillary muscle rupture, mechanical or tissue valves);
- 2.3i heart failure (e.g., systolic, diastolic); and
- 2.3j inflammatory cardiac processes (e.g., pericarditis, endocarditis).
- 2.4 intervenes based on observation of manifestations of the following actual or potential life-threatening alterations of the vascular structure and function:
  - 2.4a aneurysm and/or dissection (e.g., aortic arch, thoracic, abdominal);
  - 2.4b limb or organ ischemia (e.g., mesenteric infarct, compartment syndrome, sepsis); and
  - 2.4c hypertension (e.g., post cardiovascular surgery, pheochromocytoma, pregnancy-induced).
- 2.5 selects appropriate evidence-informed nursing interventions to correct alterations in cardiovascular perfusion, such as:
  - 2.5a administering vasopressors;
  - 2.5b administering vasodilators;
  - 2.5c administering inotropes;
  - 2.5d administering reperfusion therapy (e.g., thrombolytic agents); and
  - 2.5e administering anticoagulants and antiplatelet therapies.
- 2.6 selects appropriate evidence-informed nursing interventions to correct alterations in cardiac output, such as:
  - 2.6a optimizing preload (e.g., fluid administration, pharmacological agents);
  - 2.6b optimizing afterload (e.g., pharmacological agents);
  - 2.6c optimizing contractility (e.g., fluid administration, pharmacological agents);
  - 2.6d optimizing heart rate or rhythm (e.g., fluid management, pharmacological agents, electrolytes, pacing and cardioversion); and
  - 2.6e managing a cardiac arrest (e.g., advanced cardiac life support [ACLS] protocols, targeted temperature management).
- 2.7 selects appropriate evidence-informed nursing interventions to manage intravascular access devices, such as:
  - 2.7a assisting with invasive procedures (e.g., maximal barrier precautions, site selection, site preparation);
  - 2.7b preventing or managing complications (e.g., air embolism, thrombosis, infection, occlusion, hemorrhage, malposition); and

- 2.7c removing intravascular access devices: central venous catheters, peripheral arterial lines, femoral arterial lines (e.g., adequate hemostasis, patient positioning, infection prevention, timely removal).
- 2.8 selects appropriate evidence-informed nursing interventions to manage hemodynamic monitoring systems, such as:
  - 2.8a managing hemodynamic devices (e.g., set-up, levelling, patency, patient positioning); and
  - 2.8b troubleshooting hemodynamic devices (e.g., inaccurate results, interpreting abnormal findings, waveform interpretation).

## Respiratory System

The critical care (adult) nurse:

- 3.1 interprets data (initial and ongoing assessment or response to interventions) related to the respiratory system, including:
  - 3.1a physical assessment (e.g., respiratory pattern, rate, auscultation, palpation, inspection);
  - 3.1b laboratory results (e.g., arterial blood gases [ABGs], methemoglobins, carboxyhemoglobins);
  - 3.1c monitoring technological devices (e.g., pulse oximetry, capnography);
  - 3.1d oxygen information (e.g., PaO<sub>2</sub>, SaO<sub>2</sub>, SpO<sub>2</sub>, oxygen content, PaO<sub>2</sub>/FiO<sub>2</sub> ratio);
  - 3.1e modes of mechanical ventilations;
  - 3.1f need for ventilatory support (e.g., non-invasive, indications for intubation and ventilation, readiness for weaning and liberation); and
  - 3.1g ventilation information (e.g., tidal volume, minute volume, respiratory rate, airway pressures, PEEP).
- 3.2 understands the rationale for and clinical implications of diagnostic results (e.g., chest X-rays, CT scans, bronchoscopies, pulmonary function tests, metabolic assessment, sputum cultures).
- 3.3 recognizes an actual or potential life-threatening alterations of the respiratory system, including:
  - 3.3a ineffective airway (e.g., asthma, epiglottitis, laryngeal spasm/edema, head/neck trauma, mucous plug);
  - 3.3b ineffective breathing (e.g., Guillain-Barré syndrome, chest trauma, impaired respiratory drive, spinal cord injury);
  - 3.3c pleural abnormalities (e.g., tension pneumothorax, pleural effusion, hemothorax);
  - 3.3d non-cardiac pulmonary edema (e.g., acute respiratory distress syndrome [ARDS], acute respiratory failure);
  - 3.3e ventilation/perfusion mismatch (e.g., embolism, thrombotic, fat, air, amniotic, atelectasis);

- 3.3f pulmonary hypertension (e.g., primary, secondary);
- 3.3g inhalation injuries (e.g., thermal, carbon monoxide, aspiration);
- 3.3h chronic pulmonary disease (e.g., restrictive, obstructive); and
- 3.3i pulmonary infections (e.g., febrile respiratory illness, community-acquired pneumonia [CAP], health-care-associated pneumonia [HCAP], ventilator-associated pneumonia [VAP], tuberculosis, influenza-like illness [ILI]).
- 3.4 selects appropriate evidence-informed nursing interventions to correct alterations in respiratory function, such as:
  - 3.4a positioning (e.g., prone, head-of-bed elevation);
  - 3.4b using basic airway management (e.g., jaw thrust or chin lift, oral or nasopharyngeal airways);
  - 3.4c administering and titrating oxygen;
  - 3.4d using advanced airway management (e.g., endotracheal tube, tracheostomy);
  - 3.4e managing secretions (e.g., chest percussion, vibration, postural drainage, assisted cough, rotational therapy, subglottic suction, lung recruitment manoeuvre [breath stacking]);
  - 3.4f administering pharmacological agents to facilitate ventilation (e.g., analgesics, reversal agents, sedatives, paralytics, puffers/aerosol therapy);
  - 3.4g administering pharmacological agents to prevent or treat pulmonary embolism (e.g., thrombolytic agents, anticoagulants);
  - 3.4h administering pharmacological agents to treat pulmonary hypertension and/or hypoxemia (e.g., epoprostenol sodium, nitric oxide);
  - 3.4i administering pharmacological agents to optimize airway resistance (e.g., steroids, puffers/aerosol therapy);
  - 3.4j troubleshooting mechanical supports (e.g., ventilator, continuous positive airway pressure [CPAP] and BiLevel masks);
  - 3.4k recognizing the need for changes to ventilatory support (e.g., oxygenation, ventilation, tidal volume, PEEP, mode); and
  - 3.4l assisting with medical interventions (e.g., tracheostomy, intubation, chest tube insertion).
- 3.5 selects appropriate evidence-informed nursing interventions to promote return to spontaneous ventilation (e.g., nutrition, spontaneous awakening trial, spontaneous breathing trial, early mobilization).
- 3.6 selects appropriate interventions to prevent ventilator-associated pneumonia (VAP).

## Gastrointestinal System

The critical care (adult) nurse:

- 4.1 interprets data (initial and ongoing assessment or response to interventions) related to the gastrointestinal function, including:
  - 4.1a physical assessment (e.g., inspection, auscultation, percussion, palpation, weight);
  - 4.1b laboratory results (e.g., liver profile, glucose, amylase, proteins, electrolytes, albumin); and
  - 4.1c monitoring devices (e.g., intra-abdominal pressure).
- 4.2 understands the rationale for and clinical implications of diagnostic results (e.g., abdominal X-rays, CT scans, ultrasounds, endoscopy).
- 4.3 recognizes actual or potential life-threatening alterations to the gastrointestinal system, including:
  - 4.3a ischemic disorders (e.g., infarcted bowel, hepatic failure, cirrhosis, abdominal compartment syndrome);
  - 4.3b inflammatory disorders (e.g., peritonitis, pancreatitis, hepatitis, C. difficile, Crohn's disease, ulcerative colitis);
  - 4.3c mechanical disorders (e.g., esophageal rupture, perforated bowel, ileus);
  - 4.3d hemorrhagic disorders (e.g., upper and lower gastrointestinal bleeding, splenic injuries, hepatic injuries, esophageal varices);
  - 4.3e complications of enteral or parenteral feeding (e.g., sinusitis, diarrhea, aspiration, constipation, hyperglycemia, refeeding syndrome); and
  - 4.3f malnutrition.
- 4.4 selects appropriate evidence-informed nursing interventions to manage the patient who has ingested a toxic substance (e.g., acetylsalicylic acid, antidepressants, acetaminophen, toxic alcohols, narcotics).
- 4.5 selects appropriate evidence-informed nursing interventions to correct alterations in gastrointestinal function, such as:
  - 4.5a promoting early and safe enteral feeding (e.g., indications, patient positioning to prevent aspiration, tube placement, post pyloric feeding tube);
  - 4.5b optimizing parenteral nutrition (e.g., indications, caloric needs, lipid therapy, glucose concentration, selection of access site);
  - 4.5c administering pharmacological agents (e.g., motility enhancers, gastrointestinaprophylaxis);
  - 4.5d managing ischemic disorders;
  - 4.5e managing inflammatory disorders;
  - 4.5f managing mechanical disorders;

- 4.5g managing hemorrhagic disorders; and
- 4.5h optimizing bowel functions (e.g., diarrhea, constipation, stoma, fecal management system).

## Renal System

The critical care (adult) nurse:

- 5.1 interprets data (initial and ongoing assessment or response to interventions) related to the renal system, including:
  - 5.1a physical assessment (e.g., edema, urine, fluid balance, weight); and
  - 5.1b laboratory results (e.g., electrolytes, urine electrolytes, urea, creatinine, urinalysis, serum and urine osmolality, anion gap, drug levels).
- 5.2 understands the rationale for and clinical implications of diagnostic results (e.g., CT scans, ultrasounds, KUB, cystoscope).
- 5.3 understands the rationale for and clinical implications of renal replacement therapy.
- 5.4 recognizes effects of nephrotoxic agents or delayed clearance (e.g., diuretics, vasopressors, antibiotics, radiographic dyes, toxins).
- 5.5 recognizes potential life-threatening alterations in renal function (e.g., acute kidney injury criteria).
- 5.6 selects appropriate evidence-informed nursing interventions to correct electrolyte, acid-base imbalances (e.g., potassium, magnesium, calcium, sodium, phosphate, metabolic acidosis, alkalosis).
- 5.7 selects appropriate evidence-informed nursing interventions to optimize renal function, such as:
  - 5.7a optimizing cardiac output (e.g., fluid management, inotropic agents); and
  - 5.7b administering pharmacological agents.

## Endocrine System

The critical care (adult) nurse:

- 6.1 interprets data (initial and ongoing assessment or response to interventions) related to the endocrine system, including laboratory tests (e.g., blood glucose, arterial blood gases [ABGs], thyroid-stimulating hormone [TSH], T4, T3, cortisol, osmolality, electrolytes, urine ketones).
- 6.2 recognizes actual or potential life-threatening alterations in endocrine function, such as:
  - 6.2a antidiuretic hormone (e.g., diabetes insipidus [DI], syndrome of inappropriate antidiuretic hormone [SIADH]);
  - 6.2b hyperglycemia (e.g., ketoacidosis [DKA], hyperglycemic hyperosmolar syndrome [HHS]);
  - 6.2c hypoglycemia;



- 6.2d adrenal insufficiency (e.g., primary, secondary, associated with critical illness); and
- 6.2e thyroid function (e.g., thyrotoxicosis, myxedema).
- 6.3 selects appropriate evidence-informed nursing interventions to correct alterations in endocrine function, such as:
  - 6.3a managing antidiuretic hormone;
  - 6.3b managing hyperglycemia;
  - 6.3c managing hypoglycemia;
  - 6.3d managing adrenal insufficiency; and
  - 6.3e managing thyroid function.

## Immunology and Hematology Systems

The critical care (adult) nurse:

- 7.1 interprets data (initial and ongoing assessment or response to interventions) related to the immunologic and hematologic systems, including:
  - 7.1a laboratory results related to hematology (e.g., complete blood count [CBC]: erythrocytes, hemoglobin, hematocrit; coagulation profile: INR, aPTT, platelet count, fibrinogen, disseminated intravascular coagulation [DIC] screen, heparin antibody, lactate level); and
  - 7.1b laboratory results related to immunology and inflammation (e.g., complete blood count [CBC], neutrophils, leukocytes, lymphocytes, bands, immunoglobulins, bacterial, viral and fungal cultures).
- 7.2 understands the rationale for and clinical implications of diagnostic results (e.g., Doppler ultrasound, V/Q scan).
- 7.3 recognizes potential risk or potential life-threatening alterations of the immunologic and hematologic systems, such as:
  - 7.3a inflammatory process;
  - 7.3b infections (e.g., immunosuppression, invasive vascular devices, indwelling drainage devices, malnutrition, intubation, hyperglycemia, skin breakdown, nosocomial infections);
  - 7.3c sepsis;
  - 7.3d thrombocytopenia (e.g., drug-induced, sepsis, idiopathic thrombocytopenia purpura [ITP], mechanical devices);
  - 7.3e venous thrombotic disorders (e.g., venous thromboembolism, vascular access-associated thrombosis);
  - 7.3f arterial thrombotic disorders (e.g., cerebral thromboembolism, peripheral arterial thrombosis);

- 7.3g consumptive coagulopathies (e.g., disseminated intravascular coagulation [DIC], heparin-induced thrombocytopenia [HIT]); and
- 7.3h hemorrhagic disorders (e.g., hemophilia).
- 7.4 selects appropriate evidence-informed nursing interventions to prevent or correct alterations in the hematologic system including:
  - 7.4a infections (e.g., aseptic technique, adequate nutrition, pharmacological treatment, maximizing infection control practices including source control);
  - 7.4b sepsis (e.g., early recognition, fluid and pharmacological treatment);
  - 7.4c thrombocytopenia;
  - 7.4d venous thrombotic disorders (e.g., venous thromboembolism [VTE] prophylaxis, pharmacological treatment);
  - 7.4e arterial thrombotic disorders (e.g., pharmacological treatment, devices, surgical intervention);
  - 7.4f consumptive coagulopathies; and
  - 7.4g hemorrhagic disorders.
- 7.5 identifies infection control risks to patients, families and interprofessional team and takes necessary preventive measures to protect against exposure (e.g., hand hygiene, personal protective equipment [PPE], negative pressure room).

## **Musculoskeletal and Integumentary Systems**

The critical care (adult nurse):

- 8.1 interprets data (initial and ongoing assessment or response to interventions) related to the musculoskeletal and integumentary systems, including:
  - 8.1a physical assessment (e.g., skin integrity, risk measurement scale [Braden Scale]); and
  - 8.1b laboratory results (e.g., creatine kinase [CK], arterial blood gases [ABGs], electrolytes, complete blood count [CBC], myoglobin).
- 8.2 understands the rationale for and clinical implications of diagnostic results (e.g., X-rays, compartment pressure, CT scan, magnetic resonance imaging [MRI] ultrasound).
- 8.3 recognizes actual or potential life-threatening alterations of the musculoskeletal and integumentary systems, such as:
  - 8.3a compartment syndrome (e.g., abdominal, limb);
  - 8.3b burns (e.g., thermal, chemical, radiation, electrical);
  - 8.3c wounds (e.g., postoperative wounds, post trauma wounds, decubitus ulcers, necrotizing fasciitis); and

- 8.3d fractures (e.g., long bone, skull, pelvis, ribs, crush injuries, blood loss).
- 8.4 selects the appropriate evidence-informed nursing interventions to correct alterations of the musculoskeletal and integumentary systems, such as:
  - 8.4a administering pharmacological agents (e.g., antibiotics, analgesics); and
  - 8.4b managing rhabdomyolysis (e.g., fluid, pharmacological agents, monitoring creatine kinase [CK] or myoglobin, renal replacement therapy [RRT]).
- 8.5 selects appropriate evidence-informed nursing interventions to prevent complications related to immobility (e.g., range of motion, positioning, therapeutic surfaces, coughing, deep breathing, wound care, splinting, early mobilization, minimal restraints, fall prevention).
- 8.6 selects appropriate evidence-informed nursing interventions to manage complex wounds (e.g., vacuum-assisted wound drainage, packing, burn dressing, pharmacological agents, skin graft, extravasation).

### **Patient- and family-centred care (PFCC)**

The critical care (adult) nurse:

- 9.1 interprets data (initial and ongoing assessment or response to interventions) related to each patient's/family's needs, including:
  - 9.1a experience of the health crisis (e.g., coping skills, hopelessness, powerlessness, grief, loss, culture, spirituality, post-traumatic stress disorder [PTSD]); and
  - 9.1b response to the health-care system (e.g., current and past experiences).
- 9.2 selects appropriate evidence-informed nursing interventions to facilitate information sharing by:
  - 9.2a facilitating communication among patient, family, interprofessional team and external resources (e.g., family meetings, sensitivity to cultural variation); and
  - 9.2b providing alternative methods of communication (e.g., use of Passy-Muir valve, communication board, cuff deflation, written communication, interpreter).
- 9.3 selects appropriate evidence-informed nursing interventions to promote patient- and family-centred participation in care by:
  - 9.3a advocating for the patient (e.g., advance directives, organ donation, informed consent, privacy, allowing natural death);
  - 9.3b supporting the patient and family during decision-making and plan of care (e.g., end-of-life decisions, advance directives, transplantation, plan of care);
  - 9.3c facilitating family presence and/or participation in care (e.g., interprofessional rounds, crisis management, invasive procedures, resuscitation, assisting with basic care); and

- 9.3d consulting appropriate internal and/or external resources (e.g., social work, ethics, community support).

## End of Life

The critical care (adult) nurse:

- 10.1 understands indications for transition to palliative approach/end-of-life care (e.g., patient data, advance directives, medical assistance in dying [MAiD], patient and family wishes, potentially inappropriate treatments, legal considerations).
- 10.2 enables transition to palliative approach/end-of-life care (e.g., communication, advocating for patient and family wishes, conflict resolution).
- 10.3 understands criteria for referral for organ and/or tissue donation:
  - 10.3a after neurological determination of death (NDD); and
  - 10.3b after cardiac death (DCD).
- 10.4 selects appropriate evidence-informed nursing interventions to provide care in preparation of organ donation (e.g., maintaining hemodynamic stability, comfort care, symptom relief, diagnostic testing).
- 10.5 selects appropriate evidence-informed nursing interventions to provide palliative approach/end-of-life care including:
  - 10.5a providing palliative care strategies (e.g., pain and symptom management);
  - 10.5b supporting family (e.g., family presence, grieving, spiritual and cultural practices, education);
  - 10.5c coordinating with internal and/or external support resources (e.g., spiritual care, ethics, grief support, social work, legal consult); and
  - 10.5d supporting interprofessional team members.

## Professionalism

The critical care (adult) nurse:

- 11.1 contributes to a culture of safety by:
  - 11.1a integrating safety practices in daily nursing activities (e.g., hand hygiene, independent double check, safety bundles);
  - 11.1b recognizing adverse or near miss events (e.g., medication errors, name alerts, patient deterioration);
  - 11.1c responding to adverse or near miss events (e.g., intervene, communicate, prioritize care);
  - 11.1d disclosing and reporting adverse or near miss events (e.g., patient safety reporting system); and
  - 11.1e preventing the occurrence of adverse or near miss events (e.g., effective communication, team work, participation in simulation, education, safety alerts, product updates, “no blame” culture).
- 11.2 contributes to quality improvement initiatives (identify areas for improvements, participate in quality improvement projects, integrate patients’ and families’ feedback, collaborate with interprofessional team members).
- 11.3 accesses appropriate resources to guide ethically complex situations and foster effective coping strategies and possible resolutions (e.g., code of ethics, ethical consults, social worker, debriefing).