Exam Blueprint and Specialty Competencies

Introduction – Blueprint for the Critical Care Pediatric Nursing Certification Exam

The primary function of the blueprint for the CNA Critical Care Pediatric 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 pediatric 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 pediatric 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 Pediatric Nursing Exam is a criterion-referenced exam.[1] 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 Pediatric Nursing Certification Exam, the content consists of the competencies of a fully competent practising critical care pediatric 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 Pediatric Nursing Certification Exam Committee.

[1] 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 pediatric nurses, the following assumptions, based on current national standards for nursing practice, were made:

Health

- Health is a state of physical, mental, social and spiritual well-being and not merely the absence of disease or infirmity.
- Health exists along a continuum influenced by many factors such as illness, disability, maturation, socio-economic status and the environment.
- Health is a concept that is viewed within the context of the child's and family's personal, family and cultural value system.
- Health care is directed towards promotion, prevention, maintenance, protection and rehabilitation/restoration.
- Provision of health care focuses on quality of life, as determined by the child and family, throughout the lifespan including end of life.

The Child and Family

- Caring for the child in the context of family is critically important.
- The critical care pediatric child is one who is experiencing an actual or potentially life-threatening health crisis.
- Who is defined as family is determined by the child and family within the context of legal and situational parameters. This must be considered in decision-making.
- The child's ability to communicate is influenced by age, developmental level, health situation and/or intervention.

The Environment

- Critical care pediatric nursing is practised in a complex, evolving technological environment within a health-care system (e.g., hospital, transport, unit).
- The physical environment is conducive to the 24-hour delivery of safe nursing care to critically ill children and their families and includes relevant resources.

The Critical Care Pediatric Nurse

- Must identify and consider situational, ethical and legal complexities.
- Recognizes provincial/territorial scope of practice and institutional policies/protocols.

- Is a highly knowledgeable and skilled health professional who works in a critical care setting in collaboration with other members of the interprofessional team, child and family.
- Practises using a family-centred care philosophy respecting cultural influences.
- Documents and communicates assessment data that are reflective of the child's condition, the plan of care and responses or outcomes to the child, family and health-care team.
- Develops a therapeutic relationship with the child and family.
- Supports and respects the child's and family's needs for information, education and participation in the plan of care using knowledge of psychological, emotional and developmental stages.
- Maintains professional competence through ongoing education and the promotion of research and quality improvement initiatives.
- Promotes a safe and healthy workplace for self and interprofessional team members.
- Supports and develops team members through preceptorship, mentorship and ongoing education.
- Works as a member of the interprofessional team to provide quality end-of-life care which may include identifying potential candidates for organ and tissue procurement and supporting the process.
- Works with the interprofessional team, child and family to ensure a smooth transition within the health-care system and along the health continuum.

The Critical Care Pediatric Nursing Process

- Includes assessment that is continuous and comprehensive using available, relevant resources and evidence-based practice.
- Is a holistic plan of care that includes identified actual and potential needs and prioritized interventions that are developed in collaboration with the child, family and interprofessional team. Family members, who are the constant in the child's life, are recognized as having expertise in their child's care and are encouraged to participate in creating and carrying out the plan of care.
- Includes outcomes of care that are evaluated and a plan of care that is continuously revised in response to changes in the child's and family's status, informed by evidence-based practice and research.

Competency Categories

The competencies are classified under an eleven-category scheme commonly used to organize critical care pediatric 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 Pediatric 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
Professional Practice	2-5%
Pain, Agitation, Delirium and Withdrawal	10-15%
Neurologic System	12-18%
Cardiovascular System	20-25%
Respiratory System	20-25%
Gastrointestinal System	3-6%
Renal System	5-10%
Endocrine and Metabolic Systems	3-6%
Immunology and Hematology Systems	3-6%
Musculoskeletal and Integumentary Systems	3-6%
Care of Child and Family	2-5%

Technical Specifications

In addition to the specifications related to the competencies, other variables are considered during the development of the Critical Care Pediatric 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 Pediatric Nursing Certification Exam, 30 to 50 per cent of the questions are presented as independent questions and 50 to 70 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 Pediatric Nursing Certification Exam is aimed at one of three levels: knowledge/comprehension, application and critical thinking.[2]

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).

[2] These levels are adapted from the taxonomy of cognitive abilities developed in Bloom (1956).

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 pediatric 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.

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

Cognitive Ability Level	Percentage of questions on Critical Care Pediatric Nursing Exam
Knowledge/Comprehension	15-25%
Application	35-45%
Critical Thinking	35-45%

Contextual Variables

Child Gender and Age: Two of the contextual variables specified for the Critical Care Pediatric Nursing Certification Exam are the age and gender of the child. Providing specifications for the use of these variables ensures that the child described in the exam represent the demographic characteristics of the population encountered by the critical care pediatric nurse.

Child Culture: Questions are included that measure awareness, sensitivity, and respect for different cultural values, beliefs, and practices, without introducing stereotypes.

Child Health Situation: In the development of the Critical Care Pediatric Nursing Certification Exam, the child is viewed holistically. The health situations presented also reflect a cross-section of health situations encountered by pediatric critical care nurses.

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

Conclusions

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

Critical Care Pediatric 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 Pediatric Nursing Exam Development Guidelines

Structural Variables		
Exam Length and Format	Approximately 165 multiple-choice questions	
Question Presentation	30-50% independent questions 50-70% case-based questions	
Cognitive Ability Levels	Knowledge/Comprehension Application Critical Thinking	15-25% of questions 35-45% of questions 35-45% of questions
Competency Categories	Professional Practice Pain, Agitation, Delirium and Withdrawal Neurologic System Cardiovascular System Respiratory System Gastrointestinal System Renal System Endocrine and Metabolic Systems Immunology and Hematology Systems Musculoskeletal and Integumentary Systems Care of Child and Family	2-5% of questions 10-15% of questions 12-18% of questions 20-25% of questions 20-25% of questions 3-6% of questions 5-10% of questions 3-6% of questions 3-6% of questions 3-6% of questions 2-5% of questions
Contextual Variables		
Child Age	Birth – 12 months 13 months – 5 years 6 – 18 years	30 – 50% 20 – 40% 20 – 40%
Child Culture	Questions are included that measure awareness, sensitivity, and respect for different cultural values, beliefs, and practices, without introducing stereotypes.	
Child Health Situation	In the development of the Critical Care Pediatric Nursing Certification Exam, the Child is viewed holistically. The health situations presented also reflect a cross-section of health situations encountered by pediatric critical care nurses.	
Health-Care Environment	It is recognized that critical care nursing is practiced primarily in the hospital setting. However, critical care nursing can also be practiced in other settings. Therefore, for the purposes of the Critical Care Pediatric Nursing Certification Exam, the health-care environment is only specified where it is required for clarity or in order to provide guidance to the examinee.	

The Critical Care Pediatric Nursing Exam List of Competencies

1. **Professional Practice**

   The critical care pediatric nurse...

   1.1 Recognizes actual and potential issues related to practice including:
   - a) the identification and consideration of legal and ethical decision-making (e.g., documentation, consent, confidentiality, end-of-life care);
   - b) the components of a healthy practice environment (e.g., workload, moral distress, work-life balance, self-care, violence prevention, care planning including the child and family);
   - c) interprofessional collaboration and teamwork (e.g., situational awareness, roles and responsibilities, communication, decision-making); and
   - d) safety (e.g., environmental, child and family, interprofessional team members, infection control practices).

   1.2 Identifies and accesses available resources to address actual and potential issues (e.g., debriefing, child safety rounds, morbidity/mortality rounds, quality improvement initiatives, research).

   1.3 Uses techniques to promote safety and support for the child and family during procedures.

2. **Pain, Agitation, Delirium and Withdrawal**

   The critical care pediatric nurse...

   2.1 Evaluates data related to pain, agitation, delirium and withdrawal including:
   - a) child's health history (e.g., culture, previous experiences, communication patterns, coping strategies, mechanism of injury);
   - b) developmentally appropriate assessment tools; and
   - c) physical assessment (e.g., vital signs, precipitating factors, intensity, quality, duration).

   2.2 Recognizes types of pain (e.g., acute, chronic, neuropathic) and the pain process (e.g., behavioural, cognitive and physiological responses).

   2.3 Recognizes the consequences of ineffective pain management (e.g., delayed recovery, sleep alterations, hyperesthesia, chronic pain syndromes, delirium).

   2.4 Recognizes agitation and the consequences of ineffective management (e.g., delayed recovery, sleep alterations, delirium, increased safety risk).

   2.5 Recognizes signs and implications of delirium (hallucinations, confusion, disorientation, memory loss, anxiety, depression).

   2.6 Recognizes signs and implications of withdrawal from pharmacological agents (e.g., benzodiazepines, narcotics).

2.7 Implements nursing interventions related to the prevention and alleviation of pain, agitation, delirium and withdrawal including:

a) using non-pharmacological strategies (e.g., family presence, mobilization, therapeutic play, hot/cold compresses, distraction, positioning, environmental management, non-nutritive sucking, oral sucrose administration, relaxation techniques);
b) administering and adjusting pharmacological agents appropriate to assessment findings of pain, agitation, delirium and withdrawal (e.g., analgesics, sedatives, adjunctive therapies); and
c) managing medication delivery devices to promote optimal comfort minimizing the inappropriate use of pharmacological agents (e.g., child-controlled analgesia pumps, continuous infusions, local and regional continuous infusions, epidurals).

3. Neurologic System

The critical care pediatric nurse...

3.1 Evaluates data related to the neurologic system including:

a) child's health history (e.g., sensory or motor function, developmental milestones, toxic ingestions);
b) physical assessment (e.g., Glasgow Coma Scale, level of consciousness, protective reflexes, motor/sensory assessment, pupillary response, head shape and circumference, fontanels, newborn reflexes, respiratory patterns);
c) information from monitoring devices:
    i. intracranial pressure; and
    ii. cerebral perfusion pressure.

3.2 Laboratory reports (e.g., serum and urine glucose, serum and urine osmolality, serum and urine electrolytes, cerebral spinal fluid, blood gases, urine specific gravity, toxicology and drug levels, coagulation profile).

3.3 Investigative reports (e.g., electroencephalogram, computed tomography scan, magnetic resonance imaging, biopsies, head ultrasound).

3.4 Recognizes actual or potential life-threatening alterations in neurologic function including:

a) increased intracranial pressure (e.g., hydrocephalus, cerebral edema, intracranial bleed, tumour, Cushing's triad);
b) inflammatory brain processes (e.g., vasculitis, encephalitis, posterior reversible encephalopathy syndrome);
c) seizures and status epilepticus;
d) dystonia, status dystonicus;
e) cerebral vascular integrity (e.g., stroke, arteriovenous malformation);
f) traumatic brain injury (e.g., epidural hematoma, subdural hematoma, diffuse axonal injury);
g) infection (e.g., meningitis, encephalitis);
h) motor and sensory function (e.g., Guillain-Barré syndrome, spinal cord injury);
i) spinal cord crises (e.g., neurogenic shock, autonomic dysreflexia);
j) neurosurgical intervention (e.g., tumour resection); and
k) anoxic brain injury (e.g., submersion injury, hypoxic ischemic encephalopathy, strangulation).

3.5 Recognizes the signs of an irreversible brain injury including:
   a) herniation; and
   b) neurological determination of death (e.g., apnea testing, oculovestibular and oculocephalic reflexes).

3.6 Implements nursing interventions to optimize cerebral perfusion and prevent secondary injury including:
   a) preventing and managing spinal cord crises;
   b) preserving spinal cord integrity (e.g., C-spine precautions, pharmacological agents);
   c) managing mean arterial pressure to optimize cerebral perfusion pressure (e.g., fluids, pharmacological agents);
   d) using techniques to promote cerebral venous and spinal fluid drainage (e.g., positioning, elevating head of bed, minimizing intrathoracic pressure);
   e) managing $PaCO_2$ and PaO_2;
   f) administering pharmacological agents (e.g., anticonvulsants, diuretics, hyperosmolar therapy, barbiturates, analgesics, sedatives, neuromuscular blocking agents, steroids);
   g) providing support with insertion and management of intracranial pressure monitoring and/or cerebral spinal fluid drainage devices (e.g., set-up, drainage, levelling of intracranial device, specimen collection);
   h) minimizing noxious stimuli (e.g., environmental, nursing care considerations);
   i) managing metabolic demands (e.g., thermoregulation, pharmacological agents, pain);
   j) managing endocrine alterations (e.g., hyperglycemia, syndrome of inappropriate antidiuretic hormone, diabetes insipidus, cerebral salt wasting); and
   k) preventing and managing seizure activity.

3.7 Recognizes, responds and mobilizes team for a neurosurgical emergency (e.g., bone flap removal, evacuation of hematoma).

4. Cardiovascular System

The critical care pediatric nurse...

4.1 Evaluates data related to the cardiovascular system including:
   a) child's health history (e.g., congenital heart defects, previous surgery, acquired cardiac disease, newborn transitional circulation);
   b) physical assessment as it pertains to the cardiovascular system (e.g., heart sounds, perfusion, hepatosplenomegaly);
   c) information from monitoring devices:
      i. non-invasive (e.g., ECG for rhythm and rate, pulse oximetry, pre-/post-ductal saturations, blood pressure [including four limb BP], temperature); and
      ii. invasive pressures and waveforms (e.g., venous, arterial and intracardiac [right atrial, left atrial]).
   d) laboratory reports (e.g., CBC, arterial, venous, capillary and central venous blood gases, coagulation, electrolytes, lactate, drug levels); and
   e) investigative reports (e.g., echocardiogram, ECG, X-ray, ultrasound).

4.2 Recognizes actual or potential life-threatening alterations in cardiac output and perfusion including:
- a) cardiogenic shock (e.g., cardiomyopathy, congenital heart defects);
- b) hypovolemic shock (e.g., hemorrhagic and non-hemorrhagic);
- c) distributive shock (e.g., neurogenic, anaphylaxis);
- d) obstructive shock (e.g., cardiac tamponade, tension pneumothorax, mediastinal mass, superior vena cava syndrome);
- e) sepsis and septic shock;
- f) multiple organ dysfunction syndrome;
- g) congenital heart defects (e.g., increased/decreased pulmonary blood flow and obstructive defects);
- h) congestive heart failure (e.g., increased pulmonary blood flow defects, myocarditis);
- i) systemic hypertension (e.g., coarctation of the aorta, obesity, renal dysfunction);
- j) pulmonary hypertension (e.g., persistent pulmonary hypertension of the newborn, secondary pulmonary hypertension related to congenital heart defects); and
- k) dysrhythmias (e.g., asystole, ventricular dysrhythmias, supraventricular tachycardia, bradycardia, heart blocks, junctional ectopic tachycardia).

4.3 Recognizes indications for extracorporeal life support (ECLS):
- a) veno-arterial ECLS (e.g., severe hypothermia, refractory shock, myocardial dysfunction); and
- b) veno-venous ECLS (e.g., pulmonary dysfunction).

4.4 Recognizes contraindications for ECLS (e.g., irreversible disease, coagulopathy, access).

4.5 Recognizes goals of ECLS (e.g., bridge to transplant, bridge to recovery).

4.6 Recognizes complications of ECLS (e.g., bleeding, clotting, neurological insult, infection).

4.7 Implements nursing interventions to optimize perfusion and cardiac output including:
- a) administering oxygen (e.g., differentiating cardiac versus respiratory cyanosis, consequences of oxygen administration);
- b) establishing and/or managing vascular access (e.g., PIVs, central venous lines, IOs);
- c) supporting preload, contractility, afterload (e.g., pharmacological agents, fluid administration);
- d) supporting heart rate or rhythm (e.g., fluid administration, pharmacological agents, pacing, cardioversion, defibrillation);
- e) managing coagulation (e.g., thrombolytics, anticoagulants, blood products); and
- f) participating in the provision of high quality CPR.

4.8 Manages hemodynamic monitoring devices (e.g., evaluating findings, set-up, levelling, patency).

5. **Respiratory System**

The critical care pediatric nurse...

5.1 Evaluates data related to the respiratory system including:
- a) child's health history (e.g., prematurity, bronchopulmonary dysplasia, congenital defects, airway anatomy);
- b) physical assessment (e.g., airway, respiratory status, breath sounds, colour, level of consciousness, chest contour, cough, secretions);

c) information from monitoring and ventilation devices (e.g., pulse oximetry, CO_2 monitoring, wave forms, pressures);
d) laboratory reports (e.g., blood gases, cultures, methemoglobin); and
e) investigative reports (e.g., X-ray, ultrasound, bronchoscopy, computed tomography, magnetic resonance imaging).

5.2 Recognizes actual or potential life-threatening alterations in respiratory function including:
a) mechanisms of inadequate oxygenation and ventilation leading to impending respiratory failure:
i. upper airway process (e.g., foreign body, infections, post-extubation stridor, laryngospasm, inhalation injury, anatomical anomalies);
ii. lower airway process (e.g., bronchiolitis, asthma, chronic lung disease);
iii. parenchymal conditions (e.g., pneumonia, pulmonary edema, acute respiratory distress syndrome);
iv. disordered control of breathing (e.g., seizures, pharmacological agents, brain injury);
v. neuromuscular (e.g., Duchenne's muscular dystrophy, spinal muscular atrophy, anatomical anomalies);
vi. intrapleural conditions (e.g., chylothorax, pneumothorax); and
vii. mechanisms of hypoxemia (e.g., low ambient PO_2, alveolar hypoventilation, V-Q mismatch, cyanotic heart lesions).

5.3 Implements nursing interventions to optimize respiratory function including:
a) understanding the principles of airway management (e.g., positioning, artificial airway [oral, nasal, laryngeal mask airway, endotracheal tube, tracheostomy], secretion management);
b) understanding the principles of an airway emergency (recognition, responding, mobilizing team);
c) managing invasive and non-invasive mechanical ventilation systems (e.g., patency, securement, position, alarms, comfort);
d) applying knowledge of different types of non-invasive and invasive ventilation systems (e.g., high flow oxygen therapy, CPAP, BiPAP, conventional ventilation modes and alarms);
e) administering pharmacological agents (e.g., oxygen, bronchodilators, steroids, neuromuscular blocking agents, intubation medications, pulmonary vasodilators);
f) recognizing indications for changes in ventilatory support (e.g., bag-mask ventilation, mode, compliance, airway pressures, PEEP); and
g) recognizing child's need for advanced ventilation concepts (e.g., HFOV, HFJV, ECLS).

5.4 Implements nursing interventions to prevent and manage potential complications of mechanical ventilation (e.g., barotrauma and volutrauma, autoPEEP, hemodynamic effects, infection, trauma related to the endotracheal tube, DOPE).

5.5 Implements nursing interventions to promote successful maintenance of long-term ventilation and weaning of ventilatory support (e.g., assessment of readiness, adequate nutrition, fluid status, level of consciousness, pain, agitation, withdrawal and delirium management).

6. **Gastrointestinal System**

The critical care pediatric nurse...

6.1 Evaluates data related to the gastrointestinal system including:
- a) child's health history (e.g., congenital defects, failure to thrive, nutrition and stooling patterns, food allergies);
- b) physical assessment (e.g., intra-abdominal pressure, bowel sounds, distention, quantity/quality of output);
- c) nutritional assessment (e.g., breastfeeding needs and support, growth chart data, body mass index, caloric intake and needs, supplements);
- d) laboratory reports (e.g., total protein, liver profiles, albumin, lipid profiles, serum glucose, gastric pH, stool testing); and
- e) investigative reports (e.g., imaging, swallowing studies).

6.2 Recognizes actual or potential life-threatening alterations to the gastrointestinal function including:
- a) obstructed/ischemic/infarcted/perforated bowel (e.g., necrotizing enterocolitis);
- b) infection (e.g., gastroenteritis, Clostridium difficile, peritonitis);
- c) hepatic function (e.g., biliary atresia, hepatitis);
- d) congenital defects (e.g., gastroschisis, omphalocele);
- e) gastroesophageal reflux disease; and
- f) toxic ingestions (e.g., drugs, hydrocarbons, caustics).

6.3 Implements nursing interventions to optimize gastrointestinal function including:
- a) early enteral feeding with emphasis on reduction of n.p.o. duration (e.g., positioning, frequency, intestinal or gastric tube insertion/position/care);
- b) pharmacologic agents (e.g., histamine-reducing agents, motility enhancers);
- c) managing gastrointestinal bleeding (e.g., pharmacological agents, gastric tubes); and
- d) managing therapeutic diets (e.g., ketogenic, chylothorax, hypo/hypercaloric).

7. **Renal System**

The critical care pediatric nurse...

7.1 Evaluates data related to the renal system including:
- a) child's health history (e.g., congenital disorders, chronic renal failure, infections);
- b) physical assessment (e.g., fluid status, edema, urine quality/quantity, weight, body surface area, insensible losses);
- c) laboratory reports (e.g., serum and urine electrolytes, BUN, creatinine, osmolality, drug levels, urinalysis, blood gas, CBC, culture); and
- d) investigative reports (e.g., imaging, biopsies, glomerular filtration rate).

7.2 Recognizes actual or potential life-threatening alterations in renal function, including:
- a) pre-renal causes (e.g., inadequate preload);
- b) intra-renal causes (e.g., hemolytic uremic syndrome, nephrotic syndrome, nephrotoxic agents, acute tubular necrosis, infections); and
- c) post-renal causes (e.g., neurogenic bladder, renal outflow obstruction).

7.3 Recognizes the sequelae of renal dysfunction (e.g., uremic encephalopathy, hypertension, posterior reversible encephalopathy syndrome, fluid/electrolyte and acid-base imbalance, nutritional compromise).

7.4 Recognizes indications for and complications of renal replacement therapies (e.g., hemodialysis, peritoneal dialysis, continuous renal replacement therapies).

7.5 Implements nursing interventions to optimize renal function including:
- a) administering fluid and pharmacological agents (e.g., volume, diuretics, electrolyte replacements); and
- b) managing peritoneal dialysis.

8. **Endocrine and Metabolic Systems**

The critical care pediatric nurse...

8.1 Evaluates data related to the endocrine/metabolic system including:
- a) child's health history (e.g., endocrine/metabolic status, familial/genetic disorders);
- b) physical assessment (e.g., hydration status, respiratory patterns, odour, neurological assessment, vital signs, weight changes and body mass index);
- c) laboratory reports (e.g., serum and urine glucose, osmolality, electrolytes, pH and acid-base balance, bilirubin, ammonia, lipase); and
- d) investigative reports (e.g., imaging, genetic screening, biopsies).

8.2 Recognizes actual or potential life-threatening alterations in endocrine/metabolic function including regulation of:
- a) metabolism (e.g., diabetic ketoacidosis, hypoglycemia, inborn errors of metabolism);
- b) antidiuretic hormone (e.g., diabetes insipidus, syndrome of inappropriate antidiuretic hormone);
- c) adrenal corticoid hormones (e.g., adrenal insufficiency); and
- d) hepatic and pancreatic functions (e.g., liver failure, pancreatitis).

8.3 Implements nursing interventions to optimize endocrine/metabolic function including:
- a) administering pharmacological agents (e.g., insulin, steroids, dextrose, antidiuretic hormone, electrolyte replacement, hypertonic saline);
- b) managing fluid status and acid-base balance; and
- c) managing therapeutic diets (e.g., enzyme replacement).

9. **Immunology and Hematology Systems**

The critical care pediatric nurse...

9.1 Evaluates data related to the immunologic and hematologic systems including:
- a) child's health history (e.g., immune status, asplenia, blood dyscrasias, oncological disease, post-transplant, infection and infectious contacts, related conditions and awareness of effect on other systems);
- b) physical assessment (e.g., petechiae, pallor, purpura, bleeding);
- c) laboratory reports (e.g., cultures/viral screening [e.g., HIV/CMV], CBC and differential, C-reactive protein, coagulation profile, antibody/antigens); and

d) investigative reports (e.g., imaging, biopsies).

9.2 Recognizes actual and potential life-threatening alterations in function including:
   a) immunological (e.g., immediate postoperative solid organ transplants, severe graft vs. host, sepsis, anaphylaxis, vasculitis, Kawasaki disease, Stevens-Johnson syndrome);
   b) hematological (e.g., sickle cell crisis, disseminated intravascular coagulopathy, severe anemia, neutropenia, heparin-induced thrombocytopenia, thrombosis); and
   c) oncological (e.g., acute tumour lysis syndrome, hemorrhagic cystitis, myocardial dysfunction, sepsis, superior vena cava syndrome, mediastinal mass).

9.3 Implements nursing interventions to optimize immunological and hematological function including:
   a) minimizing the risk of and preventing infections (e.g., aseptic techniques, infection control practices, nutrition, hygiene); and
   b) administering pharmacological agents (e.g., antibiotics, intravenous immunoglobulin, immunizations, antirejection medications, granulocyte colony-stimulating factor, antiretrovirals, anticoagulants, vitamin K, tranexamic acid, protamine, thrombolytics, erythropoietin).

10. **Musculoskeletal and Integumentary Systems**

The critical care pediatric nurse...

10.1 Evaluates data related to the musculoskeletal/integumentary systems including:
   a) child's health history (e.g., surgical procedures, trauma, altered mobility, age, nutritional and fluid status, infections and infectious contacts);
   b) physical assessment (e.g., skin integrity, range of motion, circulation, sensation, petechiae, mobility, risk of skin breakdown using a validated tool, deformities, device insertion sites);
   c) laboratory reports (e.g., electrolytes, CBC, urine myoglobin, cultures); and
   d) investigative test reports (e.g., imaging, skin/muscle biopsy).

10.2 Recognizes actual or potential life-threatening alterations of the musculoskeletal/ integumentary systems including:
   a) compartment syndrome;
   b) rhabdomyolysis;
   c) burns (e.g., thermal, chemical or radiation, electrical);
   d) wounds (e.g., postoperative, post-trauma, pressure ulcers);
   e) acute skin reactions (e.g., allergic, medication, rashes); and
   f) muscle weakness/paralysis (e.g., myopathy of critical illness, pharmacologically induced, neuromuscular disorders, spinal cord injury).

10.3 Implements nursing interventions to optimize musculoskeletal/integumentary function including:
   a) administering fluids and pharmacological agents, optimizing nutrition and maintaining thermoregulation (e.g., analgesics, antibiotics, antispasmodics);
   b) performing and/or managing wound care (e.g., specialized dressings, escharotomies, stoma devices); and
   c) preventing and managing complications related to mobility (e.g., positioning, range of motion, physiotherapy, basic hygiene, therapeutic beds, early mobilization).

11. **Care of Child and Family**

The Child

The critical care pediatric nurse...

11.1 Evaluates data related to the child's psychosocial needs including:
- a) child's health history (e.g., sensory function, developmental stage, previous hospitalizations and experiences, communication patterns, culture, comorbidities, mental health); and
- b) child's place within the family unit.

11.2 Recognizes the child's behavioural and emotional responses to his or her health crisis (e.g., verbal and non-verbal communication, withdrawal, regression, aggression, depression).

11.3 Identifies resources and accesses supports (e.g., family, child life therapy, psychology, pastoral care, social work).

11.4 Implements nursing interventions to address child's behavioural and emotional responses to illness.

11.5 Provides honest, factual, developmentally appropriate, timely information and support regarding health-care crisis, care in hospital, transfer and/or discharge (e.g., distraction techniques, personalized environment, communication tools, consistency, acknowledging and validating, providing choices).

The Family

The critical care pediatric nurse...

11.6 Evaluates data related to the family's psychosocial needs including:
- a) family health history (e.g., past experience within the PICU and health-care system, mental health); and
- b) family assessment (e.g., coping skills, family structure, relationships, roles, responsibilities, behavioural/emotional responses, culture, communication patterns).

11.7 Recognizes actual or potential alterations in family well-being (e.g., withdrawal, emotional expressions, evaluation of information, ability to make decisions, risk for violence, addressing stressors with current PICU admission).

11.8 Implements nursing interventions to optimize family functioning during the health crisis including:
- a) identifying resources and accessing supports (e.g., family, child life therapy, psychology, pastoral care, social work); and
- b) accessing the child as determined by the family's needs, the environment and the situation.

11.9 Provides honest, factual, timely information and support regarding health-care crisis, care in hospital, transfer and/or discharge (e.g., personalized environment, communication tools, consistency, acknowledging and validating, supporting decision-making, grief and loss support, engaging in celebrations).