

**2014**  
**VERSION 1.0**

*This document applies to those who begin training on or after July 1<sup>st</sup>, 2014.*

**NOTE: Throughout this document the word "family" will include caregivers, legal guardians, and substitute decision-makers.**

## **DEFINITION**

Pediatric Critical Care Medicine is a field of medicine concerned with infants, children and adolescents who have sustained or are at risk of sustaining life threatening, single or multiple organ system failure due to disease or injury. Pediatric Critical Care Medicine seeks to provide for the needs of these patients through immediate and continuous observation and intervention so as to restore health and prevent complications. A subspecialist in pediatric Critical Care Medicine is a physician or surgeon competent in all aspects of recognizing and managing acutely ill pediatric patients with single or multiple organ system failure requiring ongoing monitoring and support.

## **GOALS**

Upon completion of training, a resident is expected to be a competent subspecialist in pediatric Critical Care Medicine, capable of assuming a consultant's role in the specialty. The resident must acquire a working knowledge of the theoretical basis of the specialty, including its foundations in the basic medical sciences and research.

Only candidates certified by the Royal College of Physicians and Surgeons of Canada may be eligible for certification in pediatric Critical Care Medicine (please refer to the STR for pediatric Critical Care Medicine for details). A maximum of one year of training in pediatric Critical Care Medicine may be undertaken conjointly with one of the entry specialties after at least three years of training in the primary specialty.

Residents must demonstrate the requisite knowledge, skills, and attitudes for effective patient-centred care and service to a diverse population. In all aspects of specialist practice, the graduate must be able to address ethical issues and issues of gender, sexual orientation, age, culture, ethnicity and ethics in a professional manner.

## **PEDIATRIC CRITICAL CARE MEDICINE COMPETENCIES**

At the completion of training, the resident will have acquired the following competencies and will function effectively as a:

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## Medical Expert

### **Definition:**

As *Medical Experts*, subspecialists in pediatric Critical Care Medicine integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional attitudes in their provision of patient-centred care. *Medical Expert* is the central physician Role in the CanMEDS framework.

### **Key and Enabling Competencies: subspecialists in pediatric Critical Care Medicine are able to...**

#### **1. Function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical, and patient-centred medical care**

- 1.1. Perform a consultation effectively, including the presentation of well-documented assessments and recommendations in written and/or oral form in response to a request from another health care professional
- 1.2. Demonstrate effective use of all CanMEDS competencies relevant to pediatric Critical Care Medicine
- 1.3. Identify and appropriately respond to relevant ethical issues arising in patient care
- 1.4. Prioritize professional duties effectively and appropriately when faced with multiple patients and problems
- 1.5. Demonstrate compassionate and patient-centred care
- 1.6. Recognize and respond to the ethical dimensions in medical decision-making
- 1.7. Demonstrate medical expertise in situations other than patient care, such as providing expert legal testimony or advising governments, as needed

#### **2. Establish and maintain clinical knowledge, skills and behavior appropriate to pediatric Critical Care Medicine**

- 2.1. Apply knowledge of the clinical, socio-behavioural, developmental and fundamental biomedical sciences relevant to pediatric Critical Care Medicine
  - 2.1.1. Demonstrate knowledge of applied clinical physiology and homeostasis
  - 2.1.2. Demonstrate an understanding of physiology, pathophysiology, and pharmacology as they pertain to the critically ill pediatric patient
  - 2.1.3. Demonstrate knowledge of the unique aspects of the developing infant, child, and adolescent, including a broad based understanding of developmental physiology and age-related disease, developmental pharmacology, and the psychosocial needs of patients and patients' families
  - 2.1.4. Demonstrate knowledge of the following:
    - 2.1.4.1. Respiratory
      - 2.1.4.1.1. Normal anatomy and maturational variation of the respiratory

system

- 2.1.4.1.2. Physiology of the airway, gas exchange unit, lung and chest wall mechanics including control of breathing
  - 2.1.4.1.3. Principles of respiratory monitoring
  - 2.1.4.1.4. Diagnostic imaging of the respiratory system
  - 2.1.4.1.5. Pathophysiology and treatment of lung diseases, including but not limited to acute lung injury, obstructive lung disease and pneumonia
  - 2.1.4.1.6. Principles and theory of assisted ventilation and other methods of respiratory support
  - 2.1.4.1.7. Weaning from assisted ventilation
  - 2.1.4.1.8. Initiation and maintenance of long-term assisted ventilation
  - 2.1.4.1.9. Disease processes related to the different stages of development of the pediatric respiratory system
- 2.1.4.2. Cardiovascular
- 2.1.4.2.1. Normal anatomy and maturational variation of the cardiovascular system
  - 2.1.4.2.2. Congenital malformations of the cardiovascular system leading to heart failure and/or hypoxemia
  - 2.1.4.2.3. Immediate care of the infant/child/adolescent in accordance with practices advocated by Pediatric Advanced Life Support (PALS) training
  - 2.1.4.2.4. Immediate care of the newborn, in accordance with practices advocated by Neonatal Resuscitation Program (NRP) training
  - 2.1.4.2.5. Diagnostic imaging of the cardiovascular system
  - 2.1.4.2.6. Invasive and non-invasive hemodynamic monitoring, including but not limited to calculation of the cardiac output and other derived calculations from pulmonary artery catheterization
  - 2.1.4.2.7. Pathophysiology and treatment of cardiac failure in neonates, infants, children, and adolescents, including but not limited to the pharmacology of drugs used to treat these entities
  - 2.1.4.2.8. Cardiac dysrhythmias, including but not limited to pharmacological and electrical management modalities
  - 2.1.4.2.9. Shock syndromes, with emphasis on the pathophysiological events leading to and resulting from the shock state
  - 2.1.4.2.10. Heart-lung interactions
  - 2.1.4.2.11. Consequences of surgical interventions in children with cardiac disease
  - 2.1.4.2.12. Disease processes associated with the different stages of development of the pediatric cardiac system

2.1.4.3. Neurological

- 2.1.4.3.1. Normal anatomy and maturational variation of the neurologic systems
- 2.1.4.3.2. Physiology of the central and peripheral nervous systems
- 2.1.4.3.3. Principles of invasive and non-invasive neurologic monitoring
- 2.1.4.3.4. Diagnostic imaging of the neurologic systems
- 2.1.4.3.5. Pathophysiology and treatment of toxic, metabolic, structural, vascular and infectious causes of altered consciousness including but not limited to intracranial hypertension, seizure disorders, delirium, and substance intoxication and withdrawal
- 2.1.4.3.6. Age appropriate determination of brain death and its ancillary investigations
- 2.1.4.3.7. Perioperative management of major neurosurgical procedures

2.1.4.4. Neuromuscular

- 2.1.4.4.1. Acute neuromuscular disease including but not limited to disorders of the myoneural junction, myopathy and polyneuropathy of the critically ill, spinal cord syndromes, including investigations and therapeutic options
- 2.1.4.4.2. Supportive care including but not limited to medical, physiotherapy, occupational therapy, orthotics and social services, as well as administrative and ethical considerations associated with the care of the patient with chronic neuromuscular disease

2.1.4.5. Renal

- 2.1.4.5.1. Normal anatomy and maturational differences of the genito-urinary system
- 2.1.4.5.2. Physiology of the genito-urinary system
- 2.1.4.5.3. Principles of renal function monitoring
- 2.1.4.5.4. Diagnostic imaging of the genito-urinary system
- 2.1.4.5.5. Pathophysiology, prevention and management of acute kidney injury, including but not limited to renal replacement therapies

2.1.4.6. Gastrointestinal and hepatobiliary

- 2.1.4.6.1. Normal anatomy and maturational variation of the gastrointestinal and hepatobiliary systems
- 2.1.4.6.2. Physiology of the gastrointestinal and hepatobiliary systems
  - 2.1.4.6.2.1. Biosynthetic, immunologic, and detoxification functions of the liver

- 2.1.4.6.3. Diagnosis and management of the child presenting with congenital malformations of the gastrointestinal and/or hepatobiliary system
- 2.1.4.6.4. Principles of gastrointestinal and hepatobiliary monitoring
- 2.1.4.6.5. Diagnostic imaging of the gastrointestinal and hepatobiliary systems
- 2.1.4.6.6. Pathophysiology and treatment of
  - 2.1.4.6.6.1. Gastrointestinal dysfunction including but not limited to acute abdomen arising from obstruction, ischemia, perforation and dysmotility
  - 2.1.4.6.6.2. Upper and lower gastrointestinal bleeding
  - 2.1.4.6.6.3. Severe acute pancreatitis
  - 2.1.4.6.6.4. Acute and chronic hepatobiliary dysfunction, including but not limited to fulminant hepatic failure
  - 2.1.4.6.6.5. Complications of abdominal surgery
- 2.1.4.7. Shock
  - 2.1.4.7.1. Physiology of the hormones and regulatory cytokines involved in shock
  - 2.1.4.7.2. Principles of invasive and non-invasive monitoring for shock
  - 2.1.4.7.3. Diagnostic imaging of the patient with shock
  - 2.1.4.7.4. Pathophysiology and treatment of shock, including but not limited to distributive, hypovolemic, cardiogenic and obstructive shock
- 2.1.4.8. Hematologic disorders
  - 2.1.4.8.1. Coagulation and fibrinolytic pathways
  - 2.1.4.8.2. Pathophysiology and treatment of disorders of red cells, white cells and platelets
  - 2.1.4.8.3. Pathophysiology and treatment of coagulation disorders, including but not limited to thromboembolic disease, disseminated intravascular coagulation disease, and other coagulopathies
  - 2.1.4.8.4. Blood component therapy and alternatives and principles of massive transfusion
- 2.1.4.9. Oncologic emergencies
  - 2.1.4.9.1. Pathogenesis and management
    - 2.1.4.9.1.1. Superior vena cava syndrome

- 2.1.4.9.1.2. Tumour lysis syndrome
- 2.1.4.9.1.3. Central airway obstruction
- 2.1.4.9.1.4. Neoplastic spinal cord compression
- 2.1.4.9.1.5. Hypercalcemia
  
- 2.1.4.9.2. Acute complications of chemotherapy and radiation therapy resulting in organ function compromise
  
- 2.1.4.10. Metabolic and endocrine
  - 2.1.4.10.1. Physiology of thermal regulation and metabolic, endocrine, fluid and electrolyte homeostasis
  - 2.1.4.10.2. Normal and abnormal body temperature regulation and associated disorders, with particular reference to neonates and small children
  - 2.1.4.10.3. Pathophysiology, diagnosis and treatment of
    - 2.1.4.10.3.1. Fluid and/or electrolyte disturbances
    - 2.1.4.10.3.2. Acid-base disorders
    - 2.1.4.10.3.3. Endocrine emergencies
    - 2.1.4.10.3.4. Abnormal body temperature, including but not limited to hyperthermia, rewarming for hypothermia, and therapeutic hypothermia
    - 2.1.4.10.3.5. Acute presentation/crises of inborn errors of metabolism
  
- 2.1.4.11. Perioperative care
  - 2.1.4.11.1. Patient assessment and optimization, and minimization of perioperative risk
  - 2.1.4.11.2. Management of pain and sedation in the perioperative period
  - 2.1.4.11.3. Pathophysiology and treatment of critical illness in the perioperative period
  
- 2.1.4.12. Trauma and environmental hazards
  - 2.1.4.12.1. Immediate care of the injured patient in accordance with practices advocated by Advanced Trauma Life Support (ATLS) training
  - 2.1.4.12.2. Diagnostic imaging of the injured patient
  - 2.1.4.12.3. Maturational variation as related to the care of the child with traumatic injury
  - 2.1.4.12.4. Pathophysiology, diagnosis and continuing treatment of blunt and penetrating trauma

- 2.1.4.12.5. Evaluation and prioritization of the unique needs of the traumatized patient
- 2.1.4.12.6. Continuing care of the traumatized patient with regard to all systems
- 2.1.4.12.7. Secondary insults that enhance the primary pathogenicity of the traumatized organs
- 2.1.4.12.8. Special needs of the physically and/or sexually abused child
- 2.1.4.12.9. Pathophysiology and continuing treatment of environmental injuries including but not limited to thermal injuries, near drowning and biologic, chemical, electrical and radiation injuries
- 2.1.4.12.10. Long term sequelae, physical and emotional requirements of the traumatized child and their family, and the prognosis of traumatized children
- 2.1.4.12.11. Principles for the coordination and management of mass casualties
  
- 2.1.4.13. Septic illness
  - 2.1.4.13.1. Pathogenesis and diagnostic criteria of sepsis, severe sepsis, septic shock, systemic inflammatory response syndrome and multiple organ dysfunction syndrome
  - 2.1.4.13.2. Innate host response to sepsis including but not limited to the immunocompromised host
  - 2.1.4.13.3. Techniques for diagnosis of sepsis
  - 2.1.4.13.4. Pathophysiology and treatment of septic illnesses, including but not limited to appropriate use of source control, antimicrobial agents and other therapies
  - 2.1.4.13.5. Epidemiology of host specific infectious disease
  - 2.1.4.13.6. Preventive infection control techniques, including but not limited to antibiotic prophylaxis of contacts
  - 2.1.4.13.7. Pharmacology, indications, complications, interactions, monitoring, and efficacy of usual antimicrobial agents
  - 2.1.4.13.8. Occult indicators of sepsis
  
- 2.1.4.14. Intoxication
  - 2.1.4.14.1. Pharmacology of common intoxicants and poisons
  - 2.1.4.14.2. Strategies to reduce absorption and enhance elimination of intoxicants, including but not limited to:
    - 2.1.4.14.2.1. General supportive care of the intoxicated patient
    - 2.1.4.14.2.2. Specific antidotes or supportive therapy pertinent to individual intoxicants

- 2.1.4.14.3. Indications for psychiatric assessment
- 2.1.4.15. Nutritional Therapy
  - 2.1.4.15.1. Identification of current deficiencies, ongoing losses and extra needs induced by critical illness, including but not limited to monitoring of nutritional status and response to therapy
  - 2.1.4.15.2. Caloric, protein, vitamin and micronutrient requirements in the critically ill patient
  - 2.1.4.15.3. Fluid compartments and fluid/caloric requirements in the critically ill patient
  - 2.1.4.15.4. Techniques and laboratory tests used to evaluate nutritional status
  - 2.1.4.15.5. Methods of assessing basal energy expenditure and monitoring effectiveness
  - 2.1.4.15.6. Indications, limitations, methods, and complications of enteral and parenteral nutritional therapy
- 2.1.4.16. Pharmacotherapy
  - 2.1.4.16.1. Principles of pharmacokinetics and pharmacodynamics recognizing maturational variation
  - 2.1.4.16.2. Indications, routes of delivery, risks and drug interactions of pharmacotherapy
    - 2.1.4.16.2.1. Indications for and use of vasoactive agents
    - 2.1.4.16.2.2. Management of sedation, analgesia, and neuromuscular blockade
  - 2.1.4.16.3. Safe administration of therapeutic agents including but not limited to modification in the setting of organ dysfunction
  - 2.1.4.16.4. Pharmacologic and therapeutic applications of drugs, with particular emphasis on differences found in patients of various ages
- 2.1.4.17. Patient transport
  - 2.1.4.17.1. Physiology associated with air and ground transportation
  - 2.1.4.17.2. Equipment and monitoring methods specific to air and ground transportation
  - 2.1.4.17.3. Patient preparation, transportation modes and communication to facilitate safe patient transport including but not limited to the roles of paramedical personnel and physician accompaniment
  - 2.1.4.17.4. Special needs of infants and small children during transport

2.1.4.18. Transplantation

- 2.1.4.18.1. Basic principles of immunosuppression and rejection
- 2.1.4.18.2. Opportunistic and nosocomial infectious risk and disease
- 2.1.4.18.3. Perioperative issues, pharmacological management, and potential complications in the transplant recipient
- 2.1.4.18.4. Common problems specific to solid organ and bone marrow transplantation

2.1.4.19. End-of-life issues

- 2.1.4.19.1. Ethical principles
- 2.1.4.19.2. Cultural awareness and psychological, social and spiritual support
- 2.1.4.19.3. Pain and symptom management
- 2.1.4.19.4. Prognostication, communication and shared decision-making involving patients, patients' families and/or substitute decision-maker, and intensive care unit (ICU) team
- 2.1.4.19.5. Withholding and/or withdrawing life sustaining therapies
- 2.1.4.19.6. Organ and tissue donation including but not limited to the medical and ethical issues associated with neurologic determination of death and donation after cardiac death
- 2.1.4.19.7. Optimal management of the organ donor
- 2.1.4.19.8. Bereavement and counselling

2.2. Describe the CanMEDS framework of competencies relevant to pediatric Critical Care Medicine

2.3. Apply lifelong learning skills of the Scholar Role to implement a personal program to keep up-to-date, and enhance areas of professional competence

2.4. Integrate the available best evidence and best practices to enhance the quality of care and patient safety in pediatric Critical Care Medicine

**3. Perform a complete and appropriate assessment of a patient**

3.1. Identify and explore issues to be addressed in a patient encounter effectively, including the patient's context and preferences

3.2. Elicit a history that is relevant, concise and accurate to context and preferences for the purposes of diagnosis, management, health promotion, and disease prevention

3.3. Perform a focused physical examination that is relevant and accurate for the purposes of diagnosis, management, health promotion, and disease prevention

3.4. Select medically appropriate investigative methods in a resource-effective and ethical manner

3.4.1. Interpret an electrocardiogram (ECG)

- 3.5. Demonstrate effective clinical problem solving and judgment to address patient problems, including interpreting available data and integrating information to generate differential diagnoses and management plans
  - 3.5.1. Institute immediate life-sustaining measures, carry out an appropriate examination, develop a differential diagnosis, and continue with appropriate diagnostic and therapeutic measures in the following conditions in a critically ill patient:
    - 3.5.1.1. Single or combined organ dysfunction
      - 3.5.1.1.1. Respiratory
      - 3.5.1.1.2. Cardiovascular
      - 3.5.1.1.3. Neurological
      - 3.5.1.1.4. Neuromuscular
      - 3.5.1.1.5. Renal
      - 3.5.1.1.6. Gastrointestinal and hepatobiliary
      - 3.5.1.1.7. Hematologic disorders
      - 3.5.1.1.8. Metabolic-endocrine disorders
    - 3.5.1.2. Shock
    - 3.5.1.3. Oncologic emergencies
    - 3.5.1.4. Trauma and environmental injuries
    - 3.5.1.5. Sepsis
    - 3.5.1.6. Intoxication
    - 3.5.1.7. Perioperative setting
  - 3.5.2. Demonstrate the safe application of equipment, careful monitoring, and judicious use of pharmacotherapy for effective organ system support
  - 3.5.3. Recognize, resuscitate, and stabilize patients sustaining, or at risk of, cardiopulmonary arrest or other life-threatening disturbances
  - 3.5.4. Evaluate the nutritional status of the critically ill patient
  - 3.5.5. Diagnose brain death

#### **4. Use preventive and therapeutic interventions effectively**

- 4.1. Implement an effective management plan in collaboration with patients and patients' families
- 4.2. Demonstrate effective, appropriate, and timely application of preventive and therapeutic interventions
  - 4.2.1. Use, zero and calibrate transducers

- 4.2.2. Use monitoring equipment appropriately
    - 4.2.2.1. Measure cardiac output
    - 4.2.2.2. Monitor intra-abdominal pressure
    - 4.2.2.3. Monitor neuromuscular blockade with peripheral nerve stimulation
    - 4.2.2.4. Monitor intracranial pressure (ICP)
  - 4.2.3. Use medications judiciously
  - 4.2.4. Devise an age appropriate nutritional management strategy, incorporating the differing development needs of children and including but not limited to the provision of enteral and/or parenteral nutrition
  - 4.2.5. Use invasive and non-invasive ventilation
  - 4.2.6. Use temporary cardiac pacing
  - 4.2.7. Use techniques to treat hypo/hyperthermia and induce hypothermia
  - 4.2.8. Supervise continuous renal replacement therapy
  - 4.2.9. Monitor pain and symptom management
  - 4.2.10. Manage the organ donor
- 4.3. Ensure appropriate informed consent is obtained for therapies
  - 4.4. Ensure patients receive appropriate end-of-life care
    - 4.4.1. Facilitate a dignified process of life sustaining support withdrawal, without the withdrawal of care

**5. Demonstrate proficient and appropriate use of procedural skills, both diagnostic and therapeutic**

- 5.1. Demonstrate effective, appropriate, and timely performance of diagnostic and therapeutic procedures relevant to pediatric Critical Care Medicine including:
  - 5.1.1. Airway
    - 5.1.1.1. Assessment and maintenance of the airway
    - 5.1.1.2. Endotracheal intubation
    - 5.1.1.3. Management of the difficult and failed airway
    - 5.1.1.4. Replacement of an existing tracheostomy tube
  - 5.1.2. Breathing
    - 5.1.2.1. Ventilation by bag and mask
    - 5.1.2.2. Thoracostomy tube insertion
    - 5.1.2.3. Thoracentesis

- 5.1.3. Circulation
  - 5.1.3.1. Cardiopulmonary resuscitation
  - 5.1.3.2. Insertion of central and peripheral arterial lines
  - 5.1.3.3. Insertion of central venous lines
  - 5.1.3.4. Intraosseous vascular access
  - 5.1.3.5. Defibrillation
  - 5.1.3.6. Elective cardioversion
  - 5.1.3.7. Umbilical arterial and venous catheterization
  
- 5.1.4. Renal
  - 5.1.4.1. Insertion of a temporary hemodialysis catheter
  
- 5.1.5. Gastrointestinal
  - 5.1.5.1. Paracentesis
  
- 5.1.6. Nervous system
  - 5.1.6.1. Lumbar puncture
  
- 5.1.7. Ultrasound assessment for
  - 5.1.7.1. Vascular access including but not limited to central venous access
  
- 5.2. Demonstrate knowledge (with limited experience) of the effective, appropriate, and timely performance of the following procedures:
  - 5.2.1. Breathing
    - 5.2.1.1. Fiberoptic bronchoscopy in the intubated patient
    - 5.2.1.2. Diagnostic bronchoalveolar lavage
    - 5.2.1.3. Advanced ventilation strategies
  
  - 5.2.2. Circulation
    - 5.2.2.1. Insertion of temporary transvenous pacemaker
  
  - 5.2.3. Gastrointestinal
    - 5.2.3.1. Post-pyloric feeding tube placement
  
  - 5.2.4. Ultrasound assessment of:
    - 5.2.4.1. Pericardial effusion
    - 5.2.4.2. Cardiac ventricular size and function

- 5.2.4.3. Vascular volume status
  - 5.2.4.4. Pleural effusion
  - 5.2.4.5. Ascites
  - 5.3. Describe performance of the following procedures
    - 5.3.1. Airway
      - 5.3.1.1. Cricothyrotomy and other urgent or emergent surgical airways
    - 5.3.2. Breathing
      - 5.3.2.1. Intrathoracic pressure (esophageal pressure) measurements
    - 5.3.3. Circulation
      - 5.3.3.1. Pericardiocentesis
      - 5.3.3.2. Mechanical cardiovascular support supervision and/or insertion including but not limited to extracorporeal membrane oxygenation and ventricular assist device
      - 5.3.3.3. Minimally invasive cardiovascular hemodynamic monitoring
    - 5.3.4. Nervous system
      - 5.3.4.1. Jugular bulb oximetry insertion
      - 5.3.4.2. Electroencephalogram (EEG)
      - 5.3.4.3. Cerebral Doppler
    - 5.3.5. Ultrasound
      - 5.3.5.1. Focused abdominal sonography in trauma (FAST)
      - 5.3.5.2. Deep venous thrombosis (DVT) assessment
      - 5.3.5.3. Lung
      - 5.3.5.4. Abdominal aorta
  - 5.4. Ensure appropriate informed consent is obtained for procedures
  - 5.5. Document and disseminate information related to procedures performed and their outcomes
  - 5.6. Ensure adequate followup is arranged for procedures performed
  - 6. Seek appropriate consultation from other health professionals, recognizing the limits of their own expertise**
    - 6.1. Demonstrate insight into their own limits of expertise
    - 6.2. Demonstrate effective, appropriate, and timely consultation of another health
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professional as needed for optimal patient care

- 6.3. Arrange appropriate followup care services for patients and patients' families

## **Communicator**

### ***Definition:***

*As Communicators*, subspecialists in pediatric Critical Care Medicine effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.

### ***Key and Enabling Competencies: subspecialists in pediatric Critical Care Medicine are able to...***

#### **1. Develop rapport, trust, and ethical therapeutic relationships with patients and patients' families**

- 1.1. Recognize that being a good communicator is a core clinical skill for physicians, and that effective physician-patient communication can foster patient satisfaction, physician satisfaction, adherence and improved clinical outcomes
- 1.2. Establish positive therapeutic relationships with patients and patients' families that are characterized by understanding, trust, respect, honesty and empathy
  - 1.2.1. Recognize the unique and stressful environment of the critical care facility for patients and patients' families
- 1.3. Respect patient confidentiality, privacy and autonomy
- 1.4. Listen effectively
- 1.5. Be aware of and responsive to nonverbal cues
- 1.6. Facilitate a structured clinical encounter effectively

#### **2. Accurately elicit, interpret and synthesize relevant information and perspectives of patients, patients' families, colleagues, and other professionals**

- 2.1. Gather information about a disease and about a patient's and family's beliefs, concerns, expectations, and illness experience
  - 2.1.1. Gather information about the patient's and family's perspectives and values for end-of-life care
- 2.2. Seek out and synthesize relevant information from other sources, such as a patient's family, caregivers and other professionals

**3. Convey relevant information and explanations accurately to patients, patients' families, colleagues and other professionals**

3.1. Deliver information to a patient and family, colleagues and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision-making

3.1.1. Recognize the impact of language used when imparting information

**4. Develop a common understanding on issues, problems and plans with patients, patients' families, and other professionals to develop a shared plan of care**

4.1. Identify and explore problems to be addressed from a patient encounter effectively, including the patient's context, responses, concerns, and preferences

4.2. Respect diversity and differences, including but not limited to the impact of gender, religion and cultural beliefs on decision-making

4.3. Encourage discussion, questions, and interaction in the encounter

4.4. Engage patients, patients' families, and relevant health professionals in shared decision-making to develop a plan of care

4.4.1. Explain life-sustaining therapies, in clear language, and describe the expected outcome of such therapies in view of the patient's and family's goals and wishes

4.5. Address challenging communication issues effectively, such as obtaining informed consent, delivering bad news, and addressing anger, confusion and misunderstanding

4.5.1. Assess, communicate with, and support patients and patients' families confronted with critical illness

4.5.2. Communicate effectively with families who may present as dysfunctional, angry, confused, or litigious

**5. Convey effective oral and written information about a medical encounter**

5.1. Maintain clear, concise, accurate and appropriate records of clinical encounters and plans

5.2. Present oral reports of clinical encounters and plans

5.3. Convey medical information appropriately to ensure safe transfer of care

5.4. Present medical information effectively to the public or media about a medical issue

5.4.1. Explain the concept of brain death and organ donation, in clear language

## Collaborator

### **Definition:**

As *Collaborators*, subspecialists in pediatric Critical Care Medicine effectively work within a health care team to achieve optimal patient care.

**Key and Enabling Competencies: subspecialists in pediatric Critical Care Medicine are able to...**

### **1. Participate effectively and appropriately in an interprofessional health care team**

- 1.1. Describe the specialist's roles and responsibilities to other professionals
    - 1.1.1. Demonstrate an understanding of the role and responsibilities of a critical care physician and how they vary between the local, regional, and national levels
  - 1.2. Describe the roles and responsibilities of other professionals within the health care team including but not limited to nurses, respiratory therapists, dieticians, pharmacists, social workers and physiotherapists
  - 1.3. Recognize and respect the diversity of roles, responsibilities and competencies of other professionals in relation to their own
  - 1.4. Work with others to assess, plan, provide and integrate care for individuals or groups of patients
  - 1.5. Work with others to assess, plan, provide, and review other tasks, such as research problems, educational work, program review, or administrative responsibilities
    - 1.5.1. Contribute to productive communication and cooperation among colleagues in all aspects of education, service, and research, as they impact on the critical care environment, recognizing the multi-disciplinary nature of the specialty
  - 1.6. Participate effectively by contributing to or leading, as appropriate, interprofessional team meetings dealing with patient care and administrative functions
    - 1.6.1. Demonstrate respect and understanding for the role of other team members in communicating and facilitating decision-making with critically ill patients and their families
  - 1.7. Enter into interdependent relationships with other professions for the provision of quality care
  - 1.8. Describe the principles of team dynamics
  - 1.9. Respect team ethics, including confidentiality, resource allocation and professionalism
  - 1.10. Demonstrate leadership in a health care team, as appropriate
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**2. Work with other health professionals effectively to prevent, negotiate, and resolve interprofessional conflict**

- 2.1. Demonstrate a respectful attitude towards colleagues and members of an interprofessional team
- 2.2. Work with other professionals to prevent conflicts
- 2.3. Employ collaborative negotiation to resolve conflicts
- 2.4. Respect differences and address misunderstandings and limits of scope of practice in other professions
- 2.5. Recognize one's own differences, misunderstanding and limitations that may contribute to interprofessional tension
- 2.6. Reflect on interprofessional team function

**Manager**

***Definition:***

As *Managers*, subspecialists in pediatric Critical Care Medicine are integral participants in health care organizations, organizing sustainable practices, making decisions about critically ill patients, allocating resources, and contributing to the effectiveness of the health care system.

***Key and Enabling Competencies: subspecialists in pediatric Critical Care Medicine are able to...***

**1. Participate in activities that contribute to the effectiveness of their health care organizations and systems**

- 1.1. Work collaboratively with others in their organization
- 1.2. Participate in systemic quality process evaluation and improvement, including but not limited to patient and staff safety initiatives
  - 1.2.1. Identify environmental hazards and promote safety for patients and staff
  - 1.2.2. Identify, analyze, and minimize risk of critical incidents and adverse events, including but not limited to complications of critical illness
  - 1.2.3. Implement quality improvement activities, including but not limited to evidence based practice, best practice guidelines and benchmarking, and change management
- 1.3. Describe the structure and function of the health care system as it relates to pediatric Critical Care Medicine, including the roles of physicians
  - 1.3.1. Demonstrate knowledge of the physical requirements of ICU design
  - 1.3.2. Demonstrate knowledge of the administrative organization required to

- operate a pediatric Intensive Care Unit
- 1.3.3. Demonstrate knowledge regarding unit staffing requirements, skills, education, and organization
- 1.3.4. Evaluate and cooperatively determine critical care unit equipment requirements
- 1.4. Describe principles of health care financing, including physician remuneration, budgeting, organizational funding and strategic planning of the ICU service (structure, function, financing) within the wider health care environment
- 1.5. Manage the clinical, academic, and administrative affairs of a pediatric intensive care unit
  - 1.5.1. Facilitate the clinical care of the critically ill patient
    - 1.5.1.1. Triage and prioritize patients appropriately
    - 1.5.1.2. Manage safe and timely admission to ICU, and discharge from ICU
    - 1.5.1.3. Supervise and delegate to others according to competence and role
    - 1.5.1.4. Provide effective multidisciplinary and interprofessional team cooperation and leadership
  - 1.5.2. Apply knowledge of:
    - 1.5.2.1. Criteria for admission to, and discharge from ICU
    - 1.5.2.2. Common risk factors for post-ICU mortality or re-admission
    - 1.5.2.3. Commonly used scoring systems for assessment of severity of illness, case mix and workload
    - 1.5.2.4. Published standards of care at local, national and international level including but not limited to consensus statements and care bundles
    - 1.5.2.5. Principles of national / local health care legislation applicable to Critical Care Medicine

## **2. Manage their practice and career effectively**

- 2.1. Set priorities and manage time to balance patient care, practice requirements, and outside activities and personal life
- 2.2. Manage a practice including finances and human resources
- 2.3. Implement processes to ensure personal practice improvement
  - 2.3.1. Apply knowledge of the purpose and methods of clinical audit including but not limited to mortality reviews and complication rates
  - 2.3.2. Participate in the processes of clinical audit and peer review
- 2.4. Employ information technology appropriately for patient care

**3. Allocate finite health care resources appropriately**

- 3.1. Describe the principles of allocation of finite health care resources, balancing effectiveness, efficiency and access with optimal patient care
- 3.2. Apply evidence and management processes for cost-appropriate care
- 3.3. Describe the principles of surge planning

**4. Serve in administration and leadership roles**

- 4.1. Chair or participate effectively in committees and meetings
- 4.2. Lead or implement change in health care
- 4.3. Plan relevant elements of health care delivery, such as work schedules

**Health Advocate**

***Definition:***

As *Health Advocates*, subspecialists in pediatric Critical Care Medicine responsibly use their expertise and influence to advance the health and well-being of individual patients, communities, and populations.

***Key and Enabling Competencies: subspecialists in pediatric Critical Care Medicine are able to...***

**1. Respond to individual patient health needs and issues as part of patient care**

- 1.1. Identify the health needs of an individual patient and involve the patient or patient's family in decisions about care and treatment
  - 1.1.1. Identify religious, cultural, and socioeconomic issues related to the care of the patient
- 1.2. Identify opportunities for advocacy, health promotion and disease prevention with individuals to whom they provide care
- 1.3. Demonstrate an appreciation of the possibility of competing interests between individual advocacy issues and the community at large
- 1.4. Demonstrate an awareness of the psychological impact critical illness has on patients and patients' families, both acutely and long-term

**2. Respond to the health needs of the communities that they serve**

- 2.1. Describe the practice communities that they serve
- 2.2. Identify opportunities for advocacy, health promotion and disease prevention in the communities that they serve, and respond appropriately
  - 2.2.1. Communicate about critical care issues and their impact on the maintenance

and improvement of health care to the general population

- 2.3. Appreciate the possibility of competing interests between the communities served and other populations

### **3. Identify the determinants of health for the populations that they serve**

- 3.1. Identify the determinants of health of the population, including barriers to access to care and resources
- 3.2. Identify vulnerable or marginalized populations within those served and respond appropriately

### **4. Promote the health of individual patients, communities, and populations**

- 4.1. Describe an approach to implementing a change in a determinant of health of the populations they serve
- 4.2. Describe how public policy impacts on the health of the populations served
- 4.3. Identify points of influence in the health care system and its structure
- 4.4. Describe the ethical and professional issues inherent in health advocacy, including altruism, social justice, autonomy, integrity and idealism
- 4.5. Demonstrate an appreciation of the possibility of conflict inherent in their role as a health advocate for a patient or community with that of manager or gatekeeper
- 4.6. Describe the role of the medical profession in advocating collectively for health and patient safety

## **Scholar**

### ***Definition:***

As *Scholars*, subspecialists in pediatric Critical Care Medicine demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge.

***Key and Enabling Competencies: subspecialists in pediatric Critical Care Medicine are able to...***

### **1. Maintain and enhance professional activities through ongoing learning**

- 1.1. Describe the principles of maintenance of competence
- 1.2. Describe the principles and strategies for implementing a personal knowledge management system
- 1.3. Recognize and reflect on learning issues in practice
- 1.4. Conduct personal practice audits

- 1.5. Pose an appropriate learning question
- 1.6. Access and interpret the relevant evidence
- 1.7. Integrate new learning into practice
- 1.8. Evaluate the impact of any change in practice
- 1.9. Document the learning process

**2. Critically evaluate medical information and its sources, and apply this appropriately to practice decisions**

- 2.1. Describe the principles of critical appraisal
  - 2.1.1. Describe the principles of levels of evidence
  - 2.1.2. Describe the levels of evidence for and against specific therapeutic interventions or treatments
  - 2.1.3. Describe the use of integrative literature, including but not limited to meta-analyses, practice guidelines, decision and economic analyses
- 2.2. Critically appraise retrieved evidence in order to address a clinical question
- 2.3. Demonstrate rational use of the principles of evidence based medicine in both clinical and research settings
- 2.4. Integrate critical appraisal conclusions into clinical care

**3. Facilitate the learning of patients, patients' families, students, residents, other health professionals, the public and others**

- 3.1. Describe principles of learning relevant to medical education
- 3.2. Identify collaboratively the learning needs and desired learning outcomes of others
- 3.3. Participate in, and promote continuing education of members of the multi-disciplinary health care team
- 3.4. Select effective teaching strategies and content to facilitate others' learning
  - 3.4.1. Practice the principles of adult learning and help others learn by providing guidance and constructive feedback
- 3.5. Deliver effective lectures or presentations
- 3.6. Assess and reflect on teaching encounters
- 3.7. Provide effective and constructive feedback
- 3.8. Describe the principles of ethics with respect to teaching

**4. Contribute to the development, dissemination, and translation of new knowledge and practices**

- 4.1. Describe the principles of research and scholarly inquiry
- 4.2. Describe the principles of research ethics
- 4.3. Pose a scholarly question
- 4.4. Conduct a systematic search for evidence
- 4.5. Select and apply appropriate methods to address the question
- 4.6. Disseminate the findings of a study
- 4.7. Complete a scholarly research, quality assurance, or educational project relevant to pediatric Critical Care Medicine that is suitable for peer-reviewed publication or presentation at an academic meeting

**Professional**

***Definition:***

*As Professionals*, subspecialists in pediatric Critical Care Medicine are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, and high personal standards of behaviour.

***Key and Enabling Competencies: subspecialists in pediatric Critical Care Medicine are able to...***

**1. Demonstrate a commitment to their patients, profession, and society through ethical practice**

- 1.1. Exhibit appropriate professional behaviors in practice, including honesty, integrity, commitment, compassion, respect and altruism
  - 1.1.1. Demonstrate an awareness and understanding of moral and ethical issues as they impact on patients, patients' families, and critical care providers
  - 1.1.2. Develop and demonstrate use of a framework for recognizing and dealing with ethical issues in clinical and/or research practice including but not limited to truth-telling, consent, conflict of interest, resource allocation, and end-of-life care
  - 1.1.3. Recognize circumstances where personal prejudices or biases may affect behavior, including but not limited to cultural, financial and academic aspects, and respond appropriately
- 1.2. Demonstrate a commitment to delivering the highest quality care and maintenance of competence
  - 1.2.1. Demonstrate an understanding of the role and responsibilities of the critical care physician at the local, regional, and national levels
  - 1.2.2. Develop and demonstrate use of a framework for implementing published

standards of care at a local, national and international level

- 1.2.3. Demonstrate responsibility for safe patient care, including but not limited to effective transfer and continuity of care
- 1.3. Recognize and appropriately respond to ethical issues encountered in practice
  - 1.3.1. Recognize and appropriately respond to conflict between parents and a competent minor in decision-making and/or conflict between substitute decision-makers/parents
- 1.4. Recognize and manage real or perceived conflicts of interest
- 1.5. Recognize the principles and limits of patient confidentiality as defined by professional practice standards and the law
- 1.6. Maintain appropriate boundaries with patients
- 2. Demonstrate a commitment to their patients, profession and society through participation in profession-led regulation**
  - 2.1. Demonstrate knowledge and understanding of professional, legal and ethical codes of practice
    - 2.1.1. Describe the medical, legal and ethical issues surrounding organ donation and transplantation
    - 2.1.2. Describe the legal and ethical issues that surround the capacity of minors to give informed consent
  - 2.2. Fulfil the regulatory and legal obligations required of current practice
    - 2.2.1. Demonstrate knowledge of medico legal considerations for the critically ill
  - 2.3. Demonstrate accountability to professional regulatory bodies
  - 2.4. Recognize and respond appropriately to others' unprofessional behaviours in practice
  - 2.5. Participate in peer review
- 3. Demonstrate a commitment to physician health and sustainable practice**
  - 3.1. Balance personal and professional priorities to ensure personal health and a sustainable practice
  - 3.2. Strive to heighten personal and professional awareness and insight

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- 3.3. Recognize other professionals in need and respond appropriately
  - 3.3.1. Recognize and respond appropriately to impaired performance in self and colleagues

**REVISED** – Specialty Standards Review Committee – May 2014