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Pediatric Critical Care Service Curriculum (Standard Rotation)

UKSM-W Department of Pediatrics

Rationale:

This monthly rotation is assigned to first through third year residents year round. Teaching and supervision is provided by a full-time pediatric intensivist in the PICU at Wesley Medical Center. Care of the critically ill or injured patient, from the neonatal period through adolescence, is an essential part of the pediatric resident's training and core reading recommendations with be provided. Expectations include the review and development of the core material, participation in daily instruction and supervision over patient care, literature searches of material as necessary for patient care and the understanding of evidence-based medicine in the care of the critical care patient, and participation in the development and presentation of core materials to students and allied critical care staff.

Format:

The resident will participate directly in the care of the patients in the PICU as well as supervise the care provided by third-year medical students. As a general rule, the resident will not be expected to follow more than 6 patients at one time. Thus, the resident will be expected to know the patients thoroughly and to provide a comprehensive daily ICU "systems" note. At times, there will be another service involved, with residents also involved in the care. This does not affect the role of the critical care resident, whose documentation will represent the opinion and recommendations of the critical care service only. The resident will follow both primary critical care service admissions as well participating in consultations. The typical workday in the PICU is from 0700 until 1700. The resident is required to take night-call while on this service as in accordance with the scheduling by the Inpatient Supervising Resident assignment. Availability during weekends and holidays if expected unless prior notification / arrangements have been made. All patient care and call rotations will comply with guidelines as determined by the Accreditation Council for Graduate Medical Education (ACGME). Patient care and teaching rounds will be made every day in the AM. Resident participation is mandatory.

Goals and Objectives:

During this rotation, the resident will receive exposure to the following pediatric critical care subjects, and will be expected to convey an understanding of these processes during bedside rounds, in lectures, and during actual patient care. The resident's final evaluation will be based primarily on the expression of an increased understanding of and confidence in the management of the patient and the diseases encountered in the PICU.

Medical Knowledge:

1. Read assigned materials and course syllabus.
2. Identify areas for improvement of knowledge – it is recommended that the resident seek feedback from the attending intensivist about relevant clinical questions.
3. Assess all available information to support clinical decision-making, including available pediatric critical care texts, appropriate journal articles, and internet resources.
4. Develop and use a basic fund of knowledge in the area of pediatric critical care to include:
    a. **Airway Management** – The resident will gain an understanding of the appropriate use of airway adjuncts, such as the various means of delivering oxygen and positive pressure ventilation; emergent intubation techniques including pharmacologic interventions (neuromuscular blockade, sedation, analgesia), direct and fiberoptic laryngoscopy; chronic airway management, including tracheostomy and oral or nasal endo-tracheal tube utilization; and the disease processes encountered in the PICU involving the airway, such as croup, epiglottitis, sub-glottic stenosis, foreign body, and post-extubation stridor.

b. **Basic and Advanced Pediatric Life Support** – The resident will gain an understanding of the recommended evaluation and acute interventions for the unstable and compromised critical care patient according to American Heart Association's Pediatric Advanced Life Support Guidelines and / or the American Academy of Pediatrics' Advanced Pediatric Life Support Guidelines.
c. **Mechanical Ventilation** – The resident will learn the basic fundamentals upon which a mechanical ventilator works and will become familiar with the various modes of ventilation used for the diseases causing respiratory failure in children. The resident will be expected to work closely with the respiratory therapy staff, gaining an understanding of the role of the critical care RT, as well as appropriate utilization of the services they can provide to a patient in the PICU. The resident will be expected to learn and demonstrate the appropriate method of securing an endotracheal tube, suction ing a patient on the ventilator, administering chest physiotherapy, and monitoring and applying ventilatory parameters.
d. **Vascular Access and Hemodynamic Monitoring** – The resident will gain and understanding of the indications, contraindications, complications, and appropriate utilization of central venous catheters, pulmonary artery catheters, arterial catheters, and peripheral intravenous lines.
e. **Monitoring in the PICU** – The resident will be expected to gain an understanding of the various tools utilized to monitor patients in the PICU, including pulse oximetry, end-tidal CO2 monitoring, transcutaneous CO2 monitoring, continuous cardiac and respiratory monitoring, and intracranial pressure monitoring.
f. **Conscious, Deep and Procedural Sedation** – The resident will have the opportunity to participate in the pediatric sedation program for Outpatient and Inpatients scheduled for Radiological, Neurodiagnostic, Nuclear Medicine and various diagnostic and Therapeutic procedures. With this experience, the resident will become aware of the requirements for safe and effective sedation, medication options and dosing, potential side-effects and risks associated with the sedation process, airway management and appropriate monitoring required.
g. **Pathophysiology of Diseases common to the PICU patient populations** – There will be daily discussions of the pathophysiology involved in the diseases encountered in the patients admitted to the PICU. Residents will be expected to independently find and study textbooks and journal articles describing state-of-the-art understanding and management of these processes.
h. **Psychosocial Aspects of care of children in a PICU environment** – The resident will experience the difficult psychosocial and emotional challenges inherent to caring for the critically ill child, including interactions with the patient, parents and expended family, and allied health care providers such as nurses, respiratory therapists, and support personnel. This will include personal coping mechanisms as well as the provision of support to the family and staff throughout the difficult process of diagnosis, therapy, and recovery or death. Bedside manner and professionalism will be specifically addressed.
i. **Discharge criteria and appropriate communication to and follow-up with the referring / primary care physician** – The resident will play a significant role in the process of informing and updating the referring / primary care physician of the condition and care plan of patients admitted to the PICU. In addition, residents will be expected to develop and communicate a recommended plan for follow-up upon discharge of the patient, both to the patient / patient care-giver as well as the primary care physician.

The resident on PICU will be expected to master the subject matter listed in Appendix A.

Patient Care:

In addition to direct patient care as discussed above (see FORMAT), the resident will be expected to interact with the patient and family, gaining an appreciation of the unique nature of the interaction, which occurs when caring for a critically ill child. There will also be a strict requirement that all communications with the nursing staff, unit clerks, respiratory therapists, and all other allied staff will be one of the mutual

respect and accommodation. The PICU is a potentially very stressful environment, and it is crucial that the resident demonstrate the ability to function appropriately in that environment as one in the team of care providers.

1. Perform and / or supervise the third-year student's performance of a admission history and physical when necessary for new admissions to the PICU. This is done in conjunction with the attending pediatric intensivist. Admission documentation should include a hand-written note and a dictated history and physical within the first 24 hours of hospital stay and will be complete, including a detailed past medical history and developmental history.
2. Complete a pediatric critical care consultation when appropriate or when requested in conjunction with the attending pediatric intensivist.
3. Recognize abnormal findings and symptoms and appropriately intervene.
4. Appropriately triage new admission / patients with deteriorating conditions to the proper level of care.
5. Utilize appropriate lab and imaging tests with proper interpretation of findings.
6. Formulate and prioritize a differential diagnosis and management plan based on patient information and current scientific evidence using sound clinical judgment.
7. Develop proficiency in performing procedures on patient with critical needs as required in the process of providing appropriate care and monitoring for complications associated with such procedures.
8. Understand the indications for anesthesia, sedation, and analgesia for commonly performed procedures in the PICU (intravenous catheter placement, lumbar punctures, central venous line placement, elective endotracheal intubation, elective thoracostomy tube placement, etc.) as well as for intubated / mechanically ventilated patients, postoperative surgical patients, and trauma patients.
9. Use appropriate outcome measures for evaluating the effectiveness of management plans: eg. repeat testing, monitoring devices, etc.
10. Daily chart documentation of daily patient evaluations, physical exam, assessments and care issues / plans to include but not limited to:
    - Interval History
    - Respiratory System
    - Cardiovascular System
    - Neurologic / Pain Control / Sedation
    - Gastrointestinal System
    - Nutrition
    - Renal System
    - Metabolic
    - Hematologic
    - Infectious Disease
    - Integument
    - Social Issues
    - General
    - Assessment
    - Plan of Care
11. Complete and maintain a Problem List for each patient on each chart.
12. The resident with present and/or oversee the presentation of the patient's current evaluation, assessment and plan of care on a daily basis during formal patient care / teaching rounds.
13. The resident will learn when and how to obtain consultation of other services in an appropriate manner.
14. The resident will learn the appropriate selection, dosing and required monitoring of medications common to the PICU patient.
15. The resident will develop and communicate an appropriate discharge and follow-up care plan for each patient at appropriate times and to the necessary services and physicians.
16. The resident will dictate a discharge summary for all patients under his/her care within 24 hours of their dismissal.

17. The resident is expected to learn and follow every possible precaution against the transmission of infectious diseases in the PICU.
18. The resident will complete the required list of procedures recommended during your rotation in the PICU with appropriate instructor check-off documented. The completed check-off list is to be returned to the Pediatric Critical Care office for review for your evaluation.

Professionalism:

The resident is expected to be professional in manner and appearance throughout this rotation. They are expected to be punctual, trustworthy and responsible in their role as a care provider. The residents are expected to be available and promptly evaluate assigned patients upon admission and if asked to address concerns from nursing or other care-team members. The residents are expected to respect and act appropriately during interactions with all providers involved in the care of the PICU patient. They are expected to complete hospital documentation accurately and in a timely manner. The resident is also expected to recognize the potential ethical dilemmas and cultural issues that impact the care of the critical ill child and the involvement of the parents / family (e.g. death and dying, permanent / temporary disabilities, financial limitations, etc.).

Practice-Based Learning and Improvement:

The resident will be expected to participate in the educational endeavors of the critical care service, including lectures to students and allied critical care staff such as nurses and respiratory therapists. The resident will be expected to extract information from the literature and give brief presentations on topics that are identified during patient care to both to enhance patient care as well as self-education.

Systems-Based Practice:

The resident will be exposed to the team approach to patient care in the PICU with emphasizes on appropriate, effective and efficient diagnostic and therapeutic interventions according to current standards. In addition, the resident will learn appropriate triage for patient care through consideration of proper assignment and placement for the allocation of medical resources. They will be exposed to the use of appropriate utilization and coordination personnel for the successful transition of medical care from the inpatient to the outpatient setting. The residents will be expected to play a leading role in the coordination and conduction of family and care-team meetings as they occur for the planning and coordination of both inpatient and outpatient care.

Interpersonal Skills and Communication:

The resident will be expected to establish a working relationship with the patient, patient family, allied healthcare professionals, the care team, and the attending during the rotation. They will be expected to follow appropriate etiquette for both written and verbal interactions and follow unit policies for dress, behavior, activities, and personal interactions at all times. The residents are to use consultants appropriately and communicate directly with them about patient care and follow-up. They are also expected to provide frequent feedback to and from residents and attendings regarding status of their patients and any changes. The residents are expected to contact follow-up physicians as appropriate and obtain help with concerns or questions as needed.

Evaluation:

An evaluation of the individual resident’s performance will be completed for all residents who participate in the Pediatric Critical Care elective. The residents performance will be evaluated by the attending physician, with input from the other PICU team members and appropriate allied health personnel, utilizing the Pediatric Department Teaching Attending Resident Evaluation form.

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Appendix A: Medical Knowledge expected to be mastered during the PICU Rotation

Lecture 136

Neonatal Physiology – Part 1 - Cardiorespiratory

1) Respiratory
   a) development, anatomy, surfactant
   b) pulmonary oxygen toxicity
   c) pulmonary function
   d) lung volumes vs. adult
   e) airway differences, infant vs. adult
2) Cardiovascular
   a) transition, fetal to adult
   b) persistent fetal circulation

Lecture 137

Neonatal Physiology – Part 2

1) Retinopathy of Prematurity: Anesthetic Implications
2) Metabolism, Fluid Distribution And Renal Function
3) Thermal Regulation (Neutral Temperature, Nonshivering Thermogenesis)
4) Fetal Hemoglobin
5) Prematurity, Apnea of Prematurity
6) Bronchopulmonary Dysplasia