



# Care of the Acutely Ill Pediatric Patient: Respiratory Bundle

*Children's Hospital Association*

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## Respiratory Bundle

These 13 online courses represent current evidence-based practice to prepare pediatric and adult clinicians to care for children with critical respiratory issues presenting in the ED or inpatient area.



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## Respiratory Bundle

Acute Respiratory Distress Syndrome  
Advanced Medication Calculation  
Asthma  
Basic Medication Calculation  
Basic Principles of Oxygen Therapy, Specialty Gases and Noninvasive Ventilation  
Emergency Response for the Deteriorating Pediatric Patient  
Family-Centered Care in the ICU  
Lower Airway Diseases  
Mechanical Ventilation: Introduction to Pediatric Practices  
Pediatric Assessment: The Respiratory System  
Pediatric Sepsis  
Respiratory Inhalation Medications  
Status Asthmaticus

# Respiratory Bundle

## Acute Respiratory Distress Syndrome (46 minute)

Continuing Education Available: CNE (JAICE) 0.75, CME (JAICE) 0.75, CRCE 1.00

Intended For: Physicians, Clinicians working in the CVICU, Residents, Nurses, Clinicians working in the ED, General Staff, Graduate Nurses, Pharmacists, Respiratory Therapists, Residents and Fellows, Nurse Practitioners, Clinicians working in the NICU, Educators, Clinicians working in the PICU

Pediatric acute respiratory distress syndrome (PARDS) is a life-threatening condition that results from either direct injury to the lungs or as a systemic response to an indirect injury. It occurs in 15 to 18 percent of all ventilated patients and in approximately one percent of children admitted to pediatric intensive care units. The mortality rate ranges from 20 to 45 percent. This course provides an overview of PARDS and discusses current management standards.

### Objectives:

Define PARDS using the criteria of the Pediatric Acute Lung Injury Consensus Conference. Associate the pathophysiology of PARDS to its clinical presentation. Recognize the presenting clinical features of PARDS. Outline current treatment and management modalities for PARDS.

# Respiratory Bundle

## Advanced Medication Calculation (44 minute)

Continuing Education Available: CNE (JAICE) 0.75

Intended For: Clinicians working in the CVICU, Nurses, Clinicians working in the ED, Clinicians working on units with ECG monitoring, Graduate Nurses, Clinicians, Nurse Practitioners, Clinicians working in the NICU, Educators, Managers, Clinicians working in the PICU

This course provides a review of how to calculate pump (or infusion) rate of intravenous (IV) fluids and medications that are frequently utilized in high-acuity health care environments. The content focuses on medications ordered as dose over time, administration of continuous and intermittent IV medications and the calculation of pediatric fluid replacement.

### Objectives:

Accurately calculate a medication dosage according to body weight. Determine the pump rate of intravenous fluids and medications. Accurately calculate fluid requirements for a pediatric patient. Calculate the dose being delivered when the rate and concentration are known.

# Respiratory Bundle

## Asthma (46 minute)

Continuing Education Available: CNE (JAICE) 0.75, CRCE 1.00

Intended For: Physicians, Residents, Nurses, Pharmacists, Respiratory Therapists, Residents and Fellows, Nurse Practitioners, Clinicians working in the NICU, Educators, Clinicians working in the PICU

Asthma is the most common chronic lung disease in children and the primary reason for emergency room visits, hospitalizations and missed days of school. Approximately 9.4% of children in the United States have asthma. This condition results in a narrowing of the airway, and, if not effectively managed, can progress to complete airway obstruction. NATIONAL HEART, LUNG AND BLOOD INSTITUTE (NHLBI) Definition of asthma: A chronic inflammatory disorder of the airway Asthma contributes to: Recurrent exacerbations of respiratory symptoms Chronic inflammation Variable airflow obstruction Airway hyper-reactivity

### Objectives:

Explain the pathophysiology of asthma in children. Outline risk factors and clinical presentation of asthma in the pediatric patient. Describe diagnostic and management strategies for the pediatric patient with asthma.

# Respiratory Bundle

## Basic Medication Calculation (41 minute)

Continuing Education Available: CNE (JAICE) 0.75

Intended For: Residents, Nurses, Graduate Nurses, Clinicians

Health care practitioners have an important role in medication calculation. They must not only perform accurate medication calculations themselves, but also confirm the accuracy of calculations made by colleagues. It is essential that each clinician who has responsibility for ordering, dispensing and/or administering medication is competent in medication calculation. This course provides a review of basic medication calculation including measurement, conversions and dosage calculations.

### Objectives:

Identify common sources of error in medication calculation and related strategies for safe medication delivery. Review common conversions and accurately convert simple measurements from one system of weight and measure to another. Demonstrate accurate dosage calculation utilizing appropriate methods and rounding guidelines for pediatrics.

# Respiratory Bundle

## **Basic Principles of Oxygen Therapy, Specialty Gases and Noninvasive Ventilation (62 minute)**

Continuing Education Available: CNE (JAICE) 1.00, CRCE 1.00

Intended For: Physicians, Clinicians working in the CVICU, Residents, Nurses, Clinicians working in the ED, Clinicians working on units with ECG monitoring, Graduate Nurses, Clinicians, Respiratory Therapists, Residents and Fellows, Nurse Practitioners, Clinicians working in the NICU, Nursing Aides, Clinicians working in the PICU

Oxygen is classified as a drug because, like a drug, it has distinct physiologic and biochemical actions, effective dosing ranges and well-defined adverse effects when used in high doses. When used as a therapeutic agent, oxygen plays a decisive role in correcting tissue hypoxia, improving myocardial function and accelerating tissue repair through its antiseptic effect in the anti-inflammatory response. Frequent use of oxygen, in comparison to other therapeutic agents, is due to its easy availability and relatively inexpensive material cost. This course introduces the various modes of oxygen delivery and noninvasive respiratory support measures commonly used to manage the pediatric patient's oxygen needs. The purpose and safe administration of common specialty gases is also discussed.

### **Objectives:**

Explain the use of oxygen as a therapeutic agent as well as its risks and hazards. State the indications, contraindications, and risks of the following modes of oxygen delivery: Nasal cannula, Masks, High-flow nasal cannula. Describe the use of CPAP and BiPAP as noninvasive respiratory support modalities for treating oxygen refractory hypoxemia. Describe the purpose and safe administration of common specialty gases used in neonatal-pediatric respiratory care.

# Respiratory Bundle

## Emergency Response for the Deteriorating Pediatric Patient (79 minute)

Continuing Education Available: CNE (JAICE) 1.25, CRCE 1.00

Intended For: Clinicians working in the CVICU, Nurses, Clinicians working in the ED, Clinicians working on units with ECG monitoring, Graduate Nurses, Clinicians, Respiratory Therapists, Nurse Practitioners, Clinicians working in the NICU, Educators, Managers, Nursing Aides, Clinicians working in the PICU

The course discusses anatomical and physiological characteristics of children and a systematic assessment process that will assist in the early identification of decompensating conditions along with steps to prevent progression and timely engagement of an emergency response team. The responsibilities of the bedside health care team before, during and after arrival of an emergency response team is also discussed.

### Objectives:

Discuss anatomical and physiological characteristics of children. Recognize early signs and symptoms of cardiopulmonary decompensation. Identify reasons to activate the emergency response team. Discuss your role as a member of the health care team in assisting the emergency response team.



# Respiratory Bundle

## Family-Centered Care in the ICU (32 minute)

Continuing Education Available: CNE (JAICE) 0.50, CRCE 1.00

Intended For: Nurses, Clinicians working in the NICU, Clinicians working in the PICU

The admission of a child to the critical care setting is a traumatic and stressful event for the entire family. By recognizing the typical stressors experienced by pediatric patients and their families and employing appropriate family-centered interventions, the clinician can help families cope and achieve greater patient and family satisfaction. This course discusses the core principles of providing family-centered care to the critically ill child and family.

### Objectives:

Define family-centered care. Explain the core principles of family-centered care. Identify major sources and symptoms of stress for critically ill children and their families. Describe interventions to support families in crisis. Select appropriate strategies to facilitate a positive sibling visit. Discuss factors that would lead to the involvement of a social worker.

# Respiratory Bundle

## Lower Airway Diseases (60 minute)

Continuing Education Available: CNE (JAICE) 1.00, CRCE 1.00

Intended For: Clinicians working in the CVICU, Nurses, Clinicians working in the ED, Clinicians working on units with ECG monitoring, Graduate Nurses, Clinicians, Nurse Practitioners, Clinicians working in the NICU, Educators, Clinicians working in the PICU

Many infants and children are hospitalized due to lower airway diseases. Clinicians can help prevent respiratory complications from lower airway diseases by understanding the pathophysiology, assessing for clinical manifestations and implementing early interventions based on current treatment modalities. This course will review bronchiolitis, pneumonia and respiratory syncytial virus (RSV) and will briefly review asthma.

### Objectives:

Explain the pathophysiology of bronchiolitis and pneumonia in children. Outline the clinical presentation for bronchiolitis and pneumonia. Describe diagnostic and management strategies for bronchiolitis and pneumonia.

# Respiratory Bundle

## **Mechanical Ventilation: Introduction to Pediatric Practices (40 minute)**

Continuing Education Available: CNE (JAICE) 0.75, CRCE 1.00

Intended For: Nurses, Clinicians working in the ED, Graduate Nurses, Clinicians, Respiratory Therapists, Residents and Fellows, Clinicians working in the NICU, Clinicians working in the PICU

Care of the pediatric patient requiring mechanical ventilation requires a thorough understanding of the principles of ventilatory support and in-depth clinical assessment and management skills. Because these patients are often critically ill and have complex needs, the clinician plays a crucial role in providing efficient, effective and holistic care to ensure positive patient outcomes. This course introduces the principles and current pediatric modes of mechanical ventilation. Additional Courses It is recommended to first review Pediatric Learning Solutions' Advanced Concepts in Respiratory Physiology course, which provides an overview of ventilation therapies and application to the care of a child with respiratory dysfunction.\*Note: This module may not be currently available in your organization.

### **Objectives:**

Identify the parameters of mechanical ventilation and how each can be manipulated to improve oxygenation and lung mechanics. Describe methods and modes of mechanical ventilation. Explain patient assessment criteria and equipment assessment steps to evaluate the effectiveness of mechanical ventilation, including assessment indicators for weaning and extubation readiness. Evaluate the role of nitric oxide, surfactant, patient position changes and heliox as adjunct therapies to mechanical ventilation. Identify complications of mechanical ventilation and methods of prevention.

# Respiratory Bundle

## **Pediatric Assessment: The Respiratory System (48 minute)**

Continuing Education Available: CNE (JAICE) 0.75

Intended For: Physicians, Clinicians working in the CVICU, Residents, Nurses, Clinicians working in the ED, Clinicians working on units with ECG monitoring, General Staff, Graduate Nurses, Clinicians, Respiratory Therapists, Residents and Fellows, Nurse Practitioners, Clinicians working in the NICU, Educators, Clinicians working in the PICU

Respiratory symptoms are one of the most common reasons for an outpatient visit and inpatient admission in pediatrics. Because of this, the skills required for the pediatric respiratory exam are some of the most important when assessing the pediatric patient. This course reviews the key components necessary to provide a thorough pediatric respiratory exam.

### **Objectives:**

Discuss key elements of a complete history of respiratory illnesses and thorough respiratory assessment. Describe clinical manifestations of various respiratory illnesses seen in pediatric patients. Recall important signs and symptoms to document as part of the respiratory system assessment.

# Respiratory Bundle

## **Pediatric Sepsis (40 minute)**

Continuing Education Available: CNE (JAICE) 0.75, CME (JAICE) 0.75, CRCE 1.00

Intended For: Physicians, Clinicians working in the CVICU, Residents, Nurses, Clinicians working in the ED, Clinicians working on units with ECG monitoring, General Staff, Graduate Nurses, Clinicians, Pharmacists, Residents and Fellows, Nurse Practitioners, Clinicians working in the NICU, Educators, Nursing Aides, Clinicians working in the PICU

Sepsis remains the leading cause of pediatric death worldwide, with reported mortality ranging from 4% to 50%. In the United States, over 75,000 children are hospitalized with sepsis annually, with approximately 7,000 deaths attributed to sepsis each year. Significant life-long morbidity can result for survivors of pediatric sepsis. Health care teams can directly impact sepsis-related morbidity and mortality through early identification and treatment.

### **Objectives:**

Define sepsis and discuss causative factors. Recognize patients at risk for pediatric sepsis. Describe the clinical manifestations and diagnostic criteria in pediatric sepsis. Discuss treatment strategies as well as laboratory and diagnostic tests frequently used for pediatric sepsis.

# Respiratory Bundle

## Respiratory Inhalation Medications (44 minute)

Continuing Education Available: CNE (JAICE) 0.75, CRCE 1.00

Intended For: Clinicians working in the CVICU, Nurses, Clinicians working in the ED, Clinicians working on units with ECG monitoring, Graduate Nurses, Respiratory Therapists, Nurse Practitioners, Clinicians working in the NICU, Educators, Managers, Clinicians working in the PICU

Many respiratory medications are administered via aerosol, pressurized metered dose inhaler (pMDI) or dry powdered inhaler (DPI) to deliver a prescribed dose directly to the lungs. Other medications used to treat respiratory symptoms are administered topically as an intranasal spray. This course provides the clinician an overview of common medications used in the treatment of pediatric respiratory disease, their therapeutic action, routes of administration and effects on the respiratory system.

### Objectives:

Describe the response of the autonomic nervous system on various organs and its role on airway function. Outline factors to consider when selecting the route and delivery device of respiratory inhalation medications for neonatal and pediatric patients. Identify indications and side effects of the commonly used respiratory medications.

# Respiratory Bundle

## Status Asthmaticus (58 minute)

Continuing Education Available: CNE (JAICE) 1.00, CRCE 1.00

Intended For: Nurses, Clinicians working in the ED, Respiratory Therapists, Clinicians working in the PICU

Asthma is the most common chronic illness in childhood and a leading cause of hospitalization. The incidence of asthma in the pediatric population has increased in the past 30 years. While the severity of the disease varies from mild to severe, all patients with asthma are at risk for developing status asthmaticus. Recognizing when manifestations are indicative of worsening asthma allows the clinician to intervene sooner.

### Objectives:

Recognize the presenting signs and symptoms of acute asthma exacerbation. Use an evidence-based clinical scoring system to detect acute exacerbation of asthma in the pediatric patient. Outline the medical management of status asthmaticus or severe acute asthma exacerbation across the continuum of care, as the patient transitions from the ED to the PICU. Describe respiratory support strategies to manage the airway needs of a pediatric patient with severe acute asthma exacerbation or status asthmaticus. Assess the effectiveness of treatment and the patient's readiness to wean.