

- Chapter 25

- The Child with a Respiratory Disorder
- Objectives
- Distinguish the differences between the respiratory tract of the infant and that of the adult.
- Review the signs and symptoms of respiratory distress in infants and children.
- Discuss the nursing care of a child with croup, pneumonia, and respiratory syncytial virus (RSV).
- Recognize the precautions involved in the care of a child diagnosed with epiglottitis.
- Objectives (*cont.*)
- Compare bedrest for a toddler with bedrest for an adult.
- Describe smoke inhalation injury as it relates to delivery of nursing care.
- Discuss the postoperative care of a 5-year-old who has had a tonsillectomy.
- Recall the characteristic manifestations of allergic rhinitis.
- Objectives (*cont.*)
- Discuss how sinusitis in children is different from that in adults.
- Assess the control of environmental exposure to allergens in the home of a child with asthma.
- Express five goals of asthma therapy.
- Interpret the role of sports and physical exercise for the asthmatic child.
- Objectives (*cont.*)
- Recall four nursing goals in the care of a child with cystic fibrosis.
- Devise a nursing care plan for the child with cystic fibrosis, including family interventions.

- Review the prevention of bronchopulmonary dysplasia.
- Examine the prevention of sudden infant death syndrome.
- Respiratory System
- Development of the respiratory tract
 - Pulmonary structures differentiate in an orderly fashion during fetal life
 - At 24 weeks gestation, alveolar cells begin to produce surfactant, which prevents the alveoli from collapsing during respirations after birth
 - Spontaneous respiratory movements do occur in the fetus, but gas exchange occurs via placental circulation
 - By 35 weeks gestation, the analysis of amniotic fluid will show the LS ratio; helps determine fetal maturity and the ability of the fetus to survive outside the uterus
- Summary of the Respiratory System in Children
- Ventilation
- The process of breathing air into and out of the lungs, affected by
 - Intercostal muscles, diaphragm, ribs
 - Brain
 - Chemoreceptors
- Ventilation and Chronic Lung Disease
- High CO_2 level in blood and low O_2 saturation stimulate the brain to increase respiratory rate
- In chronic lung disease, receptors become tolerant to high CO_2 and low O_2 concentrations
- Administration of supplemental oxygen increases the O_2 saturation level
 - May result in decreased respiratory effort (carbon dioxide narcosis), leading to respiratory failure
- Procedures that Can Be Done

- Throat and nasopharyngeal cultures
- Bronchoscopy
- Lung biopsy
- Arterial blood gas
- pH analysis
- Pulse oximetry
- Pulmonary function tests
- Chest X-ray
- CT scan
- Radioisotope scan
- Bronchogram
- Angiography
- Nasopharyngitis
 - Upper respiratory tract infection
 - A cold, also known as coryza, most common infection of the respiratory tract
 - Nasal discharge, irritability, sore throat, cough, and general discomfort
 - Complications include bronchitis, pneumonitis, and ear infections
- Allergic rhinitis
 - Is not the same as a cold
 - Child will not have a fever, purulent nasal discharge, or reddened mucous membranes
 - Will have sneezing and itchy, watery eyes

- Nasopharyngitis (*cont.*)
- Treatment and Care
 - Rest
 - Clear airways
 - Moist air soothes the inflamed nose and throat
 - Avoid nosedrops with an oily base
 - Adequate fluid intake
 - Prevention of fever
- Skin care
- Acute Pharyngitis
- Inflammation of the structures of the throat
- Common in children 5 to 15 years old
- Virus most common cause
- *Haemophilus influenzae* most common in children younger than 3 years
- Symptoms: fever, malaise, dysphagia, and anorexia, conjunctivitis, rhinitis, cough, and hoarseness with gradual onset, lasts no longer than 5 days
- In child older than 2 years, streptococcal pharyngitis may include fever of 104° F
- May require antibiotics if cause is bacterial
- Acute Pharyngitis (*cont.*)
- Prompt treatment is necessary in strep throat to avoid serious complications such as
 - Rheumatic fever
 - Glomerulonephritis
 - Peritonsillar abscess
 - Otitis media

- Mastoiditis
- Meningitis
- Osteomyelitis
- Pneumonia
- Sinusitis in Children
- Frontal sinuses are present around 8 years of age but are not fully mature until around age 18 years
 - Proximity of the sinus to the tooth roots often results in tooth pain when a sinus infection occurs
 - Maxillary and ethmoid sinuses most often involved in childhood sinusitis
- Suspect sinus infection when a URI lasts longer than 10 days
- Requires antimicrobial therapy
- Croup Syndromes
- Also referred to as subglottic croup because edema occurs below the vocal cords
- Can lead to airway obstruction, acute respiratory failure, and hypoxia
- Six types of syndromes
- “Barking” cough
- Inspiratory stridor
 - Acute spasmodic laryngitis is milder form
 - Acute laryngotracheobronchitis most common
- Croup Syndromes (*cont.*)
- Congenital laryngeal stridor (laryngomalacia)
 - Weakness in airway walls, floppy epiglottis that causes stridor on inspiration

- Symptoms lessen when infant is placed prone or propped in side-lying position
- Usually clears spontaneously as child grows and muscles strengthen
- Croup Syndromes (*cont.*)
- Spasmodic laryngitis (spasmodic croup)
 - Occurs in children 1 to 3 years of age
- Causes: viral, allergic, psychological
 - Trigger can be gastroesophageal reflux
- Sudden onset, usually at night
- Characterized by barking, brassy cough and respiratory distress; lasts a few hours
- Treatment: increasing humidity and providing fluids
- Croup Syndromes (*cont.*)
- Laryngotracheobronchitis
 - Viral condition manifested by edema, destruction of respiratory cilia, and exudate, resulting in respiratory obstruction
 - Mild URI followed by barking cough, then stridor develops and leads to respiratory distress; crying and agitation worsen symptoms
- Child prefers to be in upright position (orthopnea)
- Croup Syndromes (*cont.*)
- Treatment
 - Cold water humidifier
 - Helps relieve respiratory distress and laryngeal spasm
 - If hospitalized, may be placed in a mist tent or croupette

- Cool air saturated in microdroplets enter small airway of child, cooling and vasoconstriction occurs, relieving the respiratory obstruction and distress
- Opiates are contraindicated, as are sedatives
- Croup Syndromes (*cont.*)
- Epiglottitis
 - Swelling of the tissues above the vocal cords
 - Narrows airway inlet
 - Caused by H. influenzae type B
 - Most often seen in children 3 to 6 years of age
 - Can occur in any season
 - Course is rapid, progressive, and life-threatening
- Croup Syndromes (*cont.*)
- Onset of epiglottitis is abrupt
- Child insists on sitting up, leaning forward with mouth open, drools saliva because of difficulty in swallowing
- Cough is absent
- Examining the throat with a tongue blade could trigger laryngospasms; therefore, a tracheotomy set should be at the bedside before examination of the throat takes place
- Croup Syndromes (*cont.*)
- Treatment of choice is immediate tracheotomy or endotracheal intubation and oxygen
 - Prevents hypoxia, brain damage, and sudden death
- Parenteral antibiotics show dramatic improvements within a few days
- Prevention: Hib vaccine beginning at 2 months of age

- Croup Syndromes (*cont.*)
- Bronchitis
- Infection of bronchi
 - Seldom primary infection
 - Caused by variety of microorganisms
- Unproductive “hacking” cough
 - Cough suppressants prior to bedtime so child can sleep
- OTC agents such as antihistamines, cough expectorants, and antimicrobial agents are normally not helpful
- Bronchiolitis
- Viral infection of small airways
- Infants and children (6 months to 2 years)
 - Obstruction of airway leads to atelectasis
 - Increased respiratory rate
 - Can lead to irritability and dehydration
- RSV primary cause in 50% of cases
- Treat symptoms and place in semi-Fowler’s position
- Respiratory Syncytial Virus (RSV)
- Responsible for 50% of cases of bronchiolitis in infants and young children
- Spread by direct contact with respiratory secretions
- Survives more than 6 hours on countertops, tissues, and bars of soap
- Incubation approximately 4 days

- If hospitalized, place in contact isolation precautions
- Respiratory Syncytial Virus (RSV) (*cont.*)
- Infant should be assigned to personnel who are not caring for patients at high risk for adverse response to RSV
- Adults who have RSV can shed the virus for up to 1 week after the infection; therefore, precautions should be taken if that adult is caring for infants
- Strict adherence to isolation precautions and hand hygiene are essential
- Symptomatic care is provided and can include
 - Supplemental oxygen
 - Intravenous hydration
 - Antiviral medication, such as ribavirin
 - IV immune globulin (RespiGam)
- Safety Alert
- Caregivers who are pregnant or wear contact lenses should not give direct care to infants who are receiving ribavirin aerosol therapy
- *Routine immunizations may have to be postponed for 9 months after RespiGam has been given*
- Pneumonia
- Inflammation of lungs in which the alveoli become filled with exudate and surfactant may be reduced
- Breathing shallow, resulting in decreased oxygenated blood
- Many types, classified according to causative organism (i.e., bacterial, viral)
- Group B streptococci most common cause in newborns
- Chlamydia most common cause in infants 3 weeks to 3 months of age
- Pneumonia (*cont.*)

- Toddlers can aspirate small objects that can result in pneumonia
- *Lipoid pneumonia* occurs when infants inhale an oil-based substance
- *Hypostatic pneumonia* occurs if patients who have poor circulation in their lungs remain in one position for too long
- Pneumonia (*cont.*)
- Symptoms vary with age and causative organism/agent
 - Dry cough, fever, increased respiratory rate
 - Respirations shallow to reduce chest pain typically caused by coughing or from pleural irritation
 - Child is listless, poor appetite, tends to lie on affected side
- Chest X-ray confirms diagnosis
- Elevated WBC
- Cultures may be obtained from nose, throat, or sputum
- Smoke Inhalation Injury
- May cause carbon monoxide poisoning
 - Prevents oxygen from combining with Hgb so carboxyhemoglobin cannot be formed
- Has three stages
 - Pulmonary insufficiency in first 6 hours
 - Pulmonary edema from 6 to 72 hours
 - Bronchopneumonia after 72 hours
 - Can lead to atelectasis
- Tonsillitis and Adenoiditis
- Tonsils and adenoids are made of lymph tissue and are part of body's defense against infection

- Tonsillitis and adenoiditis
 - Difficulty swallowing and breathing
 - Provide cool mist vaporizer, salt-water gargles, throat lozenges (if age-appropriate), cool liquid diet, acetaminophen
 - Removal of tonsils and adenoids not recommended if under 3 years of age
 - Tonsillectomy done only if persistent airway obstruction or difficulty breathing occurs
- Safety Alert
- Frequent swallowing while the child is sleeping is an early sign of bleeding after a tonsillectomy
- Milk and milk products may coat the throat and cause the child to “clear” the throat, further irritating the operative site
- Allergic Rhinitis
 - Inflammation of nasal mucosa caused by an allergic response
 - Often occurs during specific seasons
 - Not a life-threatening condition
 - Accounts for many lost school days
 - Allergic Rhinitis (*cont.*)
 - History shows seasonal occurrence and absence of fever or purulent drainage
 - Mast cells respond to antigen by releasing mediators, such as histamine, which cause edema and increased mucus secretion
 - Characteristic signs
 - Nasal congestion
 - Clear, watery nasal discharge
 - Sneezing
 - Itching of the eyes

- Allergic Rhinitis (*cont.*)
- Symptomatic treatment
 - Antihistamines and decongestants to reduce edema
- Nursing goals
 - Help parent identify the difference between allergy and a cold
 - Provide referral for medical care and support
 - Dust control, prevention of contact with animal dander, use of HEPA filters, and planning of vacation locales are examples of parent teaching the nurse can provide
- Asthma
- Syndrome caused by increased responsiveness of the tracheobronchial tree to various stimuli
- Leading cause of school absenteeism, emergency department visits, and hospitalization
- Recurrent and reversible obstruction of airways in which bronchospasms, mucosal edema, secretions, and plugging by mucus contribute to significant narrowing of airways and subsequent impaired gas exchange
- Four Main Components of Asthma
- Asthma Triggers
- House dust
- Animal dander
- Wool
- Feathers
- Pollen
- Mold
- Passive smoking

- Strong odors
- Certain food
- Vigorous physical activity (especially in cold weather)
- Rapid changes in temperature
- Emotional upset
- Asthma (*cont.*)
- Rarely diagnosed in infancy
- Increased susceptibility of infants to respiratory obstruction and dyspnea may result from
 - Decreased smooth muscle of an infant's airway
 - Presence of increased mucus glands in the bronchi
 - Normally narrow lumen of the normal airway
 - Lack of muscle elasticity in the airway
 - Fatigue-prone and overworked diaphragmatic muscle on which infant respirations depend
- Asthma (*cont.*)
- Manifestations
 - Obstruction most severe during expiration
 - During acute episodes, patient coughs, wheezes, and has difficulty breathing, particularly during expiration
 - Signs of air hunger, such as flaring of the nostrils, and use of accessory muscles may be evident; orthopnea appears
- Chronic asthma is manifested by discoloration beneath the eyes (allergic shiners), slight eyelid eczema, and mouth breathing
- Asthma (*cont.*)
- Treatment and long-term management

- Maintain near-normal pulmonary function and activity level
- Prevent chronic signs and symptoms as well as exacerbations that require hospital treatment
- Prevent adverse responses to medications
- Promote self-care and monitoring consistent with developmental level
- Asthma (*cont.*)
- Medication treatment
 - Bronchodilators
 - Antiinflammatory drugs
 - Leukotriene modifiers
 - Metered-dose inhalers
- Status Asthmaticus
- Continued severe respiratory distress that is not responsive to drugs, including epinephrine and aminophylline
- **This is a medical emergency**
- ICU admission, supplemental oxygen, IV medications, and frequent vital signs (including pulse oximetry readings) are essential
- Safety Alert
- Oxygen is a drug, and administration should be correlated with monitoring of oxygen saturation levels
 - Too little oxygen can result in hypoxia
 - Too much oxygen can result in lung damage
- Cystic Fibrosis
- Major cause of serious chronic lung disease

- Occurs 1 in 3000 live births of Caucasian infants
- Occurs 1 in 17,000 live births of African Americans
- Inherited recessive trait, with both parents carrying a gene for the disease
- Cystic Fibrosis (*cont.*)
- Basic defect is an exocrine gland dysfunction that includes
 - Increased viscosity (thickness) of mucus gland secretions
 - A loss of electrolytes in sweat because of an abnormal chloride movement
- Cystic Fibrosis (*cont.*)
- Multisystem disease in which thick, viscid secretions affect
 - Respiratory system—obstructed by secretions
 - Digestive system—secretions prevent digestive enzymes from flowing to GI tract, results in poor absorption of food
 - Bulky, foul-smelling stools that are frothy because of the undigested fat content
 - Skin—loss of electrolytes in sweat causes “salty” skin surface
 - Reproductive system—secretions decrease sperm motility; thick cervical mucus can inhibit sperm from reaching fallopian tubes
- Cystic Fibrosis (*cont.*)
- Cystic Fibrosis (*cont.*)
- Lung involvement
- Air passages become clogged with mucus
- Widespread obstruction of bronchioles
- Expiration is difficult, more air becomes trapped, small areas collapse (atelectasis)
- Right ventricle of heart, which supplies the lungs, may become strained and enlarged

- Cystic Fibrosis (*cont.*)
- Clubbing of nails—a compensatory response indicating a chronic lack of oxygen—may be present
- Dyspnea, wheezing, and cyanosis may occur
- Prognosis for survival depends on extent of lung damage
- Cystic Fibrosis (*cont.*)
- Pancreatic involvement
 - Thickened secretions block flow of pancreatic digestive enzymes
 - Newborn may experience meconium ileus
 - Infant stools may be loose
- Sweat glands
 - Sweat, tears, saliva abnormally salty due to increased chloride levels
 - Analysis of sweat is a major aid in diagnosing the condition
- Nursing Care for Cystic Fibrosis
- Oxygen therapy
- Antibiotic therapy
- Aerosol therapy
- Use of inhalers
- Postural drainage
- Breathing exercises
- Prevention of infection is essential
- Oral pancreatic preparations are given to help child to digest and absorb food

- Diet should be high in protein and calories
- Free access to salt
- Nursing Care for Cystic Fibrosis (*cont.*)
- General hygiene
 - Care should be given to diaper area
 - Frequent changes of position help prevent development of pneumonia
 - Child wears light clothing to prevent overheating
 - Teeth may be in poor condition due to dietary deficiencies
- Long-term care
 - Goals include minimizing pulmonary complications, ensuring adequate nutrition, promoting growth and development, and assisting family to adjust to chronic care required
- Nursing Care for Cystic Fibrosis (*cont.*)
- Parents need explicit instructions regarding
 - Diet
 - Medication
 - Postural drainage
 - Prevention of infection
 - Rest
 - Continued medical support
 - Parents and child will also need emotional support
- Bronchopulmonary Dysplasia
- A fibrosis, or thickening, of alveolar walls and bronchiolar epithelium caused by oxygen concentration above 40% or by mechanical pressure ventilation given to newborns for prolonged period of time

- Swelling of tissues causes edema, respiratory cilia paralyzed by high oxygen concentration, and loss of ability to clear mucus
- Respiratory obstruction, mucus plugs, and atelectasis follow
- Bronchopulmonary Dysplasia (*cont.*)
- Respiratory distress syndrome (RDS) in the newborn is major reason why oxygen and ventilators are used
- Main cause of RDS in the newborn is prematurity
- Goal of treatment
 - Administer only the amount of oxygen required to prevent hypoxia at the minimum ventilator pressures needed to prevent tissue trauma
 - Antenatal steroids hasten lung development during preterm labor
 - Administration of surfactant within 15 minutes of delivery may also be helpful
- Bronchopulmonary Dysplasia (*cont.*)
- Symptoms include
 - Wheezing
 - Retractions
 - Cyanosis on exertion
 - Use of accessory respiratory muscles
 - Clubbing of the fingers
 - Failure to thrive
 - Irritability caused by hypoxia
- Bronchopulmonary Dysplasia Treatment
- Goal
 - To reduce inflammation of the airway and to wean infant from mechanical ventilator

- Oxygen can be delivered by
 - Synchronous intermittent mandatory ventilation (SIMV) via nasal cannula prongs
 - Continuous positive airway pressure (CPAP)
 - High-flow humidified oxygen
- Right-sided heart failure may develop
- Fluid restriction
- Bronchodilators
- Diuretics
- Nasogastric tube feedings may be required to conserve energy
- Sudden Infant Death Syndrome (SIDS)
- Clinically defined as the sudden, unexpected death of an apparently healthy infant between 2 weeks and 1 year of age
- Clinical features of the disease remain constant
 - Death occurs during sleep
 - Infant does not cry or make other sounds of distress
- Sudden Infant Death Syndrome (SIDS) (*cont.*)
- Thought to be caused by a brainstem abnormality related to cardiorespiratory control
 - Overheating, irregular respiratory patterns
 - Decreased arousal responses are contributing factors
- Increased risk factors include
 - Maternal smoking or cocaine use that causes hypoxia of the fetus
 - Preterm birth
 - Poor postneonatal care
- A face-down sleeping position may cause infant to rebreathe expired air

- Wrapping the infant who is placed face down may increase risk by preventing infant from lifting and turning the face to the side
- Sudden Infant Death Syndrome (SIDS) (*cont.*)
- Prevention
- “Back to sleep”
- For high-risk infants, they may be sent home on an apnea monitor
- Parents must be taught CPR
- Nursing Care Related to SIDS
- With grieving parents, the nurse must convey some important facts
 - The infant died of a disease called SIDS; currently the disease cannot be predicted or prevented, and they are not responsible for the child’s death
- Parents must be given the opportunity to say goodbye to their child
 - Parents are catapulted into a totally unexpected bereavement that requires numerous explanations to relatives and friends
- Question for Review
- Smoke inhalation injury may cause what to occur?
- Review
- Objectives
- Key Terms
- Key Points
- Online Resources
- Review Questions