Ch 15 - Childhood Respiratory Disorders

15.1 Introduction to Childhood Respiratory Disorders

Learning Objectives

- Identify appropriate nursing and medical care for common childhood illnesses that affect the respiratory system
- Determine teaching concepts related to the ill child with a respiratory illness

Respiratory disorders in children present unique challenges, requiring a delicate balance of clinical skill, empathy, and patience. As frontline caregivers, nurses play a pivotal role in the management of these conditions. Therefore, this chapter will explore the respiratory system and examine pediatric considerations with anatomy, physiology and assessment. We will also investigate conditions that can affect the optimal functioning of the respiratory system from the common cold to life-threatening illnesses such as bronchiolitis and epiglottitis.

The respiratory system consists of organs such as the nose, trachea, bronchi, and lungs. It serves as the vital mechanism for gas exchange within the body, facilitating the intake of oxygen from the air and the removal of carbon dioxide from cellular waste. Beyond its role in gas exchange, the respiratory system also plays a role in acid-base balance, speech, smell, and fluid balance. Efficient respiratory function is essential for maintaining overall health; therefore, nurses must have a thorough understanding of this body system to provide optimal care for clients with respiratory issues.

This chapter will review common respiratory disorders and apply the nursing process and the clinical judgment measurement model to providing care to a pediatric client and their family. Highlights for each disorder include pathophysiology, key assessment findings, diagnostic approaches, and evidence-based interventions tailored to the pediatric population. Overall, the nurse's aim is not only to alleviate respiratory symptoms but also to promote optimal lung function, facilitate recovery, and empower families to participate actively in their child's care.

15.2 Review of Anatomy & Physiology of the Respiratory System

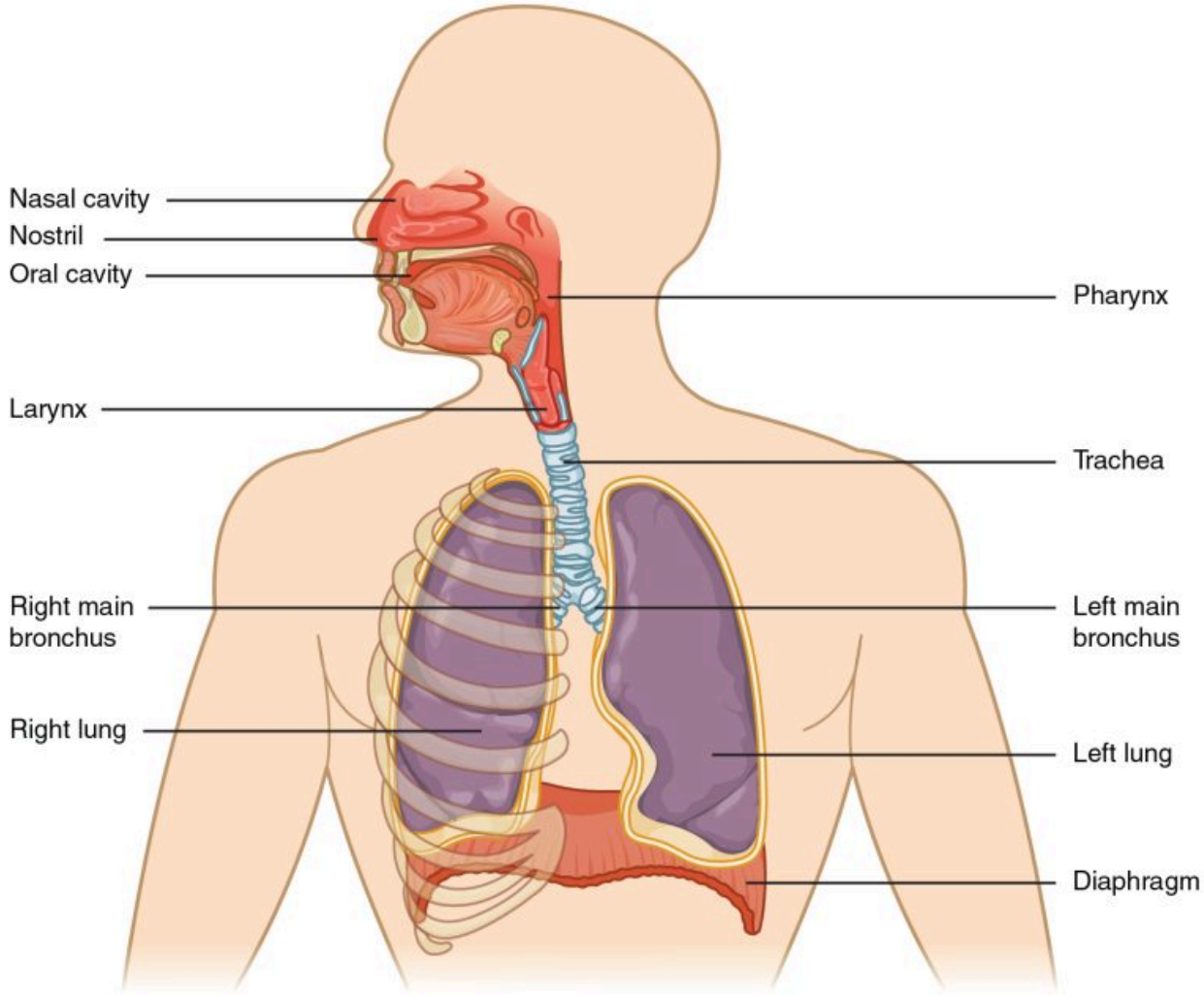
Review Table 15.1 for a high level overview of the major parts of the respiratory system and their associated functions. For a detailed overview, refer to the "Review of the Anatomy and Physiology of the Respiratory System" section of the "Respiratory Alterations" chapter of the

Open RN *Health Alterations* textbook.[1] The major parts of the respiratory system are illustrated in Figure 15.1.

Table 15.1. Overview of Respiratory Functions[2]

Parts of the Respiratory System	Function
Nasal cavity	Warms and humidifies air as it is inhaled, traps water during exhalation to preserve fluid balance, odor detection, mucus production
Sinuses	Mucus production; decrease the weight of the skull
Pharynx	Passageway for air and food; contains tonsils that trap and destroy foreign invaders
Larynx	Speech production, controls volume of airflow into and out of lungs, prevents food from entering trachea, mucus production
Trachea	Passageway for air to and from lungs
Bronchi	Passageway for air to and from lungs; mucus production
Lungs	Gas exchange; production of surfactant
Diaphragm	Contracts and relaxes to change the volume of the thoracic cavity to allow for breathing

Figure 15.1 Anatomy Of The Respiratory System (Source: "2301_Major_Respiratory_Organs.jpg" by OpenStax College is licensed under CC BY 3.0)



Pediatric Differences in Anatomy

Although the anatomy and physiology of the respiratory system of adults and children have the same components and functions, there are some pediatric differences that must be considered and include the following[1,2,3]:

- Newborns may have insufficient surfactant, especially if preterm, which can severely impact gas exchange due to the increased risk of alveolar collapse. **Surfactant** reduces surface tension of alveoli and prevents alveolar collapse.
- Infants produce little respiratory mucus, so their coughs are nonproductive, thus increasing their risk for respiratory infection.
- Infants and young children have smaller airways than adults, making it easier for them to become occluded due to laryngospasm or with mucus or foreign objects.

- When compared to adults, young children have enlarged tonsillar tissue that can occlude the pharynx, especially when suffering from an upper respiratory infection.
- Infants and young children have a more flexible larynx, making it susceptible to spasm.
- The muscles involved in respiration are weak, making children more prone to respiratory fatigue.
- The trachea of the infant client is short and narrow, which makes it more difficult to maintain an endotracheal tube.
- Infants have fewer alveoli and, therefore, less surface area available for gas exchange.

15.3 Focused Assessment for Respiratory Disorders

When a client has a respiratory alteration, signs may show in the respiratory system as well as other body systems. Nurses complete a focused assessment to determine the effects of the respiratory illness on the child. Review Table 15.2 for an overview of general manifestations of respiratory alterations across body systems. For an in-depth discussion of assessment and diagnostic tests of the respiratory system, please visit the "General Respiratory Assessment and Interventions" section of the "Respiratory Alterations" chapter of Open RN *Health Alterations*.[1]

Table 15.2. Manifestations of Respiratory Alterations by Body System[1, 4, 5, 6, 7]

Body System	Clinical Manifestations
Respiratory	Dyspnea, tachypnea, bradypnea, apnea, decreased pulse oximetry reading, use of accessory muscles, nasal flaring on inspiration, adventitious or decreased lung sounds, coughing, sputum production, retractions (sternal or intercostal), expiratory grunting **Gastrointestinal:** Decreased oral intake (due to difficulty breathing or inflammation of the pharynx or associated structures) **Genitourinary:** Decreased urine output and decrease in wet diapers (due to dehydration) **HEENT:** Sunken fontanels (in dehydrated infants), sore and/or red throat and tonsils, nasal discharge, nasal congestion
Cardiovascular	Tachycardia (in response to hypoxia, fever, or dehydration)
Neurological	Altered mental status, confusion, disorientation, dizziness, syncope (fainting), or headaches (due to hypoxia)

Musculoskeletal	Decreased activity tolerance, fatigue, and weakness (related to hypoxia). Decreased muscle mass or poor growth in children with chronic illness
Integumentary	Cyanosis, clubbing of the nailbeds due to chronic hypoxia, dry mucous membranes, and poor skin turgor if dehydration is present

Life Span Considerations

When performing an assessment on a pediatric client, there are some key differences the nurse must be aware of in regard to the respiratory system[7,8,3]:

- Although some disorders can manifest with apnea as a clinical manifestation, periods of apnea (up to twenty seconds) are common in newborns.
- Due to their irregular breathing rhythms, respirations should be counted for a full minute for infants. The respiratory rate should also be taken when the infant is calm instead of crying.
- Infants have faster respiratory rates due to increased metabolic needs. For example, the normal respiratory rate for a newborn is 30-60 breaths per minute. The rate can vary based on whether the infant is asleep or awake.
- Infants are obligatory nose breathers, meaning they have a physiological instinct to breathe through their nose rather than their mouth. If their nose or nasal passage becomes occluded, they can develop respiratory distress.
- Based on the age of the client, subjective respiratory assessment data may need to be collected from the client's caregiver.
- Some respiratory disorders may cause the pediatric client to experience pain, which they may be unable to describe on a scale of 0 to 10. Review pediatric pain scales in the "Applying the Nursing Process to Caring for an Ill or Hospitalized Pediatric Client" section of the "Planning Care for the Ill or Hospitalized Child" chapter.

15.4 Respiratory Disorders

Acute respiratory disorders that commonly occur in pediatric clients are covered in detail in the following sections.

15.5 Upper Respiratory Tract Infection

An **upper respiratory tract infection (URI)**, also known as the common cold, can be described as the swelling and irritation of the upper airways, including the nose, sinuses, throat, larynx, and larger airways. Although a variety of infectious organisms can lead to a URI, the most common causative organism is rhinovirus. Risk factors for a URI include contact with school-age children, underlying respiratory issues, exposure to smoke, and immunodeficiency.[9]

Pathophysiology

A URI results when a client inhales infected respiratory droplets that then invade the mucosa of the upper respiratory tract. Once deposited in the mucosa, the infectious organism begins to replicate. The infected individual will then mount an inflammatory response, which leads to dilation and increased permeability of blood vessels, ultimately contributing to the symptoms of the URI.[9]

Assessment (Recognizing Cues)

Physical Exam

Signs and symptoms may vary based on the causative organism of the URI. However, common signs and symptoms are as follows:

- Cough
- Sore throat
- Runny nose
- Stuffy nose
- Headache
- Fever (low-grade)
- Increased pressure in the facial region
- Sneezing
- **Malaise** (a general feeling of illness, weakness, or discomfort)
- Muscle aches

Symptoms begin one to three days after exposure to the infectious organism and usually last seven to ten days. However, symptoms can sometimes last up to three weeks. Potential complications of a URI caused by rhinovirus are exacerbations of asthma, ear infections, sinus infections, bronchitis, or pneumonia.

Common Laboratory and Diagnostic Tests

A URI is a clinical diagnosis that can be made based on the presence of common signs and symptoms and the absence of more serious illnesses. However, diagnostics may be used to rule out other disorders that lead to similar symptoms, such as influenza or strep throat.[9,10]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with a URI include symptom management and preventing the spread of infection to others.

Nursing diagnoses for clients with a URI are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that include expected outcomes, nursing interventions, and evaluation of those outcomes.

Possible nursing diagnoses for clients with a URI are as follows[11,12]:

- Ineffective airway clearance r/t increased secretions
- Fatigue r/t disease process
- Hyperthermia r/t disease process
- Risk for fluid volume deficit r/t poor oral intake

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, and realistic. These outcomes should be achievable within a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes related to the suggested nursing diagnoses are listed below:

- *The client will exhibit a reduction in secretions within 48 hours.*
- *The client will display an increase in energy and engage in age-appropriate play within 48 hours.*
- *The client will exhibit a temperature that is within normal limits for age within 48 hours.*
- *The client will exhibit blood pressure and heart rate within normal limits for age, moist mucous membranes, urine output appropriate for their age, and non-sunken fontanels for infant clients during the course of the illness.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

There is no cure for the common cold. Medical interventions focus on symptomatic relief with the use of over-the-counter medications. Examples of commonly used over-the-counter medications for children with an URI include the following:

- Acetaminophen or ibuprofen to help with fever and discomfort.
- Saline nose spray for relief of nasal symptoms.
- Menthol rub to help with cough and nasal congestion (can only be used in children older than two years of age).

- Certain formulations of guaifenesin can be used in children to help thin secretions and ease congestion.

Many other over-the-counter medications exist to treat URI symptoms such as cough suppressants, decongestants, and antihistamines. However, these may not be appropriate for children of all ages. Antihistamines and decongestants should not be given to children under the age of two because of potential serious or life-threatening side effects such as convulsions, rapid heart rate, and death.[59] When giving children over-the-counter medications, it is essential to follow the advice of the health care provider and follow age-limit and dosage guidelines.[9,13,14]

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes of the client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with a URI, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching as described in the following subsections.[11, 9, 12, 15, 16]

Nursing Assessments

- Assess the client for exposure to known sick contacts as this may aid in diagnosis.
- Consider indications of a bacterial infection or serious respiratory condition that could mimic the signs of a URI.

Nursing Actions

- Encourage fluid intake to prevent and treat dehydration. Dehydration may be caused by a sore throat that limits oral intake and increased mouth breathing due to stuffy nose. Warm liquids can also help soothe a sore throat. Adequate fluid intake is also commonly recommended to thin respiratory secretions, although research studies supporting this intervention are inconclusive.[60]
- Encourage the use of humidifiers or vaporizers to alleviate nasal congestion.
- Encourage the client to lie in a semi-Fowler's position or higher to increase lung expansion.
- Encourage adequate rest, as well as frequent ambulation. Rest will allow the client to heal, and ambulation helps prevent the development of further respiratory complications.

Client Teaching

- Teach the client and caregivers about properly using a humidifier to obtain the benefits of humidified air without increasing the risk of additional illness from bacterial and mold growth. Distilled water should be used instead of tap water that contains minerals that can irritate mucosal tissue when inhaled. The humidifier should only be run when needed because an overly-humid environment encourages bacteria and mold growth.

The unit should be cleaned daily daily to discourage microbial growth, and disinfectant cleansers should be rinsed thoroughly to prevent irritation to the respiratory tissues.[61]

- Teach the client and their caregivers about over-the-counter medications that can be administered for symptom relief.
- Teach the client and their caregivers that a dose of honey at bedtime can also be an effective remedy for cough suppression in children older than one year of age. Honey should not be given to infants less than one year of age due to the risk of botulism.
- Teach caregivers how to use a suction bulb to remove mucus from the nose of infants or small children. See Figure 15.2 for an image of a suction bulb.
- Teach clients and their caregivers about respiratory etiquette and good handwashing to prevent the spread of disease. **Respiratory etiquette** refers to actions performed to decrease the spread of infection to others, such as covering the mouth and nose with a tissue when coughing or sneezing, then disposing of the tissue in the trash. If a tissue is not available, clients should sneeze into their inner elbow instead of their hands.[62]

Figure 15.2 Suction Bulb (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/8/83/Bulb_Syringe.jpg/640px-Bulb_Syringe.jpg)

Box

For general nursing interventions related to caring for an ill child, review the "Planning Care for the Ill Child" chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client's interdisciplinary team.

15.6 Sinusitis

The term **sinusitis,** also known as a sinus infection, refers to inflammation of the sinuses. Acute sinusitis means symptoms last 4 weeks or less and chronic sinusitis lasts 12 weeks or more. Recurrent sinusitis refers to four or more episodes of sinusitis with each episode lasting four weeks or less. The focus of this section will be acute sinusitis.

Acute sinusitis can be caused by viruses, bacteria, or fungi, with viral causes being the most common. Acute bacterial sinusitis is often preceded by a URI. Other risk factors for sinusitis are a deficient immune system, exposure to cigarette smoke, or defects in nasal anatomy (deviated septum or the presence of tumors or polyps in the nose).[17,18]

Pathophysiology

The purpose of healthy sinuses is to move any foreign antigens, dust, or pollutants to the nose and throat so they can be swallowed. This is done with the help of **cilia** (small, hair-like protrusions that move debris). Sinusitis occurs when the sinuses cannot rid the area of pathogens, which leads to inflammation. This often occurs due to edema in these areas as a result of a URI. This edema prevents pathogen clearance, and the infectious agent then begins to multiply in the sinus cavities.[17] See Figure 15.3 for an illustration of the sinus cavities.

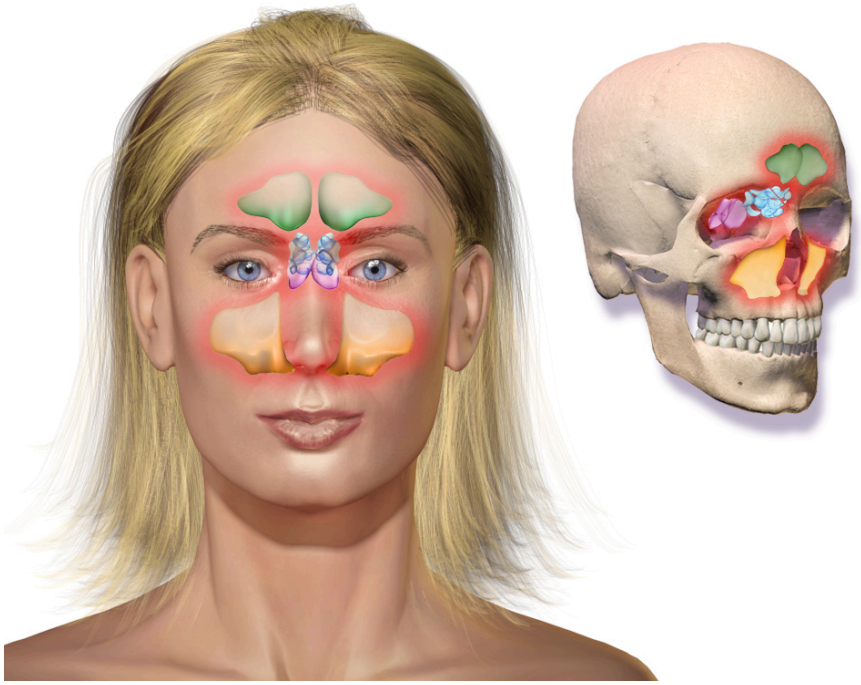


Figure 15.3 Sinusitis (Source: https://commons.wikimedia.org/wiki/File:Blausen_0800_Sinusitis.png)

Assessment (Recognizing Cues)

Physical Exam

The cardinal signs and symptoms of sinusitis are purulent nasal discharge, nasal congestion, and facial pain or pressure. Nasal discharge is typically thick and yellow or green in color. Other associated symptoms are cough or fatigue, changes in sense of smell (decreased or no sense of smell), pain in the teeth, fullness in the ear, headache, bad breath, or fever.

Complications can occur when sinusitis spreads to nearby areas, such as the brain or orbit of the eye. Orbital spread can lead to cellulitis or abscess formation. Spread to the brain can lead to hematoma, abscess formation, or inflammation of the meninges.

A diagnosis of acute sinusitis is often a clinical diagnosis that can be made with the presence of two major symptoms or one major symptom plus two or more lesser symptoms. Major symptoms refer to purulent nasal discharge, nasal congestion, facial pain, changes in smell, and fever. Minor symptoms consist of headache, ear fullness/pain, bad breath, pain in the teeth, a cough, fever, and fatigue. Children with bacterial sinusitis often have a fever as well.

To guide appropriate treatment with antibiotics, it is important to distinguish between bacterial and viral causes of sinusitis. With a bacterial cause of sinusitis, symptoms are usually present for greater than ten days, or they initially improve and then worsen. This initial improvement with subsequent worsening of symptoms is known as **double worsening.** [17,18] Antibiotics are not indicated for viral sinusitis because antibiotics are only effective against bacterial infections.

Common Laboratory and Diagnostic Tests

Laboratory tests are not routinely performed for acute sinusitis, but inflammatory markers such as ESR and CRP may be elevated with bacterial causes. Imaging or cultures are not routinely done unless there is a concern for a complication or the sinusitis is chronic or resistant to treatment.[17,18]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with acute sinusitis include symptom management and preventing complications from occurring.

Nursing diagnoses for clients with acute sinusitis are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with acute sinusitis are as follows[19]:

- Acute pain r/t disease process
- Impaired breathing pattern r/t nasal congestion
- Risk for impaired skin integrity r/t continual nasal discharge
- Fatigue r/t disease process

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, achievable, realistic, and timebound (SMART) with a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes for the suggested nursing diagnoses are listed below:

- *The client will exhibit a reduction in pain within one hour based on a numeric scale such as FACES or FLACC.*
- *The client will demonstrate the ability to breathe through their nose within 24 hours.*
- *The client will exhibit non-reddened, intact skin surrounding the nose within 24 hours.*

- *The client will display an increase in energy and engage in age-appropriate play within 48 hours.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

Treatment for acute bacterial sinusitis consists of antibiotic therapy. First-line treatment recommended by the American Academy of Pediatrics is amoxicillin or amoxicillin with clavulanate. Supportive care is encouraged for clients with acute bacterial or viral sinusitis. Nasal sprays containing steroids or saline can help relieve congestion, acetaminophen or ibuprofen can be used to manage pain, and warm compresses can help reduce sinus pressure. Clients are referred to an otolaryngologist if a complication is suspected or if initial treatment is ineffective.[17,18]

Box
Review additional information about amoxicillin in the "Penicillin" section of the "Antimicrobials" chapter of Open RN *Nursing Pharmacology 2e*.

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes of the client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with acute sinusitis, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching, as described in the following sections.[19]

Nursing Assessments

- Assess the color, consistency, and frequency of nasal secretions to determine if improvement is occurring.
- Assess the client's pain using a number scale, FACES or FLACC, as a decrease in pain could indicate improvement in their condition.
- Assess the condition of the skin around the client's nose, as excessive nasal discharge can lead to skin irritation and breakdown.
- Monitor the client for changes in neurological status, as this could indicate spread of the infection to the brain.

Nursing Actions

- Encourage the client to sit upright, as this can improve nasal drainage and breathing. Using extra pillows while sleeping can also reduce congestion and improve the quality of sleep.
- Encourage application of warm compresses to manage facial pressure.

- Encourage increased fluid intake to help thin secretions, if not contraindicated.
- Encourage the application of petroleum jelly or a moisturizing cream around the nose to protect the skin from excessive nasal secretions.

Client Teaching

- Educate the client and their caregivers why antibiotics are not effective for viral sinusitis.
- Teach the client and their caregivers about over-the-counter medications (Tylenol, ibuprofen, saline nasal sprays) that can be administered for symptom relief.
- Provide education on antibiotics or steroid nasal sprays if prescribed, including that antibiotics should be completed in their entirety to prevent the development of antibiotic resistance.
- Teach clients and their caregivers about respiratory etiquette and effective handwashing to prevent the spread of disease.

Box
Review general nursing interventions for caring for an ill child in the “Planning Care for the Ill Child” chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client’s interdisciplinary team.

15.7 Pharyngitis, Tonsillitis & Adenoiditis

Pharyngitis refers to inflammation of the pharynx or throat, and **tonsillitis** refers to inflammation of the tonsils. Although there is a distinction between the two disorders, they can coexist. When both the throat and tonsils are inflamed, it is referred to as **pharyngotonsillitis**. Both disorders are commonly referred to as a “sore throat” and have similar pathophysiologies, signs and symptoms, and treatment. At times, **adenoiditis,** or inflammation of the adenoids, also occurs with pharyngitis and/or tonsillitis.

Pharyngitis and tonsillitis are typically caused by bacterial or viral infections. However, pharyngitis can also be caused by allergies, acid reflux, or cancer. Common viral causes of pharyngitis and tonsillitis are rhinovirus, coronavirus, and adenovirus. Although there are a

variety of bacteria that can lead to pharyngitis or tonsillitis, the most common is Group A beta-hemolytic streptococcus (GABHS). This is also known as “strep throat” and is common in school-aged children. Adenoiditis can be caused by an infectious process, allergies or acid reflux. [20,21,22,23,63]

Pathophysiology

In both pharyngitis and tonsillitis, the causative bacteria or virus directly invades the mucosal tissue. The infectious agent multiplies and leads to inflammation and edema. Some viral causes, such as rhinovirus, can also cause additional irritation due to an increase in nasal secretions. Sometimes, an initial viral infection can later develop into a secondary bacterial infection.[21,22]

Acute adenoiditis occurs when bacteria multiply and spread to the adenoid tissue, often following a URI. This leads to excessive development of exudate and the resulting symptoms. If the adenoids become chronically inflamed, they can increase in size and lead to further issues.[63] See Figure 15.4 for an image of hypertrophied adenoids blocking the nasal passage.

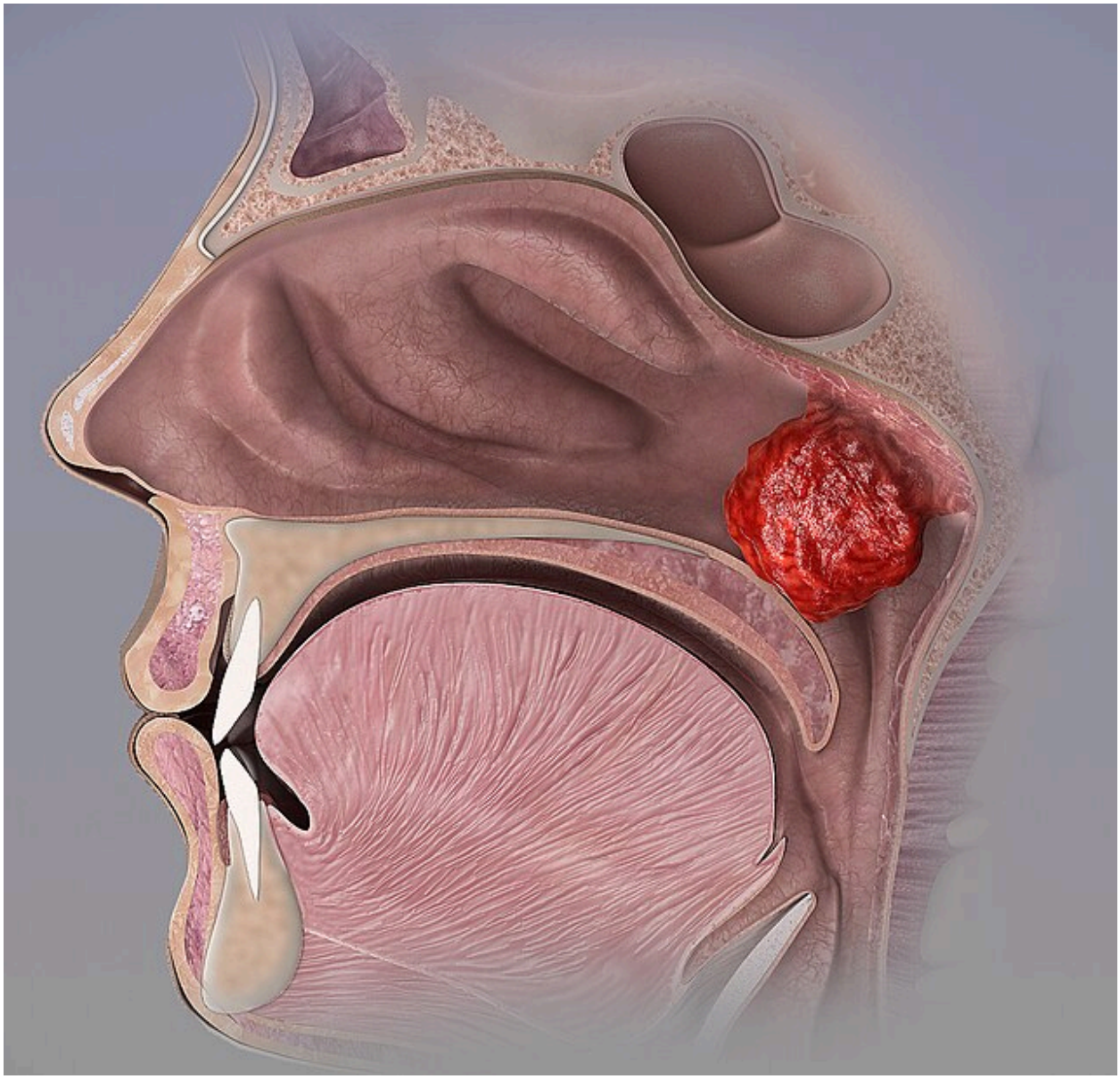


Figure 15.4 Enlarged adenoids blocking the nasal passage. Source: https://upload.wikimedia.org/wikipedia/commons/thumb/f/f6/Adenoid_hypertrophy.jpg/640px-Adenoid_hypertrophy.jpg

Assessment (Recognizing Cues)

Physical Exam

Clients with pharyngitis and/or tonsillitis can present with the following:

- Sore throat
- Fever

- Exudate on the tonsils
- Red and swollen tonsils
- Difficult or painful swallowing
- Enlarged and painful cervical lymph nodes
- Throat redness
- Ear pain

See Figure 15.5 for an image of tonsillitis with exudate. Symptoms can also vary based on whether pharyngitis is caused by a virus or bacteria. With viral infections, associated symptoms such as coughing, runny nose, headache, rash, and **conjunctivitis** (inflammation of the conjunctiva or outer lining of the eye) often occur. Bacterial causes have a faster onset of symptoms and are not associated with viral symptoms, such as a cough or runny nose. Pharyngitis caused by GABHS may also cause edema of the uvula and petechiae on the roof of the mouth.

Figure 15.5 Tonsillitis With Exudate (Source: https://commons.wikimedia.org/wiki/File:Tonsillitis_Img.jpeg)

Clients with adenoiditis can have the following symptoms[63]:

- Excessive nasal drainage
- Post-nasal drip
- Snoring

- Increased temperature
- Bad breath
- Difficulty breathing through the nose, leading to mouth breathing

Potential complications of pharyngitis and tonsillitis include spread of the infection to nearby structures, leading to epiglottitis, an ear infection, sinusitis, infection of the mastoid bone, and abscess formation. Potential complications of untreated adenoiditis are obstructive sleep apnea due to hypertrophy, otitis media with effusion, hearing loss and speech issues.[63]

When pharyngitis and/or tonsillitis caused by GABHS is not treated, scarlet fever, post-streptococcal glomerulonephritis, or pediatric autoimmune neuropsychiatric disorders (PANDAS) can develop. **Scarlet fever** is an inflammatory disease that causes inflammation of the joints and the valves of the heart. Classic symptoms of scarlet fever are a bright red rash that covers most of the body and a high fever. Scarlet fever is further discussed in the "Other Respiratory Disorders" section. **Post-streptococcal glomerulonephritis** refers to inflammation of the glomeruli of the kidneys, leading to edema, increased blood pressure, and alterations in kidney function. **PANDAS** is triggered by an autoimmune reaction when the antibodies produced by a child's immune system attack the brain and cause symptoms of tic disorder or obsessive-compulsive disorder.[21, 22, 23, 24,25]

Box
Read more information about "Glomerulonephritis" in the "Renal and Urinary System Alterations" chapter of Open RN *Health Alterations.*

Read more information about PANDAS and "Obsessive-Compulsive Disorder" in the "Mental Health Conditions" chapter.
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Common Laboratory and Diagnostic Tests

To determine if laboratory testing is needed for a client with a sore throat, health care providers may use Centor criteria to establish a level of suspicion for a bacterial cause. Centor criteria assign point values to various criteria such as age, tonsillar swelling or exudates, tender cervical lymph nodes, fever, and lack of cough as described in Table 15.3. When adding the points assigned from the Centor criteria, the higher the point value, the more likely the infection is to be caused by strep bacteria. A score of 0-1 indicates that further testing and antibiotics are not needed, but a score of 2-3 means that a rapid antigen test or throat culture should be performed. Additionally, the health care provider should also assess for known exposure to strep throat within the past two weeks to aid in diagnosis. However, the Infectious Disease Society of America recommends testing all clients that present with pharyngitis for a bacteria cause unless a clear viral cause can be determined. When the decision is made to test for GABHS, rapid antigen tests can be performed with quick results, but false negative results can occur. For pediatric clients, a negative test is followed with a throat culture.[21,22,23] See Figure 15.6 for an image of a client's tonsils being swabbed for a culture specimen.

Table 15.3 Centor Criteria

Centor Criteria	Points
Age 3-14 years	1
Tonsillar swelling or exudates	1
Tender/swollen anterior cervical lymph nodes	1
Temperature > 38° C or 100.4°F	1
Absence of cough	1
Scoring: 2 or more points requires GBS testing	

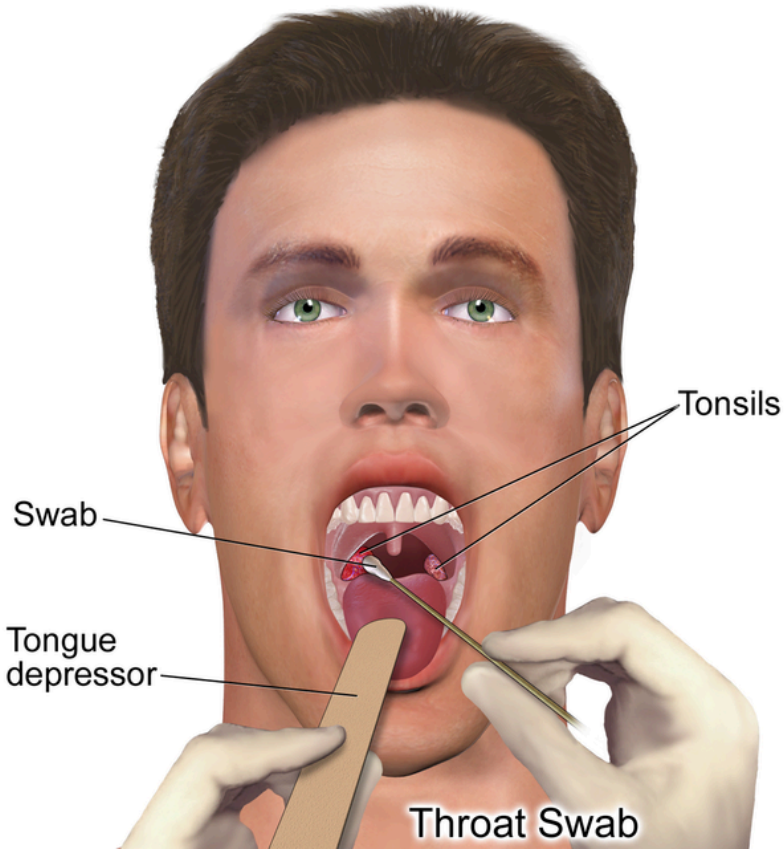

Figure 15.6 Swabbing Tonsils for Culture Specimen (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/4/44/Throat_Culture.png/640px-Throat_Culture.png)

A:"Throat_Culture" by BruceBlaus is licensed under CC BY-SA 4.0

Diagnostic imaging and additional lab work may be ordered if complications are suspected, such as respiratory compromise or abscess formation. Imaging may also be performed to assess for enlarged adenoids.[21,22,23]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with pharyngitis and/or tonsillitis include symptom management, the prevention of complications, and controlling the spread of illness.

Nursing diagnoses for clients with pharyngitis and/or tonsillitis are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with pharyngitis and tonsillitis are as follows[26,27]:

- Acute pain r/t inflammation of the throat and/or tonsils
- Hyperthermia r/t disease process
- Risk for ineffective airway clearance r/t inflammation of the throat and/or tonsils
- Risk for deficient fluid volume r/t poor oral intake

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, and realistic. These outcomes should be achievable within a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes for some of the above nursing diagnoses are listed below:

- *The client will exhibit a reduction in pain using a numeric scale, such as FACES or FLACC, within one hour.*
- *The client will exhibit a temperature that is within normal limits for age within 24 hours.*
- *The client will exhibit a patent airway and no signs of respiratory distress during the course of the illness.*
- *The client will exhibit blood pressure and heart rate within normal limits for age, moist mucous membranes, urine output appropriate for their age, and non-sunken fontanels for infant clients during the course of the illness.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

Medical treatment for pharyngitis and tonsillitis is based on the causative factor of the disorder. When caused by a bacterial infection such as GABHS, antibiotics are required. Antibiotics will not only treat the infection, but also shorten the duration of the illness and prevent the development of scarlet fever and other complications. The client is no longer considered to be infectious when they have been on antibiotic therapy for 24 hours.

Regardless of whether the infection is bacterial or viral, steroids may be prescribed to decrease the severity of symptoms, but their use is controversial. Supportive care such as the use of over-the-counter pain relievers (acetaminophen or ibuprofen) and salt water gargles can also be used. Additionally, throat lozenges or throat sprays that contain benzocaine or lidocaine can be used in older children to relieve pain by numbing the throat. Adequate hydration is essential, and the client should remain on a liquid diet until pain improves.

For clients with recurrent tonsillitis (five or more episodes over the span of a year), a **tonsillectomy**, or surgical removal of the tonsils, may be warranted. Depending on the client situation, the adenoids may or may not also be removed during this surgery. In those with recurrent tonsillitis, tonsil removal has been shown to reduce school absences, sore throats, and further infections. See the following box for information post-tonsillectomy care.

Tonsillectomy Care[21,22,23, 28,29]

Pre-Operative Tonsillectomy Health Teaching

- A tonsillectomy will be performed under general anesthesia.
- The client should NPO at midnight before surgery to prevent aspiration.
- Ten to fourteen days of recovery time may be needed. Post-operative issues that may occur are pain, nausea, vomiting, mild fever, bad breath, swelling, and a feeling that something is stuck in the throat. Pediatric clients may experience anxiety or sleep problems. Strenuous activities should be avoided in the initial days after surgery.
- A tonsillectomy is generally an outpatient procedure, but an overnight stay may be required if complications develop.

Post-Operative Tonsillectomy Teaching/Care

- Position the client in a prone or side-lying position to prevent the aspiration of blood or saliva.
- Keep suction equipment at the bedside in the event that clots form at the surgical site and block the client's airway.
- Encourage the client to perform deep breathing exercises to prevent the risk of post-surgical pneumonia.
- Administer medications, such as pain relievers, antibiotics, or IV fluids, per provider order.

- Monitor for excessive swallowing or bright red blood coming from the nose or mouth, as these could indicate bleeding from the surgical site.
- Provide clear and cold fluids in small amounts, but avoid red, purple, and brown colors because they can be misinterpreted as blood if vomiting occurs. Soft foods are started per provider order, typically after postoperative Day 1.
- Avoid the use of straws or sharp objects such as forks as they can potentially damage the surgical site and lead to bleeding.
- Discourage throat clearing, nose blowing, and coughing because they can cause surgical site bleeding.
- Administer antiemetics as prescribed to prevent vomiting because it can lead to surgical site bleeding.
- Monitor for post-operative complications such as bleeding, a high fever, signs of dehydration, or difficulty breathing.

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes of the client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with pharyngitis or tonsillitis, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching as described in the following subsections.[22,23,27,28]

Nursing Assessments

- Assess the client for signs of poor oxygenation such as increased respiratory rate, increased heart rate, confusion, pallor, or irritability. Poor oxygenation can occur due to respiratory compromise as a result of swelling in the tonsils or throat.
- Assess pain using an age-appropriate scale like FACES or FLACC to determine the need for analgesics.
- Assess the client's intake and output and vital signs to determine if a fluid volume deficit exists due to poor oral intake.
- If GABHS is the causative factor, monitor for signs of potential complications such as scarlet fever, glomerulonephritis, and PANDAS.

Nursing Actions

- Encourage the client to increase fluids to prevent the throat from becoming dry. A dry throat will make swallowing more difficult.
- Encourage the client to avoid dairy products such as milk, ice cream, and pudding, as they can leave a coating on the throat, which leads to coughing in an attempt to clear the throat. Foods that are coarse, spicy, or hot should also be avoided as they can increase pain.
- Encourage the application of ice to the neck or the intake of popsicles, as they will decrease swelling and pain.

- Encourage the use of over-the-counter medications such as acetaminophen or ibuprofen to relieve pain.
- Encourage adequate rest in order to allow the body to heal.
- Promote the use of a humidifier, as more moisture in the air can help reduce discomfort.

Client Teaching

- Educate the client and their caregivers about proper handwashing and respiratory etiquette to help prevent the spread of infection to others.
- Educate the client and their caregivers that pharyngitis and tonsillitis can be caused by either viruses or bacteria and only bacterial infections require the use of antibiotics.
- Educate the client and their caregivers on the importance of completing the entire course of antibiotics if prescribed. This prevents not only antibiotic resistance, but also helps prevent the development of complications such as scarlet fever.
- If warranted, educate the client and their caregivers about tonsillectomy care.

Box

Review general nursing interventions that relate to caring for an ill child in the “Planning Care for the Ill Child” chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client’s interdisciplinary team.

15.8 Croup

Croup, more formally known as **laryngotracheobronchitis**, is a respiratory disorder that leads to inflammation of the trachea, larynx, and bronchi. Typically, croup is caused by the parainfluenza virus, but it can also be caused by the influenza virus, adenovirus, and respiratory syncytial virus. Croup is less commonly caused by bacterial infections. Croup affects children in the age ranges of six months to three years old, with boys being affected more often than girls. Most cases of croup are mild, but it does have the potential to become a severe infection requiring hospitalization.[30]

Pathophysiology

When a client becomes infected with parainfluenza virus, the larynx, trachea, and bronchi begin to swell due to the influx of white blood cells to the area. This swelling leads to partial obstruction of the airway and the symptoms associated with croup.[30]

Assessment (Recognizing Cues)

Physical Exam

Initially, the client may present with signs of an upper respiratory infection. Common signs and symptoms are a barking cough, hoarseness, difficulty breathing, and fever that are often worse at night. Symptoms of croup last up to seven days, with the most severe symptoms typically occurring on Days 3 or 4 of the illness duration. If swelling worsens in the larynx, trachea, and bronchi, a high-pitched sound can occur as the client breathes through an obstructed airway, called **stridor**. Stridor is a characteristic symptom of severe croup. View the video in the following box to hear the sound of stridor.

View a supplementary YouTube video to hear the sound of stridor:
https://www.youtube.com/watch?v=rC4NlifTYbs
A:RegisteredNurseRN. (2016, October 11). *Stridor Sound Breathing Sounds Abnormal Lung Sounds*. [Video]. YouTube. Reused with Permission. All rights reserved.
https://www.youtube.com/watch?v=rC4NlifTYbs

The client may also exhibit an elevated heart rate, elevated respiratory rate, nasal flaring, retractions, and cyanosis. See Figure 15.7 for an image showing retractions in an infant.

Figure 15.7 Retractions in an Infant (Source: https://upload.wikimedia.org/wikipedia/commons/4/49/Sternal_retractions.JPG)

Complications of croup are uncommon, but in severe cases may include pneumonia, **pulmonary edema** (excess fluid in the lungs), bacterial infection of the trachea (**bacterial tracheitis**), or respiratory failure.[30]

The severity of croup can be determined by using the Westley scoring system, although this system is primarily used for research and not clinically. Scoring is based on several factors including chest wall retractions, the presence of stridor, reductions in air entry, the presence of cyanosis, and level of consciousness. See the following box for criteria related to the Westley scoring system. A Westley score of 2 or less means that croup is mild, scores of 3 to 5 indicate moderate croup, and scores of 6 to 11 indicate severe croup. A score over 12 suggests that respiratory failure is likely.[30]

Box
Westley Scoring System

Chest Wall Retractions	0: None 1+: Mild 2+: Moderate 3+: Severe
Stridor	0: None 1+: With Agitation 2+: At Rest
Cyanosis	0: None 4+: With Agitation 5+: At Rest
Level of Consciousness	0: Normal 5+: Disoriented
Air Entry	0: Normal 1+: Decreased 2+ Markedly Decreased

Common Laboratory and Diagnostic Tests

Croup is a clinical diagnosis, but tests may be done to rule out other conditions that present in a similar manner. Additionally, nasal secretions can be tested for parainfluenza virus or other causative factors. Although not routinely ordered, an X-ray of the neck can show narrowing of the trachea that is consistent with croup.[30]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with croup include symptom management, airway management, and preventing the spread of illness to others.

Nursing diagnoses for clients with croup are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with croup are as follows[31]:

- Ineffective airway clearance r/t airway inflammation
- Ineffective breathing pattern r/t disease process
- Anxiety r/t shortness of breath
- Risk for fluid volume deficit r/t poor oral intake

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, and realistic. These outcomes should be achievable within a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes for the described nursing diagnoses are listed below:

- *The client will exhibit a patent airway and no signs of respiratory distress during the course of the illness.*
- *The client will demonstrate an appropriate respiratory rate for their age within four hours of seeking medical treatment.*
- *The client will demonstrate a calm demeanor within fifteen minutes of medical treatment.*
- *The client will exhibit blood pressure and heart rate within normal limits for age, moist mucous membranes, urine output appropriate for their age, and non-sunken fontanels for infant clients during the course of the illness.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

Specific medical interventions for croup depend on the severity of the disorder. Clients with mild croup may be prescribed dexamethasone to reduce swelling. Clients with moderate to severe croup may be prescribed epinephrine via nebulizer to help open airways, in addition to dexamethasone. If symptoms do not improve within four hours of seeking medical attention, hospital admission is warranted. Clients with decreased oxygen saturation will receive oxygen therapy, and severe cases may require intubation and mechanical ventilation. Antibiotics are only prescribed if secondary bacterial infection is suspected. If croup is severe and linked to influenza, antiviral medications may be used. Clients are discharged from the hospital when they no longer require nebulized epinephrine, can tolerate oral intake, and are available for close follow-up appointments with the health care provider.[30]

Box

For more information on dexamethasone, view the "Corticosteroids" section of the "Endocrine System" chapter of Open RN *Nursing Pharmacology, 2e*. For more information on epinephrine, view the "Alpha- and Beta-Receptor Agonists (Catecholamines)" section of the "Autonomic Nervous System" chapter of Open RN *Nursing Pharmacology 2e*.

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Nursing Interventions

Registered nurses plan interventions based on the expected outcomes of the client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with croup, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching that are described in the following subsections.[31,32]

Nursing Assessments

- Assess the respiratory system, including the use of accessory muscles or the presence of nasal flaring, retractions, and/or cyanosis. As croup progresses, upper airway obstruction may lead to a reduction in oxygenation or respiratory distress.
- Monitor the client's vital signs. Elevated heart rate and/or respiratory rate based on normal age ranges can indicate a reduction in oxygenation.
- Assess the client's level of consciousness because confusion, restlessness, or irritability can indicate inadequate oxygen to the brain.
- Assess for the presence of anxiety in the client or their parents/caregivers to determine if health teaching about coping strategies are needed.

Nursing Actions

- Encourage increased oral fluid intake and administer IV fluids if prescribed. Fluids will prevent dehydration and may help liquefy secretions.
- Encourage the client to remain in the semi-Fowler's position or higher, as this can allow for optimal lung expansion.
- Encourage the use of a humidifier or steam from a hot shower to help clear mucus from the airway.
- Administer humidified oxygen per provider order, as this will increase oxygen levels without drying out the airways.
- Administer dexamethasone, epinephrine, and antipyretics per provider order.
- Provide the client with a calm and quiet environment to reduce anxiety. Anxiety can increase respiratory rate, which may worsen symptoms.
- Encourage adequate rest to promote healing, decrease fatigue, and prevent respiratory distress. Cluster cares to allow for rest with fewer interruptions.
- Provide suctioning as needed to remove secretions and prevent airway compromise.

Client Teaching

- Teach the client and their parents/caregivers about the disease, signs and symptoms, and treatment. Health teaching can reduce anxiety.
- Educate the client and caregivers about relaxation techniques, such as deep breathing or visualization, to reduce anxiety.
- Educate caregivers about the need to avoid anything that leads to the child crying, as crying can lead to coughing and further airway obstruction.

- Educate the client and their caregivers about proper handwashing and respiratory etiquette to help prevent the spread of infection to others.

Box
Review general nursing interventions for caring for an ill child in the “Planning Care for the Ill Child” chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client’s interdisciplinary team.

15.9 Epiglottitis

Epiglottitis refers to life-threatening inflammation of the epiglottis and associated structures. This inflammation causes severe swelling that can lead to suffocation and respiratory arrest due to obstruction of the airway. A common age group that experiences this condition is those in the 6-12 year old range, although adults can experience the condition as well. Other risk factors are male gender, people who are immunocompromised, and people who have not received the *Haemophilus influenzae type B (HIB)* vaccine.[33, 34]

Pathophysiology

Prior to the development of a HIB vaccine, epiglottitis was a common condition caused by *Haemophilus influenzae type B (HIB)*. Although HIB still causes the majority of cases, it can also be caused by other viruses, bacteria, fungi, or trauma. Due to differences in airway anatomy, children are more likely to experience epiglottitis than adults. When epiglottitis occurs, the epiglottis becomes edematous and increases in weight. In children the epiglottis is much less rigid than that of adults, which allows for easier airway obstruction. Due to the pliancy of the pediatric epiglottis, each inspiration in those suffering from epiglottitis causes the epiglottis to easily cover the airway, which results in symptoms.[33]

Assessment (Recognizing Cues)

Physical Exam

Clients with epiglottitis typically have experienced a recent URI, but symptoms worsen quickly. The classic signs of epiglottitis are the “3 Ds” that stand for drooling, dysphagia (difficulty

swallowing), and distress. Typically, the client sits upright in the tripod position and may have a muffled or hoarse voice. Airway swelling leads to stridor, retractions, and increased respiratory rate. The client may also have enlarged cervical lymph nodes. The presence of cyanosis is an ominous sign and signals a poor prognosis. It is essential that on physical exam, the nurse does not place anything (such as a tongue blade) into the throat, as this could trigger complete airway obstruction and respiratory arrest.[33]

Potential complications of epiglottitis include abscess formation, septic shock, and respiratory failure. Death can also occur if sudden airway obstruction occurs and the client cannot be intubated or have an emergent tracheostomy performed.[33]

Common Laboratory and Diagnostic Tests

A diagnosis of epiglottitis can be made clinically, but imaging is often done to help confirm the diagnosis. A lateral X-ray of the neck or ultrasound can be used to aid in diagnosis, but they should only be done on stable and cooperative clients. See Figure 15.8 for an image of a lateral neck X-ray that illustrates a swollen epiglottis. Labwork, such as a complete blood count, blood cultures, or cultures of the epiglottis, may be performed after the client's airway has been secured.[33]

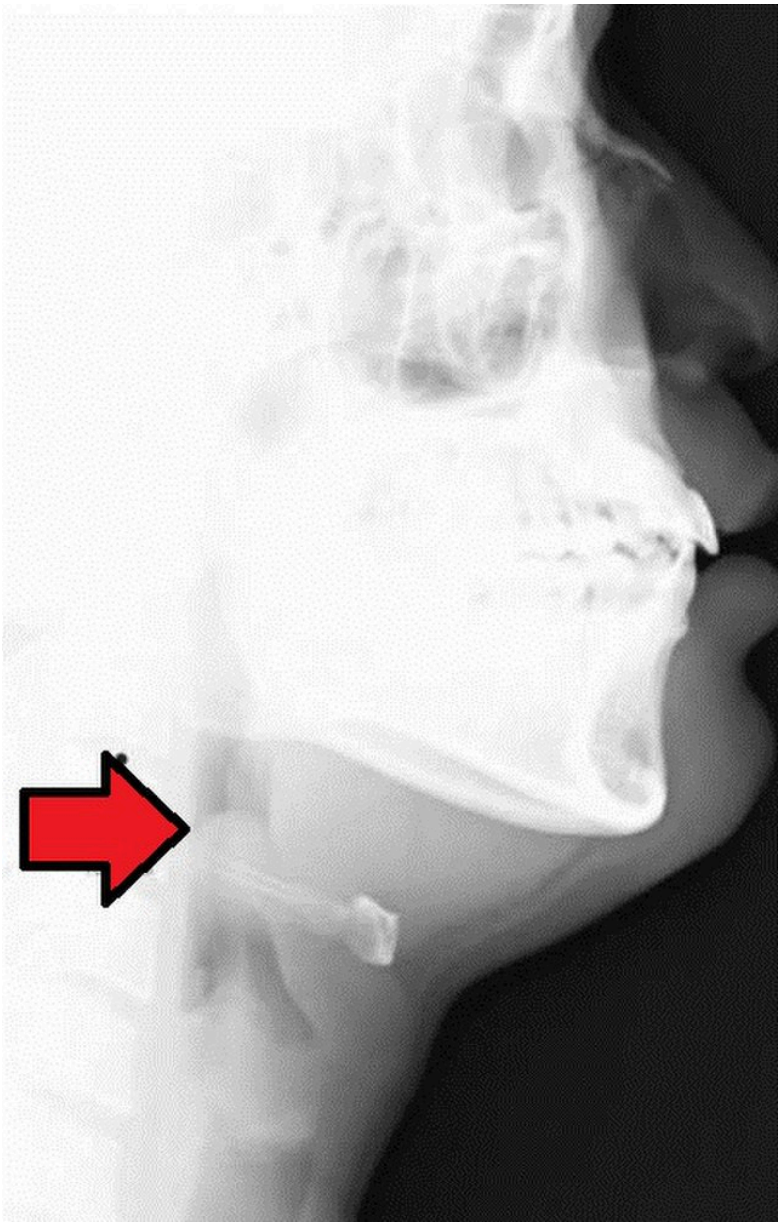


Figure 15.8 Lateral Neck X-Ray Demonstrating a Swollen Epiglottitis
(https://commons.wikimedia.org/wiki/File:Epiglottitis.jpg)
A:"Epiglottitis" by Med Chaos is licensed under CC0

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with epiglottitis include symptom and airway management and preventing the spread of illness to others.

Nursing diagnoses for clients with epiglottitis are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with epiglottitis are as follows[34, 35]:

- Ineffective airway clearance r/t airway edema
- Ineffective breathing pattern r/t airway edema
- Anxiety r/t difficulty breathing
- Risk for suffocation r/t airway edema

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, achievable, relevant, and timebound (SMART) with a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes include the following[33]:

- *The client will exhibit a patent airway and no signs of respiratory distress during the course of the illness.*
- *The client will demonstrate an appropriate respiratory rate for their age within fifteen minutes of respiratory treatment.*
- *The client will demonstrate a calm demeanor within four hours of medical treatment.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

The primary intervention for clients with epiglottitis is to secure the airway and prevent sudden airway occlusion. If indicated, an endotracheal intubation is emergently performed by an experienced health care provider, and the client is admitted to the intensive care unit. If an endotracheal intubation is not possible due to the swelling of the epiglottis, a tracheotomy may be performed by a trained physician or surgeon.[33]

Medications prescribed for epiglottitis include steroids and antibiotics. Steroid use has been shown to reduce swelling and reduce the amount of time spent in the intensive care unit. Antibiotics are initially prescribed and then adjusted later based on culture and sensitivity results. Commonly used antibiotics are cefuroxime, ceftriaxone, and cefotaxime.[33]

Box

Read additional information about these antibiotics in the "Cephalosporins" section of the Antimicrobials" chapter of the Open RN *Nursing Pharmacology, 2e.*

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes for each client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client. When caring for a client with epiglottitis, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching as described in the following sections.[33, 34, 35,36]

Nursing Assessments

- Monitor the respiratory status of the client, including lung sounds, respiratory rate and pattern, oxygen saturation levels, and arterial blood gas (ABG). Nasal flaring, increased respiratory rate, increased difficulty breathing, and worsening oxygen saturation levels or ABG results can indicate respiratory failure and the need for additional interventions such as intubation or tracheostomy.
- Assess the client's ability to swallow because epiglottitis can impair swallowing and lead to aspiration.

Nursing Actions

- Ensure that clients with epiglottitis or suspected epiglottitis do not leave the unit without adequate monitoring and resuscitation equipment.
- If indicated, prepare the client to be intubated by a trained professional to improve oxygenation.
- Ensure a tracheostomy tray is available at the bedside at all times.
- Promote relaxation strategies because agitation can trigger airway compromise.
- Administer oxygen, antibiotics, and steroids as prescribed. Oxygen should be humidified to prevent further irritation to the epiglottis. Antibiotics should be administered as soon as possible, but not until after samples have been obtained for ordered cultures.
- Do not place the client in a supine position as this can cause the epiglottis to further occlude the airway. The client should be allowed to choose a position of comfort, such as Fowler's position or tripod position.
- If appropriate, encourage the client to frequently ingest ice chips or small sips of water, as this can aid with discomfort of the throat and ensure hydration. However, if the client is NPO, administer IV fluids per provider order.

Client Teaching

- Teach the client and their caregivers that close contracts who have not received the HIB vaccine should receive prophylactic antibiotics. They may also choose to receive the HIB vaccine after exposure, but this is not always an effective method of prevention.
- Educate the client and their parents/caregivers to reduce movement and talking because these actions increase the demand for oxygen and can worsen symptoms.

- Educate the client and their parents/caregivers about epiglottitis and the course of the disease, as this can help reduce anxiety levels. Clients and their caregivers should be taught that swelling of the epiglottitis will be reduced within 24 hours of initiating antibiotic therapy and that the epiglottis will return to a normal size in about three days.
- Educate the client and their parents/caregivers on methods to reduce anxiety, such as massage, guided imagery, deep breathing, and allowing the client to have a familiar comforting object, such as a toy.
- Educate the client and their parents/caregivers about effective handwashing and respiratory etiquette to help prevent the spread of infection to others.
- To prevent epiglottitis, parents are encouraged to vaccinate their children with the HIB vaccine.

Box
Read additional information on the HIB vaccine on the Centers for Prevention and Disease Control web page on Vaccines & Immunizations.

Box
Review general nursing interventions related to caring for an ill child in the “Planning Care for the Ill Child” chapter of this text.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client’s interdisciplinary team.

15.10 Bronchiolitis

Bronchiolitis, or inflammation of the bronchioles in the lower respiratory tract, is an acute respiratory condition that is commonly seen in children. It is most commonly caused by respiratory syncytial virus (RSV), but can also be caused by rhinovirus, metapneumovirus, adenovirus, coronavirus, and parainfluenza virus. Read more information about RSV in the “Respiratory Viral Conditions” section.

Bronchiolitis can occur at any age, but infants tend to have the most severe symptoms. Cases typically occur during the fall and winter months. Risk factors for the development of this disorder include the following[37]:

- Infants that are premature or less than five months in age
- Clients of a low socioeconomic status or living in close quarters

- Clients with chronic lung disorders or immunosuppression
- Clients that are exposed to tobacco smoke

Pathophysiology

The causative virus of bronchiolitis infects cells of the airway and leads to inflammation, abnormal function of the cilia, and cell death. The inflammation results in edema and narrowing of the airways, which leads to the symptoms seen in bronchiolitis.[37]

Assessment (Recognizing Cues)

Physical Exam

The client with bronchiolitis will initially present with upper airway dysfunction and have a cough, runny nose, and elevated temperature. Symptoms generally last seven to ten days, but symptoms can linger for up to three weeks. As the disorder progresses to the lower respiratory tract (within two to three days), symptoms of respiratory distress can occur. Symptoms of respiratory distress include the following[37]:

- Adventitious lung sounds such as crackles, wheezing or rhonchi
- Elevated respiratory rate
- Retractions
- Grunting
- Cyanosis
- Excessive mucus production
- Difficulty breathing
- Irritability and poor feeding in infants

Potential complications of bronchiolitis are pneumonia and **pneumothorax** (air leaking into the thoracic space which causes a collapsed lung). Small populations of pediatric clients also develop a concurrent urinary tract infection, but the link between urinary tract infections and bronchiolitis is not yet well understood.[37,38]

Common Laboratory and Diagnostic Tests

Bronchiolitis is a clinical diagnosis, and testing may only be done to rule out other disorders. If complications are suspected, a chest X-ray may be ordered. If a urinary tract infection is suspected, urine testing may be ordered. Arterial blood gas tests are ordered in severe cases to assess the extent of respiratory distress and the need for intubation.[37,39]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with bronchiolitis include symptom management, preventing complications, and controlling the spread of infection to others.

Nursing diagnoses for clients with bronchiolitis are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with bronchiolitis are as follows:

- Ineffective airway clearance r/t airway edema
- Ineffective breathing pattern r/t disease process
- Fatigue r/t increased work of breathing

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, and realistic. These outcomes should be achievable within a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes include the following[40]:

- *The client will exhibit a patent airway and no signs of respiratory distress during the course of the illness.*
- *The client will demonstrate an appropriate respiratory rate for their age within 24 hours of medical treatment.*
- *The client will display increased energy and engage in age-appropriate play within one week of medical treatment.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

Medical treatment for clients with bronchiolitis consists of supportive care. Clients with mild symptoms can be treated at home with saline nasal spray, fever-reducing medications, and a cool-mist humidifier. Clients with severe symptoms and/or dehydration are hospitalized and receive humidified oxygen, hypertonic saline via a nebulizer, and hydration. Hypertonic saline nebulizer treatments reduce edema and the viscosity of secretions. Clients with very severe symptoms may require admission to the intensive care unit and respiratory support via intubation and mechanical ventilation.[37,39]

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes for each client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with bronchiolitis, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching as described in the following subsections.[37,39,40]

Nursing Assessments

- Monitor respiratory status, including respiratory rate and pattern, pulse oximeter readings, and the presence of nasal flaring, shortness of breath, or the use of accessory muscles. Changes in respiratory status indicate a change in condition and may require emergent interventions.
- Monitor lung sounds. Excessive edema in the bronchioles can lead to obstruction and **atelectasis** (collapse of alveoli), causing absent breath sounds in affected areas of the lung.
- Monitor intake and output because dehydration can occur due to diminished fluid intake and increased fluid loss due to fever and elevated respiratory rate. Monitor other indicators of dehydration such as elevated heart rate, decreased skin turgor, and dry mucous membranes.

Nursing Actions

- Administer prescribed medications, fluids, and oxygen therapy. Medications may be prescribed to manage fever. Fluids should be administered orally when possible, but intravenous fluids may be required for clients who are NPO or have an elevated respiratory rate. Oxygen should be humidified and should be titrated to keep oxygen saturation levels greater than 90%.
- Encourage rest periods and cluster nursing cares to reduce disruptions and help prevent fatigue. Prolonged crying can increase fatigue and should be avoided as much as possible.
- Hold infants with bronchiolitis in an upright position and elevate the head of the bed for children. These positions allow for optimal lung expansion and improved gas exchange.
- Encourage parents/caregivers to stay with hospitalized pediatric clients and perform cares such as feeding and bathing to decrease anxiety.

Client Teaching

- Teach the client and their caregivers to avoid exposure to cigarette smoke because this is a risk factor for bronchiolitis.
- Educate the client and their caregivers about effective handwashing and respiratory etiquette to help prevent the spread of infection to others.
- Teach caregivers to perform nasal suctioning prior to feeding infants because this can improve their ability to eat.
- Encourage parents/caregivers to vaccinate their children against RSV to prevent a decreased risk for developing bronchiolitis. Vaccines are further discussed in the “Respiratory Syncytial Virus (RSV)” section.

Box
Review general nursing interventions when caring for an ill child in the “Planning Care for the Ill Child” chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client’s interdisciplinary team.

15.11 Respiratory Viral Infections

Influenza, COVID-19, and respiratory syncytial virus (RSV) are three common viral respiratory illnesses that are highly contagious with the potential for severe health complications. **Influenza**, commonly known as the flu, is caused by influenza viruses that primarily infect the respiratory tract, leading to symptoms such as fever, cough, sore throat, body aches, and fatigue. **COVID-19**, caused by coronavirus SARS-CoV-2, emerged as a global pandemic in late 2019, causing a wide spectrum of symptoms, ranging from mild respiratory distress to severe pneumonia and organ failure. **RSV** is a common cause of respiratory infections in infants and young children that is characterized by symptoms similar to the common cold, including coughing, sneezing, and fever.[1]

Rhinoviruses are the most common cause of upper respiratory infections, commonly called a “cold.” Review the “Upper Respiratory Infection” section for more information about rhinoviruses.

Pathophysiology

Each pathogen has distinct pathophysiology, but they share a commonality in targeting the respiratory system, often leading to inflammation, tissue damage, and compromised lung function. Influenza viruses primarily target epithelial cells lining the respiratory tract. Once inside the respiratory tract, the virus attaches to specific receptors on the surface of epithelial cells and triggers an inflammatory response characterized by the release of cytokines and chemokines. **Cytokines** and **chemokines** are proteins that are released by cells of the immune system. Chemokines are a specific type of cytokine, but both of these proteins act as chemical messengers. Cytokines and chemokines recruit immune cells to the site of infection, regulate the creation and growth of white blood cells and help control the body’s response to illness or injury.[70,73]

COVID-19 is caused by the novel coronavirus SARS-CoV-2 that primarily targets cells expressing angiotensin-converting enzyme 2 (ACE2) receptors that are abundant in the respiratory epithelium. This triggers a dysregulated immune response characterized by the excessive production of cytokines and chemokines, often referred to as a cytokine storm. The resulting inflammation and immune dysregulation contribute to the wide spectrum of symptoms observed in COVID-19, ranging from mild respiratory symptoms to severe pneumonia and acute respiratory distress syndrome.[71]

RSV primarily infects the respiratory epithelium in the bronchioles of the lower airways leading to airway obstruction and inflammation. RSV infection triggers an immune response characterized by the recruitment of inflammatory cells such as neutrophils, macrophages, and T cells to the site of infection. The resulting inflammation and mucus production contribute to airway narrowing, respiratory distress, and symptoms such as coughing, wheezing, and difficulty breathing.[72] RSV commonly affects children and also poses a risk to older adults. Up to 90% of pediatric clients will contract RSV in the first two years of their life. Long-term immunity is not created after infection with RSV, so reinfection can happen frequently. Although most clients that develop RSV have a good prognosis, there is a higher risk of death in premature infants, clients with preexisting health conditions, and the elderly. In most climates, cases of RSV are more pronounced in the winter and spring seasons, but in tropical climates it is seen year round. A potential complication of RSV is pneumonia. Current research also suggests that RSV infection can lead to the development of wheezing and asthma later on in life.[41]

Assessment (Recognizing Cues)

See Table 15.X for a comparison of common signs and symptoms of influenza, COVID-19, RSV, and rhinoviruses.

Table 15.X Signs and Symptoms of Influenza, COIVD-19, RSV, and Rhinoviruses[1]

Body System	Influenza	COVID-19	RSV	Rhinoviruses
General	Fever, fatigue, body aches	Fever, fatigue, body aches	Fever, fatigue	Fever, fatigue

Respiratory	Cough, sore throat, nasal congestion	Cough, shortness of breath, sore throat	Cough, wheezing, nasal congestion	Runny nose, sneezing
Gastrointestinal	Nausea, vomiting, diarrhea (less common)	Nausea, vomiting, diarrhea	Nausea, vomiting (more common in infants)	N/A
Neurological	Headache	Headache, loss of taste or smell, brain fog	Irritability (more common in infants)	N/A
Musculoskeletal	Muscle aches, joint pain	Muscle aches, joint pain	Muscle aches	N/A
Cardiovascular	Chest discomfort (more common in severe cases)	Chest pain, palpitations (more common in severe cases)	N/A	N/A
Skin	N/A	Rash, discoloration	N/A	N/A

		of fingers or toes (COVID toes)		

Physical Exam

The initial manifestations of influenza, COVID-19, and RSV infection are similar to an upper respiratory tract infection with runny nose, congestion, cough, and sneezing. Sometimes the client will also have a fever and muscle aches. In clients under two years of age and those at risk for severe disease, RSV can progress to the lower respiratory tract and lead to bronchiolitis. In clients with bronchiolitis caused by RSV, common symptoms are rhonchi, elevated respiratory rate, the use of accessory muscles, wheezing, and extended expiration. In severe cases of bronchiolitis caused by RSV, the client may have decreased oxygenation levels, extreme fatigue, apnea, and respiratory failure.[41] Read more information about bronchiolitis in the "Bronchiolitis" section.

Common Laboratory and Diagnostic Tests

Two tests are available to detect the presence of respiratory viral illnesses: rapid antigen testing and PCR testing. Rapid antigen testing of nasal drainage offers quick results, but it is not as sensitive as PCR testing. PCR testing is more accurate and can detect multiple infectious organisms when a PCR panel is done, but it is more costly to perform. A chest X-ray may be performed to rule out pneumonia, but findings may be nonspecific.[41]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with viral respiratory illnesses include symptom management, monitoring for complications, and preventing the spread of illness to others. Nursing diagnoses for clients with viral respiratory illnesses are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with RSV are as follows[42]:

- Impaired gas exchange r/t disease process
- Risk for fluid volume deficit r/t poor oral intake
- Hyperthermia r/t disease process

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, and realistic. These outcomes should be achievable within a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes include the following:

- *The client will exhibit adequate oxygenation as demonstrated by a pulse oximeter reading of 95% or higher within 1 hour of treatment.*
- *The client will exhibit blood pressure and heart rate within normal limits for age, moist mucous membranes, urine output appropriate for their age, and non-sunken fontanels for infant clients throughout the course of the illness.*
- *The client will exhibit a temperature that is within normal limits for age within 24 hours of treatment.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

Clients with mild disease may be treated at home, but those with severe disease, dehydration requiring intravenous fluids, or respiratory distress need hospitalization.Treatment typically consists of supportive care and medications. Supportive care involves suctioning of nasal secretions to aid with congestion, fluid management, and antipyretic administration for fever. Fluids may be provided by mouth, intravenously, or by nasogastric tube. Oxygen is prescribed for clients with decreased oxygenation. Clients with severe symptoms may require oxygen therapy via high-flow nasal cannula, continuous positive airway pressure (CPAP), or intubation with mechanical ventilation.[41]

Antiviral medications like oseltamir may be prescribed to reduce the severity and duration of influenza symptoms or remdesivir may be prescribed to treat COVID-19. Monoclonal antibodies may be administered for high-risk clients with COVID-19 to reduce the risk of severe illness and hospitalization. Corticosteroids may be given to reduce inflammation, and bronchodilator medications (e.g., albuterol) may be administered to relieve bronchospasm and improve airflow in clients with wheezing or bronchiolitis. If a bacterial co-infection is suspected, clients may be treated with antibiotics.[footnote]Parasher, A. (2021). COVID-19: Current understanding of its pathophysiology, clinical presentation and treatment. *Postgraduate Medical Journal, 97*(1147), 312–320. https://doi.org/10.1136/postgradmedj-2020-138577[/footnote],[footnote]Centers for Disease Control and Prevention. (2023, February 9). *Respiratory virus updates*. https://www.cdc.gov/respiratory-viruses/whats-new/index.html[/footnote],[footnote]Pappas, D. (2023). Epidemiology, clinical manifestations, and pathogenesis of rhinovirus infections. *UpToDate*. Retrieved February 14, 2024, from https://www.uptodate.com/[/footnote],[footnote]Kaler, J., Hussain, A., Patel, K., Hernandez, T., & Ray, S. Respiratory syncytial virus: A comprehensive review of transmission, pathophysiology, and manifestation. *Cureus, 15*(3), e36342. https://doi.org/10.7759/cureus.36342[/footnote]

Passive immunization is also a common treatment for RSV. Passive immunization for RSV is done via administration of palivizumab, a monoclonal antibody. When administered monthly throughout the RSV season, palivizumab can help prevent RSV infection. However, this medication is relatively expensive, and only some clients are candidates to receive it. Palivizumab is recommended for children less than 24 months of age who were born premature or suffer from a chronic heart, lung, or neuromuscular disease.[44]

Nirsevimab is another type of monoclonal antibody that is recommended for passive immunization in infants less than eight months old who were born during or entering RSV season. Alternatively, a maternal RSV vaccine can be given at least 14 days prior to delivery (if delivering during RSV season), negating the need for the infant to receive nirsevimab. A second dose of nirsevimab can be given to infants 8-19 months old who have increased risk for severe RSV and are entering their second RSV season.[44]

Ribavirin, an antiviral medication, is also available to treat RSV. However, its current use is up for debate due to the expense of the medication and its questionable effectiveness. Therefore, it is not routinely used to treat RSV.[44]

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes of the client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with a viral respiratory illness, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching that are described in the following subsections.[41,42,43]

Nursing Assessments

- Monitor for retractions or other signs of respiratory distress and initiate emergent treatment. Arterial blood gas (ABG) may be obtained to assess for respiratory failure.
- Assess for the presence of apnea, as this may be the presenting symptom in premature infants or infants younger than two months of age.
- Assess vital signs, intake and output, skin turgor, and mucous membranes to determine fluid status. Increased heart rate, decreased urination, poor skin turgor, and dry mucous membranes may indicate dehydration.

Nursing Actions

- Ensure that hospitalized clients remain on transmission-based precautions to prevent the spread of viral illness. Caregivers or other visitors are often required to wear a gown and mask when in close contact with the client.
- Ensure adequate fluid intake, whether orally or intravenously. Fluids can help prevent dehydration and may help loosen secretions.

- Administer medications, such as antipyretics, antivirals, and oxygen, per provider order. Administer immunizations to qualifying clients as prescribed.
- Assist with deep suctioning per provider order. Deep suctioning can remove secretions and provide temporary relief of symptoms. Noninvasive suctioning prior to eating can also improve caloric intake.
- Cluster nursing cares and allow for rest periods to manage fatigue and conserve energy.

Client Teaching

- Educate the client and their parents/caregivers about effective handwashing and respiratory etiquette to help prevent the spread of infection to others. All surfaces in the environment should also be disinfected, as respiratory viruses can survive on surfaces for several hours.
- Teach parents/caregivers how to prevent fatigue in the client. This can be done by holding or rocking the child, feeding in small amounts, and providing diversions. Caregivers should soothe the client and not let them cry for longer than one to two minutes, as this can lead to fatigue.
- Explain to parents/caregivers that RSV is highly contagious and can be contracted from someone kissing or cuddling their infant. Therefore, caregivers may need to place limits on infant interactions with others during the RSV season.
- Educate parents and caregivers about the availability of immunizations to help prevent viral respiratory infections. Nurses encourage parents to remain up-to-date on recommended vaccinations to prevent respiratory illness, including influenza, respiratory syncytial virus (RSV), and COVID vaccines.

Box
Review current vaccine information from the CDC on the "Vaccines By Age" webpage.

Review general nursing interventions for caring for an ill child in the "Planning Care for the Ill Child" chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client's interdisciplinary team.

15.12 Acute Bronchitis

Acute bronchitis, or inflammation of the bronchi, is a common respiratory illness in the United States. It is most commonly caused by viruses, such as rhinovirus, influenza virus, or adenovirus. However, it can also be caused by bacteria or exposure to irritants like smoke or pollution. Acute bronchitis cases spike in the winter months due to the prevalence of the influenza virus at this time, but it can occur at any time of the year. Risk factors for the development of acute bronchitis are tobacco use, living in areas with high pollution, living in crowded residences, and a history of asthma, as well as a history of allergies.[45]

Pathophysiology

Acute bronchitis results when an infectious organism invades the respiratory tract and starts to replicate. This triggers an inflammatory response in the bronchi, leading to irritation and increased production of mucus. In some cases, acute bronchitis can also be caused by an upper respiratory tract infection that spreads to the lower respiratory tract.[45]

Assessment (Recognizing Cues)

Physical Exam

Common signs and symptoms of acute bronchitis are a productive and persistent cough with clear, yellowish, or purulent sputum, difficulty breathing, rhonchi or wheezing, and malaise. The cough typically lasts for 10 to 20 days but can last longer than four weeks. Prolonged coughing can also cause chest wall pain.[45]

Initially, it may be difficult to distinguish acute bronchitis from an upper respiratory tract infection (URI). However, as the infection develops, it becomes easier to differentiate between the two disorders because a URI resolves quickly, whereas acute bronchitis tends to persist.[45]

Box
Review information about URIs in the “Upper Respiratory Tract Infection” section.

Potential complications of acute bronchitis are pneumonia, acute respiratory distress syndrome, and respiratory failure. Spontaneous pneumothorax can also result from chronic, forceful coughing.[45]

Common Laboratory and Diagnostic Tests

Acute bronchitis is primarily a clinical diagnosis. The severity of the condition can be gauged based on the client’s vital signs; in clients with normal vital signs, no further diagnostic testing is typically needed. In clients with an elevated heart rate or respiratory rate, a temperature greater than 100.4 F, or the presence of egophony or fremitus on a chest examination, a chest X-ray is typically performed to rule out pneumonia or other lung issues. **Egophony** refers to increased

resonance of voice sounds that can be heard when listening to the client's chest. This increased resonance gives voice sounds a nasal quality and can indicate pneumonia. **Fremitus** refers to changes in vibration intensity when certain words are spoken while the chest is being palpated by the examiner.[45,46,47]

Laboratory testing such as a complete blood count may be ordered for clients with acute bronchitis, which typically indicate elevated white blood cell counts. PCR testing of nasal secretions may be performed to identify the causative agent in specific situations.[45]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with acute bronchitis include symptom management and preventing the spread of illness to others.

Nursing diagnoses for clients with acute bronchitis are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with acute bronchitis are as follows[48]:

- Ineffective airway clearance r/t excessive mucus
- Ineffective breathing pattern r/t disease process
- Fatigue r/t disease process and excessive coughing

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, and realistic. These outcomes should be achievable within a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes include the following:

- *The client will exhibit a patent airway and no signs of respiratory distress during the course of the illness.*
- *The client will demonstrate an appropriate respiratory rate for their age within 24 hours.*
- *The client will display an increase in energy and engage in age-appropriate play within one week.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

Medical treatment of acute bronchitis consists of supportive care. To relieve cough, nonpharmacological strategies such as hot tea, honey, ginger, and throat lozenges can be used when age appropriate. Over-the-counter medications like dextromethorphan and guaifenesin are also available for management of cough and mucus, but their use may not be appropriate for children of all ages, and parents should follow the advice of their health care provider. Over-the-counter antipyretics, such as acetaminophen or ibuprofen, can be used to manage fever.[45]

Other medications that may be used in the medical management of acute bronchitis are bronchodilators for wheezing or short-term steroid therapy to manage inflammation. Antibiotic therapy is only used when bacteria has been identified as a causative pathogen. If acute bronchitis is caused by influenza, antiviral agents such as oseltamivir may help in reducing symptoms.[45]

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes of the client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with acute bronchitis, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching as described in the following subsections.[47,48]

Nursing Assessments

- Perform a focused respiratory assessment, including airway, lung sounds, respiratory rate and pattern, pulse oximetry readings, the presence of shortness of breath, the use of accessory muscles, and the coughing pattern of the client. Changes in the client's respiratory assessment findings can indicate worsening of their condition, bronchospasm, or the accumulation of excessive mucus.

Nursing Actions

- Administer oxygen as prescribed and as indicated.
- Encourage adequate fluid intake, as well as a humidifier, as this may help loosen mucus.
- Encourage the client to sit upright with the head of the bed 30 degrees or higher to allow for optimal lung expansion.
- Cluster nursing cares and provide rest periods when fatigue is present to allow the client to conserve energy.

Client Teaching

- Educate the client and their parents/caregivers about the need to reduce exposure to smoke, allergens, and pollution to prevent recurrent acute bronchitis and reduce the risk of complications. Clients prone to developing acute bronchitis should wear a mask when in environments with high levels of irritants or pollution.
- Teach the client and their parents/caregivers that if symptoms last longer than six weeks, the client should be reevaluated by their health care provider to ensure their initial diagnosis was accurate and no complications are present.
- Educate the client and their caregivers about proper handwashing and respiratory etiquette to help prevent the spread of infection to others.
- Encourage annual influenza and pneumonia vaccines to help prevent the development of acute bronchitis.

Box
Review general nursing interventions related to caring for an ill child in the “Planning Care for the Ill Child” chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client’s interdisciplinary team.

1515.13 Infectious Mononucleosis/Epstein Barr

Infectious mononucleosis, commonly referred to as mono, is a viral infection generally caused by the Epstein-Barr virus (EBV). However, it can also be caused by cytomegalovirus, adenovirus, rubella, and other other viruses. The focus of this section will be on infectious mononucleosis caused by the EBV. Typically, this condition is diagnosed in clients aged 15-24 years old. When very young children are infected with EBV, they are often asymptomatic.[49]

Pathophysiology

EBV is spread person to person via contact with infected saliva; hence it is also known as the kissing disease. Once EBV is transmitted, it infects the cells of the salivary glands, mouth, and throat. The virus begins to replicate and spreads via the lymphatic system where it has an affinity for the B cells of the immune system. Although the person’s immune system will create antibodies against EBV, it is considered a lifelong disorder that can reactivate at a later date, particularly in those who are immunodeficient.[49]

Assessment (Recognizing Cues)

Physical Exam

The most common presenting signs of infectious mononucleosis are an elevated temperature, sore throat, and enlarged cervical lymph nodes. See Figure 15.9 for an image of a client with swollen lymph nodes due to infectious mononucleosis. The sore throat may also be accompanied by exudate on the tonsils, as well as petechiae on the roof of the mouth. Other signs and symptoms that may be seen are fatigue, headache, decreased intake, an enlarged spleen, and a generalized rash on the skin.[49]

Figure 15.9 Swollen Lymph Nodes Due to Infectious Mononucleosis (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/c/cf/Lymphadanopathy.JPG/640px-Lymphadanopathy.JPG)

Potential complications of infectious mononucleosis include obstruction of the airway due to extremely enlarged lymph nodes, rupture of the spleen, anemia, and spread to the central nervous system. In most clients, the fatigue associated with infectious mononucleosis is prolonged and can last for months.[49]

Common Laboratory and Diagnostic Tests

Infectious mononucleosis is typically diagnosed with a monospot test. The monospot test requires a sample of the client's blood and provides results within ten minutes. However, false negatives can occur if testing is done early on in the course of illness, so it may need to be repeated at a later date. Blood can also be tested for antibodies to EBV, but results take much longer. A complete blood count is typically ordered, and results usually indicate increased white blood cells and potentially a decrease in platelets. If there is concern for spleen enlargement, imaging may also be performed.[49,50, 51]

Nursing Diagnosis (Analyzing Cues)

Nursing priorities for clients with infectious mononucleosis include symptom management, monitoring for complications, and preventing spread of the disease.

Nursing diagnoses for clients with infectious mononucleosis are created based on the specific needs of the client, their signs and symptoms, and the etiology of the disorder. These nursing diagnoses guide the creation of client-specific care plans that encompass client outcomes and nursing interventions, as well the evaluation of those outcomes. These individualized care plans then serve as a guide for client treatment.

Possible nursing diagnoses for clients with infectious mononucleosis are as follows[51]:

- Hyperthermia r/t disease process
- Fatigue r/t disease process
- Imbalanced nutrition: less than body requirements r/t decreased oral intake
- Acute pain r/t disease process
- Risk for ineffective airway clearance r/t swelling of cervical lymph nodes

Outcome Identification (Generate Solutions)

Outcome identification encompasses the creation of short- and long-term goals for the client. These goals are used to create expected outcome statements that are based on the specific needs of the client. Expected outcomes should be specific, measurable, and realistic. These outcomes should be achievable within a set time frame based on the application of appropriate nursing interventions.

Sample expected outcomes include the following:

- *The client will exhibit a temperature that is within normal limits for age within 48 hours.*
- *The client will display an increase in energy and engage in age-appropriate play within one week.*
- *The client will maintain their weight within a healthy range that is appropriate for their height throughout the course of the illness.*

Interventions (Generate Solutions & Take Action)

Medical Interventions

Treatment for infectious mononucleosis consists of supportive care. Acetaminophen and/or ibuprofen can be given to manage fever and sore throat. The client should also be encouraged to maintain adequate fluids and oral intake. Due to extreme fatigue, rest should also be promoted. If the spleen is enlarged, contact sports and other physical activities should be avoided for four to six weeks due to the risk of the spleen rupturing. In clients who have partial airway obstruction due to enlarged lymph nodes, steroids may be given to reduce inflammation.[49]

Nursing Interventions

Registered nurses plan interventions based on the expected outcomes of the client. Prior to implementation, the nurse must determine if all previously planned interventions are still suitable based on the current situation of the client.

When caring for a client with infectious mononucleosis, nursing interventions can be divided into nursing assessments, nursing actions, and client teaching as discussed in the following subsections.[49,52]

Nursing Assessments

- Assess the client presenting with sore throat, fever, and enlarged cervical lymph nodes for a history of recent exposure to infectious mononucleosis.
- Assess the client's vital signs to determine a baseline as they progress through medical treatment. Vitals may be altered if a complication, such as a splenic rupture or dehydration occurs.
- Assess the client's fatigue on a scale of mild to severe to establish a baseline, as well as monitor for improvement.
- Assess the client's nutritional intake, as poor nutrition may contribute to the client's fatigue.

Nursing Actions

- Administer acetaminophen and ibuprofen for fever and pain per provider order.
- Administer steroid medications if airway compromise is present, per provider order.
- Elevate the head of the bed to encourage lung expansion and ease of breathing.
- Assist the client with progression of activity to increase their activity tolerance over time.
- Encourage oral hygiene to improve appetite during the course of the infection.

Client Teaching

- Educate the client and their parents/caregivers on the signs and symptoms of potential complications, especially rupture of the spleen. Signs of a splenic rupture include abdominal pain, shoulder pain, and decreased blood pressure.
- Teach clients to avoid sharing food, drinks, utensils, and personal care items such as toothbrushes to prevent the spread of infectious mononucleosis to others. Clients should also be advised to refrain from kissing others and to perform appropriate hand hygiene.
- Educate the client that EBV can remain in the saliva for up to 18 months.
- Educate the client on methods to conserve energy such as scheduling rest periods and prioritizing activities.

Box

Review general nursing interventions related to caring for an ill child in the “Planning Care for the Ill Child” chapter.

Evaluation (Evaluate Outcomes)

Evaluation of client outcomes refers to the process of determining whether or not client outcomes were met by the indicated time frame. This is done by reevaluating the client as a whole and determining if their outcomes have been met, partially met, or not met. If the client outcomes were not met in their entirety, the care plan should be revised and reimplemented. Evaluation of outcomes should occur each time the nurse assesses the client, examines new laboratory or diagnostic data, or interacts with another member of the client’s interdisciplinary team.

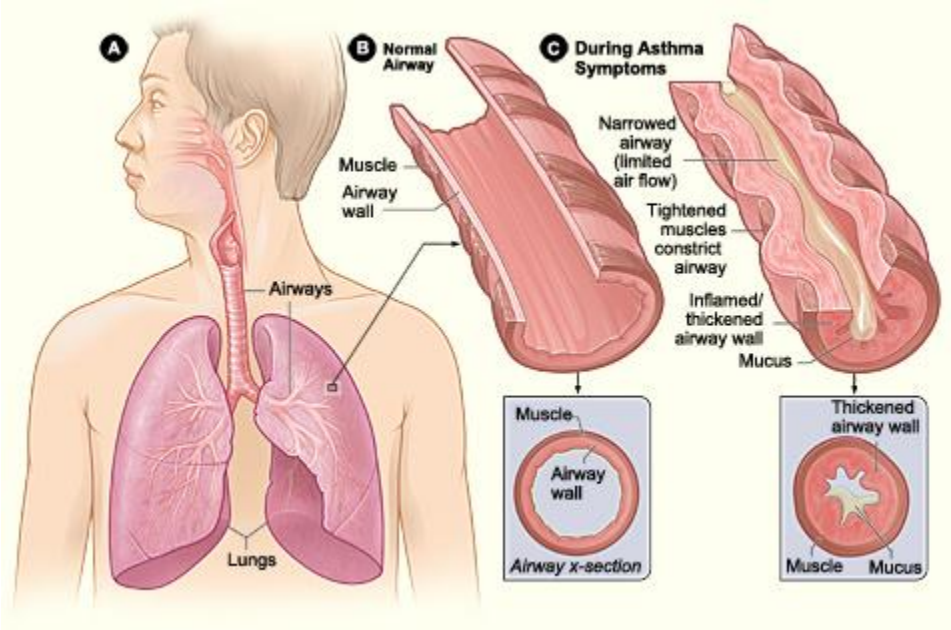
15.14 Other Respiratory Disorders

Overviews of other common respiratory disorders are discussed in this section.

Asthma

Asthma is a common chronic respiratory condition that is characterized by episodes of inflammation and edema of the airways and bronchospasms that prevent air from entering the lungs. Excessive mucus secretion can also occur, which further contributes to blockage of the airway and shortness of breath. Bronchospasms can lead to asthma attacks that can range from mild to severe and can be life-threatening. An asthma attack may be triggered by environmental factors such as dust, pollen, pet hair, or dander; changes in the weather; mold; tobacco smoke; respiratory infections; or by exercise and stress. Between episodes of asthma attacks, many individuals with asthma are asymptomatic.[2] See Figure 15.X for an illustration of how asthma affects the airways.

Figure 15.X Asthma ("Asthma_attack-illustration_NIH.jpg" by United States-National Institute of Health: National Heart, Lung, Blood Institute is in the Public Domain)



Symptoms of an asthma attack involve coughing, dyspnea (shortness of breath), wheezing, and tightness of the chest. Severe asthma attacks can be fatal and require immediate medical attention. Symptoms of a severe asthma attack include worsening dyspnea that can cause cyanotic or blue lips or fingertips, worsening wheezing, confusion, drowsiness, a rapid pulse, sweating, and severe anxiety.[2]

Chronic asthma is typically diagnosed by health care providers by using pulmonary function tests. Individuals with asthma are often prescribed a peak flow meter, a portable instrument used to measure air flow during forced exhalation, to help manage their symptoms. Asthma is treated by respiratory medications given via an inhaler and/or nebulizer. A nebulizer is a medical device that creates a mist for delivering respiratory medication. Inhalers may be referred to as dry powder inhalers (DPI) or metered dose inhalers (MDI). The severity of the condition, frequency of attacks, and identified triggers influence the type of medication that an individual may require. Long-term treatments for patients with severe asthma include oral and/or injectable medications.[2]

Box
Read more information in the "Asthma" section of the "Respiratory System Alterations" chapter in Open RN *Health Alterations*.

Cystic Fibrosis

Cystic fibrosis (CF) is a genetic disease that causes a faulty CFTR protein that affects the body's cells, tissues, and glands that make mucus and sweat. People with CF have thick, sticky mucus that builds up in the lungs and digestive tract and other areas of the body. This excessive mucus blocks airways and increases the risk for respiratory infections that can cause lung damage. It also affects the pancreas, with the increased secretions preventing digestive enzymes from reaching the intestines and decreasing the body's ability to absorb nutrients from food. The most serious complications of cystic fibrosis are respiratory exacerbations caused by lung infections.[65]

CF is diagnosed through a multistep process that includes newborn screening, a sweat chloride test, genetic testing, and clinical evaluation. The sweat test detects a higher amount of chloride in the sweat of people who have cystic fibrosis. Most children with CF are diagnosed by age 2, but some are not detected until age 18 or older.[65]

Cystic fibrosis was historically a cause of childhood mortality, but survival has significantly improved because of medical advances in newborn screening, medications, nutrition, and lung transplants. Clients with CF are typically prescribed CFTR modulators that improve how the faulty CFTR protein works. Respiratory medications such as bronchodilators open and relax the airways and mucus thinners help the client expectorate mucus. Anti-inflammatory medications, such as ibuprofen or corticosteroids reduce inflammation caused by CF that can worsen lung disease. Lung transplants may be performed for people with severe lung disease and respiratory failure.[65]

Diphtheria

Diphtheria is a preventable illness that is caused by the bacteria *Corynebacterium diphtheria*. This disorder predominantly affects the respiratory and integumentary systems. Due to the presence of a vaccine, cases are low in the United States. However, clients who are at risk for contracting this disease include those who have a low socioeconomic status, are not vaccinated, travel to endemic areas, or live in close quarters. Children under 12 years old are the most likely to contract this disease, but adults can suffer from this disorder as well.[56]

Diphtheria is transmitted by airborne respiratory secretions. Once inhaled, *C. diphtheria* produces an endotoxin that leads to inflammation in the throat of the afflicted client. This inflammation leads to the formation of a gray pseudomembrane in the throat and on the tonsils, which is a hallmark finding of this disease. The pseudomembrane will bleed if a removal attempt is made.[56] See Figure 15.13 for an image depicting this membrane.

Figure 15.13 Membrane Associated With Diphtheria (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/4/47/Dirty_white_pseudomembrane_classically_seen_in_diphtheria_2013-07-06_11-07.jpg/640px-Dirty_white_pseudomembrane_classically_seen_in_diphtheria_2013-07-06_11-07.jpg)

Other common signs and symptoms of diphtheria are fever, sore throat, enlargement of cervical lymph nodes, headache, difficulty swallowing, and malaise.[56]

To confirm a diagnosis, a throat swab is taken and cultured to determine the presence of the *C. diphtheria* bacteria. PCR testing can also be done to differentiate between different strains of the

bacteria. A complete blood count will demonstrate an elevated white blood cell count. Imaging of the chest and neck areas may indicate swelling of soft tissue.[56]

Treatment consists of antibiotics and a diphtheria antitoxin. The client is also monitored for respiratory and cardiac distress. Airway management and cardiac monitoring are necessary. Clients with diphtheria should also follow isolation precautions to prevent the spread of infection.[56]

Potential complications of diphtheria can be fatal and include inflammation of the heart, arrhythmias, and nerve inflammation, leading to weakness or paralysis. The formation of the pseudomembrane can also cause airway obstruction, necessitating the need for intubation and mechanical ventilation.[56]

Diphtheria is preventable by vaccination. Usually this is given in combination with vaccines for tetanus and pertussis (DTap or Tdap).[56]

Box
Read additional information about the DTap or Tdap vaccines on the Centers for Disease Control and Prevention web page at https://www.cdc.gov/vaccines/schedules/index.html.

Mumps

Mumps is a contagious illness caused by paramyxovirus. Although once a common disease of childhood, it has become much less frequent due to vaccination. Mumps cases are generally seen in the late winter and early spring seasons. Clients at risk for contracting mumps are those who are immunocompromised, unvaccinated, traveling to endemic areas, or living in close proximity to others.[58]

The mumps virus is transmitted via contact with respiratory secretions, saliva, or **fomites** (inanimate objects that can spread disease to others when they are contaminated with an infectious organism). After a client is infected with the mumps virus, it will replicate in the mucosa of their upper airways. Eventually, the infection will spread to lymph nodes and result in widespread inflammation of various bodily tissues.[58]

Some clients infected with the mumps virus may be asymptomatic yet contagious to others. Initial symptoms are fever, muscle aches, malaise, and loss of appetite. This is followed by **parotitis**, painful swelling of the parotid salivary glands, a hallmark characteristic of this disorder. Generally, bilateral parotid glands on both sides of the mouth will become inflamed, but sometimes the swelling will be unilateral. See Figure 15.14 for an image of a child with parotitis due to mumps. Another common manifestation of mumps is **orchitis**, or painful swelling of the testes. **Oophoritis**, or inflammation of the ovaries, can occur in females but is rarer than orchitis. Neurological issues such as meningitis or encephalitis can also occur. Other signs of systemic inflammation, such as pancreatitis, thyroiditis, arthritis, or myocarditis, may occur but are rare.[58]

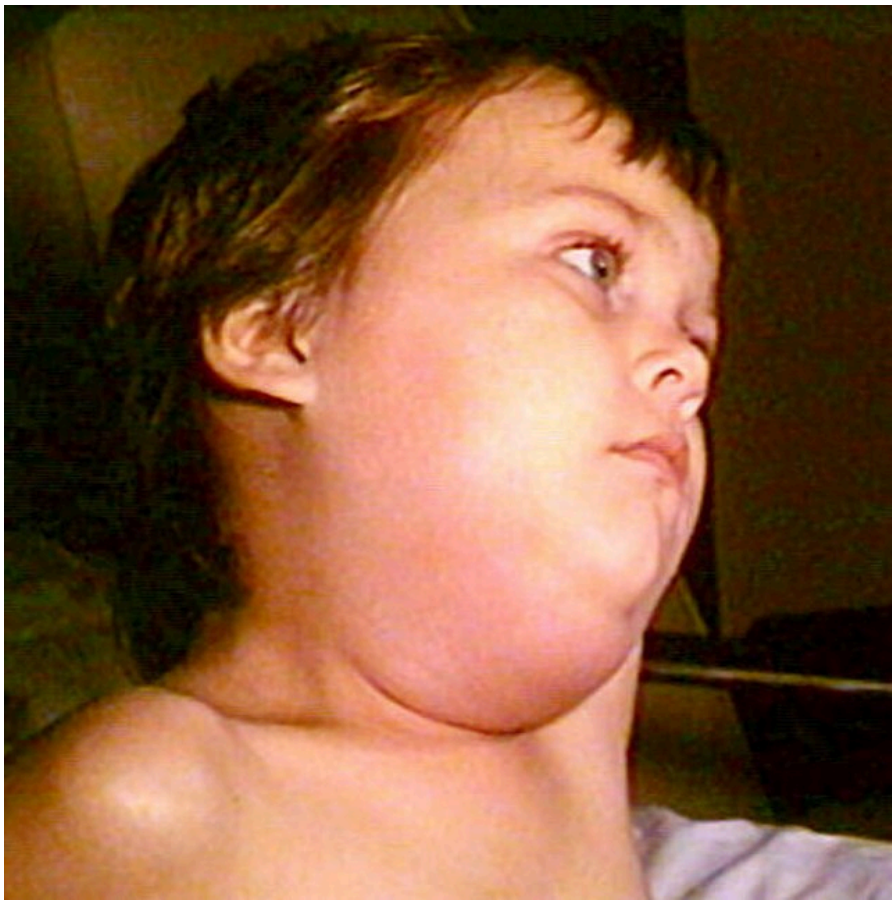


Figure 15.14 Child with Parotitis Due to Mumps (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/8/80/Mumps_PHIL_130_lores.jpg/640px-Mumps_PHIL_130_lores.jpg)

A:"Mumps_PHIL_130_lores" by CDC/Dr. Charles N. Farmer is in the Public Domain

If the client presents with swelling of the parotid glands and has a known exposure to the mumps virus, a clinical diagnosis can be made. However, a swab can be taken of the mouth and undergo PCR testing to confirm a diagnosis. Additionally, blood can be drawn to screen for antibodies to the mumps virus. However, antibody and PCR tests are falsely negative in a large number of clients, so confirmation of the diagnosis can be difficult to obtain.[58]

Mumps resolves on its own with time, so only supportive care is needed such as pain medication and cold or warm compresses. Orchitis can be managed with elevation and cold compresses. Teach clients about effective handwashing and avoiding others while ill is essential to prevent the spread of the infection to others.[58]

Potential complications can occur due to the mump virus. When mumps occurs in a pregnant client, birth defects, premature birth, low birth weight, and fetal death are possible. Deafness can also result from a mumps infection, but this complication is rare.[58]

Mumps can be prevented with the administration of the MMR vaccine.[58]

Box
Read additional information about the MMR vaccine on the Centers for Disease Control and Prevention webp age at https://www.cdc.gov/vaccines/schedules/index.html.

Pertussis

Pertussis, also known as whooping cough, is a preventable and contagious respiratory disorder caused by the bacteria *Bordetella pertussis* or *Bordetella parapertussis.* This disorder mainly affects infants and children under age five, but adults can contract pertussis as well. Clients at risk for contracting pertussis are those who are pregnant, have not been immunized, have contact with someone who is infected, or travel to an endemic region. Pertussis primarily occurs in the summer months. Even though a vaccine is available, cases are on the rise in the United States.[57]

Pertussis is spread by respiratory droplets that occur due to coughing. Once inhaled, the pertussis bacteria adheres to the respiratory tract and leads to inflammation in the lining of the mucosa.[57]

Initial signs and symptoms of pertussis are fever, rhinorrhea, and fatigue. After the fever resolves, a cough begins. The cough is followed by a strong inspiration that causes the "whooping" sound that is characteristic of this disorder. Listen to the characteristic sound using the link in the following box. The cough is more common at night and can be activated by cold air or noise. During coughing fits, the client may have excessive sweating, cyanosis, or stop breathing. When the coughing subsides, the client may vomit or experience syncope or apnea.[57]

Listen to the following video for a demonstration of the sound of a whooping cough: What is That Sound? Whooping Cough (youtube.com).

A: U.S. Food and Drug Administration. (2022, April 25). *What is That Sound? Whooping Cough.* [Video]. YouTube. All rights reserved. https://www.youtube.com/watch?v=DB70izafC1Y

Infants may exhibit atypical symptoms and may have a fever. Common signs and symptoms in infants are elevated respiratory rate, apnea, cyanosis, and decreased heart rate.[57]

Diagnosis of pertussis can be done by culturing secretions from the nose and throat or PCR testing. However, cultures are slow to grow and lack sensitivity. PCR testing is more reliable, but not always available. Clients who are positive for pertussis may also exhibit an elevated white blood cell count.[57]

Pertussis treatment consists of supportive care such as providing oxygen as indicated, increasing fluid intake, and suctioning secretions. Hospitalization is recommended for clients experiencing secondary infections, low oxygen levels, those who cannot eat or drink, and those who are less than one year old. The illness can be prolonged and require parenteral nutrition.[57]

Antibiotics are prescribed to prevent the spread of the condition, but depending on when they are initiated, they may not decrease the severity or length of the disorder. Due to its high level of contagion, antibiotics are also recommended for people who have had contact with a client who is positive for pertussis. Additionally, the client must follow isolation procedures until they are no longer infectious, which is usually five days after the start of antibiotic therapy.[57]

A frequent complication of pertussis is secondary pneumonia caused by aspiration of gastrointestinal contents during coughing. Although rare, complications of the central nervous system such as seizures or bleeding into the brain may also occur. Increased pressure in the thorax and abdomen due to frequent coughing may also lead to a collapsed lung, rupture of the diaphragm, hernia formation, or rectal prolapse.[57]

Pertussis is preventable by vaccination that is typically given in combination with vaccines for diphtheria and tetanus (DTap or Tdap).[57]

Box
Read additional information on the DTap or Tdap vaccines on the Centers for Disease Control and Prevention web page at https://www.cdc.gov/vaccines/schedules/index.html.
—-

Pneumonia

Pneumonia is an infection of the alveoli of the lungs caused by microorganisms like bacteria, viruses, or fungi that can cause mild to life threatening illness in people of all ages. It is characterized by inflammation and infection within the alveoli, causing them to fill with fluid or purulent material, resulting in a productive cough, fever, chills, and difficulty breathing. Pneumonia differs from chronic conditions like asthma and COPD in that it is an acute infection. It is most serious for infants and young children, people older than age 65, and clients with chronic health problems or weakened immune systems.[68,69]

Symptoms of pneumonia include the following[66]:

- Cough, which may produce greenish or yellow mucus (often called purulent sputum)
- Fever and shaking chills
- Dyspnea (shortness of breath)
- Rapid, shallow breathing
- Sharp or stabbing chest pain that gets worse when breathing deeply or coughing

- Loss of appetite, low energy, and fatigue

Common diagnostic tests for pneumonia include sputum cultures and chest X-rays. There are several categories of pneumonia[66]:

- **Aspiration pneumonia:** Pneumonia that occurs when food or liquid is breathed into the airways or lungs, instead of being swallowed.
- **Community-acquired pneumonia:** Pneumonia that is diagnosed in someone in the community (not in a hospital).
- **Healthcare-associated pneumonia:** Pneumonia that is diagnosed in someone during or following a stay in a health care setting.
- **Ventilator-associated pneumonia:** Pneumonia that is diagnosed in someone who has been on a ventilator.

Pneumonia treatment is based on the causative factor. Bacterial pneumonia will be treated with antibiotics. However, antibiotics will not be effective for pneumonia that is caused by a virus. Viral pneumonia is treated with supportive care and antiviral medications in some situations.

Box
Read more information in the "Pneumonia" section of Open RN *Health Alterations*.

Rubella

Rubella, also known as the German measles, is a contagious viral condition that affects children and adolescents who are not immune. In children, the disease is usually mild. However, the disorder can have drastic effects when contracted by a pregnant client, leading to severe birth defects or miscarriage. Due to the presence of a rubella vaccine, this disorder is rare in the United States. Clients at risk for contracting the rubella virus are those who are not vaccinated, immunocompromised, exposed to the virus in the home, or travel to an area where rubella is endemic.[54]

Rubella is spread via particles in the air from the respiratory secretions of another infected individual. Once the disorder is contracted, it replicates in the upper respiratory tract and ultimately spreads to the blood and distant organs.[54]

Although some young children may not exhibit symptoms when infected, typical symptoms are fever, loss of appetite, headache, sore throat, enlarged lymph nodes, and feelings of malaise. Another characteristic sign of rubella is a rash that starts on the face and spreads to the rest of the body.[54] See Figure 15.11 for an image of a child with rubella rash.

Figure 15.11 Rubella Rash (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/d/d8/Rash_of_rubella_on_back_%28crop%29.JPG/640px-Rash_of_rubella_on_back_%28crop%29.JPG)
A:"Rash_of_rubella_on_back_(crop)" by CDC is in the Public Domain.

A diagnosis of rubella can be confirmed via a blood test by detecting the presence of antibodies to rubella. To detect the presence of rubella in a fetus, amniotic fluid or fetal blood can be tested for the virus.[54]

Treatment for nonpregnant clients suffering from rubella is supportive. NSAIDs may be used to manage fever and body aches. In those who are pregnant, management is determined by age of gestation at time of diagnosis. If diagnosed prior to 18 weeks of gestation, termination of the pregnancy may be suggested due to the high risk of birth defects. Immunoglobulins may be administered to induce passive immunity if pregnancy termination is not an option. If diagnosed after 18 weeks of gestation, additional monitoring of the pregnancy is needed. Clients diagnosed with rubella must also follow isolation procedures to prevent the spread of the disease.[54]

The most common complication of rubella is inflamed and achy joints, usually affecting the wrists, fingers, knees, and ankles. More rare complications consist of anemia, reduction in platelet count, inflammation of the heart, liver, testicles, eyes, or brain.[54]

Rubella can be prevented with the administration of the MMR or MMRV (measles, mumps, rubella, varicella) combination vaccine.[54]

Box
Read more information on the MMR or MMRV vaccine on the the Centers for Disease Control and Prevention web page at https://www.cdc.gov/vaccines/schedules/index.html.

Rubeola

Rubeola, commonly known as measles, is an acute, contagious viral illness that is preventable by vaccine. Although currently rare in the United States due to vaccination, outbreaks can occur due to contact with unvaccinated children or those from endemic areas. Clients at highest risk for contracting measles are children who are not vaccinated and adolescents who are pregnant.[53]

The measles virus is transmitted via respiratory droplets and/or close contact with infected individuals. When the virus is inhaled, it initially affects the respiratory tract, but then spreads to lymph tissue, the bloodstream, and other organs.[53]

Clients infected with the measles virus present with cough, runny nose, conjunctivitis, cough, fever, and a skin rash. The rash will first appear on the face and then spread inferiorly. **Koplik spots**, or white raised bumps on the inside of the mouth, are a characteristic sign of measles, but they may not be present in every case. See Figure 15.10 for an image showing Koplik spots. Measles can also lead to suppression of the immune system, which puts the client at risk for other infections.[53]

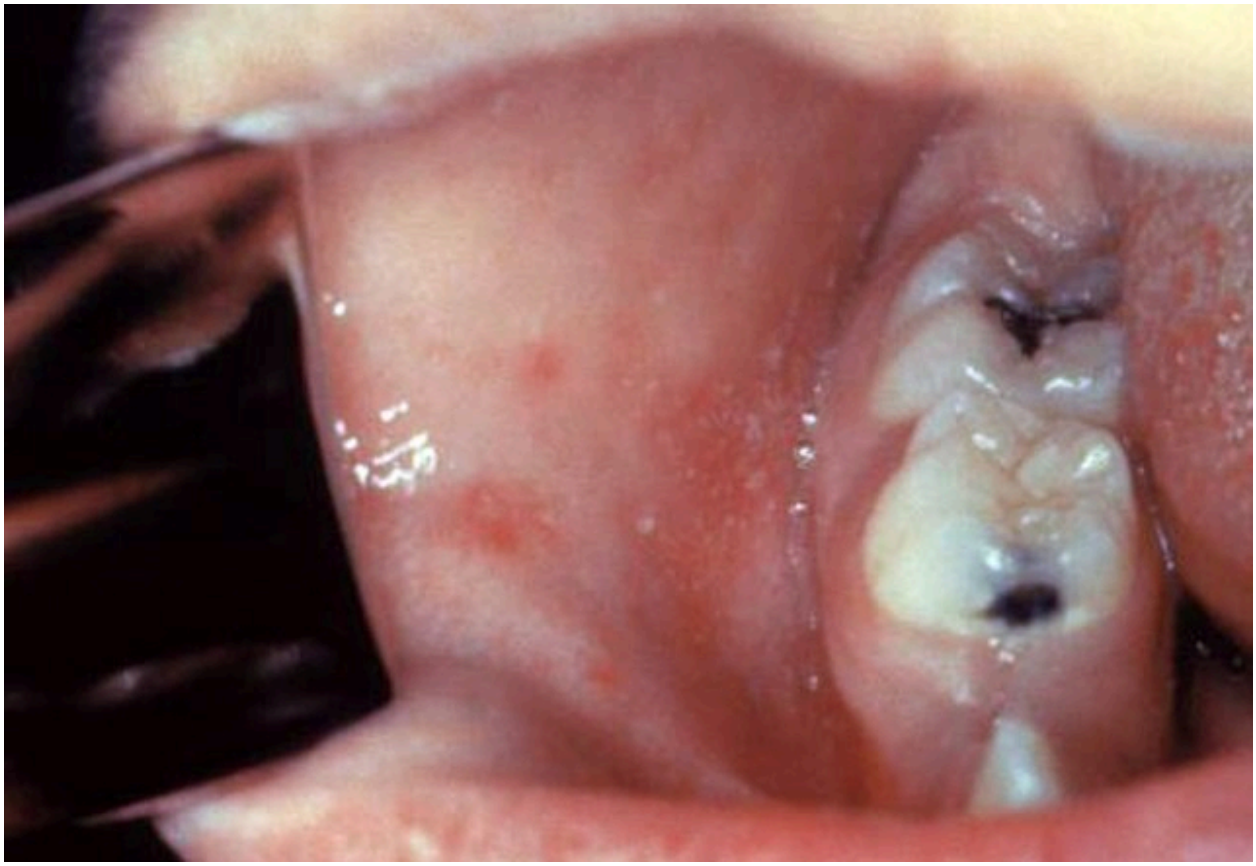


Figure 15.10 Koplik Spots (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/6/6b/Koplik_spots%2C_measles_6111_lores.jpg/640px-Koplik_spots%2C_measles_6111_lores.jpg)
A:"6111_lores" by CDC/ Heinz F. Eichenwald, MD is in the Public Domain

A diagnosis of measles can be confirmed by identifying the presence of measles antibodies in the blood. Clients with measles may also exhibit a reduction in white blood cells and platelets on a complete blood count. A PCR test can also be done on nose or throat secretions or urine samples to detect the presence of the virus.[53]

Treatment of measles consists of supportive care. Fever should be managed, and dehydration should be prevented or treated if present. Care must also be taken to prevent the spread of the virus. Uncomplicated cases usually conclude a week or so after the appearance of the rash.[53]

Complications may occur in infants, adolescents who are pregnant, and children who have poor nutrition or compromised immune systems. Common complications include pneumonia, ear infections that may lead to hearing loss, diarrhea, central nervous system disorders, and blindness. Pregnant females who contract measles are at risk for death, miscarriage, and delivering an infant with a reduced birth weight.[53]

Measles is preventable with the administration of a vaccine. Although it can be given as a stand-alone vaccine, it is commonly given as the Measles, Mumps, Rubella (MMR) combination vaccine.

Box
Read more information about the MMR vaccine on the Centers for Disease Control and Prevention web page at https://www.cdc.gov/vaccines/schedules/index.html.

Scarlet Fever

Scarlet fever is commonly associated with an untreated pharyngitis/tonsillitis infection caused by Group A beta-hemolytic streptococcus (GABHS) bacteria. However, scarlet fever can also occur if wounds or burns become infected with this bacteria. Clients at risk for scarlet fever are school-aged children, young children who have contact with school-aged children, and people living in undeveloped countries or crowded living areas. GABHS is easily transmitted by those in close contact with one another, such as in classrooms and daycare facilities.[55]

GABHS releases an endotoxin that causes the characteristic rash of scarlet fever. The release of this toxin also causes a localized inflammatory response on the skin. Common signs and symptoms of scarlet fever are sore throat (when associated with pharyngitis), high fever, swollen cervical lymph nodes, and a characteristic rash. The rash feels like sandpaper and begins under the arms, on the trunk, and in the groin, and ultimately spreads to the extremities. A classic symptom of scarlet fever is a **strawberry tongue,** in which the tongue initially has a white coating and then appears red and bumpy. See Figure 15.12 for an image showing a strawberry tongue. As the rash begins to resolve, **desquamation**, or peeling of the skin may occur.[55]

Figure 15.12 Strawberry Tongue (Source: https://upload.wikimedia.org/wikipedia/commons/thumb/4/41/Stomatite_001.jpg/640px-Stomatite_001.jpg)

Scarlet fever is diagnosed by a throat culture or rapid strep test to determine if GABHS is present. Treatment of scarlet fever consists of antibiotics to destroy the GABHS bacteria. Clients should also be taught to use effective hand hygiene and respiratory etiquette and to avoid

others while ill to prevent the spread of GABHS.[55] Clients should be taught they can return to normal activities 24 hours after initiation of antibiotics.

Although scarlet fever is considered a mild disease after the advent of antibiotic use, complications can develop when GABHS is not treated or if treatment is delayed. The original infection may spread from the throat to the ears or meninges, leading to bacterial meningitis.[55] Another complication called rheumatic fever is caused by the immune response after the original infection has resolved. Rheumatic fever causes long-term effects on the heart valve. Review the "Pharyngitis, Tonsillitis, & Adenoiditis" section of this chapter for more information on complications caused by GABHS.[64]

Box
View the "Respiratory Alterations" chapter in Open RN *Health Alterations* for additional information on respiratory disorders such as chronic obstructive pulmonary disease, pneumonia, tuberculosis, lung cancer, and respiratory viruses such as influenza and COVID-19.

15.15 Spotlight Activity

The following activity highlights how to apply the nursing process and the clinical judgment model to a pediatric client with a respiratory illness.

Client Background:

Sarah, a five-year-old female, is brought to the emergency department by her parents with complaints of high fever, difficulty swallowing, and respiratory distress. On examination, Sarah appears anxious, has a temperature of 103.1°F, tachycardia, and tachypnea. Her voice is muffled, and she refuses to lie flat.

1. What priority assessment data should the nurse collect at this time? (Assessment/Recognizing Cues)

The nurse should first note Sarah's current symptoms: fever of 103.1 F, difficulty swallowing, respiratory distress, anxiety, tachycardia, tachypnea, muffled voice, and will not lie flat. The nurse should also note what is meant by respiratory distress. Does Sarah exhibit retractions, cyanosis, or accessory muscle use? The nurse should also assess how elevated Sarah's heart and respiratory rates are for further comparison.

Other nursing assessments that should be done at this time are as follows:

- Airway patency
- Presence of stridor or adventitious lung sounds
- Complete set of vitals (including blood pressure and oxygen saturation levels)
- Hydration status
- Is Sarah drooling? Is Sarah able to swallow?
- Is Sarah exhibiting tripod positioning?

- Is there any lymph node enlargement?
- Is there any available lab work or other diagnostics that the nurse can review at this time?
- Does Sarah have any other respiratory symptoms (cough, congestion, nasal drainage, sneezing)?
- How quick was the symptom onset?
- Has Sarah had contact with any ill individuals?
- Is Sarah up-to-date on all vaccinations?

Because Sarah has some symptoms that are consistent with epiglottitis, the nurse should ensure that while assessing this client, nothing is placed into her mouth until her airway is secure.

2. Based on the assessment data provided, which nursing diagnoses would be appropriate at this time? (Diagnosis/Analyzing Cues)

- Ineffective airway clearance
- Ineffective breathing pattern
- Anxiety
- Risk for deficient fluid volume
- Hyperthermia

3. Provide a sample of expected outcomes that would be appropriate for Sarah. (Outcome Identification/Generate Solutions)

- *Sarah will exhibit a patent airway and no signs of respiratory distress prior to discharge.*
- *Sarah will demonstrate an appropriate respiratory rate for her age prior to discharge.*
- *Sarah will demonstrate a calm demeanor and verbalize reduced anxiousness prior to discharge.*
- *Sarah will exhibit moist mucous membranes and blood pressure, heart rate, and urine output within normal limits for her age prior to discharge.*
- *Sarah will exhibit a temperature that is within normal limits for her age prior to discharge.*

4. What nursing interventions would be appropriate for this client? (Planning & Implementation/Generate Solutions & Take Action)

Immediate nursing interventions that would be appropriate would be as follows:

- Continue to monitor vital signs and respiratory status
- Help Sarah assume a position of comfort
- Oxygen administration
- Establish intravenous access
- Assist with intubation if needed

- Administer medications, per provider order
- Promote relaxation
- Provide reassurance to Sarah and her parents
- Include Sarah and her parents in the treatment plan

Other nursing interventions may be appropriate based on Sarah's specific diagnosis and the course of her illness.

5. How would you evaluate if Sarah's outcomes were met? (Evaluation/Evaluate Outcomes)

Every time the nurse interacts with Sarah, outcomes should be evaluated. Continued assessment of Sarah's vital signs, respiratory status, and any available lab work will help the nurse determine if outcomes are met, partially met, or not met. If outcomes are partially met or not met, the nurse may need to continue monitoring Sarah's progress or the care plan may need revision.

15.16 Learning Activities

ADAPT NGN Case Study by Kellea Ewen:
https://adapt.libretexts.org/students/assignments/103982/init-formative

Infectious Mononucleosis Case Study:

Use the following information to answer questions 1-6.

Handoff Report:

1706: This is a 17-year-old male, David Garcia, in the emergency department for infectious mononucleosis. He was initially diagnosed yesterday by his primary care provider. He has no known allergies, weighs 75kg and has a BMI of 22.5. He has significant fatigue, making it difficult for him to participate in ADLs. He is also experiencing a severe sore throat that is impacting his ability to swallow. His lymph nodes remain palpable. His spleen is enlarged and mildly tender upon palpation. His most recent vital signs are: oral temperature 101.5°F, pulse 110 bpm, respirations 18 breaths/minute, blood pressure 120/80 mmHg and O2 saturation 99% on room air. He is ready to be transferred to the medical-surgical floor for continual monitoring of his temperature and intravenous fluids. Surgery will also be consulted due to his spleen enlargement.

History & Physical:

History

- Client reports a several-day history of malaise, fatigue, and sore throat.

- Reports poor oral intake and decreased urine output
- Client denies cough or congestion.
- Client is a high school athlete, and his illness is impacting his ability to participate in sports.
- Client is concerned about falling behind in schoolwork due to his illness.

Physical Findings

- Posterior cervical and axillary lymphadenopathy
- Erythematous pharynx
- Splenomegaly on palpation
- Dry mucous membranes
- Urine is concentrated

Lab/Diagnostic Results:

Test	Results	Reference Range
Monospot Test	Positive	Negative
CBC	Pending	

Provider Orders:

Order:
Admit to medical-surgical unit
Consult surgery regarding enlarged spleen
Monitor vitals every 4 hours

Diet as tolerated, encourage oral fluids
Strict I&O
Acetaminophen 500mg PO q4h PRN for fever/pain
Normal saline IV at 125 ml/hr
Throat lozenges PRN
Obtain CBC, once, now

1. Based on David's diagnosis and assessment findings, which nursing diagnosis is the highest priority?

a. Acute pain related to sore throat

b. Imbalanced Nutrition: Less Than Body Requirements related to poor oral intake

c. Risk for Deficient Fluid Volume related to decreased oral intake and fever

d. Activity Intolerance related to fatigue

2. Based on David's current condition, what is the most important action for the nurse to take?

a. Administer a throat lozenge for pain relief.

b. Place the client on contact precautions.

c. Review the complete blood count (CBC) results.

d. Encourage the client to participate in activities.

3. Based on the provided information, which of the following is the most appropriate goal to include in David's plan of care?

a. Client will maintain a heart rate between 60 - 100 bpm

b. Client will report a pain level of 3/10 or less by the end of the shift

c. Client will consume 1200 ml of fluids by the end of shift

d. Client will have no signs or symptoms of infection

4. Which of the following nursing interventions will best address David's potential for inadequate fluid volume?

a. Provide oral care every 4 hours

b. Encourage the client to drink when he feels thirsty

c. Offer the client a variety of fluids he enjoys

d. Educate the client on the importance of staying hydrated

5. You are providing education to David about infectious mononucleosis. Which of the following statements made by David would indicate a need for further teaching?

a. I will wash my hands frequently with soap and water

b. I can share utensils and drinks with my family since they have already been exposed to me

c. I will avoid kissing anyone while I am recovering

d. I should avoid contact sports to reduce the risk of injuring my spleen

6. Given that David is experiencing significant fatigue and difficulty with activities of daily living (ADLs), which of the following interventions should be prioritized in his care plan?

a. Encouraging him to stay as active as possible to prevent deconditioning

b. Offering pain medication to alleviate discomfort and improve energy

c. Providing frequent rest periods and assistance with ADLs to conserve energy

d. Teaching him deep breathing exercises to increase oxygenation

Answers and Rationale

1. Correct Answer: C) Risk for Deficient Fluid Volume related to decreased oral intake and fever. While all other options are relevant nursing diagnoses for this client, risk for fluid volume deficit takes precedence. David's severe sore throat is impacting his ability to swallow, putting him at a high risk for dehydration, especially considering his fever. Addressing his hydration status is paramount to prevent complications. Options A, B, and D are important to address but are not the immediate priority over a potential fluid volume deficit.

2. Correct Answer: C) Review the complete blood count (CBC) results. The CBC results are pending and will provide important information about David's condition, such as his white blood cell count, which can help guide treatment decisions. While the other options might be appropriate actions, they are not the most important at this time. Option A addresses a symptom but not the underlying condition. Option B is not necessary. Since infectious mononucleosis is primary transmitted via saliva, only standard precautions are needed. Option D contradicts the need to rest and avoid strenuous activity while recuperating from infectious mononucleosis.

3. Correct Answer: C) Client will consume 1200 ml of fluids by the end of shift. This addresses the nursing diagnosis of 'risk for deficient fluid volume' and promotes hydration. While option B is important for managing the client's pain, it does not directly address a priority concern. Option A is not specific or measurable enough and is not the priority at this time. Option D is not a realistic goal, as the client has an active infection.

4. Correct Answer: C) Offer the client a variety of fluids he enjoys. Providing a variety of fluids the client enjoys can encourage him to drink more and therefore increase his fluid intake. While options A and D are appropriate interventions, they are not as directly impactful in addressing the client's potential for inadequate fluid volume. Option B is incorrect as fluids should be consumed before feeling thirsty. Feelings of thirst can indicate that the client is already dehydrated.

5. Correct Answer: B) I can share utensils and drinks with my family since they have already been exposed to me. Even if family members have already been exposed, sharing utensils and drinks can increase the risk of spreading the virus, especially since the virus is present in saliva. Options A, C, and D all reflect accurate understanding of infectious mononucleosis.

6. Correct Answer: C) Providing frequent rest periods and assistance with ADLs to conserve energy. The priority is to help David conserve his energy due to his significant fatigue. Rest periods and assistance with ADLs will help him manage his symptoms and prevent overexertion. While physical activity is important for recovery, pushing David to stay active when he is fatigued could worsen his symptoms and lead to further exhaustion. The focus should be on rest and gradual activity as tolerated. Pain medication can help manage discomfort, but the priority should be on addressing David's

fatigue through rest, rather than assuming that alleviating pain will immediately improve energy levels. Although deep breathing exercises are beneficial for lung expansion and relaxation, David's primary issue is fatigue from infectious mononucleosis, not a respiratory problem. Rest and energy conservation are more critical in this situation.

Asthma Exacerbation Case Study:

Use the following information to answer questions 1-6.

Handoff Report:

1900: This is Nurse Jones giving report on Sofia Gonzalez, a 7-year-old female admitted for an acute asthma exacerbation. She has allergies to amoxicillin, peanuts, pollen, mold and pet dander. She weighs 23 kg. She presented to the ED with her parents with complaints of worsening shortness of breath, wheezing, and cough. She was noted to be using accessory muscles upon inspiration and her oxygen saturation was 88% on room air. She received one dose of nebulized albuterol and was started on 2L of oxygen via nasal cannula in the ED, with improvement in her respiratory effort and oxygen saturations. Her most recent vital signs are: temperature 98.8 degrees F, heart rate 102 bpm, respiratory rate 27 breaths per minute, blood pressure 95/65 mmHg, and oxygen saturation 95% on 2L. Please continue to monitor her respiratory status and oxygen saturation closely.

History & Physical:

History

- History of asthma since age 3
- Previous life-threatening asthma exacerbation requiring intubation at age 5
- Current exacerbation triggered by recent wildfires, according to parents
- Family history of asthma

Physical Findings

- Respiratory rate elevated
- Use of accessory muscles to breathe
- Audible wheezing upon auscultation of lungs
- Oxygen saturation levels below normal (initial assessment 88% on room air)

Progress Notes:

- **1600:** Client admitted to the pediatric unit from the ED. Respiratory assessment completed - mild wheezing bilaterally. Continues on 2L oxygen via nasal cannula. Parents are at the bedside. -B. Jones, RN

- **1615:** Oral prednisolone administered as ordered. -B. Jones, RN

- **1645:** Client reports feeling less short of breath. Wheezing is still present but improved from previous assessment. - B. Jones, RN

- **1730:** Respiratory therapist provided education to client and parents about asthma triggers and management. - C. Smith, RRT

Provider Orders:

Order:
Admit to pediatric unit under Dr. Smith
Oxygen via nasal cannula, titrate to maintain oxygen saturation ≥ 95%
Albuterol 2.5mg nebulizer every 4 hours PRN
Prednisolone 20 mg by mouth daily
Vital signs every 4 hours, continuous pulse oximetry
Chest X-ray
Respiratory therapy consult for education on asthma triggers and management

1. Based on Sofia's presentation and recent admission for an acute asthma exacerbation, which nursing diagnosis is the most appropriate?

a. Impaired Gas Exchange

b. Risk for Infection

c. Ineffective Airway Clearance

d. Anxiety

2. What is the priority nursing action for Sofia upon arrival to the pediatric unit?

a. Educate the client and her family about asthma triggers.

b. Administer oral prednisolone as prescribed.

c. Complete a focused respiratory assessment.

d. Orient Sofia and her parents to the unit.

3. The provider has entered orders for Sofia to have continuous pulse oximetry. Which of the following actions is required when implementing this order?

a. Apply the sensor to Sofia's finger and ensure the waveform correlates with her radial pulse.

b. Place the sensor on Sofia's toe because it provides a more reliable reading.

c. Change the sensor location every 2 hours to prevent skin breakdown.

d. Set the pulse oximeter alarm limits to 85% and 100%.

4. One hour after administering the nebulized albuterol treatment, you evaluate Sofia's response. Which finding indicates that the albuterol has been effective?

a. Sofia's respiratory rate is 18 breaths per minute.

b. Sofia states she feels tired and wants to sleep.

c. Wheezing is no longer audible upon auscultation of her lungs.

d. Sofia's oxygen saturation remains at 96% on 2L of oxygen.

5. Sofia's parents express concern that this is her second serious asthma exacerbation in two years and are worried about her long-term health. How should the nurse best address their concerns?

a. Reassure Sofia's parents that she is receiving the best possible care and should be fine.

b. Acknowledge their concerns, reinforce the importance of following the asthma action plan, and answer any questions they have.

c. Explain that Sofia is likely just prone to respiratory illnesses and there is not much they can do to prevent it.

d. Refer Sofia's parents to the doctor to discuss their concerns further.

6. Considering Sofia's asthma triggers, which of the following is the most comprehensive approach to preventing future asthma exacerbations?

a. Advise Sofia's family to follow a daily asthma management plan that includes avoiding her known allergens and using prescribed medications as directed, with an emphasis on environmental control.

b. Recommend that Sofia avoid all outdoor activities, including walking or playing in the park, to eliminate exposure to environmental allergens.

c. Instruct Sofia's family to administer a daily dose of oral corticosteroids to reduce inflammation, regardless of symptom presence.

d. Encourage Sofia's parents to monitor her respiratory symptoms and only administer albuterol if she experiences symptoms of wheezing or shortness of breath.

Answers and Rationale

1. **Correct Answer:** A) Impaired Gas Exchange. The primary nursing diagnosis for a client with an acute asthma exacerbation who presents with shortness of breath, wheezing, and low oxygen saturation is **Impaired Gas Exchange**. This diagnosis takes priority over the other options because it addresses the most immediate and life-threatening physiological need. While the other diagnoses may be relevant, they are not the primary concern at this time.

2. **Correct Answer:** C) Complete a focused respiratory assessment. Although all options are important nursing interventions, completing a focused respiratory assessment to establish a baseline is the most critical action for a client experiencing an acute asthma exacerbation. The assessment will help determine the severity of her condition and guide further interventions. Administering medications, providing

education, and orienting the client and family are important but can be addressed after the initial assessment.

3. Correct Answer: A) Apply the sensor to Sofia's finger and ensure the waveform correlates with her radial pulse. It's essential to ensure the pulse oximeter is providing accurate readings. This is done by applying the sensor to a peripheral location (like the finger) and verifying the waveform aligns with the client's radial pulse. Toes, while a possible location for pulse oximetry, are not more reliable and can sometimes provide inaccurate readings due to poor circulation. While rotating the sensor site can help prevent skin breakdown, it is not necessary every 2 hours, and frequent changes can also irritate the skin. Alarm limits should be set appropriately based on the provider's orders and the client's condition; in Sofia's case, her oxygen saturation should be maintained above or equal to 95%.

4. Correct Answer: C) Wheezing is no longer audible upon auscultation of her lungs. Albuterol is a bronchodilator, which means it helps open up the airways in the lungs. The most direct indication that the albuterol has been effective is the absence of wheezing upon auscultation. While the other options might be associated with improved respiratory status, they are not the most specific indicators of the medication's effectiveness in this scenario.

5. Correct Answer: B) Acknowledge their concerns, reinforce the importance of following the asthma action plan, and answer any questions they have. It is important to validate the parents' feelings and concerns. Providing reassurance without addressing their concerns is dismissive. Reinforcing the importance of following the asthma action plan empowers the parents to participate in Sofia's care and can help prevent future exacerbations. While a referral to the doctor might be appropriate, the nurse should first address their immediate concerns and provide support.

6. Correct Answer: A) Advise Sofia’s family to follow a daily asthma management plan that includes avoiding her known allergens and using prescribed medications as directed, with an emphasis on environmental control. The most comprehensive approach to preventing asthma exacerbations includes creating a tailored asthma management plan, which involves both avoiding known allergens (e.g., pollen, pet dander, mold) and adhering to prescribed medications (such as inhaled corticosteroids or long-acting beta-agonists) to control inflammation. This approach also emphasizes the importance of environmental control, which can significantly reduce the frequency and severity of asthma attacks. **B** is incorrect as complete avoidance of all outdoor activities may not be practical and could lead to a sedentary lifestyle. Managing exposure to allergens through proper precautions (e.g., wearing a mask, checking pollen levels) is more feasible. **C** is incorrect because oral corticosteroids are typically used for short-term exacerbations and should not be used daily unless prescribed by a healthcare provider for long-term control. **D** is incomplete because it only addresses the use of albuterol during symptoms and does not include broader management strategies such as allergen avoidance or long-term medication use.

Questions developed by Angela Landry (author):

1. You are caring for a six-year-old female client who just arrived in the post-anesthesia care unit after a tonsillectomy. Which of the following assessments should the nurse immediately report to the health care provider?

a. The client reports something dripping down her throat.

b. The client has an episode of vomiting.

c. The client has complaints of a sore throat.

d. The client has a dark brown blood stain on her teeth.

2. A twelve year old client was diagnosed with pharyngitis caused by Group A beta hemolytic streptococcus and was prescribed an antibiotic. Which statement describes when the client can return to school?

a. She may return as soon as she no longer has a fever.

b. She may return in one week if she is feeling better.

c. She may return when her course of antibiotics are completed.

d. She may return after being on antibiotics for 24 hours.

3. A father brings his seven-month-old infant to the emergency department because the infant has not been eating well. The client exhibits a strong cough, is irritable, and has nasal flaring and retractions. What is the priority intervention at this time?

a. Offer the infant formula to soothe their irritability.

b. Suction the infant's nose with a bulb syringe.

c. Acknowledge the father's concerns about the infant's symptoms.

d. Notify the provider that the infant must be seen quickly.

4. A five-year-old child has been brought to the emergency room with suspicions of epiglottitis. Which of the following should be included in their plan of care?

a. Administer cough syrup to the client.

b. Culture the client's throat.

c. Encourage the client to sit in the tripod position.

d. Restrict the client's fluid intake.

5. The caregiver of a pediatric client diagnosed with croup asks the nurse what this is. Which statement best describes this disorder?

a. It is a viral illness that leads to swelling near the larynx and a barking cough.

b. It is an asthmatic disease where the child wheezes and coughs.

c. It is a bacterial inflammation that causes inflammation of the epiglottis.

d. It is a viral illness that leads to swelling of the small airways and mucus production.

6. The caregiver of a five month old diagnosed with bronchiolitis caused by RSV tells the nurse that the infant has not been feeling well. Which of the following signs and symptoms indicate that the infant is dehydrated? Select all that apply.

a. Sunken fontanels

b. Dry mucous membranes

c. Reduced urine output

d. Decreased heart rate

e. Decreased respiratory rate

f. Decreased skin turgor

7. An eight-year-old child presents to the emergency department with suspected epiglottitis. Which of the following is the priority to include in the client's plan of care?

a. Explain the disease to the client's caregivers.

b. Ensure the client has IV access.

c. Ensure the client has a patent airway.

d. Send the client to radiology for a lateral neck X-ray.

8. The nurse is preparing a six-year-old client for discharge home after a tonsillectomy. Which of the following should be included in their discharge instructions?

a. The client should drink milk to ensure optimal nutrition.

b. The client should lay flat on their back for 24 hours.

c. Coughing, throat clearing, and nose blowing are discouraged.

d. The client can eat a regular diet as soon as they are alert.

9. Several children have been brought to the clinic with cold-like symptoms. Which child has symptoms most consistent with acute sinusitis?

a. A child with bad breath and thick, green nasal discharge.
b. A child who exhibits coughing and sneezing.
c. A child with nasal discharge that is thin and watery.
d. A child with congestion and a sore throat.

10. Which of the following nursing interventions is most appropriate for a pediatric client with an upper respiratory tract infection?

a. Administer antiviral medications.
b. Initiate antibiotic therapy.
c. Encourage physical activity.
d. Administer saline nasal spray.

Answers with Rationale:

1. Correct answer is A. The presence of something dripping down her throat is likely blood. Blood dripping down the throat after a tonsillectomy is a sign of bleeding and needs to be reported immediately to the surgeon. Dark brown blood is old blood and will likely be found on the teeth, in the nose, or in any vomit after surgery. This does not need to be reported. Vomiting is common after surgery and does not need to be reported to the surgeon unless it continues or if it contains bright red blood. A sore throat is expected after tonsillectomy.
2. Correct answer is D. After 24 hours of antibiotic therapy, the client is no longer considered infectious and may return to school. Completing 24 hours of antibiotic therapy is the main determinant in when the child can return to school. However, in considering a return to school, the child should also be fever free and have an improvement in symptoms.
3. Correct answer is D. Poor appetite, irritability, nasal flaring, and retractions are signs of respiratory distress in infants. This client should be seen quickly. Feeding the infant is not appropriate at this time as they are in respiratory distress. There is no mention of nasal secretions, so suctioning would not be appropriate at this time. Suctioning the infant's nose could also increase hypoxia. The father's concerns should be acknowledged, but this is not the priority action.
4. Correct answer is C. Epiglottitis is a life-threatening infection that can lead to complete airway obstruction. They should be encouraged to sit in the tripod position to ease breathing. The throat should not be examined until the client is intubated, as this could trigger complete airway obstruction. There is no indication for cough syrup at this time. Although the client should not be given something by mouth at this time, there is no

need to restrict their fluid intake. Fluids (oral or IV) should be included in the treatment plan.

5. Correct answer is A. Croup is a viral illness that leads to inflammation of the larynx, trachea, and bronchi. It is also characterized by a barking cough and stridor. Croup is not associated with asthma and does not produce wheezing. A viral illness that affects the small airways and leads to mucus production is descriptive of bronchiolitis. A bacterial inflammation of the epiglottis describes epiglottitis.
6. Correct answers: A, B, C, F. Sunken fontanels, dry mucous membranes, reduced urine output, and decreased skin turgor indicate dehydration. Decreased heart rate and respiratory rates do not occur with dehydration.
7. Correct answer is C. With epiglottitis, airway patency is the priority, as airway obstruction can occur at any time. Explaining the disorder to the parents, establishing an IV, and sending the client for an X-ray are also appropriate interventions, but are not the priority.
8. Correct answer is C. After a tonsillectomy, the client should try not to cough, blow the nose, or clear their throat, as they can lead to bleeding. Milk can cause a coating on the throat and lead to throat clearing, so it should be avoided in the postoperative period. The client should be encouraged to be in an upright position, not lay flat. Once the client is alert, they can begin eating, but it will not be a regular diet. The initial postoperative diet consists of cold clear liquids.
9. Correct answer is A. Bad breath and thick nasal discharge that is green or yellow in color is most consistent with acute sinusitis. Coughing, sneezing, congestion, or sore throat are more likely to be an upper respiratory tract infection. Thin and watery nasal discharge is more consistent with allergies.
10. Correct answer is D. A client with an upper respiratory tract infection requires supportive care. Saline nasal spray can help relieve congestion, moisten nasal passages, and promote drainage. The common cold is most commonly caused by rhinovirus, and antiviral medications are not needed. Because it is caused by a virus, antibiotics are not appropriate. Rest should be encouraged, not physical activity.

15.17 Glossary

Acute bronchitis: Inflammation of the bronchi. It is most commonly caused by viruses, such as rhinovirus, influenza virus, or adenovirus. However, it can also be caused by bacteria or exposure to irritants like smoke or pollution.

Adenoiditis: Inflammation of the adenoids.

Atelectasis: Collapse of alveoli in the lungs.

Bacterial tracheitis: Inflammation of the trachea caused by a bacterial organism.

Bronchiolitis: Inflammation of the bronchioles.

Bronchitis: Inflammation of the bronchi.

Chemokine: A specific type of cytokine; acts as a chemical messenger.

Cilia: Small, hair-like protrusions that move debris out of the respiratory tract.

Conjunctivitis: Inflammation of the conjunctiva or outer lining of the eye.

Covid-19: Caused by coronavirus SARS-CoV-2, emerged as a global pandemic in late 2019, causing a wide spectrum of symptoms, ranging from mild respiratory distress to severe pneumonia and organ failure.

Croup: Inflammation of the trachea, larynx and bronchi, also known as laryngotracheobronchitis.

Cytokine: A protein that is released by cells of the immune system; acts as a chemical messenger.

Chemokines: A specific type of protein that are released by cells of the immune system.

Desquamation: Peeling of the skin associated with scarlet fever.

Diphtheria: A preventable illness that is caused by the bacteria *Corynebacterium diphtheria*.

Double worsening: Initial improvement of sinusitis symptoms, followed by subsequent worsening of sinusitis symptoms.

Egophony: Increased resonance of voice sounds that can be heard when listening to the chest, gives voice sounds a nasal quality and can indicate pneumonia

Epiglottitis: Inflammation of the epiglottis.

Fomites: Inanimate objects that can spread disease to others when they are contaminated with an infectious organism.

Fremitus: Changes in vibration when certain words are spoken while the chest is being palpated; its presence can indicate underlying lung issues.

Infectious mononucleosis: A viral infection commonly caused by Epstein-Barr Virus.

Influenza: Commonly known as the flu, is caused by influenza viruses that primarily infect the respiratory tract, leading to symptoms such as fever, cough, sore throat, body aches, and fatigue.

Koplik spots: White raised bumps on the inside of the mouth that are consistent with measles.

Laryngotracheobronchitis: Inflammation of the larynx, trachea and bronchi; also known as croup.

Malaise: A general feeling of illness, weakness or discomfort.

Mumps: A contagious respiratory illness caused by paramyxovirus.

Oophoritis: Inflammation of the ovaries, associated with mumps.

Orchitis: A painful swelling of the testicles, associated with mumps.

Parotitis: A painful swelling of the parotid salivary glands, associated with mumps.

Pediatric Autoimmune Neuropsychiatric Disorders Associated With Streptoccocal Infections (PANDAS): An autoimmune reaction triggered by antibodies produced by a child's immune system that attack the brain and causes symptoms of tic disorder or obsessive-compulsive disorder.

Pertussis: A preventable and contagious respiratory disorder, also known as whooping cough.

Pharyngitis: Inflammation of the pharynx.

Pharyngotonsillitis: Inflammation of the pharynx and tonsils.

Pneumothorax: A collapsed lung due to air in the pleural space.

Post-streptococcal glomerulonephritis: Inflammation of the glomerulus of the kidneys as a result of an untreated strep infection; leads to edema, increased blood pressure and alterations in kidney function.

Pulmonary edema: Excess fluid in the lungs.

Respiratory etiquette: Actions to decrease the spread of infection to others. This includes covering the mouth and nose with a tissue when coughing and sneezing and disposing of the tissue in the trash. If a tissue is not available, clients should sneeze into their inner elbow instead of hands

Respiratory Syncytial Virus (RSV): A common respiratory virus that affects children and also poses a risk to older adults.

Rhinoviruses: The most common cause of upper respiratory infections, commonly called a "cold."

Rubella: A contagious viral condition, also known as the German measles.

Rubeola: An acute, contagious viral illness, commonly known as the measles.

Scarlet fever: A disorder that affects the valves of the heart and is caused by an untreated strep infection.

Sinusitis: Inflammation of the sinuses.

Strawberry tongue: A tongue that initially has a white coating and then appears red and bumpy; a classic symptom of scarlet fever.

Stridor: A high-pitched sound that occurs when breathing through an obstructed airway.

Surfactant: Reduces surface tension of alveoli and prevents alveolar collapse.

Tonsillectomy: Surgical removal of the tonsils.

Tonsillitis: Inflammation of the tonsils.

Upper respiratory tract infection (URI): Swelling and irritation of the upper airways, often caused by rhinovirus, also referred to as the common cold.

15.18 References

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