

Respiratory Infections

Home care for respiratory patients includes a complex array of services delivered in an uncontrolled setting. Home health care providers are expected to assist patients and their caregivers to manage day-to-day living with respiratory diseases, to identify and respond to complications, to teach patients the proper use of respiratory equipment and assist with medication management. Physicians and nurses providing care need clinical knowledge and skills, a patient centered perspective, and understanding of the cost and reimbursement structures for home care services.

Respiratory infections can spread in several ways. Infections, such as a cold, distribute tiny droplets of fluid containing the cold virus into the air whenever someone sneezes or coughs. If these droplets are breathed in by someone else, they may become infected. Infections can also be spread through indirect contact such as on door handles, utensils, handrails, etc. Respiratory tract infections are any infection of the sinuses, throat, airways or lungs. They are usually caused by viruses, but can be caused by bacteria. Respiratory tract infections are thought to be one of the main reasons why people seek guidance from healthcare professionals. The common cold is the most widespread respiratory tract infection.



Clinicians generally classify respiratory infections in 2 ways.

1. Upper respiratory tract infections- which affect the nose, sinuses, and throat. These include the common cold, tonsillitis, sinusitis, laryngitis, and flu.
2. Lower respiratory tract infections- which affect the airways and lungs. These include bronchitis, pneumonia, bronchiolitis, tuberculosis and the flu. The flu can affect both the upper and lower respiratory tract.

From the Healthy People 2020 Initiative, “Acute respiratory infections, including pneumonia and influenza, are the 8th leading cause of death in the United States, accounting for 56,000 deaths annually.

According to data released by the Centers for Medicare and Medicaid Services, average 2012 hospital charges for inpatient treatment of uncomplicated pneumonia in the United States were \$24,549 and ranged as high as \$124,000.00. The average cost of an emergency room consult for pneumonia was \$943.00. The global economic cost of community acquired pneumonia is estimated at \$17 billion annually.

As with any illness, patient assessment is a critical component of care. We must stay updated with new treatments, medications, and trends. But even more crucial is the importance of prevention. Being able to recognize signs and symptoms of respiratory infections early can help eliminate further infection, reduce hospitalizations, and improve lives.

We all know the key to a thorough patient assessment is to approach it systematically so that we don't become side tracked or skip steps that may provide valuable information like listening to breathe sounds. The respiratory assessment must be approached systematically much the same way as a general assessment and it begins with the patient's general appearance. During a respiratory assessment, some of the most critical information can be found in the first few seconds. As you approach the patient, begin your assessment, looking at the patient's position, skin color, and work of breathing. A proper respiratory exam involves both skill and practice. In this section, we will review techniques of inspection, palpation, percussion and auscultation and an overview of physical findings.

Inspection

Inspection includes observation of the chest wall, shape of thorax, skin color, temperature, facial expressions, and moisture. When doing inspection, the patient should be sitting upright and be properly draped. The respiratory pattern should be assessed for one full minute. Normal respiratory rate is 14-20 with a regular rate and frequency and should be quiet. The shape of the thorax should be symmetrical with equal chest movement. Retractions or bulging of the interspaces may indicate narrowed or obstructed airways. The skin should be warm and dry and color should be uniform and consistent with ethnicity. Facial expressions should be relaxed without signs of distress. Nail beds, lips, ears, mouth, and conjunctiva should be assessed for oxygen saturation. A bluish color indicates cyanosis and hypoxia. Clubbing of the fingers may suggest chronic hypoxemia. (Bickley 2012, Mansen & Gabiola 2015)

Palpation

Palpation should begin with placing your index finger in the suprasternal notch at the base of the trachea. The trachea should be midline and slightly movable. Using the palmar surface of your fingers, palpate the anterior and posterior chest. It should be free of tenderness, pain, or masses. A cracking sensation on palpation is known as crepitus, also known as subcutaneous emphysema. When palpated, it produces a coarse, crackling sensation as the gas moves under the skin. This occurs when air from the lungs is introduced into the subcutaneous space, usually with a pneumothorax. (Bickley 2012, Mansen & Gabiola 2015) Stephen, T., Skillen, D., Day, R. & Bickley, L (2010). Canadian Bates Guide to Health Assessment for Nurses. PA: Lippincott, Wilkins and Williams

Fremitus is a palpable vibration generated from the larynx and transmitted through the patients bronchi to the chest wall. It is felt on the posterior chest using the ulnar side of the hand. Instruct the patient to say "baby", "ninety-nine", or "blue moon" to create vibrations, each time the hands are moved from one area to another. Solid areas of consolidation such as with pneumonia or tumors will have increased vibrations; COPD, pleural effusion, fibrosis, pneumothorax and emphysema have decreased fremitus. (Bickley 2012, Mansen & Gabiola, 2015)

Percussion

Percussion is helpful to determine the density of the underlying lung tissue and identify the position of the diaphragm during inspiration and expiration. Percussion is performed by placing the middle finger of the non-dominant hand against the chest wall. Percuss the posterior chest in each of the intercostal spaces, avoiding the ribs and scapula. It is important to compare one side with the other, using a side-to-side ladder pattern, striking in each place twice. Percussion sounds should be low-pitched, hollow, and long in duration. Dullness occurs when fluid or solid tissue replaces the normally air filled lung and are thud-like sounds. Dull tones may indicate pneumonia, atelectasis, or pleural effusion. Emphysema or pneumothorax will have very loud, low pitch, and longer percussion sound and are usually are unilateral. (Bickley 2012, Mansen & Gabiola 2015)

Auscultation

It is important to ask the patient to breathe slowly and deeply with their mouth open. Using the diaphragm of the stethoscope, listen in each area for at least one full breath. If the person is unable to sit up without help, percuss the upper lung and auscultate each side. Vesicular breath sounds are soft. Bronchial breath sounds are normally heard over the trachea and larger airways. Bronchial breath sounds that are heard over the lateral or posterior chest wall may indicate consolidation, as seen in pneumonia. Broncho-vesicular sounds are normally heard between the scapula. These are abnormal if heard over the peripheral lung fields and indicate that the lung tissue is dense. This is possibly due to consolidation, infection or compression.



During auscultation it is important to listen for adventitious or extra sounds.

- **Crackles/Rales:** Caused by small airways reopening as the chest wall expands, forcing air through the passages narrowed by fluid, pus, or mucous. Most frequently heard in lung bases due to hypoventilation. The sound of hair being rubbed between one's fingers simulates this sound or the sound of Velcro
- **Rhonchi:** Coarse rattling noises that often sound like snoring. Usually caused by secretions in bronchial airways.
- **Wheeze:** Coarse whistling, continuous sound that suggest narrow airways as in a bronchospasm. Wheeze is heard in asthma, bronchitis, and COPD.
- **Stridor:** Loud, rough, continuous, high pitched medical emergency due to an obstruction of the upper airway. This is heard loudest over the trachea.
- **Pleural Friction Rub:** Squeaking or grating sound of the linings of the pleura rubbing together. Described as the sound made by treading on fresh snow. This occurs when the pleural layers are inflamed and have lost their lubrication. (Bickley 2012, Mansen & Gabiola 2015)

When conducting a focused pulmonary assessment on an adult, it is important to begin with a thorough history. Chest disease usually manifests as the presence of any of the following:

1. **Cough:** An acute cough usually represents a viral infection or allergic response. A chronic cough may be more ominous. Chronic coughs may manifest from underlying disease processes such as asthma, bronchitis, tuberculosis, chronic allergies, gastroesophageal reflux disease, or cancer. Certain medications may also produce a cough. A productive cough usually indicates some type of infection or inflammatory process. Chronic bronchitis presents with a history of productive cough for 3 months of the year, for 2 years in a row. (Jarvis, 2012) A dry or non-productive cough may indicate an “atypical” pneumonia, such as mycoplasma pneumonia which presents with a hacking cough, early heart failure presents with a dry, non-productive cough or croup which has a barking sound. (Jarvis, 2012) Coughs that increase in severity and frequency at night could indicate an underlying cardiac condition. Coughs that increase after meals could suggest gastroesophageal reflux disease and a cough that is worse upon waking may indicate bronchitis and sometimes referred to a “smokers cough.”
2. **Sputum:** If noticing that the patient has a productive cough, it is imperative to inquire about sputum production and characteristics of their sputum. It is important to ask the duration of coughing and the color of the sputum. Sputum that has a foul odor may indicate an infectious process.

Cough Etiquette

- Cover mouth and nose with a tissue when coughing or sneezing
- If no tissue, cough into your sleeve
- Use nearest waste receptacle to dispose of tissue
- Perform hand hygiene after having contact with secretions or contaminated objects.

Color	Consistency	Associated Condition
Pink tinged	Frothy	Pulmonary Edema
Rust colored	Purulent	Tuberculosis, Pneumococcal pneumonia
Green		Viral Infection, Pseudomonas
Yellow	Thick	Bacterial Infection
Black		Black lung occupational pneumonconiosis
Clear	Thick or thin	Cold, bronchitis, Viral infection
Blood		Pulmonary Disease, Gastrointestinal Bleeding, Tuberculosis

Jarvis, C. (2012). Physical Examination & Health Assessment (6th ed.). St Louis, Missouri: Elsevier Saunders.

Sputum Collection-Sputum collections are collected to provide a variety of diagnostic information. They can be difficult to obtain because they are easily contaminated with saliva. When collected first thing in the morning, before eating and drinking, provides most accurate analysis. Patients that can breathe deeply and cough may collect a sputum specimen and expectorate it in the specimen cup. For those patients that are unable to cough up secretions, chest physiotherapy can be used. For most tests, the laboratory will need 1-2 teaspoons of

sputum for accurate results. This is taken to a laboratory where it is placed in a medium that allows bacteria or fungi to grow. Follow your agency policy and procedure on sputum collection.

3. **Dyspnea:** Diseases associated with dyspnea include: congestive heart failure, asthma, chronic bronchitis, airway obstruction, tuberculosis, HIV pulmonary disorders, emphysema, COPD, pulmonary fibrosis, and infections or inflammatory processes. If your patient complains of shortness of breath, it is important to further investigate when this occurs.
4. **Chest Pain:** Many times patients with pulmonary disease also have some degree of cardiac disease. It is important to rule out cardiac chest pain from respiratory chest pain. Ask the patient to describe their chest pain in detail. Cardiac chest pain is usually a squeezing or gripping pain. Esophageal chest pain is usually increased or decreased depending on food intake or antacid ingestion. Tracheal chest pain burns during inhalation. Chest wall or rib pain is easily localized and recurs with palpation. Pleural chest pain is described as “stabbing.” Pain associated with lung diseases such as tuberculosis and cancer may be described as boring, dull and aching.
5. **Wheezing:** High-pitched whistling noises produced by air movement through the narrowed or compressed small airways. It is a symptom as well as a physical finding. More common during expiration which suggests milder obstruction. If wheezing is heard during inspiration and expiration, a more severe airway narrowing is probable. Wheezing may be caused by bronchoconstriction, mucosal edema, or partial obstruction by a tumor, foreign body or thick secretions. The most common causes of wheezing are asthma and COPD. Wheezing can occur with other disorders including heart failure, anaphylaxis, and toxic inhalation.

Physical Changes Associated with Aging



Many physical changes are associated with aging and thereby putting older persons at increased risk for developing pneumonia and bronchitis. Bones become thinner, more rigid, and change shape and the muscles become weakened. Because of this, chest expansion is decreased. A lower oxygen level with less carbon dioxide is removed from the body and the ability to cough is lessened. Osteoporosis may cause a shortened thoracic vertebra height. Aging also causes the alveoli to lose their shape causing shortness of breath. (Minaker, 2011; Sharma & Goodwin, 2006)

Pneumonia

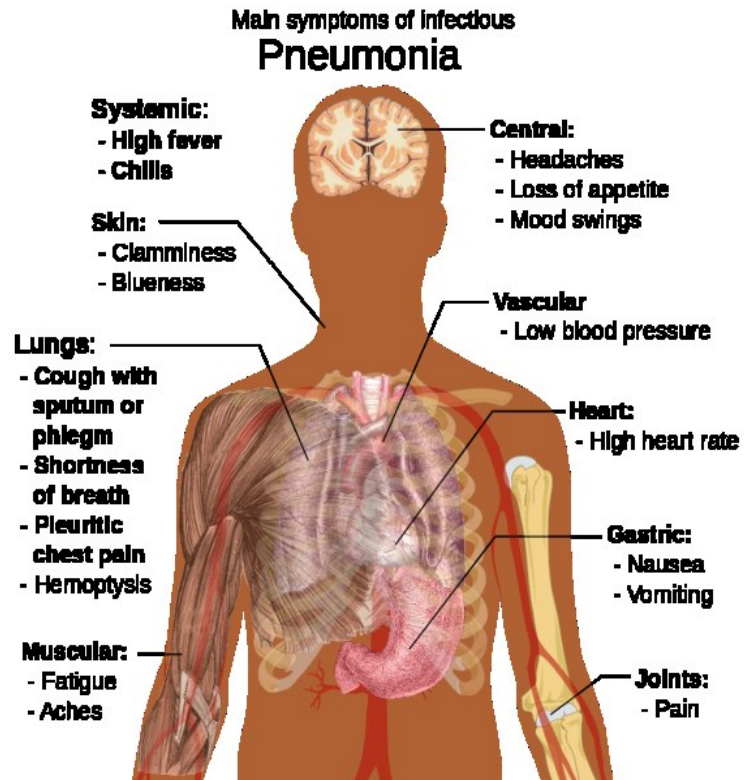
The term pneumonia may be linked to any condition that results in inflammation of the lungs. Conditions and risk factors that predispose patients to pneumonia include: smoking, immunodeficiency, alcoholism, chronic obstructive pulmonary disease, asthma, chronic kidney disease, and liver disease. The use of acid-suppressing medications such as proton pump inhibitors or H2 blockers are also associated with pneumonia.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3042441>. Old age and exposure to environmental factors are also associated with respiratory infections and pneumonia.

The main symptom of an upper and lower respiratory tract infection is a cough. However in a lower infection, it is usually more severe and phlegm and mucus may be present. Other symptoms may include a tight feeling in your chest, increased respiratory rate, shortness of breath and wheezing.

Regardless of the type of pneumonia, of which there are many, all need to be closely evaluated by a health care professional and recommendations should be followed. There are ways to help prevent pneumonia including getting vaccinated. Vaccines are available to prevent some types of pneumonia and the flu. It is important to discuss your vaccination status with your physician and review current guidelines. Practicing good hygiene is also important in prevention of pneumonia and washing your hands frequently can reduce the spread of a respiratory infections. Encouraging patients to stop smoking and keeping their immune system strong by getting enough sleep, exercising regularly and eating a healthy diet are also important factors.

Exploring barriers to adherence, providing education and assisting patients to use medications correctly are essential in home interventions. If patients are to adhere to their prescribed regimens, it is necessary to ensure correct administration techniques, assist in development of a realistic medication schedule, and teach how to order medications and ensure correct maintenance and cleaning of the administration system. Fostering communication among multiple prescribers, so that the primary physician is aware of the number of medication a patient is taking, may reduce polypharmacy or complexity.



Hägström, Mikael (2014). "[Medical gallery of Mikael Häggström 2014](#)". *WikiJournal of Medicine*

Tuberculosis

Although a great decrease in the incidence of tuberculosis since 1953, the Centers for Disease Control and Prevention (CDC) in 2016 reported 9287 new tuberculosis cases. Although much less than in 1953 when that same number was 84,304, healthcare awareness needs to be maintained so those numbers do not continue to climb. Newly diagnosed cases in 2016 were in foreign born persons, who had a case rate 14 times that among US born persons.

What is TB? Tuberculosis (TB) is a disease caused by bacteria that are spread from person to person through the air. It usually affects the lungs, but can affect the brain, kidneys, lymph nodes, joints or the spine.

TB Symptoms - Productive cough, night sweats, fever, weight loss, chest pain, hemoptysis or coughing up blood, chills, difficulty breathing, shortness of breath, and fatigue. The symptoms of TB in other body parts are dependent on the area affected.

How is it spread? TB is spread when bacteria from an infected person coughs, sneezes, speaks, or sings, putting that bacteria into the air. These bacteria can stay in the air for several hours, depending on the environment. Persons who breathe in the air containing the TB bacteria can become infected.

People with latent TB infection (LTBI) have TB bacteria in their bodies, but they are not sick because the bacteria are not active or multiplying. These people do not have symptoms of the disease and they cannot spread the bacteria to others. However, they may develop TB in the future. They are often prescribed treatment to prevent TB from developing.

What is the difference between latent TB and TB disease? People with TB are sick from the bacteria because the bacteria are active and are multiplying and destroying tissue in their body. They usually have symptoms of the disease. People with TB can be capable of spreading the bacteria to others. They are prescribed medications to treat the disease.

What should I do if I have spent time with someone that has latent TB infection? If you have spent time with someone with active TB or someone with symptoms of TB, you should go to your healthcare provider for evaluation and testing. Follow your facility's post-exposure evaluation procedure and have post-exposure PPD testing done in 8-10 weeks as recommended.

Testing: TB infection can be tested by a skin test or by a blood test. The mantoux tuberculin skin test is performed by injecting a small amount of fluid called tuberculin into the skin in the lower part of the arm. A person given the tuberculin skin test must return within 48-72 hours to have a trained healthcare worker look for a reaction on the arm. The TB blood tests measure how the patient's immune system reacts to the bacteria that cause TB. A positive TB test only tells if the person has been infected with the TB bacteria. It does not tell whether or not the person has progressed to active TB disease. Other tests, such as a chest X-ray or a sputum sample are needed to diagnosis if the person has either TB or latent TB.

Why is latent TB infection treated? Latent TB infection may be treated to kill the tuberculosis germs and prevent TB from developing. Some people are more likely than others to develop TB disease once they have been infected. This includes people with HIV infection, people who were recently exposed to someone with TB disease, and people with certain medical conditions. There are effective medications to treat latent TB infection and treatment may take from 12 weeks to 9 months, depending on the medications used.

How is TB treated? TB disease can be treated by taking several different medications for 6-12 months. Treatment is completed with local health departments who meet regularly with individuals and may watch them take their medication. It is very important to take all TB medication exactly as prescribed.

Tuberculosis Patient Care Guidelines

Patients should not leave their home except for required procedures and appointments prior to completing adequate therapy. In the home setting, patients do not wear masks, however if leaving their home, TB patients **MUST** wear a mask. Patients are no longer considered contagious when they have received adequate therapy. This is generally 2 weeks of medication and being cleared from their provider. If patients have three negative consecutive sputum smears they are also not considered contagious. The TB patient must remain in isolation until the patient's physician and the state's Department of Health's epidemiologist agree to discontinue isolation. The healthcare worker should wear a N95 mask when caring for patients in their home with a diagnosis of tuberculosis.

<https://www.cdc.gov/tb/education/corecurr/pdf/chapter7.pdf>

TB teaching should include but not limited to:

- Encourage patients to cough into a tissue
- Properly dispose of used tissues
- Education on need to complete all antibiotic regimens
- Encourage patient and family hand hygiene
- Regular communication with physician
- Support regular medical follow-up and physician appointments



Prevention

Prevention includes vaccination, and utilizing standard precautions, and education. Vaccination prevents against certain bacterial and viral pneumonias both in adults and children. Vaccinations against Haemophilus influenza and Streptococcus pneumoniae have good evidence to support their use. Vaccinating children against Streptococcus pneumoniae has led to a decreased incidence of these infections in adults, because many adults acquire infections from children. A vaccine is available for adults that have been effective in

decreasing the risk of invasive pneumococcal disease. Receiving vaccinations for pertussis, varicella, and measles offers a protective effect against pneumonia. Immunizing health care workers decreases the risk of viral pneumonia.



Unless contraindicated, travelers should be vaccinated against influenza and should be up to date on other routine immunizations. Although preventing respiratory illness while traveling may not be entirely possible, common sense prevention measures should be stressed. Those include: limiting close contact with people that are coughing or sneezing and frequent handwashing.

Education regarding smoking cessation and reducing indoor air pollution, such as that from cooking indoors with wood are recommended. Smoking appears to be the single biggest risk factor for pneumococcal pneumonia in normally healthy adults. Hand hygiene, wearing surgical masks, and cough etiquette are also effective prevention measures. In the elderly, good oral health care may lower the risk of aspiration pneumonia.

Oral Care

Oral care is an important component of prevention of pneumonia. One of the main micro-organisms of aspiration pneumonia is thought to be a gram-negative anaerobic bacteria that lives in phlegm and saliva. Many people micro-aspirate this saliva, thereby causing pneumonia. Poorly fitting dentures may lead to swallowing difficulties increasing the risk of aspiration. Poor oral hygiene and periodontal disease are also contributing factors. Oral care should at the very least, include brushing the teeth and cleaning the tongue and palate to remove any bacteria that can lead to aspiration pneumonia. Dentures also need to be routinely cleaned and brushed.

Multidrug Resistant Organisms

Multi-drug resistant organisms also known as MDROs, are bacteria that have become resistant to certain antibiotics. These antibiotics can no longer be used to control or kill the bacteria. MDROs usually affect older people or the very ill and can cause bad infections. The widespread use of antibiotics plus the natural growth of bacteria over time, has led to a number of MRDOs. These are often spread from patient to patient on the hands of healthcare workers. They can also spread on objects in the home such as bedside tables, IV poles, catheters, scales. They can spread from person to person through direct contact.

Infection with an MDRO usually affects young children, elderly, or those that have a severe illness or health condition such as chronic lung, heart, or kidney disease. Healthy people are at low risk of infection. Colonization means that you may have bacteria on your body, but is not causing any illness. MDROs can cause infections in almost any part of the body including the bloodstream, lungs, urinary tract, wounds, skin and surgical sites.

Home Care clinicians face many challenges in caring for patients in their own home. Each patient, family, home, and environment has unique challenges and obstacles. Many patients prefer to remain at home to receive their care in the comfort and security of their own surroundings. By following basic infection control

principles, the transmission of bacteria and viruses such as pneumonia, MDRO's, Methicillin-resistant Staphylococcus aureus (MRSA), and influenza can be lessened.

Basic Infection Control Measures

1. Hand Hygiene- all persons in the household should carefully follow recommendation for hand hygiene (i.e., alcohol based hand rub or hand washing with soap and water) before and after touching body fluids (e.g. respiratory secretions, stool, urine, and vomitus) and potentially contaminated surfaces and materials such as linens. www.cdc.gov/handhygiene
2. Patients should cover the nose and mouth when coughing and dispose of tissues in a lined waste container. If a mask is indicated, it should fit snugly around the face and should not be touched or handled by others. If masks are reused by persons in the home, masks should be properly marked.
3. Gloves and protective attire if necessary. Use of gloves is recommended when touching any body fluids or patient with known infection. Gloves should not replace hand hygiene. They should be discarded immediately after use and never washed or reused.
4. Laundry. This includes bedding, towels, and clothing. Towels and bedding should not be shared. Laundry may be washed in a standard washing machine with warm water and detergent. Bleach may be added, but is not necessary. Gloves should be worn when handling soiled laundry. Soiled laundry should not be shaken or handled in a manner that may aerosolize infectious particles.
5. Dishes and other eating utensils should not be shared. Soiled dishes and eating utensils should be washed either in a dishwasher or by hand with warm soapy water.
6. Household waste should be disposed of properly.
7. Environmental surfaces should be cleaned and disinfected that are frequently touched by the patient with a household disinfectant. It is good practice to use household utility gloves when cleaning.

The complexity of care and lack of provider control all can contribute to increase in healthcare costs. It is important to educate patients and families on infection prevention measures to keep everyone safe from respiratory illness and complications and to be good antibiotic stewards. In the home, it is important for visiting staff to prevent the spread of infection. Visiting staff should not use the patient's soap and/or towels for hand hygiene.

Supplies and Equipment

Cleaning and decontamination of respiratory therapy equipment in the home is important in prevention of infection. Proper cleaning and disinfecting will minimize the chance of infection. To prevent equipment contamination, a simple but effective cleaning procedure must be carried out on a routine basis. Teaching should include educating the patient and family on following the manufacturer's recommendations for cleaning equipment. When cleaning respiratory equipment, it is important to avoid doing it after vacuuming, under an

open window, or in dusty, dirty, or smoky areas. This avoids germs and bacteria from recirculating back into the environment.

Nebulizers are potential reservoirs for respiratory pathogens, among them *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Although no evidence based guidelines exist for cleaning of home nebulizers, usual recommendations include rinsing after each use, disinfecting three times per week, and air drying. Washing with household detergent removes *S. aureus*. Thus washing followed by a vinegar soak has been accepted practice. Ammonium compounds have been shown to be effective against both *S. aureus* and *P. aeruginosa*, whereas, acetic acid (white distilled household vinegar) has been shown effective against *P. aeruginosa* but ineffective against *S. aureus* <https://www.ncbi.nlm.nih.gov/pubmed/10656352?dopt=Abstract> Chatburn RL, Kallstrom TJ, Bajaksouzian MS. A comparison of acetic acid with a quaternary ammonium compound for disinfection of hand-held nebulizers. *Respir Care* 1988;33:179–187.

Patients who utilize a mouthpiece treatment with a great technique only get about 10% of the medication. Efficacy of the device is technique dependent. Consider the use of an aerosol mask for patients who are unable to take a mouthpiece treatment due to not breathing through their mouth.

Positive airway pressure (PAP): PAP machines are used by millions of people in the United States every night. CPAP is delivered using a mask that covers the nose and sometimes the mouth and works by blowing air into the nose and throat continuously. This blowing of air causes a positive pressure that holds the upper airway open during sleep. When the upper airway is open, air can flow freely into the lungs. Sleep apnea is the main diagnosis for someone using a CPAP, but patients with diabetes, sickle cell disease, obesity, and those with heart or lung disease, (such as asthma, COPD, and emphysema) may be at increased risk.



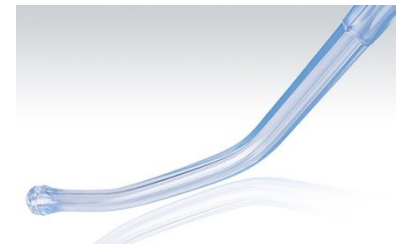
There are high counts of bacterial and fungal flora on CPAP masks and interfaces, despite routine washing. Therefore it is critical to maintain a regular pattern of ordering supplies. Many suppliers have an auto-resupply program that should be utilized for proper care and maintenance of supplies.

Old equipment needs to be replaced regularly.

Cleaning your equipment: Daily Cleaning- inspect and clean components regularly. The mask, tubing, and headgear should last approximately 3-6 months, but the life of equipment can vary considerably. Inspect all components daily and clean them as necessary. Daily cleaning is recommended for PAP masks, other supplies should be cleaned according to manufacturer's instructions. It is important to NOT clean any parts of the system with alcohol, bleach, or any strong household cleaners.

Meter Dose Inhalers: Many patients that have a respiratory condition use a metered dose inhaler with a chamber that delivers a prescribed amount of medication to the lungs. It can be difficult for patients to use a metered dose inhaler (MDI) correctly. Taking a deep breath can be difficult in itself, let alone taking a deep breath and spraying the medication at the same time. Providers will often recommend a spacer or chamber be used so patients do not have to breath in and spray at the same time. Using a chamber also helps reduce the side effects, such as thrush or hoarseness when inhaling corticosteroids. Keeping the MDI and spacer/chamber clean is important to prevent infections. The spray may clog the dosing the chamber. It is important to follow the manufacturer’s directions when teaching patients to clean their MDI’s. It is also important to check the expiration date of the MDI.

Suction Catheters and Yankauers: If reusing suction catheters and yankauers, it is important to follow the manufacturers’ guidelines. General cleaning procedures should include: washing hands and wearing gloves, washing the soiled suction catheters and supplies thoroughly in a solution of liquid detergent and warm water and allow them to soak for 15 minutes. Run tap water over supplies for at least 3 minutes. Rinse each catheter and supplies under warm running water. Shake off excess water. Mix disinfectant solution. You may use one part water with one part white vinegar or other solution as manufacturer guidelines. Allow the catheters and supplies to soak for 30 minutes or as instructed. After the 30 minute soak, remove and shake off excess solution. Place on a clean towel to air dry. Do not dry with a towel. After supplies are dry, they should be rinsed in warm tap water. After the supplies are dry, store in a clean bag until next use.



Patient and family teaching is an important aspect in prevention of illnesses. Infection related education is equally as important. A comprehensive teaching plan should be individualized for each patient. If patients are to adhere to their prescribed regimens, it is necessary that they know about the disease, symptoms, energy conservation measures, and how to take their medication. Ensuring that patients adhere to their medication regime and teaching them how to correctly administer those medications, in whatever form is prescribed, can assist with compliance and decrease relapses.

Patient/Family Education

- Disease process
- Breathing Techniques
- Signs and Symptoms to Report
- Energy conservation techniques
- Symptom Management
- Medication Use
- Nutrition techniques
- Inhaled medication techniques, equipment management
- Home oxygen use, cleaning, management
- CPAP, BiPAP, Ventilator use and cleaning

In Summary

Providing quality care is a critical factor in prevention of readmissions and cost management strategies. As with any illness, patient assessment is a critical component of care and taking time to educate patients, families, and healthcare providers are equally important. Prevention of infection and being able to recognize respiratory infections early can help eliminate the spread of disease, reduce hospitalizations and improve the lives of patients. When a patient develops an infection while in home health care, it is difficult to track where protocols and standards fail due to the intermittent nature of the nurse visits, the home environment in which the patient lives, the knowledge and skills of the patients and caregivers, and various environmental factors that the patient encompasses on a daily basis. Education on hand hygiene, cough etiquette, immunizations, staying informed of outbreaks, and keeping equipment clean can all assist in reducing respiratory infections.

There are many resources available to assist clinicians in assessments and for patient use. We have listed just a few of these resources for clinicians to use in your practice.

Website:	Examples/Descriptions:
Nebulizer Patient Handout	Patient Handout-Nebulizer Care
Cleaning Positive Airway Equipment-Patient handout	Patient handout-Cleaning PAP Equipment
https://www.thoracic.org/patients/patient-resources/resources/cough.pdf https://www.thoracic.org/patients/patientresources/resources/PHSCough.pdf	Cough
http://www.thoracic.org/patients/patient-resources/resources/metered-dose-inhaler-mdi.pdf	Patient handout-Metered Dose Inhaler
https://www.thoracic.org/patients/patient-resources/resources/cpap-for-osa.pdf	CPAP Patient Handout
https://www.thoracic.org/patients/patient-resources/resources/tuberculosis.pdf	TB Patient Handout
Home Tuberculosis Isolation Handout	TB Home Isolation handout-
https://www.thoracic.org/professionals/clinical-resources/disease-related-resources/resources/sunovion-tearsheet.pdf	COPD –Patient Handout Inhalation
http://www.thoracic.org/patients/patient-resources/videos.php	Patient Videos on Asthma, COPD, Chronic Lung Disease, Pulmonary Hypertension, Sleep Apnea, Dyspnea
http://www.health.state.mn.us/divs/idepc/diseases/tb/factsheets/homeresp.pdf Minnesota Department of Health	TB Patient Handout
http://www.fmh.org/documents/NonStaff/FMHInfectionControl(HH)2017_NonStaff.pdf	Staff Training -TB
American Association for Respiratory Care http://www.aarc.org/	Clinical Guidelines and Education

Website:	Examples/Descriptions:
National Guideline Clearinghouse Initiative of the Agency for Healthcare Research and Quality (AHRQ) www.guideline.gov	Public resource for summaries of evidence-based clinical practice guidelines
https://apic.org/Resource/TinyMceFileManager/for_consumers/IPandYou_Bulletin_Clean_your_home_to_prevent_winter_illness.pdf	Prevention Winter Household Cleaning Handout

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