Anatomy and Physiology BREATHING:

* Breathe in through the nares
* Air travels down the pharynx
* Epiglottis opens (for air only…it closes when eating to block food from entering the trachea)
* The opening in the vocal cords is called the ***Glottis.***
* Enters the Trachea
* Travels down the right and left mainstem bronchus
* The area where they go into each lung is called the Carina
* Travels down the bronchioles
* End point is the Alveoli
* Specialized cells that contain ***Cilia*** sweeps any debris up and out toward the nasal cavity
* Specialized cells called Goblet Cells secrete mucous
* The amount of air the can be inhaled in one breath is called ***inspiratory capacity.***

Anatomy and physiology of RESPIRATION

* Chemoreceptors in the carotid body determine the levels of O2, CO2, and acids-they then stimulate the respiratory centers to modify respiratory rates
* Alveoli is where gas exchange happens
* Walls are so thin they are only single cell lining
* Walls are surrounded by capillaries
* Deoxygenated blood comes from the heart, drops off CO2 and picks up O2
* We breathe out the CO2 and the cycle happens over and over again
* Exhaled air contains about 16% O2 and 3.5% CO2
* Oxygenated blood returns to the heart to be pumped out to the body to provide oxygen for all our cells and organs

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| Respiratory Changes in the Older Adult | Lung Tissue becomes Rigid and Less Elastic  Mucous Membranes tend to be dry  Reduced number of cilia  Decreased pulmonary blood flow  Kyphosis affects the ability to take deep breaths  Pooling of secretions happens due to stasis | Deep breathing exercises  Pursed Lip Breathing-opens bronchioles by backflow air pressure  Walking or light exercise increases the capacity to use oxygen  Flu and Pneumonia Vaccines  Stop Smoking  Increase Fluid Intake to Thin Secretions |

**LUNG SOUNDS STUDY TABLE 49.1 on page 1593**

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| **LUNG SOUND** | **SOUNDS LIKE** | **CAUSED BY** |
| Friction Rub | Low pitched grating sound | Pleurisy |
| Sibilant wheezes | High pitched whistle sound | Asthma attack |
| Medium Crackles | Brief intermittent bubbling sounds at the end of respiration | Diseases of the small Bronchi |
| Sonorous Wheezes (Rhonchi) | Sounds like a motor running | Transportation of air through the tracheobronchial passages |

Random Facts:

* SAO2 (oxygen saturation) measures the percentage of oxygen bound to the hemoglobin compared with the amount available
* Always place the pulse oximeter on a finger with normal temperature
* When collecting a SPUTUM SPECIMEN
* Rinse mouth with water first
* Obtain first morning specimen if possible
* Always collect specimen BEFORE administering antibiotics
* To assist in helping the patient expectorate
* Position in orthopneic position
* Suction if necessary
* Assist to cough
* Provide hydration to thin secretions making it easier to expectorate
* With diseases like pneumonia use the following nursing interventions
* Place the “good Lung” down (lie on the side of the healthy lung
* This increases PaO2 levels in the good lung
* The dependent lung will be better perfused
* Hypoxia will be reduced
* Signs of Respiratory Distress
* Mild: Abdominal breathing with SaO2 97%
* Moderate: Nasal Flaring, Symmetrical chest wall expansion, SAO2 88%
* Moderate: Substernal retractions with SaO2 90%
* INTERVENTIONS
* Elevate the head of the bed an provide oxygen
* Plan care to provide optimum rest
* Severe: Substernal retractions with SaO2 84%
* Thoracentesis Principles
* Used to remove excess fluid from around the lungs to improve respiration
* May also be used to obtain a specimen
* The maximum amount of fluid that can be drained over 30 minutes is 1300ml
* Position the patient on the UNAFFECTED side after the procedure
* Infected fluid in the pleural space is called **empyema**
* Chest Tube Principles
* Purpose of chest tubes are to drain air, blood and fluid from the pleural space
* Restores negative intrapleural pressure
* Allow the lung to expand
* The water level in the unit will rise and fall with each breath (Tidaling)
* Document that the tidaling is present as a normal finding
* Prevent dependent loops to keep the tube from becoming occluded
* DO NOT irrigate the tube, “Milk” the tube, or loop it OVER the bedrail
* DO NOT give medications through a chest tube
* Bronchoscopy Principles
* Used to visualize the airways and take biopsies
* Explain that the patient will be sedated to help relax
* Mildly blood tinges sputum after a biopsy is normal
* Reassure them that they will be able to breathe during the procedure
* The patient will be able to eat and drink once the **gag reflex** has returned
* VATS (video assisted thoracoscopic surgery) can be used to remove tumors through a small keyhole incision in the chest wall if any tumors were seen on imaging or during bronchoscopy
* General Principles
* Whenever bleeding is present (such as with epistaxis) we always want to check the blood pressure which might indicate hemorrhage that we can’t see and hypovolemia
* Group B Strep is the most common cause of tonsillitis
* NEVER stop corticosteroid treatment abruptly as it can cause rebound hypoglycemia
* The spiral CT scan is the fastest and can be completed in 30 seconds
* Cor pulmonale is hypertension of the pulmonary circulation so the symptoms will be edema of the lower extremities, distended neck veins from fluid backup
* If a patient has any procedure where they are unable to speak afterwards provide a pad and pencil, a magic slate (white board), or communication board
* Acid Base Balance
* The kidneys retain bicarbonate to increase the pH in respiratory acidosis
* PaO2 is the amount of oxygen that is dissolved in the plasma
* PCo2 is the amount of carbon dioxide that is dissolved in the plasma
* COPD
* Two types: Emphysema (pink puffers) and Chronic Bronchitis (blue bloaters)
* Barrel chest can develop from an increased anteroposterior diameter caused by overinflation of the alveoli
* If spontaneous pneumothorax occurs in the patient with emphysema the symptoms may be sharp pleuritic pain from severe coughing, increased respiratory rate and heart rate and ABSENT breath sounds on the affected side.
* Tuberculosis
* Patient must be placed in negative pressure room also known as acid fast bacillus isolation
* One of the medications to treat TB is isoniazid which can affect renal function
* Asthma Process
* Exposure to an allergen
* Mast cells in the lungs begin the inflammatory process
* Histamine is released.
* Edema and mucus production in the bronchioles occurs
* The airways narrow
* Leukotriene modifiers (like montelukast) are used to open up the airways by bronchodilation
* Laryngeal Cancer
* Total laryngectomy will leave patient with aphonia (no voice)
* Partial laryngectomy will leave patient with some voice (may only remove one of the cords)
* Postoperatively tracheal suction will be frequent and there will be a temporary tracheostomy