Gas Exchange

Tuberculosis or TB presently effects 1/3 of the world's population. TB is spread via inhalation airborne droplet nuclei of the person infected; these droplets are imbedded in the proximal airway which for now doesn't cause the infection. The infection happens when the droplets then pass the upper respiratory defense, reaching the lungs and planting the droplets in the subpleural spaces of the lung's lobes causing a spread of the disease.
People that are carriers for Tuberculosis, they're what is called in a "Latent" stage or inactive in which the affected person cannot transmit the bacteria to others making it not contagious. However, the disease can grow anytime if the carrier's immune system becomes weak, possibly making the individual immunocompromised depending on their age.

Chronic Obstructive Pulmonary Disease or COPD is the ineffective or restricted airflow to and from the lungs. This is usually caused by toxins or other foreign substances entering the lobes of the lungs, such as pollution or smoke exposure often leading to the production of excessive mucous that enters the lungs. This disease causes peoples immune system to become immunocompromised which in patients that this happens to, if they acquire other diseases such as Pneumonia or Influenza this can become very dangerous to them making them become sicker. With COPD you will see shortness of breath, wheezing, as well as a cough and chest tightening which can make the patient very uncomfortable and lower their oxygen saturation. The Alveoli of the lungs begin to lose their shape due to trapping of oxygen and are unable to expel all the air breathed in. This disease is now the 3rd leading cause of death in the U.S.

Sleep Apnea, this is the lack of, or stoppage of oxygen in the airways leading to frequent periods of no oxygen reaching the lungs. This often occurs in older adults from 50-60 years of age, genetics which can increase your chances to 86%, testosterone, and over-weight people or people with more fatty tissue at the base of the neck under the chin, which when laying supine has the effect of pushing against the esophageal wall causing an ineffective airway as well as the relaxing of the tongue during sleep which also causes the falling to the esophagus. R.E.M which means Rapid Eye Movement is also a complication of this disease, causing temporary dream paralysis which the person won't be able to move making apnea worse.

Pneumonia is a disease of the lungs caused mainly by Streptococcus pneumonia which starts as an upper respiratory tract infection spreading to the lungs via inhalation of oral bacteria/droplets. This effect can cause Alveoli to fill with fluid or puss, hindering gas exchange that may cause a cough and difficulty breathing which leads to chest pain. Most infections are seen as what is called Community-acquired pneumonia and is the least harmful. The reason the Health Care-Associated pneumonia is so harmful is due to the multi drug resistance they have because of the hospital setting. A chest X-ray will be done to diagnose this disease and will show excessive opacity in the lungs, as well as hearing the presence of chest crackles. This can be treated with antibiotics and antiviral medications.

Chest Tubes are inserted when either air, blood, or pleural fluid are over accumulated in the pleural space of the lung causing pressure which squeezes the lung or lungs. A chest tube is inserted in the intercostal space between the ribs after a Thoracentesis is done, which is the prep for a tube. The doctor with insert a needle into the intercostal space to aspirate either the fluid or air to ensure placement, then he will do what is called a Pneumothorax (air in pleural lung space) or a Hemothorax (fluid buildup in pleural lung space) by making an incision in the same location as the Thoracentesis and placing a tube with holes on the end that then puncture the outer wall of the effected lung allowing the release of either the air or fluid. This is then hooked up to water suction which in turn does not allow the backflow of the drainage allowing the lung to re-expand.