

***Human Biology ATAR – Task 3: Extended Response***

***Lung diseases and treatments (7.5%)***

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| --- | --- | --- | --- |
| Name: Nicole Whittle | | | |
| Time allowed: 1 Lessons | | | |
| **Section** | Your Mark | Marks available | Percentage |
| **Section 1:**  Report |  | 10 | 18.5% |
| **Section 2**:  Validation Test |  | 44 | 81.5% |
|  |  | **54** | **100%** |

**Declaration of Authenticity**

I, Nicole Whittle declare that this work is my own and I have not plagiarised from any source.

Signature: Nicole W  
  
Date: 17/4/23

DISEASES

|  |  |
| --- | --- |
| **LIST A** | **LIST B** |
| Chronic bronchitis | Pneumonia |
| Emphysema | Pleurisy |
| Cystic fibrosis | Tuberculosis |

Check list

* Cause, or main causes
* Symptoms and diagnosis
* Current treatments…how they work and what they do.
* Prevention

Write the names of the diseases you have chosen here:

Disease A \_\_Chronic Bronchitis

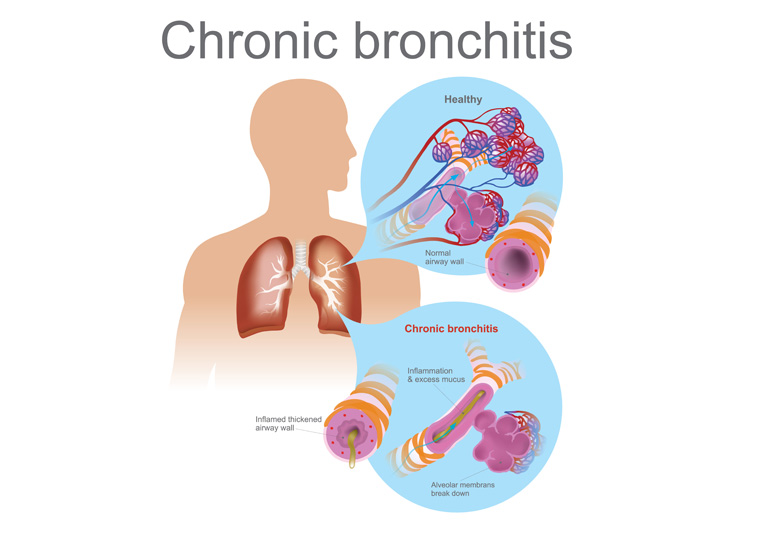
Disease B\_\_ Pneumonia

**Marks Table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Report** | **Cause** | **Symptoms** | **Treatments** | **Prevention** | **Marks** | Your mark |
| **Disease A** | 1 | 1 | 1 | 1 | 5 |  |
| **Disease B** | 1 | 1 | 1 | 1 | 5 |  |

This sheet is to be the cover page of your report.

The comparison between the two lung diseases known as chronic bronchitis and pneumonia will be discussed in this report. It will cover in explicit detail the difference between causes, treatments, preventions, and symptoms of the designated disease(s). This report will also include how both diseases may have similar characteristics, as they’re both related to the respiratory system.



**Chronic Bronchitis**

Chronic Bronchitis is classified as a chronic obstructive pulmonary disease (COPD), which refers to the group of respiratory diseases that result in airway blockage and breathing-related problems. Specifically, Chronic Bronchitis refers to inflammation and the build up of mucus in the bronchial tubes that carry oxygen towards the alveoli. This medical condition is defined as a productive, persistent cough which lasts about 2-3 months, but still occurs within the span of 2 consecutive years. Due to chronic bronchitis following similar symptoms to the common cold and other COPD, it can be difficult to distinguish the disorder from other illnesses. Therefore, a health professional would usually conduct a few medical examinations, before diagnosing a patient. This includes pulmonary function tests, chest X-rays, sputum tests, arterial blood gas test and CT scans.

**Causes**

The main cause of Chronic Bronchitis is the long-term exposure of substances which results in inflammation or damage to your lungs and airways. These substances are known as irritants, such as pipe, cigar, and other types of tobacco smoke. The risk of chronic bronchitis can heighten depending on if you’re directly inhaling irritants or experiencing second hand smoke. Other pollutants such as air pollution, chemical fumes and dust in the environment can also contribute to the cause of this disease. In rare cases, alpha-1 antitrypsin deficiency (AATD) can also cause Chronic Bronchitis, as well as other respiratory diseases. AATD is a rare genetic condition where an individual can’t produce enough Alpha-1 antitrypsin, a protein that assists in protecting your lungs and liver from diseases. Individuals with this genetic condition have an early onset to developing lung diseases such as chronic bronchitis.

**Symptoms**

Due to Chronic Bronchitis being a long-term disease, symptoms may progressively get better or worser, but will never completely go away. The extended period of inflammation results in mucus build-up and breathing difficulties. One of the main symptoms a doctor will look for in a patient when diagnosing Chronic Bronchitis, is a productive cough. A productive cough is characterised with the presence of mucus or phlegm (sputum) being expelled from the lungs when coughing. Although symptoms may vary depending on the individual, the most common include frequent wheezing, fatigue, chest discomfort and shortness of breath. Another type of bronchitis is acute bronchitis, which is short-lasting and overall less severe than Chronic. It follows similar symptoms to the cold such as body aches, headaches, chills, and a productive cough.

**Treatments**

Chronic bronchitis has no cure as of right now, however treatment method’s primary aim is to help slow the progression of the disease and relieve symptoms. There are many types of treatment options available for patients with chronic bronchitis such as anti-inflammatory drugs, oxygen therapy and airway openers. Medical professionals usually prescribe patients with inhalers containing anti-inflammatory drugs such as corticosteroids, alongside airway openers known as bronchodilators.

Inhalers are a type of medical device used to deliver medication directly into a user’s lungs. A doctor would generally prescribe an inhaler containing steroids as this drug assist with Chronic bronchitis as it helps treat inflammation in the lung’s airways. Additionally, inhaled steroids also help reduce excess mucus, tight airways and swelling. Anti-inflammatory drugs can also be provided with patients through a similar machine known as a Nebulizer. This is analogous to an inhaler as it turns liquid medication into a fine mist, making it easier for an individual to inhale. Although, inhaled steroids are an effective anti-inflammatory drug used to treat chronic bronchitis it does have negative side effects. In some cases, incorrect use of inhalers can cause oral thrush, dermatitis, increased thirst, bruises, sore throat, and hoarseness in speech.

In serious cases of Chronic Bronchitis or other COPD diseases, a patient may be provided with supplemental oxygen. Oxygen therapy, also known as supplemental oxygen, is a treatment method that provides patients with extra oxygen. In this method, oxygen is administered through oxygen devices such as nasal cannulas and O2 masks. This treatment option is suggested for individuals with damaged lungs which causes low oxygen levels in their blood. With the assistance of oxygen therapy, a patient will have reduced breathlessness and higher levels of oxygenated blood. However, in most cases patients diagnosed with chronic bronchitis don’t require supplemental therapy and are capable of living with moderate symptoms, however it is still a treatment method available to them.

Lastly, medication known as bronchodilators can be used to treat Chronic Bronchitis, as well as other chronic obstructive pulmonary diseases. Bronchodilators is a type of drug used to dilate air passages in the respiratory system, such as the bronchi and bronchioles. As a result, the patient is able to breath easier, overall increasing the airflow into the lungs. There are 2 types of bronchodilators: short-acting and long-acting. Short-Acting bronchodilators are used to relieve acute asthma symptoms or attacks, allowing for a fast relief. Albuterol, Metaproterenol and Levalbuterol are all short-acting bronchodilator inhalers used to treat asthma symptoms. While long-acting bronchodilators provide control of breathlessness in asthma and COPD. Long-acting bronchodilators such as Beta-2 agonists, Anticholinergics and Theophylline are commonly used to treat COPD. Generally, a doctor will prescribe patients with Chronic bronchitis with bronchodilators alongside inhaled corticosteroids because they help enhance the effect and keep the airways open.

**Preventions**

Since smoking is the main cause of chronic bronchitis, the best preventative method is to never start smoking or if a habit is already formed, to quit as soon as possible. It is difficult to break a smoking habit, however there a products and programs a health professional can advise. Exposure to second-hand smoke and other lung irritants is another leading cause of chronic bronchitis. Therefore, it is vital for an individual to avoid areas where smoke and other environmental toxins are present Additionally, wearing a mask when working in areas with strong fumes or during flu season can also contribute to the prevention of chronic bronchitis. By following these preventative methods, it can overall lower the risk of developing chronic bronchitis and other lung diseases.

**Diagram

Description automatically generatedPneumonia**

Pneumonia is an acute respiratory infection which inflames the alveoli (air sacs) in one or both lungs. This infection causes the air sacs to fill with fluid or pus, making it difficult and painful for an individual to breathe. Pneumonia can range from mild to life-threatening depending on the patient’s age and health. Infants, young children, elders over the age of 65 and individuals with weakened immune system are at risk of developing life-threatening cases, however anyone can contract it. Pneumonia is often classified based on how and where it was acquired. These classifications include Hospital-acquired, Community-acquired, Ventilator-associated and Aspiration. There are also different types of pneumonia such as viral, bacterial, walking, and fungal. Due to the different types of pneumonia, there is a variety of causes, treatment, and severity.

**Causes**

The causes of pneumonia vary depending on where it is acquired and what type of pneumonia it is. Community-acquired pneumonia which occurs outside of hospitals and other health care facilities is most common. It’s mainly caused by bacteria, fungi, viruses, mycoplasma, and other pathogens. While for hospital-acquired pneumonia, it can be a more serious case as the bacteria causing it may be resistant to antibiotics. Additionally hospitalised patients on ventilators are more likely to develop hospitalised-acquired pneumonia, due to a higher risk of germs directly entering their lungs. Lastly, Aspiration pneumonia is caused when consumed substances such as food, liquid, vomit, or saliva enters the lungs, instead of the stomach. Overall, the leading cause of pneumonia is when pathogens or foreign substances enter the lungs causing an infection.   
Additional Information on Causes

* Bacterial Pneumonia: most common cause is Streptococcus pneumoniae. Other causes include Mycoplasma pneumoniae and haemophilus influenzae.
* Viral Pneumonia: caused by viral infections such as influenza, rhinoviruses, respiratory syncytial virus and COVID.
* Fungal Pneumonia: mostly affects individuals with a weakened immune system. This type of pneumonia is caused by fungi such as pneumocystis jirovecii, cryptococcus and histoplasmosis species.

**Symptoms**The symptoms of pneumonia vary depending on factors such as the type of pneumonia, the causal germ and overall health of the patient. Mild symptoms often follow those similar to a cold or flu, however they last for an extended period. These symptoms include chest pain when using your lungs, fever, fatigue, either a dry or productive cough, and nausea. In some cases, patients may also experience shortness of breath and develop blueish coloured lips and fingernails. Other symptoms can vary according to your age, for example infants may not show any sign of infection, other than vomiting, lack of energy and loss of appetite. While kids under the age of 5 usually have symptoms such as fast breathing or wheezing. Lastly, older patients usually follow mild symptoms as well as confusion or a lower body temperature.

**Treatments**

Treatments will vary depending on the type of pneumonia, how severe it is and the age of the patient. If it’s a case of bacterial pneumonia, the main treatment method is antibiotics. Health care professionals need to first identify the causal bacteria and use the specific antibody for treatment. This is because one group of bacteria may not respond to the same antibiotic as another, making it difficult to treat this type of pneumonia. Doctors would usually prescribe patients with bacterial pneumonia with specific antibiotic treatment and suggest the use of over-the-counter medication such as aspirin or ibuprofen to help relieve any pain or fever.

Unfortunately, in cases of viral pneumonia, antibiotics are ineffective and not used as a treatment method. Alternatively, a doctor may prescribe an antiviral medication, which can assist with easing the symptoms and shorten the lifespan of the virus. However, generally in most cases symptom management, rest and at-home care is all that’s needed to treat viral pneumonia. Natural home remedies such as drinking more fluids and warm beverages, steamy baths and the use of humidifiers can also assist with relieving symptoms.

While in cases of fungal pneumonia it’s primarily treated by antifungal medications. Health care professionals would usually prescribe specific dosages and methods of administration depending on the individual’s case and type of infection. Amphotericin B is the mainstay of treatment and is mostly used to treat patients with acute fungal pneumonia. However, the type of anti-fungal drug that is used depends on the type of pathogen that is isolated or clinically suspected of causing the infection.



In severe cases of pneumonia, hospitalisation may be required for treatment. This is most common for people who are very old, young, or prone to other illnesses. Hospital treatment is recommended for patients that require supplemental oxygen and other intense forms of treatment. Oxygen therapy is used to help maintain a patient’s oxygen levels in their bloodstream, with the use of ventilators or nasal cannulas. This method is also used to treat Chronic Bronchitis and other respiratory diseases. Lastly, some patients with pneumonia would be hospitalised so their medication is administered safely. These patients can be treated with antibiotics and fluid being administered through the veins via an intravenous (IV) line.



**Preventions**

The main preventative method of pneumonia is vaccinations. Different types of vaccinations can prevent the growth of bacteria and lower the risk of contracting viruses, which can cause pneumonia or similar symptoms. Considering that pneumonia can be caused by viruses, vaccinations is an excellent preventative choice for pneumonia, as well as other infections.



Types of vaccinations:

* Pneumococcus
* Influenza
* HIB (Haemophilus influenza type B).

Individuals can speak to their doctor about which vaccination is best to prevent pneumonia for themselves and their children.

Other preventions include basic self-care practices. This includes daily exercise, washing your hands regularly and maintaining an overall healthy lifestyle to help strengthen your immune system. By following these preventative methods, an individual can lower their risk of contracting pneumonia and other infectious respiratory diseases.