

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

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

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| --- | --- | --- | --- |
| Name: Abdullah Hussain | | | |
| 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 (Student Name) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ declare that this work is my own and I have not plagiarised from any source.

Signature:  
  
Date:

**Lung disease and treatments**

You are to choose **one** lung disease from List A and **one** disease from List B to research and find information about the named aspects of each disease. You will then complete an in-class validation assessment on your research without notes.

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 **Emphysema**

Disease B  **Tuberculosis**

**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.

***Lung diseases and treatments***

**Disease A: Emphysema**

**Causes:**

Emphysema is a chronic lung condition that damages the lungs' air sacs, or alveoli. It can be caused by inhalation of other harmful substances such air pollution, chemicals, and dust. It is typically brought on by long-term exposure to cigarette smoke. These irritants harm and inflame the walls of the air sacs when they are inhaled, causing the walls to stretch and weaken. As a result, the air sacs become less elastic and are unable to properly expand and contract, which makes it challenging for the lungs to work efficiently.

**Symptoms and diagnosis:**

Shortness of breath is the main symptom of emphysema, and it often develops gradually and gets worse with time. Wheezing, coughing, chest tightness, and increased mucus production are some additional symptoms that might be present. Emphysema can cause more severe symptoms as it worsens, including frequent respiratory infections, exhaustion, weight loss, and bluish discoloration of the lips and nails as a result of low blood oxygen levels.

**Shortness of breath**: Emphysema damages the lungs' air sacs, making it harder for them to properly expand and contract. This makes it difficult to breathe deeply and causes loss of breath, especially when performing physical activity.

**Chronic cough:** Emphysema frequently causes a persistent cough that generates mucus. The cough could be stronger in the morning or right after exercise.

**Wheezing:** When the airways narrow due to emphysema, wheezing, a high-pitched whistling sound occurs when breathing.

**Chest tightness:** Emphysema patients who have trouble breathing and poor lung function sometimes report chest tightness or discomfort.

Emphysema is often diagnosed with a complete medical history, physical examination, and array of tests that measure lung function. To determine the presence and severity of emphysema, pulmonary function tests like spirometry and lung imaging tests like chest X-rays and CT scans are frequently performed. To determine the amount of oxygen and carbon dioxide in the blood, a blood test may occasionally be used.

**Treatments:**

Even though there is no known cure for emphysema, there are a number of treatments that can be used to control the symptoms and decrease the disease's progression. The main goal of treatment is to relieve symptoms, improve lung function, and enhance the overall quality of life for individuals with emphysema.

Avoiding further exposure to dangerous substances, especially cigarette smoke, is one of the most important aspects of treatment. The best method for preventing the growth of emphysema and preventing it from getting worse is to quit smoking. Additionally, those who have emphysema should stay away from pollutants in the environment such second-hand smoke, air pollution, and other environmental pollutants that might worsen lung damage.

Emphysema is currently treated with medication, oxygen therapy, pulmonary rehabilitation, and in some cases, surgery. Medications like bronchodilators and corticosteroids are frequently prescribed in order to relax the muscles of the airways and reduce lung inflammation. Exercise, breathing exercises, and education are frequently included in pulmonary rehabilitation programs, which can assist to improve lung function and general physical fitness.

For individuals who have severe emphysema who have low blood oxygen levels, oxygen therapy may also be advised. Oxygen supplements can raise oxygen levels and reduce breathlessness. For people with advanced emphysema, surgical procedures including lung volume reduction surgery or lung transplantation can be considered.

**Prevention:**

Emphysema is a chronic lung condition characterized by the destruction of the lungs' air sacs, and prevention is vital for managing and reducing the chance of getting the disease. Avoiding smoking or being around second-hand smoke is an important preventative step. Emphysema is primarily brought on by smoking, thus the best approach to prevent it from starting is to stop. In the event that you smoke, quitting as soon as you can greatly reduce your chance of emphysema. There is never a bad time to stop smoking, and there are many resources at your disposal, including support groups, counselling, and medications, to make the journey easier.

Avoiding exposure to environmental pollutants, such as dust, fumes, and chemicals, which can irritate and harm the lungs, is another crucial preventative approach. To lessen your risk of developing emphysema if you work in an industry where you are exposed to such pollutants, it is crucial to take the necessary security measures, such as using a mask or utilizing optimal ventilation. Emphysema can also be prevented by taking steps to enhance the quality of the indoor air in your house, such as frequent cleaning, proper ventilation, and the use of air purifiers.

Emphysema can be avoided by maintaining good general health. The chance of getting emphysema can be decreased by maintaining a healthy weight, engaging in regular exercise, and controlling other chronic illnesses like allergies or asthma. It's also important to prevent lung damage that can eventually result in emphysema by avoiding respiratory infections through good hygiene habits including routine hand washing and avoiding close contact with sick people. In order to take the proper measures to stop the advancement of emphysema, regular check-ups with a medical professional can also assist monitor your lung health and identify any early signs of the disease.

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**Disease B: Tuberculosis**

**Causes:**

Tuberculosis (TB) is caused by the bacteria Mycobacterium tuberculosis, which is transmitted from person to person through the air. The bacteria Mycobacterium tuberculosis, which spreads from person to person through the air, is what causes tuberculosis. Small particles of the bacteria can be released into the air while coughing, sneezing, or speaking, and if another person breaths in these particles, they could receive tuberculosis. But not everyone who is exposed to the bacteria goes on to have active Tuberculosis. In some cases, the immune system is able to keep the bacteria under control and stop the sickness from progressing. A weaker immune system, such as that seen in those who have HIV/AIDS, malnutrition, diabetes, and other chronic diseases, as well as lifestyle factors including smoking and alcohol abuse, all increase the likelihood of acquiring tuberculosis.

**Symptoms and diagnosis:**

Depending on where the infection occurred, tuberculosis (TB) may present with a number of symptoms. Pulmonary tuberculosis, which affects the lungs, is the most typical type of the disease. Chest pain, exhaustion, fever, night sweats, and weight loss are some of the signs and symptoms of pulmonary tuberculosis. A persistent cough (frequently with blood-tinged sputum) is also possible. Yet occasionally, other bodily organs including the bones, joints, kidneys, and brain can also be impacted by tuberculosis, causing a range of symptoms specific to the affected organ.

Medical examinations, imaging tests (such chest X-rays or CT scans), and laboratory tests are all used to diagnose Tuberculosis. Commonly used to check for the presence of Tuberculosis is a skin test known as the tuberculin skin test (TST) or Mantoux test, although it cannot tell the difference between latent tuberculosis and active tuberculosis. (When the bacteria are present in the body but are not causing symptoms is known as latent tuberculosis). It is important to isolate the bacteria using sputum culture or other biological samples in order to confirm a diagnosis of active Tuberculosis. In some circumstances, a biopsy of the affected organs may also be performed.

* A little quantity of Tuberculosis protein is injected beneath the skin during a tuberculin skin test (TST), and after 48–72 hours, the patient is observed to see if there is a reaction. Although a positive test result indicates exposure to the Tuberculosis bacteria, it does not always indicate an active disease.
* Blood tests known as interferon-gamma release assays (IGRAs) can help distinguish between latent and active tuberculosis infections by measuring the body's immune response to the tuberculosis bacteria.
* Chest X-ray: An X-ray of the chest can show abnormalities in the lungs suggestive of TB disease.
* Sputum culture involves collecting a sample of the mucus that is coughed up from the lungs and testing it in a lab to see if bacteria associated with tuberculosis is present.

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**Disease B: Tuberculosis**

**Treatments:**

Antibiotics are often taken in combination for a long time as part of treatment for tuberculosis. Isoniazid, rifampin, ethambutol, and pyrazinamide are the most often prescribed antibiotics for the treatment of tuberculosis. Together, these medications target and eliminate the TB-causing bacteria. An initial period of intensive therapy is followed by a second phase of less frequent dosing while providing a treatment. The length of treatment varies depending on the kind of Tuberculosis and the severity of the disease, but it usually lasts between 6 and 12 months.

Targeting the bacteria and limiting its spread are the primary objectives of current Tuberculosis treatments. Isoniazid acts by preventing the production of a crucial element of the bacterial cell wall, reducing the bacteria's capacity for growth and survival. Rifampin functions by impeding the enzyme required for the bacterial production of RNA, which is essential for its survival and growth. The capacity of the bacteria to build a protective cell wall is interfered with by ethambutol, rendering the bacteria more vulnerable to other antibiotics. Pyrazinamide functions by preventing the formation of fatty acids, which are essential for the survival of the bacteria.

Patients with Tuberculosis may also get supportive care, such as symptom management and nutritional support, in addition to medications. Even if their symptoms get better, patients must finish the entire course of antibiotics as directed in order to avoid the development of drug-resistant tuberculosis strains.

**Preventions:**

The key to controlling the spread of Tuberculosis is prevention. It includes a number of strategies, such as immunization, early Tuberculosis case detection and treatment, and infection control measures. In many nations with high Tuberculosis burdens, newborns are given the Bacille Calmette-Guérin (BCG) vaccination, which is a commonly used Tuberculosis vaccine. The BCG vaccine helps lessen the severity of the illness, especially in children, even though it may not completely prevent every case of Tuberculosis.

Early detection of TB cases through active case finding and contact tracing is crucial in preventing the spread of TB. In order to stop the spread of TB, it is essential to identify cases of Tuberculosis as soon as possible by aggressive case finding and contact tracing. The danger of spreading to others can be reduced and the growth of TB from a latent infection to an active disease may be prevented. The use of personal protective equipment and good ventilation in crowded areas are two infection control strategies that can help stop the spread of tuberculosis in hospitals and other high-risk settings.