

## Lecture 1: Nature of HIV/AIDS

### What is HIV?

- HIV stands for human immunodeficiency virus.
- HIV is a virus that attacks the immune system, which is our body's natural defence against illness. The virus destroys a type of white blood cell in the immune system called a T-helper cell, and makes copies of itself inside these cells. T-helper cells are also referred to as CD4 cells.
- As HIV destroys more CD4 cells and makes more copies of itself, it gradually breaks down a person's immune system. This means someone living with HIV, who is not receiving treatment, will find it harder and harder to fight off infections and diseases.
- If HIV is left untreated, it may take up to 10 or 15 years for the immune system to be so severely damaged it can no longer defend itself at all. However, the speed HIV progresses will vary depending on age, health and background.

### What is AIDS?

- AIDS is not a virus but a set of symptoms (or syndrome) caused by the HIV virus. A person is said to have AIDS when their immune system is too weak to fight off infection, and they develop certain defining symptoms and illnesses. This is the last stage of HIV, when the infection is very advanced, and if left untreated will lead to death.

### Myths about HIV/AIDS

- Due to the mystery about HIV/AIDS, communities in different parts of the World have come up with different myths about HIV/AIDS and used different names to describe the scourge
- **Activity**
  - ✓ In groups of FIVE, discuss the myths that explain the causes of HIV/AIDS and the different names used to refer to it.

### Basic facts about AIDS

- AIDS stands for acquired immune deficiency syndrome.
- AIDS is also referred to as advanced HIV infection or late-stage HIV.

- AIDS is a set of symptoms and illnesses that develop as a result of advanced HIV infection which has destroyed the immune system.
- Treatment for HIV means that more people are staying well, with fewer people developing AIDS.

### **How is HIV Transmitted**

- You can get or transmit HIV only through specific activities that cause contacts between certain body fluids
- Most commonly, people get or transmit HIV through sexual behaviors and needle or syringe use.
- Only certain body fluids—blood, semen, pre-seminal fluid, rectal fluids, vaginal fluids, and breast milk—from a person who has HIV can transmit HIV.
- These fluids must come in contact with a mucous membrane or damaged tissue or be directly injected into the bloodstream (from a needle or syringe) for transmission to occur.
- Mucous membranes are found inside the rectum, vagina, penis, and mouth.

### **How HIV is not transmitted**

- HIV from kissing or shaking hands
- Coughs, sneezes or other bodily fluids
- Toilet seats or sharing cups and plates
- Animals or insects bites
- Giving or receiving blood
- NB: You Cannot 'catch' AIDS

### **The Immune System and HIV**

- The HIV virus attacks a type of white blood cell called T-helper cells (also called CD4 cells).
- These cells are important when it comes to having a healthy immune system as they help us fight off diseases and infections.
- HIV cannot grow or reproduce on its own. Instead, it makes new copies of itself inside T-helper cells. This damages the immune system and gradually weakens our natural defense.
- This process of infected T-helper cells multiplying is called the HIV life cycle.
- How quickly the virus develops depends on your overall health, how early you are diagnosed and started on treatment, and how consistently you take your treatment.

- It's important to know that antiretroviral treatment will keep the immune system healthy if taken correctly, preventing the symptoms and illnesses associated with AIDS developing.

### **The HIV life cycle**

- There are several steps in the life cycle of HIV that can happen over many years. Antiretroviral treatment works by interrupting the cycle and protecting your immune system.
- There are different drugs offered depending on the particular stage of the HIV life cycle.
- Understanding the HIV life cycle helps scientists to know how to attack the virus when it is weak and reduce its ability to multiply.
- Drug resistance means a person's HIV treatment no longer prevents the virus from multiplying.
- This usually happens if treatment has not been taken correctly, allowing the virus to mutate.

### **Stages of the HIV life cycle**

#### **1. Binding and fusion**

- First, the HIV virus attaches itself to a T-helper cell and releases HIV into the cell.

#### **2. Conversion and integration**

- Once inside the cell, HIV changes its genetic material so it can enter the nucleus of the cell and take control of it.

#### **3. Replication**

- The cell then produces more HIV proteins that can be used to produce more HIV.

#### **4. Assembly, budding and maturation**

- New HIV particles are then released from the T-helper cell into the bloodstream. These are now ready to infect other cells and begin the process all over again.

### **Symptoms of HIV**

- The symptoms of HIV can differ from person-to-person and some people may not get any symptoms at all for many years. Without treatment, the virus will get worse over time and damage your immune system. There are three broad stages of HIV infection, with different possible effects.

#### **Stage 1: Acute primary infection**

- Around one to four weeks after becoming infected with HIV, some people will experience symptoms that can feel a lot like flu. This may not last long (a week or two) and you may only get some of the flu symptoms – or none at all. Experiencing these symptoms alone is not a reliable way of diagnosing HIV.
- You should always visit your doctor if you are worried you have been at risk of HIV infection, even if you don't feel unwell or have any of the following symptoms. They can then arrange for you to have an HIV test.
- Symptoms can include:
  - ✓ Fever (raised temperature)
  - ✓ Body rash
  - ✓ Sore throat
  - ✓ Swollen glands
  - ✓ Headache
  - ✓ Upset stomach
  - ✓ Joint aches and pains
  - ✓ Muscle pain.
- These symptoms can happen because your body is reacting to the HIV virus. Cells that are infected with HIV are circulating throughout your blood system. Your immune system, in response, tries to attack the virus by producing HIV antibodies. This process is called Seroconversion. Timing varies but it can take up to a few months to complete.
- It may be too early to get an accurate HIV test result at this stage (depending on the type of HIV test, it can take anything from a few weeks to a few months for HIV to show up), but the levels of virus in your blood system are very high at this stage.

### **Stage 2: The asymptomatic stage**

- Once the seroconversion stage is over, many people start to feel better. In fact, the HIV virus may not reveal any other symptoms for up to 10 or even 15 years (depending on age, background and overall health).
- However, the virus will still be active, infecting new cells and making copies of itself.
- Over time this will cause a lot of damage to your immune system.

### **Stage 3: Symptomatic HIV infection**

- By the third stage of HIV infection there has been a lot of damage to your immune system. At this point, you are more likely to get serious infections or bacterial and fungal diseases that you would otherwise be able to fight off. These infections are referred to as 'opportunistic infections'.

- Symptoms that you may have during this time can include:
  - ✓ Weight loss
  - ✓ Chronic diarrhoea
  - ✓ Night sweats
  - ✓ A fever
  - ✓ A persistent cough
  - ✓ Mouth and skin problems
  - ✓ Regular infections
  - ✓ Serious illnesses or diseases.

### **HIV Incubation Period**

- The period from infection to the primary seroconversion illness (Acute primary infection) is usually 1 to 4 weeks.
- The period from infection to development of anti-HIV antibodies is usually less than 1 month but may be up to 3 months

### **The Window Period**

- The window period is time between potential exposure to HIV infection and the point when the test will give an accurate result.
- During the window period a person can be infected with HIV and be very infectious but still test HIV negative.
- The interval from HIV infection to the diagnosis of AIDS ranges from about 9 months to 20 years or longer, with a median of 12 years.