



- HIV virus infects CD4+ helper T-cells resulting in suppression of cell-mediated immunity. When CD4 count falls below 200 cells/mm<sup>3</sup>, there is increased risk for opportunistic infections and tumors.

How is it transmitted?

- By **sexual contact** (not protected by using condoms).
- **Vertical transmission** (from the mother to her child): this can be reduced by treating the mother during pregnancy with antiretroviral drugs to reduce the viral load and thus the risk of transmitting the HIV to her baby.
- **Blood transfusion**: this is rare nowadays since blood is checked for antibodies against the virus before being transfused to other patients.
- **Needles**: for example in IV drug abusers or health workers in hospitals.  
**Note**: HIV virus is present in all fluids of the body but it is not transmitted through saliva, tears, sweat, sneezing... etc because these fluids contain very low amounts of the virus which is not enough to cause infection. HIV is not transmitted through kissing except if both partners have bleeding ulcers or lesions in their mouth.

- The normal CD4 count in humans is between 800-1500. If CD4 is ≤ 500, the patient is considered immunosuppressed and is at increased risk of minor forms of opportunistic infections. If CD4 is ≤ 200, this is AIDS and the patient is exposed to opportunistic infections which can be lethal.

Progression of HIV to AIDS:

- Some cases progress within months while others are infected with HIV but remain asymptomatic for life and never progress to AIDS (these cases are known as elite controllers).
- When a person is exposed to HIV virus → it will be taken by dendritic cells → and within 10 days → all other organs of the body will be infected with the virus.
- HIV virus has a long incubation period, so if a person is infected with the virus he may remain asymptomatic for years. After an average of 10 years, the CD4 count will fall below the threshold of 200 cells/mm<sup>3</sup> and the viral load will reach its peak (more than 10,000 copies). Therefore, the patient will progress to AIDS.
- Globally, there are 35 million people who are HIV-positive (15,000 new cases/day). In the middle east, 1 million people are reported to be infected but the actual numbers may be higher because many cases might not be reported (poor health system in these countries).

Presentation of primary HIV infection:

- On the first exposure to the virus, the patient will develop flu-like illness within 2-4 weeks. This manifests as: fever, myalgia, lymphadenopathy, rash and ulcers. These symptoms will resolve within 1-2 weeks after seroconversion occurs (production of antibodies against the virus). Then, the patient will enter an asymptomatic period which can last for months to years.

Most of HIV cases are found in sub-saharan Africa (2/3 of cases).

Comparison between HIV-I and HIV-II:

HIV-I	HIV-II
Present worldwide – more common – more severe and progressing rapidly	Milder and slower progression – initially was found only in west Africa but nowadays it is found everywhere – only 40% identical in viral proteins to HIV-I

- Diagnosis of HIV is made by: ELISA → and confirmed by doing western blot (the test is repeated 3 times to avoid false-positive results).

Cases and their prognosis:

- **Case-I**: a patient infected with HIV virus, his CD4 count is 500 cells/mm<sup>3</sup> and the viral load present in the plasma is 10,000 copies.
- **Case-II**: a patient infected with HIV virus, his CD4 count is 5 cells/mm<sup>3</sup> and the viral load present in the plasma is 200,000 copies.  
 When antiretroviral therapy is given to the first case, there will be a good outcome and prognosis since the patient is still not fully immunosuppressed but this treatment will not be as good as case-I when it is given to the patient in case-II (because he is already presented with AIDS).

Baseline laboratory tests following the confirmation of an HIV diagnosis:

- CBC (Complete Blood Count).
- LFT (Liver Function Test), lipids and amylase.
- Chest x-ray.



- Toxoplasmosis.
- PPD skin test (for Tb).
- PAP smears (which are done more frequent than for a normal female).
- HBV (Hepatitis B Virus) and HCV (Hepatitis C Virus).
- CMV (Cytomegalovirus) serology.
- HSV (Herpes Simplex Virus).

- **WHO clinical staging system:**

<b>STAGE-1</b>	<ul style="list-style-type: none"><li>• Asymptomatic infection.</li><li>• Persistent generalized lymphadenopathy.</li><li>• Acute retroviral infection.</li></ul>
<b>STAGE-2</b>	<ul style="list-style-type: none"><li>• Unintentional weight loss.</li><li>• Minor mucocutaneous manifestations.</li><li>• Herpes zoster, within previous 5 years.</li><li>• Recurrent upper respiratory tract infections.</li></ul>
<b>STAGE-3</b>	<ul style="list-style-type: none"><li>• Unintentional weight loss.</li><li>• Chronic diarrhea.</li><li>• Prolonged fever.</li><li>• Oral candidiasis.</li><li>• Oral hairy leukoplakia.</li><li>• Pulmonary tuberculosis.</li><li>• Severe bacterial infections.</li><li>• Vulvovaginal candidiasis.</li></ul>
<b>STAGE-4</b>	<ul style="list-style-type: none"><li>• Opportunistic infections (mentioned previously in microbiology notes) such as:<ul style="list-style-type: none"><li>✓ PCP.</li><li>✓ Toxoplasmosis.</li><li>✓ Cryptosporidiosis.</li><li>✓ CMV diseases.</li><li>✓ PML.</li><li>✓ MAC.</li><li>✓ Kaposi sarcoma</li></ul></li></ul>

- **Conditions of the respiratory system:**

- PCP → when CD4 count is less than 200 cells/mm<sup>3</sup>.
- Tuberculosis → occurs with any CD4 count.
- Mycobacterium avium complex (MAC) → when CD4 count is less than 100 or 50 cells/mm<sup>3</sup>.
- Cytomegalovirus (CMV) → when CD4 count is less than 100 or 50 cells/mm<sup>3</sup>.

- **Conditions of the neurological system:**

- Refer to pathology notes for more details.
- For patients with toxoplasmosis → before doing lumbar puncture (LP) you have to check their intracranial pressure (because usually it is very high and raised when the patient is infected with toxoplasma) → therefore, if the intracranial pressure is high → you must not perform LP because the patient will collapse and die.

- **Conditions of the gastrointestinal tract:**

- Refer to pathology notes for more details.
- If you suspect that the patient is infected with cryptosporidium parvum → you have to request that in the lab test (because special stain is used to detect it: acid-fast staining in direct film microscopy).

- **In follow-up visits:**

- You have to check patient's compliance with therapy, if there any side effects or toxicity, and you to check the CD4 count and viral load.

- **Treatment (refer to pharmacology notes for more details):**

- HIV Patients are treated with antiretroviral therapy:
  - ✓ Backbone: 2 drugs belonging to NRTIs.
  - ✓ Base: 1 drug belonging to other classes such as NNRTIs or PIs.