Module 0: Basics of HIV
Learning Objectives

By the end of this unit, participants will be able to:

• Define HIV and AIDS
• Describe how the immune system works
• Describe how HIV is and is NOT transmitted
• Explain how HIV is diagnosed in both adults and children
• Describe treatment for HIV/AIDS
• Identify 3 key groups who are eligible for ART
What is HIV? What is AIDS?

• **HIV**: Human Immuno Deficiency Virus
  – Virus that affects the immune system
  – Over time, causes damage to the immune system

• **AIDS**: Acquired Immune Deficiency Syndrome
  – Advanced stage of HIV disease
  – A person is diagnosed with AIDS when he/she has a combination of certain illnesses that result from a weakened immune system
The Relationship between HIV & AIDS

- HIV is the virus that causes AIDS
- A person who has HIV may not appear sick
- Over time, this person will become more ill
- Those conditions may lead to an AIDS diagnosis
What is the Immune System?
Immune Response

• CD4 cells
  – Direct other cells in the immune system

• Antibodies
  – Proteins (immunoglobulins) produced in the body in response to the presence of a foreign substance

• Antigens
  – Foreign substances that elicit the body to produce antibodies
Stages of HIV Infection

Four Stages of HIV Disease Progression

- **Acute Stage**
  - Weeks

- **Asymptomatic Stage**
  - Years →

- **PGL Stage**
  - Years →

- **AIDS**

Opportunistic Infections
- A pregnant woman with HIV can pass it to her baby
- For infants and children with HIV, the disease progresses more rapidly to AIDS

**EARLY DIAGNOSIS AND TREATMENT ARE CRITICAL**
Children are Vulnerable—Mortality

If 10 HIV+ infants are born today, and none get care...

After 1 year, 34% will have died
After 2 years, 50% will have died
After 3 years, 75% will have died
Important Points

• Many people with HIV look and feel healthy
• There is no cure for HIV
• Over time, HIV causes damage to the immune system, leading to frequent illness
• Even if they feel and appear healthy, infected people can transmit HIV to others
• After some time, a person may develop AIDS
HIV Transmission
HIV Transmission

- Which bodily fluids transmit HIV?
- What are the modes of transmission?
Exposure vs. Infection

• What is the difference between exposure and infection?

• Not every exposure leads to transmission
  – *Not every act of sex* with an infected person results in transmission
  – *Not every baby born* from an HIV+ mother will become infected with HIV
  – *Not every HCW who gets a needle stick* from an HIV+ patient will become infected with HIV
Factors That Affect Transmission:
Sexual Exposure

Consider factors that affect transmission at points A, B and C

A
- Viral load of person with HIV
- Other STIs

B
- Frequency of sex
- Exposure to infectious fluids

C
- Overall health and immune strength
- Any STIs
Factors that Affect Transmission: MTCT

• Health of the mother during pregnancy
  – Infections (eg. STIs, malaria) can weaken the immune system and allow the viral load to increase.
  – When the mother’s viral load is high, risk of transmission is greatest

• When the mother becomes infected
  – HIV transmission is more likely if the mother becomes infected while pregnant
Testing for HIV
Antibody Tests

- HIV tests used for adults detect HIV antibodies in the blood
- There are times after becoming infected when antibody levels are too low to be detected by the test
Antibody Tests and Disease Progression

Four Stages of HIV Disease Progression

- Acute Stage (weeks)
- Asymptomatic Stage (years)
- PGL Stage
- AIDS
Antibody Tests and the Window Period

• A person who is infected with HIV during this time will test negative

• The window period is usually 4-6 weeks (>95%)
  – For a minority (< 5%) it may extend between 6-12 weeks
  – Rare for it to be more than 12 weeks

• The virus can be passed to others during this time
Virological Tests for Infants

• HIV *antibody* tests cannot be used to diagnose infants under 12 months
  – Infants are born with their mother’s antibodies
  – At 9 months, the infant begins to shed the mother’s antibodies

  – For infants under 12 months, a test that detects parts of the virus must be used (DNA PCR)
Overview of HIV Treatment
Can Disease Progression Be Delayed?

Disease progression can be delayed by:

• Preventing Opportunistic Infections (OIs)
• Treating OIs early
• Starting Anti-retroviral Therapy (ART)
Eligibility to Start ART (1)

- Any person with signs that the body’s defense system has been damaged
  - Specific diseases classified as WHO Stage III or IV (adults and children)
  - CD4 count below 500 (adults)
  - Infants with presumed severe HIV disease
Eligibility to Start ART (2)

• Some groups are universally eligible
  – Pregnant women
  – Breastfeeding women
  – Children under 5 years
What is Option B+?

• For HIV+ pregnant/breastfeeding women
  – Lifelong ART
  – Infants take 6 weeks NVP after birth
• Option B+ facilitates:
  – Increased access to ART
  – Prevention of maternal deaths after delivery
  – Reduction of HIV transmission to both the infant and to sexual partner(s)
Option B+ Leads to Safer Breastfeeding

• Makes breast feeding (BF) safe for HIV infected women
• BF recommendations are now identical for HIV infected and non-infected women
  – Breastfeeding is recommended until age 2
  – Add suitable food from age 6 months
Impact of Option B+

Comparing HIV transmission rates among exposed infants with and without ARVs for the mother

No ARVs

- Not infected: 54%
- Infected at birth: 22%
- From breast milk: 24%

ART (Option B+)

- Not infected: 93%
- Infected at birth: 2%
- From breast milk: 5%
Quick Review

• Who is eligible to start ART?
  – Adults, children w/signs of weak immune system
  – All HIV+ infants and children under 5 years
  – All HIV+ pregnant and breastfeeding women

• After testing positive, who should be referred to the ART clinic for assessment?

  **EVERYONE!**

*Every HIV+ person: child, adult, healthy or unhealthy*
After Testing Positive, Every Client is Assessed for ART

• If eligible to start ART, clinician will usually initiate treatment at the same visit
  – Assessment
  – Patient education session
  – Prescribe ARVs

• If not yet eligible, patient will be enrolled in HIV Care Clinic. Follow up continues for:
  – Exposed children until age 24 months
  – Pre-ART children and adults – until they start ART
CD4 Count

• Measures the strength of the immune system
• Low CD4 count suggests that the disease has progressed
• Helps determine the right time to start treatment
All HIV+ Patients are Monitored

- Patients on ART and those enrolled in HCC need regular monitoring
- Disease progression is monitored using 1 test: Viral load

Photo courtesy of Amy Gottlieb
Viral Load

• Measures level of virus in the body
• Helps determine if treatment is working
• Viral load tests are not common in Malawi, but availability is increasing
Post-Exposure Prophylaxis

• Under certain circumstances, ARVs can also be used to prevent HIV transmission
• After a high risk contact with body fluids from an HIV infected person, ARVs started within 72 hours of exposure
  – Reduces the risk of infection by 80%
  – Starting more than 72 hours after exposure is not effective and should be avoided
PEP—Who is Eligible?

- Any exposure classified as risk in the past 72 hours

Eligible clients should NEVER be refused access to PEP
Cotrimoxazole Prophylaxis

• An antibiotic used to prevent opportunistic infections in HIV infected individuals
• All patients eligible for ART are also eligible for CPT
• Also offered to DNA-PCR negative children born from HIV infected mothers who continue to breast feed.

46% reduction in mortality when CPT is given to HIV infected patients
Key Points (1)

• HIV is the virus that causes AIDS
• HIV affects immune system and body’s ability to fight off infections
• HIV is transmitted through 4 bodily fluids:
  – semen
  – vaginal secretions
  – breast milk
  – blood
• Adults are tested for HIV using an HIV antibody test
• HIV antibody tests cannot be used to diagnose infants under 12 months, use DNA PCR test instead
Antiretroviral treatment (ART) is used to treat HIV by delaying disease progression and strengthening the immune system.

3 groups are eligible for ART:
- Adults, children w/signs of a weak immune system
- All HIV+ infants and children under 5 years
- All HIV+ pregnant and breastfeeding women