HIV-1/2 Diagnosis:

Diagnosis of HIV-1/2 Infection in Individuals >18 Months Old

(Compiled by: Dr. Allison Glass - Aug 2012)

HIV-1/2 is diagnosed either by detecting HIV-specific antibodies or the virus itself. In individuals >18 months old the detection of HIV-specific antibodies remains the recommended method for routine diagnosis.

Antibody Detection

- 4th generation HIV-1/2 ELISA
  Detects HIV-specific antibodies and p24 antigen (a component of the virus) simultaneously.
  Window period: ± 18 days
- 3rd generation HIV-1/2 ELISA
  Detects HIV-specific antibodies.
  Window period: ± 24 days
- Rapid HIV-1/2
  Detects HIV-specific antibodies.
  There are many different rapid tests available. Only those with high sensitivity and specificity, and FDA/CE marking should be used.
  Window period: ± 24-28 days

According to WHO guidelines, all positive HIV results should be confirmed with:
- A second test on the same specimen.
- Repeat testing on a second specimen.
  Although the ELISA has a sensitivity of close to 100% and specificity of ± 99.6%, the serious nature of HIV warrants confirmatory testing.

p24 Antigen Detection

The p24 antigen is detectable from approximately 2 weeks after infection. During the seroconversion phase it is detected in the majority of patients. However, when high levels of HIV-specific antibodies develop, the p24 antigen usually becomes undetectable. A negative p24 result does not exclude HIV infection. Specific p24 antigen testing may be used to detect an acute infection, but should not be used for routine diagnosis.

HIV-1 DNA PCR

The HIV-1 DNA PCR detects the HIV genome that has integrated into the CD4+ cells. It provides a qualitative result (positive/negative). The HIV-1 DNA is detectable from approximately 2 weeks after infection. It is more expensive than the HIV - 1/2 ELISA and only detects HIV-1, but it can be used to detect acute infection or to resolve discrepant ELISA results.

HIV-1 Viral Load

The HIV-1 viral load quantifies the amount of viral RNA in plasma. It should not be used routinely for diagnosis of HIV infection for the following reasons:

- The HIV-1 viral load only detects HIV-1.
- An undetectable HIV-1 viral load does not mean that the patient is HIV negative.
- Due to the nature of the test, a low level viral load is not considered to be diagnostic of HIV infection.

Viral RNA can be detected in the plasma as early as 11 days after infection. In cases where acute seroconversion is suspected, an HIV-1 viral load of >10 000 copies/ml is considered diagnostic of HIV infection.

Recommended testing algorithm:

1. HIV Screening ELISA/rapid test
2. Confirmatory ELISA / rapid test
3. Further testing recommended:
   - p24 antigen detection
   - HIV-1 DNA PCR
   - HIV-1 Load if acute seroconversion is suspected

Note: The HIV-1/2 ELISA and rapid tests detect HIV-1 and HIV-2. The HIV-1 DNA PCR and the HIV-1 viral load only detect HIV-1. If infection with HIV-2 is suspected, an HIV-2 PCR can be done.
Maternal HIV-specific antibodies may be detectable in the infant up to the age of 18 months. For this reason, the diagnosis of HIV infection in infants depends on detection of the virus. HIV-1 DNA PCR is test of choice.

Testing at 6 weeks of age will detect ante- and intra-partum infection in 98% of infants. If the 6 week test is negative, repeat testing is recommended at 3 months. If the baby is breastfed and tests negative, testing should be repeated 2-6 weeks after breastfeeding is stopped.

Note: the HIV-1 DNA PCR only detects HIV-1. If infection with HIV-2 is suspected, an HIV-2 PCR or Western blot can be done.

References:


If the baby is exposed to antiretrovirals as part of prevention of mother-to-child transmission (PMTCT), the HIV-1 DNA PCR should be done >2 weeks after discontinuing the antiretrovirals. An HIV-1 viral load can be used to confirm a positive HIV-1 DNA PCR and provide a baseline viral load simultaneously. An HIV-1 viral load >10 000 copies/ml will confirm the diagnosis.