
Lab Dept: Microbiology/Virology

Test Name: HIV-1 RNA PCR, QUANTITATIVE

General Information

Lab Order Codes: HIVP

Synonyms: HIV Monitor Test, RT-PCR; HIV-1 PCR; HIV-1 Quantitation, PCR; HIV-1 RNA, Viral Load; Human Immunodeficiency Virus, PCR; PCR, HIV-1 Quantitation; Quantitation, HIV Monitor Test RT-PCR; Viral Load, HIV-1 RNA; HIV-1 Quantitation Ultra Sensitive

CPT Codes: 87536 – HIV-1, quantification

Test Includes: Detection of HIV-1 RNA either as undetected or reported in copies/mL.

Logistics

Test Indications: Diagnosis of HIV-1 infection in individuals with acute or early HIV-1 infection. Diagnosis of HIV-1 infection in infants of <18 months of age born to HIV-1 infected mothers.

Quantifying HIV-1 RNA levels (viral load) in HIV-1 infected individuals:

- Before initiating anti-HIV-1 drug therapy (baseline viral load)
- Who may have developed HIV-1 drug resistance while on anti-HIV-1 therapy
- Who may be non-compliant with anti-HIV-1 drug therapy

Monitoring HIV-1 disease progression while on or off antiretroviral drug therapy.

Lab Testing Sections: Microbiology/Virology - Sendouts

Referred to: Mayo Medical Laboratories (MML Test: 81958/HIVDQ)

Phone Numbers: MIN Lab: 612-813-6280

STP Lab: 651-220-6550

Test Availability: Daily, 24 hours

Turnaround Time: 1 – 3 days, test set up Monday - Saturday

Special Instructions: Specimen must be centrifuged and plasma removed within 6 hours of collection.

Specimen

Specimen Type:	Blood
Container:	Lavender top (EDTA) tube
Draw Volume:	7.5 mL (Minimum: 3.6 mL) blood
Processed Volume:	2.5 mL (Minimum: 1.2 mL) plasma
Collection:	Routine venipuncture
Special Processing:	Lab Staff: Processing must occur within 6 hours of collection. Aseptically centrifuge the specimen, remove plasma aliquot and place in a screw-capped plastic vial. Freeze immediately. Store and ship at frozen temperatures. Avoid specimen to specimen contamination, freeze-thaw cycles, prolonged ambient exposure. Forward promptly.
Patient Preparation:	None
Sample Rejection:	Avoid freeze/thaw cycles; prolonged ambient temperature exposure; obvious microbial contamination; specimen to specimen contamination; incorrect anticoagulant, mislabeled or unlabeled specimens; specimens other than EDTA

Interpretive

Reference Range: Undetected

If detected, results are reported in copies/mL.

Interpretation: This assay has a plasma HIV-1 RNA quantification result range from 20 copies/mL to 10,000,000 copies/mL.

An “undetected” result indicates that the assay was unable to detect HIV-1 RNA with the plasma specimen.

A “detected” result with the comment, “HIV-1 RNA detected, but <20 HIV-1 copies/mL”, indicates that HIV-1 RNA is detected, but the level present is less than the lower quantification limit of the assay. Possible causes of such a result include very low plasma HIV-1 viral load present (eg, in the range of 1-19 copies/mL), very early HIV-1 infection (ie, <3 weeks from time of infection), or absence of HIV-1 infection (ie, imprecision of the assay).

A “detected” result with the comment, “Greater than 10,000,000 HIV-1 RNA copies/mL”, indicates that HIV-1 RNA is detected, but the level present is above the upper quantification limit of this assay.

For the purpose of monitoring patient’s response to antiretroviral therapy, the United States Department of Health and Human Services Panel on Antiretroviral Guidelines for Adults and Adolescents defines virologic failure as a confirmed viral load of >200 copies/mL, which eliminates most cases of viremia resulting from isolated blips or assay variability. Confirmed viral load rebound (ie, >200 copies/mL on 2 separate tests obtained at least 2-4 weeks apart) should prompt a careful evaluation of patient’s tolerance of current drug therapy, drug-drug interactions, and patient adherence.

Critical Values: N/A

Limitations: This test is not licensed by the Food and Drug Administration (FDA) as a screening test for HIV-1 infections in donors of blood, human cells, tissues or tissue products. Although this quantitative HIV-1 RNA test is not FDA approved for diagnostic purposes, the US Working Group on Antiretroviral Therapy and Medical Management of molecular-based assays to detect HIV-1 RNA or proviral DNA for the diagnosis of HIV infection in infants and <18 month of age and born to HIV-infected mothers.

A single HIV-1 viral load test result should not be used as the sole criterion in guiding therapeutic decisions and intervention in the clinical care of HIV-1-infected patients. Viral load results should be correlated with patient symptoms, clinical presentation, and CD4 cell count. Due to the inherent variability in the assay, physiologic variation and concurrent illnesses in the infected patients, <100-fold (<2 log) change in plasma HIV-1 viral load should not be considered as significant change.

Viral load results of <20 copies/mL do not necessarily indicate absence of HIV-1 viral replication. Inhibitory substances may be present in the plasma specimen, leading to negative or falsely low HIV-1 RNA results. Improper specimen collection or storage may falsely lower the plasma viral load results.

Although this commercial viral load assay is optimized for quantification of plasma viral load in HIV-1 infection due to HIV-1 group M, subtypes A to H and O strains, results generated from HIV-1 group O strains may be discordant ($>$ or $=$ 0.5 log copies/mL) with those obtained from other commercially available HIV-1 viral load assays. The assay is not reliable for quantifying plasma viral loads in infection caused by HIV-1 group N strains or HIV-2 strains.

ACD plasma specimens are not optimal for HIV-1 viral load testing because such plasma specimens show HIV-1 RNA levels that are approximately 15% lower than those collected in tubes containing EDTA.

Methodology:

Reverse Transcription-Polymerase Chain Reaction (RT-PCR)

PCR is utilized pursuant to a license agreement with Roche Molecular Systems, Inc.

References:

[Mayo Medical Laboratory](#) June 2015

Updates:

4/21/2004: Test moved from Fairview University Diagnostic Laboratories forward to ARUP to Mayo Medical Laboratories.

8/10/2004: Ultra Sensitive was added to the test name.

8/19/2008: Ultra Sensitive removed from test name as per Mayo.

7/14/2009: Minimum volume of 1.2 mL plasma removed due to short sampling/QNS specimens. Instrument change at Mayo (COBAS AmpliPrep/COBAS TaqMan HIV-1)

5/4/2010: Minimum volume of 1.2 mL plasma reinstated.

1/3/2011: Minimum volume removed due to test cancellations.

6/26/2015: Updated PCR method at MML.