MAYO CLINIC LABORATORIES

Test Definition: HCVQG

Hepatitis C Virus (HCV) RNA Quantification with Reflex to HCV Genotype, Serum

Overview

Useful For

Detection of acute hepatitis C virus (HCV) infection before the appearance of HCV antibodies in serum (ie, <2 months from exposure)

Detection and confirmation of chronic HCV infection and determining HCV genotype (1 to 5) to guide antiviral therapy in patients with chronic hepatitis C

Quantification of HCV RNA in serum of patients with chronic HCV infection (HCV antibody-positive) before initiating antiviral therapy

Determining cure and detection of relapse of HCV infection after completion of antiviral therapy

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
HCVG	HCV Genotype, S	Yes	No
HCVGR	HCV Genotype Resolution, S	No	No

Testing Algorithm

Specimens with hepatitis C virus (HCV) RNA levels greater than or equal to 500 IU/mL will be tested for HCV genotype at an additional charge.

Specimens either generating indeterminate genotype results or results with multiple or mixed HCV genotypes (eg, 1, 5; 1a, 2; or 3, 5) containing genotype 1 but no subtype will be automatically evaluated with by genotype resolution at an additional charge.

For more information see:
-Chronic Hepatitis C Treatment and Monitoring Algorithm: Direct Antiviral Antigen (DAA) Combination
-Hepatitis C: Testing Algorithm for Screening and Diagnosis

Special Instructions

- Hepatitis C: Testing Algorithm for Screening and Diagnosis
- Chronic Hepatitis C Treatment and Monitoring Algorithm: Direct Antiviral Agent (DAA) Combination

Highlights

A reflex test for serum specimens that are hepatitis C Virus (HCV) antibody screen-reactive for diagnosis of chronic hepatitis C.

This test is appropriate for diagnosis of acute hepatitis C in high-risk or immunosuppressed individuals who may be

negative for HCV antibodies.

This test can be used to establish a baseline HCV viral load and viral genotype before initiating antiviral therapy for chronic hepatitis C.

This test is appropriate for confirming a sustained virologic response and detecting a relapse of hepatitis C after completion of antiviral therapy.

Method Name
HCVQG: Real-Time Reverse Transcription-Polymerase Chain Reaction (RT-PCR)
HCVG, HCVGR: RT-PCR followed by Hybridization with Sequence-Specific, Fluorescent-Labeled Oligonucleotide Probes

NY State Available
No

Specimen

Specimen Type
Serum SST

Ordering Guidance
For detection and quantification of hepatitis C (HCV) RNA and genotype in serum before initiating antiviral therapy for chronic hepatitis C.

Do **not** order this test to monitor response and progress during antiviral therapy for chronic hepatitis C.

Shipping Instructions
1. Freeze serum immediately, and ship specimen frozen on dry ice only.
2. If shipment will be delayed for more than 24 hours, freeze serum at -20 to -80 degrees C (up to 42 days) until shipment on dry ice.

Specimen Required
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 3.5 mL
Collection Instructions: Centrifuge and aliquot serum into plastic vial within 2 hours of collection.

Forms
If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Microbiology Test Request (T244)
-Gastroenterology and Hepatology Test Request (T728)

Specimen Minimum Volume

1.6 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum SST	Frozen (preferred)	42 days	
	Refrigerated	72 hours	

Clinical & Interpretive

Clinical Information

About 75% of all individuals infected with hepatitis C virus (HCV) will develop chronic hepatitis C with ongoing viral replication in the liver and detectable HCV RNA in serum or plasma, eventually resulting in cirrhosis. The remaining 25% of the infected individuals recover from the infection without evidence of viral replication or the presence of detectable HCV RNA in serum or plasma. Chronic HCV infection can be cured at variable success rates with either combined interferon-alpha and ribavirin therapy or interferon-free combination of direct-acting antiviral (DAA) agents.

The antiviral response rates correlate with pretreatment serum or plasma HCV RNA levels (viral load) and the HCV genotype found in the infected individuals. The optimal duration of combined interferon and ribavirin therapy can be determined from the patient's pretreatment viral load and HCV genotype. Clinical trial studies indicated that a decrease in HCV RNA levels of more than 2 log IU/mL at 4 weeks or 12 weeks of therapy is predictive of an increased chance of achieving a sustained virologic response (defined as undetectable HCV RNA levels in serum 6 months after completing antiviral therapy). Despite receiving longer duration of antiviral therapy (48 weeks versus 24 weeks), patients with chronic infection due to HCV genotypes 1 and 4 generally have less favorable sustained virologic response rates (40%-50%) than those infected with genotypes 2 and 3 (>80%). Due to the necessary prolonged duration (typically 24- to 48-week duration) and low cure rates of such antiviral therapy, interferon-based therapy has been supplanted with potent interferon-free DAA combination therapy now.

Unique nucleotide sequences of certain regions (eg, 5'-noncoding, core, NS5b) of the HCV genome allow classification of HCV into 6 major genotypes or clades (1-6), based on the most recently proposed HCV genotype nomenclature. In the United States, the most commonly encountered HCV genotypes are 1a and 1b, followed by genotypes 2 and 3. Worldwide geographic distribution, disease outcome, and response to antiviral therapy differ among the genotypes. HCV genotype determination is important for proper selection of antiviral therapy and optimal patient management.

Therapeutic response rates for chronic HCV infection have improved significantly (cure rates of >90%) over the past 5

years when oral DAA agents are used in lieu of interferon-based combination therapy. However, antiviral resistance can emerge during such combination therapy, and occurrence of such resistance is more frequent with HCV subtype 1a than 1b for simeprevir-treated patients.

The American Association for the Study of Liver Diseases and Infectious Disease Society of America recommendations for testing, managing, and treating hepatitis C are available at www.hcvguidelines.org/contents.

Reference Values
Undetected

Interpretation
This assay has a result range of 15 to 100,000,000 IU/mL (1.18 log to 8.00 log IU/mL) for quantification of hepatitis C virus (HCV) RNA in serum. Only those specimens with HCV RNA levels greater than or equal to 500 IU/mL will be tested for HCV genotype (HCVG / Hepatitis C Virus Genotype, Serum or HCVGR / Hepatitis C Virus Genotype Resolution, Serum).

An "Undetected" result indicates that the HCV is absent in the patient's serum specimen. Such specimens will **not** be tested for HCV genotype.

A result of "<15 IU/mL (<1.18 log IU/mL)" indicates that HCV RNA is detected, but the HCV RNA level present cannot be quantified accurately below this lower limit of quantification of this assay. Such specimens will **not** be tested for HCV genotype.

A result of ">100,000,000 IU/mL (>8.00 log IU/mL)" indicates the presence of active HCV viral replication, and the HCV RNA level present cannot be quantified accurately above this upper limit of quantification of this assay.

An "Inconclusive" result reported with a comment indicates that testing failed, likely due to the presence of inhibitory substances in the submitted serum specimen. A new specimen should be collected for retesting. Such specimens will **not** be tested for HCV genotype.

Cautions
Except for immunocompromised patients or patients with suspected acute hepatitis, laboratory evaluation of hepatitis C virus (HCV) infection status should begin with HCV serologic testing, including testing for the presence of HCV antibodies (See Hepatitis C: Testing Algorithm for Screening and Diagnosis). A diagnosis of chronic HCV infection should not be based solely on the presence of detectable or quantifiable HCV RNA in a single serum specimen.

An "Undetected" HCV RNA test result with a "Reactive" HCV antibody screen result may be due to:
1. A false-reactive HCV antibody screen result
2. Resolved or past HCV infection
3. Transient low viremia (ie, episodic viral replication) of active HCV infection.

To distinguish between the first 2 conditions, another HCV antibody test (eg, HCCAD / Hepatitis C Virus Antibody Screen for Cadaveric or Hemolyzed Specimens, Asymptomatic, Serum) can be requested. To distinguish between the latter 2 conditions, patients should be retested for HCV RNA in 1 to 2 months, as clinically indicated.

Clinical Reference

1. de Leuw P, Sarrazin C, Zeuzem S. How to use virological tools for the optimal management of chronic hepatitis C. Liver Int. 2011;31 Suppl 1:3-12
2. Centers for Disease Control and Prevention: Testing for HCV infection: an update of guidance for clinicians and laboratorians. MMWR Morb Mortal Wkly Rep. 2013;62(18):362-365
3. American Association for the Study of Liver Diseases and Infectious Diseases Society of America: HCV guidance: Recommendations for testing, managing, and treating hepatitis C. Accessed May 10, 2024. Available at www.hcvguidelines.org/contents

Performance

Method Description

The cobas hepatitis C virus (HCV) assay is an FDA-approved, in vitro nucleic acid amplification test for the quantification of HCV RNA in human serum using the cobas 6800 System or cobas 8800 System for fully automated viral nucleic acid extraction (generic silica-based capture technique) and automated amplification and detection of the viral nucleic acid sequence. This polymerase chain reaction (PCR) assay amplifies sequences within the highly conserved 5' noncoding region of the HCV genome and generates amplification products that are detected and quantified in real-time with 2 sequence-specific TaqMan probes. A non-HCV armored RNA quantitation standard (RNA QS) is introduced into each specimen during sample preparation to serve as internal control for nucleic acid extraction and PCR amplification/detection processes. Fluorescent reporter dye-labeled TaqMan probes hybridized to the complementary HCV target sequences and RNA QS sequence undergo hydrolysis during PCR amplification step to generate fluorescent signal detected in 2 different dye channels. Concentration of the HCV RNA in a patient's serum sample is determined by a ratio of the intensity of the fluorescent dye from the cleaved HCV target sequence probes and that from the RNA QS target probe detected throughout the PCR process.(Package insert: cobas HCV-Quantitative nucleic acid test for use on the cobas 6800/8800 Systems. Roche Molecular Systems, Inc; Rev. 1.0, 10/2015)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

1 to 8 days

Specimen Retention Time

60 days

Performing Laboratory Location

Mayo Clinic Jacksonville Clinical Lab

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

87522
87902 (if appropriate)
87902 (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
HCVQG	HCV RNA Detect/Quant Reflex Geno, S	11011-4

Result ID	Test Result Name	Result LOINC® Value
603602	HCV RNA Detect/Quant, S	11011-4