

FACT SHEET FOR HEALTHCARE PROVIDERS

Healgen Scientific LLC, COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma)

May 29, 2020

Coronavirus
Disease 2019
(COVID-19)

This Fact Sheet informs you of the significant known and potential risks and benefits of the emergency use of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma).

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is authorized for the detection of IgG and IgM antibodies against SARS-CoV-2 in human serum, plasma (EDTA, lithium heparin, and sodium citrate), or venous whole blood.

All individuals whose specimens are tested with one of these tests will receive the Fact Sheet for Recipients: COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma).

What are the symptoms of COVID-19?

Many individuals with confirmed COVID-19 have developed fever and/or symptoms of acute respiratory illness (e.g., cough, fever, difficulty breathing). The current information available to characterize the spectrum of clinical illness associated with COVID-19 suggests that symptoms include cough, shortness of breath or dyspnea, fever, chills, myalgias, headache, sore throat or new loss of taste or smell. Based on what is known about the virus that causes COVID-19, signs and symptoms may appear any time from 2 to 14 days after exposure to the virus. Based on preliminary data, the median incubation period is approximately 5 days, but may range 2-14 days.

Public health officials have identified cases of COVID-19 infection throughout the world, including the United States, which poses risks to public health. Please check the CDC webpage for the most up-to-date information.

What do I need to know about COVID-19 antibody testing?

Current information on COVID-19 for healthcare providers is available at CDC's webpage, *Information for Healthcare Professionals* (see links provided in "Where can I go for updates and more information" section).

- COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) can be ordered by healthcare providers to test human venous

This test detects human SARS-CoV-2 IgM and IgG that are generated as part of the human adaptive immune response to the COVID-19 virus and is to be performed only using human serum, plasma, or venipuncture whole blood specimens.

whole blood, plasma, or serum to detect if there has been an adaptive immune response to COVID-19, indicating recent or prior infection.

- COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) should not be used to diagnose or exclude acute infection and should not be used as the sole basis for treatment or patient management decisions. Direct testing for SARS-CoV-2 should be performed if acute infection is suspected.
- COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is only authorized for use in laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, to perform moderate or high complexity tests.

Specimens should be collected with appropriate infection control precautions. Current guidance for COVID-19 infection control precautions are available at the CDC's website (see links provided in "Where can I go for updates and more information" section).

Use appropriate personal protective equipment when collecting and handling specimens from individuals suspected of having COVID-19 as outlined in the CDC *Interim Laboratory Biosafety Guidelines for Handling and Processing Specimens Associated with Coronavirus Disease 2019 (COVID-19)*. For additional information, refer to CDC *Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens from Persons Under Investigation (PUIs) for Coronavirus Disease 2019 (COVID-19)* (see links provided in "Where can I go for updates and more information" section).

Report Adverse events, including problems with test performance or results, to MedWatch by submitting the online FDA Form 3500 (<https://www.accessdata.fda.gov/scripts/medwatch/index.cfm?action=reporting.home>) or by calling **1-800-FDA-1088**

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There are no approved available alternative tests. FDA has issued EUAs for other antibody tests that can be found at

<https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#2019-ncov>.

What does it mean if the specimen tests positive for antibodies against the virus that causes COVID-19?

A positive test result with the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) indicates that antibodies to SARS-CoV-2 were detected, and the individual has potentially been exposed to SARS-CoV-2.

Antibodies to SARS-CoV-2 are generally detectable several days following infection. Individuals may have detectable virus present for several weeks following seroconversion. A positive result can indicate recent or past infection but does not exclude recently infected patients who are still contagious. ***It is unknown how long antibodies to SARS-CoV-2 will remain present in the body after infection and if they confer immunity to infection. Incorrect assumptions of immunity may lead to premature discontinuation of physical distancing requirements and increase the risk of infection for individuals, their households and the public.***

False positive results may occur due to cross-reactivity from pre-existing antibodies or other possible causes.

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) has been designed to minimize the likelihood of false positive test results. However, in the event of a false positive result, risks to individuals could include the following: a recommendation for isolation of the individual, monitoring of household or other close contacts for symptoms, isolation that might limit contact with family or friends and may increase contact with other potentially COVID-19 individuals, limits in the ability to work, the delayed diagnosis and treatment for the true infection causing the symptoms, unnecessary prescription of a treatment or therapy, or other unintended adverse effects. ***Due to the risk of false positive results, confirmation of positive results should be considered – using a second,***

different antibody assay that detects the same type of antibodies.

Laboratory test results should always be considered in the context of clinical observations and epidemiological data in making patient management decisions.

All laboratories using this test must follow standard confirmatory testing and reporting guidelines according to their appropriate public health authorities.

What does it mean if the specimen tests negative for antibodies against virus that causes COVID-19?

A negative test result with this test means that SARS-CoV-2 specific antibodies were not present in the specimen above the limit of detection. ***However, patients tested early after infection may not have detectable antibodies despite active infection; in addition, it is not certain that all infected patients will develop a detectable antibody response to SARS-CoV-2 infection. A negative result should not be used to rule out infection. Direct testing of SARS-CoV-2 should be performed if acute infection is suspected.***

The absolute sensitivity of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is unknown.

Risks to an individual resulting from a false negative result include: restriction of activities deemed acceptable for individuals with evidence of an antibody response to SARS-CoV-2, lack of monitoring of infected individuals and their household or other close contacts for symptoms resulting in increased risk of spread of COVID-19 within the community, or other unintended adverse events.

What is an EUA?

The United States (U.S.) FDA has made this test available under an emergency access mechanism called an Emergency Use Authorization (EUA). The EUA is supported by the Secretary of Health and Human Service's (HHS's) declaration that circumstances exist to justify the emergency use of *in vitro* diagnostics (IVDs) for the detection and/or diagnosis of the virus that causes COVID-19.

An IVD made available under an EUA has not undergone the same type of review as an FDA-approved or cleared IVD. FDA may issue an EUA when certain criteria are met, which includes that there are no adequate,

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approved, available alternatives, and based on the totality of scientific evidence available, it is reasonable to believe that this IVD may be effective.

The EUA for the test you received is in effect for the duration of the COVID-19 declaration justifying emergency use of IVDs, unless terminated or revoked (after which the test may no longer be used).

Where can I go for updates and more information?

CDC webpages:

General: <https://www.cdc.gov/COVID19>

Healthcare Professionals:

<https://www.cdc.gov/coronavirus/2019-nCoV/guidance-hcp.html>

Information for Laboratories: <https://www.cdc.gov/coronavirus/2019-nCoV/guidance-laboratories.html>

Laboratory Biosafety: <https://www.cdc.gov/coronavirus/2019-nCoV/lab-biosafety-guidelines.html>

Isolation Precautions in Healthcare Settings:

<https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html>

Specimen Collection: <https://www.cdc.gov/coronavirus/2019-nCoV/guidelines-clinical-specimens.html>

Infection Control: <https://www.cdc.gov/coronavirus/2019-ncov/infection-control/index.html>

FDA webpages:

General: www.fda.gov/novelcoronavirus

EUAs: (includes links to recipient fact sheet and manufacturer's instructions) <https://www.fda.gov/medical-devices/emergency-situations-medical-devices/emergency-use-authorizations>

Manufacturer Contact Information:

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Website: www.healgen.com

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FACT SHEET FOR RECIPIENTS

Healgen Scientific LLC, COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma)

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You are being given this Fact Sheet because your sample(s) is being tested or was tested for antibodies to the virus that causes Coronavirus Disease 2019 (COVID-19) using the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma).

This Fact Sheet contains information to help you understand the risks and benefits of using this test to evaluate your adaptive immune response to SARS-CoV-2, the virus that causes COVID-19. After reading this Fact Sheet, if you have questions or would like to discuss the information provided, please talk to your healthcare provider.

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- **For the most up to date information on COVID19 please visit the CDC Coronavirus Disease 2019 (COVID-19) webpage:**
 - <https://www.cdc.gov/COVID19>
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What is COVID-19?

COVID-19 is caused by the SARS-CoV-2 virus. The virus, which can cause mild to severe respiratory illness has now spread globally, including the United States. The current information available to characterize the spectrum of clinical illness associated with COVID-19 suggests that symptoms include cough, shortness of breath or difficulty breathing, fever, chills, muscle pain, headache, sore throat or new loss of taste or smell.

How are people tested for COVID-19?

Two kinds of tests are currently available for COVID-19: diagnostic tests and antibody tests.

- A diagnostic test tells you if you have a current infection.
- An antibody test tells you if you had a previous infection

What is the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) test?

This test is an antibody test. It will help assess if you have antibodies to the virus that causes COVID-19. An antibody test may not be able to show if you have a current infection, because it can take 1-3 weeks after infection to make antibodies.

What are the known and potential risks and benefits of the test?

Potential risks include:

- Possible discomfort or other complications that can happen during blood collection.
- Possible incorrect test result (see below for more information).

Potential benefits include:

- The results, along with other information, can help you and your healthcare provider make informed recommendations about your care.

What does it mean if I have a positive test result?

If you have a positive test result, it is possible that you have had recent or prior COVID-19 infection and that you have developed an antibody response to the virus. Your healthcare provider will work with you to determine how best to care for you based on the test results along with other factors of your medical history, your symptoms, possible exposures, and geographic location of places you have recently traveled. There is also the small possibility that this test can give a positive result that is wrong (a false positive result). Even a high-performing antibody test when used in a population without many cases of COVID-19 infection may produce as many or more false results as true results because the likelihood of finding someone who has been infected is very small. Your healthcare provider will work with you to determine the likelihood of false result.

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- **Where can I go for updates and more information?** The most up-to-date information on COVID-19 is available at the CDC General webpage: <https://www.cdc.gov/COVID19>. In addition, please also contact your healthcare provider with any questions/concerns.
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It is not known how long antibodies to SARS-CoV-2 will remain present in the body after infection. It is not known whether having antibodies to SARS-CoV-2 will protect you from getting infected again or help reduce the severity or duration of a future COVID-19 infection.

What does it mean if I have a negative test result?

A negative test result means that the antibodies to the virus that causes COVID-19 were not found in your sample. However, it is possible for this test to give a negative result that is incorrect (false negative) in some people with COVID-19. A negative result may occur if you are tested early in your illness and your body hasn't had time to produce antibodies to infection. This means that you could possibly still have COVID-19 even though the test is negative. If this is the case, your healthcare provider will consider the test result together with all other aspects of your medical history (such as symptoms, possible exposures, and geographical location of places you have recently traveled) in deciding how to care for you.

It is important that you work with your healthcare provider to help you understand the next steps you should take.

Is this test FDA-approved or cleared?

No. This test is not yet approved or cleared by the United States FDA. When there are no FDA-approved or cleared tests available, and other criteria are met, FDA can make tests available under an emergency access mechanism called an Emergency Use Authorization (EUA). The EUA for this test is supported by the Secretary of Health and Human Service's (HHS's) declaration that circumstances exist to justify the emergency use of in vitro diagnostics for the detection and/or diagnosis of the virus that causes COVID-19. This EUA will remain in effect (meaning this test can be used) for the duration of the COVID-19 declaration justifying emergency of IVDs, unless it is terminated or revoked by FDA (after which the test may no longer be used).

What are the approved available alternatives?

There are no approved available alternative tests. FDA has issued EUAs for other antibody tests that can be found at <https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#2019-ncov>.

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- **Where can I go for updates and more information?** The most up-to-date information on COVID-19 is available at the CDC General webpage: <https://www.cdc.gov/COVID19>. In addition, please also contact your healthcare provider with any questions/concerns.
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COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) Instruction for Use

REF Cat: GCCOV-402a

IVD *In Vitro* Diagnostic Medical Device

For Emergency Authorization Use (EUA) only
For *in vitro* diagnostic use only
For prescription use only

INTENDED USE

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is a lateral flow immunoassay intended for the qualitative detection and differentiation of IgM and IgG antibodies to SARS-CoV-2 in human venous whole blood, plasma from anticoagulated blood (Li+ heparin, K2EDTA and sodium citrate), or serum. The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is intended for use as an aid in identifying individuals with an adaptive immune response to SARS-CoV-2, indicating recent or prior infection. At this time, it is unknown for how long antibodies persist following infection and if the presence of antibodies confers protective immunity. The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) should not be used to diagnose acute SARS-CoV-2 infection. Testing is limited to laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C 263a, to perform moderate or high complexity tests.

Results are for the detection of SARS CoV-2 antibodies. IgM and IgG antibodies to SARS-CoV-2 are generally detectable in blood several days after initial infection, although the duration of time antibodies are present post-infection is not well characterized. Individuals may have detectable virus present for several weeks following seroconversion.

Laboratories within the United States and its territories are required to report all positive results to the appropriate public health authorities.

The sensitivity of COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) early after infection is unknown. Negative results do not preclude acute SARS-CoV-2 infection. If acute infection is suspected, direct testing for SARS-CoV-2 is necessary.

False positive results for COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) may occur due to cross-reactivity from pre-existing antibodies or other possible causes. Due to the risk of false positive results, confirmation of positive results should be considered using second, different IgG or IgM assay.

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is only for use under the Food and Drug Administration's Emergency Use Authorization.

INTRODUCTION

Coronaviruses are enveloped RNA viruses that are distributed broadly among humans, other mammals, and birds and that cause respiratory, enteric, hepatic, and neurologic diseases. Seven coronavirus species are known to cause human disease. Four viruses - 229E, OC43, NL63, and HKU1 - are prevalent and typically cause common cold symptoms in immunocompetent individuals. The three other strains - severe acute respiratory syndrome coronavirus (SARS-CoV), Middle East respiratory syndrome coronavirus (MERS-CoV) and 2019 Novel Coronavirus (COVID-19) - are zoonotic in origin and have been linked to sometimes fatal illness. IgG and IgM antibodies to 2019 Novel Coronavirus can be detected with 1-3 weeks after exposure. The seroconversion rate and the antibody levels increased rapidly during the first two weeks.

PRINCIPLE

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is a lateral flow immunochromatographic assay. The test uses anti-human IgM antibody (test line IgM), anti-human IgG (test line IgG) and rabbit IgG (control line C) immobilized on a nitrocellulose strip. The burgundy colored conjugate pad contains colloidal gold conjugated to recombinant COVID-19 antigens (SARS-CoV-2 Spike S1 antigen) conjugated with colloidal gold (COVID-19 conjugates). When a specimen

followed by assay buffer is added to the sample well, IgM &/or IgG antibodies if present, will bind to COVID-19 conjugates making an antigen antibodies complex. This complex migrates through nitrocellulose membrane by capillary action. When the complex meets the line of the corresponding immobilized antibody (anti-human IgM &/or anti-human IgG) the complex is trapped forming a burgundy colored band which confirms a reactive test result. Absence of a colored band in the test region indicates a non-reactive test result.

To serve as a procedural control, a colored line will always change from blue to red in the control line region, indicating that the proper volume of specimen has been added and membrane wicking has occurred.

MATERIALS SUPPLIED



25 sealed pouches each containing a test cassette, a dropper and a desiccant
1 Buffer
1 Package insert

MATERIAL REQUIRED BUT NOT PROVIDED

1. Specimen collection containers
2. Centrifuge (for plasma only)
3. Timer

STORAGE AND STABILITY



The kit can be stored at room temperature or refrigerated (2-30°C). The test device is stable through the expiration date printed on the sealed pouch. The test device must remain in the sealed pouch until use. DO NOT FREEZE. Do not use beyond the expiration date.

WARNINGS AND PRECAUTIONS

1. For professional *in vitro* diagnostic use only. Do not use after expiration date.
2. Use of this product is limited to laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, to perform moderate or high complexity tests.
3. This test should be performed at 15 to 30°C. If stored refrigerated, ensure that the pouch and buffer are brought to operating temperature before performing testing.
4. This package insert must be read completely before performing the test. Failure to follow the insert gives inaccurate test results.
5. Do not use it if the tube/pouch is damaged or broken.
6. Test is for single use only. Do not re-use under any circumstances.
7. Handle all specimens as if they contain infectious agents. Observe established precautions against microbiological hazards throughout testing and follow the standard procedures for proper disposal of specimens.
8. Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
9. Humidity and temperature can adversely affect results (especially with an RH over 80%). Testing must be performed within one hour after opening the pouch.
10. Do not perform the test in a room with strong air flow, ie. electric fan or strong air-conditioning.
11. Practice a few times the use of the mini dropper prior to testing if you are not familiar with the mini dropper. For better precision, transfer specimen by pipette capable to deliver 5 µL of volume.

12. This test has not been FDA cleared or approved.
13. This test has been authorized by FDA under an EUA for use by authorized laboratories.
14. This test has been authorized only for the presence of IgM and IgG antibodies against SARS-CoV-2, not for any other viruses or pathogens.
15. This test is only authorized for the duration of the declaration that circumstances exist justifying the authorization of emergency use of in vitro diagnostics for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Act, 21 U.S.C. § 360bbb-3(b)(1), unless the authorization is terminated or revoked sooner.

SPECIMEN COLLECTION

1. COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) can be performed using either venous whole blood, serum or plasma.
2. The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) test has not been evaluated with fingerstick specimens. Use of this test with fingerstick blood is not recommended.
3. Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear, non-hemolyzed specimens.
4. Testing should be performed immediately after specimen collection. Do not leave the specimens at room temperature for prolonged periods. Serum and plasma specimens may be stored at 2-8°C for up to 3 days. For long term storage, specimens should be kept below -20°C for up to one month. Whole blood specimens must be stored at 2-8°C if not tested immediately and tested within 24 hours of collection. Do not freeze whole blood specimens.
5. Bring specimens to room temperature prior to testing. Frozen specimens must be completely thawed and mixed well prior to testing. Specimens cannot be frozen and thawed more than 3 times.
6. If specimens are to be shipped, they should be packed in compliance with local regulations covering the transportation of etiologic agents.

TEST PROCEDURE

Allow test cassette, specimen, buffer and/or controls to equilibrate to room temperature (15-30°C) prior to testing.

1. Remove the test cassette from the sealed foil pouch and use it as soon as possible. Results must be obtained within one hour.
2. Place the test device on a clean and level surface.

For Serum or Plasma Specimens:

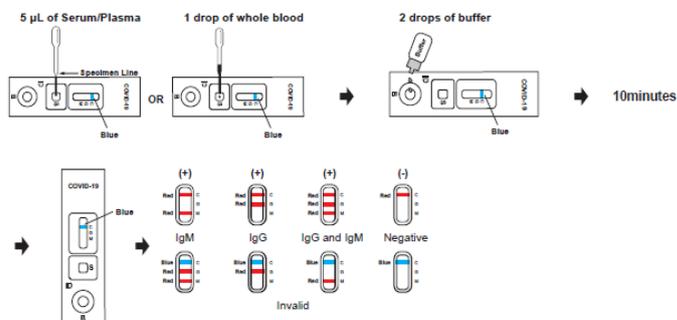
With a 5 µL mini plastic dropper provided, draw serum/plasma specimen to exceed the specimen line as showed in the following image and then transfer drawn serum/plasma specimen into the sample well (S). Then add 2 drops (about 80 µL) of sample buffer to the buffer well (B) immediately. Avoid air bubbles.

Note: Practice a few times prior to testing if you are not familiar with the mini dropper. For better precision, transfer specimen by pipette capable to deliver 5 µL of volume.

For Venous Whole Blood Specimen:

Hold the 5 µL mini plastic dropper vertically and transfer 1 drop of whole blood (about 10 µL) to the specimen well (S) of the test device, then add 2 drops (about 80 µL) of sample buffer to the buffer well (B) immediately. Avoid air bubbles.

3. Wait for the colored line(s) to appear. After 2 minutes, if the red color has not moved across the test window or if blood is still present in the specimen well (S), add 1 additional drop of the sample buffer to the buffer well (B).
4. The result should be read in 10 minutes. Positive results may be visible as soon as 2 minutes. Do not interpret the result after 15 minutes.



INTERPRETATION OF RESULTS

NEGATIVE:

The colored line in the control line region (C) changes from blue to red. No line appears in the test line regions M or G. The result is negative.

IgM POSITIVE:

The colored line in the control line region (C) changes from blue to red, and a colored line appears in test line region M. The test result indicates the presence of IgM anti-SARS-CoV-2 antibodies.

IgG POSITIVE:

The colored line in the control line region (C) changes from blue to red, and a colored line appears in test line region G. The test result indicates the presence of IgG anti-SARS-CoV-2 antibodies

IgG and IgM POSITIVE:

The colored line in the control line region (C) changes from blue to red, and two colored lines appear in test line regions M and G. The test results indicate the presence of IgM and IgG anti-SARS-CoV-2 antibodies.

INVALID:

Control line is partially red, and fails to completely change from blue to red. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test cassette. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

QUALITY CONTROL

A procedural control is included in the test. A red line appearing in the control region (C) is the internal procedural control. It confirms sufficient specimen volume and correct procedural technique.

Control standards are not supplied with this kit; however, it is recommended that positive and negative controls be tested as a good laboratory practice to confirm the test procedure and to verify proper test performance. Additional controls may be required according to guidelines or local, state, and/or federal regulations (such as 42 CFR 493.1256) or accrediting organizations.

LIMITATIONS

For use under an Emergency Use Authorization only.

1. Use of COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is limited to laboratory personnel who have been trained. Not for home use.
2. This product is only used for testing of individual serum, plasma (Li+ heparin, K₂EDTA and sodium citrate), and venous whole blood. Other specimen types have not been evaluated and should not be used with this assay.
3. Use fresh samples whenever possible. Frozen and thawed samples (especially repeatedly) contain particles that can block the membrane. This slows the flow of reagents and can lead to high background color, making the interpretation of results difficult.
4. The Assay Procedure and the Interpretation of Assay Result must be followed closely when testing for the presence of SARS-CoV-2 virus specific antibodies in the serum, plasma or whole blood specimen from individual subjects. For optimal test performance, proper sample collection is critical. Failure to follow the procedure may give inaccurate results.
5. Reading test results earlier than 10 minutes after the addition of Buffer may yield erroneous results. Do not interpret the result after 15 minutes.
6. This test detects the presence of SARS-CoV-2 IgM/IgG in the specimen and should not be used to diagnose or exclude SARS-CoV-2 infection. Testing with

a molecular diagnostic must be performed to evaluate for active infection in symptomatic individuals.

until otherwise notified by FDA. Such records will be made available to FDA for inspection upon request.

7. It is not known at this time if the presence of antibodies to SARS-CoV-2 confers immunity to re-infection.
8. A positive result may not indicate previous SARS-CoV-2 infection. Consider other information, including clinical history and local disease prevalence, in assessing the need for a second but different serology test to confirm an adaptive immune response.
9. A negative result for an individual subject indicates absence of detectable anti-SARS-CoV-2 antibodies. Negative results do not preclude SARS-CoV-2 infection and should not be used as the sole basis for patient management decisions. IgM antibodies may not be detected in the first few days of infection; the sensitivity of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) early after infection is unknown. False positive results for IgM and IgG antibodies may occur due to cross-reactivity from pre-existing antibodies or other possible causes. Samples with positive results should be confirmed with alternative testing method(s) and clinical findings before a diagnostic determination is made. A negative result can occur if the quantity of the anti-SARS-CoV-2 antibodies present in the specimen is below the detection limits of the assay, or the antibodies that are detected are not present during the stage of disease in which a sample is collected.
10. Some specimens containing unusually high titer of heterophile antibodies or rheumatoid factor may affect expected results.
11. The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is limited to the qualitative detection of antibodies specific for the SARS-CoV-2 virus. The intensity of the test line does not necessarily correlate to SARS-CoV-2 antibody titer in the specimen. Neither the quantitative value nor the rate anti-SARS-CoV-2 IgM/IgG concentration can be determined by this qualitative test.
12. The sensitivity of the test is impacted after being open for two hours—the density of T line becomes weak. Testing must be performed within one hour after opening the pouch.

*The letter of authorization refers to, "Laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, to perform moderate or high complexity tests" as "authorized laboratories."

PERFORMANCE CHARACTERISTICS

1. Assay Clinical Performance

Study 1: Healgen Clinical Agreement Validation

The clinical performance of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) was evaluated by testing a total of 191 plasma (K2EDTA) clinical samples—90 positive samples and 101 negative samples) from individual patients exhibiting pneumonia, respiratory symptoms and fever etc. Testing was performed at two sites in China from January to mid-March 2020. COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) results for IgM and IgG detection were compared to the results of RT-PCR assays for SARS-CoV-2 from oropharyngeal swabs (Site #1) and sputum (Site #2). At Site #1, 61 retrospective specimens and 4 prospective specimens were included in the study. At Site #2, 95 retrospective specimens and 31 prospective specimens were included in the study. The time from RT-PCR result to collection of specimens (plasma) ranged from 15-45 days (Site #1) and 0-38 days (Site #2). The time from collection of specimens (plasma) from each individual to testing ranged from 12-23 days (Site #1) and 3-29 days (Site #2). Overall study results are shown in below (Table 1).

Table 1: Assay Clinical Study Results

Method			RT-PCR		Subtotal
			Positive	Negative	
COVID-19 IgG/IgM Rapid Test Cassette	Positive	IgG+/IgM+	78	0	78
		IgG-/IgM+	0	1	1
		IgG+/IgM-	9	2	11
	Negative	IgG-/IgM-	3	98	101
Subtotal			90	101	191

CONDITIONS OF AUTHORIZATION FOR THE LABORATORY

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) Letter of Authorization, along with the authorized Fact Sheet for Healthcare Providers, the authorized Fact Sheet for Recipients, and authorized labeling are available on the FDA website:

<https://www.fda.gov/medical-devices/emergency-situations-medical-devices/emergency-use-authorizations#covid19ivd>.

Authorized laboratories using the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) ("your product" in the conditions below), must adhere to the Conditions of Authorization indicated in the Letter of Authorization as listed below:

1. Authorized laboratories* using your product will include with result reports of your product, all authorized Fact Sheets. Under exigent circumstances, other appropriate methods for disseminating these Fact Sheets may be used, which may include mass media
2. Authorized laboratories using your product will use your product as outlined in the Instructions for Use. Deviations from the authorized procedures, including the authorized clinical specimen types, authorized control materials, authorized other ancillary reagents and authorized materials required to use your product are not permitted.
3. Authorized laboratories that receive your product will notify the relevant public health authorities of their intent to run your product prior to initiating testing.
4. Authorized laboratories using your product will have a process in place for reporting test results to healthcare providers and relevant public health authorities, as appropriate.
5. Authorized laboratories will collect information on the performance of your product and report to DMD/OHT7-OIR/OPEQ/ CDRH (via email: CDRH-EUA-Reporting@fda.hhs.gov) and Healgen Scientific LLC (info@healgen.us) any suspected occurrence of false reactive or false non-reactive results and significant deviations from the established performance characteristics of your product of which they become aware.
6. All laboratory personnel using your product must be appropriately trained in immunoassay techniques and use appropriate laboratory and personal protective equipment when handling this kit and use your product in accordance with the authorized labeling. All laboratory personnel using the assay must also be trained in and be familiar with the interpretation of results of the product
7. Authorized distributors, and authorized laboratories using your product will ensure that any records associated with this EUA are maintained

IgG

Positive Percent agreement (PPA): 96.7% (87/90) (95%CI: 90.7%~98.9%)
 Negative Percent agreement (NPA): 98.0% (99/101) (95%CI: 93.1%~99.5%)

IgM

Positive Percent agreement (PPA): 86.7% (78/90) (95%CI: 78.1%~92.2%)
 Negative Percent agreement (NPA): 99.0% (100/101) (95%CI: 94.6%~99.8%)

Overall (either IgG+ or IgM+)

Positive Percent agreement (PPA): 96.7% (87/90) (95%CI: 90.7%~98.9%)
 Negative Percent agreement (NPA): 97.0% (98/101) (95%CI: 91.6%~99.0%)

Study 2: Independent Clinical Agreement Validation

The test was validated against a panel of previously frozen samples consisting of 30 SARS-CoV-2 antibody-positive serum samples and 80 antibody-negative serum and plasma samples. Each of the 30 antibody-positive samples were confirmed with a nucleic acid amplification test (NAAT) and both IgM and IgG antibodies were confirmed to be present in all 30 samples. The presence of antibodies in the samples was confirmed by several orthogonal methods prior to testing with the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma). The presence of IgM and IgG antibodies specifically was confirmed by one or more comparator methods. Antibody-positive samples were selected at different antibody titers.

All antibody-negative samples were collected prior to 2020 and include: i) Seventy (70) samples selected without regard to clinical status, "Negatives" and ii) Ten (10) samples selected from banked serum from HIV+ patients, "HIV+". Testing was performed by one operator using one lot of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma). Confidence intervals for sensitivity and specificity were calculated per a score method described in CLSI EP12-A2 (2008).

For evaluation of cross-reactivity with HIV+, it was evaluated whether an increased false positive rate among antibody-negative samples with HIV was statistically higher than the false positive rate among antibody-negative samples without HIV (for this, a confidence interval for the difference in false positive rates was calculated per a score method described by Altman). The results and data analysis are shown in the tables below.

Table 2. Summary Results

	Comparator Method	

COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma)		Positive (IgM/IgG) +	Negative (IgM/IgG)-	Negative, HIV+	Total
Positive	IgM +/ IgG+	29	0	0	29
	IgM+, IgG-	1	0	0	1
	IgM-, IgG+	0	2	0	2
Negative	IgM- / IgG-	0	68	10	78
Total (n=110)		30	70	10	110

Table 3. Summary Statistics

Measure	Estimate	Confidence Interval
IgM Sensitivity	100% (30/30)	(88.7%; 100%)
IgG Sensitivity	96.7% (29/30)	(83.3%; 99.4%)
(IgM+ or IgG+; Total) Sensitivity (PPA)	100% (30/30)	(88.7%; 100%)
(IgM-/IgG-; Total) Specificity (NPA)	97.5% (78/80)	(91.3%; 99.3%)
Cross-reactivity with HIV+	0% (0/10) not detected	

Limitations of Study 2

- Samples were not randomly selected, and sensitivity and specificity estimates may not be indicative of the real-world performance of the device.
- These results are based on serum and plasma samples only and may not be indicative of performance with other sample types, such as whole blood, including finger stick blood.
- Information about anticoagulants used is not known.
- The number of samples in the panel is a minimally viable sample size that still provides reasonable estimates and confidence intervals for test performance, and the samples used may not be representative of the antibody profile observed in patient populations.

2. Assay Cross Reactivity

Cross-reactivity of the COVID-19 IgG/IgM Rapid Test (Whole Blood/Serum/Plasma) was evaluated using serum samples which contain antibodies to the pathogens listed below. A total of 120 specimens from 24 different categories were tested. No false Positives were found with the following (Table 4):

Table 4: Assay Cross Reactivity Results

Sample Categories	Tested Sample Number
Influenza A virus IgG	5
Influenza B virus IgG	5
Respiratory syncytial virus IgG	5
Adenovirus IgG	5
Rhinovirus IgG	5
Human metapneumovirus IgG	5
Mycoplasma pneumoniae IgG	5
Chlamydia pneumoniae IgG	5
HCV IgG	5
Haemophilus influenza IgG	5
HBV core antibody IgG	5
Bacterial pneumonia	5
Influenza A virus IgM	5
Influenza B virus IgM	5
Respiratory syncytial virus IgM	5
Adenovirus IgM	5
Rhinovirus IgM	5
Human metapneumovirus IgM	5
Mycoplasma pneumoniae IgM	5
Chlamydia pneumoniae IgM	5
HCV IgM	5

Haemophilus influenza IgM	5
HBV core antibody IgM	5
Antinuclear antibodies (ANA)	5

3. Potentially Endogenous Interfering Substances

Low titer COVID-19 antibody positive serum samples and COVID-19 antibody negative serum samples were spiked with one of the following substances to specified concentrations and tested in multiple replicates. No false Positives or false Negatives were found with the following (Table 5).

Table 5: Assay Interfering Substance Results

Name of Substances	Concentration
Ascorbic Acid	20 mg/dL
Hemoglobin	1000 mg/dL
Bilirubin	10 mg/dL
Albumin	2000 mg/dL
Triglyceride	500 mg/dL

4. Class Specificity

A Class Specificity Study was conducted to determine the impact of DTT treatment on the detection of IgM and/or IgG positive samples by the COVID-19 IgG/IgM Rapid Test Cassette (Whole blood/Serum/Plasma). IgM samples treated with DTT showed no visible IgM line with the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma), whereas the IgG samples were not affected by DTT treatment. Test results with IgM positive samples after DTT treatment showed 100% agreement to the expected results. Test results with IgG positive samples after DTT treatment showed 100% agreement to the expected results. The results observed confirm the class specificity of the test.

5. Study of: Venous Whole Blood and Plasma Specimens with Anticoagulants

To evaluate if various anticoagulants have an effect on the results of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma), negative plasma specimens and positive plasma specimens (with 2 different low positive IgG and IgM concentrations) were mixed with three different anticoagulants (lithium heparin, EDTA, sodium citrate) in separate tubes and tested in triplicate in plasma only or spiked into venous whole blood. IgG and IgM were correctly identified in all spiked whole blood specimens by the test, similar to results obtained with the plasma only specimens. There was a 100% concordance rate with expected results when IgM or IgG positive venous whole blood specimens or plasma specimens were tested with anticoagulants.

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3. Su S, Wong G, Shi W, et al. Epidemiology, genetic recombination, and pathogenesis of coronaviruses. Trends Microbiol 2016; 24: 490-502.
4. Cui J, Li F, Shi ZL. Origin and evolution of pathogenic coronaviruses. Nat Rev Microbiol 2019; 17: 181-192.

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Revision Date: 2020-5-2

	Consult instructions for use		Tests per kit		Authorized Representative
	For <i>in vitro</i> diagnostic use only		Use by		Do not reuse
	Store between 2~30°C		Lot Number		Catalog#