

# GW MMA Coronavirus Guidance

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## Disclaimers and use of this Document – PLEASE READ THIS FIRST

This document has been put together by GW Maritime Medical Access to provide guidance on the COVID-19 Coronavirus pandemic.

This document was first published in May of 2020. At that time there was limited information on the SARS-CoV-2 Virus and its associated disease, COVID-19. Since that time relevant authorities have published a great deal of information about the virus and disease, including guidelines on management and specific guidance for ships. This document has been updated continuously to provide information consistent with current understanding of the SARS-CoV-2 virus and the evolution of the COVID-19 pandemic. Although COVID-19 infections, hospitalizations, and deaths continue, in many places the restrictions and changes to daily life brought on by the pandemic have been reversed.

On May 5, 2023, The Director General of the World Health Organization accepted the recommendation of the International Health Regulations Emergency Committee on the COVID-19 pandemic “that COVID-19 is now an established and ongoing health issue which no longer constitutes a public health emergency of international concern (PHEIC).”<sup>1</sup> The United States Federal COVID-19 Public Health Emergency ended on May 11, 2023.

Despite these statements both the WHO and the US CDC continue to acknowledge that there is a threat from COVID-19, and preliminary data show that COVID-19 was the 4<sup>th</sup> leading cause of death in the United States in 2022 (down from 3<sup>rd</sup> leading cause in 2021).<sup>2</sup>

GW MMA continues to recommend that clients maintain health and safety policies that recognize the risk from COVID-19, and that provide guidance on minimizing the spread of infection and allow for an appropriate response if there is an outbreak. These policies may overlap with prevention and response procedures for other infectious diseases that may affect ship’s crews.

The information contained in this document is not designed to serve as company policy for individual clients. **We recommend that each client develop internal company policies on coronavirus management and response that best suit their individual operational needs.** This document is designed to provide background information and recommend practices to support our clients in the development of these policies. **This document does not serve as medical or**

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<sup>1</sup> [https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-coronavirus-disease-\(covid-19\)-pandemic](https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic). (last accessed 6/26/2023)

<sup>2</sup> Ahmad FB, Cisewski JA, Xu J, Anderson RN. Provisional Mortality Data — United States, 2022. MMWR Morb Mortal Wkly Rep 2023;72:488–492. DOI: <http://dx.doi.org/10.15585/mmwr.mm7218a3> (last accessed 6/26/2023)

**legal advice, nor as a regulatory mandate or industry standard. Relevant local laws and health department requirements should be followed.**

We do suggest that organizations consider some of the following questions when developing policies:

- 1) How will crew be educated about the Coronavirus and company policies?
- 2) How will crew be screened for Coronavirus prior to embarking on a vessel?
- 3) How will operations aboard be altered to minimize the risks from Coronavirus?
- 4) How will operations in port be altered to minimize Coronavirus aboard?
- 5) How will ill crew members be isolated and managed aboard the vessel?
- 6) How will operations be managed if a vessel diversion or crew-member evacuation becomes necessary?
- 7) What additional or extra equipment should be carried on the vessel during the coronavirus pandemic?

COVID-19 presents a dynamic situation and as such, guidance on the topics discussed in this document may change over time. Governmental or other relevant authority requirements or should supersede information provided in this document.

The guidance in this document is based on a variety of sources, including review of medical literature and current US CDC recommendations. Where possible, links to additional information published by the CDC are included. Linking to this material will help to ensure that the most up-to-date recommendations are available. CDC “Guidance for Maritime Vessels on the Mitigation and Management of COVID-19” may be found here and is referenced frequently throughout this document:

<https://www.cdc.gov/quarantine/maritime/covid-19-ship-guidance.html>

As always, clients should contact GW MMA at 001-202-715-4219 if assistance is needed or if a crew member becomes ill.

## General Information

### Multi-layered approach to COVID-19 Safety

A great deal has been learned and put into practice since SARS-CoV-2 (the virus that causes COVID-19) first emerged in late 2019. Tests have been developed, vaccines have been put into use and are now being modified for emerging strains of the virus, and COVID specific anti-viral medications are now in use. None-the-less, there is still a significant daily world-wide disease burden, and COVID-19 may still disrupt maritime operations. The best way to limit disruption due to COVID-19 is to keep it off vessels and to limit its spread in case there is an outbreak. This requires a multi-layered approach that includes vaccination, surveillance, and limiting exposure while in port.

### Background

The SARS-CoV-2 Coronavirus, which causes COVID-19 infection, appears to have started infecting people in and around the city of Wuhan China in late 2019. It is presumed that the infection spread out of the area where it started through infected travelers. Patients with the disease were identified throughout the world, and the infection was declared a pandemic by the World Health Organization on March 11<sup>th</sup>, 2020. As the WHO and the U.S. Centers for disease control's (CDC) understanding of the virus evolved, they provided updated guidance on prevention and management of disease. Although updates have become less frequent, recommendations on management may still periodically change.

There are many types of Coronaviruses that infect humans and other animals, including 4 Coronaviruses that cause the common cold in humans. Sometimes Coronaviruses that prefer non-human hosts begin to cause disease in people. They are referred to as "new" or "novel" Coronaviruses and can cause more serious and even fatal infections in people. Therefore, when a novel Coronavirus is identified, and it is shown to be passing on from person to person, this is regarded as a potential public health emergency. To date, there have been 3 major outbreaks associated with novel Coronaviruses: SARS-CoV in 2003, MERS-CoV in 2012, and more recently SARS-CoV-2, which causes the disease called COVID-19. SARS-CoV-2 is unique from other recent novel coronaviruses in several ways that have allowed it to spread world-wide, while the other recent novel coronaviruses saw more limited spread.

### Transmission

Coronaviruses are usually spread from infected to non-infected persons through respiratory droplets or aerosols which come from a person's oral and nasal secretions. When a patient coughs or sneezes, these droplets or aerosols can become airborne. A person can deposit secretions on their hands and transmit them to any surface that they touch (such as a door handle or a faucet). When a noninfected person comes into contact with infected droplets or aerosols, they are risk for contracting the disease. In particular, the SARS-CoV-2 virus can be

contracted when an infected droplet comes in contact with a person's mucous membranes, such as when it is inhaled or gets into the eye.

One aspect of the SARS-CoV-2 Coronavirus that is distinct from other Coronaviruses is that infected persons can pass the virus on to others before showing any symptoms. Some individuals may become infected and recover without ever showing symptoms. Consequently, the virus can spread from one person to another without the first person even being aware that they have, or are spreading, the virus.

Transmission is more likely when an infected individual has prolonged or continuous contact with others. In particular, the US CDC defined a close contact as "Someone who was less than 6 feet away from an infected person (laboratory-confirmed or a clinical diagnosis) for a cumulative total of 15 minutes or more over a 24-hour period (for example, *three individual 5-minute exposures for a total of 15 minutes*). An infected person can spread SARS-CoV-2 starting from 2 days before they have any symptoms (or, for people without symptoms, 2 days before the positive specimen collection date)"<sup>3</sup>

Although there have been reports of virus transmission from contact with infected surfaces (fomites), transmission through surfaces appears far less likely than transmission by direct contact with an infected individual.<sup>4</sup>

However, multiple factors influence the likelihood of transmission, such as crowding, ventilation, mask use, and vaccination status, among others. The confined quarters aboard some ships may accelerate outbreaks aboard.

## Symptoms

Almost all of the Coronaviruses that infect people cause a common cold: runny nose, slight fever, mild cough, aches, and fatigue. Most individuals who are infected with the SARS-CoV-2 virus will develop some of these symptoms.

Symptoms that may indicate infection with SARS-CoV-2 include:

- 1) Fever (temperature over 100.4° Fahrenheit or 38° Celsius) or chills
- 2) Cough
- 3) Shortness of breath or difficulty breathing
- 4) Fatigue
- 5) Muscle or body aches

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<sup>3</sup> <https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/contact-tracing-plan/appendix.html#contact> (last accessed 01/23/2023).

<sup>4</sup> Science Brief: SARS-CoV-2 and Surface (Fomite) Transmission for Indoor Community Environments. <https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/surface-transmission.html>. (last accessed 01/23/2023)

- 6) Headache
- 7) New loss of taste or smell
- 8) Sore Throat
- 9) Congestion or runny nose
- 10) Nausea or vomiting
- 11) Diarrhea

A small percent of those infected with SARS-CoV-2 will go on to develop severe symptoms and have difficulty breathing that is severe enough to require a breathing tube and ventilator (machine to assist breathing). SARS-CoV-2 also appears to increase the likelihood of other severe complications such as blood clots and strokes. Identifying and managing SARS-CoV-2 infections may be challenging because many of these symptoms overlap with other infections that will not progress to severe disease.

Older individuals and people with pre-existing medical conditions, such as diabetes, high blood pressure, obesity, COPD, chronic kidney disease, heart disease, or other conditions are at greater risk for having more severe COVID-19 disease. Smokers and those who are immunocompromised are also at greater risk for having more severe COVID-19 disease.

More information on conditions that increase risk may be found here:

<https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>

While many who become infected with SARS-CoV-2 never develop symptoms or develop only mild symptoms, others may become quite ill. The fatality rate from diagnosed infections prior to vaccination varied by country but generally remained over 1%, with greater risk in older patients. Those with SARS-CoV-2 infection can also have delayed health problems from the infection or prolonged recovery from the disease, including in those who are young or otherwise healthy. These extended courses or later complications of COVID-19 have been dubbed post-acute sequelae SARS-CoV-2 infection (PASC) or Post-COVID Conditions (PCC) and may be referred to as “long-COVID”. Additional information on delayed health problems and prolonged recovery may be found here: <https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects/index.html>.

## Variants of Concern

Over the course of the pandemic new genetic variants of the SARS-CoV-2 virus have emerged. Natural changes to viruses occur on a regular basis due to small random changes in the virus’ genetic code. These changes to the genetic code can alter the way the virus behaves. Most of these changes result in virus variants that do not cause differences in infection, but occasionally a variant may emerge that is more transmissible and that consequently becomes the new dominant variant. In some scenarios a variant may be less susceptible to vaccine. Variants that may change the course of the pandemic are called Variants of Concern (VOC).

Variants are assigned alpha-numeric names based on changes in their genetic code, and occasionally lineages of virus are given names based on the way they are related. The US CDC tracks recently circulating variants, along with estimates of currently circulating variants, here: <https://covid.cdc.gov/covid-data-tracker/#variant-proportions>.

Several more-transmissible variants have emerged over the course of the pandemic, including the Alpha and Delta variants in late 2020, and Omicron variant in late 2021, and Omicron subvariants in 2022 and 2023. These variants have each contributed to increases in cases, especially among the unvaccinated. The Omicron variant and many of its subvariants appear to cause infection in those who are fully vaccinated more readily than the preceding variants, however vaccines still appear to provide a measure of protection against severe illness, hospitalization, and death. No variant yet discovered appears to be fully resistant to existing vaccines, however it is important to maintain COVID-19 management strategies even after vaccination since continued spread may provide more opportunity for new Variants of Concern to emerge.

## Vaccination

Vaccines have now been in use for over two years and over 4.7 billion people have received at least one vaccine dose.<sup>5</sup> Vaccines provide a measure of protection against all known widely-circulating COVID-19 variants and are the single most-impactful intervention to keep mariners safe from COVID-19 and reduce the COVID-19 threat to ship operations. Vaccines provide a signal to the body's immune system that allows the immune system to be prepared to fight the SARS-CoV-2 virus when exposed to it.

Four vaccines have received either emergency use authorization (EUA) or full approval in the United States (Pfizer/BioNTech, Moderna, Johnson and Johnson, and Novavax), however one of these vaccines (Johnson and Johnson) is no longer available in the United States. The Pfizer/BioNTech and Moderna vaccines may be referred to as mRNA vaccines for the properties that allow them to work. These vaccines have different storage and handling requirements, and the number of doses and timing of doses needed vary by product. All three remaining vaccines (Pfizer/BioNTech, Moderna, and Novavax) are available to be given to individuals over 12, and the Pfizer/BioNTech and Moderna vaccines are available to individuals as young as 6 months. The initial set of vaccine doses is called the **primary series**, and subsequent doses after the primary series are called **boosters**. The number and timing of vaccine doses in the primary series is dependent on age and vaccine product used.

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<sup>5</sup> <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (last accessed 09/12/2022)

While there are some differences in the published effectiveness of these vaccines, all appear to be effective, especially with regard to protection against the most severe disease. Per the US CDC “vaccination is recommended for people who are pregnant, trying to get pregnant now, or who might become pregnant in the future, and people who are breastfeeding.”<sup>6</sup>

There are additional vaccines that have received emergency use authorization outside the United States. Some of these vaccines came into use prior to the completion of initial clinical trials. The World Health Organization (WHO) has granted Emergency Use Listing (EUL) to all four of the vaccines that have been used in the United States, as well as several additional vaccines in use in other countries. The list of WHO vaccines with EUL may be found here: <https://extranet.who.int/pgweb/vaccines/vaccinescovid-19-vaccine-eul-issued>. Some vaccines in wide use may not have WHO EUL. Mariners who choose to be vaccinated with a vaccine that is not on the WHO EUL list should consider the approval type and completeness of clinical trials for the vaccine used. The US CDC recommends that those who have been previously vaccinated with a product that is not on the WHO list be re-vaccinated at least 28 days after the last dose of the unapproved product.<sup>7</sup>

Although wider vaccine availability has eased access to vaccines, seafarers may still face unique challenges to getting vaccinated. Extended time at sea and variable vaccine availability across the world pose particular challenges. Furthermore, scheduling a follow up dose after the first dose in a multi-dose regimen may be difficult due to work schedules, travel needs, and vaccine product availability. Although the vaccines that require a multi-dose primary series were previously not considered interchangeable, in certain age groups some vaccine products can now be used interchangeably. Details may be found here: <https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html>.

Seafarers should keep a record of which vaccine they receive for their first dose, and should make every effort to have the second dose from the same manufacturer. However ***we recommend that seafarers do not delay obtaining the first dose due to uncertainty about scheduling the second dose.*** A different vaccine product may be given for the second dose at least 28 days after the first dose if the first dose manufacturer is not known or is no longer available. Those who inadvertently received doses of two different vaccine products during the primary series are still considered to have completed the primary series.

Any written documentation of vaccine administration should be kept by all mariners as proof of vaccination. Should mariners elect to become vaccinated, they should continue to follow public health advice regarding social distancing and mask wearing, as well as company SARS-CoV-2

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<sup>6</sup> <https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html> (last accessed 7/22/2023)

<sup>7</sup> <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html> (last accessed 07/22/2023)

safety protocols, for the reasons outlined in the preceding section. As seagoing vessels are places of work, may be far from medical care, and have communal dining and berthing areas, maintaining COVID-19 control measures such as masking and social distancing continue to be important to control virus spread.

#### Vaccine Boosters and Remaining Up-to-date on Vaccination

At the start of the vaccination campaign, individuals were considered **fully vaccinated** 14 days after the final dose in their primary series. This meant that full vaccination was 14 days after the second dose for a two-dose vaccine and 14 days after the first dose for a single dose vaccine. However, current CDC recommendations have de-emphasized the term fully vaccinated in favor of a recommendation that all individuals remain **up to date** with COVID-19 vaccination. Up to date means that an individual has received all recommended vaccine doses from the primary series, plus any recommended subsequent doses (historically referred to as **boosters**) based on age and health status. Individuals who are up to date on vaccination are optimally protected.

Scientific and medical understanding of the need for, and timing of, vaccine boosters is still evolving, however several other vaccines in wide use for many years require more than two doses. For example, the Diphtheria, tetanus, and pertussis (DTaP) vaccine is a 5 dose childhood series, and the Haemophilus influenzae type b (Hib) vaccine is a 3 or 4 dose childhood series depending on the vaccine product used. Several vaccines in wide use may also require an annual vaccine (e.g. influenza) or periodic booster shots years after the primary series (e.g. tetanus).

Based on current understanding of the duration and effectiveness of immunity the CDC has put out recommendations for individuals to remain up to date with their vaccines. These recommendations vary based on age and vaccine product used. These recommendations may be found here: <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html>.

As of September 2022, an updated booster (also called the **bivalent booster**) was made available in the United States that has been formulated to provide greater protection against newer, more recently circulating variants, and as of April 18, 2023, the original vaccine (also called the monovalent vaccine) was taken off the market. A further update to the formulation of COVID-19 vaccines is expected in the Fall of 2023, and may result in changes to recommendations for individuals to remain up-to-date on COVID-19 vaccines.

Those who are **moderately to severely immunocompromised** may respond differently to the vaccines, and may need an additional vaccine dose as part of their primary series and/or be on a different booster schedule to remain up to date. Those who think they may be moderately to severely immunocompromised or who are unsure should speak with their personal physician for a recommendation. More information, as well as a list of conditions that may result in moderate or severe immunocompromise may be found here:

<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/immuno.html>.

Those who are immunocompromised may previously have also qualified for regular administration of a medication called Evusheld to further reduce the likelihood of developing a symptomatic COVID-19 infection, however this medication is no longer authorized for use in the United States.

### Breakthrough Cases

While vaccination reduces the chance that an individual will become infected with COVID-19, no vaccine provides 100% protection. When a person who is fully vaccinated becomes infected with SARS-CoV-2, it is called a **breakthrough case**. Breakthrough cases are expected, and the number of breakthrough cases will be related to several factors, including overall vaccination rate, the use of mitigation measures such as screening, masking, and social distancing, and transmissibility of the circulating SARS-CoV-2 variants (see below). Breakthrough cases may produce less severe illness than cases in those who are not fully vaccinated, and there has been evidence that vaccinated individuals are less likely to pass SARS-CoV-2 on to others.<sup>8</sup> However, transmission may still occur and vaccinated individuals who become infected should still isolate away from others.

### Treatment

At the start of the pandemic all COVID-19 treatment was *supportive*, meaning that health care workers treat a patient's symptoms while the patient recovers. Respiratory support, such as the use of oxygen or a ventilator, are examples of supportive care. However, there are now several medications and other emerging treatments that are either in use or in trials for use in treating COVID-19. Some of these treatments are oral medications that can be carried aboard ships if they are able to be sourced. These include the antiviral medications Paxlovid (Nirmatrelvir+Ritonivir) and Molnupiravir, which received FDA Emergency Use Authorization for COVID-19 treatment in December of 2021. If these medications are able to be sourced, they may be carried aboard. There are multiple contraindications and drug interactions that limit the use of these medications, and they should only be given after physician consultation. Paxlovid is more effective than Molnupiravir however Molnupiravir can be given to those who are unable to take Paxlovid.

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<sup>8</sup> Effect of Vaccination on Household Transmission of SARS-CoV-2 in England.  
<https://www.nejm.org/doi/full/10.1056/NEJMc2107717> Last Accessed 7/23/21.

Several monoclonal antibody treatments, (bamlanivimab-etesevimab, casirivimab+imdevimab, sotrovimab, and bebtelovimab) have received emergency use authorization at various times throughout the pandemic. As of this update, none of these antibody treatments are authorized for use in the United States because they are not effective against the currently circulating variants. Although there may be additional monoclonal antibody treatments available in the future, they are given intravenously and are less practical to store and administer aboard a ship. These treatments, if available again, are likely to continue to have differing activity against different variants of the virus, and if they become available at shoreside treatment facilities their use should be matched to the expected infecting COVID-19 variant.

There are additional medications that may be given to hospitalized patients for the treatment of COVID-19, such as Remdesivir or steroid medications such as dexamethasone.

Since on-board treatment options are limited it continues to be important to be vigilant about identifying and isolating potential cases AND that advisories on how to avoid contracting and transmitting the virus are followed.

## Testing

GW Maritime Medical Access has put together the following guidance for crews to understand the different types of tests available for COVID-19.

### Carrying Diagnostic Tests Aboard

There are now molecular tests and antigen tests (see below) that have become small enough and are low cost enough to carry aboard vessels. Such tests are called Point-of-Care (POC) tests because they may be performed at the point of care and are not dependent on a dedicated laboratory. Some POC tests still require delicate dedicated machinery, but some tests require only the contents of a small kit to provide results. GW MMA recommends that tests be carried aboard, and that ship operators that choose to carry tests should be aware of the expiration dates and proper handling and storage requirements for the specific tests carried. Crew should also be trained on the correct use of the tests.

Point-of-Care tests can be used aboard ships to limit the spread of SARS-CoV-2 when an outbreak is identified. They can also potentially be used for scheduled on-board surveillance testing, however this use case will require a large volume of tests and frequent replenishment, and so is generally not practical.

When supply is limited, tests are best used when COVID-19 is suspected based on a combination of symptoms and known exposures. Clients who are considering a test kit purchase may contact GW MMA prior to purchase to discuss specific test kits available in the

market and appropriate onboard testing strategies. If an outbreak is suspected aboard a vessel, we also recommend that clients contact us so we may help determine whom to test and interpret the results in context.

### Some Important Notes on Testing

A basic concept that is true of ALL medical testing (lab tests, EKGs, x-rays, etc.) is that no test is perfect and no test will give the correct answer 100% of the time. Consider a strep test: if your doctor only swabs one side of your throat for a fraction of a second, there might not be enough strep on the q-tip to detect strep, even if you do have strep throat. Furthermore, tests have different abilities to see disease. That's why a small fracture in a bone might not show up on an x-ray but will show up on a CT scan. This is true of blood tests as well.

Different SARS-CoV-2 test types and variations in accuracy can complicate interpretation of the tests. While some tests for SARS-CoV-2 have become smaller, cheaper, and more portable, not all tests have the same utility in all situations. There is no fail-safe test, or mix of testing and quarantine, that can guarantee that a vessel is free of the virus that causes COVID-19 before it leaves port. Testing may be used to lessen risk, but testing cannot completely eliminate the risk. When tests are done, they should be interpreted by a physician with experience in evaluating the context in which the test was performed. **It is important to note that a single negative test cannot reliably rule out SARS-CoV-2 infection.**

### Test Types (Information Provided for Context)

There are several categories of testing for SARS-CoV-2, which is the virus that causes COVID-19: **diagnostic tests**, which are used to provide a *diagnosis* of COVID-19, and **antibody tests**, which are used to evaluate for an *immune response* to SARS-CoV-2.

#### *Diagnostic Tests*

There are two types of tests that are used to look for active COVID-19 infection: **Antigen Tests**, which look for certain material on the outside of a COVID virus, and **molecular tests**, which look for genetic material from inside the virus. There are several types of molecular tests, such as RT-PCR, NAAT, LAMP tests, and others.

Antigen tests may be simpler to perform than molecular tests, but because they are less accurate than molecular tests, especially in those who don't have symptoms, they are more often used to **screen** for disease rather than **diagnose** disease. Some antigen tests may be performed without laboratory equipment (in a similar fashion to a home pregnancy test), so may be the most readily available tests in the maritime environment. If an antigen test is negative but the person tested has symptoms of COVID-19, then additional antigen tests or a follow-up molecular test should be obtained. Additionally, if an antigen test is positive but the

person tested does not have symptoms of COVID-19, then a follow-up molecular test should be obtained if possible. If an antigen test is positive and the person tested does have symptoms, then the test may be considered diagnostic. This is why it is very important to know what type of test is done, and in what context, when a mariner is tested.

**Molecular tests** are generally obtained by nasal swab that looks for viral genetic material. These tests usually require a professional to obtain the nasal swab and generally must be run in a lab, although there are some molecular tests that can be done by saliva or by self-swab, which is when the patient self-collects the sample. These tests may carry some risk to the individual collecting the sample, and test accuracy is dependent on proper sample collection technique. While the accuracy of these tests has improved over the course of the pandemic, it still varies from test manufacturer to test manufacturer. Furthermore, accuracy of these tests is also highly dependent on when in the course of the disease the sample is taken, sample collection technique, sample handling, and transport to the lab. Consequently, COVID infection is often presumed in a symptomatic individual even if a molecular test is negative if there is no alternative explanation for the patient's symptoms. A test that returns a negative result in an individual who is actually infected is called a **false negative test**. Occasionally, although less frequently, a test may show a positive result in someone who is not infected. This is called a **false positive test**.

Both antigen tests and molecular tests may be used for disease **surveillance testing** as well. Surveillance testing is when a group of individuals are tested on a regular basis, even if asymptomatic, to see if any of them have been infected with SARS-CoV-2. Surveillance testing may allow an outbreak to be caught earlier and limit the spread of virus.

Due to the persistence of virus genetic material, molecular tests may remain positive in some individuals for weeks or months after they have recovered from illness and are no longer able to transmit virus to. Consequently repeat testing to clear individuals of infection is not required or recommended, nor is the use of molecular tests within 90 days of recovery from infection. After an individual has been diagnosed with COVID-19, surveillance testing of while asymptomatic is not recommended for 30 days from diagnosis and the use of molecular tests for surveillance is not recommended for 90 days from diagnosis (surveillance with antigen tests may be done from day 31-90).

### *Antibody Tests*

This section has been moved to Appendix 3: Antibody Tests.

## Specific Recommendations

### General Precautions

The best way to manage COVID-19 is to attempt to avoid contracting it. Individuals will reduce their chance of contracting the virus or spreading it to others by integrating the following recommendations into their daily routine, whether ashore or aboard ship.

- 1) Stay up to date on COVID-19 vaccination. While other interventions continue to be relevant, having a fully vaccinated crew is the single most effective intervention to reduce onboard risk. Mariners should remain up-to-date on vaccines, with boosters as recommended for the specific vaccine used.
- 2) Ensure that air handling and ventilation equipment is kept clean and properly serviced. Ensure that filters in this equipment are regularly changed or cleaned as appropriate based on manufacturers recommendations. If possible, use a MERV-13 filter in air handling equipment, however do not use a filter that is beyond the rating or capability of the equipment. Portable HEPA air filtration devices may be used in spaces that are poorly ventilated. These devices should be sized appropriately for the space in which they are used and should have appropriate ratings for the environment in which they are used.
- 3) Frequently clean and disinfect surfaces and objects that come into contact with multiple crew members (e.g. ship's wheel, radar screens, radios, bathrooms, dining areas, exercise rooms etc.). Consider developing a cleaning schedule that ensures routine cleaning at standard times such as the start of each watch, or with each boat check.
- 4) Practice social distancing when appropriate\*, which includes the following
  - a. Stay at least 6 feet from other people
  - b. Do not gather in groups
  - c. Stay out of crowded places and avoid mass gatherings
  - d. Further details and tips on social distancing can be found on the CDC website here: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html>
- 5) Wash hands frequently with soap and water or an alcohol-based hand sanitizer.
  - a. Hands should be washed for a full 20 seconds and care should be taken to ensure that all surfaces of the hands and wrists are washed
  - b. more information on handwashing may be found here: <https://www.cdc.gov/handwashing/when-how-handwashing.html>
- 6) Avoid touching the face.
  - a. Every effort should be made to avoid touching the face, which would transfer infectious material from the hands to the mucous membranes of the eyes, nose, and mouth.
- 7) Wear a mask or respirator when appropriate.\*
  - a. Surgical masks are designed to catch respiratory droplets as people talk, breathe, or sneeze, and reduce the likelihood of transmitting the virus to others. They may provide some protection to the wearer as well.

- b. N-95 masks reduce the chance that the wearer will contract the virus when in the presence of an infected individual (see below section on care for an ill crewmember). N-95 masks must be fit-tested to the wearer to be maximally effective to their rating.
  - c. If the above are not available, homemade masks or other face coverings may be used, however these types of coverings are felt to be less effective than purpose designed face masks.
  - d. Disposable masks are not designed for repeat use however in case of supply shortage aboard it may become necessary in certain circumstances to reuse masks. If the supply of masks is limited and they must be reused, each crewmember should be issued multiple masks and they should be used in rotation. After a mask is used it should be stored in a paper bag labeled with the date of use and the following day the next mask should be used. Each should be stored and when a crewmember's individual supply of masks has been fully used, the mask worn on the first day should be used again. Crewmembers should then cycle through their supply of masks in the same order as they were originally used. The storage in a bag is to allow any virus particles to reduce their infectivity.
  - e. Double masking (wearing a cloth mask over a surgical mask) has been shown to be more effective than wearing a single mask alone. However, two surgical masks or an N-95 mask and a surgical mask should not be worn together.
  - f. Masks should not be worn if masking would create a task-specific safety-hazard. However masks should be worn until immediately before and then immediately after the task.
  - g. Masks are less effective when wet and should be changed if wet, soiled, or damaged.
  - h. Masks with exhalation valves should not be used.
- 8) Cover coughs and sneezes with a tissue and throw the tissue away after use. Wash hands after coughing or sneezing.
- 9) Gloves should not be worn for an extended period of time except during activities for which specific gloves are otherwise indicated.
- a. When latex or nitrile gloves are worn for an extended period of time they may become contaminated with coronavirus or other infectious or dangerous material. They may provide a false sense of security and are generally not routinely cleaned the way hands are when washed. Consequently, contaminated gloves may spread infectious material as the wearer touches multiple surfaces or his or her face.
  - b. Latex or nitrile gloves should be worn when cleaning potentially infectious surfaces or when caring for a mariner who is known or suspected to have COVID-19. Appropriate protective gloves should also be worn if otherwise indicated (for example during activities such as cargo handling, rigging, welding, etc.).
- 10) Ensure that nails are trimmed.
- 11) Avoid Close Contact with those who are sick unless providing direct care.

- a. The CDC defined **close contact** as being within 6 feet of an infected individual “for a cumulative total of 15 minutes or more over a 24 hour period starting from 2 days before illness onset (or, for asymptomatic patients, 2 days prior to test specimen collection) until the time the patient is isolated.”<sup>9</sup>

\*The US CDC has progressively made changes to its recommendations for masking and social distancing. Descriptions of how these measures should be used aboard ships may be found here: <https://www.cdc.gov/quarantine/maritime/covid-19-ship-guidance.html>

How to clean and disinfect surfaces

The CDC provides detailed guidance on cleaning and disinfecting surfaces and objects. This guidance can be found here: <https://www.cdc.gov/hygiene/cleaning/facility.html>

Additionally, the EPA maintains a list of disinfectant products that are effective against SARS-CoV-2, which can be found here: <https://www.epa.gov/pesticide-registration/list-n-disinfectants-coronavirus-covid-19>

### Prior to Embarkation

Every effort should be made to ensure that potential crewmembers do not embark on a vessel if they are sick or are likely to infect others.

New crew who are rotated on to the vessel should be screened for symptoms of COVID-19 or recent exposure to COVID-19, and consideration should be given to vaccination status, quarantine, and SARS-CoV-2 testing prior to embarkation.

The CDC provides guidance to ship operators on pre-boarding procedures which may be found here: <https://www.cdc.gov/quarantine/maritime/covid-19-ship-guidance.html>.

### *Pre-embarkation Quarantine*

Quarantining crew members ashore prior to embarkation was a strategy used frequently at the start of the COVID-19 pandemic. In some circumstances this may be desirable if a ship will have an extended time at sea or will be very far from assistance in case of an outbreak. The goal of the quarantine period is to observe each potential crewmember for signs of infection during a period when their exposure to other individuals is at a minimum. Testing can be employed during pre-embarkation quarantine to surveil for SARS-CoV-2 infection.

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<sup>9</sup> <https://www.cdc.gov/coronavirus/2019-ncov/global-covid-19/operational-considerations-contact-tracing.html>. Last accessed Jan 19, 2021, site no longer accessible.

## Aboard Ship

Aboard each vessel we recommend that crew follow advisories on how to avoid contracting and transmitting the virus, and also that crew are vigilant about identifying and isolating potential cases. Shipboard policies should address transmission reduction and disease management, should any crew member become ill.

### Access Control

Ship operators may continue to consider screening individuals prior to allowing them to board vessels. This process may include both symptom and temperature checks.

### Prevention

All crew should practice prudent standard infection precautions. These are described in the “General Precautions” section above. It is important that all crew adhere to best practices. Crew should be empowered to point out lapses in best practices to others, regardless of job or rank. We also feel that it is important that crew feel comfortable expressing that they do not feel well if they develop symptoms, as an unreported infection could have subsequent consequences.

### If a Crewmember Becomes Ill

#### Pre-planning

Caring for an ill crew member should begin prior to embarkation. A plan of care should include the following at a minimum:

- 1) **Where will the ill crew member isolate?** Crew members who develop symptoms will have to isolate aboard the vessel. Ideally a space for isolation will be identified in advance. It may be the crew-member’s own quarters, however it may be another private space. This space should ideally have its own head. If a head outside the isolation room must be used, it should be as close as possible to the isolation room and should only be used by crew who are in isolation.
- 2) **Who will care for the ill crew member?** He or she may have both medical and non-medical needs. Thought will have to be given to how supplies and waste go to and from the isolation room. This is addressed below in greater detail. **Contact with an ill crewmember should be brief and adhere to good social distancing practices** (e.g. masks should be worn by both the ill crew member and the caregiver, 6 feet of separation should be maintained if possible).
  - a. **Ideally a single individual will be designated to have contact with the isolated crew-member, and anyone who has contact with the ill crewmember must be trained in the use of PPE.**
- 3) **Which individual crewmembers are critical to the safe operation of the vessel, and how many crewmembers could become ill before vessel operation is jeopardized?** There should be a plan available in case critical members of the crew become ill, or

multiple members of the crew become ill. The CDC outlines options for managing multiple ill crew members within its Guidance for Maritime Vessels on the Mitigation and Management of COVID-19: <https://www.cdc.gov/quarantine/maritime/covid-19-ship-guidance.html>. Consideration should be given to the possibility that diversion or evacuation may be needed in case of severe illness or staffing shortages.

- 4) **What must happen immediately after crewmember becomes ill?** Suggested steps are below. Consider having a plan to further limit crew interaction in case of disease outbreak.
- 5) **What additional equipment must be carried aboard to manage COVID-19?** Examples includes PPE, disinfection supplies, COVID tests, and additional medications.

### *Discovery of Illness*

Crew should be encouraged to immediately report all illness to the medical officer, no matter how seemingly minor. If a crew member develops coronavirus symptoms the following suggested steps should be taken:

- 1) Follow guidance provided by the US CDC in its Guidance for Maritime Vessels on the Mitigation and Management of COVID-19 (<https://www.cdc.gov/quarantine/maritime/covid-19-ship-guidance.html>). This guidance provides procedures and recommendations for isolation aboard.
- 2) The crew member should immediately be isolated in the pre-determined isolation space and tested for COVID-19 if tests are available.
- 3) Clients should call GW Maritime Medical Access to open a case and begin medical management.
- 4) Close contacts should be traced and questioned about symptoms. Depending on the type of vessel and size of crew, this may mean that all crew members are considered close contacts.
  - a. The CDC has defined a **close contact** as being within 6 feet of an infected individual “for a cumulative total of 15 minutes or more over a 24-hour period starting from 2 days before illness onset (or, for asymptomatic patients, 2 days prior to test specimen collection) until the time the patient is isolated.”
- 5) If the symptomatic individual has a roommate, he or she should be isolated in a different room from the symptomatic individual.
- 6) Consideration should be given to testing close contacts if testing is available. Remember that a negative test does not definitely rule the disease out.
- 7) Close contacts should wear masks while around others and should be tested at least 5 days after exposure. Close contacts should also participate in a working quarantine as described within the CDC’s Guidance for Maritime Vessels on the Mitigation and Management of COVID-19.
- 8) Any crew member in quarantine who becomes symptomatic should be tested, or treated as positive if testing is not available.
- 9) Anyone who has contact with a quarantined individual should be wearing appropriate personal protective equipment. This includes an N95 mask (surgical mask if an N95 is

not available), splash goggles or face shield, isolation gown, and gloves. The ill crewmember should also wear a surgical mask while the caregiver is in the room.

- a. This personal protective equipment must be properly put on (donned) and taken off (doffed) before and after the caregiver is in the room.
  - b. A CDC information sheet with details on the proper way to don and doff PPE may be found here: <https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf>. This may be kept on the vessel.
  - c. It is very important to perform hand hygiene (washing) after PPE is doffed.
  - d. We also recommend that multiple crew members be familiar with donning and doffing procedures. An individual or individuals can be designated as safety officers to observe the caregiver donning and doffing to ensure that no contamination occurs during these procedures.
- 10) Any items that the ill crewmember needs should be delivered to the room, including meals.
- 11) Any items brought out of the room, such as garbage or laundry, should be considered infectious, and should be bagged and handled by persons wearing appropriate PPE until disposed of or cleaned or disinfected.
- 12) The CDCs guidance on caring for someone in isolation outside of a healthcare setting has more information on how to manage contact with an ill individual, and on managing the flow of items in and out of the isolation space: <https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/care-for-someone.html>

#### Returning to Work after Exposure or Infection

Recommended isolation duration is different aboard ships than for the general population.

In December of 2021 the US CDC shortened its isolation guidance for the general population in the community setting to recommend 5 days of isolation followed by 5 days of masking for those who are asymptomatic or have mild illness. Those with moderate or severe illness are recommended to isolate for 10 days (moderate illness) or possibly longer (severe illness); definitions of illness severity are re-produced in Appendix 2: Disease Severity Definitions. However, the CDC recognizes that “In certain high-risk congregate settings that have high risk of secondary transmission, CDC recommends a 10-day isolation period for residents.”<sup>10</sup>

The CDC guidance for non-cruise ships explicitly recommends a 10-day isolation period after confirmed infection. This guidance also recommends a 10-day quarantine for exposed crew members regardless of vaccine status. If minimum safe manning cannot be maintained, the ship may consider a “working quarantine” in which exposed crew may work but must quarantine while not performing their duties. CDC guidance for ships may be found here:

<https://www.cdc.gov/quarantine/maritime/covid-19-ship-guidance.html>

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<sup>10</sup> <https://www.cdc.gov/coronavirus/2019-ncov/hcp/duration-isolation.html> (accessed 7/26/2023)

Those who are contacts of the positive case are recommended to enter an on board 10-day “working” quarantine, in which they work but engage wear masks and when outside of their cabin and limit activity and exposure to others when not working. The link above provides additional information on the working quarantine.

If it is feasible for crew to isolate ashore this can be considered, but local laws and health department requirements should be followed. Testing of close contacts or all aboard should be considered if an infection is discovered and tests are available. Tests do not routinely need to be repeated after an initial positive test, and daily testing or re-testing is not recommended.

### In Port

We recommend that prior to visiting any port, captains and crews adhere to the following:

- 1) Prior to docking in any port, please refer to the WHO and CDC travel advisories (<https://wwwnc.cdc.gov/travel>). In addition, local port authorities might have advisories that are in effect that should be considered.
- 2) While in port, we suggest that close contact with local populations be limited only to what is necessary to conduct business.
- 3) Crewmembers not disembarking should remain on the vessel unless they must go ashore to conduct business related to the operation of the vessel, or to seek medical care as needed.

### Education and Training

We recommend that all crewmembers should be educated on best practices and should be made aware of company policies on the management of COVID-19. In particular all crew should:

- 1) Be aware of the signs and symptoms of COVID-19 and be encouraged to report illness.
- 2) Be educated on, and encouraged to infection control practices.
- 3) Be familiar with the ship’s disease surveillance and response plan.
- 4) Be educated on the company’s pre-embarkation procedures.
- 5) Know how COVID preparedness impacts day to day ship operations (extra cleaning, limits on social gatherings, etc.).
- 6) Know how COVID preparedness impacts operations while in port and while essential non-screened individuals such a local pilots are on board.

We recommend that any company policies be readily available to all crew, and that training be conducted with crew-members to ensure that they are aware of safety practices and company policies.

## Additional Resources

Where possible we have linked to specific sources that may be updated over time. The following resources will provide additional information.

The CDC's "Guidance for Maritime Vessels on the Mitigation and Management of COVID-19: may be found here: <https://www.cdc.gov/quarantine/maritime/covid-19-ship-guidance.html>

## Appendices

### Appendix 1: Quarantine and Isolation Definitions

Crew who are exposed to COVID-19 or who test positive for COVID-19 are asked to separate themselves from others to limit the spread of the virus in one of two ways:

1. **Quarantine** separates and restricts the movement of people who were exposed to a contagious disease to see if they become sick.<sup>11</sup> Crew who are exposed to COVID-19 are *quarantined*.

Anyone who gets sick or tests positive during this period goes from quarantine to isolation.

2. **Isolation** separates sick people with a contagious disease from people who are not sick.<sup>6</sup> Crew who test positive for COVID-19, or who have symptoms of COVID-19 prior to testing, are *isolated*.

CDC guidance on isolation and quarantine can be found here:

<https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/steps-when-sick.html>

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<sup>11</sup> <https://www.cdc.gov/quarantine/index.html>

## Appendix 2: Disease Severity Definitions

These definitions are quoted from the NIH COVID-19 Treatment Guidelines<sup>12</sup>:

**Asymptomatic or presymptomatic infection:** Individuals who test positive for SARS-CoV-2 using a virologic test (i.e., a nucleic acid amplification test [NAAT] or an antigen test) but have no symptoms consistent with COVID-19.

**Mild illness:** Individuals who have any of the various signs and symptoms of COVID-19 (e.g., fever, cough, sore throat, malaise, headache, muscle pain, nausea, vomiting, diarrhea, loss of taste and smell) but do not have shortness of breath, dyspnea, or abnormal chest imaging.

**Moderate illness:** Individuals who show evidence of lower respiratory disease during clinical assessment or imaging and who have an oxygen saturation measured by pulse oximetry (SpO<sub>2</sub>) ≥94% on room air at sea level.

**Severe illness:** Individuals who have SpO<sub>2</sub> <94% on room air at sea level, a ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO<sub>2</sub>/FiO<sub>2</sub>) <300 mm Hg, a respiratory rate >30 breaths/min, or lung infiltrates >50%.

**Critical illness:** Individuals who have respiratory failure, septic shock, and/or multiple organ dysfunction.

## Appendix 3: Antibody Tests

*Note: this section has been moved to an appendix and is no longer being updated. It is included for historical completeness. Antibody tests emerged early in the pandemic as a way to look for prior infection. At that time those with positive antibody tests were felt to have some immunity from re-infection. Some SARS-CoV-2 antibody tests indicate prior infection (e.g. N protein test) while others do not (S protein test). Antibody tests have little clinical utility as they cannot be used to diagnose active infection, while low-cost, portable diagnostic tests can. A detailed discussion of the types of antibody tests is not included below due to the limited clinical use of antibody tests.*

Antibody tests look for antibodies in the blood. Antibodies are produced by the body's immune system in RESPONSE to the virus. These tests can be run using a small kit in nearly any location and are comparatively simple to administer. A small blood sample is typically collected via a sterile pinprick of the patient's finger. The individual collecting the sample must still adhere to basic infection control precautions.

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<sup>12</sup> <https://www.covid19treatmentguidelines.nih.gov/overview/clinical-spectrum/> (Accessed 7/26/2023)

The test looks for two markers in the blood call immunoglobulins (Ig):

1. IgM – a marker of acute infection. If IgM is detected it means the body is fighting the virus.
2. IgG – a marker of lasting immunity. The medical community is still unsure how effective this immunity is or how long it may last. It appears that most people who are infected become immune for a period of time, although there are documented cases of re-infection.

Typically after a person is infected with a virus, they eventually begin to “shed” the virus, meaning that they may potentially infect others around them. During this time the RT-PCR nasal swab test can detect the virus.

At some point, they may become symptomatic, and the body will start making IgM, which can be detected by the blood test. Later on, they will start to make IgG, which can also be detected by the blood test, and they will eventually stop making IgM. If they become re-infected in the future, the body “remembers” the virus with the IgG and the body will start making IgM again to fight the virus. This series of events is typical for most viruses. The body undergoes the same process when vaccinated.

**Error! Reference source not found.** demonstrates our current understanding of these events for SARS-CoV-2. Patients with COVID-19 can be contagious both before and after they show symptoms, and some may be contagious but never show symptoms at all. Because those infected with SARS-CoV-2 do not typically develop antibodies until sometime after they become contagious, antibody tests cannot currently be used to rule-out infection. This issue is compounded by a great deal of variability in the reliability of the tests from manufacturer to manufacturer.<sup>13</sup> **Because of these concerns antibody testing for COVID-19 cannot be used to rule out an active infection and cannot currently be used to make decisions about the individual returning to work.**

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<sup>13</sup> <https://covidtestingproject.org/>

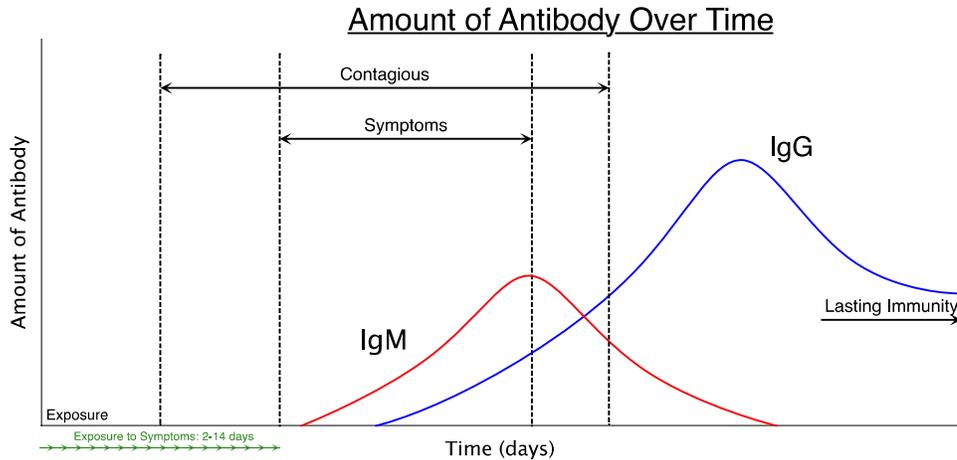


Figure 1: Infection Timeline

### How are the Ig test results interpreted?

Although antibody testing for COVID-19 cannot currently be used for clinical decision-making, there may be emerging uses for these tests in disease surveillance. We provide the following detail on how the antibody tests are interpreted for reference.

Ig Type →	IgM	IgG	↓ Interpretation ↓
Detected by Test?	No	No	Negative Test, though there is a chance patient is infected and it's too early to detect immune response, or test is a "false negative"
	Yes	No	Patient is infected, consider diagnostic testing, isolation, monitoring, and treatment in the right clinical setting
	Yes	Yes	Patient is infected and has started to mount immune response
	No	Yes	Patient was infected at some point in the past, or was previously immunized

If there is any IgM detected, whether or not IgG is detected, the patient has likely been recently infected, or recently vaccinated. Diagnostic testing and isolation may be considered, especially if the patient has any symptoms of COVID-19. However, the antibody test should not be used in place of the diagnostic test, so this finding will probably be incidental.

If there is no IgM or IgG detected, the test is negative. However, there is still a chance the patient is infected but an immune response can't yet be detected, or that the test is a *false negative*. The patient may be re-tested after a period of to see if the results have changed.

If there is no IgM detected but IgG is detected, the patient was likely previously infected and now has mounted and immune response, or was vaccinated in the past. Based on current understanding the IgG confers some measure of immunity. Per prior CDC recommendations:

- “Unvaccinated persons who are asymptomatic and who test positive for SARS-CoV-2 antibody without recent history of COVID-19 or a compatible illness have a low likelihood of active infection and do not need to isolate.”<sup>14</sup>

Those who have immunity by vaccination should generally still follow the same public health guidance around social distancing and mask wearing as those who have not been infected or vaccinated.

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<sup>14</sup> <https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antibody-tests-guidelines.html>. Last accessed April 29, 2021.