



## **An introduction to testing for COVID-19**

The COVID-19 pandemic is still ongoing. It presents major challenges to seafarers and shipowners due to the lockdown of countries, travel restrictions, changes in local regulations, problems accessing healthcare ashore when needed, and worries if crewmembers develop COVID-19-like symptoms while at sea. In some countries and regions, the infection numbers are still rising while in others, the infection rate is declining with many countries and regions slowly opening to greater human interaction. One of the critical features in addressing the pandemic as well as easing lockdown has been testing for the disease. Gard receives many questions about the use of tests, and has sought the assistance and expertise of doctors at the Norwegian Centre for Maritime and Diving Medicine to help answer some of the questions.

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## **The Coronavirus, the immune system – and the tests**

Although the Coronavirus that causes COVID-19 is relatively new to us, the virus behaves like other viruses in the same family. Other Coronaviruses include SARS and MERS as well as the more innocent, common cold producing Coronaviruses that regularly go around in society. Our bodies respond to the virus that produces COVID-19 in a similar fashion as to other viruses. When the body is infected, the immune system recognizes the virus as something alien and starts combatting it. Because the efficiency of our immune systems varies between individuals, the strength, speed, and effectiveness of the response to the virus will vary between people.

When testing for the virus, one can either test for the presence of the virus or the presence of an immune response to the virus. The testing methods that look for an active virus in the body, are called PCR-tests and antigen tests. For a virus to be active, it must have started spreading in the body. This means that if the test is taken too early after a person has been exposed to the virus, the virus might not be detected. Furthermore, the virus can sometimes be found in the body long after a person has recovered from the disease. The PCR-tests and antigen tests therefore say nothing about how ill or infectious the person is. PCR-tests are in general costly, labor intensive, and are mostly performed at hospitals and in other health care settings. In the future antigen tests might be developed into point-of-care tests that can be used locally.

The testing method that looks for the immune response to the virus is called an antibody test. Whenever a person has been infected by a virus, the individual's immune system forms several different types of antibodies. However, the rate at which they form, varies between people. This means that an antibody test can be used to confirm that a person has had the Coronavirus, but it is unreliable during the first 8-10 days of the disease. Furthermore, some antibody tests will react to antibodies formed to other Coronaviruses than the one that produces COVID-19. The medical community therefore never uses a positive antibody test alone to confirm COVID-19. An additional PCR-test is needed.

### **The quality of tests**

Currently, only antibody tests are commercially available as rapid tests. PCR-tests can be taken locally, but the swab must be transported to and analyzed at a laboratory. Antigen tests might become available as point-of-care tests in the future. Although PCR-tests are the gold standard for tests, they still miss an infection in up to 30 % of cases. This is largely due to when in the course of the disease the swab was taken, errors when taking the swab, transport issues and errors at the laboratory.

Available antibody tests vary greatly in quality. In a recent evaluation of eleven rapid tests for detection of antibodies against the virus causing COVID-19, the financially independent agency The Norwegian Organization for Quality Improvement of Laboratory Examinations (Noklus) found that only 4 of the eleven tests held high enough quality to be recommended for use.

If you do want an antibody test, you have to look for a test that tests the two types of antibody called IgG and IgM. To be useful outside health care settings, the test needs to be done with a “lancet”, a small sharp needle that pricks the finger to draw a drop of blood to test. The test further needs to be specific for the type of Coronavirus that gives COVID-19. You should also choose a test that is CE-marked or has been given emergency use authorization by the Food and Drug Administration (FDA) of the United States. An updated list of tests that have been given emergency use authorization by FDA can be found [here](#).

### **Be aware of the false security derived from tests**

Most people tend to think that if you test for something, without finding anything, then it means that whatever you tested for is not there. Unfortunately, that is not necessarily true. First of all, a test shows the status at a specific point in time. The test does not say anything about the future or what happens after the test is done. Secondly, although tests can confirm that a person is or was infected by a Coronavirus, no tests can be used to say for sure that a person **is not** infected

by Coronavirus. Thirdly, all tests come with a built-in uncertainty, which includes how accurate they are and how specific they are. That means the tests sometimes do not detect what they are supposed to detect (false negative), and sometimes they say that something is there, when it is not (false positive).

All test should therefore be used in collaboration with health care personnel who know the quality of that particular test, and who can relate the answer of the test to the person's symptoms or history.

### **Which questions can the tests answer?**

Let us look at some of the possible questions people try to answer by testing to see if the tests actually can help us:

### **Concluding remarks**

If you worry about getting COVID-19, one of the safest places to be is a vessel which has been at sea for 14 days and which has no ill people on board. A two-week quarantine before boarding is the safest approach to keep a vessel free of COVID-19. PCR-tests can be used to further increase the likelihood that someone is not infected by Coronavirus. Still, a negative test is no guarantee of absence of infection.

Antibody tests can be used to screen for people who have been infected by Coronavirus. They cannot say anything definite about their immunity to the virus. We do know that most people who have been infected acquire some kind of immunity. But at this time, we still do not know how long the immunity lasts, and we do not know whether immunity means that they will never acquire the disease again or that they might get the disease again, but only in a milder form.

The International Chamber of Shipping published the fourth version of their [COVID-19-guidance for ship-operators](#) on 7 June 2021. The guide includes detailed advice on how to manage the ship/shore interface, embarkation and disembarkation, suspected COVID-19 cases and other medical cases on board. The ICS guidance suggests caution in use of tests – *“Since a negative PCR test does not guarantee that a seafarer is not infected with COVID-19 and they could still potentially carry the virus on board the ship, any seafarer about to join the ship who develops any symptoms of a respiratory tract infection (cough, fever, sore throat, etc.) should not be boarded as planned and should receive further medical advice”*.

Testing is an important diagnostic and tracking tool. However, to prevent the spread of COVID-19, other measures are more important - washing hands, respiratory hygiene, shipboard self-distancing, temperature screening, self-monitoring for symptoms, and health self-declaration before embarkation.