The Diving Medical Advisory Committee

DMAC, 66 Buckingham Gate, London SW1E 6AU, UK
Tel: +44 (0) 20 7824 5520

www.dmac-diving.org
info@dmac-diving.org

Return to Diving after COVID-19

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Supersedes DMAC 33 Rev. 3, which is now withdrawn

1 Introduction and Scope

This guidance covers the return to commercial offshore surface supplied and saturation diving after COVID-19. It is recognised that the guidance may be of interest to other diving sectors (e.g. inland/inshore, military etc.).

2 Short-term and Long-term Health Effects of COVID-19

The severity of COVID-19 disease is highly variable – from asymptomatic infection to death. One review suggests that the fraction of asymptomatic patients may be as high as 40-50% (1). Although pulmonary infection (pneumonia) with ground-glass opacities visible in chest CT scans is well recognised (2), it has been reported that, particularly in severe cases, the central nervous system and the cardiovascular system may be involved as well (3, 4). It has been shown that Covid-19 is an independent risk factor for pulmonary embolism, and that an increased risk is observed for 6 months after infection (5). A high proportion (44-89%) of pulmonary CT changes has been reported in studies of patients with asymptomatic or mildly symptomatic COVID-19 disease (6, 7). In a study of cardiopulmonary recovery after COVID-19, the authors found significant improvement of lung abnormalities in chest CT scans 100 days after diagnosis in patients with moderate, severe and critical disease (8). In this study radiological changes for non-hospitalised patients were minor. Overall, the findings suggest that there may be structural pulmonary changes in the absence of symptoms, but these changes are likely to improve over the course of a few months.

3 Effects of COVID-19 on Fitness for Diving

In the acute phase of disease, symptoms like fatigue, malaise, dyspnoea and coughing will often preclude diving and this will not be further discussed. The question arises as to the consequence for diving safety and infectivity once the diver is asymptomatic. Advice on these questions will be based on extrapolation of data and expectations based on the effects of similar infectious diseases. An example of such an assessment is the one published by the Belgian Hyperbaric Medicine Society (9). This statement discusses the potential consequences for fitness for diving after COVID-19 based on infectivity to other divers, pulmonary barotrauma, cardiac events, pulmonary oxygen toxicity and decompression sickness. The statement does not specify whether it is applicable to diving in general or whether it specifically addresses recreational or occupational diving.

It is the opinion of DMAC that the data on any effects from COVID-19 on pulmonary oxygen toxicity and decompression sickness is too scarce to support any guidance. If the chest CT is normal, the likelihood of contracting pulmonary barotrauma is probably very low in the occupational diving industry. The most significant effects of COVID-19 on divers' fitness are probably fatigue, impaired exercise capacity and infectivity. Our recommendations in section 5 below reflect this opinion.

4 Existing Guidelines on Fitness for Diving after COVID-19

The Belgian Hyperbaric Medicine Society calls for a minimum of two, preferably three months, of abstention from diving after COVID-19 (9). The Society recommends extensive pulmonary function testing, high resolution CT scans and cardiac evaluation before diving is resumed for divers who have been hospitalised for COVID-19. The University of California, San Diego, has issued guidelines for examination of recreational, scientific and commercial divers after COVID-19 (10). The guidelines detail requirements for clinical examination, exercise testing (with and

without oximetry), chest X-ray, ECG, and echocardiogram. Similar guidelines have been issued by the US Physicians Diving Advisory Committee. The UK Diving Medical Committee (UKDMC) has published guidance on its webpage including a scorecard. It should be noted that UKDMC primarily supports recreational diving.

5 Recommendations for Assessment of Fitness for Commercial Diving during the ongoing COVID-19 Pandemic

DMAC advice is based upon the precautionary principle. We recommend caution and vigilance with respect to the as yet unknown consequences for diving health and safety that previous COVID-19 infection amongst divers may cause. The diving industry is international, and divers are recruited from areas where the proportions of people affected by COVID-19 in populations may be vastly different. As previously mentioned, a significant proportion of persons infected with COVID-19 remain asymptomatic but can still have pulmonary changes on CT scans. Asymptomatic carriers present virus RNA in the same order as symptomatic patients, but data suggest that asymptomatic carriers are less contagious than symptomatic patients (11, 12).

The risk of virus transmission from a person with mild-to-moderate COVID-19 is considered low from 10 days after debut of symptoms. PCR testing should not be used to assess infectivity once COVID-19 has been confirmed, as shedding of non-viable virus can continue for many weeks after cessation of infectivity (13). Therefore, the interpretation of a positive PCR result (and subsequent actions) must be discussed with the diving contractor's medical adviser, taking into account medical history, previous results, and other relevant factors.

With the emergence of Omicron variants of the SARS-CoV-2 virus, there has been an increase in number of COVID-19 cases but a lower proportion of severe cases. This is probably caused by increased immunity in the population, possibly in combination with lower viral pathogenicity (14). With the current situation (June 2022), we no longer advocate screening of all divers with testing of physical fitness as a general measure.

For assessment of fitness for commercial diving after COVID-19 infection, we have divided divers into two groups:

1. Asymptomatic divers with positive SARS-CoV-2 virus test and divers who have suffered COVID-19 with mild symptoms only. Chest x-rays or CT scans in this group are normal or not taken.
2. Divers with moderate or severe symptoms of COVID-19. This includes (but is not limited to) all divers who have been hospitalised with COVID-19, divers who have received supplemental oxygen treatment or other medical treatments, divers who have shown signs or symptoms of hypoxemia, divers who have experienced shortness of breath or chest pain linked to the infection, any cardiac or neurological sign or symptom, and divers with changes in chest x-rays or CT scans secondary to COVID-19.

For divers in group 1 we recommend:

- Divers who have suffered COVID-19 with no or mild symptoms only should observe a seven-day absence from diving after the cessation of fever and respiratory symptoms.
- Divers in group 1 may return to diving after the seven-day period of absence provided they have two negative antigen test results 24 hours apart.
- The diver should be reviewed by a Medical Examiner of Divers (MED) before resumption of diving. The extent and nature of the review is left to the discretion of the MED. A clinical examination and an exercise test should be considered for those who have exhibited mild symptoms.

For divers in group 2 we recommend:

- The diver's medical fitness for diving should be reassessed by a Medical Examiner of Divers. The examination should comply with the appropriate standard for medical examination and assessment of working divers, and a new certificate of medical fitness should be issued.
- A chest X-ray or CT should be completed in all cases when previous imaging has identified structural changes secondary to the infection, or the diver wants to return to diving earlier than 3 months after being asymptomatic. Abnormal findings on the CXR should be followed up with a chest CT.
- If considered necessary by the Medical Examiner of Divers, the diver should be assessed by a specialist in pulmonary medicine and/or cardiology before the certificate of medical fitness is issued.

6 Participation in Commercial Offshore Diving Operations after Vaccination for COVID-19

Several vaccines have been developed and have been proven to significantly reduce the risk of severe COVID-19 infection. They may also reduce transmission of the virus. Data from phase 3 studies of the vaccines indicate that they are effective and generally well tolerated. However, mild to moderate local side effects are common, specifically local reactions at the injection site and systemic effects like fatigue, headaches and chills. The median onset of systemic side effects was 1-2 days after injection and duration generally 1-2 days. More serious side effects have been reported, but these are very rare. As with all other vaccines, there is a small risk of serious allergic reactions immediately after vaccination. There have also been reports of blood clotting and inflammatory heart conditions that may be linked to vaccinations. In the Norwegian Medicines Agency report on suspected adverse reactions to COVID-19 vaccines published in September 2021, the frequency of serious side effects is 3.7 cases per 10,000 vaccinations (15). This is probably a high estimate, as it is based on reports of possible, not confirmed, side effects.

Side effects after vaccination may temporarily reduce the work ability of the diver and may also be confused with symptoms of decompression illness. The risk of side effects should therefore be considered carefully for divers participating in offshore diving operations shortly after vaccination. In the Position of the Belgian Society for Diving and Hyperbaric Medicine on Diving and COVID-19 Vaccination (16), the authors recommend divers to consider a waiting period of 7-14 days after vaccination before engaging in diving activities. We have found no evidence to support this as a general recommendation. Based on the available safety data for the vaccines, we consider an abstention period of 2-3 days after vaccination to be sufficient for offshore diving. A similar abstention period has been suggested by the Italian Diving and Hyperbaric Medical Society (17).

As noted above, vaccination will significantly reduce the risk of severe COVID-19 infection and may also reduce human to human transmission of the SARS-CoV-2 virus. DMAC has issued a Position Statement on COVID-19 Vaccination and the Offshore Energy Diving Community recommending strongly that offshore divers and diving personnel follow national guidelines for vaccination.

It should be noted that although COVID-19 vaccination significantly reduces the risk of severe infection, it does not eliminate the risk of contracting the infection. The SARS-CoV-2 Omicron variants are associated with higher transmissibility than previous variants. It should be noted that persons who have been vaccinated or have previously had COVID-19, are still capable of contracting and transmitting the virus. All divers and diving contractors are therefore urged to maintain compliance with preventative measures, and to continually monitor for symptoms of COVID-19 disease.

7 References

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