

# Physicians Diving Advisory Committee

## Coronavirus Related Items

### Introduction

As the world deals with SARS-CoV-2, the novel coronavirus that causes COVID-19, the Physicians Diving Advisory Committee (PDAC) is issuing a new statement regarding physicals that should be performed on commercial divers or candidates. The purpose of this guidance is to give diving medical examiners advice about parts of medical examinations that may expose their staff and other patients to the virus, and guidance on return to diving on people that have recovered from the virus. Medical examiners will be faced with local or federal laws that must be adhered to and may supersede some of these recommendations. PDAC mandates the use of a questionnaire, and one is provided for those providers who do not currently have one developed. It is expected that divers currently on extension should have their annual examinations as required by the Consensus Standards 6.3 by November 1, 2020.

The prevalence of COVID-19 can be expected to rise until an effective vaccine is developed and given to a majority of the population. Until then, we must assess risk and determine procedures to minimize spread of the virus. The most concerning tests to be considered that may expose staff or other patients are spirometry and exercise stress testing. The following recommendations have been discussed by PDAC regarding these tests.

### Recommendations on Initial and Annual Diver Physical Exams during the COVID-19 Pandemic

\*\* The following recommendations assume the diver has not experienced a case of COVID-19 nor symptoms consistent with COVID-19. Divers who have missed multiple consecutive days of work due to a respiratory illness since 1/1/20 should be medically evaluated in consultation with a diving medical examiner prior to return to diving. If the diver does have a history suggestive of COVID infection, please follow the "return to diving" flowsheet addressed in the UCSD Guidelines with a link below.

#### Initial Examination:

For a new diver presenting for their first evaluation for diving, or a diver who has not been seen for the last 2-3 years it is the recommendation of the PDAC that the candidate completes the entire medical protocol as written in the Consensus Standards 6.3, including spirometry. If your clinic is not able to provide PFT's in a safe manner, it is recommended that the remainder of the exam be completed and the patient referred to an outside facility for completion of the PFT's. The American College of Occupational and Environmental Medicine (ACOEM) has information on occupational spirometry and fit testing at:

<https://acoem.org/acoem/media/PDF-Library/Publications/Spirometry-and-Fit-Testing-Recommendations-During-COVID-19-7-10-2020.pdf>

Rationale: Stable, healthy lung function is critical to reducing the risk of a life-threatening diving injury from arterial gas embolism or pulmonary barotrauma. While imaging (x-ray and CT) can provide essential information about the architecture and structure of the lungs, it does not give us insight into the function of the airways. Pulmonary function studies close the gap and give the physical performance of the airways, and insight into risk.

#### Annual Examination:

For a returning diver that has a history of stable spirometry (see definition below) and normal interval chest x-rays over the last few years, and no interval history of lung injury or significant irritant exposure,

it is the recommendation of the PDAC that spirometry be waived for the upcoming year. For divers that have had progressively worsening or variable spirometry (see definition below), interval history of significant irritant exposure or pathology on the most recent CXR, it is the recommendation of the PDAC that the candidate completes the entire medical protocol as written, including spirometry. If the physician feels that there is another clinical indication to perform spirometry, then PDAC would support spirometry or full pulmonary function testing. If your clinic is not able to provide spirometry in a safe manner, it is recommended that the remainder of the exam be completed and the patient referred to an outside facility for completion of the spirometry.

Rationale: Lung function and health is primarily a result of lifestyle choices, external exposures, and illness. A detailed interval history and questionnaire can give valuable insight into the likelihood of pulmonary injury. This insight coupled with historical spirometry data and imaging results should be enough to allow the examiner to estimate the likelihood of significant change in lung function. For those divers at low risk of deficit, the risk of spirometry testing during the pandemic outweighs the benefit. For those at intermediate or high likelihood of changes in their spirometry, then such studies would be recommended.

\*Acceptable clinic based spirometry are results performed by trained technicians using ATS/ERS standards<sup>1,2,3</sup>. Spirometry results that are greater than 5% decline of prior numbers [FEV1 and/or FVC] over the last 2-3 tests or with a downward trend may indicate the need for ordering formal pulmonary function tests; or at the discretion of the examining physician.

### **Re-examination After Illness**

Divers who have missed multiple consecutive days of work due to a respiratory illness since 1/1/20 should be medically evaluated in consultation with a diving medical examiner prior to return to diving using the UCSD Guidelines for Evaluation of Divers during COVID-19 Pandemic.

<https://health.ucsd.edu/coronavirus/Documents/UC%20San%20Diego%20Guidelines%20for%20Evaluation%20of%20Divers%20during%20COVID-19%20pandemic.pdf>

Rationale: We are learning more each day about the impact of the COVID 19 virus on the body. The most recent patient reports demonstrate significant injury to the cardiopulmonary system of varying severity and permanence. As such, thorough provocative testing is required to ensure fitness for diving and acceptable recovery from the illness. Detailed imaging and provocative testing (exercise stress, stress echo, etc.) is recommended to ensure cardiac fitness to dive.

### **Face Coverings in the Offshore Environment**

Regarding the uses of masks offshore, the ADCI has published COVID-19 Guidance for Surface Diving Operations. PDAC supports the following that is covered in the document:

Commercial divers and support personnel should use face coverings for the entire duration of a project. Neck gaiters are acceptable. Personnel who remain offshore in excess of 14 days should be required to wear a face covering for the first 14 days while they are offshore. Any “Day Workers” to these locations must wear a face covering for the duration of their stay. Any dive operation that has medical personnel should have N-95 respirators for use in case of suspected positive COVID-19 personnel. Refer to the ADCI COVID-19 Guidance for Surface Diving Operations and the CDC for more information. If the CDC changes recommendations for face coverings that would contradict any part of the ADCI COVID-19 Guidance for Surface Diving Operations then the CDC recommendation should supersede.

<sup>1</sup>Graham BL, et. al., Standardization of Spirometry 2019 Update, Am J Resp & Crit Care Med, Vol 200, No.8, 2019

<sup>2</sup><https://www.cdc.gov/niosh/topics/spirometry/training.html>

<sup>3</sup><https://www.atsjournals.org/doi/full/10.1164/rccm.201908-1590ST>

Classification of divers based on severity of COVID-19 suspected illness

| <b>Category 0</b><br><i>NO history of COVID-19 suspected illness</i>  | <b>Category 1</b><br><i>MILD COVID-19-suspected illness</i>  | <b>Category 2</b><br><i>MODERATE COVID-19-suspected illness</i>   | <b>Category 3</b><br><i>SEVERE COVID-19-suspected illness</i>  |
|---|--|---|--|
| <p>Definition:<br/>Divers who have no history of COVID-19 suspected illness should proceed with normal evaluations.<br/>Additionally, we would use these criteria in those who may have had a positive screening PCR or antibody test, but without any history of illness or symptoms consistent with COVID-19.</p> | <p>Definition:<br/> <ul style="list-style-type: none"> <li>● Did not seek health care or received outpatient treatment only without evidence of hypoxaemia.</li> <li>● Did not require supplemental oxygen</li> <li>● Imaging was normal or not required</li> </ul> </p> | <p>Definition:<br/> <ul style="list-style-type: none"> <li>● Required supplemental oxygen or was hypoxic</li> <li>● Had abnormal chest imaging (chest radiograph or CT scan)</li> <li>● Admitted to the hospital but did NOT require mechanical (intubation) or assisted ventilation (BIPAP, CPAP) or ICU level of care.</li> <li>● If admitted, had documentation of a normal cardiac work up including normal ECG and cardiac biomarkers e.g. troponin or CK-MB and BNP</li> </ul> </p> | <p>Definition:<br/> <ul style="list-style-type: none"> <li>● Required mechanical (intubation) or assisted ventilation (BIPAP, CPAP) or ICU level of care.</li> <li>● Cardiac involvement defined as abnormal ECG or echocardiogram, or elevated cardiac biomarkers; e.g. troponin or CK-MB and BNP (or absence of documented work up)</li> <li>● Thromboembolic complications (such as PE, DVT, or other coagulopathy)</li> </ul> </p> |

Recommendations for evaluations of divers or diving candidates

| <b>Category 0</b><br><i>NO history of COVID-19 suspected illness</i>  | <b>Category 1</b><br><i>MILD COVID-19-suspected illness</i>  | <b>Category 2</b><br><i>MODERATE COVID-19-suspected illness</i>   | <b>Category 3</b><br><i>SEVERE COVID-19-suspected illness</i>   |
|---|--|---|---|
| <ul style="list-style-type: none"> <li>● Initial/periodic exam per ADCI guidelines</li> <li>● Chest radiograph only if required per professional group</li> <li>● No additional testing required</li> </ul> | <ul style="list-style-type: none"> <li>● Initial/periodic exam per ADCI guidelines</li> <li>● Spirometry</li> <li>● Chest radiograph (PA &amp; lateral); if abnormal, obtain chest CT</li> <li>● If unknown (or unsatisfactory) exercise tolerance*, perform exercise tolerance test with oxygen saturation</li> </ul> | <ul style="list-style-type: none"> <li>● Initial/periodic exam per ADCI guidelines</li> <li>● Spirometry</li> <li>● Chest radiograph (PA &amp; lateral); if abnormal, obtain chest CT</li> <li>● ECG</li> <li>● Echocardiogram (if no work up was done as an inpatient. Can forgo if had negative work up)</li> <li>● If unknown (or unsatisfactory) exercise tolerance*, perform exercise tolerance test with oxygen saturation</li> <li>● Investigation and management of any other complications or symptoms per provider and professional group or RSTC guidelines</li> </ul> | <ul style="list-style-type: none"> <li>● Initial/periodic exam per ADCI guidelines</li> <li>● Spirometry</li> <li>● Chest radiograph (PA &amp; lateral); if abnormal, obtain chest CT</li> <li>● ECG</li> <li>● Repeat cardiac troponin or CK-MB and BNP to ensure normalization</li> <li>● Echocardiogram</li> <li>● Exercise Echocardiogram with oxygen saturation</li> <li>● Investigation and management of any other complications or symptoms per provider and professional group or RSTC guidelines</li> </ul> |

*\* If the physician is not assured the diver's self-reported exercise level meets appropriate criteria or is concerned it would not reveal underlying cardiac or pulmonary disease, further testing is warranted.*

Adapted from : Charlotte Sadler, Miguel Alvarez Villela, Karen Van Hoesen, Ian Grover, Michael Lang, Tom Neuman, Peter Lindholm. Diving after SARS-CoV-2 (COVID-19) infection: Fitness to dive assessment and medical guidance. Diving and Hyperbaric Medicine. 2020 30 September;50(3). doi: 10.28920/dhm50.3

## ADCI COVID-19 DIVER QUESTIONNAIRE

**NAME:** \_\_\_\_\_ **DOB:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**COVID-19 SYMPTOMS:**

**Please circle**

Since January 2020:

- |  |    |     |
|--|----|-----|
| 1. Have you had a positive swab (PCR) or blood (antibody test) for COVID-19? If YES, date of test(s): _____  | No | Yes |
| 2. Have you had any of the following symptoms? (circle all that apply) cough, shortness of breath, difficulty breathing, fever, chills, shivering, muscle aches, headache, sore throat, loss of taste or smell, diarrhea | No | Yes |
| 3. Did you miss any days of work due to the above symptoms?  | No | Yes |
| 4. Have you had severe respiratory illness with clinical or x-ray evidence of pneumonia, or acute respiratory distress syndrome?   | No | Yes |
| 5. If YES to question 2-4, were you diagnosed with any respiratory illness other than COVID-19? If YES, what illness: _____  | No | Yes |
| 6. Are you having any symptoms currently?  | No | Yes |
| 7. Do you feel anxious or depressed about the COVID-19 pandemic or working?  | No | Yes |

**EXERCISE TOLERANCE:**

1. What is your normal exercise routine? - \_\_\_\_\_

2. Any change in your ability to do your normal exercise or exertion? No      Yes

3. If YES to question 2, why can't you do your normal exercise? \_\_\_\_\_

**Stop** here if you answered no to all above questions.

| <b>HEALTHCARE:</b>  |    |  |
|---|----|--|
| 1. Did you seek healthcare related to the symptoms you experienced above?   | NO | YES, what level of healthcare?<br><input type="checkbox"/> Outpatient<br><input type="checkbox"/> Hospital admission<br><input type="checkbox"/> Intensive Care Unit |
| 2. Did you have a low blood oxygen level or require supplemental oxygen?    | NO | YES  |
| 3. Was a chest x-ray or CT scan done?                                       | NO | YES, it was:<br><input type="checkbox"/> Normal<br><input type="checkbox"/> Abnormal   |
| 4. Did you require assisted ventilation (BiPAP, CPAP, ventilator)?          | NO | YES  |
| 5. Was an evaluation of your heart done (EKG, echocardiogram, blood tests)? | NO | YES, it was:<br><input type="checkbox"/> Normal<br><input type="checkbox"/> Abnormal   |
| 6. Did you have any blood clots or blood clotting problems?                 | NO | YES  |