UMG 200-01 Diving fitness after respiratory illness

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References

A. Return to diving after COVID-19. DMAC 33 Rev. 3 – February 2022
B. NLD review of respiratory investigations. UDWG 2022 Med panel, Van Oiji
C. RAN - Fleet Health Instruction 93 – 27 Jan 2022
D. UK - DRI 14/20 Medical Recovery Pathway for COVID 19 Positive Divers V3
E. CF H Svc C Instruction 6636-80
F. Tillmans et Al. DAN – Longitudinal to dive after COVID-19 infection – 23 May 2022 (Poster UHMS Scientific Meeting 2022)
G. Sadler et Al. Evaluation of Scuba divers after COVID-19 Infections (Poster UHMS Scientific meeting - 2022)
H. Weaver et Al. Chest CT analysis of cavities / cyst, emphysematous changes and bronchiectasis after SAR-CoV-2, Poster UHMS Scientific meeting 2022

Records of Amendments – Endorsed by US-AUMB

Date (DD/MM/YY)	**Description of change**

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BACKGROUND

Purpose

1. The purpose of this Instruction is to provide direction to all Canadian Forces Health Services Group (CF H Svcs Gp) personnel regarding the assessment of fitness for return to CAF diving following respiratory infections.

Application

2. This Instruction applies to all CF personnel, Department of National Defense (DND) Public Servants, contractors and sub-contractors who provide health services to CF members.

3. This UMG replaces all other “Return to CAF diving after COVID-19 policies” and any subsequent versions thereof.

Purpose of Policy

4. Divers have often choose to manage mild upper respiratory tract infection without consulting a DMO. The practice of self–beaching & resuming diving once symptoms

have cleared has been common practice among all CAF diver trades. Symptomatology will vary greatly depending on the affected tissue (e.g. between URI, Bronchitis and Pneumonia), but all can share similar features. Both the diver and clinician will have a role to play in assessing the symptoms. A goal of this policy is to maintain this approach for mild illness, while maintaining availability of dive qualified medical personnel should diver or COC have concerns.

5. The other goal is to assist clinicians in identifying CAF divers who will need a clinical assessment prior to resuming diving activities. Many viruses, bacteria and other pathogens can infect upper airways and the lung of diver. The extent and location of these infections will determine how the risks identified are managed.

GENERAL DIRECTION DIVER PHAs

6. Respiratory illness have always been a significant concern for diving fitness, however the COVID-19 pandemic triggered requirements for unprecedented review to ensure fitness following infection. This policy is therefore more inclusive and aims to describe the management of respiratory illnesses in general, with regards to diving fitness, moving away from a specific COVID-19 policy. However, specific COVID-19 guidance will continue to be updated as required.

7. Returning a diver to duty following an infectious process involving the lung and/or upper airways requires consideration of the risk associated with several key factors:

    a. Risk of dysbaric injuries:
        i. Arterial Gas Embolism (AGE): This is perceived to be the main barrier to early clearance. Mucous plugs or other processes (fibrosis, airway hyper reactivity, etc.) could cause a pulmonary BT / AGE on ascent. Increase in lung tissue density following immersion may also potentiate this.
        ii. Decompression Syndrome (DCS): Theoretical consideration for the inflammatory markers of infection to potentiate DCS as well as affecting bubble filtering effectiveness of lung tissue. Unclear effects of inflammatory markers & coagulation cascade effects on DCS severity during active illness.
        iii. Non-pulmonary barotrauma – Sinus / middle ear / mask.
    b. Risks to Dive safety:
        i. Medications: Vasoactive medication used for masking symptoms could enhance risk of narcosis / O2 toxicity.
        ii. DCI or barotrauma can introduce unexpected action from diver which may require buddy or rescue diver to effect rescue.
        iii. Distraction of diver by symptoms may contribute to diving incident.
    c. Risk of reduced operational effectiveness:
        i. Member may be unable to work at the desired intensity and compromise mission given increase in air density and vascular redistribution related to immersion, both of which could be potentiated by unresolved infection or

related sequelae.

Note on COVID-19

8. The COVID-19 pandemic continues to evolve and the health protection measures have relaxed in most jurisdictions following an improved population immunity and evolution of strains. The lack of PCR testing availability is also affecting the medical management of members with S/S consistent with COVID-19. Medical authority may not always have the tools to determine with certainty COVID-19 status of divers.

9. More data is now available to inform risk management strategies for the return to duty of CAF divers with COVID-19. This will enhance ability to conduct diving operations. Radiological data from NLD and US (Ref. B & H) mitigates the initial grave concerns identified regarding diving fitness at the pandemic onset. Although some organizations have seen testing anomalies (Ref. G) in moderately sick patients the clinical significance is unknown. DAN has also presented on higher rates of DCS/AGE (0.6%) in their survey based study, but confounders like aggressive initial diving and disease severity have not been analyzed (Ref. F). A few numbers “mild” COVID-19 patients who had subjectively recovered, but who continue to demonstrate slightly lower oxygen saturation on functional testing have been anecdotally reported by various organizations, but a correlation to diving safety has not been determined. Nonetheless, despite increasingly lenient return to diving policies following COVID-19, associated increases in diver injury or related incidents in various jurisdictions have not been reported.

Respiratory illness severity & management

10. Various organizations have categorized the severity of respiratory illnesses differently, making outcome comparison difficult. The 4 categories of severity of respiratory illness to be used for CAF diving are shown in Table 1.

11. Management and disposition for return to diving depends on the category of severity. Recommended minimum actions are described here and also summarized in Table 2:

    a. Asymptomatic: Member has no subjective complaints however a positive screening test may trigger a limitation from diving. See para 12 for additional operational guidance (e.g. for course loading) on infection prevention and public health measures.

    b. Mild Symptoms:
        i. Testing:
            1) Requirement based on availability.
            2) Most viral illness do not require testing.

3) COVID-19: Members with known positive close contacts should seek testing. If negative non-PCR test, it should be repeated in 24-48h to confirm negative test. If both are negative can follow the non-COVID guidance at table 2.

ii. Isolation:
1) Member to complete any isolation required by Ref. E if symptoms are attributed to COVD-19 without testing.

iii. Initial disposition:
1) As a minimum - Unfit CAF diving until 48h after symptoms of fever / congestion / rhinorrhea / fatigue have resolved without use of medication.
2) Slight residual (improving) cough or sore throat is acceptable.
3) *COVID-19 infection - the minimum time UNFIT CAF diving will be of 7 days after symptom onset until more evidence of safety has been reviewed. All other criteria to return to CAF diving still apply.

iv. Return to dive:
1) Prior to return to CAF diving member will be required to participate in 30 min high intensity (7-10 METS or 70-85% of max heart rate) PT session. For example: Vigorous bicycling including steep uphill terrain, Steady pace lap swimming, jogging (about 7 min / km). Member should report performance is at or close to baseline.
2) No requirement for PA or Medical Officer to assess unless there is concern from Diver or COC.

c. Moderate and Severe Symptoms:
i. Unfit CAF diving until reviewed by ADMO.
ii. Medical workup will include at minimum CXR; Exercise saturation testing; ECG; Screening spirometry.
iii. All cases will need to be reviewed by CDSM and may involve specialist review.

12. Operational considerations for purposes of Dive Op / Exercise / Course planning with asymptomatic / recovered diver participants are based on ongoing infection risk as follows:

a. Divers at baseline population risk:
i. Consider basic hygiene measures. Hand washing - distance - outside activity - clean surfaces.
ii. Avoid sharing of diving gear.
iii. If high risk activity /isolated area / limited access to medical care - consider screening for endemic disease (ex:COVID-19)

b. Considered high risk Individual (Ex: sick close contact, from higher prevalence area, unvaccinated or under-vaccinated):
i. Consider screening as part of dive planning depending on risk of dive / access to medical care / potential to spread and affect the

mission.

c. Nasal or pharyngeal sample test positive for a respiratory virus:
    i. Follow Ref. E for isolation requirements. (Ex. COVID-19)
    ii. Should avoid strenuous PT for 48 hours and monitor for symptoms.
    iii. May return to diving after 5 days of positive COVID test provided has not developed symptoms and had a strenuous PT session of 30 min without noted performance change from baseline.

13. This document is published as guidance for CAF medical providers and does not replace good clinical judgment. A more conservative approach may be appropriate in some cases. However, plans for expedited return to duty should be reviewed with a CDSM prior to implementation.

TABLE 1- Determination of respiratory illness severity

	Asymptomatic	Mild	Moderate	Severe
Symptoms	None	Fever, Cough, rhinorrhea, sore throat, muscle ache Atypical: Nausea, vomiting, anosmia, rash.	Significant shortness of breath / Respiratory distress / Chest pain / Palpitations / Mental status change	
Objective	None	Normal Saturation	Any requirement for O2 – Sat <95% at rest.	
Lab	+ PCR / Rapid Ag testing	+ PCR / Rapid Ag test **or** high risk exposure followed by congruent illness within incubation period.		
Imaging	None	+/- CXR – If present, no acute findings	CXR or CT with acute findings which may include consolidation, fibrosis, ground glass opacities, cavitation, bleb, bullae.	
Treatment	None	+/- Clinic visit; Uneventful self-isolation at home; **no** supplemental oxygen requirement, **no** suspected cardiac (myocarditis / pericarditis) involvement, **no** prescription medication use	ER consult; Outpatient treatment or short hospital stay for O2; No intubation.	Inpatient course required; Any ICU level care or intubation;

TABLE 2 - Recommended minimal actions for return to CAF diving fitness after respiratory illness

	Completely Asymptomatic	Mild	Moderate to severe
Min Unfit Diving period (from onset or test if asymptomatic)	*5 days (COVID-19)* *See CDSM (TB or other significant pathogen)*	Fully recovered for >48 (very mild residual cough acceptable) *7 Day minimum (COVID-19)*	Case by case (ADMO - CDSM)
Clinical	Exam as required only		Full Diver Subj/Obj exam (in person) - to include Cardiac, Resp and Neurological physical exam
	Back to Full PT (> 7-10 METS) without subjective limitation from pre-illness.		
			Rest O2 Sat 95% or above
			Exercise O2 Saturation Challenge (included below) or 6 min walk test as per FSG 100-05 (Annex C)
Lab	Only if indicated by clinical picture		Case by case with CDSM input
Investigations	None		CXR +/- CT
	None		Resting ECG +/- Stress ECG
	None		Full Pulmonary function test with lung volumes, diffusion capacity (+/- Resp Challenge testing)
Consultations	None CDSM for info / tracking (COVID-19 only)		CDSM +/- Specialist
MEL on resumption	None		Discuss with CDSM

TABLE 3 - Exercise Saturation challenge

Criteria for testing	Subjectively back at pre-illness physical fitness
	Resting SpO2 of 95% or more
	Minimum 2 weeks from resumption of illness
	Cardiology review if had significant cardiac involvement
Testing procedure	CAF member to exercise on treadmill, elliptical or exercise bike to a HR of 120-130. Continuously monitor SpO2 while maintaining HR for 10 minutes. (*Treadmill testing may be difficult given movement of sat probe)
Interpretation	Any saturation of <90% or desaturation of more than 5 % will trigger review from CAF Occupational Cardiologist.