

# E-NEWS

## EDITOR'S NOTE – January 2023

The E-News is the monthly newsletter of CUHMA, the primary outlet to share news/announcements, upcoming events, recent publication abstracts, job postings, professional perspectives, and images of relevant professional scenes. Submission of relevant content is welcome. New issues will generally be released on the last business day of each month. Past issues will be available at <https://cuhma.ca>.

Neal W. Pollock, PhD  
 Université Laval

## PRESIDENT'S NOTE

Dear Colleagues,  
 I wish all of you a healthy and happy 2023 on behalf of the new board of directors. CUHMA has faced some challenges and we look forward to the New Year ahead. CUHMA is holding a joint scientific meeting with UHMS this year at the Sheraton Hotel and Marina in beautiful San Diego. We hope to see you there.

Geoff Zbitnew, MD  
 Memorial University

## NEWS/ANNOUNCEMENTS

### CUHMA BOD Election 2023

The 2023 board of directors election cycle is now complete. The 7 individuals elected appear below with province and membership status. The complete board roster appears on the last page of this issue. Thanks to all who participated in the process.

Kaighley Brett (ON - regular)	President-Elect
Caroline Bain (AB - regular)	Vice-President-Elect
Neal Pollock (QC - regular)	Secretary
Julie Malone (NS - associate)	Treasurer
George Harpur (ON - regular)	Director-at-Large
Hafeez Jamal (ON - regular)	Director-at-Large
Felix Soibelman (AB - regular)	Director-at-Large

## UPCOMING EVENTS

### Rebreather Forum 4

Rebreather Forum 4 will be held April 20-22, 2023 in Valletta, Malta. The purpose of the scientific and leadership meeting is to advance the diving community's state of knowledge regarding rebreather technology and its uses, with the goal of improving rebreather diving safety and performance. The program will include 22 hours of scheduled sessions plus additional events. The RF4 scientific program committee (Drs. John Clarke, Simon Mitchell, Neal Pollock, Frauke Tillmans, and journalist Michael Menduno) have designed the schedule of events. Diving activities are planned for those wishing to stay after the meeting. For additional information and registration: <https://rebreatherforum.tech>.

### SPUMS Annual Scientific Meeting 2023

The South Pacific Underwater Medicine Society annual scientific meeting will be held June 04-09 in Cairns, Australia. The theme is diver health and ocean health amid the storm clouds of climate change. Details and registration: <https://spums.au>.

### UHMS-CUHMA Annual Scientific Meeting 2023

The Undersea and Hyperbaric Medical Society (UHMS) and CUHMA will hold a joint live annual scientific meeting June 16-18 in San Diego, CA. Visit: <https://www.uhms.org>.

### UMC Introductory Diving Medicine Course

Undersea Medicine Canada is offering a Level 1 'Introductory Course in Diving Medicine - Fitness to Dive' September 18-22 in Quebec City, QC. An optional half-day pre-course will be held September 17 for those wanting additional preparation for the program. Upon successful completion of the course, physicians will qualify as CSA Z275.2-15 Level 1 Diving Medical Examiners and can have their names listed with the Diver Certification Board of Canada (DCBC) to conduct commercial diver medicals in Canada. This 40-h course has been accredited for 35 MAINPRO+ CME credits by the College of Family Physicians of Canada. Contact Dr. Debbie Pestell ([drdeb1@ns.sympatico.ca](mailto:drdeb1@ns.sympatico.ca); 902-225-8214) or visit: <https://underseamedicine.ca> for more information.

## Canadian Association of Wilderness Medicine 2023

CAWM was founded in 2020 as a non-profit organization with the goal of connecting Canadian practitioners and researchers with an interest in Wilderness Medicine, and in promoting the field as an area of focus and specialization. The fourth annual conference will be a hybrid in-person and virtual event, held October 13-15 in Penticton, BC. Details and registration: <https://cawm.ca>.

## RECENT PUBLICATIONS

**Cousin N, Goutay J, Girardie P, Favory R, Drumez E, Mathieu D, Poissy J, Parmentier E, Duburcq T. Effects of high oxygen tension on healthy volunteer microcirculation. *Diving Hyperb Med.* 2022;52(4): 260-70. doi: 10.28920/dhm52.4.260-270.**

**Introduction:** Previous studies have highlighted hyperoxia-induced microcirculation modifications, but few have focused on hyperbaric oxygen (HBO) effects. Our primary objective was to explore hyperbaric hyperoxia effects on the microcirculation of healthy volunteers and investigate whether these modifications are adaptative or not. **Methods:** This single centre, open-label study included 15 healthy volunteers. Measurements were performed under five conditions: T0) baseline value (normobaric normoxia); T1) hyperbaric normoxia; T2) hyperbaric hyperoxia; T3) normobaric hyperoxia; T4) return to normobaric normoxia. Microcirculatory data were gathered via laser Doppler, near-infrared spectroscopy and transcutaneous oximetry (PtcO<sub>2</sub>). Vascular-occlusion tests were performed at each step. We used transthoracic echocardiography and standard monitoring for haemodynamic investigation. **Results:** Maximal alterations were observed under hyperbaric hyperoxia which led, in comparison with baseline, to arterial hypertension (mean arterial pressure 105 (SD 12) mmHg vs 95 (11), P<0.001) and bradycardia (55 (7) beats·min<sup>-1</sup> vs 66 (8), P<0.001) while cardiac output remained unchanged. Hyperbaric hyperoxia also led to microcirculatory vasoconstriction (rest flow 63 (74) vs 143 (73) perfusion units, P<0.05) in response to increased PtcO<sub>2</sub> (104.0 (45.9) kPa vs 6.3 (2.4), P<0.0001); and a decrease in laser Doppler parameters indicating vascular reserve (peak flow 125 (89) vs 233 (79) perfusion units, P<0.05). Microvascular reactivity was preserved in every condition. **Conclusions:** Hyperoxia significantly modifies healthy volunteer microcirculation especially during HBO exposure. The rise in PtcO<sub>2</sub> promotes an adaptative vasoconstrictive response to protect cellular integrity. Microvascular reactivity remains unaltered and vascular reserve is mobilised in proportion to the extent of the ischaemic stimulus.

**Johnson-Arbor K. Electric shock leading to acute lung injury in a scuba diver. *Diving Hyperb Med.* 2022 Dec 20;52(4):286-8. doi: 10.28920/dhm52.4.286-288.**

**Introduction:** Electrical injuries are a rarely reported complication of scuba diving. **Case report:** A 33-year-old woman wore a 12-volt heated shirt designed for motorcycling, powered by a canister light battery, while scuba diving. A leak in her drysuit allowed water to make contact with an electrified connector from the heated shirt, and she experienced painful electrical shocks. She was able to disconnect the power source and finish the dive, but she developed progressive fevers and dyspnoea several hours later. She was diagnosed with acute lung injury and treated with bronchodilators. Her symptoms resolved over subsequent weeks. **Discussion:** Acute lung injury is rarely reported after low voltage electrical injury. In this case, the use of a heated shirt that was not intended for underwater activities heightened the patient's risk for electric shock that likely resulted in aspiration of seawater and subsequent acute lung injury. To reduce risk of injury, divers should use equipment that is designed for underwater submersion. Medical professionals who treat the diving population should be aware that divers may use modified equipment that increases the risk of diving-related complications.

**Morin J, Vallée N, Dufresne PL, Rives S, Lehot H, Daubresse L, Roffi R, Druelle A, Cungi PJ, Blatteau JE. Symptomatic or asymptomatic SAR-CoV-2 positive divers should be medically evaluated before returning to scuba diving. *Front Physiol.* 2022 Nov 11;13:1022370. doi: 10.3389/fphys.2022.1022370. eCollection 2022.**

**Introduction:** In order to allow the resumption of diving activities after a COVID-19 infection, French military divers are required to undergo a medical fitness to dive (FTD) assessment. We present here the results of this medical evaluation performed 1 month after the infection. **Methods:** We retrospectively analyzed between April 2020 and February 2021 200 records of divers suspected of COVID-19 contamination. Data collected included physical examination, ECG, blood biochemistry, chest CT scan and spirometry. **Results:** 145 PCR-positive subjects were included, representing 8.5% of the total population of French military divers. Two divers were hospitalized, one for pericarditis and the other for non-hypoxemic pneumonia. For the other 143 divers, physical examination, electrocardiogram and blood biology showed no abnormalities. However 5 divers (3.4%) had persistent subjective symptoms including fatigability, exertional dyspnea, dysesthesias and anosmia. 41 subjects (29%) had significant decreases in forced expiratory flows at 25-75% and 50% on spirometry (n=20) or bilateral ground-glass opacities on chest CT scan (n=24). Only 3 subjects were affected on both spirometry and chest CT. 45% of these abnormalities were found in subjects who were initially asymptomatic or had non-respiratory symptoms. In case of

abnormalities, normalization was obtained within 3 months. The median time to return to diving was 45 days (IQR 30, 64). Conclusion: Our study confirms the need for standardized follow-up in all divers after COVID-19 infection and for maintaining a rest period before resuming diving activities.

**Plogmark O, Hjelte C, Ekström M, Frånberg O. Agreement between ultrasonic bubble grades using a handheld self-positioning Doppler product and 2D cardiac ultrasound. Diving Hyperb Med. 2022 Dec 20;52(4):281-5. doi: 10.28920/dhm52.4.281-285.**

Introduction: Intravascular bubble load after decompression can be detected and scored using ultrasonic techniques that measure venous gas emboli (VGE). The aim of this study was to analyse the agreement between ultrasonic bubble grades from a handheld self-positioning product, the O'Dive™, and cardiac 2D ultrasound after decompression. Methods: VGE were graded with both bilateral subclavian vein Doppler ultrasound (modified Spencer scale) and 2D cardiac images (Eftedal Brubakk scale). Agreement was analysed using weighted kappa ( $K_w$ ). Analysis with  $K_w$  was made for all paired grades, including measurements with and without zero grades, and for each method's highest grades after each dive. Results: A total of 152 dives yielded 1,113 paired measurements. The  $K_w$  agreement between ultrasound VGE grades produced by cardiac 2D images and those from the O'Dive was 'fair'; when zero grades were excluded the agreement was 'poor'. The O'Dive was found to have a lower sensitivity to detect VGE compared to 2D cardiac image scoring. Conclusions: Compared to 2D cardiac image ultrasound, the O'Dive yielded generally lower VGE grades, which resulted in a low level of agreement (fair to poor) with  $K_w$ .

**Sokolowski SA, Räisänen-Sokolowski AK, Tuominen LJ, Lundell RV. Delayed treatment for decompression illness: factors associated with long treatment delays and treatment outcome. Diving Hyperb Med. 2022 Dec 20;52(4):271-6. doi: 10.28920/dhm52.4.271-276.**

Introduction: Effectiveness of delayed hyperbaric oxygen treatment (HBOT) for decompression illness (DCI) and factors affecting treatment delays have not been studied in large groups of patients. Methods: This retrospective study included 546 DCI patients treated in Finland in the years 1999-2018 and investigated factors associated with recompression delay and outcome. Treatment outcome was defined as fully recovered or presence of residual symptoms on completion of HBOT. The symptoms, use of first aid oxygen, number of recompression treatments needed and characteristics of the study cohort were also addressed. Results: Delayed HBOT (>48 h) remained effective with final outcomes similar to those treated within 48 h. Cardiopulmonary symptoms were associated with a shorter treatment delay (median 15 h vs 28 h

without cardiopulmonary symptoms,  $P<0.001$ ), whereas mild sensory symptoms were associated with a longer delay (48 vs 24 h,  $P<0.001$ ). A shorter delay was also associated with only one required HBOT treatment (median 24 h vs 34 h for those requiring multiple recompressions) ( $P=0.002$ ). Tinnitus and hearing impairment were associated with a higher proportion of incomplete recoveries (78 and 73% respectively,  $P<0.001$ ), whereas a smaller proportion of cases with tingling/itching (15%,  $P=0.03$ ), nausea (27%,  $P=0.03$ ), motor weakness (33%,  $P=0.05$ ) and visual disturbances (36%,  $P=0.04$ ) exhibited residual symptoms. Patients with severe symptoms had a significantly shorter delay than those with mild symptoms (median 24 h vs 36 h respectively,  $P<0.001$ ), and a lower incidence of complete recovery. Conclusions: Delayed HBOT remains an effective and useful intervention. A shorter delay to recompression is associated with fewer recompressions required to achieve recovery or recovery plateau.

CUHMA-ACMHS is the Canadian voice for the advancement of hyperbaric and diving medicine throughout our country and beyond. Our activities include continuous medical education for physicians, nurses, respiratory therapists and anyone involved in the fields of hyperbaric and diving medicine. We are also promoting dissemination of clinical research, publishing position statements, liaising with related professional associations and government agencies. Our main goal is advocating on behalf of our patients. Our vision is to be the reference for the development and delivery of hyperbaric and diving medicine in Canada and beyond. Our mission is to promote excellence in hyperbaric and diving medicine through leadership in education, promotion of best practices and advocacy for our patients. Our values are excellence, leadership, collaboration, communication, and integrity.

**Canadian Undersea and Hyperbaric Medical Association**

10 Plumtree Place, Portugal Cove-St. Philips,  
Newfoundland and Labrador, A1M 3T1  
[info@cuhma.ca](mailto:info@cuhma.ca) <https://cuhma.ca>

Editor: Neal W. Pollock, PhD - [neal.pollock@kin.ulaval.ca](mailto:neal.pollock@kin.ulaval.ca)

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