

## **UHMS Position Statement – Physician’s Duties in Hyperbaric Medicine - 99183**

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### **INTRODUCTION**

The Undersea and Hyperbaric Medical Society (UHMS) stands at the forefront of advancing medical knowledge and promoting patient safety in the field of hyperbaric medicine. In the dynamic landscape of healthcare, the critical role of physicians in overseeing Hyperbaric Oxygen Treatment (HBO<sub>2</sub>) cannot be overstated. This position statement aims to underscore the significance of physician involvement in the delivery of HBO<sub>2</sub> and articulate the UHMS's commitment to maintaining the highest standards of care and safety for patients undergoing hyperbaric treatments.

### **ABSTRACT**

Hyperbaric Oxygen Treatment demands a meticulous approach to patient management. As the complexity of hyperbaric patients continues to evolve, the direct oversight of qualified physicians becomes paramount to ensuring optimal patient outcomes and safeguarding against potential risks. In this statement, we outline the key reasons why physician involvement is essential in every facet of HBO<sub>2</sub>, addressing both the technical intricacies of the treatment and the broader spectrum of patient care.

### **RATIONALE**

Physician oversight for Hyperbaric Oxygen Treatment is rooted in both the technical complexities of the treatment and the broader responsibilities associated with clinical patient care. The responsibilities outlined below delineate services that are an intrinsic part of the physician's duties for treating patients undergoing hyperbaric oxygen treatments.

### **CONCLUSIONS/RECOMMENDATIONS**

The UHMS affirms that the duties of a physician supervising HBO<sub>2</sub> include:

#### ***Physician Work Performed Pre-Hyperbaric Treatment***

1. Review the pertinent medical records of each patient.
2. Determine the depth, duration, and frequency of treatment for each patient for a particular disease.
3. Assess patient’s clinical parameters which may impact hyperbaric clinical response and safety. When appropriate, adjust therapeutic dose, duration and frequency of treatments derived from any changes that have occurred since their previous treatment, i.e. isolation measures, seizure precautions, URI, barotrauma, pain etc.

4. Evaluate for new contraindications to treatment from a clinical change, such as a new medication (which may increase a patient's susceptibility to such adverse effects as lowering the seizure threshold and facilitating oxygen seizures), or a recent surgical procedure (such as the inadvertent creation of a pneumothorax during the placement of a CVP line).
5. Evaluate for the interaction of any new medications or medical devices with the hyperbaric environment. The physician may have to verify with device companies if their device is HBO<sub>2</sub> compatible (pacemakers, VP shunts, and implantable medication delivery systems).
6. Evaluate the relevancy to the hyperbaric environment for any changes to the patient's current chest imaging or pulmonary function test or for any underlying pulmonary conditions the patient may have that require special consideration.
7. Discuss with the hyperbaric medicine team members any specialized nursing needed by the patient during the pre-, intra-, or post-treatment phases.
8. Calculation of Unit Pulmonary Toxic Dosage (UPTD) of oxygen for patients receiving high FIO<sub>2</sub>s during prolonged treatments (Table 6, or multiple treatments in one day). These high inspired oxygen concentrations for prolonged periods can cause lung damage due to their synergy with the high oxygen tensions in the chamber and the production of pulmonary oxygen toxicity, seizures, and visual myopic changes.
9. Consult with other physicians participating in the patient's care, particularly concerning any changes such as High fever, catheter insertions or revisions, or addition of new medications that might complicate the patient's hyperbaric oxygen treatment.
10. Order and schedule laboratory, imaging, and other diagnostic or therapeutic modalities and interpret their results.
11. Evaluate the development of any psychological stress, such as anxiety or depression, from previous or upcoming treatments and prescribe appropriate treatment for these problems, which may include appropriate use of anxiolytics, antidepressants, or antipsychotics.
12. Evaluate the patient's general medical condition from answers to historical questions and findings from a physical examination. Special attention is paid to possible adverse effects of HBO<sub>2</sub> on tympanic membranes, eyes, lungs, and central nervous system. Any deleterious effects of previous hyperbaric treatments on potentially closed spaces are evaluated and treated.
13. Oversee clinical safety questions and concerns, including approved material that will enter the chamber with, on, or in the patient. These specific items vary from patient to patient and from day to day. The hyperbaric physician is ultimately responsible for everything that enters the chamber. This list includes, but is not limited to, the following:
  - a. The patient's clothing, make-up, and hair products for fire risks.
  - b. Determine whether intravenous fluid pumps or patient-controlled analgesia can be continued or must be disconnected.
  - c. Determine if the patient's specific model of cardiac pacemaker or other implantable devices is safe under hyperbaric conditions.
  - d. Pre-treat patients with appropriate pain medications and anxiolytics.
  - e. Examine any balloon-tipped catheters, drains, or tubes, to insure they have not been improperly filled with air instead of saline, causing a lack of sealing at depth, and compromised function or tube loss.
  - f. Modification of orthopedic or surgical devices and materials may be required. Modifications, such as the beveling of casts or the padding of the ends of external fixation devices to prevent sparking or chamber tube damage, may have to be performed by the hyperbaric physician and are always done under their authority.
14. Determine which appropriate and safe wound dressings are placed over any open wound before treatment. Only certain wound care dressings are appropriate for patients undergoing hyperbaric medicine, and the provider may need to discuss dressing options with referring providers. All

wounds should be closely monitored during the hyperbaric medicine treatments to assess clinical improvement and for utilization review for the ongoing need for continued hyperbaric treatments.

15. Determine if specialized testing modalities, such as in-chamber transcutaneous oxygen monitoring, will be employed during the treatment and what site(s) will be monitored.
16. Evaluate the patient's need for any specialized monitoring during the treatment, such as additional guidance in pressure equalization via the Eustachian tubes, fluid restriction, special body position requirements to prevent movement that would geometrically stress a fresh graft or flap, or continuous electrocardiographic or blood pressure surveillance.
17. Determine the need for adjunctive agents such as Vitamin E, Trental, or antibiotics.
18. Work with the patient (specifically outpatients) to establish what treatment schedule they will be able to meet based upon their work schedule, transportation availability, physician appointments, additional scheduled studies (x-ray, CT, MRI, or Doppler vascular), and other activities.

### ***Intra-Hyperbaric Treatment Physician Work***

1. Diagnose and treat alternobaric vertigo of ascent or descent.
2. Manage difficulties with pressure equalization of any air spaces, such as the middle ears, sinuses, dental pockets underlying recent fillings, tight orthopedic casts, and the like. These can occur at either ascent or descent and require immediate management.
3. Prevent or manage difficulties with pressure equalization of gas-containing patient appliances, such as colostomy and ileostomy bags, closed drainage systems, and continuous irrigation systems that are not designed for the hyperbaric environment, but may be required by the patient. The barometric changes can result in unplanned insufflation of air or liquids into the patient, with potentially serious results.
4. Manage oxygen toxicity effects, such as seizures, either grand mal or focal motor.
5. Treat acute confinement anxiety, alterations in behavior.
6. Manage the potentiation in the hyperbaric environment of respiratory depressant medications such as sedatives or the lingering effects of recent anesthesia, which could result in respiratory failure.
7. Control the amount of fluid intake during descent for patients on fluid restricted diets. Many patients equalize the pressure in their middle ears by drinking water to open the Eustachian tubes, and their fluid intake varies depending upon the ease with which they clear their ears during that dive.
8. Control the effects of the latent heat of compression, and adiabatic cooling of decompression to help maintain patient comfort.
9. Alter the treatment profile due to patient or technical problems as patients may require unplanned ascents due to equipment failure or due to medical problems or emergencies. Since hyperbaric oxygen is a drug being delivered in a therapeutic device under pressure, only the hyperbaric physician supervising the treatment can modify the treatment schedule.
10. Manage the medical complications of in-chamber emergencies, such as seizures, hypoglycemia, explosive decompression from chamber failure or door seal failure.
11. Many patients treated with hyperbaric medicine are chronically ill and have many co-morbid conditions. Patients are treated daily for several hours for a prolonged period and the chance of having a complication during the treatment course is relatively high. The hyperbaric medicine physician should be available to immediately treat such life-threatening problems such as: Acute myocardial infarction, respiratory distress, metabolic derangements, hypo/hyperglycemia, confusion, stroke, pneumothorax, or a myriad of other medical complaints.
12. Patients being treated in a monoplace chamber may have to urinate, defecate, start bleeding, have severe pain or discomfort, claustrophobia, or want to stop the treatment necessitating removal from the chamber. The physician should be available to evaluate these patients, decide if treatment should continue or be aborted, and render treatment as needed.

## **Post-Hyperbaric Treatment Physician Work**

1. Management and treatment of any problems that occurred during the treatment. If a patient is unable to adequately ventilate middle ear spaces, and suffers barotitis media, the hyperbaric physician evaluates the problem immediately after the treatment, diagnoses the condition, initiates treatment, and determines if the patient's barotitis will require alteration of their next treatment protocol. If the patient has had ear-clearing problems during previous treatments, the hyperbaric physician arranges for an otolaryngology consultation and for the otorhinolaryngologist to place pressure equalizing tubes in the person's tympanic membrane(s).
2. Evaluation of any post-treatment change in the patient's clinical condition, such as the new onset of pain, shortness of breath, or a change in mentation, to determine if that symptom or sign might be due to decompression sickness or arterial gas embolism incurred during the hyperbaric treatment. If either is the cause, immediate recompression of that patient on an emergency basis is required.
3. Re-evaluation of the condition of reimplanted digits or limbs, or skin grafts or flaps that are being treated on an emergency basis for salvage, and then communication with the referring provider to relate these findings so an updated treatment plan can be followed.
4. Contact the referring provider for any unexpected event that occurs during the treatment. Appropriate referrals for the management of any new problems, such as seizures, are made by direct contact with the appropriate specialist, by telephone, or in person.
5. Prescription of any ancillary treatment needed by the patient, such as wound care, physical therapy, occupational therapy, or diabetes training.
6. Preparation of that patient's medical records, and the documentation of those findings that would need to be known by any other physicians caring for that patient.
7. Coordination with other physicians concerning the other aspects of the patient's care, such as the scheduling of surgery, based upon any new findings.
8. Determination of whether the patient may be converted to outpatient or skilled nursing facility status and facilitating that change.
9. The physician should be available to assess faculty members who work inside multiplace hyperbaric chambers acting as patient tenders. Any hyperbaric medicine tender with any complaints during or after treatment, such as barotrauma, oxygen toxicity, decompression sickness, or any other clinical issue, should be assessed by the physician.
10. Documentation of every procedure note, including a description of time-out, time, treatment number, treatment protocol, diagnosis, vital signs prior to and after treatment, glucose readings for diabetic patients, complications during treatment, appropriate hyperbaric medicine ICD codes, and treatment course along with improvement.
11. Customize treatment based on new changes to the patient's medical condition or acquire new diagnoses during the time of their allotted hyperbaric treatments.

The attending hyperbaric medicine physician providing oversight of the daily hyperbaric oxygen treatment shall be immediately available within the chamber room or in close physical proximity within the same building or connected structure(s) to where hyperbaric medicine is delivered. The physician should be able to respond immediately chamber-side for patient assessment as soon as requested.