

1 MAY 1998



*Aerospace Medicine*

**HYPERBARIC CHAMBER PROGRAM**

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OPR: AL/AOH (Col James P. Dixon)  
Supersedes AFI 48-112, 19 July 1994,

Certified by: HQ AFMOA/SGO (Lt Col Parkinson)  
Pages: 9  
Distribution: F

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This instruction directs requirements for the USAF Hyperbaric Chamber Program and implements AFI 48-1, *Aerospace Medicine Program*. It applies to all personnel involved in the use of clinical, operational, and research hyperbaric chambers. It assigns management responsibilities and defines training requirements and duties of US Air Force hyperbaric medicine teams. It does not apply to Air Force Reserve or Air National Guard units and personnel. Send comments and suggested improvements on AF Form 847, **Recommendation for Change of Publication**, through channels, to AL/AOH, 2510 Kennedy Circle Suite 117, Brooks AFB TX 78235-5119. The system of records covered by this instruction is authorized by 10 U.S.C. 133 and 8013. The DD Form 2005, **Privacy Act Statement--Health Care Records**, guides the use of each form required by this instruction that falls under the Privacy Act. A | indicates revisions from the previous edition.

**SUMMARY OF REVISIONS**

This revision clarifies the number of flight surgeons authorized to collect hazardous duty pay at operational hyperbaric chamber units and establishes the position, duties and responsibilities of the hyperbaric safety officer.

**Section A—Responsibilities**

**1. Office of the Surgeon General and Command Surgeons:**

1.1. Headquarters United States Air Force Surgeon General (HQ USAF/SG). The USAF/SG oversees and sets policy for the Hyperbaric Chamber Program throughout the Air Force.

1.2. **Major Command Surgeon General (MAJCOM/SG).** Command surgeons provide medical, technical, fiscal, and administrative support for their hyperbaric chamber units.

**2. United States Air Force School of Aerospace Medicine (USAFSAM):** USAFSAM/FP conducts specific instructional courses in manning, maintaining, and operating hyperbaric chambers.

**3. Armstrong Laboratory.** The Armstrong Laboratory, Hyperbaric Medicine Division (AL/AOH), serves as the focal point for Air Force hyperbaric expertise. It recommends and executes HQ USAF/SG policy and procedures for all Air Force hyperbaric chambers. AL/AOH is the consultant to HQ USAF/SG for all Air Force clinical, operational (A/F99S-2), and research hyperbaric facilities. The Chief, AL/AOH, chairs the Joint Advisory Committee on Clinical Hyperbaric Medicine (JACCHM). JACCHM advises the Air Force Medical Service on its responsibilities as the Department of Defense (DoD) lead agency for clinical hyperbaric medicine. AL/AOH carries out specific tasks in the following areas:

- 3.1. Designate clinical entities for trials and issue guidance letters governing medical treatment dive schedules to Air Force hyperbaric chamber facilities.
- 3.2. Keep hyperbaric dive team members up to date on the latest techniques and procedures and monitors the effectiveness of hyperbaric chamber operations.
- 3.3. Determine clinical indications for hyperbaric oxygen (HBO) therapy and establish proper HBO treatment tables for all hyperbaric chamber facilities.
- 3.4. Review and comment on all Air Force HBO clinical investigations and research activities using hyperbaric chambers.
- 3.5. Develop and maintain a centralized Air Force hyperbaric oxygen therapy patient registry and research file library.
- 3.6. Determine hyperbaric chamber facility design criteria and recommend requirements for personnel.
- 3.7. Under United States Air Force School of Aerospace Medicine administrative guidance, develop and provide advanced hyperbaric training in clinical hyperbaric medicine and physiology for physicians, nurses, physiologists, and technicians.
- 3.8. Maintain a roster of personnel trained in hyperbaric medicine and coordinate with AFMPC on personnel assignments to hyperbaric facilities.
- 3.9. Determine clinical and cost effectiveness of HBO at DoD health care facilities.
- 3.10. Develop, evaluate, and transition equipment and materials for use in, around, and for hyperbaric environments and chambers supported by Air Force personnel.

### ***Section B—Hyperbaric Chamber Program Elements***

**4. General Administration.** Hyperbaric chamber facilities use the forms listed in AFPAM 48-134, *Hyperbaric Chamber Operations*.

- 4.1. All clinical and operational hyperbaric chamber facilities must maintain a recall roster of qualified team members who can be promptly recalled 24 hours a day, 7 days a week. Each team must practice actual or telephone recall procedures during after-duty hours at least once a month. Teams may use an actual recall (treatment) to satisfy the monthly practice recall procedure. Each facility maintains recall records described in AFPAM 48-134.
- 4.2. Telephone directories at installations hosting clinical or operational hyperbaric chamber facilities must list duty-hour and after-duty-hour phone numbers for each facility.

4.3. Each clinical or operational hyperbaric chamber facility maintains a listing of other AL/AOH approved military and civilian hyperbaric chamber facilities in the surrounding geographical area. This listing must include information about other facilities' abilities to provide assistance in emergency situations. All operational hyperbaric chamber teams must consult with AL/AOH prior to transport and treatment of patients to any of these other facilities. A physician who has completed course B30ZY48X0-009, Hyperbaric Training for Health Care Officers, must accompany the patient and coordinate the treatment with the civilian physician.

**5. Disorders Treated.** Hyperbaric chamber facilities treat acute disorders such as decompression sickness, carbon monoxide poisoning, air-gas embolism, and gas gangrene. In addition, clinical hyperbaric chamber facilities treat necrotizing soft-tissue infections, thermal burns, acute traumatic ischemias, wounds, experimental disorders (paragraph 12.), and other chronic disorders responsive to HBO.

**6. Hyperbaric Treatment Procedures.** All operational hyperbaric chamber facilities provide clinical treatments described in AFPAM 48-134.

6.1. Patient Transportation. Expeditiously transport patients with altitude-induced decompression sickness or air-gas embolism, protecting them from reduced barometric pressure by maintaining an aircraft cabin pressure equivalent to the point of destination. (Additional information for handling such patients is described in AFPAM 48-134). In addition, carry out the following consultation requirements:

6.1.1. Transport patients to a hyperbaric facility after consulting with the clinical hyperbaric medical officer on duty at AL/AOH.

6.1.2. Prior to transporting any patient, consult the hyperbaric medical officer on duty at the receiving facility for approval.

**6.2. Patient Processing.** The hyperbaric physician at the treatment facility determines disposition of patients with acute disorders requiring treatment with hyperbaric oxygen. These patients are normally processed administratively as inpatients. Those patients referred from local civilian or other nearby military hospitals to Air Force hyperbaric chamber facilities remain as inpatients in the referring facility. Civilian patients treated in USAF medical facilities are processed and charged according to the procedures and standards in AFI 41-115, *Medical Programs and Benefits*.

**6.3. Flying After Treatments.** All aircrew diagnosed and treated for decompression sickness must report to their flight surgeon for disposition. Patients with joint pain, (simple bends, whose symptoms have completely resolved) may fly as crewmembers 72 hours after successful treatment. Patients with neurological decompression sickness whose symptoms have completely resolved, or patients with any residual symptoms should not fly as a crewmember or passenger until medically cleared by their flight surgeon in consultation with the clinical hyperbaric medical officer on duty at AL/AOH.

**7. Types of Dives.** Dives conducted at hyperbaric chamber facilities include patient treatment and research dives, student dives, functional test dives, proficiency, and equipment check dives. All hyperbaric chamber facilities conduct dives according to AFPAM 48-134.

**8. Hyperbaric Chamber Team Requirements.** The composition of hyperbaric chamber teams varies depending on the category of the chamber facility. Basic team member qualifications are similar for all facilities. Facilities may select team members only from Air Force Specialty Codes listed in **Table 1.**

**Table 1. Hyperbaric Medicine Team Member: Eligible AFSCs.**

Primary Team Members	AFSC
Medical Officer	48XX
Aerospace Physiologist	43AX/M11XXX/M12XXX
Nurse	46XX
Aerospace Physiology Technician	4M0XX
Medical Technician	4N0X1
Supplemental Team Members	AFSC
Physicians	44XX/45XX
Oral Surgeons	47SX
Nurses	46XX
Physician Assistants	42GX
Podiatrists	42FX
Medical Technicians	4N0X1/4F0X1

**8.1. Team Member Qualifications.** Team members must:

8.1.1. Meet medical standards for hyperbaric duty according to AFI 48-123, *Medical Examination and Medical Standards*.

8.1.2. Have orders issued according to Executive Order 11157, Section 109.

8.1.3. Complete, at a minimum, the applicable Air Force Catalog 36-2223, *USAF Formal Schools*, hyperbaric training course B30ZY48X0-009 (Hyperbaric Training for Health Care Officers), B30ZY43A1-001 (Hyperbaric Training for Aerospace Physiologist), B3AZY4M051-002 (Hyperbaric Chamber Enlisted Team Training), or B3AZY4X0XI-000 (Hyperbaric Training for Health Care Technicians). AFPAM 48-134 explains authority to issue orders.

8.1.4. Medical technicians must be nationally registered emergency medical technicians, IV skill verified following local medical training facility requirements, have current certification in CPR, critical care experience endorsed by the Chief of Nursing Services and Chief Aerospace Medicine, and a minimum 5-skill level AFSC.

**8.2. Qualifying for Hazardous Duty Incentive Pay (HDIP).** A team member qualifies for HDIP by serving as an inside attendant on treatment dives, functional test dives, research dives, and proficiency or equipment-check dives. HDIP is prorated for the member's first and last months of hazardous duty. Members on HDIP orders who do not participate in a hyperbaric dive at least once during a month, must be reported to their accounting and finance office for collect-pay action for that month according to AFM 177-373V1, *Joint Uniform Pay System - JUMPS AFO Procedures*. This collect pay action is not required if members are qualified to participate and do participate in hypobaric chamber operations.

**8.2.1. Rated Position Indicator (RPI) Slots for Operational Chambers.** No more than 4 flight surgeons holding RPI-5 slots may receive HDIP for hyperbaric exposures. Temporary or permanent waiver requests for additional RPI-5 positions will be granted on a case-by-case basis. Requests for waiver should be sent by the Aerospace Medicine Squadron Commander, in turn, to their respective MAJCOM/SG office and AL/AOH.

**9. Personnel.** Staff members permanently assigned to clinical hyperbaric chamber facilities must be graduates of hyperbaric medicine fellowships or advanced training courses. Up to 30 other medical personnel qualified as supplemental hyperbaric medical specialist team members (**Table 1.**) may be assigned to assist clinical hyperbaric chambers. Staff members permanently assigned to operational hyperbaric chamber facilities consist of personnel assigned to Aerospace Physiology Units (See AFI 11-403, *Air Force Aerospace Physiological Training Program*).

**9.1. Dive Team Composition.** The hyperbaric dive team consists of a minimum of four trained (paragraph **8.1.**) individuals with a combination of AFSCs listed in table **Table 1.** AFPAM 48-134 gives detailed guidance on dive team composition and team member responsibilities.

**9.2. Team proficiency .** Each team member participates on a minimum of one dive per month. Proficiency dives must go to a minimum of 2.36 ATA (45 fsw) or deeper.

9.2.1. Rotate assigned hyperbaric personnel to applicable crew positions on subsequent dives to maintain team proficiency.

**9.3. Safety Officer .** Hyperbaric chamber units will designate a safety officer for all hyperbaric operations. The safety officer is responsible for ensuring the safe operation, control and maintenance of the chamber and support equipment and the safety of all personnel in and around the hyperbaric chamber.

9.3.1. The safety officer has the authority to:

9.3.1.1. Restrict or remove from the chamber any potentially hazardous material or unsafe equipment.

9.3.1.2. Act as final level of approval in decompression schedule requirements and selection.

9.3.2. The safety officer must:

9.3.2.1. Document and ensure compliance with Department of Defense Military Standards, Air Force hyperbaric chamber and support equipment technical orders, AFPAM 48-134 and Air Force, MAJCOM and unit policies governing hyperbaric operations.

9.3.2.2. Document and ensure compliance with National Fire Protection Agency guidelines.

9.3.2.3. Conduct periodic safety reviews.

9.3.2.4. Update unit safety policies and procedures as needed.

9.3.2.5. Develop a skills verification program to include potential medical and equipment emergencies for all team members. Cover each skill area at least once per year and include, at a minimum, exercises for medical emergencies, oxygen tolerance reactions, ruptured porthole, and chamber orientation.

9.3.2.6. Monitor continuing education of personnel on safety issues.

9.3.2.7. Review safety incidents and provide in-service training on accident prevention.

- 9.3.2.8. Serve as hyperbaric representative to hospital safety committee.
- 9.3.2.9. Validate training of new personnel and supplemental team members regarding chamber operations and safety before their initial entry into the chamber.
- 9.3.2.10. Verify equipment used in chamber meets biomedical requirements.
- 9.3.2.11. Signs off on new equipment and textiles before they are permitted inside the chamber.
- 9.3.2.12. Provide maintenance program oversight.
- 9.3.2.13. Document any modifications to the chamber or support equipment.
- 9.3.2.14. Oversee staff and patient decompression schedules.
- 9.3.2.15. Assist in developing the technical aspects of the quality improvement process.
- 9.3.2.16. Clinical chambers: Obtain national certification in Hyperbaric Technology through the National Board of Diving and Hyperbaric Medical Technology within one year of assignment.
- 9.3.2.17. Clinical chambers: Have a working knowledge of American Society of Mechanical Engineer - Pressure Vessel for Human Occupancy (ASME PVHO) codes.
- 9.3.2.18. Operational chambers: It is highly recommended safety officers of operational chambers obtain national certification in Hyperbaric Technology.
- 9.3.2.19. Operational chambers: Are encouraged to be familiar with ASME PVHO codes.

**10. Distributing and Retaining Forms.** Hyperbaric chamber facilities must complete AF Form 1352, **Hyperbaric Patient Information and Therapy Record**, for each patient undergoing hyperbaric treatment in an A/F99S-2 operational chamber and complete AF Form 1354, **Hyperbaric Chamber Operation Record**, during every manned dive conducted in an A/F99S-2 or research chamber. Complete AF Form 1389, **Clinical Hyperbaric Treatment Record** for all clinical treatment dives, either practice or with patients, in the large clinical chambers. AFPAM 48-134 describes how to fill out these forms. Complete other medical forms with pertinent patient information.

**11. USAF Hyperbaric Exposure Research Library.** This library at AL/AOH is responsible for tracking the continued use of hyperbaric oxygen in treating AL/AOH selected medical conditions to better define hyperbaric oxygen efficacy, safety, and optimal dose and response. It will maintain a repository of patient, subject and attendant research files for all exposures at hyperbaric facilities involving Air Force personnel (paragraph 3.).

**12. Hyperbaric Oxygenation Research.** Conduct Major Force Program (MFP) 6 and Defense and Health Program (DHP) research at both clinical and research hyperbaric chamber facilities. Develop all research protocols according to AFI 40-403, *Clinical Investigation and Human Test Subjects in the Medical Service*, AFI 40-402, *Using Human Subjects in Research, Development, Test, and Evaluation*, or AFJI 40-401, *The Use of Animals in DoD Programs*. Obtain review and comment for such protocols from AL/AOH during protocol development and before submitting to HQ AFMOA/SGPT.

*Section C—Hyperbaric Facilities***13. Clinical Hyperbaric Chamber Facilities:**

- 13.1. Hyperbaric oxygen therapy for patients with disorders listed in paragraph 5..
- 13.2. Consultation and diagnostic assistance for aeromedical and hospital services in selecting those patients likely to benefit from HBO.
- 13.3. Medical and technical HBO expertise for coordinated and comprehensive care of selected patients.
- 13.4. HBO to eligible patients requiring this treatment modality.
- 13.5. Conduct clinical investigations and research to further delineate the efficacy and mechanistic action of HBO. Get preapproval for experimental treatment according to protocols described in paragraph 12..

**14. Operational Hyperbaric Chamber Facilities.** Facilities support the Air Force operational flying mission by treating altitude-induced decompression sickness.

- 14.1. Treat other acute disorders responsive to hyperbaric oxygen therapy, such as gas gangrene, air-gas embolism, carbon monoxide poisoning, and diver's decompression sickness, if the chamber size, staff, medical, and ancillary support equipment necessary for designated beneficiary treatment requirements (as specified by AL/AOH) are available.
- 14.2. AL/AOH must review and approve requests for treating any disorders other than those defined in paragraphs 14. and 14.1.

**15. Research Hyperbaric Chamber Facilities:** Facilities support the research mission of the Air Force.

- 15.1. Although research facilities do not conduct patient treatment dives, if personnel are exposed to hyperbaric conditions, these facilities must comply with hyperbaric chamber facility man-rating standards and training requirements to ensure their safe operation. Research chambers are exempted from those portions of this AFI pertaining to patient treatment requirements. Inside attendants must meet the requirements listed in paragraph 8.1.. These attendants qualify for hazardous duty incentive pay according to paragraph 8.2..
- 15.2. All research hyperbaric chamber facilities coordinate with AL/AOH on human exposure activities including training, equipment, and safety code compliance requirements. Track human exposure using guidelines in paragraph 11..

**16. Forms Prescribed:** AF Form 1352, **Hyperbaric Patient Information and Therapy Record.**

AF Form 1354, **Hyperbaric Chamber Operations Record.**

AF Form 1389, **Clinical Hyperbaric Treatment Record.**

DD Form 2005, **Privacy Act Statement--Health Care Records.**

CHARLES H. ROADMAN II, Lt General, USAF, MC  
Surgeon General



**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 11-403, *Air Force Aerospace Physiological Training Program*  
AFI 40-402, *Using Human Subjects in Research, Development, Test, and Evaluation*  
AFI 40-403, *Clinical Investigation and Human Test Subjects in the Medical Service*  
AFI 41-115, *Medical Programs and Benefits*  
AFJI 40-401, *The Use of Animals in DoD Programs*  
AFPD 48-1, *Aerospace Medical Program*  
AFI 48-123, *Medical Examination and Medical Standards*  
AFPAM 48-134, *Hyperbaric Chamber Operations*  
AFM 177-373,V1, *Joint Uniform Pay System - JUMPS AFO Procedures*  
AFCAT 36-2223, *USAF Formal Schools*

***Abbreviation and Acronyms***

**AFMPC**—Air Force Military Personnel Center  
**AFPAM**—Air Force Pamphlet  
**AFSC**—Air Force Specialty Code  
**ATA**—Atmospheres Absolute  
**CPR**—Cardiopulmonary Resuscitation  
**DCS**—Decompression Sickness  
**DHA**—Defense Health Agency  
**DoD**—Department of Defense  
**FSW**—Feet Sea Water  
**HBO**—Hyperbaric Oxygenation  
**HDIP**—Hazardous Duty Incentive Pay  
**JACCHM**—Joint Advisory Committee on Clinical Hyperbaric Medicine  
**MFP**—Major Force Program  
**MSL**—Mean Sea Level  
**USAFSAM**—United States Air Force School of Aerospace Medicine