

### CARE OF CRITICALLY ILL PATIENTS

The HCMC multiplace hyperbaric unit is equipped and staffed to care for critically ill patients (i.e., patients requiring respiratory support, central venous and arterial monitoring, intracranial pressure monitoring, controlled drip medications). A specially trained nurse and/or physician accompanies the patient in the chamber during the entire treatment.

### PRECAUTIONS

The treatment protocols used at HCMC have all been designed to minimize oxygen toxicity; patients are observed carefully during their course of treatments for any signs of oxygen toxicity. Furthermore, patients are screened by the hyperbaric physician for medical problems associated with increased risk of oxygen toxicity or pulmonary overpressure accident during decompression. The referring physician is informed of any such increased risk prior to initiation of therapy.

Hyperbaric oxygen therapy for patients who have been screened by a hyperbaric physician is a very safe treatment modality. Pressure or pain in the ears or sinuses occurs in some patients during compression; some patients require myringotomy. Otherwise, the treatment is totally painless and leaves the patient with no residual effects.

Smoking and hyperbaric oxygen therapy for chronic problems are clinically incompatible. All patients are urged to stop smoking. In some cases, cessation of smoking during the course of therapy is a prerequisite for HBO treatment.

Patients and their referring physicians are requested to inform chamber medical personnel of any intercurrent illness prior to the next therapy session. The referring physician, in turn, is apprised of the patient's progress during the course of treatments.

The only absolute contraindication to hyperbaric oxygen therapy is an untreated pneumothorax.

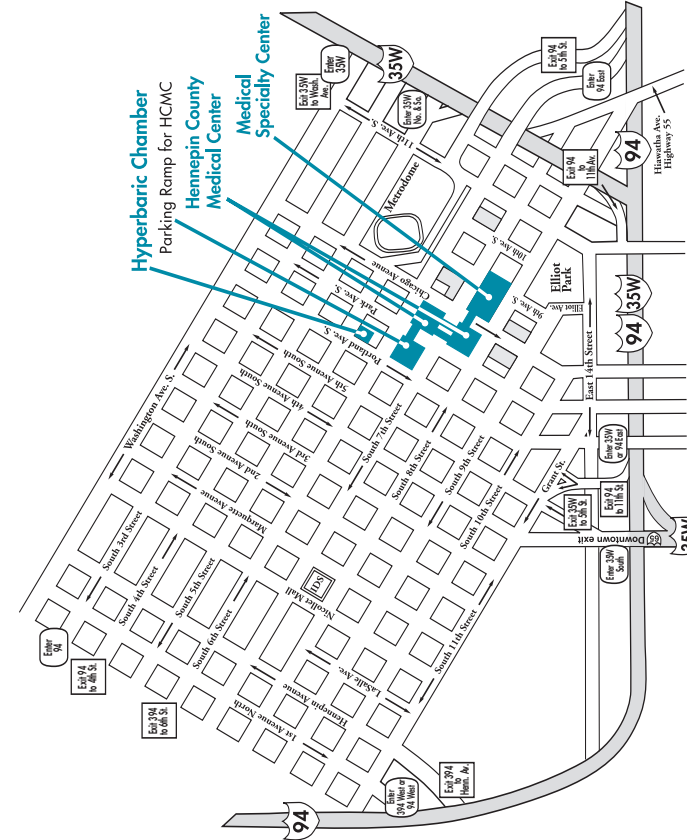
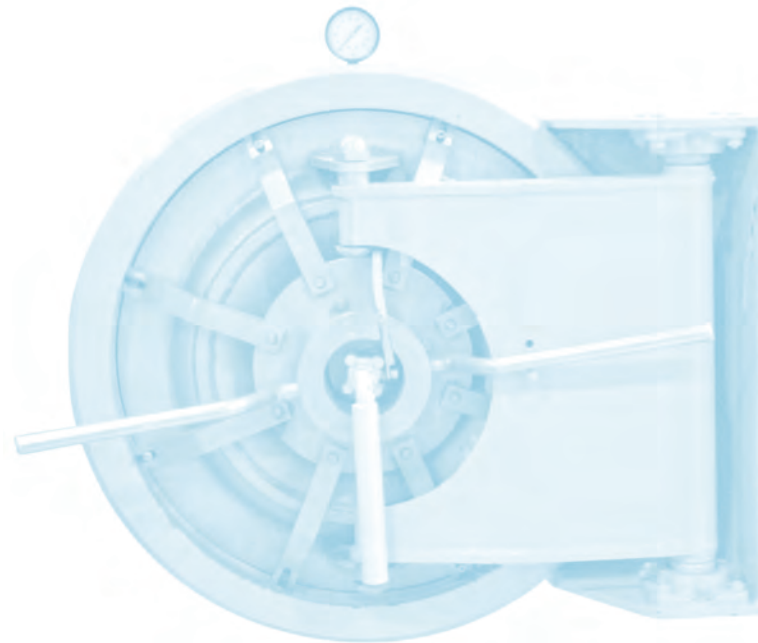
### INSURANCE COVERAGE

Third-party insurance carriers generally cover "currently accepted" disorders and will cover other cases with appropriate documentation. It is wise to check with the payer before initiating therapy for non-emergent problems.

*Our Hyperbaric Physicians are board certified in Hyperbaric Medicine and Emergency Medicine.*

### For more information . . .

For more information about nearby low cost housing, restaurants and other services close to HCMC, please call the Patient Representative's Office at (612) 873-8585 or check the hospital website at [www.hcmc.org](http://www.hcmc.org).



### HYPERBARIC MEDICINE

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Minneapolis, MN 55415  
(612) 873-7420

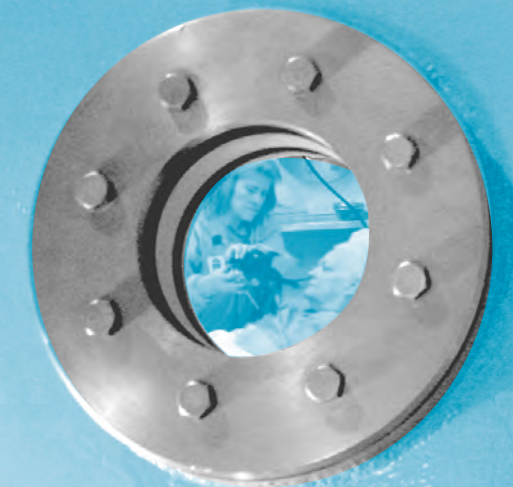
**Mailing address:**  
701 Park Avenue  
Minneapolis, MN 55415

[www.hcmc.org](http://www.hcmc.org)

# HYPERBARIC MEDICINE

HENNEPIN COUNTY MEDICAL CENTER  
Minneapolis, Minnesota

## FOR MEDICAL PROVIDERS



## INTRODUCTION

Hyperbaric oxygen therapy is a specialized medical treatment in which the patient breathes 100 percent oxygen while inside a chamber at increased atmospheric pressure.

Hyperbaric oxygen (HBO) is used for specific medical conditions. HBO has long been recognized as vital in the resolution of critical medical conditions such as gas gangrene, carbon monoxide poisoning, air embolism, trauma or surgical procedures, and decompression sickness. It is also, however, an important adjunctive therapy for a growing number of chronic conditions such as refractory osteomyelitis, osteoradionecrosis, soft tissue radiation injury and complicated non-healing wounds.

## TREATMENT INDICATIONS

The Hyperbaric Oxygen Committee of the Undersea and Hyperbaric Medical Society (UHMS) periodically reviews the applications of HBO, listing for approval those diseases that are supported by prevailing scientific information. The Hyperbaric Medicine Unit will generally treat patients with diagnoses in the "currently accepted" category. Other cases may be considered on an individual basis or as part of an established research protocol.

## UHMS "CURRENTLY ACCEPTED" CONDITIONS

- Air or gas embolism
- Carbon monoxide poisoning
- Carbon monoxide poisoning complicated by cyanide poisoning
- Clostridial myositis and myonecrosis (gas gangrene)
- Crush injury, compartment syndrome, and other acute traumatic ischemias
- Decompression sickness
- Enhancement of healing in selected problem wounds including Wagner III or greater diabetic foot ulcers and nonhealing amputation sites
- Exceptional blood loss anemia
- Intracranial abscess
- Necrotizing soft tissue infections
- Osteomyelitis (refractory)
- Delayed radiation injury (soft tissue and bony necrosis)
- Skin grafts and flaps (compromised)

## MECHANISMS

HBO is used for conditions in which ischemia, edema, bubble formation, or the presence of a toxin interferes with tissue function, survival, or repair. The beneficial effects of HBO are achieved through several mechanisms.

### Hyperoxygenation

- 10- to 15-fold increase in oxygen dissolved in plasma
- Two- to three-fold increase in oxygen diffusion distance
- Elevated tissue PO<sub>2</sub>s for two to four hours after treatment

### Vasoconstriction

- Alpha adrenergic-like effect
- 20 percent reduction in blood flow
- 20 percent reduction in edema

### Bubble reduction

- Volume inversely related to pressure (Boyle's law)
- Counterdiffusion: oxygen replaces inert gas in bubble

### Antimicrobial effect

- Facilitation of oxidative WBC killing in ischemic environment
- Inhibition of toxin formation (gas gangrene)
- Inactivation of toxins (gas gangrene)
- Bacteriostasis (anaerobes)
- Enhanced antibiotic transport across cell wall (aminoglycosides)

### Neovascularization

- Enhanced tissue viability until collaterals develop
- 20 percent acceleration of capillary formation
- Angiogenesis (collagen deposition and capillary budding)



## THE HYPERBARIC CHAMBER

The Hyperbaric Medicine Unit has been in operation for patient care and research since 1964. The facility has three multiplace treatment chambers, the largest of which can accommodate simultaneously five stretcher patients along with specially trained physicians and nurses. The chambers are operated and maintained by certified hyperbaric technicians.

## CONSULTATION PROCEDURE

Patients are seen in consultation by a hyperbaric physician only through referral by their attending physician or surgeon. Since hyperbaric treatment is added to but never replaces other required treatment, the patient must remain under the care of the attending physician or surgeon. The referring physician may elect to transfer care to an HFA physician of his or her own specialty.

Out-of-town consultations are referred to appropriate HFA specialists for primary care or specialty care as needed.

Routine consultation by a hyperbaric physician can be arranged during business hours by calling the hyperbaric unit at (612) 873-7420. A letter of referral is also needed, and copies of patient medical records are very helpful. Emergency consultation by a hyperbaric physician can be arranged 24 hours a day seven days a week by calling the Emergency Department at (612) 873-3132 or 1-800-424-4262.

## OUTPATIENT AND INPATIENT CARE

Hyperbaric therapy is administered on an outpatient or inpatient basis depending upon the patient's needs. Inpatients may be hospitalized at HCMC or, if circumstances warrant, may be transported to HCMC for hyperbaric treatment only. All emergency transfers are seen initially in the Emergency Department.