

HENNEPIN COUNTY MEDICAL CENTER, HYPERBARIC MEDICINE UNIT

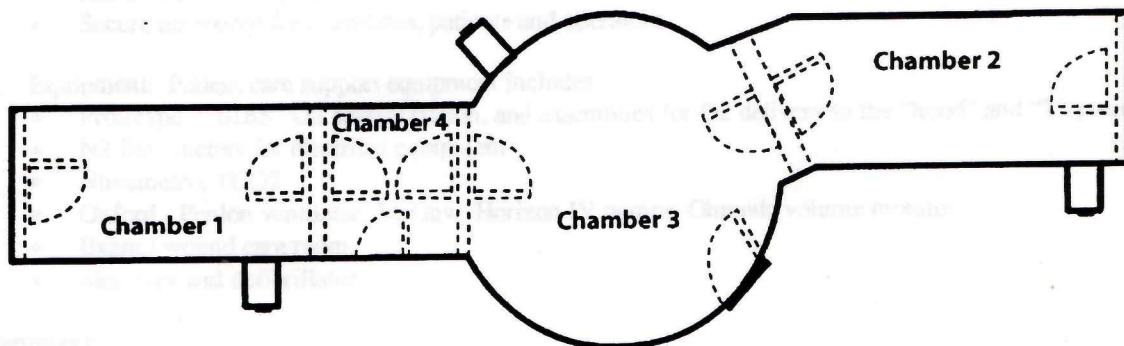
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Introduction

The HCMC Hyperbaric Medicine Department has been in operation for patient care and research since 1964. The facility consists of four interconnected multiplace chambers. Three of the chambers are designed for patient care; the fourth chamber is a personnel lock. This outline will cover the history, construction, floor plan, controls and monitors, air and medical gas supply, design features, fire suppression and support equipment.

Hyperbaric Facility Outline

1. **History:** The Hyperbaric facility at Hennepin County Medical Center was initiated by the work of Dr. Claude Hitchcock and his colleagues. Dr. Hitchcock stated in 1963 that: "The basic premise for the design and construction of the Hyperbaric Surgical and Medical Facility...has been to provide a unit capable of both basic and clinical research on an expanded basis." Dr. Hitchcock and his colleagues were among the pioneers of Hyperbaric Medicine. Their work on understanding and treating gas gangrene is well documented. The chambers were designed to accommodate simultaneous surgical and medical operations. Surgeries involving the heart and kidney were performed in the chambers.
2. **Construction:** The Hyperbaric facility was constructed in 1963 and 1964. Funding was provided by federal (NIH) and local contributions. The design engineering was done by Vacudyne Corp. The construction was performed by Chicago Bridge and Iron. The overall length is 66 feet and the weight is 60 tons.
 - Chambers #1 and #4 are a double compartment lock, 8-ft. 9-in. diameter X 26-ft. 8-in. long. Chamber #1 has an internal length of 15 ft. Chamber #4 has an internal length of 8 ft. Chambers #1 and #4 are rated for 100 psi.
 - Chamber #2 is an 8-ft. 9-in. diameter X 22-ft. long single lock and is rated for 60 psi.
 - Chamber #3 is a 19-ft. diameter sphere and is rated for 60 psi.
3. **Floor plan:** The chambers are interconnected with chambers #1 and #4 on one side of chamber #3 and Chamber #2 on the other side. The chambers have rectangular 3 ft. by 6 ft double doors between them. The chambers are designed to operate at different pressures and schedules simultaneously.



4. Controls and Monitors: The chambers are controlled and monitored from a central control panel.
 - The main controls are semi-automatic, Honeywell, Foxboro and Fisher.
 - The chambers are equipped with video, intercoms and phone lines.
 - The facility can also be controlled from a set of manual control valves.
 - There are headset stations for additional monitoring.
 - The chambers are monitored for pressure, temperature, humidity, O2% and CO PPM.
5. Air Supply: The facility is designed for constant ventilation, the compressors are low-pressure high volume.
 - The facility draws its air from a 50-ft intake.
 - The air is filtered and tested semi annually to CGA grade D standard.
 - The 2 main compressors are electric, type ESH-NL Ingersoll / Rand's.
 - The emergency compressor is a Joy WGOL-9 powered by a natural gas engine.
6. Medical Gas and Controls: The Hyperbaric facility is supplied with O2, Air, N2, Nitrox, Heliox, N2O, and vacuum.
 - The supplies are duplex.
 - The controls and alarms are located at the main control station.
 - The chambers are supplied gases at 50 psi over pressure.
 - The facility is not connected to the hospital medical gas supply.
7. Design features:

<ul style="list-style-type: none"> • 18 in. by 2ft 5 in. medical locks • Pneumatic floor ramps • Sink in the chambers • 110 volt explosion proof outlets • Incandescent lighting / explosion proof fixtures • Explosion proof electric fans • GFI protection 	<ul style="list-style-type: none"> • Tempered glass portholes • Conductive tile flooring • Electrical pass-through for patient care • External ventilation fans for 1 Ata operation • Emergency Generator • Venturi air horn
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8. Fire Suppression: The chambers are equipped with a water filled fire suppression system and a secure breathing air source for personnel.
 - Fire pump and volume tanks
 - Overhead deluge manually activated from inside or outside the chambers
 - Hand held fire suppression in each chamber
 - Secure air source for attendants, patients and operators
9. Equipment: Patient care support equipment includes;
 - Prototype "BIBS" O2 supply station, and assemblies for O2 delivery to the "hood" and "T" piece
 - N2 flow meters for electrical equipment
 - Novamatrix TCO2
 - Oxford - Penlon ventilator, McGaw Horizon IV pumps, Ohmeda volume monitor
 - Exam / wound care room.
 - Monitors and defibrillator

Summary

The Hyperbaric Facility at Hennepin County Medical Center is designed, built and equipped to care for both stable, non-emergent patients and critically ill patients, 24 hours a day / 7 days a week. Staff are on the premises Monday through Friday, 7:30 am – 4:00 pm, and on call the remainder of the time for emergencies. This facility serves the five-state area and parts of Canada. The closest Hyperbaric facilities of this capability are in Milwaukee, WI; Iowa City, IA; Chicago, IL and Denver, CO.