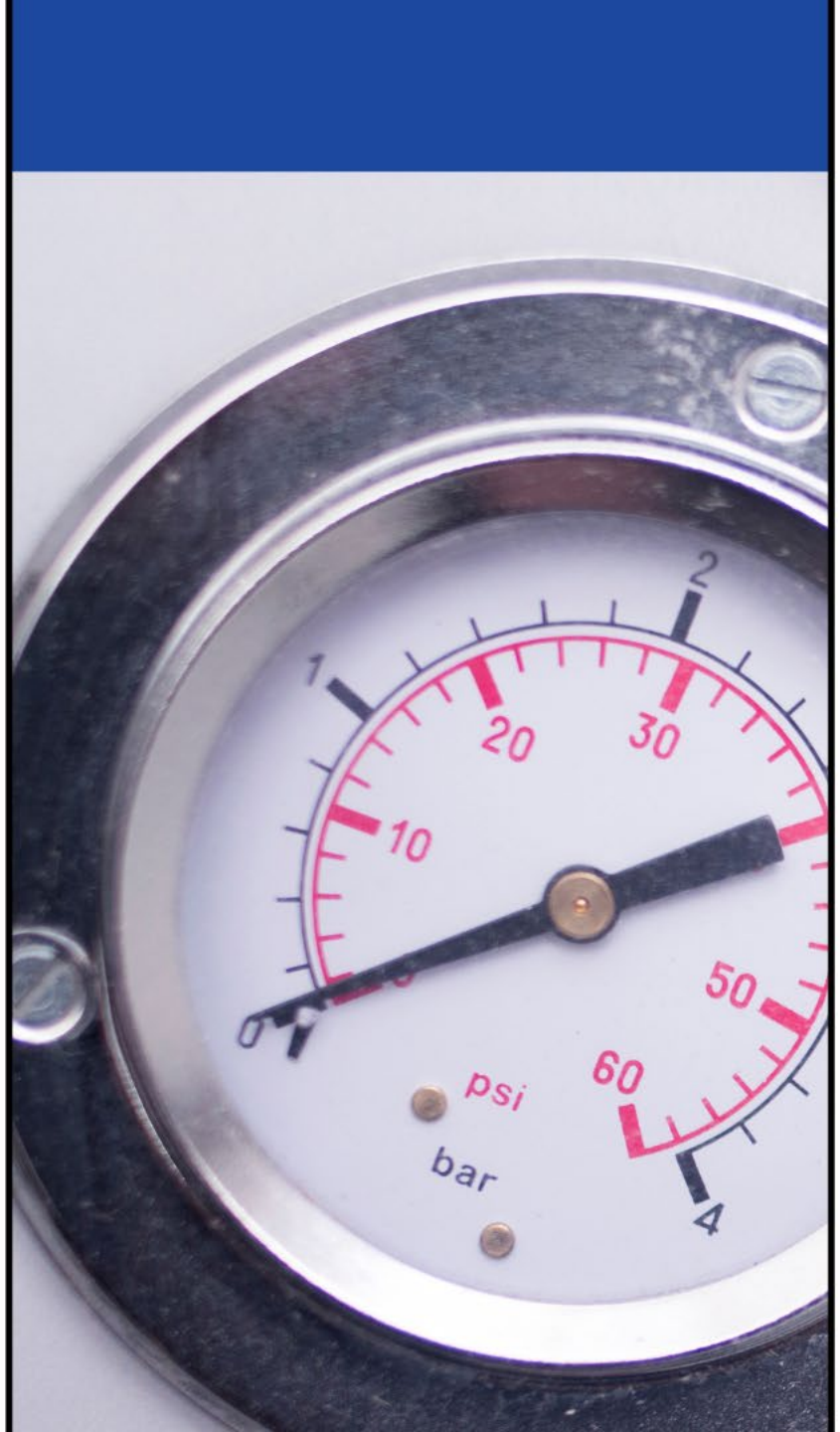
JULY 2022 MONTHLY HBOT WEBINAR

What can and cannot go into the chamber?

PRESENTED BY THE MEMORIAL HERMANN - THE WOODLANDS PROGRAM



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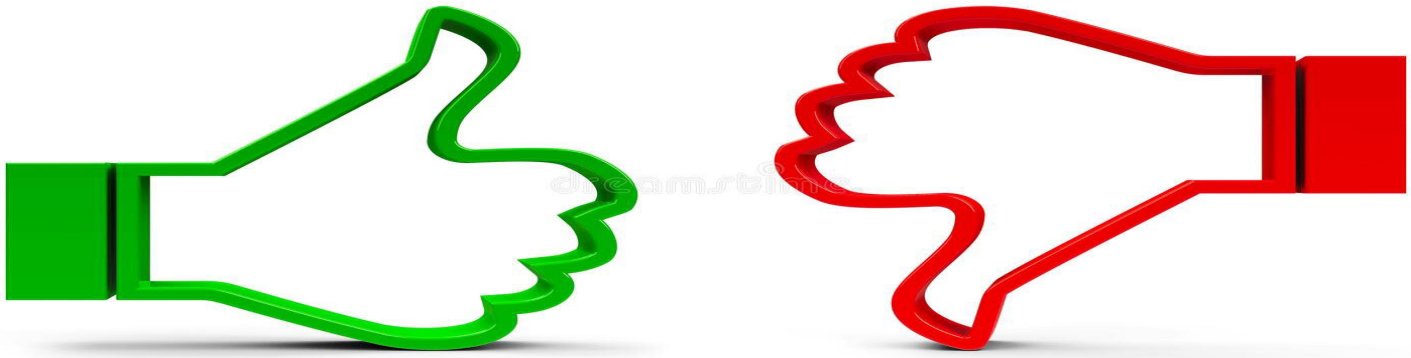
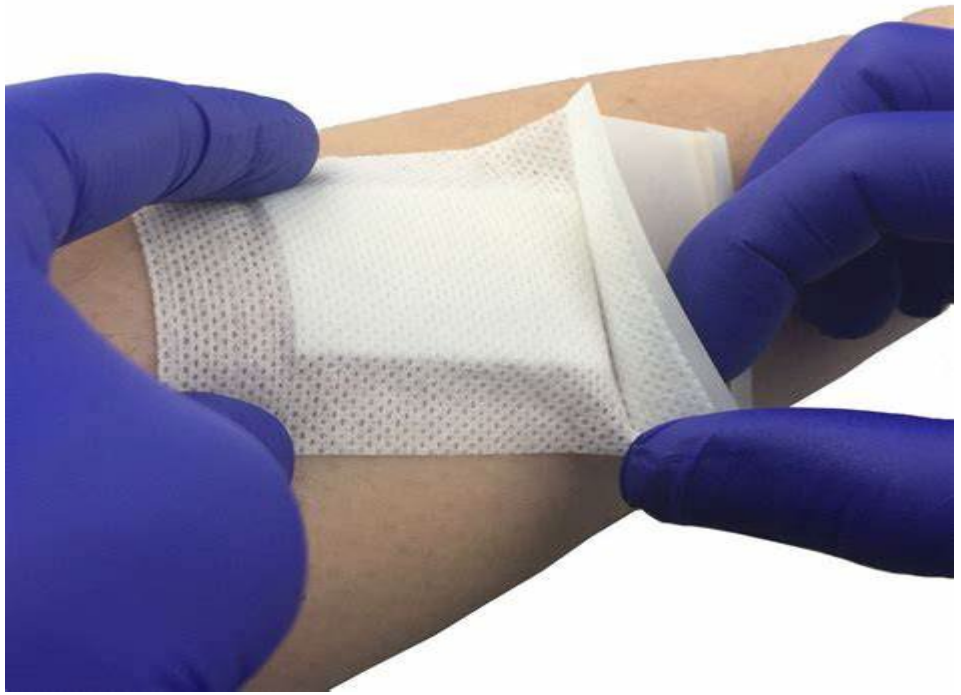
What Can Go Into The Chamber

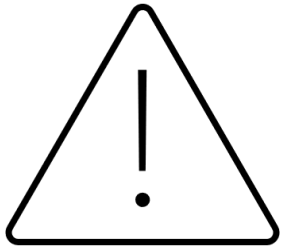
- This question can confound HBO techs daily, some have gone to the extreme of removing all medical related dressings and skin barriers prior to HBOT; of course, you cannot be too safe, right? Well, not really. You do run the risk of making the patient's wound worse by drying it out and exposing it to the atmosphere as well as denying the patient a treatment that a physician has deemed necessary.



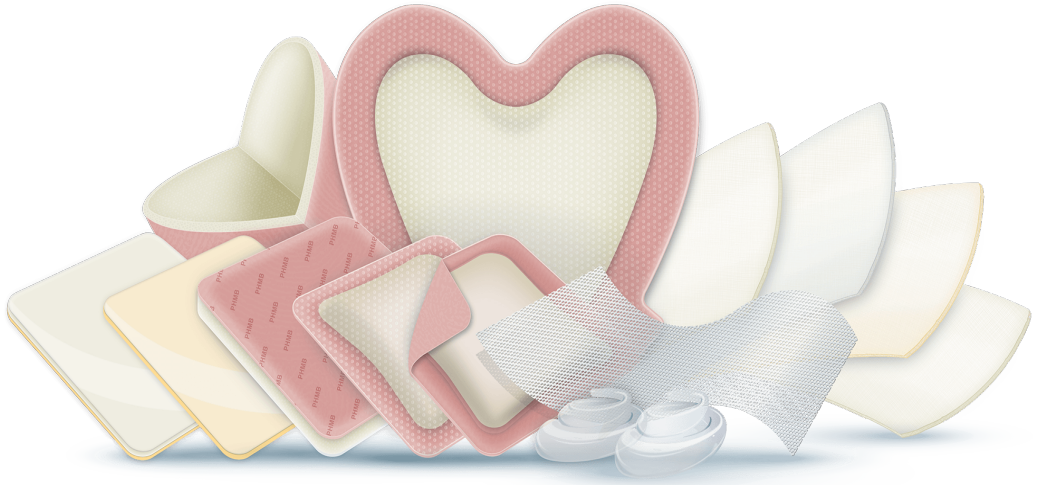


- The answer lies in the balance between the risks associated with the dressing and its potential benefits in treating the wound. First ask, “is the dressing necessary?” If the answer is no, the dressing is removed prior to treatment. If the answer is yes, decide whether to cancel the treatment or mitigate the risk.

What do the NFPA Guidelines suggest?



- “The physician or surgeon in charge, with the concurrence of the safety director, shall be permitted to use prohibited items in the chamber that are one of the following:
  - Suture material
  - Alloplastic devices
  - Bacterial barriers
  - Surgical dressings
  - Biological interfaces" (NFPA 14.3.5.4.3)



- When evaluating a dressing it is important to first understand the roll of fuel in the chemical reaction known as fire. Normally this reaction is between oxygen in the atmosphere and some sort of fuel. (wood or gasoline, for example) Of course, wood and gasoline do not spontaneously catch fire just because they are surrounded by oxygen. Fuel must be heated to its ignition temperature for combustion to occur. The reaction will keep going as long as there is enough heat, fuel, and oxygen. This is known as the fire triangle.

- Fuels can be solids, liquids or gases. During the chemical reaction that produces fire, fuel is heated to such an extent that (if not already a gas) it releases gases from its surface. Only gas can be used as fuel. Gas is made up of molecules (groups of atoms). When these gases are hot enough heated molecules are loosened, moving apart to form a gas. The gas molecules combine with oxygen in the air resulting in fire. This is important for us for two reasons: first the hyperbaric environment is 100% oxygen under pressure. There are 15 times more molecules of oxygen available to "mix" with molecules of fuel. This lowers the heat required for combustion, or flash point.

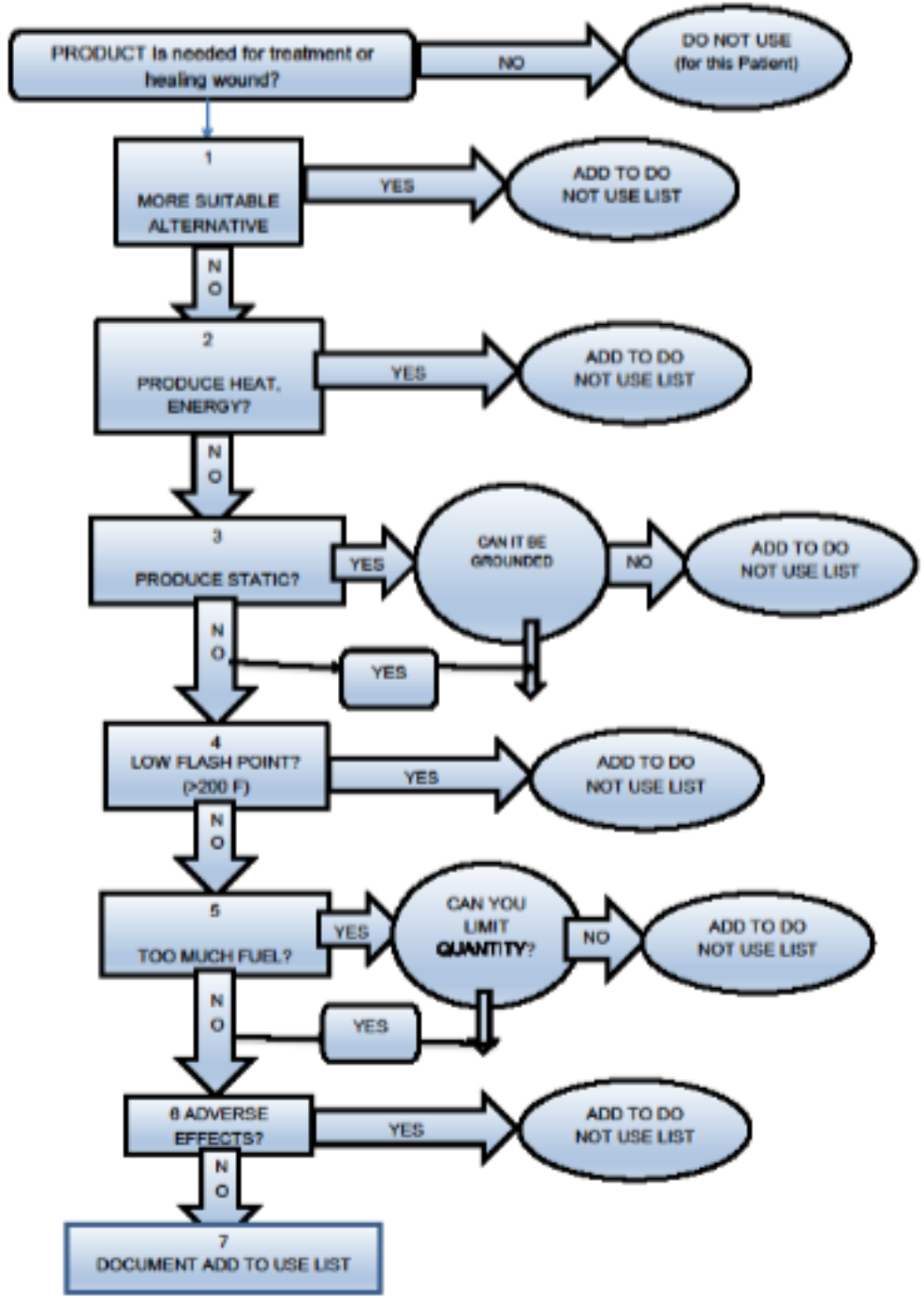
- The second factor is the need to convert fuel to gas, meaning that any product that evaporates or ‘off gases’ at room temperature becomes exceptionally rich fuel as no heat is required to convert the solid or liquid to gas. An example of this can be found in the oily rags left in the attic that on a hot summer day spontaneously combust. This happens at temperatures as low as 120 degrees Fahrenheit in room air (21% oxygen).

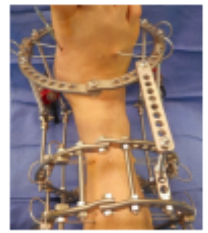
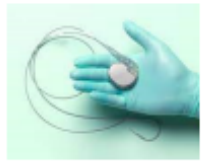
- Most skin and wound care products have petroleum, alcohol, or benzine base. These are all rich fuels and according to our prohibited items list should not enter the chamber. Let’s examine this a little more closely. These highly flammable products are used in most cases as ‘carriers’; in others words they keep the product moist or pliable for storage and once exposed to air they evaporate. Once they evaporate, they are no longer a ‘rich fuel’ and no longer pose an unacceptable fire risk.

- Fuel is not the only consideration in deciding on whether an item can enter the chamber. We must consider the amount of fuel, potential energy sources, interactions with high dose oxygen, ability to produce a static charge, and potential damage to the chamber acrylic.

- When developing a “go” or “no go” list, it is also important to consider ways to mitigate risk, minimizing the likelihood of an incident. Mitigating risk can include covering a dressing with a damp cloth, increasing the vent rate, padding over a device, and substitution with a compatible product.

- Utilizing the decision tree below, let’s walk through a go/no-go list.


PRODUCT Is needed for treatment or healing wound?
NO
DO NOT USE (for this Patient)
1
MORE SUITABLE ALTERNATIVE
YES
ADD TO DO NOT USE LIST
NO
2
PRODUCE HEAT, ENERGY?
YES
ADD TO DO NOT USE LIST
NO
3
PRODUCE STATIC?
YES
CAN IT BE GROUNDED
NO
ADD TO DO NOT USE LIST
NO
YES
4
LOW FLASH POINT? (>200 F)
YES
ADD TO DO NOT USE LIST
NO
5
TOO MUCH FUEL?
YES
CAN YOU LIMIT QUANTITY?
NO
ADD TO DO NOT USE LIST
NO
YES
6 ADVERSE EFFECTS?
YES
ADD TO DO NOT USE LIST
NO
7
DOCUMENT ADD TO USE LIST

	**Unna Boot**	YES OR NO
	**Continuous Glucose Monitoring (CGM)**	YES OR NO
	**Loop Recorder Implant**	YES OR NO
	**External Fixator Device**	YES OR NO
	**Pacemaker**	YES OR NO
	**Vaseline Gauze**	YES OR NO
	**Silver Alginate**	YES OR NO

- Procedure: When evaluating a dressing for use in HBOT, employ a logical method and document the reasoning underpinning the decision. To lesser extent, consider the psychosocial results when considering low risk personal items; however, never compromise safety: when in doubt leave it out.

- References:
- **“Hyperbaric Medicine Practice” 2nd edition by Dr. Kindwall (pp. 417). NFPA 99, 2012 addition chapter 14 SerenaGroup policy and procedure.2020

- SerenaGroup Policies and Procedures that are available to support a safety director in his or her decision making about prohibited and permitted items.
  - HM.402.0 - Prohibited & Approved Items in the Hyperbaric Chamber
  - HM.403.0 - Exception to Protocol on Prohibited Items in HBO
  - HM.514.0 – Implanted Devices

HM.402.0 - Prohibited & Approved Items in the Hyperbaric Chamber

The only items allowed in the chamber are those found in the approved items list. If an item is not listed on the approved items list, it is considered prohibited unless it has been specifically cleared by the Safety Director in accordance with “Exception to Protocol Policy”.

1. **PROHIBITED:**

- Outside clothing (clothes worn when coming into center whether street or from other healthcare facilities) including, undergarments and socks
- “Velcro” (unless inactivated with tape)
    - “Inactivated” is defined as wrapping each side of Velcro such that it cannot be connected together. It is not inactivated if wrapped when it is connected together
- Jewelry or Metals (unless covered in tape)
- Hearing aids or ear plugs
- Electronic devices including cell phones, iPad, electronic tablets of any type pagers, etc.
- Dentures or bridge work (Removable ONLY)
- Prostheses (detachable)
- Alcohol pads
- Hair sprays, oils, gels, any hair care products
- Hairpieces or hair pins
- Cologne or deodorant
- Make-up, skin lotions, creams
- Nail polish or products that have been applied within 24 hours
- Food, candy, gum
- Suntan lotion
- Smoking items, including matches and lighters
- Muscle ache patches, warming devices
- Reading material
- Kleenex etc.
- Any battery-operated device
- Transdermal medication patches
- Beverages in a can
- Flammable liquids, gases or vapors
- Non- approved implanted devices
- Sanitary pads with wings
- Glasses (titanium)

PROHIBITED MATERIALS FOUND OR SEEN IN THE CHAMBER
ARE JUST CAUSE FOR IMMEDIATE TERMINATION OF THE TREATMENT

HM.403.0 - Exception to Protocol on Prohibited Items in HBO

PROCEDURE:

1. Identify the item that presents risk prior to treatment.
2. Determine if the item is necessary.
3. If the item is necessary, complete the Exception to Protocol Form.
4. Submit the completed form to the HBO Safety Director and treating provider for review and signature.
5. Final approval will be made by SerenaGroup®.
6. Keep a copy of the form in the patient's medical record.

HM.514.0 – Implanted Devices

PROCEDURE:

1. Obtain and document the patient's history of implanted devices.

2. Request a copy of the patient's device card. If the card is not available, contact SerenaGroup®.

3. Chamber technician contacts the manufacturer to determine if the device is rated for hyperbaric pressures.

4. Findings are documented in the patient's medical record.

Pre-Dive Checklist

- Before the patient enters the chamber, STOP!
- Take inventory of your surroundings
  - Do you smell any prohibited items?
  - Do you see any prohibited items?
- Perform the pre-dive checklist out loud, questioning the patient about prohibited items.
- Don’t make a quick habit out of the 60 seconds of safety, ensure a time out is taken to perform a complete assessment.


QUIZ

Question 1: True or False?

- A 2 x 2 Vaseline gauze dressing may be permitted in the monoplace chamber.

Answer 1

- Yes, but the Vaseline gauze should be covered with an appropriate dry sterile dressing and should not remain exposed in the chamber.

Question 2

- The first question to ask when evaluating a dressing or product for the chamber is?

Answer 2

- Is product needed for treatment or healing the wound?

Question 3

- Per NFPA Guidelines, the physician or surgeon in charge, with the concurrence of the safety director, shall be permitted to use prohibited items in the chamber that are one of the following: (list two)

Answer 3

- 1 Suture material
- 2 Alloplastic devices
- 3 Bacterial barriers
- 4 Surgical dressings
- 5 Biological interfaces (NFPA 14.3.5.4.3)

Question 4

- If the doctor orders a dressing, then it is safe to go into the chamber without further investigation

- True or False?

Answer 4

- False, the hyperbaric tech should always be aware of what is going in the chamber and whether or not it is safe for use in the chamber.

Question 5

- If a product contains a small amount of a questionable ingredient, such as a petroleum base, a good practice is simply to cover it during treatment.

- True or False?

Answer 5

- False, a decision should be made on each questionable product individually based on the decision tree flow chart.

Collagenase Santyl and Hyperbaric Oxygen Therapy

- Is Santyl safe for use in HBOT?
  - Yes
- Then why should Collagenase Santyl be applied to a wound after HBOT and not before?
  - Possible HBOT inactivation-a fresh dose must be applied after HBOT. HBOT can reduce the efficacy of the enzymatic debriding agent.

No, means No.

- *Did you all receive Matt's email regarding the dangers of continuous glucose monitors and lithium ion batteries in the hyperbaric environment?*
- After Li-ion batteries became prevalent in the marketplace, the 2012 edition of NFPA 99 made specific menti on of Li-ion batteries, "Lithium and lithium ion batteries shall be prohibited in the chamber during chamber operations, unless the product has been accepted or listed for use in hyperbaric conditions by the manufact urer or a nationally recognized testing agency." In the 2018 edition of NFPA 99, this sentence was removed. The 2018 edition of NPFA 99 contains the following rules in section 14.2.8.3 Wiring and Equipment Inside Cla ss A Chambers: 14.2.8.3.17.5 Battery-Operated Devices. Battery-operated devices shall meet the followin g requirements: (1) Batteries shall be fully enclosed and secured within the equipment enclosure. (2) Batte ries shall not be damaged by the maximum chamber pressure to which they are exposed. (3) Batteries shall be of a sealed type that does not off-gas during normal use. (4) Batteries or battery-operated equipment sh all not undergo charging while located in the chamber. (5) Batteries shall not be changed on in-chamber equ ipment while the chamber is in use. (6) The equipment electrical rating shall not exceed 12 V and 48 W. Cur rent NFPA rules on batteries in hyperbaric chambers are not specific to Li-ion batteries; and do not address a ll potential issues one might have with Li-ion batteries
- What about the battery in an implanted medical device? Implanted pacemakers, defibrillators, and most li kely all implanted devices use a disposable lithium-ion battery. The biggest concern for most implanted de vices is pressure tolerance, not the power source. Any gas spaces in
  the device will be affected by chamber pressure. This might cause a malfunction or failure of the device but would not likely affect the disposable battery.

Reportable Events

- Who
- What
- When
- Why
- How

SerenaGroup HBOT Monthly Show Rate

Centers	Program Director	HBO Show Rate
Cleveland Clinic Akron	Kim	91%
ACMH	Erika	
Berkshire	Sean	85%
CHI Health CUMC Bergan	Joe	
CHI Health Mercy	Joe	
Deborah	Megan	95%
Fairview	Jamie	100%
Henry Ford	Eliece	
Jackson	Dean	88%
St. Mary's	Katie	100%
St. Joseph Med Ctr	Doris	100%
Via Christi	Nancy	100%
MH The Woodlands	Andrea	99%
Inspira Health – Elmer	Ally	100%

SerenaGroup Upcoming HBOT Educational Courses

LIST DATES AND LOCATIONS

- August 18-21, West Palm Beach, FL
- August 25-28, Houston, TX

Next Month's Presenter

DATE: August 16, 2022

PRESENTING: St. Joseph's

TOPIC: Know the Resources
Available for You and Your Patients

SerenaGroup HBOT Contact Information

Matt Schweyer, Chief Compliance Officer | VP Head of Compliance, Reimbursement & Safety | National Safety Director

- mschweyer@serenagroups.com
- C. 214-315-5109

SerenaGroup Education Committee

- Ally George - HBO Educator
  - C. 609-202-6152
  - ageorge@serenagroups.com
- Blair Flinn
- Nancy Trafelet
- Jill Schroder