



CLINICAL POLICY

Safe Handling of Liquid Nitrogen

A. EFFECTIVE DATE :

June 30, 2021

B. PURPOSE :

1. To provide a framework for safe handling of liquid nitrogen dewars or flasks and the proper transfer of liquid to avoid potential hazards.
2. To outline protective clothing when handling liquid nitrogen.
3. To identify proper containers for storage of liquid nitrogen.
4. To outline proper transfer of liquid nitrogen. To provide first aid instructions if reactions to working with liquid nitrogen occur.

C. POLICY :

When handling liquid nitrogen clinical staff will follow procedures outlined below to assure safe handling of liquid Nitrogen.

Staff will receive training in the handling and use of liquid nitrogen as follows:

1. The physical, chemical and psychological hazards associated with cryogenic fluids.
2. The proper handling procedures for cryogenics and cryogenic containers.
3. The emergency procedures required in case of an accidental exposure to liquid nitrogen.
4. The reporting procedures in case of such an accident.

D. SCOPE :

Employees of all UConn Health clinics that use, store, and handle liquid nitrogen.

E. DEFINITIONS :

1. Dewar: An insulated bulk storage container of liquid cryogenics
2. GAB: Gallagher Bassett – State of Connecticut’s third party workers compensation administrator

F. MATERIAL(S) NEEDED :

1. Dolly or hand cart if needed for transport
2. Face shield and goggles
3. Cryogenic gloves
4. Impervious lab coat
5. Wooden or solid dipstick

G. PROCEDURE :

To avoid potential injury or damage to skin or eyes (serious freezing/frostbite) the following precautions must be taken by all staff handling liquid nitrogen:

1. Store and use liquid nitrogen only in a well-ventilated space.
 - i. Proper handling of liquid nitrogen dewars:
 - ii. Contact of liquid nitrogen or any very cold gas with the skin or eyes may cause serious freezing (frostbite) injury. Protect hands, skin and eyes at all times when working with liquid nitrogen.
 - iii. Do not walk or roll or drag containers – use a dolly or handcart when moving containers
 - iv. When transporting a liquid nitrogen dewar, maintain adequate ventilation and protect the unit from damage.
 - v. Do not place these units in closed vehicles where the nitrogen gas that is continuously vented from unit can accumulate.
 - vi. Prevent spillage of liquids and damage to unit by securing it in the upright position so that it cannot be tipped over.
 - vii. Protect the unit from sever jolting and impact that could cause damage, especially to the vacuum seal. Condensed moisture or frost on the outer shell of a refrigerator and abnormally rapid evaporation of the liquid nitrogen are indications of vacuum loss.
 - viii. **NOTE:** Special care must be taken when transporting a Dewar in an elevator so as not to damage or spill the contents as this is a confined space.
2. Clothing: Protective clothing as follows must be worn by al staff handling liquid nitrogen:
 - i. Face shield and safety goggles to protect eyes (safety glasses without side shields do not give adequate protection),
 - ii. Impervious lab coat to allow for easy removal in the event of a splash,
 - iii. Gloves specifically designed for this task when handling anything that is, or may have been, in immediate contact with liquid nitrogen. Unless specifically designed, most cryogenic gloves are not designed for complete immersion,
 1. Gloves should fit loosely so that they may be thrown off quickly should liquid splash into them,
 - iv. Impervious shoes must be worn. Opened toed shoes are not allowed.
3. Proper containers: only cryogenic containers designed for low-temperature liquids (liquid nitrogen).
 - i. Never cover or plug the entrance opening of any liquid nitrogen dewar to allow for proper venting of gas.
 - ii. Check the container periodically to be sure that venting is not restricted by accumulated frost or ice.
4. Transfer of liquid nitrogen:
 - i. Don proper personal protective equipment (gloves and face shield approved for use with cryogenic material, lab coat and the proper shoes. Report missing or damaged PPE to clinic administration.
 - ii. When filling a secondary container introduce a small amount to chill the receiving vessel prior to filling. The sudden evaporation can create a splash hazard.
 - iii. Be extremely careful not to over fill cylinder.
 - iv. Be vigilant about excessive frost buildup on the fill valve during peak use.
 - v. Do not dispose of excess liquid nitrogen by dumping it down the drain. The extreme temperature change and associated contraction of the drain can cause damage. Simply allow the cylinder to vent.
 - vi. **NOTE: A hissing cylinder is a working cylinder.**
 - vii. Wooden or solid metal dipsticks are recommended.
 1. Never use hollow rods or tubes as dipsticks
 2. Never use plastics that may become brittle and prone to shattering at cryogenic temperatures
5. In the event of an accidental exposure to skin or eyes:
 - i. Dizziness or loss of consciousness – move to a well ventilated area immediately, evacuate the area and call 911.
 - ii. Skin exposure:

1. Rapidly warm the exposed area with water at 108° F/42° C Water should never be over 112° F/44°C).
2. Never rub the affected area before or after warming.
3. Seek medical treatment. (911 to go to ED or Employee Health Services)
4. Report incident to your supervisor and report to GAB: 1 (800) 828-2717

H. ATTACHMENTS :

None

I. REFERENCES :

None

J. SEARCH WORDS :

Liquid nitrogen

K. ENFORCEMENT:

Violations of this policy or associated procedures may result in appropriate disciplinary measures in accordance with University By-Laws, General Rules of Conduct for All University Employees, applicable collective bargaining agreements, the University of Connecticut Student Code, other applicable University Policies, or as outlined in any procedures document related to this policy.

L. STAKEHOLDER APPROVALS :

On File

M. COMMITTEE APPROVALS :

None

N. FINAL APPROVAL :

- | | |
|--|--|
| <p>1. <u>Andrew Agwunobi, MD (Signed)</u>
 Andrew Agwunobi, MD, MBA
 UConn Health Chief Executive Officer</p> | <p><u>07/21/2021</u>
 Date</p> |
| <p>2. <u>Anne D. Horbatuck, (Signed)</u>
 Anne D. Horbatuck, RN, BSN, MBA
 Clinical Policy Committee Co-Chair</p> | <p><u>07/21/2021</u>
 Date</p> |
| <p>3. <u>Scott Allen, MD (Signed)</u>
 Scott Allen, MD
 Clinical Policy Committee Co-Chair</p> | <p><u>07/14/2021</u>
 Date</p> |
| <p>4. <u>Caryl Ryan (Signed)</u>
 Caryl Ryan, MS, BSN, RN
 Interim Chief Operating Officer, JDH
 VP Quality and Patient Services & Chief Nursing Officer</p> | <p><u>07/12/2021</u>
 Date</p> |

O. REVISION HISTORY :

Date Issued: 6/2021