Status **Scheduled** PolicyStat ID **12966288**

Beaumont

Origination	6/18/2023
Last Approved	5/19/2023
Effective	6/18/2023
Last Revised	5/19/2023
Next Review	5/18/2025

Document Contact	Wendy Frizzo: Bone and Tissue Coordinator
Area	Laboratory-Blood Bank
Applicability	FH, GP, RO, Troy

Handling Dry Ice for Tissue Transport to Operating Room

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

The purpose of this document is to provide the Blood Bank staff with information and procedures for safe handling of dry ice when storing and transporting tissues requiring storage temperatures less than -40°C to the operating room.

II. CLINICAL SIGNIFICANCE:

Dry ice is the solid form of carbon dioxide (chemical formula CO_2), comprising two oxygen atoms bonded to a single carbon atom. It is colorless, with a sour zesty odor, non-flammable, and slightly acidic. Dry ice will sublime (vaporizes directly to a gaseous state) at a temperature of -78.5°C (-109.3°F) or higher. It sublimates at 10% or 5 to 10 pounds every 24 hours, whichever is greater.

III. DEFINITIONS:

A. **Dry ice:** A solid form of carbon dioxide, non-combustible, available in flakes, pellets, or blocks form.

B. **Sublimate:** The transition from the solid phase to the gas phase without passing through an intermediate liquid phase.

IV. HAZARDS OF HANDLING DRY ICE:

A. **Store dry ice in an insulated container:** The thicker the insulation, the slower it will sublimate. Do not store dry ice in a completely airtight container. The sublimation of dry ice to carbon dioxide gas will cause any airtight container to expand or possibly explode.

B. **Do not store dry ice in a refrigerator or freezer:** The extremely cold temperature will cause the

thermostat to turn off the freezer.

C. **Displacement of Oxygen/Asphyxiation:** Dry ice is capable of causing asphyxiation by displacing breathable air. To avoid such conditions, natural ventilation should be used.

V. SPECIAL SAFETY PRECAUTIONS:

Because of its low temperature, dry ice will cause frost bite to the skin much in the same way as hot liquids can burn. For this reason, always wear the proper protective clothing when handling dry ice. Personal protective equipment includes wearing face shields or goggles, cryogenic gloves (large enough to allow quick removal), and a cryogenic apron and/or lab coat. It is preferable that closed toe shoes with backs (no clogs) be worn.

VI. PROCEDURE:

A. TRANSFERRING DRY ICE INTO STYROFOAM™ STORAGE CONTAINERS:

1. Styrofoam™ coolers filled with dry ice are used as temporary storage containers when transferring frozen tissue products to the OR. Designated coolers are available in the triage area. Due to the safety hazards that dry ice poses, the following steps must be done to promote the safety of the handler:
2. Put on a pair of cryogenic gloves, cryogenic apron or lab coat, and safety glasses or goggles.
    a. Exposed skin surfaces of the handler should be minimized.
    b. Gloves should fit loosely and the handler should be able to shake the gloves free from the hands.
3. Use a plastic or metal scoop to transfer dry ice into the designated storage container.
    a. Tissue Styrofoam™ containers are clearly marked as Human Tissue Intended for Transplant.
    b. Storage containers must have a fixed UN1845 safety label:

c. Storage containers must also have fixed transport instructions. See Blood Bank form, *Dry Ice Cooler Instructions*.

4. Fill the container with dry ice to the designated line and replace the lid.
    a. Human tissue should be placed on the dry ice with maximum dry ice surface contact.
    b. Overfilling of the temporary storage container may make the container difficult to handle as the weight of the container may be cumbersome.

B. DISPOSAL OF DRY ICE:

1. Dry ice should dissipate in an open storage container. This container may be a Styrofoam™ cooler or a cardboard box.
2. Do not put dry ice in the sink. Due to the extreme temperature of dry ice, it can adversely affect the plumbing.
3. Do not run water over dry ice to accelerate dissipation.
4. Place the temporary container out of the flow of work traffic.

VII. WARNINGS:

A. First Aid**:**
    1. Exposure of skin or eyes:
        a. If skin or eyes come in contact with dry ice, flood the exposed area with large quantities of unheated water.
        b. Eye wash stations located in the blood bank may be used to irrigate the

eyes.

c. Protect frozen areas with loose, bulky, dry, and sterile dressings.

d. Do not rub frozen areas to warm. This activity may cause further damage to tissue.

2. Asphyxiation:

a. If a person is overcome by loss of oxygen while working with dry ice, move that individual to a well-ventilated area immediately.

b. Artificial respiration should be immediately started if breathing has stopped.

c. In all cases, notify your direct supervisor and seek medical help immediately.

d. Refer to Beaumont Laboratory Policies, Laboratory Precautions and Control Measures for Handling Chemicals, and Dry Ice Handling for additional information.

VIII. SPECIAL NOTES:

A. Dry ice may be ordered directly by the Blood Bank. The following is a contracted source:

a. HAV-A-BAR INC. at (810) 234-4155 or toll free at (800) 875-2227.

b. FAX (810) 234-7216

c. Email: havabar@comcast.net

B. Dry ice is also available in the Royal Oak Research Building for all sites:

a. Location: Royal Oak Basement, LL BRL Store Room

b. If the store room is locked, call ext. 15024

c. **** Please record the volume of dry ice removed on the log located next to the dry ice bin ****

d. MSDS for dry ice can be accessed at: MSDS Chem Management

IX. REFERENCES:

A. Association for the Advancement of Blood & Biotherapies, Standards, current edition

B. American Association of Tissue Banks, Standards, current edition

C. Laboratory Safety Cryogens & Dry Ice

D. UN1845 Label

Approval Signatures

Step Description	Approver	Date
	Kristina Davis: Staff Physician	5/19/2023
	Vaishali Pansare: Chief, Pathology	5/16/2023
	Ryan Johnson: OUWB Clinical Faculty	5/16/2023
	John Pui: Chief, Pathology	5/12/2023
Policy and Forms Steering Committe (if needed)	Wendy Frizzo: Bone and Tissue Coordinator	5/12/2023
	Abigail Swaney: Medical Technologist Lead	5/12/2023
	Kelly Sartor: Mgr, Division Laboratory	5/11/2023
	Karrie Torgerson: Supv, Laboratory	5/11/2023
	Teresa Lovins: Supv, Laboratory	5/11/2023
	Wendy Frizzo: Bone and Tissue Coordinator	5/10/2023