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Blood Bank Storage Equipment Temperature Monitoring - Troy

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

This document describes how the Troy Blood Bank monitors the temperature of storage equipment.

II. CLINICAL SIGNIFICANCE:

A. In the clinical laboratory, the use of refrigeration designed for storing temperature-sensitive patient samples and reagents is important for maintaining their integrity and sustaining regulatory compliance.

B. Refrigerators, freezers, Pyxis and platelet incubators must have alarm systems that are monitored to provide opportunity to take action before the temperature of blood, blood components, tissue and reagents are outside of acceptable ranges.

C. The Blood Bank is required to safeguard that blood components, reagents, derivatives, samples, and critical materials are handled and stored in a manner and at temperatures that prevents damage and limits deterioration.

III. DEFINITIONS/ACRONYMS:

A. Uninterruptible power supply (UPS): The backup power system used in case of a standard electrical power system failure.

B. NA: Not applicable

C. QC: Quality Control

D. PM: Preventative Maintenance

E. Designee: Any Blood Bank technical director, transfusion medicine fellow or lead medical technologist.

IV. POLICIES:

A. All storage devices have an internal thermometer and a Temp Trak® sensor.
    1. These thermometers and sensors are calibrated yearly as described in the Troy Laboratory procedure, Laboratory Temperature Monitoring System- Troy.
    2. Storage devices include refrigerators, freezers, Pyxis, and a platelet incubator.

B. Audible equipment alarms are set to trigger before the temperature falls outside the acceptable temperature range for refrigerators, freezers, and platelet incubators.

C. The Blood Bank shall remain staffed at all times.

D. If temperatures fall outside of the acceptable range or if an alarm is activated, refer to Transfusion Medicine policy, *Storage Equipment Alarms and Temperature Deviations.*

E. If the door of a Helmer® refrigerator is left open for approximately three minutes an audible equipment alarm will sound. This can be quickly resolved by closing the door.

F. The refrigerators, freezer, and platelet incubator are plugged into red power outlets which are connected to the hospital UPS system.

V. EQUIPMENT AND SUPPLIES:

A. Calibrated thermometers located inside each storage device.

B. TempTrak® sensors installed by facilities management.

C. Temperature graphs specific to the temperature range of each storage device.

VI. PREVENTATIVE MAINTENANCE (PM) AND QUALITY CONTROL (QC):

A. Quarterly alarm checks confirm that the alarm ranges produce the expected alarm before the temperature of blood or components is outside of acceptable ranges.

B. Refer to Transfusion Medicine policy, *Preventative Maintenance of Temperature Monitored Equipment.*

VII. SPECIAL NOTES:

A. Temperature Monitoring Methods
    1. The Blood Bank uses several methods to monitor temperatures and to confirm that blood, blood components, and reagents are stored at appropriate temperatures to maintain viability and function.
    2. These storage temperatures are monitored continuously or at least every four hours, so that appropriate action can be taken if the temperature of the storage device

approaches the limits of the acceptable range.

3. Temperature graphs are set up weekly by the Blood Bank on each storage device and are reviewed daily as described in Transfusion Medicine policy, *Blood Bank Temperature Monitoring*. The temperature graphs record the equipment temperatures continuously.
4. Each morning, a technologist takes the temperature from an internal thermometer located inside of each storage device.
5. Audible alarms from the Blood Bank storage devices are triggered before temperature ranges reach unacceptable levels. Since the Blood Bank is staffed at all times, the alarm should be heard by a technologist.
6. Beaumont Troy Blood Bank uses the TempTrak® system to monitor the temperatures of Blood Bank storage devices, room temperature, and humidity.
    a. This system monitors temperatures continuously at 15-minute intervals.
    b. The system is used only to monitor temperatures; it is not used to notify staff when sensors go into an alarm state.
    c. Sensors go into an alarm state when unacceptable temperatures are detected for the pre-configured alarm times set in Temp Trak®. These pre-configured alarm times are 15 minutes for refrigerator sensors, and one hour for all other sensors.
    d. Each morning a Blood Bank staff member reviews the data recorded by TempTrak® for each sensor.
        i. Green display: current sensor reading is normal, within the alarm set point temperature range.
        ii. Red display: current sensor reading is above the alarm set point temperature range.
        iii. Blue display: current sensor reading is below the alarm set point temperature range.
        iv. Sensor in Alarm
            a. This icon appears on the sensor display if a sensor is in alarm (the sensor reading is above or below the alarm set point temperature range), and has been above or below the alarm set point range for at least the pre-configured alarm time.
            b. A sensor may be currently outside of the acceptable range but is not in alarm because it has not been outside of the acceptable range for the pre-configured alarm time.
        v.  Missed Communication
            a. This icon appears if a missed communication occurs.

Each sensor has been programmed to send a temperature data packet to the Temp Trak® server every 15 minutes via Wi-Fi.

b. If the expected packet is not received by the server for 15 minutes, a missed communication message appears.

c. Failure to receive a data packet may be due to a network outage, but is more likely to be caused by a random network error.

d. Once communication is re-established, the data from the missing packets will be sent to the server.

VIII. EXPECTED VALUES:

Acceptable Storage Equipment Temperature Ranges

Equipment Name and ID number	Acceptable Storage Temperature	Equipment Audible Alarm Setpoint	Temp Trak Sensor or thermometer	Temp Trak Alarm Set Point	
				Low	High
Room Temperature	18° - 25° C	NA	075172/1	18.5° C	24.5° C
Room Humidity	20% to 60%	NA	075172/2	22%	58%
Jewett 2-door refrigerator A100939	2° - 6° C	2.1°C and 5.5°C	121168/1	2.1°C	5.5°C
Helmer 1-door refrigerator #1 A211919	2° - 6° C	2.1°C and 5.5°C	121169/1	2.1°C	5.5°C
Helmer 1-door refrigerator #2 384396	2° - 6° C	2.1°C and 5.5°C	121167/1	2.1°C	5.5°C
Helmer 2-door refrigerator A208964	2° - 6° C	2.1°C and 5.5°C	118125/2	2.1°C	5.5°C
Platelet Incubator 1002003	20° - 24° C	20.2°C and 23.5° C	121170/1	20.2° C	23.5° C
Jewett Plasma Freezer 1002005	-65°C to -18°C	-35° C and -22° C	140212/2	-35° C	-22° C

Forma Upright Ultra Low Freezer 329743	-90°C to -45°C	-85° C and -60° C	250233/2	-85° C	-60° C
Revco Chest Ultra Low Freezer 446256	-90°C to -45°C	-85°C and -60°C	162182/2	-85°C	-60°C
Pyxis	15°C to 25°C	16°C and 24.5°C	157076175/1	16°C	24.5°C
Pyxis Humidity	20% to 60%	NA	157076175/2	22%	58%

IX. PROCEDURE:

A. Each morning a day shift technologist will record the temperature of the internal thermometer located inside of each storage device.

B. Each morning, a day-shift technologist will review the TempTrak ® system and note whether or not the system is within acceptable temperature and humidity ranges.

1. Access TempTrak ® directly through the website.
2. Double click on GROUP: Blood Bank.
3. Twelve sensor displays appear: one sensor display corresponding to each of the eight monitored storage devices, two sensor display for room temperature, and two sensor display for humidity.
4. Observe the sensor displays to determine whether any sensor is in alarm or is affected by a missed communication . Also observe the color of the sensor displays.
    a. Green display – current sensor reading is normal, within the alarm set point temperature range.
    b. Red display – current sensor reading is above the alarm set point temperature range.
    c. Blue display – current sensor reading is below the alarm set point temperature range.
    d. Double click on the heading for one of the sensors (this step will be repeated for each of the 8 sensors). A graph displays the condition for the previous 24 hours, and the temperature readings that were recorded every 15 minutes for the last 24 hours display.
    e. Determine whether each sensor was in or out of the acceptable range at any point for the previous 24-hour period.

C. Monthly, the supervisor or designee will print a sensor report as described below, to demonstrate that the system was checked and documented each day. This report is saved in the Blood Bank QC/PM binder.

D. Access the Temp Trak® system Reports / Sensor Audit Report / Group / Blood Bank / Select the date range for the applicable month / Run / Export / Print the report.

X. REFERENCES:

1. AABB, *Technical Manual,* current edition.
2. AABB, *Standards for Blood Bank and Transfusion Services,* current edition.
3. College of American Pathologist, *Transfusion Medicine Checklist* and *Laboratory General Checklist*, current editions.

Attachments

Storage Equipment Alarms and Temperature Deviations -CHE.pdf

Approval Signatures

Step Description	Approver	Date
	Masood Siddiqui: Staff Pathologist	8/5/2024
	Ryan Johnson: OUWB Clinical Faculty	8/5/2024
Policy and Forms Steering Committe (if needed)	Teresa Lovins: Supv, Laboratory	8/5/2024
	Teresa Lovins: Supv, Laboratory	8/5/2024

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