



Montgomery County Fire and Rescue Service

Division of Operations

Emergency Medical and Integrated Healthcare Services

Low-titer O-Positive Whole Blood (LTO+WB)

A. Administrative and Storage Procedures

SECTION 1. Purpose:

Blood for transfusion is a highly regulated process that must be observed in a very specific manner to ensure the strictest quality control. This document establishes a comprehensive framework outlining the management and storage procedures for the blood supply carried by MCFRS.

SECTION 2. Applicability:

All MCFRS credentialed Emergency Medical Service Duty Officers (EMSDOs) who have completed the approved training program and are approved by the EMIHS Operations Battalion Chief and Medical Director may administer LTO+WB when clinically indicated and must strictly adhere to practices for storage and administration as described in this document.

SECTION 3. Background:

MCFRS is committed to providing our patients with the highest quality and most evidence driven emergency medical care.

The pre-hospital administration of LTO+WB has been shown to improve survival of critically ill patients in hemorrhagic shock and decrease in-hospital blood product administration.

MCFRS acknowledges risks associated with administering blood in the prehospital arena. This risk is appropriately mitigated through evidence-based protocols which include appropriate indications, contraindications, and other safeguards, and is outweighed by the potential benefit to patients that has been demonstrated in the medical literature.

There is increased risk associated with the logistical requirements of cold chain storage in EMSDO vehicles. This risk is necessary because it allows blood to be taken immediately to the sick or injured patient in the prehospital setting. This risk is mitigated by the credentialing of EMSDOs, the procedures contained in this document, and by the aggregate experience of minimal wastage in other model EMS jurisdictions.

The goal of the MCFRS LTO+WB program is absolutely zero waste of blood units due to improper handling.



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SECTION 4. Definitions:

- a. **Blood Administration Bag:** An equipment storage bag containing ancillary equipment for the administration of blood products.
- b. **Delta ICE™ (“Cooler”):** A smart passive refrigeration system that insulates a PCM Pack.
- c. **Deployment Site:** The home station of the unit to which the LTO+WB is assigned. Typically, these will be the EMSDO home stations.
- d. **Hemo-Trac™:** Blood temperature indicator attached by the blood bank.
- e. **LifeFlow™:** A hand-operated rapid infuser that allows clinicians to administer blood or crystalloids to a critically ill patient.
- f. **LTO+WB Process Owner:** Individual(s) designated by MCFRS responsible for monitoring, assessment, and improvement of the LTO+WB program.
- g. **PCM (Phase Change Material) Pack:** The container inserted into the **Cooler** that houses whole blood and maintains the required temperature range.

SECTION 5. Adherence Expectation:

All personnel charged with the responsibility of handling, storing, or administering blood are expected to strictly adhere to the procedures contained in this document in order to achieve the goal of zero-waste of blood units.

SECTION 6. Responsibility:

- a. The MCFRS Medical Director is responsible for the medical oversight of the LTO+WB program, including individual case review of administration and anomalies that occur in the cold-chain storage process.
- b. The MCFRS EMIHS Operations Battalion Chief is responsible for the process of obtaining and refreshing the MCFRS blood supply.



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- c. The EMSDO is responsible for the daily administrative and storage procedures of LTO+WB stored in their **Deployment Site**. This includes overseeing the maintenance of specialized equipment, facilitating blood exchanges, managing blood storage, monitoring storage temperatures, ensuring accountability and compliance with regulatory requirements, promptly addressing any discrepancies or issues, and maintaining thorough documentation of all related activities.
- d. The **LTO+WB Process Owner** is responsible for initial review of all LTO+WB administrations for appropriateness and adherence to protocol, review of missed blood administration opportunities, and audit of cold-chain storage procedures at all deployment sites. Review of administrations should occur as soon as possible after the case occurs. Review of missed opportunities and cold-chain storage audits should occur at no greater than one calendar month intervals.
- e. The EMIHS Quality Assurance Officer is responsible for investigation, documentation, and remediation of administration that does not adhere to the established protocol, missed opportunities for administration, and anomalies in the cold-chain storage process.

SECTION 7. Required Equipment Inventory

Refer to hyperlinked inventory.

SECTION 8. Procedure:

a. General

1. All blood shall be continuously stored in the **Cooler** maintained at a temperature between 2°– 6° Celsius. The blood shall be removed only for transfusion or to exchange the **PCM Pack**. Only blood products and applicable monitoring equipment shall be stored in the freezer or the **Cooler**. At no time shall food or drink be stored in the freezer or the **Cooler**.
2. The **Cooler** has an integrated thermometer with a cellular connection to the Internet. The thermometer requires power. The **Cooler** has an internal battery that lasts a short period of time. The thermometer shall therefore remain connected to a portable power pack or other static power source.
3. Each **Deployment Site** will be issued one **Cooler** with three **PCM Packs**.



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4. The **Cooler** and **PCM Packs** must be handled with care.
5. The **Cooler** must be stored with the lid closed and tightly secured with the exterior clasp to maintain proper temperature.
6. Every effort should be made to maintain the **Cooler** in a suitable environment with a stable ambient temperature. The passenger compartment area of the EMSDO vehicle is the preferred location to maintain a consistent and suitable environment. The **Cooler** must be secured during vehicle movement.
7. When parked anywhere other than the **Deployment Site**, the EMSDO vehicle must be secured and must be running to maintain a suitable ambient temperature within the passenger compartment.
8. If a temperature excursion alarm occurs, the EMSDO will immediately condition and exchange the **PCM Pack** and notify the EMIHS Operations Battalion Chief for further instructions.

b. Blood Accountability Procedure

1. The EMSDO is responsible for the daily accountability, exchange of **PCM Packs**, and temperature monitoring of the LTO+WB.
2. The EMSDO will immediately escalate any accountability, process, or temperature anomalies to the EMIHS Operations Battalion Chief.
3. The blood must be continuously temperature monitored. Consistent temperature monitoring will be achieved with technology capable of recording temperatures at programmed intervals (15 minutes) and sending out alerts when the temperature exceeds the specified range.
4. The EMSDO must keep the assigned cell phone with them to receive push notifications from the temperature data logger.
5. Electronic logging database records shall be maintained by the EMIHS Operations Battalion Chief for one year.



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c. Daily Changeover Procedures

1. Refer to the daily changeover process.
2. If this daily process has not occurred by 1000 hours the EMSDO will coordinate an apparatus detail and complete it.
3. Any **PCM Pack** that conditions to a temperature above 4°C must re-condition for at least 4 hours.
4. Document the daily changeover at this form link:
<https://mcfirs.jotform.com/241667962178874>

d. Exchange and Replenishment of LTO+WB

1. Refer to the exchange and replenishment process.
2. Document an exchange and replenishment at this form link:
<https://mcfirs.jotform.com/241544489076869>