

HARBOR-UCLA MEDICAL CENTER

**SUBJECT: COMPUTERIZED PNEUMATIC TUBE SYSTEM**

**POLICY # 377**

**PURPOSE:**

To establish procedures for the operation of the Computerized Pneumatic Tube system.

**POLICY:**

Harbor-UCLA Medical Center uses the Computerized Pneumatic Tube System (CTS) to transport supplies, records, specimens, medications, blood products and other small items. All staff having contact with specimens must be trained to handle specimens using Standard Precautions. Training shall be provided in departmental orientation and incorporated as part of the annual training. During downtime, departments will hand deliver items. Nothing over 2.5 pounds will be sent in carriers.

**PROCEDURE:**

**A. Use of the CTS – General Guidelines**


- a. Individuals who open carriers shall wear gloves whenever removing biohazard materials from the tube system carrier as it may be contaminated with leakage. The staff shall be trained in decontamination of the carrier. Training shall be provided as part of departmental orientation. The decontamination procedure should be easily accessible and posted if appropriate.
- b. All precautions and standards for manual transport of specimens also apply to the automated transport of specimens (e.g., appropriate containers, tagging/labeling).
- c. In a pneumatic tube system, carriers containing specimens can be accidentally misdirected to a location other than a laboratory. All staff who may potentially open a carrier should regard the contents as biohazardous in nature and must be given instructions on how to:
  - i. Identify a spill.
  - ii. Implement spill/decontamination notification procedures.
  - iii. Redirect the carrier to the Laboratory (or sending department) – if no spill present.
- d. Use of Gloves:
  - i. All departments must have a supply available of appropriate sizes adjacent to their tube station.
  - ii. Hand hygiene is required before donning gloves and after glove removal.
  - iii. Hand hygiene is required for all staff who handle CTS containers; even for those employees who do not handle specimens.

**EFFECTIVE DATE: 2/14**  
**REVISED: 4/15, 5/18, 9/20**  
**REVIEWED: 4/15, 5/18, 9/20**  
**REVIEWED COMMITTEE:**

**SUPERSEDES:**

**APPROVED BY:**   
 Anish Mahajan, MD  
 Acting Chief Executive Officer

  
 Anish Mahajan, MD  
 Chief Medical Officer

  
 Nancy Blake, PhD, RN, NEA-BC, FAAN  
 Chief Nursing Officer

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- e. Periodic inspections shall be conducted as part of the environment of care rounds.
  - i. Observation and documentation of work practices to determine whether a ZIP N' Fold pouch is being used when necessary.
  - ii. Observation and documentation that the Zip pouch is present in the container at all times.
  - iii. Observation that hand hygiene occurs when the employees handle containers with specimens.
- f. The Facilities Management Department shall perform periodic inspections and decontamination of containers.
- g. Damage to the containers shall be reported to the Facilities Management Department.

**B. Basic System/Operating Instructions**

- a. Sending an item
  - i. The message **STATION READY** indicates the station is ready for sending a carrier. If it does not display this message, see **DISPLAY MESSAGES** section L.
  - ii. Place items to be sent in an empty carrier. Ensure that contents are immobilized and/or securely contained. (See Packaging Instructions).
  - iii. Close carrier and ensure that both latches are engaged. Ensure that no plastic bag or paper is protruding from the carrier.
  - iv. Place carrier in dispatcher.
  - v. Enter the correct destination station address using the keypad or press the pre-programmed **Speed Dial Key** for the desired destination.
  - vi. Press **SEND**.
  - vii. The message **SELECTION ACCEPTED PLEASE WAIT** indicates carrier has been accepted for processing and will be processed as soon as possible.
  - viii. For messages that may be displayed when a carrier cannot be dispatched, see **DISPLAY MESSAGES** section L.
  - ix. Any extra carriers can be sent by pressing the **EMPTY SEND** button, then **SEND** button.
- b. Clearing or Canceling a Transaction
  - i. If an error is made while keying an entry, press **CLEAR** and start over.
  - ii. If an improper keyboard entry is made, a short "beep" will sound. Press **CLEAR** and start over.
  - iii. To stop a transaction after the **SEND** button has been pressed and **SELECTION ACCEPTED** is displayed, press **CANCEL**.
  - iv. If **TRANSACTION WAS ABORTED** is displayed, press **CANCEL** and start over.  
**Note: the transaction cannot be canceled if the dispatcher has started to move. Removing the carrier from the dispatcher can cause a system shut down since it is looking for a carrier that does not exist. (See downtime procedure).**
- c. Receiving an Item
  - i. The messages **INCOMING CARRIER** and **INCOMING SECURE CARRIER** indicate a carrier will be arriving at the station.
  - ii. Remove the carriers promptly to prevent receiver from becoming full and shutting off the station. Observe Standard Precautions when necessary.

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- iii. All items removed from the carrier (medication, central supply items, etc.) need to be placed in the designated area within the unit. **No medication should be left on a counter or any other non-designated medication area.**
- iv. If carriers, latches, or bands are damaged or worn, remove carrier from system and contact Facilities Management to repair.
- v. If **RETURN SURPLUS CARRIERS** is displayed, send extra carrier with Zip pouches using **EMPTY SEND** feature. Zip pouches shall never be removed from carriers.

**Note: If a carrier is suspected of being contaminated, follow the System Spill Procedures for Users contained in this policy.**

**d. Carriers**

- i. There are normally four (4) carriers assigned to each tube station. Extra carriers should be returned to the system by pressing the **EMPTY SEND** key. The computer will distribute empty carriers to those stations in need. Hoarding carriers will slow down the system. Zip pouches must be distributed with each carrier.

**C. Items Not Approved for Transport in the CTS System****a. Pathology:**

- i. Formalin and/or alcohol preserved specimens.
- ii. Empty blood bags.
- iii. Blood bags, IV sets, IV solutions that have been implicated in a possible transfusion reaction.
- iv. Sputum/mucous traps.
- v. 24-hour urine collection.
- vi. Semen Analysis Specimens.

**b. Medications: See Pharmacy Procedures contained within this policy.****c. Sharps, either contaminated or sterile, must not be placed into the transport system.****d. Other:**

- i. Drinks or food items.
- ii. Contaminated supplies.
- iii. Non-hospital business document.
- iv. Patient valuables.
- v. Non-leak tight containers containing liquids.
- vi. Soiled instruments.
- vii. Money.

**D. Packaging**

- a. Potentially infectious items must be contained and transported in a manner that prevents breakage, leakage or contamination of the system. In accordance with Standard Precautions and OSHA Blood Borne Pathogen regulations, all patient specimens must be handled as potentially infectious.
- b. Gloves, and other barrier protection as appropriate, must be worn when inserting and removing any patient specimens from carriers.
- c. Follow special instructions for lab samples that need to be sent on ice (e.g., lactic acid ammonia, pH/blood gas). Place sample in a small zip lock bag. Fill routine zip lock bag with ice and place

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- zip lock bag with sample in the bag of ice. Close zip lock bag with ice. Place bag with ice in another zip lock bag to prevent leakage of water. Sample is now ready to be sent via carrier.
- d. If the Blood Gas samples are sent to the Blood Gas Lab within 15 minutes from draw time, no ice is needed. Place sample in biohazard zip bag, close zip lock and send via carrier.
  - e. Leakage is primarily due to:
    - i. Improper packaging and failure to immobilize contents.
    - ii. Use of non-leak tight containers or failure to tighten container lids.
  - f. To prevent spillage or breakage, remember:
    - i. Containment prevents leakage.
    - ii. Immobilization ensures integrity.
  - g. To avoid contamination of paperwork in case of a spill, first secure all request forms and other paperwork in a separate zip-lock plastic bag and then place the bag with the paperwork in the zip-lock plastic bag with the specimen.
  - h. A combination of zip-lock plastic bags, Zip N' Fold pouches, and foam liners will be used to immobilize and package items.
    - i. Make sure any specimen container cap is secure.
    - ii. Place sealed, labeled specimen in a zip-lock plastic bag.
    - iii. Completely close zip-lock bag.
    - iv. Place specimen enclosed in the zip-lock bag in Zip N' Fold pouch.
    - v. Seal pouch.
    - vi. Place pouch in carrier and send.
    - vii. Receiver will return Zip N' Fold pouch to carrier.

**E. Medications (Procedures)**

- a. The CTS is used by Pharmacy to dispatch items necessary for patient care:
  - i. Carriers are dispatched to their respective, medication secure stations according to proper procedures.
- b. Items to be dispatched via CTS (Items not stocked in Pyxis or Refrigerator):
  - i. All STAT and urgent doses are dispatched immediately upon processing in compliance.
  - ii. All ROUTINE doses are dispatched as soon as the order is processed.
- c. Items which will not be dispatched via CTS:
  - i. Products exceeding the weight of a liter bag of fluid (2.5 pounds).
  - ii. There is a potential for alteration of the active ingredient or vehicle, such as protein denaturation, cracking of emulsions, etc.
  - iii. If a product's package insert contains a statement such as "DO NOT SHAKE".
  - iv. Products in a glass bottle or large containers which cannot be adequately secured or padded during transport.
  - v. Living therapeutic modalities that may be harmed during transport (such as medicinal leeches).
  - vi. Controlled substances.
  - vii. Chemotherapeutic agents.
  - viii. Extremely expensive items, difficult to procure, or difficult to compound items.
  - ix. Explosive or flammable substances.
    - x. Neuromuscular Blocking Agents
  - xi. Any other drug item the pharmacist deems should be hand-delivered.

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- d. Sending Carrier Tubes
  - i. Foam inserts are to be used for all fragile items being dispatched.
  - ii. Put items in a plastic bag to protect drugs from any possible contamination.
  - iii. Closing the carrier:
    - 1. Properly match carrier sides.
    - 2. Firmly close latch.
    - 3. Do not overload or overfill the carrier.
    - 4. Do not force "oversized" material into the carrier.
  - iv. If an alarm sounds, read the screen above the key pad to determine problem:
    - 1. The send station may be full. Wait a few minutes and try again.
    - 2. If the problem continues, call Facilities Management.
    - 3. If there are transactions for other areas, try them. Often you can send to other stations.
- e. Receiving Carrier Tubes
  - i. Contents of arriving carriers are inspected as soon as they arrive to ensure that they were destined for Pharmacy.
    - 1. If the carrier was destined for Pharmacy, the contents are removed and processed.
    - 2. If the carrier was not destined for the Pharmacy, Pharmacy personnel will attempt to determine the correct destination and dispatch carrier to that station.
  - ii. The receiving area is kept clear.
  - iii. Empty containers are returned to the carrier storage located near the CTS station.
  - iv. Carrier contents are sorted by pharmacy personnel and directed to respective areas within the pharmacy.
- f. System Downtime
  - i. Pharmacy personnel will hand deliver all pharmacy items until the system is operational.

**F. System Spill and Decontamination Procedures**

- a. Always use Standard Precautions when handling carriers that may be contaminated. If an employee notices a spill, or what is believed to be a spill that has leaked outside the carrier, the employee shall immediately:
  - i. Stop sending carriers from the station where the contamination was first noticed.
  - ii. Initiate EMERGENCY SHUTDOWN from their station.
  - iii. Call Facilities Management at Ext. 68501 and provide the following:
    - 1. Receiving station number
    - 2. Type of spill (specimen type and amount)
    - 3. Time the contaminated carrier arrived
    - 4. Number of contaminated carriers that have arrived.
  - iv. Call Telephone Operator: Telephone operator will page overhead, "CTS is down for cleaning. Please hold any transaction until further notice". STAT items will be hand carried by unit/department staff.

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- b. Procedures for Disinfecting Station and Piping:
  - i. This procedure shall be performed by Facilities Management when decontaminating the system.
  - ii. The basic procedure consists of sending a carrier containing the cleanout bottle from station to station until all affected segments of the system have been traversed. This procedure will require one person except when cleaning the inter-zone lines, which will require two people and radio communication between them.
  - iii. As the carrier travels through the piping, the cleanout bottle dispenses the cleaning solution while the carrier rubbing bands act as swabs.
  - iv. While wearing protective clothing, fill the cleanout bottle with EPA approved 0.5% Sodium Hypochlorite solution to ¼ inch from the top holes on the bottle.
  - v. Place lid on the bottle. While maintaining the upright position of the bottle, place it in carrier.
  - vi. Close and latch the carrier.
  - vii. Periodically check the level of the cleaning solution. When there is less than an inch of solution left in the bottle, refill it and towel dry the carrier rubbing bands.
  - viii. Disinfect the affected station's receiver bin.
  - ix. After cleaning, a slight amount of cleaning solution may remain in the tubing. This will not affect the system operation.
  - x. Use diagnostics to clean out any contaminated inter-zone lines.
  - xi. Turn on the disinfected zones.
  - xii. Send the cleanout carrier back to yourself from all stations suspected of being contaminated to clean the contaminated routes.
  - xiii. Reassign all stations on "Off" schedules to their original ON/OFF schedules when cleanout is completed.
  - xiv. When schedules have been entered, the system will be fully operational.
  - xv. Use the same precautions when cleaning up this spill as would be used if the spill was out in the open.
  
- c. Approved disinfectants:
  - i. Carrier Liners: Ethylene Oxide, steam autoclave 270 degrees for 5 minutes, dry one minute at 270 degrees, or clean with EPA and hospital approved germicide as recommended by the manufacturer.
  - ii. Zip pouches: Ethylene Oxide or clean with EPA and hospital approved germicide as recommended by the manufacturer. Do not autoclave Zip pouches.
  - iii. Plastic Carriers: Ethylene Oxide or clean with EPA and hospital approved germicide as recommended by the manufacturer. Do not autoclave Plastic Carriers.

**G. CTS System Recovery Stations**

- a. Recovery stations have been designated throughout the system to recover lost carriers in the event of system failure. The designated station is listed below:
  - i. Laboratory (The Lab will then distribute the lost carriers to their appropriate locations, once the system failure is resolved).

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- i. Scheduled maintenance is performed by the contractor (Swisslog) on a quarterly basis (the first Monday of the month from 8:00 AM to 9:00 AM). STAT items will be hand carried by unit/department personnel.
- ii. Facilities Management will notify the user departments a minimum of 3 working days prior to any additional scheduled downtimes along with approximate length of time the system will be non-functional.
  1. Repairs will routinely be scheduled between 10 PM and 6 AM. Patient care area personnel must transport both STAT and routine specimens to the lab when the system is shut down for repairs.
  2. Each area will be required to transport specimens and other items when there is scheduled downtime.
  3. The Telephone Operator will notify all user areas when the system is functioning again using the overhead paging system.

**b. Contingency Plan for Unscheduled Downtime**

- i. Problems should be reported to Facilities Management and Telephone Operator who will page overhead "CTS is down, please hold transactions until further notice".
- ii. Telephone Operator will notify Pharmacy and lab of downtime.
- iii. As soon as possible, but at least within 30 minutes, user areas will be notified by Facilities Management and given an assessment as to how long a station or system will be down.
- iv. STAT items requiring immediate transport are to be handled by the unit/department personnel.
- v. The Facilities Management Stationary Engineer (computer controller) will notify the telephone operator to notify all user areas that the system is functioning again.

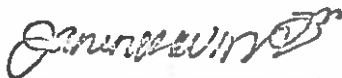
**I. Display Messages**

"DOWN FOR MAINTENANCE"

"SYSTEM DOWN"

**References:****Swisslog (12/2010): Eco-Seal and Universal Carrier. Maintenance**

Revised and Approved by:  
Medical Executive Committee on 9/2020



Janine R. E. Vintch, M.D.  
President, Professional Staff Association