	THE JOHNS HOPKINS HOSPITAL INTERDISCIPLINARY CLINICAL PRACTICE MANUAL	<i>Policy Number</i> IFC-024
	<i>Subject</i> Respiratory Equipment	<i>Effective Date</i> 8/01
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PATIENT CARE OBJECTIVES

- Published reports document the role of respiratory equipment as an important source of transmitting microorganisms causing respiratory diseases.
- Nebulizers are capable of generating aerosols containing large numbers of viable bacteria. Nebulizers generate particles of a size which can penetrate to the lower respiratory tract. Contaminated nebulizers are a common source of pulmonary infection as opposed to humidifiers or heat and moisture exchange devices. Solutions or medications contaminated before use may be the initial source of bacterial contamination. Some bacteria, e.g. *Pseudomonas aeruginosa* and *Serratia marcescens*, can grow in distilled water. Bacteria can multiply in water trapped in tubing and can be aerosolized into the patient's respiratory tract.

RESPONSIBILITIES


All JHMI/JHH/JHU Staff

- Respiratory Therapy staff will comply with these guidelines
- HEIC will expedite review and approval every three years and as needed
- Respiratory Therapy or HEIC may be contacted for question related to these guidelines.

INFECTION CONTROL MANAGEMENT

MEASURES TO REDUCE CONTAMINATION OF RESPIRATORY THERAPY EQUIPMENT DURING USE

- Every effort should be made to eliminate the sources of contamination in equipment, accessories, and solutions as follows:
 - Use **sterile** medications and single-dose vials
 - Use sterile distilled or sterile deionized water. **Unused portions should be discarded daily.**
 - Replace sterile water used in nebulizers and humidifiers entirely; do not add water for replenishment.
 - Use sterile or medically clean disposable breathing circuits, including any accessories incorporated into the circuit.
 - Ventilator accessories, such as spacers for metered dose inhalers, may be stored at the bedside between treatments in clean plastic bags.
 - Avoid having the tubing condensate drain into the patient's trachea. Condensate should be periodically removed from the tubing using aseptic technique to empty the trap device.
 - Protect and cover all pre-assembled equipment used for emergency care. Reservoirs should not be filled with medications or water in advance of use.

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UNIT DOSE SYSTEM

- Change disposable tubing on IPPB machines every 48 hours. NOTE: If the tubing becomes contaminated before the scheduled change, it should be changed.
- Every IPPB device should be equipped with a Main Flow Bacteria Filter that is changed every 48 hours.
- At the end of the treatment:
 - Empty residual solution from the nebulizer cup.
 - Rinse with sterile water and dry.
 - Rinse the mouthpiece or mask with warm water and then dry it with a paper towel.
- Keep the IPPB device with the patient throughout the treatment phase. When not in use cover the device with a plastic bag.
 - Remove IPPB machine to the soiled utility room on the patient unit.
- When therapy is discontinued
 - Remove all disposable items from the IPPB machine.
 - Move the machine to the soiled processing area.
 - The IPPB machine and all its components (high-pressure hoses, support arm, pedestal base and wheels) will be wiped with a hospital approved disinfectant.

BUBBLE THROUGH HUMIDIFIERS/NASAL CANNULA

- Change the patient set-ups (i.e., prefilled bubble humidifiers and cannula) when empty or when visibly soiled.

HEATED NEBULIZERS (TRACHEOSTOMY MASK, AEROSOL MASK, BRIGGS T-ADAPTER)


- The entire set-up must be changed every 48 hours.
- Use only sterile distilled water to fill those humidifiers, which are not pre-filled.
- Use new, previously unopened bottles to fill the humidifier.

COLD NEBULIZERS

- Change the entire set-up every 48 hours

LONG-TERM MECHANICAL VENTILATOR


- Change the entire humidifier wick system when indicated or empty. Place labels noting when the system was changed in a conspicuous place on the circuit to assure compliance. Breathing circuits with an excess of blood, mucous, etc. in their breathing circuit will be changed as necessary.

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- While assembling the patient circuit, do not allow the circuit to dangle close to the floor.
- Do not drain rainout (condensation) which collects in both the inspiratory and expiratory tubing back into the humidifier. Disconnect the tubing to drain the rainout into a disposable cup or other suitable container.
- During use, the machine and all its parts (support arm, electrical cord, high-pressure hoses, alarm and wheels) should be wiped down with hospital approved disinfectant when visibly soiled.
- The ventilator circuit must be changed every 14 days, when visibly soiled or when the integrity of the circuit is in question. Label the circuit with the date when the mechanical ventilation is instituted.
 - For non-disposable MRI circuits, follow pasteurization procedure.
- Change in-line suction catheters every 7 days or when grossly soiled, contaminated or malfunctioning.
- Heat and moisture exchangers must be changed every 24 hours
- Replace the main flow bacteria filter with tubing changes and when necessary.
- When patients receive nebulized medications through the breathing circuits:
 - Empty the residual medication from the nebulizer cup when each treatment is finished.
 - Rinse the cup with sterile water
 - Dry and store it in a clean plastic bag at the bedside.
 - Change the nebulizer set-up every 48 hours and label with the date changed.
- When discontinued:
 - Discard all disposable equipment
 - Empty water from the humidifier
 - Wipe the machine with a hospital approved disinfectant
 - Remove soiled non-disposable ventilator parts from the machine
 - Place parts in a soiled equipment bin for transportation to the equipment bin and then to the equipment processing area.
- Discard disposable equipment in the soiled utility room or in the patient's room.

BEDSIDE PULMONARY SCREENING DEVICES

- Discard all disposable pulmonary screening devices such as inspiratory force manometers, tidal volume and vital capacity devices, and peak flow meters after single individual patient use.
- Discard all disposable components of the non-disposable pulmonary devices after single individual patient use.
- Wipe all non-disposable spirometers and manometers with a hospital approved disinfectant **between** patients.

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OXYGEN HOODS


- Replace the entire oxygen hood delivery system which includes the (Wick) humidifier column, the water bottle, the tubing adapter, the 7ft. connecting tubing, the corrugated oxygen tubing and T-piece temperature-probe assembly, every 7 days.
- Clean the disposable oxygen hood with a hospital approved disinfectant at the time of the system change, every 48 hours.
- Replace the oxygen hood when visibly soiled.
- The entire oxygen hood system is disposable. Discard the oxygen hood after each patient use. Dispose of entire assembly after use.
- Document the equipment change on the Neonatal Respiratory Care Flow Sheet.

CLEANING RESPIRATORY THERAPY EQUIPMENT

- Personnel responsible for cleaning the equipment should be instructed in proper handling methods necessary to reduce the risk of infection and to reduce contamination of the cleaning area.
- Manufacturer's recommendations for equipment disassembly, cleaning, pasteurization, and sterilization should be followed.
- All equipment should be thoroughly washed and rinsed before attempting pasteurization or sterilization. Debris interferes with the action of pasteurization and sterilization.
- The exterior surfaces of large pieces of equipment (e.g. ventilators, portable suction units, IPPB machines, end tidal CO² monitor) should be cleaned and disinfected between patients.
- All equipment should be covered when not in use.

WASHER/PASTEURIZER SYSTEM

- Drain and clean the system twice weekly with a hospital approved disinfectant.
- Clean the equipment dryer twice weekly with a hospital approved disinfectant.
- Inspect the process record from the washer/pasteurizer after each run to insure that the cycle is completed. Keep the process record in the Computer Sheet Book.
- If malfunctions occur, the Oxygen Services Coordinator will notify Clinical Engineering Services.

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PROCEDURE FOR WASHER/PASTEURIZER

- Transport the soiled equipment to the soiled equipment bins.
- Wear gloves to remove equipment from plastic bags at the disassembly table. Discard plastic bags in a trash can.
- Disassemble equipment as completely as possible for disinfection. If visual inspection of equipment reveals gross contamination, scrub with a brush in the sink, using a hospital approved detergent solution.
- Load equipment into the stainless steel container for decontamination.
- Pack equipment snugly to minimize tumbling of loose parts.
- Equipment should not be packed so that it compresses or bends any plastic parts (such equipment may be permanently distorted if pasteurized while under stress).
- Put small parts, which might slip out of a container, in the provided soft mesh bags, then place bags in the washer/pasteurizer.
- Place equipment and detergent into the washer/pasteurizer according to the manufacturer's procedure manual.
- When the cycle is complete, wash hands, put on clean gloves
- Transfer equipment to dryer and place the articles in dryer appropriately. Tubes should hang freely from the dryer outlets. Small parts should be spaced on drying tray.
- Activate dryer.
- To remove equipment from the dryer, the operator must wear clean gloves. Once cabinet is opened, wear clean gloves when handling equipment. Avoid touching anything but the equipment and the plastic bags. If clean gloves contact contaminated objects, change gloves.
- When drying is complete, transfer equipment to a clean table to reassemble package. Operator should wear clean gloves.
- Place assembled equipment in plastic bags and heat seal
- Initial and date all bagged equipment prior to placing the equipment in the clean processing area.

