Methods to Prevent Healthcare-Associated Pneumonia

Purpose: To reduce the risk of healthcare-associated pneumonia

I. Staff Education

• The nurse managers/supervisors are responsible for educating healthcare workers regarding the epidemiology of healthcare-associated pneumonia and infection control procedures used to prevent pneumonia. Healthcare Workers will be involved in the implementation of interventions to prevent healthcare-associated pneumonia. The Infection Control Practitioner (ICP) is available to assist in this process.

• This guideline is revised as new information becomes available.

II. Modifying Host Risk for Infection

Host risk factors can be grouped into the following general categories:

• Host factors – extremes in age and severe underlying conditions, including immunosuppression.

• Factors that enhance microbial colonization of the oropharynx and/or stomach – administration of antimicrobials, admission to an ICU, underlying chronic lung disease or coma.

• Conditions favoring aspiration or reflux – endotracheal intubation, insertion of nasogastric tube, or supine position.

• Conditions requiring prolonged use of mechanical ventilatory support with potential exposure to contaminated respiratory equipment and/or contact with contaminated or colonized hands of healthcare workers.

• Factors that impede adequate pulmonary toilet – undergoing surgical procedures that involve the head, neck, thorax, or upper abdomen or being immobilized as a result of trauma or illness.

III. Preventing Aspiration Associated with Enteral Feeding

• Discontinue enteral-tube feeding and remove devices such as endotracheal nasogastric or other enteral tubes from patients as soon as clinical indications for these are resolved.

• If there is no contraindication to the maneuver, elevate at the angle of 30-45 degrees the head of the bed of a patient who is receiving mechanically assisted ventilation and has a nasogastric or other enteral tube in place. It is critical that this position be maintained at all times. If patient condition does not allow for head of bed elevation, reverse Trendelenberg may be used. Reverse Trendelenberg is ONLY used if patient condition does NOT allow elevating head of bed (i.e. IABP, certain cervical traumas, ECMO, certain traction).

• Routinely assess the patient’s intestinal motility, (e.g., measuring residual gastric volume) and adjust the rate and volume of enteral feeding to avoid regurgitation.

• Routinely verify the appropriate placement of the feeding tube by x-ray.

• No recommendation for the preferential use of small-bore tubes for enteral feeding.

• No recommendation for administering enteral feeding intermittently rather than continuously. Continuous feeding is associated with increased energy efficiency in adults; however it is associated with decreased energy use in children.
• No recommendation for preferentially placing the feeding tubes (e.g., jejunal tubes) distal to the pylorus.

IV. Preventing Aspiration Associated with Endotracheal Intubation

• Wean ventilator support as quickly as patient condition permits and remove endotracheal tubes as soon as clinically indicated.

• Unless contraindicated by patients’ condition perform orotracheal rather that nasotracheal intubation on patients.

• The endotracheal tube with dorsal lumen above the endotracheal cuff to allow drainage (i.e. by suctioning) of tracheal secretions that accumulate in the patient’s subglottic area should be used unless technically not feasible (i.e. tube not available in pediatric size).

• Before deflating the cuff of the endotracheal tube in preparation for tube removal, or before moving the tube; ensure that secretions are clear above the tube cuff.

• When feasible and not medically contraindicated, use of non-invasive ventilation to reduce the need for and duration of endotracheal intubation.

V. Preventing Gastric Colonization

• Stress-bleeding prophylaxis for a patient receiving mechanically assisted ventilation, using an agent that does not raise the patient’s gastric pH is an unresolved issue.

• Meta-analysis has shown a reduction in morbidity and mortality in high-risk patients with selective decontamination of an ICU patient’s digestive tract with oral and/or intravenous antimicrobials to prevent gram-negative bacillary (or Candida spp.) pneumonia.

• No recommendations for routine acidification of gastric feedings.

VI. Preventing Postoperative Pneumonia

• Instruct preoperative patients, especially those at high risk of developing pneumonia, regarding frequent coughing, taking deep breaths, and ambulating as soon as medically indicated in the postoperative period. High risk patients include those who will receive anesthesia, especially those who have abdominal, thoracic, head, neck operation, or who have substantial pulmonary dysfunction, such as patients with obstructive lung disease, musculoskeletal abnormality of the chest, or abnormal pulmonary function test.

• Encourage postoperative patients to cough frequently, take deep breaths, move about the bed, and ambulate unless it is medically contraindicated.

• Control pain that interferes with coughing and deep breathing during the immediate postoperative period by using a systemic analgesic, including patient-controlled analgesia, with as little cough-suppressant effect as possible, appropriate support of abdominal wounds, such as lightly placing a pillow across the abdomen; or regional (e.g., epidural) analgesia.

• Use an incentive spirometer on patients at increased risk for contracting post-operative pneumonia. Physicians should use the American Association of Respiratory Care (AARC) Clinical Practice Guidelines when ordering intermittent positive pressure breathing or chest physiotherapy.

• Use of non-invasive ventilation to reduce the need for and duration of endotracheal intubation. Extubate patient as soon as the clinical indications for mechanical ventilation is resolved.
VII. Sterilization or Disinfection and Maintenance of Equipment and Devices

- Semi-critical medical equipment and devices that come in contact with mucous membranes, are sterilized.
- Equipment or devices that are manufactured for single use only are not reprocessed.
- Breathing circuits and tubing are changed every 7 days, when visibly soiled, or mechanically malfunctioning, for a ventilator that is used on an individual patient.
- Disposable breathing circuits are used once and discarded after patient use.
- Condensate that collects in the tubing of mechanical ventilator or anesthesia machine are periodically drained and discarded taking precautions not to allow condensate to drain toward the patient. Hands are washed after performing the procedure or handling the fluid. Gloves should be worn when performing this procedure and/or when handling condensate fluid.
- No recommendations for placing filter at the distal end of expiratory phase of the breathing circuit.
- Bacterial filters are not placed between the humidifier reservoir and the inspiratory-phase tubing of the breathing circuit of a mechanical ventilator, or in the circuit of an anesthesia machine.

VIII. Humidification

Wall Humidifiers

- Sterile water is used to fill bubbling and wick humidifiers.
- There is no recommendation for preferential use of a closed continuous feed humidification system when additional humidification is indicated.
- Disposable oxygen humidifiers are changed every seven days and between patient uses.
- The reservoir, tubing (including any nasal prongs) and any mask used to deliver oxygen from a wall outlet are changed every seven days and between patients.

Small-Volume Medication Nebulizers “In Line” and Hand-held Nebulizers

- Disposable nebulizers are used.
- Nebulizers are rinsed with normal saline, air dried, and stored in a clean dry place, between treatments on the same patient.
- Nebulizers are changed every 24 hours.
- Only sterile fluids are used for nebulization and dispense these fluids aseptically.
- Single-dose medication vials are preferred. If multi-dose medication vials are used, handle, dispense, and store them according to directions on the label or package insert. They are discarded when contamination occurs.

Large-Volume Nebulizers and Mist Tents

- Large-volume room-air humidifiers are not used.
- Large-volume nebulizers that are used for inhalation therapy, (e.g., for tracheostomized patients) are disposable and are discarded every 24 hours and between patients.
IX. **Ventilator Circuits with Heat Moisture Exchangers**

- No recommendations for preferential use of heat-moisture exchanger. These may be utilized when the patient’s condition indicates. The decision is based on AARC Clinical Practice Guidelines.

- The heat-moisture exchanger is changed every twenty-four (24) hours (based on current manufacturer’s recommendations) and/or when evidence of gross contamination or mechanical dysfunction of the device is present.

X. **Other Devices**

- Respirometers are cleaned with the housekeeping disinfectant between each patient use. HEPA filters are used and the filters are changed between each patient. As preventative maintenance, the respirometers are sent weekly to CMS for sterilization.

- Assess disposable ambu bags every shift for contamination. If contaminated, discard. Disposable bags should be discarded every 7 days or when visibly soiled. When not in use, bags should be stored aseptically at the bedside.

XI. **Handwashing**

- Wash hands after contact with mucous membranes, respiratory secretions, or objects contaminated with respiratory secretions, whether or not gloves are worn. Wash hands before and after contact with a patient who has an endotracheal or tracheostomy tube in place and before and after contact with any respiratory device that is used on the patient, whether or not gloves are worn. Facility approved waterless alcohol sanitizer may be used unless hands are visibly soiled. Refer to Hand Hygiene Policy (IC 2.0)

XII. **Barrier Precautions**

- Gloves are worn for handling respiratory secretions or objects contaminated with respiratory secretions of any patient.

- Gloves are changed and hands washed between patients; after handling respiratory secretions or objects contaminated with secretions from one patient and before contact with another patient, object, or environmental surface; and between contact with a contaminated body site and respiratory tract of, or respiratory device on the same patient.

- Gowns, masks and goggles are worn when soiling with respiratory secretions from a patient is anticipated, and are changed after such contact and before providing care to another patient.

XIII. **Caring for Patients with Tracheostomy**

- Tracheostomies are performed under sterile conditions.

- When changing a tracheostomy tube, wear a gown, use aseptic technique, and replace the tube with one that undergone sterilization. Refer to Nursing Policy T-25: Tracheostomy Care (for disposable inner cannulas and/or reusable metal cannulas.)

- Remove devices as soon as the clinical indications for their use are resolved.
XIV. Principles of Asepsis for Intubation Procedure

- Hands are washed thoroughly using chlorhexidine antiseptic soap.
- Sterile supplies and equipment are used. Disposable items are used one time and discarded.
- Any item that enters the oropharyngeal cavity is maintained aseptically prior to use. (Keep the ET tube inside the sterile package until it is used. Do not place on bed or handle in such a way as to allow contamination to occur).
- Variance reports are written when aseptic technique is not maintained.

XV. Suctioning of Respiratory Tract Secretions

- Only sterile fluid is used to remove secretions from the suction catheter if the catheter is to be used for re-entry into the respiratory tract.
- The open suctioning system is used on non-intubated patients as indicated.
- Sterile gloves are worn when suctioning a patient’s respiratory secretions using the open system. Clean gloves are utilized when suctioning patients with closed suction.
- When employing an open system, a sterile catheter is used once and discarded. Closed system catheters will be changed according to manufacturer recommendation, when soiled beyond reasonable expectation, or if malfunction occurs.
- Suction tubing and canister are changed:
  1. Between patients
  2. Daily for an individual patient
  3. More often as needed, for an individual patient
- Canisters are not emptied and reused.
- Yankauer suctions are maintained aseptically between uses on same patient, and are changed daily or whenever contaminated.

XVI. Other Prophylactic Procedures for Pneumonia

- Vaccination of Patients
  Vaccination of patients with pneumococcal vaccine is considered prior to admission or at discharge. High risk patients include persons >65 years old; adults with chronic cardiovascular or pulmonary disease, diabetes mellitus, alcoholism, cirrhosis, or cerebrospinal fluid leaks; and children and adults with immunosuppression, functional or anatomic asplenia, or HIV infection. Also, consider the influenza vaccine for these patients.

- Systemic Antimicrobial Prophylaxis
  Systemic antimicrobial agents are not routinely administered to prevent healthcare-associated pneumonia.

- Use of Rotating “Kinetic Beds”
  No recommendations for the use of continuous lateral rotational therapy (i.e., placing patients on “kinetic” beds that turn on their longitudinal axis) for prevention of healthcare-associated pneumonia.

- Oropharyngeal care
  Daily oral care with chlorhexidine is provided for all patients on ventilator support, unless it is contraindicated.
References:


Institute for Healthcare Improvement: Prevent Ventilator Associated Pneumonia, accessed online 8/29/2010 @ http://www.ihi.org/IHI/Programs/Campaign/VAP.htm

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