

Recommendations and guidelines of the CDC and Institute for Healthcare Improvement

Guidelines

For CDC recommendations, Category 1 recommendations are in bold.

CDC Central Line Insertion Practices (CLIP) Adherence Monitoring

- **Hand hygiene performed**
- **Appropriate skin prep**
 - **Chlorhexidene gluconate (CHG) for patients \geq 2 months old**
 - **Povidone iodine, alcohol, or CHG for children $<$ 2 months old**
 - **Skin prep agent has completely dried before insertion**
- **All 5 maximal sterile barriers used**
 - **Sterile gloves**
 - **Sterile gown**
 - **Cap**
 - **Mask worn**
 - Large sterile drape

CDC Respiratory Hygiene/Cough Etiquette

1. **Educate healthcare personnel on the importance of source control measures to contain respiratory secretions to prevent droplet and fomite transmission of respiratory pathogens, especially during seasonal outbreaks of viral respiratory tract infections (e.g., influenza, RSV, adenovirus, parainfluenza virus) in communities. *Category IB***
2. Implement the following measures to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of a respiratory infection, beginning at the point of initial encounter in a healthcare setting (e.g., triage, reception and waiting areas in emergency departments, outpatient clinics and physician offices).
 - 2.a. Post signs at entrances and in strategic places (e.g., elevators, cafeterias) within ambulatory and inpatient settings with instructions to patients and other persons with symptoms of a respiratory infection to cover their mouths/noses when coughing or sneezing, use and dispose of tissues, and perform hand hygiene after hands have been in contact with respiratory secretions. *Category II*
 - 2.b. Provide tissues and no-touch receptacles (e.g., foot-pedal operated lid or open, plastic-lined waste basket) for disposal of tissues. *Category II*
 - 2.c. **Provide resources and instructions for performing hand hygiene in or near waiting areas in ambulatory and inpatient settings; provide conveniently-located dispensers of alcohol-based hand rubs and, where sinks are available, supplies for handwashing. *Category IB***
 - 2.d. **During periods of increased prevalence of respiratory infections in the community (e.g., as indicated by increased school absenteeism, increased number of patients seeking care for a respiratory infection),**

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offer masks to coughing patients and other symptomatic persons (e.g., persons who accompany ill patients) upon entry into the facility or medical office 126, 899 898 and encourage them to maintain special separation, ideally a distance of at least 3 feet, from others in common waiting areas. *Category IB*

2d.i.. Some facilities may find it logistically easier to institute this recommendation year-round as a standard of practice. *Category II*

CDC Prevention of Health-Care--Associated Bacterial Pneumonia (those that do not apply to ventilator associated pneumonia were deleted)

I. Staff Education and Involvement in Infection Prevention

Educate health-care workers about the epidemiology of, and infection-control procedures for, preventing health-care--associated bacterial pneumonia to ensure worker competency according to the worker's level of responsibility in the health-care setting, and involve the workers in the implementation of interventions to prevent health-care--associated pneumonia by using performance-improvement tools and techniques (IA).

II. Infection and Microbiologic Surveillance

A. Conduct surveillance for bacterial pneumonia in intensive care unit (ICU) patients who are at high risk for health-care--related bacterial pneumonia (e.g., patients with mechanically assisted ventilation or selected postoperative patients) to determine trends and help identify outbreaks and other potential infection-control problems. The use of the new National Nosocomial Infection Surveillance (NNIS) system's surveillance definition of pneumonia is recommended. Include data on the causative microorganisms and their antimicrobial susceptibility patterns. Express data as rates (e.g., number of infected patients or infections per 100 ICU days or per 1,000 ventilator days) to facilitate intrahospital comparisons and trend determination. Link monitored rates and prevention efforts and return data to appropriate health-care personnel (IB).

B. In the absence of specific clinical, epidemiologic, or infection-control objectives, do not routinely perform surveillance cultures of patients or of equipment or devices used for respiratory therapy, pulmonary-function testing, or delivery of inhalation anesthesia (II).

III. Prevention of Transmission of Microorganisms

A. Sterilization or Disinfection and Maintenance of Equipment and Devices

1. General measures

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- a. Thoroughly clean all equipment and devices to be sterilized or disinfected (IA).
- b. Whenever possible, use steam sterilization (by autoclaving) or high-level disinfection by wet heat pasteurization at >158 F (>70°C) for 30 minutes for reprocessing semicritical equipment or devices (i.e., items that come into direct or indirect contact with mucous membranes of the lower respiratory tract) that are not sensitive to heat and moisture (Box)

BOX. Example of semicritical items* used on the respiratory tract

Anesthesia device or equipment including:

- face mask or tracheal tube
 - inspiratory and expiratory tubing
 - Y-piece
 - reservoir bag
 - humidifier
- Breathing circuits of mechanical ventilators
- Bronchoscopes and their accessories, except for biopsy forceps and specimen brush[†]
- Endotracheal and endobronchial tubes
- Laryngoscope blades
- Mouthpieces and tubing of pulmonary-function testing equipment
- Nebulizers and their reservoirs
- Oral and nasal airways
- Probes of CO₂ analyzers, air-pressure monitors
- Resuscitation bags
- Stylets
- Suction catheters
- Temperature sensors

* Items that directly or indirectly contact mucous membranes of the respiratory tract should be sterilized or subjected to high-level disinfection before reuse.

[†] Considered critical items and should be sterilized before reuse.

Use low-temperature sterilization methods (as approved by the Office of Device Evaluation, Center for Devices and Radiologic Health, Food and Drug Administration [FDA]) for equipment or devices that are heat- or moisture-sensitive (24--28). After disinfection, proceed with appropriate rinsing, drying, and packaging, taking care not to contaminate the disinfected items in the process (IA).

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c. Preferentially use sterile water for rinsing reusable semicritical respiratory equipment and devices when rinsing is needed after they have been chemically disinfected. If this is not feasible, rinse the device with filtered water (i.e., water that has been through a 0.2 μ filter) or tap water, and then rinse with isopropyl alcohol and dry with forced air or in a drying cabinet (IB).

d. Adhere to provisions in FDA's enforcement document for single-use devices that are reprocessed by third parties (IC).

2. Mechanical ventilators

Do not routinely sterilize or disinfect the internal machinery of mechanical ventilators (II).

3. Breathing circuits, humidifiers, and heat-and-moisture exchangers (HMEs)

a. Breathing circuits with humidifiers

1) Do not change routinely, on the basis of duration of use, the breathing circuit (i.e., ventilator tubing and exhalation valve and the attached humidifier) that is in use on an individual patient. Change the circuit when it is visibly soiled or mechanically malfunctioning (IA).

2) Breathing-circuit--tubing condensate

a) Periodically drain and discard any condensate that collects in the tubing of a mechanical ventilator, taking precautions not to allow condensate to drain toward the patient (IB).

b) Wear gloves to perform the previous procedure and/or when handling the fluid (IB).

c) Decontaminate hands with soap and water (if hands are visibly soiled) or with an alcohol-based hand rub after performing the procedure or handling the fluid (IA).

3) No recommendation can be made for placing a filter or trap at the distal end of the expiratory-phase tubing of the breathing circuit to collect condensate (Unresolved issue).

4) Humidifier fluids

a) Use sterile (not distilled, nonsterile) water to fill bubbling humidifiers (II).

b) No recommendation can be made for the preferential use of a closed, continuous-feed humidification system (Unresolved issue).

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b. Ventilator breathing circuits with HMEs

1) No recommendation can be made for the preferential use of either HMEs or heated humidifiers to prevent pneumonia in patients receiving mechanically assisted ventilation (Unresolved issue) (IB).

2) Changing HME

a) Change an HME that is in use on a patient when it malfunctions mechanically or becomes visibly soiled (II).

b) Do not routinely change more frequently than every 48 hours an HME that is in use on a patient (II).

3) Do not change routinely (in the absence of gross contamination or malfunction) the breathing circuit attached to an HME while it is in use on a patient (II).

4. Oxygen humidifiers

a. Follow manufacturers' instructions for use of oxygen humidifiers (II,C).

b. Change the humidifier-tubing (including any nasal prongs or mask) that is in use on one patient when it malfunctions or becomes visibly contaminated (II).

5. Small-volume medication nebulizers: in-line and hand-held nebulizers

a. Between treatments on the same patient clean, disinfect, rinse with sterile water (if rinsing is needed), and dry small-volume in-line or hand-held medication nebulizers (IB).

b. Use only sterile fluid for nebulization, and dispense the fluid into the nebulizer aseptically (IA).

c. Whenever possible, use aerosolized medications in single-dose vials. If multidose medication vials are used, follow manufacturers' instructions for handling, storing, and dispensing the medications (IB).

7. Other devices used in association with respiratory therapy

a. Respirometer and ventilator thermometer: between their uses on different patients, sterilize or subject to high-level disinfection portable respirometers and ventilator thermometers (IB).

9. Pulmonary-function testing equipment

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- a. Do not routinely sterilize or disinfect the internal machinery of pulmonary-function testing machines between uses on different patients (II).
- b. Change the mouthpiece of a peak flow meter or the mouthpiece and filter of a spirometer between uses on different patients (II).

B. Prevention of Person-to-Person Transmission of Bacteria

1. Standard Precautions

a. Hand hygiene: Decontaminate hands by washing them with either antimicrobial soap and water or with nonantimicrobial soap and water (if hands are visibly dirty or contaminated with proteinaceous material or are soiled with blood or body fluids) or by using an alcohol-based waterless antiseptic agent (e.g., hand rub) if hands are not visibly soiled after contact with mucous membranes, respiratory secretions, or objects contaminated with respiratory secretions, whether or not gloves are worn. Decontaminate hands as described previously 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 (IA).

b. Gloving

1) Wear gloves for handling respiratory secretions or objects contaminated with respiratory secretions of any patient (IB).

2) Change gloves and decontaminate hands as described previously between contacts with different 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 contacts with a contaminated body site and the respiratory tract of, or respiratory device on, the same patient (IA).

c. When soiling with respiratory secretions from a patient is anticipated, wear a gown and change it after soiling occurs and before providing care to another patient (IB).

2. Care of patients with tracheostomy

a. Perform tracheostomy under aseptic conditions (II).

b. When changing a tracheostomy tube, wear a gown, use aseptic technique, and replace the tube with one that has undergone sterilization or high-level disinfection (IB).

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c. No recommendation can be made for the daily application of topical antimicrobial agent(s) at the tracheostoma (Unresolved issue).

3. Suctioning of respiratory tract secretions (See also Section IV-B-1-d)

a. No recommendation can be made for the preferential use of either the multiuse closed-system suction catheter or the single-use open-system suction catheter for prevention of pneumonia (Unresolved issue) (44, 100-102).

b. No recommendation can be made about wearing sterile rather than clean gloves when performing endotracheal suctioning (Unresolved issue).

c. No recommendation can be made about the frequency of routinely changing the in-line suction catheter of a closed-suction system in use on one patient (Unresolved issue) (103).

d. If the open-system suction is employed, use a sterile, single-use catheter (II).

e. Use only sterile fluid to remove secretions from the suction catheter if the catheter is to be used for re-entry into the patient's lower respiratory tract (II).

IV. Modifying Host Risk for Infection

B. Precautions for prevention of aspiration

As soon as the clinical indications for their use are resolved, remove devices such as endotracheal, tracheostomy, and/or enteral (i.e., oro- or nasogastric or jejunal) tubes from patients (IB).

1. Prevention of aspiration associated with endotracheal intubation

a. Use of noninvasive ventilation (NIV) to reduce the need for and duration of endotracheal intubation

1) When feasible and not medically contraindicated, use noninvasive positive-pressure ventilation delivered continuously by face or nose mask, instead of performing endotracheal intubation in patients who are in respiratory failure and are not needing immediate intubation (e.g., those who are in hypercapnic respiratory failure secondary to acute exacerbation of COPD or cardiogenic pulmonary edema) (II).

2) When feasible and not medically contraindicated, use NIV as part of the weaning process (from mechanically assisted ventilation) to shorten the period of endotracheal intubation (II) (130).

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b. As much as possible, avoid repeat endotracheal intubation in patients who have received mechanically assisted ventilation (II) (131).

c. Unless contraindicated by the patient's condition, perform orotracheal rather than nasotracheal intubation on patients (IB).

d. If feasible, use an endotracheal tube with a dorsal lumen above the endotracheal cuff to allow drainage (by continuous or frequent intermittent suctioning) of tracheal secretions that accumulate in the patient's subglottic area (II).

e. Before deflating the cuff of an endotracheal tube in preparation for tube removal, or before moving the tube, ensure that secretions are cleared from above the tube cuff (II).

2. Prevention of aspiration associated with enteral feeding

a. In the absence of medical contraindication(s), elevate at an angle of 30--45 degrees of the head of the bed of a patient at high risk for aspiration (e.g., a person receiving mechanically assisted ventilation and/or who has an enteral tube in place) (II).

b. Routinely verify appropriate placement of the feeding tube (IB).

c. No recommendation can be made for the preferential use of small-bore tubes for enteral feeding (Unresolved issue).

d. No recommendation can be made for preferentially administering enteral feedings continuously or intermittently (Unresolved issue).

e. No recommendation can be made for preferentially placing the feeding tubes, (e.g., jejunal tubes) distal to the pylorus (Unresolved issue).

3. Prevention or modulation of oropharyngeal colonization

a. Oropharyngeal cleaning and decontamination with an antiseptic agent: develop and implement a comprehensive oral-hygiene program (that might include the use of an antiseptic agent) for patients in acute-care settings or residents in long-term--care facilities who are at high risk for health-care--associated pneumonia (II).

b. Chlorhexidine oral rinse

1) No recommendation can be made for the routine use of an oral chlorhexidine rinse for the prevention of health-care--associated pneumonia in all postoperative or critically ill patients and/or other patients at high risk for pneumonia (Unresolved issue) (II).

2) Use an oral chlorhexidine gluconate (0.12%) rinse during the perioperative period on adult patients who undergo cardiac surgery (II) (158).

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c. Oral decontamination with topical antimicrobial agents.

1) No recommendation can be made for the routine use of topical antimicrobial agents for oral decontamination to prevent VAP (Unresolved issue).

4. Prevention of gastric colonization

a. No recommendation can be made for the preferential use of sucralfate, H2-antagonists, and/or antacids for stress-bleeding prophylaxis in patients receiving mechanically assisted ventilation (Unresolved issue).

b. No recommendation can be made for the routine selective decontamination of the digestive tract (SDD) of all critically ill, mechanically ventilated, or ICU patients (Unresolved issue).

c. No recommendation can be made for routinely acidifying gastric feeding (Unresolved issue).

Institute for Healthcare Improvement Recommendations

- 1. Elevation of the head of the bed to 30 degrees or greater**
- 2. Daily "sedation vacations" and assessment of readiness to extubate**
- 3. Peptic ulcer disease prophylaxis**

CDC Recommendations

These recommendations are designed to prevent transmission of infectious agents among patients and healthcare personnel in all settings where healthcare is delivered. As in other CDC/HICPAC guidelines, each recommendation is categorized on the basis of existing scientific data, theoretical rationale, applicability, and when possible, economic impact. The CDC/HICPAC system for categorizing recommendations is as follows:

Category IA Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.

Category IB Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale.

Category IC Required for implementation, as mandated by federal and/or state regulation or standard.

Category II Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.

No recommendation; unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.