HHS Action Plan to Prevent Healthcare-Associated Infections: PREVENTION – PRIORITIZED RECOMMENDATIONS

I. Introduction

A 2008 report by the Government Accountability Office (GAO) calls for prioritization of Centers for Disease Control and Prevention (CDC) recommendations for the prevention of healthcare-associated infections (HAIs).

The report emphasized that there are 1,200 such recommendations, accompanied by limited guidance on implementation or prioritization. In response to that report, and as part of the ongoing effort to increase the impact of CDC recommendations, the Department's Steering Committee for the Prevention of HAIs and the Healthcare Infection Control Practices Advisory Committee (HICPAC) has evaluated and prioritized recommendations from four key CDC guidelines. Prioritized recommendations come from guidelines for the prevention of catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI), intravascular catheter-related bloodstream infections (BSI), and ventilator-associated pneumonia (VAP). The four infection types account for over 80% of all HAI.

These guidelines reflect a range of publication dates and are updated on an ongoing basis. CDC's guideline preparation process has been updated to ensure that scientific evidence is compiled and evaluated in a consistent, concise, and transparent way.

The guideline for prevention of CAUTI (to be published in 2009) is the first example of this process and includes evidence tables as well as sections on implementation, auditing, and prioritization. As guidelines are updated and healthcare facilities implement recommended practices, priorities will be updated to address current prevention gaps and establish new strategies to address them.

II. Methods

The framework for identifying implementation priorities is based on supporting scientific evidence that a practice is effective/beneficial, recognized gaps in current implementation (i.e., many important practices are fully implemented), synergy with other related practices (i.e., several practices need to be implemented together to have the desired effect), and potential impact. The following process was used for selection of high-priority recommendations from the guidelines for the prevention of CAUTI, BSI, VAP and SSI:

1) For each guideline, the pool of recommendations considered for prioritization was narrowed to only those with strong evidentiary support (Category 1A and 1B recommendations). Category 1C recommendations, which include state and

federal regulations regardless of evidentiary support, also were considered. However Category 2 recommendations, without strong evidence to support their efficacy, were not. The prioritization for VAP prevention includes recently compiled recommendations from the Society for Healthcare Epidemiology of America (SHEA)/Infectious Diseases Society of America (IDSA) *Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals* in order to capture practices not included in the 2003 CDC guideline.

2) CDC subject-matter experts in infectious diseases, infection control, and healthcare epidemiology assessed each recommendation for its urgency and relative importance for HAI prevention, the degree to which it is currently implemented by all healthcare facilities (i.e., whether there is a gap in current implementation), and how it is related in healthcare delivery to other recommendations.

3) Recommendations were grouped based on interdependence in implementation. These groupings are referred to as "priority modules."

4) Priority modules, each of which contains interdependent and thematically-related recommendations for clinical practice, were then mapped to relevant recommendations for implementation and auditing.

5) Finally, priority modules were reviewed and refined by an expanded CDC group and by HICPAC.

III. Results

Below are the lists of priority recommendations, grouped by priority modules, for each of the guidelines reviewed for prioritization. Most recommendations correlate with those included in the SHEA/IDSA *Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals.*

Note that topics such as that of hand hygiene, healthcare personnel- and patient-vaccinations, such as those recommended in the guideline for prevention of influenza, and similar overarching requirements are not included below in order to focus on specific recommendations for prevention of each infection type.

A. Prevention of Catheter-Associated Urinary Tract Infections

The CDC Guideline for Prevention of Catheter-Associated Urinary Tract Infections (CAUTI) is being updated in 2008 to expand upon the previous guideline published in 1981. The updated guideline is more concise than previous guidelines and includes new, readily-updateable evidence tables summarizing scientific evidence supporting each recommendation.

In addition, the guideline contains an implementation and audit section. Because of this updated methodology this guideline provides the greatest implementation and auditing detail among the four guidelines.

For prioritization of clinical practices for the prevention of CAUTI, Category 1A, 1B, and 1C recommendations were considered. Category 1C recommendations are required by state or federal regulation, or represent an established association standard, regardless of the quality of scientific evidence used to support the recommendation.

Priority Module 1 – Recommendations for Appropriate Urinary Catheter Use
Related HICPAC Recommendations:

- **HICPAC Rec.:** Insert catheters only for appropriate indications, and leave in place only as long as needed (Category 1A)
- **HICPAC Rec.:** Do not use urinary catheters in patients and nursing home residents for management of incontinence (Category 1B)
- **HICPAC Rec.:** For operative patients, who have an indication for an indwelling catheter; remove the catheter as soon as possible post-operatively, preferably within 24 hours (Category 1B)

Priority Module 2 – Recommendations for Aseptic Insertion of Urinary Catheters
Related HICPAC Recommendations:

- **HICPAC Rec.:** Ensure that only properly trained persons (e.g., hospital personnel, family members, or patients themselves) who know the correct technique of aseptic catheter insertion and maintenance are given this responsibility (Category 1C)
- **HICPAC Rec.:** Insert catheters using aseptic technique and sterile equipment (except as stated in other recommendations where clean technique is appropriate for intermittent catheterization) (Category 1C)

Priority Module 3 – Recommendations for Proper Urinary Catheter Maintenance
Related HICPAC Recommendations:

- **HICPAC Rec.:** Maintain a sterile, continuously closed drainage system (Category 1C)
- **HICPAC Rec.:** Do not disconnect the catheter and urinary drainage system unless the catheter must be irrigated (Category 1B)

B. Prevention of Intravascular Catheter-Associated Infections

The CDC guidelines for Prevention of Intravascular Catheter-Related Infections were published in 2002. Among the infections associated with intravascular catheter use, bloodstream infections (BSI) have severe consequences for patients and are therefore the focus of these prioritized recommendations. However, adhering to recommendations for prevention of BSI will reduce superficial catheter-site infections as well. Due to the

number of recommendations in this guideline, only Category 1A recommendations were considered for prioritization.

Priority Module 1 – Recommendations for Aseptic Insertion of Vascular Catheters
Related HICPAC Recommendations:

- **HICPAC Rec.:** Maintain aseptic technique during insertion and care of intravascular catheters (Category 1A)
- **HICPAC Rec.:** Use aseptic technique including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile drape, for the insertion of central venous catheters (CVC),including for peripherally inserted central catheters (PICC) and guide wire exchange (Category 1A)
- **HICPAC Rec.:** Apply an appropriate antiseptic to the insertion site on the skin before catheter insertion and during dressing changes (Category 1A)
- **HICPAC Rec.:** Although a 2% chlorhexidine-based preparation is preferred, tincture of iodine, an iodophor, or 70% alcohol can be used (Category 1A)
- **HICPAC Rec.:** Select the catheter, insertion technique, and insertion site with the lowest risk for complications (infectious and noninfectious) for the anticipated type and duration of IV therapy (Category 1A)
- **HICPAC Rec.:** Use a subclavian site (rather than a jugular or a femoral site) in adult patients to minimize infection risk for non-tunneled CVC placement (Category 1A)
- **HICPAC Rec.:** Weigh the risk and benefits of placing a device at a recommended site to reduce infectious complications against the risk for mechanical complications (e.g., pneumothorax, subclavian artery puncture, subclavian vein laceration, subclavian vein stenosis, hemothorax, thrombosis, air embolism, and catheter misplacement) (Category 1A)

Priority Module 2 – Recommendations for Appropriate Maintenance of Vascular Catheters
Related HICPAC Recommendations:

- **HICPAC Rec.:** Use either sterile gauze or sterile, transparent, semipermeable dressing to cover the catheter site (Category 1A)
- **HICPAC Rec.:** Promptly remove any intravascular catheter that is no longer essential (Category 1A)
- **HICPAC Rec.:** Replace the catheter-site dressing when it becomes damp, loosened, or soiled or when inspection of the site is necessary (Category 1A)

C. Prevention of Surgical Site Infections

The CDC guideline for Prevention of Surgical Site Infection (SSI) was published in 1999. As such, recent research on SSI is not captured in the guideline. However the recommendations in the 1999 guideline remain important. Recent evidence was reviewed and recommendations that have been called into question based on research published after 1999 were excluded from consideration. Both Category 1A and 1B

recommendations were considered for prioritization due to the limited number of 1A recommendations for this topic.

Priority Module 1 – Recommendations for Appropriate Pre-Operative Measures
Related HICPAC Recommendations:

- **HICPAC Rec.:** Whenever possible, identify and treat all infections remote to the surgical site before elective operation and postpone elective operations on patients with remote site infections until the infection has resolved (Category 1A)
- **HICPAC Rec.:** Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation (Category 1A)
- **HICPAC Rec. :** If hair is removed, remove immediately before the operation, preferably with electric clippers (Category 1A)
- **HICPAC Rec.:** Administer a prophylactic antimicrobial agent only when indicated, and select it based on its efficacy against the most common pathogens causing SSI for a specific operation and published recommendations (Category 1A)
- **HICPAC Rec.:** Administer by the intravenous route the initial dose of prophylactic antimicrobial agent, timed such that a bactericidal concentration of the drug is established in serum and tissues when the incision is made (Category 1A)
- **HICPAC Rec.:** Maintain therapeutic levels of the agent in serum and tissues throughout the operation and until, at most, a few hours after the incision is closed in the operating room (Category 1A)
- **HICPAC Rec.:** Before elective colorectal operations, mechanically prepare the colon by use of enemas and cathartic agents; Administer nonabsorbable oral antimicrobial agents in divided doses on the day before the operation (Category 1A)
- **HICPAC Rec.:** Use an appropriate antiseptic agent for skin preparation (Category 1B)

Priority Module 2 – Recommendations for Appropriate Intra-Operative Measures
Related HICPAC Recommendations:

- **HICPAC Rec.:** Adequately control serum blood glucose levels in all diabetic patients and avoid perioperative hyperglycemia (Category 1B)
- **HICPAC Rec.:** Keep operating room doors closed during surgery except as needed for passage of equipment, personnel, and the patient (Category 1B)

Priority Module 3 - Recommendations for Appropriate Post-Operative Measures
Related HICPAC Recommendations:

- **HICPAC Rec.:** Protect primary-closure incisions with a sterile dressing for 24 to 48 hours postoperatively (Category 1B)

D. Prevention of Ventilator-Associated Pneumonia

Due to marked severity and high mortality of VAP, this prioritization focuses on the subset of VAP-relevant recommendations within the broader category of healthcare-associated pneumonia prevention. The CDC Guideline for Preventing Healthcare Associated Pneumonia was published in 2003. Additional recommendations included in Module 1 of this prioritization are derived from the 2008 SHEA/IDSA *Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals* and therefore do not carry HICPAC evidence ratings.

Priority Module 1 – Recommendations for Routine Care of Patients Requiring Mechanical Ventilation
Related Recommendations from 2008 SHEA/IDSA *Compendium of Strategies*

- Use non-invasive ventilation whenever possible
- Use orotracheal rather than nasotracheal intubation when possible
- Minimize the duration of ventilation; Perform daily assessments of readiness to wean from ventilation
- Prevent aspiration by maintaining patients in a semi-recumbent position (30-45 degree elevation of head of bed) unless otherwise contraindicated
- Use a cuffed endotracheal tube with an endotracheal cuff pressure of at least 20cm H2O and in-line or subglottic suctioning
- Perform regular oral care with an antiseptic solution

Priority Module 2 – Recommendations for Appropriate Cleaning, Disinfection, and Sterilization of Ventilator Equipment
Related HICPAC Recommendations:

- **HICPAC Rec.:** Thoroughly clean all equipment and devices to be sterilized or disinfected (Category 1A)
    a. 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 semi-critical 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 (Category 1A)
    b. 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 (Category 1A)
    c. After disinfection, proceed with appropriate rinsing, drying, and packaging, taking care not to contaminate the disinfected items in the process (Category 1A)
- **HICPAC Rec.:** Preferentially use sterile water for rinsing reusable semi-critical 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 0.2μ filter) or tap water, and then rinse with isopropyl alcohol and dry with forced air or in a drying cabinet (Category 1B)

- **HICPAC Rec.:** Between uses on different patients, clean reusable components of the breathing system or patient circuit (e.g., tracheal tube or face mask) inspiratory and expiratory breathing tubing, y-piece, reservoir bag, humidifier, and tubing, and then sterilize or subject them to high-level liquid chemical disinfection or pasteurization in accordance with the device manufacturers' instructions (Category 1B)
- **HICPAC Rec.:** Between treatments on the same patient clean, disinfect, rinse with sterile water (if rinsing is needed), or dry small-volume in-line or hand-held medication nebulizers (Category 1B)
- **HICPAC Rec.:** Between their uses on different patients, sterilize or subject to high-level disinfection portable respirometers and ventilator thermometers (Category 1B)

Priority Module 3 – Recommendations for Appropriate Maintenance of Ventilator Circuit and Associated Devices

Related HICPAC Recommendations:

- **HICPAC Rec.:** 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 (Category 1B)
- **HICPAC Rec.:** Use only sterile fluid for nebulization and dispense the fluid into the nebulizer aseptically (Category 1A)
- **HICPAC Rec. :** Use only sterile (not distilled, nonsterile) water to fill reservoirs of devices used for nebulization (Category 1A)

IV. Conclusion

The HHS effort currently underway offers a coordinated strategy that makes the best use of currently available technologic and procedural capacities and drives toward future needs. The focus on measurable progress toward specific national target metrics is both practical and efficient.

In order to achieve those targets, we have provided prioritized modules for implementation at the bedside, realizing that priorities will change and be updated as adherence targets are met and new areas for attention are identified. Although current emphasis is being placed on priorities for implementation, safe and effective healthcare still requires correct adherence to all recommended practices for every episode of care.