For home care and hospice organizations that are accredited by The Joint Commission (TJC), a new National Patient Safety Goal (NPSG) 07.04.01 went into effect in 2009 with the expectation of full implementation by January 1, 2010. NPSG 07.04.01 requires that home health agencies and hospices implement best practices or evidenced-based guidelines to prevent central line-associated bloodstream infections (CLABSI). There are a total of 12 elements of performance (EPs) (excluding the 4 EPs that address implementation expectation deadlines) that have specific expectations and requirements that have to be implemented. Of the 12 EPs, six of the EPs (i.e., EPs 6, 10, 11, 13, 14, and 15 as noted in Table 1) apply to the insertion of central lines in the home setting. Back in the late 1980s/early 1990s, peripherally inserted central catheters (PICCs) were more commonly inserted by specially trained nurses in the home setting. Over the years, this patient care practice has basically been eliminated and almost all central lines are now inserted in a healthcare setting, such as an outpatient or acute care setting. Therefore, this article will not address the EPs that pertain to the insertion of a central line. This article will, however, review the EPs for NPSG 07.04.01 for preventing a CLABSI from care rendered in the home setting and offer suggestions for meeting their intent.

Applicability
NPSG 07.04.01 addresses both short- and long-term central lines or central venous catheters (CVCs) and PICCs. It is the location of the catheter tip that determines whether a catheter qualifies as a central line, not the location of the catheter insertion site or the type of device inserted. A catheter is considered a central line, (or CVC,) if the “tip of the catheter ends in the lower one third of the superior vena cava to the junction of the superior
The home care and hospice organization is required to educate its staff responsible for providing central line catheter care and maintenance and patient/family education per EP 5. The topics for staff education are to include the following:

- Healthcare-associated infections
- CLABSI s
- The importance of infection prevention (TJC, 2008).

Suggested topics for providing staff education specific to the prevention of central line infections include the following:

- CLABSI and patient safety
- Venous access device anatomy and physiology
- Types of central lines
- Central line necessity evaluation and criteria for removal
- Evidenced-based practice: recommendations

**Deadlines**

Home care and hospice organizations have deadlines that have been imposed by TJC for calendar year 2009, with the expectation of full implementation of all applicable EPs by January 1, 2010. Here’s what needs to be accomplished and when:

- **EP 1.** By April 1, 2009, leaders need to assign responsibility for the oversight and coordination of the development, testing, and implementation of NPSG 07.04.01 (assessment phase)
- **EP 2.** By July 1, 2009, set a work plan that identifies what resources are needed; how and where the resources will be obtained; who will be responsible for implementing the work plan and set a time line of when all of the EPs will be fully implemented with a deadline of full implementation by January 1, 2010 (planning phase)
- **EP 3.** By October 1, 2009, implement the plan on a pilot basis to determine what worked and what needs to be modified before it can be fully implemented (trial implementation phase)
- **EP 4.** By January 1, 2010, all applicable EPs of NPSG 07.04.01 need to be fully implemented throughout the organization (TJC, 2008).

**Staff Education**

The home care and hospice organization is required to educate its staff responsible for providing central line catheter care and maintenance and patient/family education per EP 5. The topics for staff education are to include the following:

- Healthcare-associated infections
- CLABSI s
- The importance of infection prevention (TJC, 2008).

Suggested topics for providing staff education specific to the prevention of central line infections include the following:

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**Table 1. Elements of Performance Applicable to the Insertion of a Central Line**

<table>
<thead>
<tr>
<th>EP</th>
<th>Description</th>
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<tbody>
<tr>
<td>EP6</td>
<td>Prior to insertion of a central venous catheter, the organization educates patients, and their families as needed, about central line-associated bloodstream infection prevention</td>
</tr>
<tr>
<td>EP10</td>
<td>Use a catheter checklist and a standardized protocol for central venous catheter insertion</td>
</tr>
<tr>
<td>EP11</td>
<td>Perform hand hygiene prior to catheter insertion</td>
</tr>
<tr>
<td>EP13</td>
<td>Use a standardized supply cart or kit that is all inclusive for the insertion of central venous catheters</td>
</tr>
<tr>
<td>EP14</td>
<td>Use a standardized protocol for maximum sterile barrier precautions during central venous catheter insertion</td>
</tr>
<tr>
<td>EP15</td>
<td>Use a chlorhexidine-based antiseptic for skin preparation during central venous catheter insertion in patients over 2 months of age, unless contraindicated</td>
</tr>
</tbody>
</table>

for implementing CLABSI prevention strategies in the care and maintenance of central lines
- Identifying and managing central line complications
- Preventing CLABSI through patient education
- Strategies to detect home care-acquired CLABSI through surveillance activities and reporting requirements

The frequency for this staff education is to occur:
- On hire (and prior to providing central line catheter care)
- On an annual basis
- Whenever a staff member’s job duties change that now involve them in central line catheter care and maintenance (when it was not required at the time of hire) (TJC, 2008).

The home care and hospice managers will need to evaluate the current content of its education material to determine if TJC’s required topics are addressed. If not, staff education will need to be performed and completed by January 1, 2010 and then the staff educated on an annual basis thereafter.

**Policies, Procedures, and Protocols**

Policies and procedures need to be in place for staff to implement that are aligned with evidenced-based standards and professional organization’s guidelines per EP 7 (TJC, 2008), such as the following:

- Centers for Disease Control and Prevention’s (CDC) Healthcare Infection Control Practices Advisory Committee (HICPAC) (CDC, 2002b)
- Infusion Nurses Society (2006)
- Institute for Healthcare Improvement (IHI, 2008)
- National Quality Forum (NQF, 2006)
- Society for Healthcare Epidemiology of America and Infectious Diseases Society of America (SHEA/IDSA, 2008).

Topics that should be addressed in the home care and hospice organizations’ policies when staff care for and maintain central lines in the home setting should minimally include:

- Hand hygiene
- Catheter hub
  - Disinfection
  - Indications for and frequency of catheter cap change
- Exit site skin antisepsis
- Catheter stabilization devices and change frequency
- Central line dressing material and frequency of dressing changes
- CVC and PICC flushing protocol
- PICC insertion, if performed by staff in the home
- Central line catheter necessity and criteria for central line removal
- PICC removal, if performed by staff in the home (McGoldrick, 2009).

**Surveillance Activities and Monitoring CLABSI Rates**

EP 8 requires that the home care and hospice organization measure CLABSI rates, monitor compliance with best practices or evidence-based guidelines, and evaluate the effectiveness of prevention efforts (TJC, 2008). Organizations may also need to begin collecting surveillance data on CLABSI. Collecting these data require active, prospective surveillance of CLABSI that develop 48 hours after admission while a patient is receiving care in the home. Any trained person can report the infection, but for accuracy and consistency, the Infection Preventionist should review the surveillance report, and the clinical record if needed, to make a final determination as to whether the patient met the surveillance definition as noted in Table 2. It is important that consistent surveillance methods and definitions be used to allow for data comparison between home care and hospice organizations. The total number of patient cases that met this surveillance definition should be aggregated on either a monthly or quarterly basis (if there is a low sample size). In addition, the total number of central line device days for the month for all home care and hospice patients who had a central line in place should be collected.

To calculate the CLABSI rate, the CLABSI data should be expressed as the number of CLABSi per 1,000 central line days and calculated by dividing the number of CLABSi by the number of
central line-days and multiplying the result by 1,000 as follows:

(Total number of CLABSI cases/Total number of central line-days) × 1,000 = CLABSI rate per 1,000 catheter days

The surveillance definition for CLABSI includes all bloodstream infections (BSIs) that occur in patients 48 hours after admission to home care with a CVC in place, when other sites of infection have been excluded. When an organism that is isolated from a blood culture is compatible with a related infection at another site, the bloodstream infection is classified as a secondary bloodstream infection. As such, the rate of CLABSI may overestimate the true incidence of CLABSI because not all BSIs originate from CVCs (i.e., infections may be secondary from undocumented sources such as postoperative surgical sites, intra-abdominal infections, and pneumonia or urinary tract infections) (CDC, 2008). It is beyond the scope of this article to fully discuss how to perform surveillance activities in home care and hospice; therefore, it is suggested that the reader review the surveillance chapter in the books Infection Control in Home Care and Hospice (Rhinehart & McGoldrick, 2006) or the Infection Prevention and Control in the 3rd edition of Infusion Therapy in Clinical Practice (McGoldrick, in press). EP 8 also requires that the organization monitor their compliance with best practices or evidence-based guidelines in preventing CLABSI. These best practices or evidenced-based guidelines should be outlined in the organization’s policies and procedures (as required by EP 7) and protocol (as required by EP 16). The implementation of these policies and protocol can be evaluated through competence assessment activities, in-home supervisory visits or a skills lab.

Finally, EP 8 requires that organizations evaluate the effectiveness of their CLABSI prevention efforts. This can be performed though a combination of analyzing the surveillance data collected for CLABSI against their targeted outcome performance measure (i.e., zero CLABSI) and monitoring their internal compliance with implementing best practices or evidence-based guidelines through internal or external staff. CLABSI prevention outcome measures need to be established. An example includes: The organization will have zero CLABSI rate on a monthly basis. The outcome measure formula would provide the organization with a rate of infection that could be monitored over time and displayed on a run chart and analyzed against the targeted compliance rate set by the organization, and as data become available, with other home care and hospice providers.

The results from the organizations’ evaluation of their effectiveness in preventing CLABSI (as required by EP 8) and in meeting their CLABSI prevention outcome measure should be communicated to key stakeholders including leaders, licensed independent practitioners, nursing staff, and other clinicians (including contracted professional staff) as required by EP 9 at a frequency that is set by the organization. These key stakeholders would also include governing body members and the professional advisory board members in a home health agency and the interdisciplinary group in a hospice. This information can be communicated to others on run charts or bar graphs, displaying the outcomes on a statistical tool. Other infection prevention measures, such as hand hygiene compliance monitoring and any data collected may also be used to meet the intent of EP 9, as hand hygiene is also an important infection prevention measure (CDC, 2002a).

Catheter Hub Disinfection Protocol

Colonization of microorganisms on the catheter hub is an important source of pathogens causing catheter-related infections (Bennet & Brachman, 1998). As such EP 16 requires that home care and hospice organizations use a standardized protocol to disinfect catheter hubs and injection ports before accessing the ports (TJC, 2008). This protocol should address:

- What product will be used to clean the hub and injection port.
- How long the cleaning product should remain on the catheter hub and injection port during cleaning.
- The method of cleaning the catheter hub and injection port.
- The frequency of injection cap changes.

Before anyone accesses a catheter hub on a central line (either a CVC or an accessed implanted port) hand hygiene should be performed
Table 2. APIC-HICPAC Surveillance Definitions for Home Health Care and Home Hospice Infections

### Primary Bloodstream Infection

**Clinical Sepsis (CSEP)**

*Surveillance definition*: CSEP must meet the criteria below:
- Must have at least one of the following clinical signs with no other recognized cause:
  - Fever; or
  - Hypotension (systolic pressure <90 mmHg); or
  - Hypothermia; or
  - Apnea; or
  - Bradycardia; or
  **AND**
- Meets *all* of the following:
  - Blood culture not done or no organisms detected in blood.
  - No apparent infection at another site.
  - Physician institutes treatment for sepsis.
  - Hospital admission for clinical sepsis or death due to clinical sepsis or both.

### Laboratory-Confirmed Bloodstream Infection (LCBSI)

*Surveillance definition*: LCBSI must meet 1 of the following 3 criteria below:

**Criterion 1:**
- Patient has a recognized pathogen cultured from one or more blood cultures *and*
- Organism cultured from blood is *not* related to an infection at another site.

**Criterion 2:**
- Patient has at least one of the following three signs or symptoms:
  - Fever (≥100.4°F [≥38°C]); or
  - Chills; or
  - Hypotension; **AND**
- Signs and symptoms and positive lab results are not related to an infection at another site; **AND**
- Common skin contaminant (e.g., diphtheroids [Corynebacterium spp.], Bacillus [not B. Anthracis] spp., Propionibacterium spp., coagulase-negative staphylococci [including Staphylococcus epidermidis], viridans group streptococci, Aerococcus spp., Micrococcus spp.) is cultured from two or more blood cultures drawn on separate occasions.

**Criterion 3:**
- Patient aged younger than 1 year has at least one of the four following signs or symptoms:
  - Fever = (≥100.4°F [≥38°C]) rectal/tympanic/temporal artery; (≥37°C oral); (≥36°C axillary); or
  - Hypothermia (≤98.6°F [<37°C]) rectal/tympanic/temporal artery; (≥36°C oral); (≥35°C axillary); or
  - Apnea; or
  - Bradycardia, **AND**
- Signs and symptoms and positive lab results are not related to an infection at another site; **AND**
- Common skin contaminant (e.g., diphtheroids [Corynebacterium spp.], Bacillus [not B. Anthracis] spp., Propionibacterium spp., coagulase-negative staphylococci [including Staphylococcus epidermidis], viridans group streptococci, Aerococcus spp., Micrococcus spp.) is cultured from two or more blood cultures drawn on separate occasions.

(CDC, 2002a) and the hub or injection port cleaned with 70% alcohol or povidone-iodine by aseptically cleaning the injection or access port using a twisting, turning, and scrubbing motion, similar to “juicing an orange” for 15 seconds (McGoldrick, in press). The CDC recommends that injection caps not be changed more frequently than every 72 hours or according to the manufacturers’ recommendations (CDC, 2002b); however, the INS’s *Infusion Nursing Standards of Practice* recommend that the injection cap on a CVC be changed when the catheter dressing is changed, any time the injection cap is removed from the catheter, if residual blood remains in the injection port, or whenever contamination occurs (INS, 2006).

The home care or hospice organization may choose to monitor its internal performance as to whether the catheter’s hub and injection port are being properly cleaned and disinfected according to its internal protocol by collecting data. This data collection is not required, but could serve as evidence of the organization’s compliance with EP 16. The data collection could occur during supervisory visits or on-site competence assessment visits in which the number of times the staff disinfected the catheter hub or port prior to accessing the central line is divided by the total number of times that the catheter hub or port was observed to be accessed and then multiplied times 100. This formula would provide the home care or hospice organization with a percentage rate of compliance for disinfecting the catheter hub prior to accessing the central line. This data could be monitored over time and displayed on a run chart and analyzed against the targeted compliance rate set by the home care and hospice organization.

**Central Line Necessity**

EP 17 requires that the home care and hospice organization routinely evaluate the necessity of all CVCs and recommend the removal of nonessential catheters (TJC, 2008). Often central lines remain in place because of convenience for the patient by providing a reliable means of obtaining a blood sample or accessing the patient’s venous system for scans and other tests “just in case” it is needed. They also remain in place because healthcare personnel have previously not considered recommending them for removal. The longer the central line remains in place, the higher the risk of infection over time. Once the central line is removed, so is the risk of CLABSI. The CDC recommends that any intravascular catheter be promptly removed when it is no longer essential (CDC, 2002b). The IHI, NQF, SHEA/IDSA recommend reviewing the medical necessity of the central line on a daily basis in an acute care setting (IHI, 2008; NQF, 2006; SHEA/IDSA, 2008 ) to prevent any unnecessary delays in promptly removing a central line that is no longer clearly needed for the patient’s care. This time frame can be easily met in an acute care setting; however, daily review for a home care or hospice patient may not be considered reasonable as the nurse often does not even make daily home visits.

The organization’s policies and procedures should include the frequency in which the central line will be routinely evaluated and the criteria for when the nurse would make a recommendation for removal. Central line evaluation time frames that *could* be considered would include: on admission, at the completion of a course of home intravenous therapy if applicable, at the time of recertification and at the time of discharge. During the evaluation, the nurse would assess whether the CVC would be considered nonessential and whether the criterion for removal was met. When a nonessential CVC is identified, the physician should be contacted and a recommendation made that the nonessential catheter be removed. The nurse may obtain orders for its removal in the home setting (if performed by the home care organization) or arrangements may be made to have the central line removed in a healthcare facility. The physician may also determine that the CVC is still considered to be essential to meet the patient’s care needs. Regardless of the outcome, the catheter evaluation and communication with the physician about the recommendation for removal of a nonessential CVC is to be documented in the clinical record (i.e., to meet the intent of standard RC 02.02.01 EPs 2 and 4).

**Performance Measures**

If the home care or hospice organization chose to monitor its internal performance as to whether the need for a central line was being
assessed according to its internal policy, data could be collected measuring the percentage of patients with a central line that had documentation of the central line necessity being evaluated. These data are not required to be collected, but could serve as the organization’s evidence of compliance with EP 17. For example, the numerator would be the number of patients with a central line where there is documentation of an evaluation according to the time set in policy divided by the number of patients with a central line times 100. This formula would provide the organization with a percentage compliance rate that could be monitored over time and displayed on a run chart and analyzed against the targeted compliance rate set by the organization.

Home Care and Hospice Challenges

One of the challenges in providing care in the home setting and targeting a zero CLABSI rate is that home care and hospice staff are not the only ones providing direct, hands-on central line care. In between home visits, other caregivers manipulate and flush central lines and may even administer medication through the central line. Patients may also go to other care settings in between home visits, such as dialysis centers, physician’s offices, and ambulatory infusion centers. This doesn’t mean that zero CLABSIs is not attainable, it just means that assessing the patient and caregiver’s knowledge and competence about implementing measures that can be taken to prevent CLABSIs is more important. If we effectively teach our patients and their caregiver’s infection prevention and control measures they too can understand the importance of infection prevention while providing care and advocate for the patient in other care settings.

This NPSG about implementing best practices or evidence-based guidelines to prevent central line infections is applicable to all Joint Commission-accredited facilities in other care settings that provide care to patients with central lines. Therefore, not only will home care staff be focusing on preventing central line infections,但 also staff in other facilities and organizations. It will be through this coordinated, concerted effort that there will be a reduction in the number of preventable central line infections. Preventing CLABSIs begins with the individuals inserting the central line and continues through to the nurse providing care in the home setting who will reinforce the education provided to the patient and their caregiver, assess the patient’s knowledge and competence, and provide ongoing catheter care and maintenance activities as needed. The Joint Commission has raised the bar for making sure that preventable infections do not occur and that’s what home care and hospice is all about—doing the right thing for the patients and their families. Together we will all make a difference.

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REFERENCES

Sources of Support and Partnership for Nurse Training Programs

It has been the pleasure of the Southeast Pennsylvania Area Health Education Center (SE PA AHEC) to support and partner with the Ventilator Assisted Children’s Home Program (VACHP) in the development and delivery of the valuable nurse education program. The program was described in the article, “Care of Technology-Dependent Children in the Home” which appeared in the January 2009 edition. As AHECs are in 46 states and have a mission to increase care to underserved and special populations, some regional AHECs may be able to assist institutions that are interested in educating nurses (and other professionals) who work in the home and community. Information about the AHEC system and regional centers can be found at http://www.nationalahec.org.

Another source of support for this program in the last 2 years has been the Christopher and Dana Reeve Foundation. Special interest charitable organizations are an excellent source of support for training that improves the delivery of care to those for whom the organizations advocate.

Kathleen Kennedy, PhD, RN
Executive Director
Southeast Pennsylvania Area Health Education Center