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Bringing Central Line–Associated Bloodstream Infection Prevention Home: CLABSI Definitions and Prevention Policies in Home Health Care Agencies

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Abstract

Background—A study was conducted to investigate home health care agency central line–associated bloodstream infection (CLABSI) definitions and prevention policies and compare them to the Joint Commission National Patient Safety Goal (NPSG.07.04.01), the Centers for Disease

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Control and Prevention (CDC) CLABSI prevention recommendations, and a best-practice central line care bundle for inpatients.

Methods—A telephone-based survey was conducted in 2011 of a convenience sample of home health care agencies associated with children's hematology/oncology centers.

Results—Of the 97 eligible home health care agencies, 57 (59%) completed the survey. No agency reported using all five aspects of the National Healthcare and Safety Network/Association for Professionals in Infection Control and Epidemiology CLABSI definition and adjudication process, and of the 50 agencies that reported tracking CLABSI rates, 20 (40%) reported using none. Only 10 agencies (18%) had policies consistent with all elements of the inpatient-focused NPSG.07.04.01, 10 agencies (18%) were consistent with all elements of the home care targeted CDC CLABSI prevention recommendations, and no agencies were consistent with all elements of the central line care bundle. Only 14 agencies (25%) knew their overall CLABSI rate: mean 0.40 CLABSIs per 1,000 central line days (95% confidence interval [CI], 0.18 to 0.61). Six agencies (11%) knew their agency's pediatric CLABSI rate: mean 0.54 CLABSIs per 1,000 central line days (95% CI, 0.06 to 1.01).

Conclusions—The policies of a national sample of home health care agencies varied significantly from national inpatient and home health care agency targeted standards for CLABSI definitions and prevention. Future research should assess strategies for standardizing home health care practices consistent with evidence-based recommendations.

Central line (also known as central venous catheter)–associated bloodstream infections (CLABSIs) cause significant morbidity and mortality in pediatric patients, costing an average of $45,000 per infection, occurring at a rate of 0.7 to 7.4 infections per 1,000 central line days, and carrying an associated 1% mortality rate.[1–5] Much attention has focused on identifying, adjudicating, and preventing these harmful infections in hospitalized pediatric patients.[6–11] Yet many pediatric patients with central lines are cared for outside the hospital, and only minimal attention has been given to ambulatory CLABSIs.[1,2,5,12–20] Among pediatric oncology patients, twofold-more ambulatory CLABSIs occur than inpatient CLABSIs, indicating a pressing need to investigate this higher burden of CLABSI disease in the ambulatory setting.[15]

Inpatient pediatric CLABSI rates have been monitored using standard definitions and reduced by employing best-practice bundles for central line care (central line care bundles).[6–8,21,22] The Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) CLABSI definition[11] is intended for surveillance of hospital infections and does not include reference to ambulatory CLABSIs. Because home health care agencies are essential in maintaining ambulatory pediatric central lines and preventing ambulatory CLABSIs,[12,20,23,24] the Association for Professionals in Infection Control and Epidemiology (APIC) created a definition for home health care agency CLABSIs based on the CDC-NHSN definition in 2008,[25] but its use has not been assessed. In addition, few studies have described CLABSI rates in home health care agencies, and none have focused on pediatric patients, despite multiple articles and editorials calling for home health care infection surveillance programs and national ambulatory CLABSI benchmarking.[16,20,23,24,26–30]

The Joint Commission's National Patient Safety Goal NPSG.07.04.01,[31–33] effective January 1, 2010, required accredited hospitals and long term care facilities to implement best practices to prevent CLABSIs. It had been suggested that this goal will be expanded to home health care agencies,[30] but The Joint Commission does not put forward a definition for ambulatory CLABSIs, and no work has been done evaluating whether agencies will be able to comply with these requirements. It is also unclear if home health care agencies are employing best practices to reduce CLABSIs, as defined by the CDC, which specifically addresses home health care agencies.[34] In addition, central line care bundles were developed to prevent pediatric inpatient CLABSIs,[6–8,21] although they have been used in ambulatory patients[10] and are the state of the art for central line care in pediatric patients.[6–8,21] To our knowledge, no one has assessed the use of central line care bundles in the home health care setting.

To reduce ambulatory CLABSIs, we must understand current CLABSI definitions and CLABSI prevention policies in the home health care setting. We conducted a survey of home health care agencies regarding CLABSI definitions and prevention policies and compared them to the inpatient-focused NPSG.07.04.01, the home health care CDC recommendations, and an inpatient central line care bundle to identify areas of variation that can be targeted for improvement. This knowledge will facilitate efforts to maximize central line care for all ambulatory patients and identify gaps between inpatient- and ambulatory-focused CLABSI prevention efforts and current ambulatory policies.

Methods

Study Sample

We conducted telephone-based, structured interviews of a national convenience sample of home health care agencies from January 2, 2011, to November 1, 2011. To improve our response rate and aid the national effort aimed at reducing CLABSIs in pediatric hematology/oncology patients, we partnered with the Children's Hospital Association's (CHA) Hematology/Oncology CLABSI Quality Transformation collaborative to identify candidate home health care agencies. The CHA Quality Transformation effort uses collaborative quality improvement practices to reduce inpatient and ambulatory pediatric hematology/oncology CLABSIs in a group of pediatric institutions in the United States. Home health care agencies were identified as those most commonly used by the 34 institutions in 19 states participating in the collaborative. Each participating institution was asked to voluntarily provide a list of the five home health care agencies used most often by their patients. We invited all home health care agencies to participate who provided home nursing visits for pediatric patients with central lines. Satellite agencies connected to a central, national home health care company were excluded if their national office requested we survey their company through the national office only.

Survey Administration

Each agency was contacted by telephone up to three times, and the survey administrator [K.D.] asked specifically for the "nurse manager" to participate. Before beginning the structured interview, the respondent was asked if he or she was authorized to discuss the

information addressed in the survey.. The survey was developed using cognitive interview techniques[35] and piloted with five home health care agencies in January 2011—data from which were included in the final results because the survey did not change appreciably. The remaining surveys were completed from May through October 2011 after approval was obtained from the Johns Hopkins University School of Medicine Institutional Review Board. All surveys were administered by the same person [K.D.] and followed a predetermined script. The survey took approximately 30 to 40 minutes to complete, and the respondent received a $30 inducement for participation.

The survey focused on methods and policies for caring for central lines (maintenance policies) and not central line insertion policies. We made this choice because previous evidence suggests that improved maintenance practices are significantly associated with decreased infection rates in pediatric patients,[6] and few pediatric central lines are inserted by home health care agencies.[30] Survey questions asked for agency demographics (total patients cared for annually, total pediatric patients cared for annually, percentage of pediatric patients with a hematologic/oncologic diagnosis and existence of pediatric-specific policies), the influence of insurance reimbursement on agency policies, agency CLABSI rates, agency CLABSI definitions and agency policies relating to NPSG.07.04.01,[31–33] CDC guidelines for preventing CLABSIs,[34] and central line care bundles.[6,7] (*See* Appendix 1, available in online article for the complete survey.) Respondents were asked to investigate unknown answers to any survey questions and reply back to the survey administrator. Any missing data were followed up by at least three e-mails from the survey administrator to the respondent asking for the missing information.

Central Line–Associated Bloodstream Infection Definitions

Each agency was asked about the following five aspects of CLABSI surveillance based on CDC-NHSN and APIC CLABSI definitions[11,25]:

1. Positive blood culture not related to another infection (numerator)

2. Using a trained infection preventionist to determine if a positive blood culture meets criteria as a CLABSI (numerator)

3. Patient under surveillance beginning 48 hours after discharge from a hospital (numerator and denominator)

4. Patient under surveillance up to 48 hours after discharge from home health care (numerator and denominator)

5. Infection rate recorded per central line days at risk (denominator)

The APIC CLABSI definition is specifically designed for home health care agency CLABSI surveillance and based on the inpatient surveillance CDC-NHSN CLABSI definition. Although alternative CLABSI definitions have been proposed, using cumulative incidence rates per month or all positive blood cultures instead of adjudicated CLABSIs, we believed that the CDC-NHSN and APIC CLABSI definitions, as widely used, standardized, detailed, and frequently tested and vetted, currently provide the best starting place for examining the

state of CLABSI surveillance and prevention in the home health care setting and for comparing our findings with the volumes of work done on inpatient CLABSIs.

Policy Standards

As stated earlier, NPSG.07.04.01 deals with short- and long-term central lines and focuses on insertion and maintenance practices,[31–33] but we surveyed only maintenance practices in this study. Surveyed central line policies in NPSG.07.04.01 included regular staff education on CLABSIs, implementing policies to reduce CLABSIs, monitoring effectiveness of CLABSI reduction policies, disseminating CLABSI rate data, performing hand hygiene, using standardized disinfection protocols, and evaluating central lines routinely. The CDC recommends a set of best practices to prevent CLABSIs in the home health care setting, including 10 addressed by our survey: catheter-entry hand hygiene, four dressing-change recommendations, daily assessment, antiseptic cap scrubbing, needle-change hand hygiene, and tubing-and cap-change frequencies.[34] Best-practice bundles are recognized as key drivers for patient safety behavioral change,[22] and the bundle applied in this study operationalizes best practices for central line maintenance care through 43 separate items in the following areas: setting patient line goals, site assessment, catheter entries, cap changes, tubing changes, central line dressing changes, and indwelling port/needle changes.[6,7,36] This robust bundle was developed for inpatients,[36] but similar approaches have been successfully used in ambulatory patients.[10]

Although it is unknown what measures will work best to prevent infection in the ambulatory setting, we assume that maintenance practice used in the inpatient setting will be effective in ambulatory setting and that this bundle remains the leading candidate for what would be most effective in reducing ambulatory CLABSIs. Therefore, we assessed how commonly the central line care bundle is used in the ambulatory setting, although we recognize that this is not a current expectation for home health care agencies. Each home health care agency surveyed receives patient referrals from CHA institutions that implemented the central line care bundle in their inpatient hematology/oncology units as part of the CHA collaborative.

Data Analysis

We used an all-or-none measurement strategy[37] to investigate CLABSI definitions and home health care agency policy consistence with NPSG.07.04.01,[31–33] CDC recommendations to prevent CLABSIs,[34] and a central line care bundle.[6,7,36] The all-or-none measurement strategy counts an agency's policy to be consistent with one of the comparators only if every element of the comparator is specified in the agency's policy. For example, if an agency had a policy consistent with 9 of the 10 CDC recommendations, it would be counted as not consistent with the CDC recommendations under the all-or-none measurement strategy. Consistency between agency policies and any elements of NPSG. 07.4.01, CDC recommendations, or a central line care bundle was also assessed, defined as the number of consistent elements for all the agencies divided by the total number of policies with which they could possibly be consistent.

Descriptive statistics, including mean, standard deviation (SD), median, and interquartile range (IQR) for rates and continuous variables and proportions for categorical variables

were used to summarize the reported CLABSI rates, home health care agency policies, and insurance barriers to performance. Ninety-five percent confidence intervals (CI) for the agency and pediatric CLABSI rates were calculated from a bootstrap method, in which 1,000 bootstrap samples were drawn from the reporting agencies data and the empirical 95% interval was calculated. Bivariable linear regression models were used to examine associations between consistency with NPSG.07.04.01, CDC recommendations, or the central line care bundle, and home health care agency demographics. Stata 11.1 (Stata Corp, College Station, Texas) was used for all analyses.

Results

Sample

Twenty-seven participating CHA institutions identified 128 unique home health care agencies. Of these 128 agencies, 15 were excluded because their national office requested that we survey their company only once, 15 were excluded because they did not provide home nursing services and one was excluded because no contact phone number was found. Of the 97 eligible home health care agencies, 57 agreed to complete the survey (59% response rate), eight refused (8%), and 32 (33%) did not respond to three phone call attempts.

Our sample contained a diverse group of home health care agencies (Table 1, right), with wide ranges for total number of patients seen each year (median, 700; IQR, 375 to 2,508), total number of pediatric patients seen each year (median, 140; IQR, 50 to 600), and the percentage of patients with a primary hematologic/oncologic diagnosis (median interval variable choice, 21% to 40%). Thirteen agencies (23%) were affiliated with a hospital. Forty-four agencies (77%) agreed to share their identifiable answers with the CHA institution that referred them to the study. Twenty-six respondents (46%) were nurse managers or equivalent, 16 respondents (28%) were administrators/ owners/directors, 6 respondents (11%) were case managers, 5 respondents (9%) identified themselves only as nurses, and 4 (7%) respondents identified themselves as other positions.

Central Line–Associated Bloodstream Infection Definition

Seven respondents (12%) reported that their agency did not track CLABSI rates or that they were unsure if their agency did so (4 and 3 agencies, respectively). Of the remaining 50 agencies that reported tracking CLABSI rates, appreciable variation in CLABSI definition existed—21 (42%) reported using the CDC-NHSN CLABSI definition,[11] 4 (8%) used the APIC CLABSI definition for home health care,[25] 4 (8%) reported using another organization's CLABSI definition, 19 (38%) did not know what CLABSI definition they used, 1 agency (2%) reported "we don't have an official definition," and 1 agency (2%) reported "anyone with a cellulitis" (Table 2, pages 366–367).

No agency reported using all five standard aspects of a CLABSI definition and adjudication processes as defined by CDC-NHSN and APIC.[11,25] The mean consistency with any of these five definitional aspects was 23%, with 20 (40%) agencies reporting that they use no aspects of this CLABSI definition and adjudication process. Only 8 (16%) agencies reported

that their CLABSI event definition (numerator) included positive blood cultures without other sources of infection, and only 27 (54%) agencies reported that their CLABSI denominator definition included central line days at risk. Only 22 (44%) agencies began surveillance for CLABSIs 48 hours after discharge from a hospital, and only 1 (2%) agency continued surveillance on patients for 48 hours after discharge from their service. Finally, only 7 (14%) agencies reported using an infection preventionist to adjudicate CLABSIs (Table 2).

Policy Stand ards

Of the 57 participating home health care agencies, only 10 (18%) had policies consistent with all elements of the inpatient-focused NPSG.07.04.01. The largest discrepancies between policies and NPSG.07.04.01 was in agencies' evaluation of the effectiveness of their CLABSI prevention efforts (54%) and knowledge of their overall CLABSI rate in any form (58%) (Table 2, pages 366–367; and Table 3, pages 368–369). When consistency between policies and NPSG.07.04.01 was made more robust by requiring agencies to know their pediatric CLABSI rate, 17 (30%) of the 57 agencies knew their pediatric CLABSI rates, and only 7 agencies (12%) had policies consistent with all elements of NPSG. 07.04.01. Of the 52 agencies (91%) that reported considering or discussing central line removal with the medical team, only 2 (4%) reported doing so at every visit.

Ten agencies (18%) had policies consistent with all elements recommended by the CDC to prevent CLABSIs in the home health care setting and asked about in the survey. The mean percentage consistency between agency policies and any of the 10 CDC–recommended practices was 89%. Only 12 agencies (21%) had policies consistent with the recommendation to change caps no more frequently than every 72 hours (Appendix 2, available in online article).

When examining home health care agency use of the 43 elements of the central line care bundle, no home health care agency had policies that were fully consistent. The mean percentage consistency between agency policies and any of the 43 elements was 81%. The largest discrepancies between policies and the central line care bundle elements was observed for changing caps no more frequently than every 72 hours (21%), wearing masks for reconnection of new tubing to catheter hubs (24%), wearing sterile gloves for reconnection of new tubing to catheter hub (30%), and shielding a patient's face or tracheostomy site from the dressing change site (47%) (Appendix 2).

There were no significant bivariable associations between consistency with the NPSG. 07.04.01 elements, the CDC recommendations, or the central line care bundle elements, and home health care agency demographics ($p > .05$ for all variables, data not shown).

Insurance Barriers

Six agencies (11%) reported that insurance companies limit their ability to use sterile gloves 21% or more of the time. For all other supplies, at most, 4% of agencies reported that insurance companies limit their ability to use supplies related to central line maintenance more than 20% of the time. Similarly, at most, 4% of agencies reported that insurance

companies limit their policies on cap, tubing and needle changes, more than 20% of the time. Five agencies (9%) reported that insurance companies limit their policies on dressing changes more than 20% of the time.

Central Line–Associated Bloodstream Infection Rat es

Only 14 (25%) of the 57 agencies knew their agency's overall CLABSI rate per 1,000 central line days for one of the previous three years, and only 6 (11%) agencies knew their agency's pediatric CLABSI rate per 1,000 central line days. On the basis of this small sample, the mean overall home health care agency CLABSI rate among those tracking it was 0.40 CLABSIs per 1,000 central line days (95% CI, 0.18 to 0.61), and the mean pediatric home health care agency CLABSI rate was 0.54 CLABSIs per 1,000 central line days (95% CI, 0.06 to 1.01). Seventeen (30%) other agencies knew their agency's overall CLABSI rates per number of patients with a central line.

Discussion

In a national convenience sample survey of home health care agencies, we found appreciable variability in CLABSI definitions and policy agreement with the inpatient CLABSI standard of NPSG.07.04.01, the home health care agency–targeted CDC CLABSI prevention recommendations, and an inpatient best-practice central line care bundle. Insurance company reimbursement did not substantially limit agencies' abilities to adhere to current, local policy standards in each agency. Despite widespread attention to CLABSIs from national home health care organizations and the literature,[23,24,31–33] 7 (12%) respondents reported that their agency did not track CLABSI rates or did not know if their agency tracked CLABSI rates. Only 24% of the agencies were able to report their agency's CLABSI rates per 1,000 central line days, and only 11% were able to report their agency's pediatric CLABSI rate per 1,000 central line days.

These results reveal the gap between home health care agencies' policies and national recommendations regarding CLABSIs. Although neither NPSG.07.04.01 nor the central line care bundle are currently targeted toward home health care agencies, the CDC CLABSI prevention recommendations do focus on home health care agencies, and only 18% of the agencies had polices consistent with all elements recommended by the CDC. In addition, home health care agency policy likely represents the "best-case scenario" for the practices patients actually experience. If actual practice was audited, we would expect imperfect provider consistency with policies, potentially around 80% if previous studies are demonstrative,[6,36] leading to an additional source of variation and potentially further harm.[6,36,38] To reduce the burden of ambulatory CLABSIs,[5,15] we must increasingly work to standardize ambulatory CLABSI definitions and home health care agency CLABSI prevention policies and investigate actual home health care nurse practices.

This study strongly suggests the need to adapt and update the CDC-NHSN surveillance CLABSI definition[11] to include ambulatory CLABSI events. Forty-two percent of the agencies in this study reported using the CDC-NHSN definition to define CLABSIs, but this definition specifically excludes all events that occurred outside the acute care setting. One potential reason for the variability in CLABSI definitions identified in this research is the

lack of a consensus definition for ambulatory CLABSIs, despite the existence of an APIC CLABSI definition for home health care.[25] We would suggest two potential CLABSI home health care definitions to serve the needs of these caregivers and patients, and we believe both definitions should be tracked and reported. The first definition would define a home health care CLABSI as an infection that occurred within 48 hours of a member of the agency handling a central line. In these cases, the agency would be directly responsible for a CLABSI, as one of the agency's caregivers recently accessed the line. The second definition would define a home health care CLABSI as any infection noted between 48 hours of entry into home health care and 48 hours after discharge from home health care. This definition incorporates the shared responsibility that a home health care agency takes for patient education around central line care, even if a member of the home health care agency has not accessed the line for some time. Multiple other definitions for CLABSI numerators and denominators could be applied, and studies are needed that examine the applicability, feasibility, generalizability, and utility of alternative CLABSI definitions for the home health care setting. Future research should also focus on how often home health care agency staff are accessing central lines, who else accesses ambulatory central lines in the ambulatory arena, and whom patients and caregivers look toward for central line education.

Although it has been more than five years since APIC created a definition for home health care CLABSIs,[25] and more than two years since the CDC issued guidelines for preventing CLABSIs in the home health care setting,[34] much work remains to be done to implement consistent CLABSI prevention standards across home health care agencies. If we hope to achieve comparable CLABSI prevention efforts between home health care patients and hospitalized patients, we must close the gap between the Joint Commission–mandated "evidenced-based practices to prevent CLABSIs" [31] (p.26) and current home health care policies. Although central line care bundles are the state of the art for preventing inpatient CLABSIs, there is scant research examining their application in ambulatory settings,[10] and further work is needed to evaluate their implementation in home health care agencies. As state mandates for public reporting of health care–associated infections become commonplace,[39–42] policy makers should not exclude home health care agencies from these efforts. After reporting and regulatory mandates are implemented, research should focus on rigorous quality improvement collaborative efforts[7,43] aimed at reducing these harmful infections in all patients with central lines, inside or outside an acute care setting.

It is concerning that many home health care agencies are unable to present pediatric-specific CLABSI rates or have pediatric-specific central line care policies. In adults, inpatient CLABSIs can be virtually eliminated with meticulous attention to central line insertion practices.[43] In children, elimination of inpatient CLABSIs is not achieved when central line insertion practices are prioritized alone; central line maintenance practices must also be stressed.[44,45] The drivers and risk factors for pediatric CLABSIs are likely very different than those for adult CLABSIs, and therefore, home health care agencies should be encouraged to track and report pediatric-specific CLABSI rates. In terms of CLABSIs, children are really not "little adults."[46]

There are limitations to this current study. First, while the APIC definition,[25] and CDC recommendations[34] specifically target home health care agencies, much CLABSI prevention

work has focused on inpatients, and it may not be appropriate to expect home health care agencies to use the same CLABSI definitions, NPSG.07.04.01, or an inpatient-tested central line care bundle.[7,36] Furthermore, we asked respondents about only one best-practice central line care bundle,[7,36] and other bundles[8–10,21] may be equally appropriate for the home health care setting. We used a convenience sample of home health care agencies associated with institutions participating in a CLABSI reduction collaborative. Their policies may not be representative of all home health care agencies nationally, and we hypothesize they may be biased toward better consistency with national recommendations for CLABSI prevention given their associations with institutions interested in this topic and the higher percentage of agencies in our sample who are affiliated with hospitals (23%) as compared to national estimates (12%).[47] While our response rate was 59%, we acknowledge the potential for nonresponse bias and are unable to report on how it could have affected our results.[48] The median number of patients cared for annually by our cohort (500–999 patients) approximates the mean number of patients seen by home health care agencies in a national survey (1,134),[47] likely reducing the risk of nonresponse bias and improving generalizability. Even though our survey was structured from cognitive interview techniques and piloted, it has not been validated. We hoped to decrease the risk for respondent variability by designating only one person to administer the structured interview using a predetermined script. Social desirability bias is also possible and would have likely skewed our results toward higher rates of consistency with accepted CLABSI definitions and policies. When assessing policy consistency with NPSG.07.04.01 and CDC recommendations, survey questions covered only elements related to pediatric patients and did not cover all areas of NPSG.07.04.01 or the CDC recommendations and therefore estimates may be affected. Finally, although we asked for the nurse manager at each home health care agency, only 46% of respondents self-identified as nurse-managers and it is possible that the person responding to the survey was not the most knowledgeable about his or her agency's CLABSI policies and definitions. We believe that a nurse manager or equivalent is a key stakeholder as defined by the goal and should have authoritative knowledge of policies related to central line care and CLABSI rates.[31]

Conclusion

Significant variation exists between national standards for CLABSI prevention and policies of a national convenience sample of home health care agencies. Standardization of an ambulatory CLABSI definition and continued oversight of home health care agency consistency with national recommendations is needed. Future research should focus not only on home health care agency CLABSI policies, but assessing actual practice of home health care agency staff while caring for and educating vulnerable patients with central lines.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1

Demographics of Participating Home Health Care Agencies

Characteristic	N= 57 (%)
Total Number of Patients Cared for Each Year	
0–499	12 (21)
500–999	10 (18)
1,000–1,499	5 (9)
1,500–1,999	2 (4)
2,000–2,499	1 (2)
2,500–2,999	1 (2)
3000+	10 (18)
Unknown	16 (28)
Total Number of Pediatric Patients Cared for Each Year	
0–49	8 (14)
50–99	10 (18)
100–149	5 (9)
150–199	1 (2)
200–999	9 (16)
1,000–1,999	6 (11)
2000+	3 (5)
Unknown	15 (26)
Percentage of Pediatric Patients with a Primary Hematologic/ Oncologic Diagnosis	
0–20	18 (32)
21–40	11 (19)
41–60	5 (9)
61–80	9 (16)
81–100	7 (12)
Unknown	7 (12)
Hospital-Affiliated Home Health Care Agency	13 (23)

Table 2

Home Health Care Agency Central Line–Associated Bloodstream Infection (CLABSI) Definitions and Selected Qualitative Responses[*]

Question	N= 50 (%)[†]	Selected Qualitative Responses
What definition does your agency use to define a CLABSI?		
■ CDC National Healthcare Safety Network[‡]	21 (42)	"We don't have an official definition."
■ Association for Professionals in Infection Control and Epidemiology definition for home health care[§]	4 (8)	"Anyone with a cellulitis."
■ Another organization's definition	4 (8)	
■ Unknown	19 (38)	
■ Agency-specific definition	2 (4)	
How do you define the numerator (event) for your agency's CLABSI? For example:		
■ A positive blood culture without another source of infection	8 (16)	"Physician documented suspected infection"
■ Any positive blood culture	23 (46)	"Positive symptoms of infection 48 hours after discharge"
■ A positive blood culture > 48 hours after discharge	9 (18)	"Admission to the hospital"
■ Other	8 (16)	"Whenever the hospital tells us a line was removed
■ Unknown	2 (4)	for a CLABSI"
How do you define the denominator for your agency's CLABSIs? For example:		
■ Each day a patient has a central line in our care	27 (54)	"No definition yet."
■ Each patient with a central line	19 (38)	
■ Unknown	4 (8)	
How long does a patient need to be discharged from the hospital in order for you to count his or her CLABSI?		
■ Less than 2 days	10 (20)	"30 days"
■ 2 days	22 (44)	"21 days"
■ 3–4 days	6 (12)	"0 hours"
■ 7 or more days	7 (14)	
■ Unknown	5 (10)	
When do you stop counting patients in your denominator?		
■ 2 days after discharge from home health care	1 (2)	
■ When discharged from home health care or central line removed	45 (90)	
■ Unknown	4 (8)	
Who makes the final determination of a CLABSI? (job title)		
■ Infection preventionist	7 (14)	"No specific person"
■ Quality assurance person	6 (12)	"Doctor at the hospital"

Question	N= 50 (%)[†]	Selected Qualitative Responses
■ Other ‖	31 (62)	"Owner"
■ Unknown	6 (12)	"Pharmacist"
How does your agency evaluate the effectiveness of its CLABSI prevention efforts?		
	See Table 3, Question A4	"We do not evaluate, we think what we're doing is working well."
		"We've only had one CLABSI so it's not an issue."
		"We don't have a good tool because we have really low rates and don't need one." [This agency reported not knowing its CLABSI rate.]
		"We don't because we've never had any infections."
During which events is removal of catheter considered/discussed with the medical team? (can report more than one)[#]		
■ At every visit	2 (4)	"Fever over 100.5°F"
■ At conclusion of therapy	27 (47)	"According to doctor's orders"
■ Infection/clot/dislodged/other adverse event	43 (75)	
■ Not considered/discussed	7 (12)	

[*]CDC, Centers for Disease Control and Prevention.

[†]The seven agencies that did not track CLABSI rates or did not know if they did so were not included in this table.

[‡]Horan TC, Andrus M, Dudeck MA. CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control*. 2008;36(5):309–332.

[§]Association for Professionals in Infection Control and Epidemiology. APIC - HICPAC Surveillance Definitions for Home Health Care and Home Hospice Infections. Feb 2008. Accessed Jun 17, 2013. http://www.apic.org/resource_/tinymcefilemanager/practice_guidance/hh-surv-def.pdf.

[‖]Many "other" responses included positions such as Director of Nursing, Pharmacist, and Ordering Physician. It is unclear if these people or people listed as "Quality Assurance" had Infection Preventionist training.

[#]N = 57 for this question. Percentages do not equal 100% because respondents could report more than one option.

Table 3

Compliance with The Joint Commission's National Patient Safety Goal 07.04.01[*][†][‡]

Joint Commission National Patient Safety Goal 07.04.01 Element	Survey Question	Compliance *N*= 57 (%)
1. Educate staff and licensed independent practitioners who are involved in managing central lines about central line–associated bloodstream infections and the importance of prevention. Education occurs upon hire, annually thereafter, and when involvement in these procedures is added to an individual's job.	How often do you assess compliance with the above procedures [describing best-practice central line care]?[§]	54 (95)
3. Implement policies and practices aimed at reducing the risk of central line–associated bloodstream infections. These policies and practices meet regulatory requirements and are aligned with evidence-based standards (for example, the Centers for Disease Control and Prevention [CDC] and/or professional organization guidelines).	Do you have pediatric-specific policies related to central line care? ‖	38 (67)
4. Conduct periodic risk assessments for central line–associated bloodstream infections, monitor compliance with evidence-based practices, and evaluate the effectiveness of prevention efforts. The risk assessments are conducted in time frames defined by the organization and this infection surveillance activity is organization-wide, not targeted.	How do you assess compliance with the above procedures [describing best-practice central line care]?[#] How does your agency evaluate the effectiveness of its CLABSI prevention efforts? (explain)[**]	57 (100)
	Answer: used CLABSI numbers or rates	31 (54)
	Answer: used CLABSI events as learning opportunities	11 (19)
	Answer: used either numbers/rates or events	38 (67)
5. Provide central line–associated bloodstream infection rate data and prevention outcome measures to key stakeholders, including leaders, licensed independent practitioners, nursing staff, and other clinicians.	What is your agency's overall CLABSI rate since January 2008?[††]	33 (58)
	What is your agency's pediatric CLABSI rate since January 2008?	17 (30)
7. Perform hand hygiene prior to catheter insertion or manipulation.	Is proper hand hygiene performed prior to all catheter entries?	57 (100)
12. Use a standardized protocol to disinfect catheter hubs and injection ports before accessing the ports.	Is cap connection site scrubbed with alcohol (15 seconds, and 15 second dry) or chlorhexadine (30 seconds, and 30–60 seconds dry) prior to removal of old cap?	46 (81)
13. Evaluate all central venous catheters routinely and remove nonessential catheters.	Is removal of catheter considered/discussed with medical team?	52 (91)
	Is [catheter] site assessed for clean, dry, and intact at every visit?	57 (100)
Total Number of Home Health Care Agencies Consistent with All Elements All-or-None Measurement Strategy[‡‡]		10 (18)
Mean Percentage Consistency with Any Element (Standard Error)		82.8% (11.7)

[*] Although the Home Healthcare Survey (Appendix 1) uses the term *compliance*, neither NPSG.07.04.01, Centers for Disease Control and Prevention guidelines for preventing central line–associated bloodstream infection (CLABSI), nor central line care bundles are mandated for home care agencies.

[†] The Joint Commission. *2013 Comprehensive Accreditation Manual for Hospitals: The Official Handbook*. Oak Brook, IL: Joint Commission Resources, 2012; The Joint Commission. *2013 Comprehensive Accreditation Manual for Long Term Care: The Official Handbook*. Oak Brook, IL: Joint Commission Resources, 2012.

‡The following elements of The Joint Commission's National Patient Safety Goal 07.04.01 were related to central line insertion for adults only and were not asked about in the survey: C2, C6, C8, C9, C10, and C11.

§Respondents were "compliant" if they assessed compliance at least annually.

∥On the basis of the foundational principle that "children are not little adults" (Moore P. Children are not small adults. *Lancet*. Aug 22 1998;352(9128):630), respondents were compliant if they had specific line care policies for pediatric patients.

#Respondents were compliant if they answered anything other than "Not Assessed."

**Respondents were compliant if they mentioned CLABSI rates because significant agreement exists that evaluating the effectiveness of any patient safety program requires measurement of data. (McGoldrick M. Preventing central line-associated bloodstream infections and the Joint Commission's Home Care National Patient Safety Goals. *Home Healthc Nurse*. 2009;27(4):220–228; quiz 229–230; Langley GJ, et al. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*, 2nd ed. San Francisco: Jossey-Bass, 2009). Learning from failures is also a potential method to improve processes (Agency for Healthcare Research and Quality. Becoming a High Reliability Organization: Operational Advice for Hospital Leaders. Apr 2008. Accessed Jun. 17, 2013. http://www.ahrq.gov/qual/hroadvice/hroadvice.pdf), so these results are presented as well.

††Given that the respondent was a nursing manager or comparable "key stakeholder" in the home health care agency, respondents were compliant if they knew their agency's central line–associated bloodstream infection rate. If the rate was unknown during the initial survey, we asked them to investigate the rate and the survey administrator followed up with three e-mails trying to determine the rate. As noted above, we consider it integral for agencies to know pediatric central line–associated bloodstream infection rate data, but this was not a specific Joint Commission requirement, this question was not utilized in the aggregate results.

‡‡Nolan T, Berwick DM. All-or-none measurement raises the bar on performance. *JAMA*. 2006 Mar 8;295(10):1168–1170.