

Bridging the Gap: A Collaborative to Reduce Peripherally Inserted Central Catheter Infections in the Home Care Environment

Katherine Baumgarten, MD, FIDSA, FACP,* Yvette Hale, RN, CRNI,[†]
Michael Messonnier, RPH, MSPH,[†] Margaret McCabe, RN,*
Maria Albright, MSN, APRN, ACNS-BC,[‡] Elaine Bergeron, RN[§]

*Department of Infectious Diseases, Ochsner Clinic Foundation, New Orleans, LA

[†]CarePoint Partners, Metairie, LA

[‡]St. Bernard Parish Hospital, Chalmette, LA

[§]Family Homecare, Metairie, LA

ABSTRACT

Background: Ochsner Health System agreed to participate in a nationwide collaboration to reduce central line infections in our intensive care units. Our outpatient peripherally inserted central catheter (PICC) infection rate was unacceptably high, so as an adjunct to the nationwide study we attempted to reduce PICC infections in the home care environment. Typically, home health nurses or outpatient infusion centers care for PICCs per protocol. However, no standardized protocol exists, and each facility may have a different way to care for PICCs, leading to varied and inconsistent maintenance.

Methods: Key members from our hospital, home health agencies, and an infusion company formulated a plan to reduce outpatient PICC infections. We hypothesized that the only way to reduce infections was to standardize line care and maintenance and to empower the patient to be an advocate for his or her care. The best avenue for achieving standardized care across multiple infusion companies and multiple home health agencies was to develop an order set for PICC care and

dressings changes. We also developed a checklist for the nurse and the patient to complete together during dressing changes. The checklist and order set were linked to the hospital's home health discharge orders so that they would print automatically when the provider discharged the patient to home health care.

Results: Baseline data were collected from July 1, 2010, to June 30, 2011. During that time, the infusion company identified 20 PICC infections. In 20,773 line days, the infection rate was 0.963 per 1,000 line days. The new order sets and checklists were instituted on July 1, 2011. From July 1, 2011 through June 30, 2012, 11 PICC infections were identified with 21,021 line days. The calculated infection rate was 0.52 per 1,000 line days. PICC infections so far have been reduced by 46%.

Conclusion: By bridging the gap between inpatient and outpatient care, we reduced PICC infections by 46% in our home infusion patients. We accomplished this result through a collaborative partnership among hospital staff, an infusion company, and home health agencies and a standardized process for line care and maintenance using a PICC home care order set and a patient/nursing PICC care checklist.

Address correspondence to
Katherine Baumgarten, MD
Department of Infectious Diseases
Ochsner Clinic Foundation
1514 Jefferson Hwy.
New Orleans, LA 70121
Tel: (504) 842-4005
Fax: (504) 842-5254
Email: kbaumgarten@ochsner.org

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INTRODUCTION

The Ochsner Health System (OHS) Jefferson Highway campus refers patients in the New Orleans metropolitan area and outlying regions to outpatient infusion services. Common reasons for outpatient infusion include antibiotic administration, total parenteral nutrition, and inotrope therapy. Physicians, nurses, and pharmacists for the facility found that the peripherally inserted central catheter (PICC) infection rates were unacceptably high. These infections led to the interruption of home therapy, readmission to the hospital, the use of additional antibiotics, and inconvenience for the patient.

Ochsner Physician Order Form			
<small>Doctor's Note: Drug form and full directions must be specified. Another brand or drug identical in form or content or another drug in the same therapeutic class per P&T standards may be dispensed unless DAW or 'dispense as written' is specified by the prescriber. DO NOT CROSS THROUGH PRE-PRINTED ORDERS! Any modifications must be written as separate, new orders. (Modified pre-printed order sheets cannot be processed.)</small>			
The following unacceptable abbreviations will not be used in written physician orders or written documentation in the medical record.			
IU	QD	MS	Do not use terminal zeros for doses expressed in whole numbers (example: 5 mg)
U	QOD	MSO4	Always use a zero before a decimal when the dose is less than a whole unit (example: 0.5 mg)
		MgSO4	
Date & Time	HOME HEALTH CENTRAL LINE CARE ORDERS - ADULT		
	Type of line:		
	Location of line:		
	Length:		
	Diagnosis:		
	Allergies/unfavorable effects (note reaction):		
	<input type="checkbox"/> Review Central Line Care Checklist & Central Line Flush Checklist with patient		
	<input type="checkbox"/> Infusion Therapy		
	Administer (drug and dose): _____ every _____		
	Last dose given: _____ Home dose due: _____		
	Scrub the Hub: Prior to accessing the line, always perform a 30 second alcohol scrub		
	Each lumen of the central line is to be flushed at least daily with 10 mL Normal Saline and 3 mL Heparin flush (100 units/mL)		
	<input type="checkbox"/> Skilled Nurse (SN) may draw blood from IV access		
	Blood Draw Procedure:		
	- Aspirate at least 5 mL of blood		
	- Discard		
	- Obtain specimen		
	- Change posiflow cap		
	- Flush with 20 mL Normal Saline followed by a 3-5 mL Heparin flush (100 units/mL)		
	Central Line Maintenance:		
	- Sterile dressing changes are done weekly and as needed.		
	- Use chlor-hexadine scrub to cleanse site, apply Biopatch to insertion site, apply securement device dressing		
	- Posi-flow caps are changed weekly and after EVERY lab draw.		
	- If sterile gauze is under dressing to control oozing, dressing change must be performed every 24 hours until gauze is not needed.		

 Physician Print Name / Physician Signature / Beeper No.

Form No. DRORD-405 (Rev. 1/12/2012)

Chart Location: Physician's Orders

Figure 2. Physician order form for home health central line care.

and outpatient line care to provide safer care for our patients and ultimately reduce PICC infection rates in the home.

METHODS

We invited nurses, physicians, pharmacists, and infection preventionists from the OHS Jefferson Highway campus, CarePoint Partners infusion com-

pany, and a few regional home health agencies to lead a task force to identify methods for eliminating PICC infections. One of the greatest challenges in the home care setting is that many infusion companies and home health agencies provide services but do not necessarily have common standards for central line care. After considering several options, we decided that the best approach was to standardize

Central Line Care Checklist

Name: _____

Date: _____

Steps of Care	S/U/NP	Comments/ Validated by
Wash your hands for 15-30 seconds or use alcohol hand sanitizer.		
Put masks on the patient and the caregiver. Put non-sterile gloves on both your hands.		
Remove and throw away the old dressing.		
Look at the site for redness, swelling, tenderness, or drainage. If you see any of these, report it to your doctor.		
Remove the non-sterile gloves. Wash and dry your hands.		
Open the sterile dressing kit and put on the sterile gloves.		
Scrub the central line insertion site with Chlorhexidine skin prep for 30-60 seconds using back and forth strokes. Let the site dry completely. Do not fan or blow on the area.		
Place a BioPatch disc around the catheter. Make sure the printed side is up and the slit is facing down.		
Put on the new dressing from the sterile dressing kit.		
Clamp the line, change the PosiFlow injection (white) cap, and unclamp the line.		
Write the date and time on the sticker and place it on the new dressing.		
Throw away the used supplies and wash your hands.		

S=Satisfactory U=Unsatisfactory NP=Not Performed

This form is for use by nurses, patients, and families for awareness and education of central line care.



Figure 3. Central line care checklist for the nurse and the patient to complete during home care.

line care after patients were discharged from the hospital and back in their homes. To standardize maintenance of the central lines in a home care environment, the task force developed home health discharge order sets (Figure 2) that are linked to central line care order sets and patient/nurse checklists that the discharging provider can print. The hospital social workers and nurse navigators were encouraged to ask the discharging provider to use the central line care order sets upon discharge.

The order sets provided instructions for the care of the central line, the type of dressing, and the

placement of a chlorhexidine-impregnated patch. Also included were 2 checklists for the patient and nurse to complete together to help empower the patient to be an advocate for his or her own line care (Figures 3 and 4).

Prior to implementing the home care order sets, we sent letters to the directors of nursing at local home health agencies explaining the changes that would be expected. We stressed in the letter that if the companies wanted to continue to care for our patients, we expected their representatives to attend an education session. Representatives from the

Central Line Flush Checklist

Name: _____

Date: _____

Steps of Care	S/U/NP	Comments/Validated by
Wash your hands for 15-30 seconds or use alcohol hand sanitizer.		
Using a Chloraprep wipe, scrub the hub of the PosiFlow (white) injection cap for 15 turns.		
Allow the PosiFlow (white) injection cap to dry for 15 seconds.		
Flush the line with 10cc of normal saline before and after giving any medication.		
Flush with 10-20cc of normal saline after each blood draw or blood transfusion and change the PosiFlow (white) injection cap.		
Flush twice a day with 10-20cc of normal saline using the steps above to make sure the line does not close or clot.		

S=Satisfactory U=Unsatisfactory NP=Not Performed

This form is for use by nurses, patients, and families for awareness and education of central line care.



Figure 4. Central line flush checklist for the nurse and the patient to complete during home care.

agencies were invited to meet at the OHS Jefferson Highway campus where we provided background about central line infections, discussed the reasons to eliminate infections, and educated the agency representatives about proper line care and dressing changes. CarePoint Partners offered an education session each week for the agencies' new nurses or nurses who wished to review the process.

Additionally, we discussed the plan with pharmacists from the 2 other major infusion companies in our area because our order sets specified particular

supplies that would be more costly to the infusion companies.

To compile baseline data, CarePoint Partners monitored outpatient PICC infection rates from July 1, 2010, to June 30, 2011. On July 1, 2011, we began using the new order sets, including the modified bandage change kit. CarePoint Partners then monitored outpatient line infection rates until June 30, 2012. Figure 5 shows the project timeline.

The definition of a line infection was consistent and did not change throughout the 2-year study period. Outpatient criteria for central line infections are

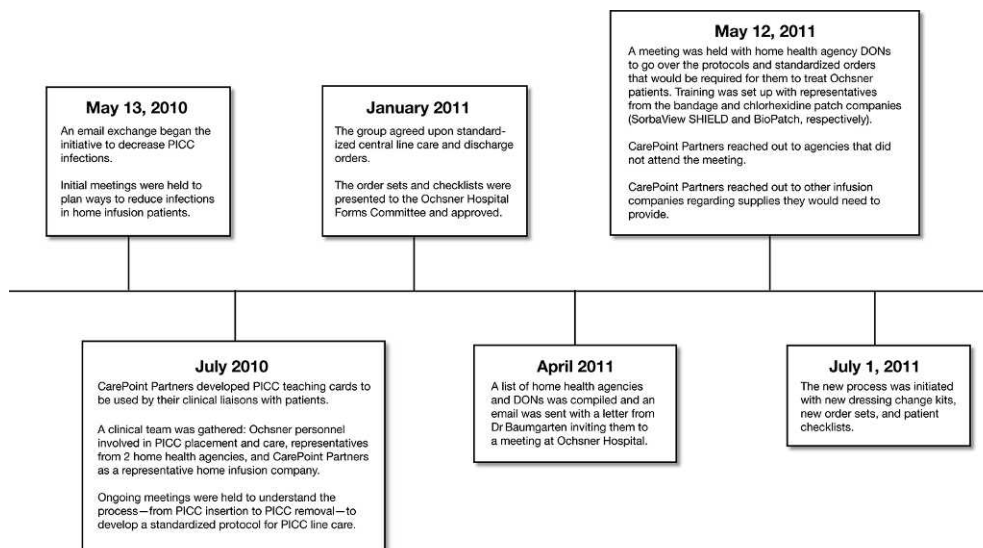


Figure 5. Timeline of the central line care improvement process.
DON, director of nursing; P_{ICC}, peripherally inserted central catheter.

not standardized as the Centers for Disease Control and Prevention inpatient CLABSI definitions are.

The outpatient infusion pharmacy depended on information received verbally from home health nurses, physicians, and patients regarding P_{ICC} infections. The pharmacy documented patient symptoms—eg, redness, swelling, drainage at the insertion site, or fever. Medical records also often contained a report that the P_{ICC} had been removed because of infection and that antibiotic treatment had been begun. If P_{ICC} cultures or blood cultures were available and an organism was obtained, the pharmacy staff documented that information. However, the majority of infections reported were identified not by cultures but rather by symptomatology.

Statistical Methods

We used a 2-sample proportions test to assess whether infection rates were statistically different between the baseline period and the follow-up period. *P* values <0.05 were considered statistically significant. All statistical analyses were performed using STATA v.11 (College Station, TX).

RESULTS

During the baseline data collection period (July 1, 2010–June 30, 2011), the infusion company identified 20 P_{ICC} infections. With 20,773 line days, we had a rate of 0.963 infections per 1,000 line days. After the new order sets and checklists were instituted (July 1, 2011–June 30, 2012), CarePoint Partners identified 11 P_{ICC} infections during 21,021 line days: 0.52 infec-

tions per 1,000 line days. The 46% reduction in P_{ICC} infection rate between baseline and follow-up was statistically significant (*P*<0.001) (Figure 6).

DISCUSSION

To our knowledge, this study is the first to use order sets to influence outpatient P_{ICC} care and thus significantly reduce outpatient P_{ICC} infections. We were able to overcome barriers that we faced trying to standardize care with multiple home health agencies and infusion companies by using an order set that specified how to care for central lines.

A recognized weakness of the study was the lack of an accepted definition of outpatient P_{ICC} infec-

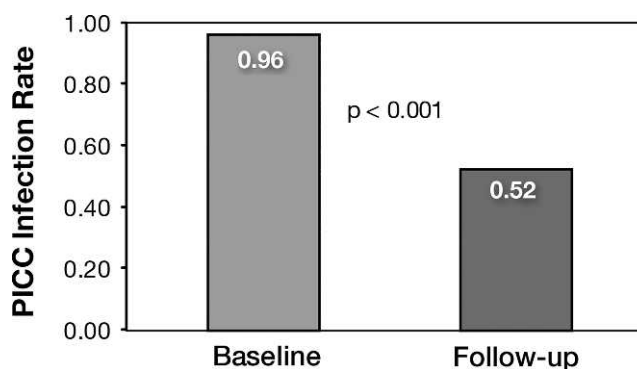


Figure 6. Peripherally inserted central catheter (P_{ICC}) infection rates, per 1,000 line days. Baseline data were collected July 1, 2010–June 30, 2011, and follow-up data were collected July 1, 2011–June 30, 2012.

tions. Additionally, some barriers remain because hospital medical records and results regarding PICC infections are not available to infusion companies or home health agencies. Only when an integrated medical record exists for all aspects of a patient's continuum of care will those problems be solved.

CONCLUSION

We demonstrated that outpatient PICC infections can be reduced by instituting a standardized central line care order set and patient/nurse checklists. In our patients, we reduced the PICC infection rate by 46%. Through collaboration and coordination of care, we bridged the gap that typically occurs when infusion patients are discharged home. Even though multiple nursing agencies provided care to our patients, by using an order set that detailed how we expected our PICCs to be cared for and maintained, we successfully forced standardization, improved line care, and ultimately reduced infection rates. We were able to

effectively provide benefits to our patients by avoiding medical costs of readmission, additional antibiotics, and morbidity associated with PICC infections.

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REFERENCE

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