The Journey to Clinical Indication: The Journey Continues

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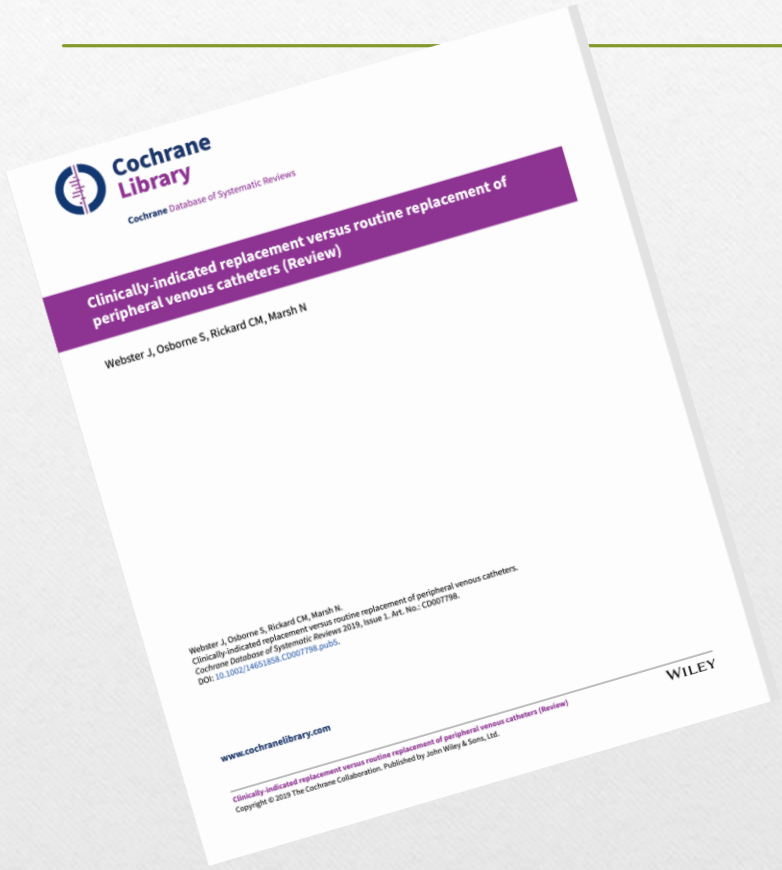
Disclosures

- This presentation reflects the technique, approaches, and opinions of the individual presenter(s). This Ethicon sponsored presentation is not intended to be used as a training guide. The steps demonstrated may not be the complete steps of the procedure. Before using any medical device, review all relevant package inserts with particular attention to the indications, contraindications, warnings and precautions, and steps for use of the device(s).
- Michelle DeVries is compensated by and presenting on behalf of Ethicon and must present information in accordance with applicable regulatory requirements.
- Michelle DeVries is a director at large with the Association for Vascular Access and an adjunct research fellow with the Alliance for Vascular Access Teaching and Research

Time flies…

- 2011, 2016, 2021 INS Standards recommend Clinical Indication (rather than time-based device rotation)
- Cochrane Reviews reiterate no increase in infections with Clinical Indication
- Policies are slow to change in some organizations

Cochrane Review



- Originally published in 2010
  - 3 updates (last in 2019)
  - No changes to the conclusions

More than just central lines

CDC 2011

- There is no need to replace peripheral catheters more frequently than every 72-96 hours to reduce risk of infection and phlebitis in adults.
- Replace peripheral catheters in children only when clinically indicated.
- Remove peripheral venous catheters if the patient develops signs of phlebitis

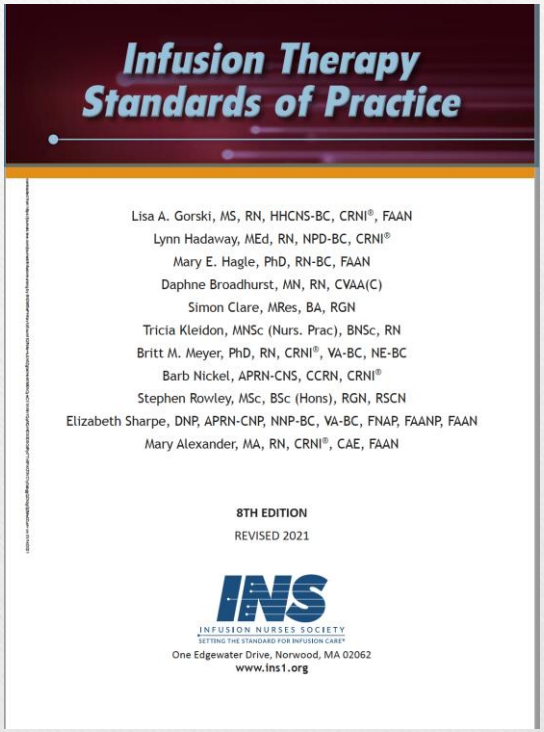
APIC 2016

- Repeated (PIV) sites may be required for lengthy courses… thus increasing costs
- Superficial phlebitis results in pain, and lack of (PIV) sites can delay treatment and prolong hospitalization.
- Venipuncture has been documented to produce nerve damage, such as complex regional pain syndrome

SHEA 2014

- Peripheral artery catheters and peripheral venous catheters are not included in most surveillance systems, although they are associated with risk of bloodstream infection independent of CVCs

2021 Infusion Therapy Standards of Practice



Short PIVC

- Insert PIVC via a forearm vessel to prolong the dwell time, increase the likelihood of the PIVC lasting the full length of the prescribed therapy, decrease pain during dwell time, promote self-care, and prevent accidental removal and occlusions.
- Choose veins found on the dorsal and ventral surfaces of the upper extremities, including the metacarpal, cephalic, basilic, and median veins.1,2,8-13,21-23,25-33 (IV)
- Consider hand veins for short-term therapy (eg, less than 24 hours). PIVC insertion in areas of flexion such as the hand is associated with higher rates of failure over time.34 (V)
- Consider use of the external jugular vein in patients in acute care settings and in emergency situations when other veins cannot be accessed; collaborate with the provider for an alternative vascular access site as soon as possible.35-37 (IV)

Long PIVC

- Consider veins found on the dorsal and ventral surfaces of the upper extremities, including the cephalic, basilic, and median veins.
  - Insertion should be in the forearm without crossing into the antecubital fossa.28,29,38-40 (III)
- Midline catheter: Select an upper arm site using the basilic, cephalic, and brachial veins.16,28,41-43 (IV)

Renal dysfunction, presence of an AVF/AVG

- Restrict venipuncture for PIVC insertion to the dorsum of the hand whenever possible and avoid the cephalic vein, regardless of arm dominance, in patients with an actual or planned dialysis fistula or graft.
- Avoid the use of forearm and upper arm veins for peripheral catheter insertion.
- A collaborative discussion with the patient and the provider is needed to discuss the benefits and risks of using a vein in an affected extremity (see Standard 29, Vascular Access and Hemodialysis).41,56-60 (IV)

Vascular Access Device Removal

- 45.1 The clinical need for each VAD is assessed daily for acute inpatient settings and during regular assessment visits in other settings, such as the home, outpatient facility, or skilled nursing facility.
- 45.2 VADs are removed when clinically indicated (eg, unresolved complication, discontinuation of infusion therapy, or when no longer necessary for the plan of care).
- 45.3 VADs are not removed based solely on length of dwell time, because there is no known optimal dwell time.

2021 INS SOP

Practice Recommendations

I. Short and Long PIVCs and Midline Catheters

A. Remove if no longer included in the plan of care or if not used for 24 hours or more.1-4 (I)

B. Remove PIVCs and midline catheters in pediatric and adult patients when clinically indicated, based on findings from site assessment and/or clinical signs and symptoms of systemic complications

C. Label catheters inserted under suboptimal aseptic conditions in any health care setting (eg, "emergent").

* Remove and insert a new catheter as soon as possible, within 24 to 48 hours.2,5-7 (IV)

D. Notify the health care team of signs and symptoms of suspected CABSI and discuss the need for obtaining cultures (eg, drainage, blood culture, catheter tip) before

2021 INS SOP

50. INFECTION

KEY DEFINITIONS

Catheter-Associated Bloodstream Infection (CABSI): Given variability in international definitions, outcome reporting, and application of the terms catheter-related bloodstream infection (CR-BSI) and central line-associated bloodstream infection (CLABSI), the INS Standards of Practice Committee is using the terminology Catheter-Associated Bloodstream Infection (CABSI) to refer to bloodstream infections (BSIs) originating from either peripheral intravenous catheters (PIVCs) and/or central vascular access devices (CVADs). Both are equally injurious and can occur from 4 possible sources:

- 1. During catheter insertion/during catheter dwell time through migration of microbes down the catheter tract.
- 2. Via the catheter hub/lumen during routine administration and manipulation at the hub/lumen.
- 3. Due to endogenous microorganisms within the bloodstream.
- 4. From contaminated infusates.

INS SOP 2021

Standard

50.1 Infection prevention measures are implemented with the goal of preventing infusion- and VAD-related infections.

50.2 The patient with a VAD is assessed for signs and/or symptoms of infection and is educated about infection, risks, interventions, and any required follow-up.

Practice Recommendations

A. Implement a care bundle in conjunction with a culture of safety and quality to reduce the risk of infection associated with VADs during insertion and during daily care and management.1-9 (IV)

H. Remove a PIVC if the patient develops symptoms of complication and failure such as infection (eg, erythema extending at least 1 cm from the insertion site, induration, exudate, fever with no other obvious source of infection) or the patient reports any pain or tenderness associated with the catheter.1,10,11,38-42 (II)

VASCULAR ACCESS DEVICE ASSESSMENT, CARE, AND DRESSING CHANGES

- Implement a postinsertion care bundle in conjunction with a culture of safety and quality to reduce the risk of catheter-related infection during daily care and management (refer to Standard 50, Infection).
- Assess and discuss with the patient's health care team the continuing need for the VAD on a daily basis (refer to Standard 45, Vascular Access Device Removal).
- Assess the entire infusion system through visual inspection, from the solution container, progressing down the administration set to the patient and VAD insertion site with each infusion intervention.1,2 (V)

  1. Assess VAD patency (refer to Standard 41, Flushing and Locking).

  2. Assess the VAD site and surrounding area, by palpation and inspection, including catheter pathway, for integrity of skin, dressing, and securement device.1 (V)

What was lacking…

- Guidelines and standards did not offer operationalization suggestions

An Implementation Framework for the Clinically Indicated Removal Policy for Peripheral Intravenous Catheters

Mari Takashima, MEpi, RN; Marie Cooke, PhD, RN; Michelle DeVries, MPH; Tricia M. Kleidon, MNursSci(Nurs Prac), RN; Evan Alexandrou, PhD, RN; Vineet Chopra, MD, MSc, MBBS; Claire M. Rickard, PhD, RN

ABSTRACT

Background: Equivalent clinical outcomes, lower costs, and fewer invasive procedures have resulted in revised recommendations for the removal of peripheral intravenous catheters (PIVCs) from the traditional 72- to 96-hourly removal to removal based upon clinical indication.

Problem: Uptake of this evidence-based innovation to health systems is often delayed, in part due to the lack of a guiding framework for successful implementation strategies to guide systems to transition to and sustain clinically indicated PIVC removal.

Approach: We used the Consolidated Framework for Implementation Research (CFIR) to reflect on strategies likely important for the successful implementation of PIVC removal evidence into policy and practice.

Outcomes: We discuss and provide a critique of salient strategies for successful implementation of clinically indicated PIVC removal with regard to intervention characteristics, the outer and inner settings, characteristics of individuals, and implementation processes.

Conclusions: Successful implementation of clinically indicated PIVC removal can be achieved through planned and systematic processes within the CFIR framework.

Keywords: clinically indicated peripheral intravenous catheter removal, Consolidated Framework for Implementation Research, implementation science, intravenous administration, peripheral intravenous catheter

A major change in peripheral intravenous catheter (PIVC) policy in the past decade has been in criteria for PIVC removal, from

How do the latest INS Standards help?

6. QUALITY IMPROVEMENT

Standard

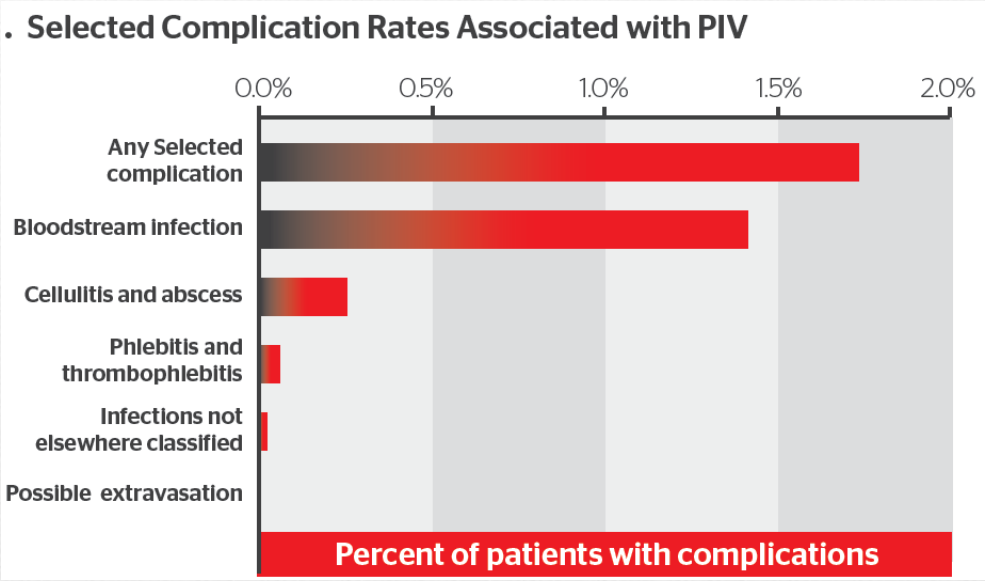
- 6.1 Quality improvement (QI) activities are implemented to advance safety and excellence in infusion administration and VAD insertion and management.
- 6.2 QI programs incorporate surveillance, aggregation, analysis, and reporting of patient quality indicators and adverse events with clinicians taking action as needed to improve practice, processes, and/or systems.
- Evaluate adverse events from peripheral/arterial catheters for complications (eg, bloodstream infection [BSI], infiltration, phlebitis) through incidence, point prevalence, reports from patient health records, or International Classification of Diseases (ICD) codes.

1. Use surveillance methods and definitions that are consistent and permit comparison to benchmark data.
2. Collect data; analyze and evaluate outcomes against benchmarks for areas of improvement.
3. Compare rates to historical internal data and when possible to external national rates.
4. Report as mandated by local/national requirements to external quality initiatives or programs.[30,38-46] (II)

Not In My Hospital… or is it?

A retrospective Premier database analysis evaluated over 588k patients' records and ICD-9-CM codes from a two year period.

- The leading PIV associated complication was bloodstream infection
- 1.45% of all patients were impacted
- That equated to 10k+ patients with PIV-BSI



Lim S, Adams E, Hyde R, Broder M, Chang E, Reddy SR, Tarbox M, Bentley T, Ovington L. Clinical and Economic Burden of Peripheral Intravenous Catheter-Associated Complications in a U.S. Hospital Discharge Database. Poster presented at: 31st Annual Scientific Meeting of the Association for Vascular Access; 2017 Sep 16-19; Phoenix, AZ.

It "costs" even if it doesn't "count"

TABLE 6

Everywhere Hospital's Cost for Poor-Quality Infusion Therapy

SPC Failure Mode	Occurrence Rate	Occurrence Percentage (%) Needing Pharmacy/Testing (n)	Costs of Catheter Failure ($)	Hospital's Costs for 1 Month
Insertion failures per 10 000 placement attempts	3510	100%	$35	$122,850
PICC placement 2% of patients	131	100%	$336	$44,016
CVAD placement 1% of patients	66	100%	$407	$26,862
Needlestick injury Blood exposure	3	100%	$400 (testing only)	$1,200
Mucocutaneous Blood exposure	1	100%	$400 (testing only)	$400
Dislodgement 70% replaced	440	70% (n = 308)	$53	$16,324
Phlebitis New catheter 80% hot compress 10% cultured	566	 70% (n = 396) 80% (n = 452) 10% (n = 56)	 $35 $40 $150	 $13,860 $18,080 $8,400
Bloodstream infection	3	100%	$33,000	$99,000
Infiltration 70% replace SPC 80% hot compress	1391	 70% (n = 973) 80% (n = 1112)	 $35 $40	 $34,055 $44,480
Extravasation 100% replace SPC 33% I&D	6	 100% 33% (n = 2)	 $35 $3,000	 $210 $6,000
Mechanical failure 80% replace	1434	80% (n = 1147)	$35	$40,145
Total CPQ				$475,882

Abbreviations: CPQ, cost of poor quality; CVAD, central vascular access device; I&D, incision and drainage; PICC, peripherally inserted central catheter; SPC, short peripheral catheter.

Jones RK. Short Peripheral Catheter Quality and Economics: The Intravenous Quotient. *J Infus Nurs.* 2018;41(6):365-371.

12. PRODUCT EVALUATION, INTEGRITY, AND DEFECT REPORTING

- Establish **clear goals** of what is to be measured and evaluated during the process of product evaluation (eg, enhance continuity of care, reduce a complication, improve clinician compliance, save time, and standardize use) and define in advance the minimum parameters that must be met for evaluation to be considered successful.
- Evaluate the intended organizational use of the product (eg, reduction of infection, occlusion, or thrombosis) against the **manufacturers' directions for use and indications for the product**.
- Develop data collection tools for analysis and ongoing monitoring.
- Provide education and training for use of the product/equipment selected for evaluation; consider support/involvement by the manufacturer in product education.1-3 (V)

The Data on PIV Impact Keeps Growing

International Journal of Antimicrobial Agents 55 (2020) 105875

Contents lists available at ScienceDirect

International Journal of Antimicrobial Agents

journal homepage: www.elsevier.com/locate/ijantimicag

Hot Topic

Complications of peripheral venous catheters: The need to propose an alternative route of administration

Morgane Mailhe[a], Camille Aubry[a], Philippe Brouqui[a,b], Pierre Michelet[c], Didier Raoult[a,b], Philippe Parola[a,d], Jean-Christophe Lagier[a,b,*]

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Infection Control & Hospital Epidemiology (2021), 1–7
doi:10.1017/ice.2020.1373

Original Article

An eight-year multicenter study on short-term peripheral catheter–related bloodstream rates in 100 units of 9 countries in Argentina, Costa Rica, Do... Venezu...

Heart & Lung 49 (2020) 273–286

Contents lists available at ScienceDirect

Heart & Lung

journal homepage: www.heartandlung.com

Defining risk factors associated with difficult peripheral ven- Cannulation: A systematic review and meta-analysis

Miguel Angel Rodríguez-Calero[a,b,c,1,2,*], Ian Blanco-Mavillard[b,c,d,1], José Miguel Morales-Asencio[e,2], Ismael Fernández-Fernández[d,1], Enrique Castro- Joan Ernest de Pedro-Gómez[b,c,1,2]

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The Art and Science of Infusion Nursing

Short Peripheral Catheter Dwell Time and Associated Complications

A Systematic Review

Susan G. Hopkinson, PhD, MSN • Angela K. Green, MSHA, BSN • Brenda E. Hewitt, BSN, RN, CEN • Sara A. Grace, BSN

ABSTRACT

There is evidence that the risk of complications caused by short peripheral catheters (SPCs) does not increase when SPCs are replaced due to clinical indication versus at a specific time frame. In the studies, however, the dwell time does not typically exceed an average of 3.5 days. It is uncertain how long SPCs may stay in place before there is an increased risk for complications or if there is an increased risk. This systematic review was conducted to explore the current state of the science regarding SPC dwell time as a predictor of SPC complications in adult inpatients.

Key words: clinically indicated, complications, dwell time, short peripheral catheter, vascular access

Original research article

Should the CDC's recommen... promptly removing unnecessary ... inserted central catheters be enhanced? Ultrasound-guided peripheral venous cannulation to fully comply

Stelios Iordanou[1], Nicos Middleton[2], Elisavet Papathanassoglou[3], Lakis Palazis[4] and Vasilios Raftopoulos[5]

ELSEVIER

Management ... implementatio... of guidelines in Germany: a national survey

...pheral venous catheters and

S.J.S. Aghdassi[a,b,1,*], C. Geffers[a,b,1], M. Behnke[a,b], A. Gropmann[a,b], P. Gastmeier[a,b], T.S. Kramer[a,b]

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[b] National Reference Centre for Surveillance of Nosocomial Infections, Berlin, Germany

...er.com/locate/jhin

Healthcare Infection Society

TABLE 4. **Subgroup Analyses of Studies of Short-term Intravascular Devices***

Device	All studies		Studies requiring microbial concordance between catheter and blood cultures		Studies requiring microbial concordance and *all* devices cultured	
	No. of studies	IVD-related BSIs per 1000 IVD-days (95% CI)	No. of studies	IVD-related BSIs per 1000 IVD-days (95% CI)	No. of studies	IVD-related BSIs per 1000 IVD-days (95% CI)
Peripheral IV catheters	10	0.5 (0.2-0.7)	9	0.6 (0.2-0.9)	9	0.6 (0.2-0.9)
Midline catheters	3	0.2 (0.0-0.5)	2	0.2 (0.0-0.5)	1	0.2 (0.0-0.5)
Arterial catheters for hemodynamic monitoring	14	1.7 (1.2-2.3)	11	1.3 (0.8-1.9)	8	1.4 (0.8-2.0)
Peripherally inserted central catheters	15	1.0 (0.8-1.2)	5	0.8 (0.4-1.3)	4	0.8 (0.4-1.2)
Noncuffed central venous catheters						
Nonmedicated						
Nontunneled	79	2.7 (2.6-2.9)	63	2.9 (2.7-3.2)	50	2.9 (2.6-3.2)
Tunneled	9	1.7 (1.2-2.3)	7	0.9 (0.4-1.3)	5	2.1 (1.0-3.2)
Medicated						
Chlorhexidine-silver-sulfadiazine	18	1.6 (1.3-2.0)	16	1.3 (1.0-1.7)	16	1.3 (1.0-1.7)
Minocycline-rifampin	3	1.2 (0.3-2.1)	3	1.2 (0.3-2.1)	3	1.2 (0.3-2.1)
Pulmonary artery catheters	13	3.7 (2.4-5.0)	11	3.3 (2.0-4.6)	10	3.3 (1.9-4.6)
Noncuffed, nontunneled hemodialysis catheters	16	4.8 (4.2-5.3)	11	5.0 (4.2-5.8)	9	6.1 (4.9-7.4)

*BSI = bloodstream infection; CI = confidence interval; IV = intravenous; IVD = intravascular device.

Maki DG et al., Mayo Clinic Proc 2006;81:1159-1171.

Open Forum Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Risk Factors and Outcomes Associated With Hospital-Onset Peripheral Intravenous Catheter–Associated *Staphylococcus aureus* Bacteremia

Mica Blauw,[1] Betsy Foxman,[4] Juan Wu,[2] Janice Rey,[1] Neelay Kothari,[3] and Anurag N. Malani[1,3]

[1]Department of Infection Prevention and Control, [2]Department of Academic Research, and [3]Section of Infectious Diseases, Department of Medicine, St. Joseph Mercy Hospital, Ann Arbor, Michigan; [4]Center for Molecular and Clinical Epidemiology of Infectious Diseases, University of Michigan School of Public Health, Ann Arbor, Michigan

Table 1. Sources of *Staphylococcus aureus* Bacteremia

Source	Total *S. aureus* Bacteremia (n = 205), No. (%)	Hospital-Onset *S. aureus* Bacteremia (n = 45), No. (%)	Community-Onset *S. aureus* Bacteremia (n = 160), No. (%)
Soft tissue/bone	67 (32.7)	4 (8.9)	63 (39.4)
PVC	18 (8.8)	16 (35.6)	2 (1.3)
CVC or PICC	14 (6.8)	7 (15.6)	7 (4.4)
Hemodialysis	13 (6.3)	2 (4.4)	11 (6.9)
Pulmonary	8 (3.9)	0 (0.0)	8 (5.0)
Endovascular	7 (3.4)	1 (2.2)	6 (3.8)
Biliary	1 (0.5)	0 (0.0)	1 (0.6)
Urinary	3 (1.5)	0 (0.0)	3 (1.9)
Unknown	74 (36.1)	15 (33.3)	59 (36.9)

Abbreviations: CVC, central intravenous catheter; PICC, peripherally inserted central catheter; PVC, peripheral intravenous catheter.

- Blauw M, Foxman B, Wu J, Rey J, Kothari N, Malani AN. Risk Factors and Outcomes Associated With Hospital-Onset Peripheral Intravenous Catheter-Associated Staphylococcus aureus Bacteremia. *Open Forum Infect Dis.* 2019;6(4):ofz111.

Site matters!

Table 3. Evaluation of Interaction Between Antecubital PVC Placement and Line Duration for Hospital-Onset PVC-Associated *Staphylococcus aureus* Bacteremia Using Logistic Regression[a]

	Anatomic Placement	Line Duration	Odds Ratios (95% Confidence Interval)
Model β (standard error)	2.5315 (1.1)	1.3876 (0.8)	-
	Antecubital	<4 d	12.6 (1.3–117.5)
	Nonantecubital	≥4 d	4.0 (0.8–20.6)
	Antecubital	≥4 d	50.4 (2.4–1043.8)
Reference	Nonantecubital	<4 d	1.0

Abbreviation: PVC, peripheral intravenous catheter.

[a]N = 16 cases and 32 controls.

Preventing Hospital Onset Bacteremia

Infection Control & Hospital Epidemiology (2019), 1–5
doi:10.1017/ice.2019.40

Original Article

Hospital epidemiologists' and infection preventionists' opinions regarding hospital-onset bacteremia and fungemia as a potential healthcare-associated infection metric

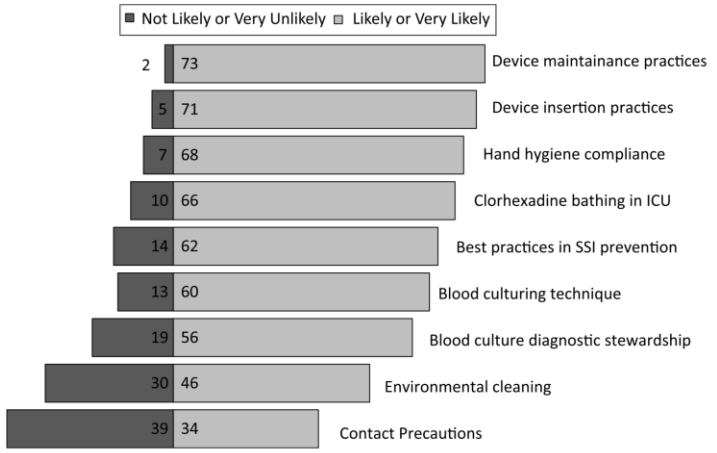


Fig. 3. Infection prevention improvement initiatives perceived as most likely to reduce hospital-onset bacteremia and fungemia (HOB).*n = 76.
*Survey respondents were asked: "In your opinion, how likely are the following specific infection practices to reduce hospital-onset bacteremia/fungemia?"

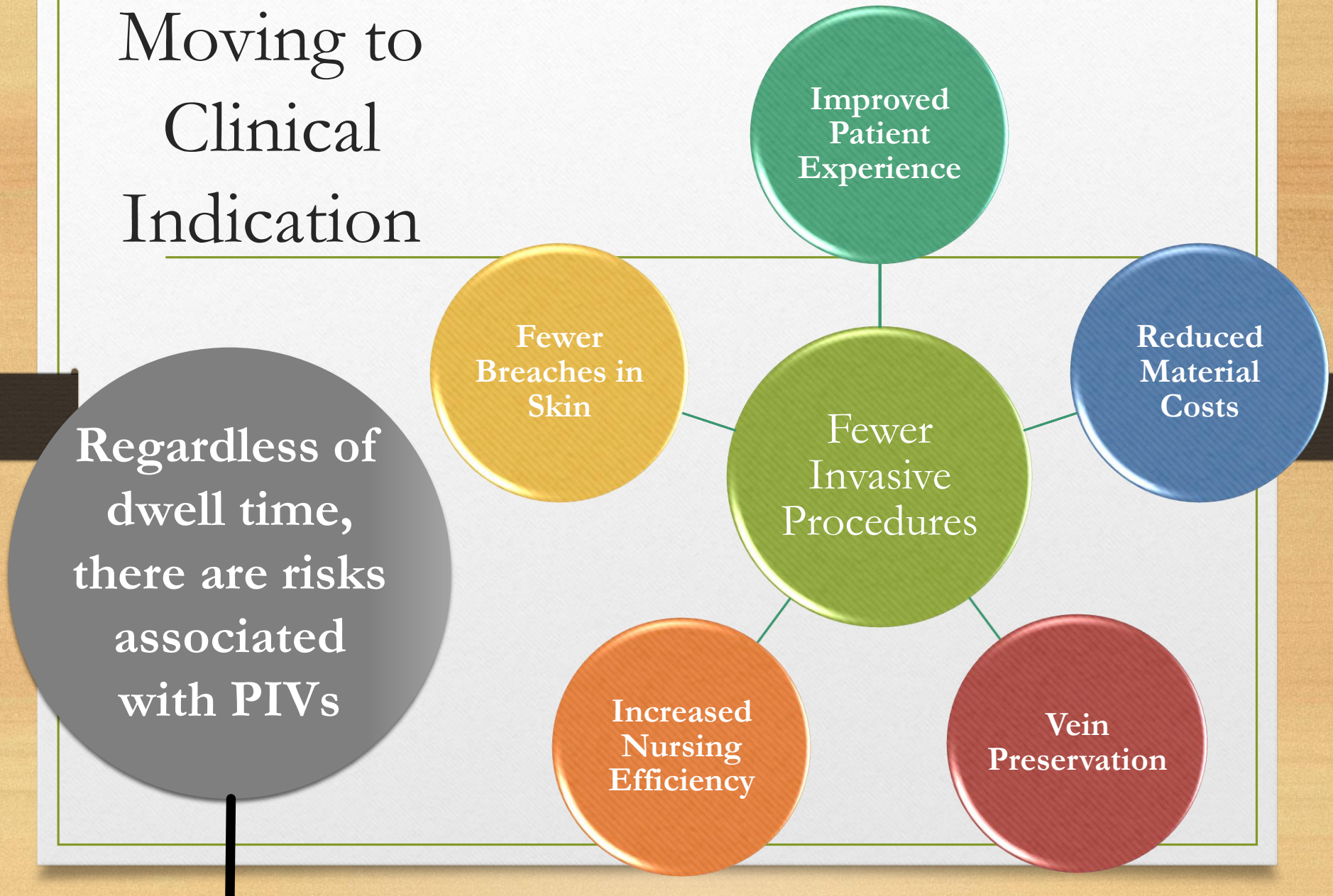
Dantes RB, Abbo LM, Anderson D, et al. Hospital epidemiologists' and infection preventionists' opinions regarding hospital-onset bacteremia and fungemia as a potential healthcare-associated infection metric. Infect Control Hosp Epidemiol. 2019;40(5):536-540.

What did we do differently?

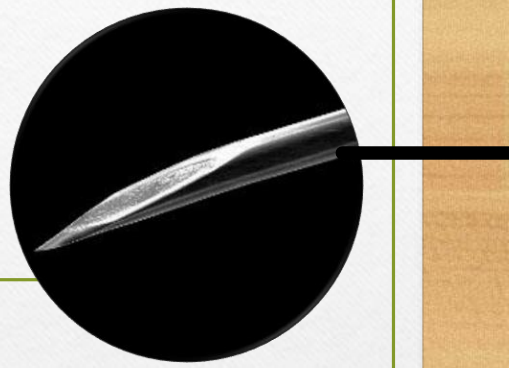
Planning

- There are no shortcuts to success
- The standards apply to all care settings
- “Cherry picking” the easy parts is not a viable option

Moving to Clinical Indication



Most Frequent Invasive Procedure[1]



60% of first attempts to insert are unsuccessful[2]

27% of patients endure 3 or more attempts[2,3]

57% of RNs report that they were not taught how to insert PIVs during nursing school[5]

1. Zingg W. et al., Int J Antimicrob Agents 2009;34 Suppl4:S38-42.
2. Kokotis K. Cost containment and infusion services. J Infusion Nurs. 2005; 28(3S):S22-S32
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6. Trinh, et al. Peripheral Venous Catheter-Related *Staphylococcus aureus* Bacteremia. Infect Control Hosp Epidemiol 2011;32(6):579-583

Pre-licensure help is coming!

- 3 part certificate program to address foundational knowledge
- FREE to all pre-licensure programs
- Pilots began in late 2020 with full curriculum being launching during 2021 academic year
- Post licensure companion product in development

PIV 101: FOUNDATIONAL COURSE

- Legal, ethical, and risk aspects of peripheral vascular access
- Anatomy and physiology
- Lifespan considerations
- Infection prevention overview
- Patient assessment
- Complications
- PIV removal
- Documentation practices

PIV 201: INTERMEDIATE COURSE

- Review of PIV 101
- Pharmacology
- Patient care considerations associated with PIVC insertion
- Infection prevention, sterile technique, no-touch, and ANTT®
- Insertion of a PIVC
- Patient education

PIV 301: CERTIFICATE COURSE

- Review of PIV 101 and PIV 202
- Advanced concepts of Vascular Access
- Adjuncts to improve PIVC insertion
- Integument challenges
- Legal pitfalls
- Critical thinking in Vascular Access
- Defining the role of a Vascular Access Specialist
- Improving outcomes

Methodist Hospitals, NW Indiana

- Background
  - 674 beds
  - Previous standard of care for PIVs
    - Routine replacement every 72-96h
    - Transparent film and tape dressings
    - Basic PIV policy not reflective of recent guideline updates
  - Years of baseline PIV related LC-BSI data
  - Fall 2013 infection cluster

Building the Case: "WIIFM"

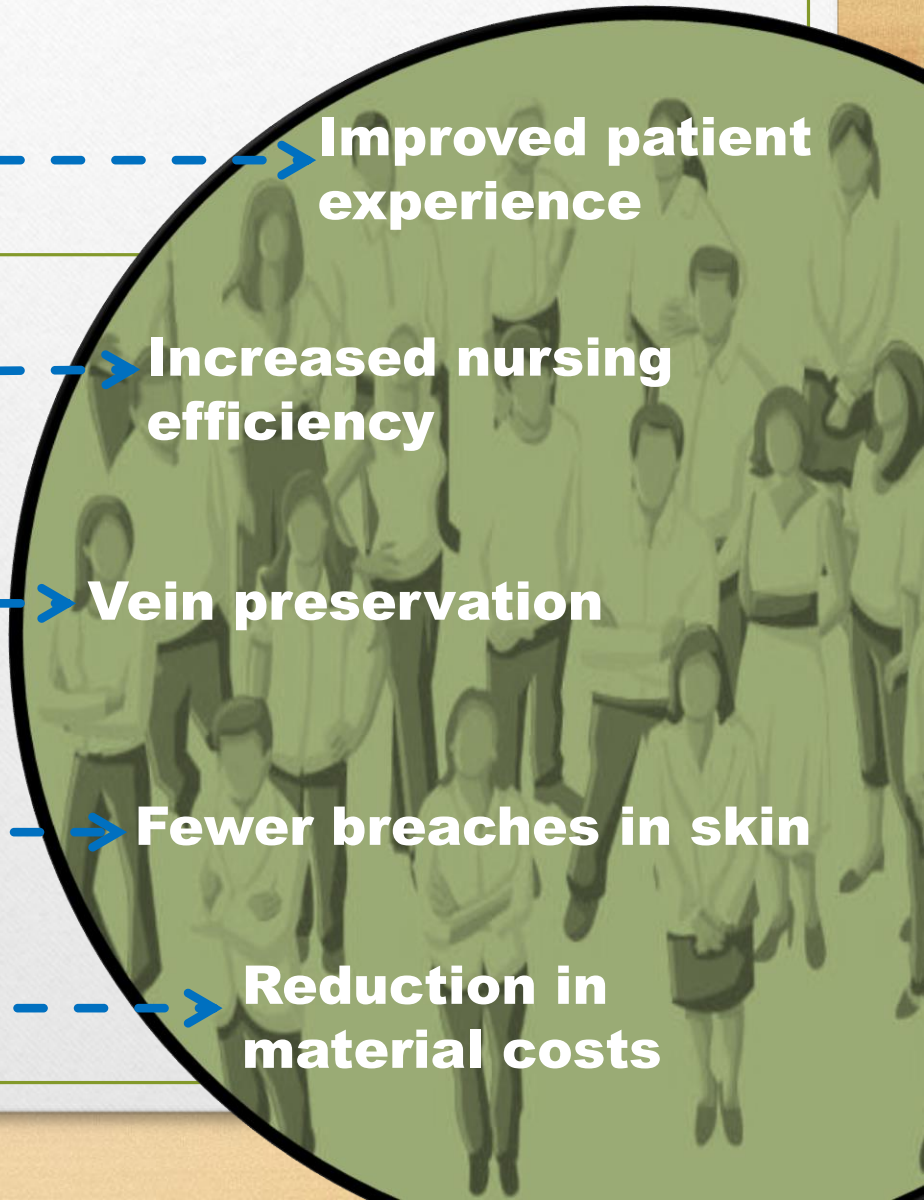
Nursing, Admin, Patients → **Improved patient experience**

Nursing, Admin, Patients → **Increased nursing efficiency**

Medical, Nursing, Admin, Patients → **Vein preservation**

Quality, Legal, Medical, Infection Prevention, Patients → **Fewer breaches in skin**

Materials/Purchasing, Admin → **Reduction in material costs**

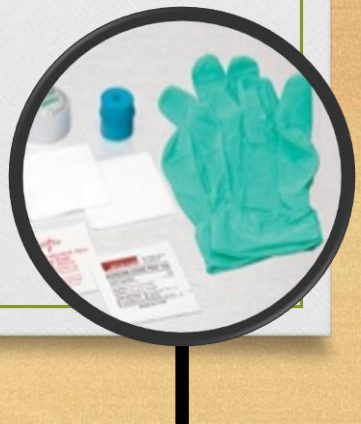


Starting the Journey

- All interested parties
  - Nursing, IR, Anesthesia, Pharmacy…
- Applicability
  - All inpatients vs. select populations
  - All clinical units vs. select locations
- Timeline
- Policies, materials, education…
- Support systems

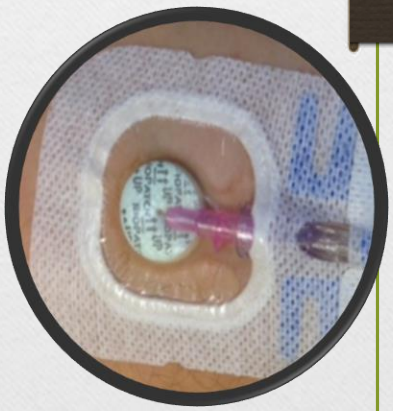
Materials/Equipment

- Efficacy and Durability
  - Is the dressing going to hold?
  - Is a stabilization dressing or device needed?
  - Does the policy reflect what to do when the dressing is loose (ie; avoidance of tape reinforcements)
- Protection from bacterial re-colonization



Creating a Bundle

- Policy, Practice and Materials
  - 2011(now 2021!) CDC Guidelines and INS Standards of Practice
    - Insertion, care and maintenance
    - Dwell time & removal guidelines
  - Best Practices and Process Improvements
    - "No touch" after prep or use sterile gloves
    - Closed system IV catheter
    - Protective disk with CHG
    - Securement dressing
    - Alcohol impregnated caps on all lines
    - Replacement when clinically indicated
    - Post implementation updates: change to anti-reflux needleless connector and addition of gum mastic liquid adhesive for dressing securement



Bundling for success – Peripheral lines

- Insertion:
  - CHG skin prep
  - Sterile gloves if repalpating the site
  - Alcohol caps for intraluminal protection
  - Chlorhexidine impregnated sponge dressing for extraluminal protection
  - Updated catheter – integrated extension set
  - Bordered (securement) dressing
  - Neutral connectors
  - New addition 2017 – liquid gum mastic adhesive with dressing placement
- Maintenance:
  - Careful assessment – check the patient, not the box
  - Remove when clinically indicated, with dressing change at 7 days (or sooner if dressing compromised)
  - Re-prep when redressing the site
- Ongoing surveillance of process and outcomes
- Review any infections with floor staff in "real time" to discuss missed opportunities for prevention

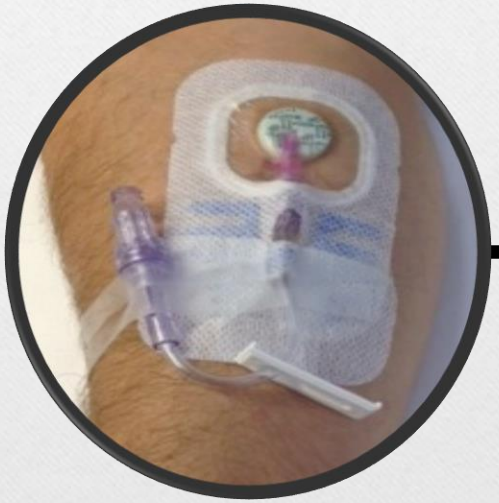
- Devries M, Valentine M. Bloodstream Infections from Peripheral Lines: An Underrated Risk. American Nurse Today. January 2016. Volume 11. Number 1. http://americannursetoday.com/piv/

Bolstering Best Practices

- Education and skill building
  - All clinicians, all units
  - Targeted product in-services
  - "IV Basics" classes (repeated in 2019)
    - Device, site & gauge selection
    - Strict adherence to site prep protocol
    - Application and dry time
    - "No Touch" or sterile gloves for palpation after prep
    - Application of protective CHG disk, securement device & dressings
    - Meticulous hub hygiene

Post- Implementation

- On-going Clinician Assistance
  - Internal
  - External/vendor
- Surveillance
  - What will be monitored?
  - Frequency?
  - Who is responsible?
  - How will the data be used?



Using data to drive continued improvements

JAMBOREE: BRINGING IT ALL TOGETHER

Michelle DeVries, MPH, CIC, VA-BC™
Nancy Scott DNP, APN, ACNS-BC, CIC, VA-BC™, PCCN, SCRN, CNRN

Are you looking for a way to broaden the interest and awareness around vascular access outcomes? Is your goal to make it a priority for more than just the vascular access team?

Several years ago, the infection prevention team at our large, urban community hospital handled rounding on vascular access devices. Soon, an identified gap between the general understanding of a unit-based staff and the observations reported in bedside rounds became apparent. With the support of hospital administration, the expectation of ongoing rounds was expanded to include nursing leadership in all inpatient care units. The institution developed data dictionaries and spreadsheets to assist in the standardization of observations and analysis of data and conducted trainings for individuals who would begin assisting in the collection. Monthly nursing score cards were updated to include performance measures obtained through these rounds.

Analysis of the data led to the identification of trends and planned interventions. Often vascular access providers in addition to our internal stake holders and learn together, through bedside rounding, where there remained opportunities to optimize outcomes by improving the understanding around the appropriate use of the products provided in the vascular access kits for central and peripheral vascular access devices.

Product representatives and their clinical support are invited monthly to attend inclusive rounds at the hospital. Two VA-BC™ members of the infection prevention team lead the team, with organization invitations including the vascular access team,professional/development/ clinical nurse specialists and nursing leadership. Front line nurses are engaged during the team's rounds. Industry involvement includes the companies represented in the hospitals central and peripheral line options, semi-permeable transparent dressing, CHG skin preparation, CHG sponge dressing, gum mastic liquid adhesive/adhesive remover, flush syringe manufacturer and alteplase clinical support.

The Jamboree team rounds monthly consisting of industry partners and hospital staff. Representation varies each month. From left to right, front to back:

The Art and Science of Infusion Nursing

Beyond Bean Counting: Gathering and Using Data to Drive Improvements

Michelle DeVries, MPH, CIC, VA-BC

ABSTRACT
Data collection of process and outcome measures for vascular access procedures and devices is recommended in all relevant guidelines and standards. A variety of strategies for achieving these objectives and how the findings can be aggregated and presented to improve patient care is discussed, along with a review of specific recommendations.
Key words: analysis, data, outcomes, process measures, vascular access

Patient safety is a priority for every clinician in a health care organization. Vascular access and infusion specialists provide a tremendous service that clinical competence is developed and routinely assessed for specialist vascular access and infusion clinicians, there is still a critically undervalued companion proficiency that

Methodist Hospitals:
1 Year Post Implementation

37% Reduction in House-wide LC-BSIs

19% Reduction in PIV related BSIs

48% Reduction in PIV Kit usage

68% Fewer CLABSIs (compared to NHSN prediction)

- Reduced IV "sticks"
- Positive patient feedback
- Positive staff feedback

Can you measure the impact on patient experience?

Press Ganey:

Top Box: Overall patient satisfaction

Tests and Treatment: Courtesy of the person starting IV

We hypothesized that overall satisfaction could be improved by improving the overall experience with IVs. One year after introducing our protected clinical indication bundle we experienced an increase of 23 percentile ranking improvement with top box and 24 percentile ranking improvement with courtesy of person starting IV. This suggests a quantifiable association worth further study.

Methodist Hospitals
2 Year Post Implementation

1st Place Oral Abstract AVA 2016

37%
Reduction in House-wide LC-BSIs

sustained

25%
Reduction in PIV related BSIs

6% further reduction

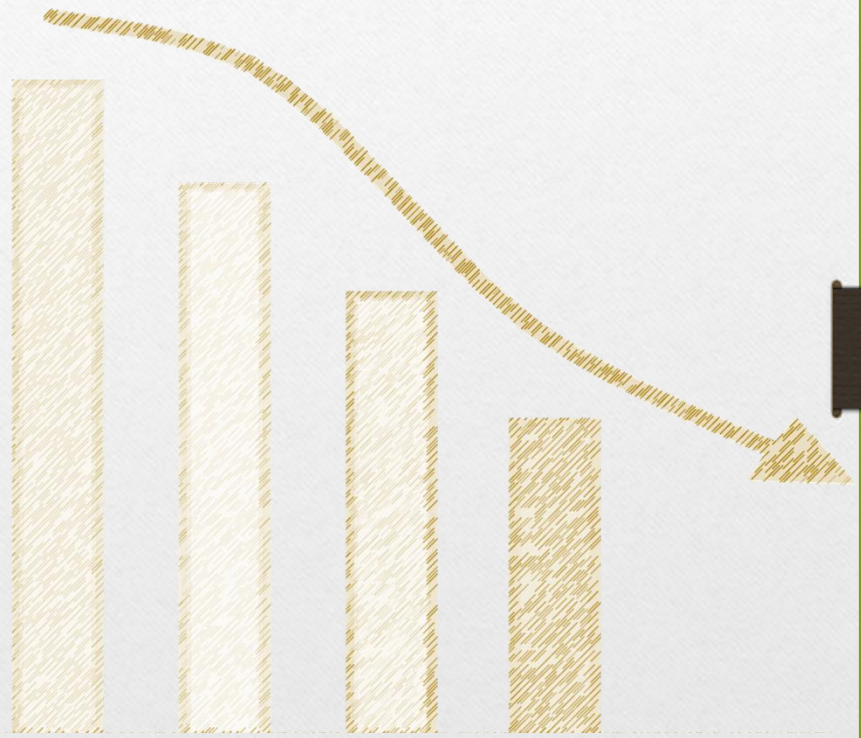
75%
Reduction in CLABSIs
(68% Fewer CLABSIs compared to NHSN prediction)

sustained

DeVries, M. – Oral Abstract, AVA 2016, Orlando, FL

3 Year Post Implementation

- Sustained original decrease in PIV bloodstream infections
- PIV performance remained strong despite institutional opportunities with CLABSI



DeVries, M. and Methodist Hospital Infection Control Department, 2017 PIV Study findings. Presented at AVA 208.

Removal Reasons

TABLE 4a

Reasons for Removal Based on Anatomical Location, 2016

Anatomical Location	Total Number of Catheters	% Damage	% Infiltration	% Dislodgement	% No Reason	% Leaking	% Drainage	% Occluded	% Per Protocol/ Site Change/Per Order	% Patient Discharge	% Patient or Family Request
Ankle	1	0	0	0	100	0	0	0.00	0	0	0
Antecubital fossa	157	1.3	21.02	4.46	36	0.6	6.4	2.55	20.38	0	1
Forearm	157	0	22.93	6.37	39	0	3.8	1.91	17.83	0	3
Wrist	62	1.6	25.81	0	35	0	1.6	6.45	22.58	0	3
Upper arm	15	6.7	26.67	0	27	0	0	20.00	13.33	0	0
Foot	5	0	20	0	20	0	0	0.00	40	0	20
Hand	129	2.3	18.6	10.1	32	0.8	3.9	6.20	19.38	1	3

TABLE 4b

Reasons for Removal Based on Anatomical Location, 2017

Anatomical Location	Total Number of Catheters	% Damage	% Infiltration	% Dislodgement	% No Reason	% Leaking	% Drainage	% Occluded	% Per Protocol/ Site Change/ Per Order	% Patient Discharge	% Patient or Family Request	% Emergent Start
Antecubital fossa	183	1.1	13.66	9.29	15	0.5	6	5.46	3.279	36.6	3	4.37158
Forearm	193	1	19.69	18.1	15	0	6.2	2.59	5.181	29.5	2	1.03627
Wrist	61	0	27.87	19.7	0	1.6	3.3	1.64	3.279	29.5	2	4.91803
Upper arm	18	0	16.67	5.56	0.2	5.6	11	5.56	5.556	27.8	0	5.55556
Foot	3	0	33.33	33.3	0	0	0	0.00	0	33.3	0	0
Hand	154	1.9	14.29	16.2	20	0.6	3.2	2.60	8.442	26	3	3.24675
External jugular	5	0	40	0	0	0	0	0.00	0	20	0	0

DeVries M, Strimbu K. Short Peripheral Catheter Performance Following Adoption of Clinical Indication Removal. Journal of Infusion Nursing. 2019;42(2).

Protected Clinical Indication Bundle – Did they last?

TABLE 5

Dwell Time Distribution and Frequency of Complications/Reasons for Removal

Number of Dwell Days	2016				2017				
	Number of Catheters	Percentage of Total	Percentage Infiltrated	Percentage Due to Device Dislodgement	Number of Catheters	Percentage of Total	Percentage Infiltrated	Percentage Due to Patient Discharge	Percentage Due to Device Dislodgement
1	43	8%	37%	5%	67	11%	15%	24%	16%
2	118	22%	26%	10%	136	22%	24%	22%	18%
3	105	20%	21%	29%	119	19%	22%	33%	19%
4	96	18%	9%	15%	88	14%	15%	44%	7%
5	40	8%	18%	5%	53	8%	13%	25%	19%
6	35	7%	17%	23%	43	7%	14%	23%	9%
7+	95	18%	8%	2%	123	20%	11%	37%	9%

DeVries M, Strimbu K. Short Peripheral Catheter Performance Following Adoption of Clinical Indication Removal. Journal of Infusion Nursing. 2019;42(2).

Process measures

VAD DEVICE TYPE		
TYPE	**# OF DEVICES**	**% OF TOTAL**
PIV	0	#DIV/0!
MIDLINE	0	#DIV/0!
PICC	0	#DIV/0!
PAC	0	#DIV/0!
NONTUNNELLED CVC	0	#DIV/0!
TUNNELLED CVC	0	#DIV/0!
TOTAL	**0**	

INDICATION		
INDICATION	**# OF DEVICES**	**% OF TOTAL**
IVF	0	#DIV/0!
ANTIBIOTICS	0	#DIV/0!
PRESSORS	0	#DIV/0!
MEDS REQUIRING CENTRAL ACCESS	0	#DIV/0!
MULTIPLE INCOMPATIBLE MEDS	0	#DIV/0!
DIFFICULT ACCESS	0	#DIV/0!
OTHER	0	#DIV/0!
TOTAL	**0**	

DRESSING INTEGRITY		
STATUS	**# OF DEVICES**	**% OF TOTAL**
INTACT	0	#DIV/0!
NONINTACT	0	#DIV/0!
REINFORCED / LIFTED	0	#DIV/0!
TOTAL	**0**	

SITE ASSESSMENT		
ASSESSMENT	**# OF DEVICES**	**% OF TOTAL**
WDL	0	#DIV/0!
RED	0	#DIV/0!
SWOLLEN	0	#DIV/0!
NO BLOOD RETURN	0	#DIV/0!
DRAINAGE	0	#DIV/0!
LEAKING	0	#DIV/0!
PAIN	0	#DIV/0!
PUS	0	#DIV/0!
INFILTRATED	0	#DIV/0!
CLOTTED	0	#DIV/0!
TOTAL	**0**	

ALCOHOL CAPS IN PLACE		
YES OR NO	**# OF DEVICES**	**% OF TOTAL**
YES	0	#DIV/0!
NO	0	#DIV/0!
TOTAL	**0**	

TUBING DATED		
YES OR NO	**# OF DEVICES**	**% OF TOTAL**
YES	0	#DIV/0!
NO	0	#DIV/0!
TOTAL	**0**	

INTERVENTION		
INTERVENTION	**# OF DEVICES**	**% OF TOTAL**
NO INTERVENTION	0	#DIV/0!
DRESSING CHANGED	0	#DIV/0!
IV REMOVED – MD CONTACTED	0	#DIV/0!
TOTAL	**0**	

What's next?

- Now that we are are achieving increased dwell without increased complications, we will continue to emphasize the importance of maintaining and improving excellent insertion technique and enhanced site selection for all staff inserting PIVs.

Surveillance for PIV BSIs

- The NHSN (and formerly NNIS) protocols are applied in
the exact manner for PIVs as they are for central lines.
- Cultures are first screened to identify whether timing of collection is consistent with a hospital acquired infection, including readmissions from recent discharges.
- Pathogens are then assessed to determine which criteria from the protocol are to be considered.
- After fulfilling all elements of the definitions, and ruling out the presence of secondary infections (per the NHSN protocol) only then are line types assessed.

More things to consider…

- What is the contribution of PIVs to CLABSIs?
  - Pre-implementation of clinical indication: 20% of CLABSIs also have peripheral IVs
  - Year one after implementation: 12% of CLABSIs also have peripheral IVs
  - Year two after implementation: 10% of CLABSIs also have peripheral IVs

It ”counts” even if you aren’t “counting”

Safety — 25%

Patient Safety Composite

Baseline Period
Oct. 1, 2015–June 30, 2017

Performance Period
July 1, 2019–June 30, 2021*

	Measure ID	Measure Name	Achievement Threshold	Benchmark
★⇩	PSI 90	Patient Safety and Adverse Events Composite	0.972658	0.760882

Healthcare-Associated Infections

Baseline Period
Jan. 1, 2019–Dec. 31, 2019

Performance Period
Jan. 1, 2021–Dec. 31, 2021

	Measure ID	Measure Name	Achievement Threshold	Benchmark
⇩	CAUTI	Catheter-Associated Urinary Tract Infection	0.676	0.000
⇩	CDI	Clostridium *difficile* Infection	0.544	0.010
⇩	CLABSI	Central Line-Associated Bloodstream Infection	0.596	0.000
⇩	MRSA	Methicillin-Resistant Staphylococcus *aureus*	0.727	0.000
⇩	SSI	Colon Surgery	0.734	0.000
		Abdominal Hysterectomy	0.732	0.000

Protect All Lines. Protect All Lives.™

To make a large impact, make a small change to the most frequently performed invasive procedure in your institution.