The Blind Spot:
Vascular Access Devices and Hospital-Onset Bacteremia

What the Data Reveal About Missed Risks, Patient Harm, and Reporting Implications





Lori Kaczmarek, MSN, RN, VA-BC™
Director of Clinical Education
H.B. Fuller Medical Adhesive Technologies

9

DISCLOSURES

- Director of Clinical Education, H. B. Fuller Medical Adhesive Technologies
- President, Association for Vascular Access (AVA)
  - I am currently an AVA board member.
    This presentation does not reflect the position of AVA unless specifically cited.



AI tools were utilized in the development of this presentation. I have manually reviewed the final version to ensure accuracy and integrity. Images used in this work are from Creative Commons or Shutterstock and are used under the terms of their respective licenses. Where applicable, Creative Commons images are used with attribution as required by the license. Shutterstock images are used with the permission of the rights holder. All other images are original to the author or H. B. Fuller Medical Adhesive Technologies.

10

Understanding Implicit Bias (CA 241)



Small biases. Big impact.

Awareness changes everything.

01 Unconscious & Unintentional
Attitudes and stereotypes we hold about groups—by race, gender, age, or status—that quietly shape our decisions, even when we intend to be fair.

02 Deeply Ingrained
Shaped by culture, upbringing, and media, these biases operate beneath our awareness and influence how we interact.

03 Hidden, Not Explicit
Unlike explicit bias, we may not know we hold them—so they persist even alongside a real commitment to fairness.

04 Self-Reflect
Naming our biases promotes fairness in healthcare, education, and work. Reflection and dialogue help us challenge them.

05 Toward a More Equitable Society
We can counter bias through awareness, diverse perspectives, fair policies, and empathy.

By recognizing implicit bias, we move closer to a more **just, inclusive**, and **equitable** world.

11



OBJECTIVES

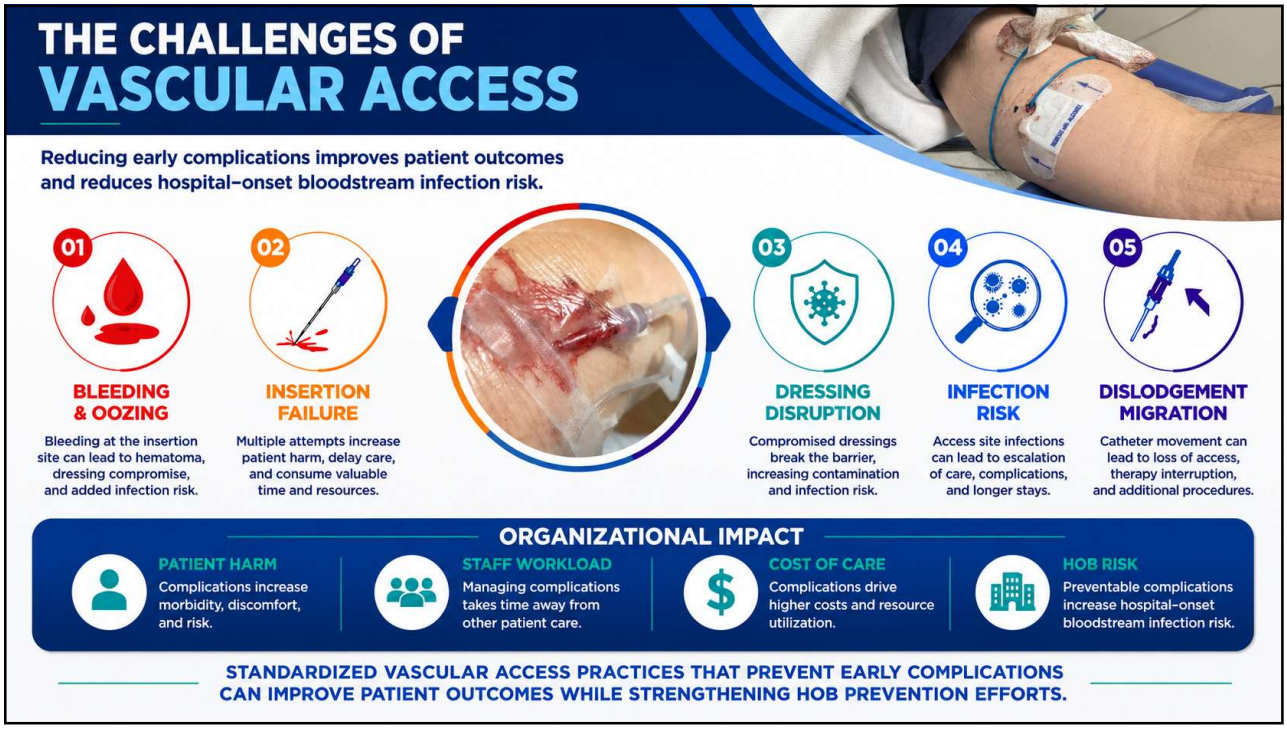
IDENTIFY the contribution of vascular access devices, including peripheral IVs, to hospital-onset bacteremia and bloodstream infection risk.

EXPLAIN the patient safety, quality, and regulatory implications of underrecognized vascular access device–related bacteremia.

INTERPRET published and institutional data demonstrating gaps in detection, attribution, and reporting of vascular access–associated infections.

COMPARE available technologies used to protect peripheral IVs and their role in reducing infection risk.

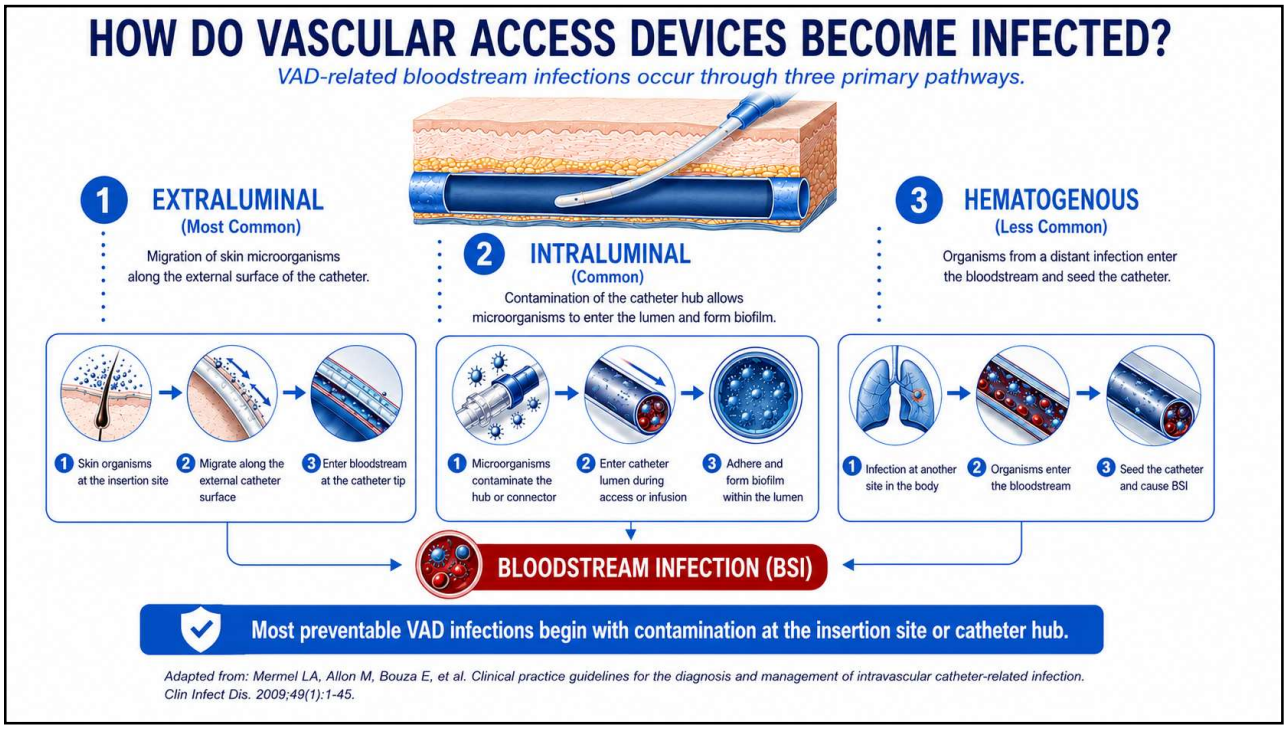
12


THE CHALLENGES OF
VASCULAR ACCESS
Reducing early complications improves patient outcomes and reduces hospital-onset bloodstream infection risk.
01
BLEEDING & OOZING
Bleeding at the insertion site can lead to hematoma, dressing compromise, and added infection risk.
02
INSERTION FAILURE
Multiple attempts increase patient harm, delay care, and consume valuable time and resources.
03
DRESSING DISRUPTION
Compromised dressings break the barrier, increasing contamination and infection risk.
04
INFECTION RISK
Access site infections can lead to escalation of care, complications, and longer stays.
05
DISLODGEMENT MIGRATION
Catheter movement can lead to loss of access, therapy interruption, and additional procedures.
ORGANIZATIONAL IMPACT
PATIENT HARM
Complications increase morbidity, discomfort, and risk.
STAFF WORKLOAD
Managing complications takes time away from other patient care.
COST OF CARE
Complications drive higher costs and resource utilization.
HOB RISK
Preventable complications increase hospital-onset bloodstream infection risk.
STANDARDIZED VASCULAR ACCESS PRACTICES THAT PREVENT EARLY COMPLICATIONS CAN IMPROVE PATIENT OUTCOMES WHILE STRENGTHENING HOB PREVENTION EFFORTS.

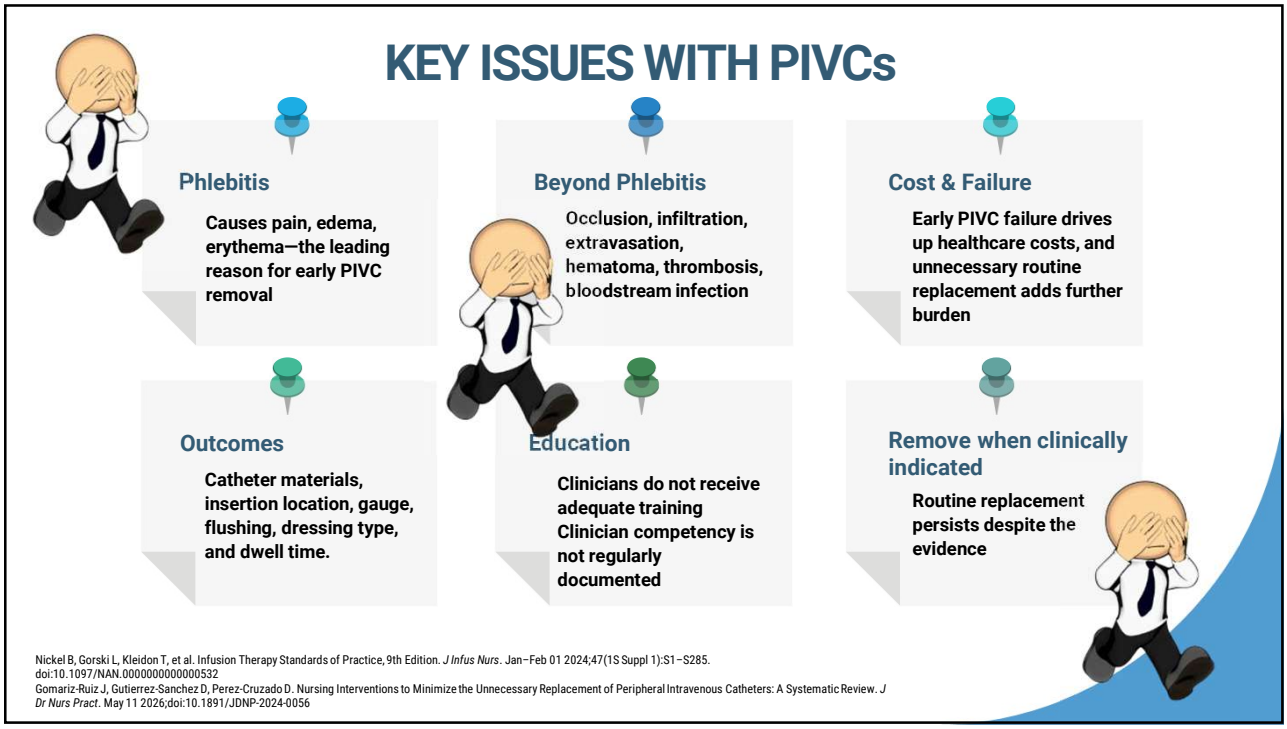
13


PERIPHERAL IV CATHETERS HAVE THEIR OWN UNIQUE CHALLENGES

14



15



Nickel B, Gorski L, Kleidon T, et al. Infusion Therapy Standards of Practice, 9th Edition. *J Infus Nurs*. Jan–Feb 01 2024;47(1S Suppl 1):S1–S285. doi:10.1097/NAN.0000000000000532

Gomariz-Ruiz J, Gutierrez-Sanchez D, Perez-Cruzado D. Nursing Interventions to Minimize the Unnecessary Replacement of Peripheral Intravenous Catheters: A Systematic Review. *J Dr Nurs Pract*. May 11 2026;doi:10.1891/JDNP-2024-0056

16

Peripheral IVs and Patient Care

PIVC use, demand, and complication rates



60-90%
Of hospitalized patients require a PIVC

13.7%
Experience infiltration or extravasation



~300 Million
PIVCs placed in the U.S. each year

~36%
Of PIVCs fail before completion of therapy

19.3%
Experience phlebitis (rate varies with definition)

Helm RE, Klausner JD, Klemperer JD, Flint LM, Huang E. Accepted but unacceptable: peripheral IV catheter failure. *J Infus Nurs*. May–Jun 2015;38(3):189–203. doi:10.1097/NAN.0000000000000100
Alexandrou E, Ray-Barruel G, Carr PJ, et al. International prevalence of the use of peripheral intravenous catheters. *Journal of Hospital Medicine*. 2015/08/01 2015;10(8):530–533. doi:10.1002/jhm.2389
Marsh N, Larsen EN, Takashima M, et al. Peripheral intravenous catheter failure: A secondary analysis of risks from 11,830 catheters. *Int J Nurs Stud*. Sep 26 2021;124:104095. doi:10.1016/j.ijnurstu.2021.104095

17

Patients Harmed by Peripheral IVs

PIVCs are a significant, underrecognized source of patient harm



01 Most Common Device
Used in over 70% of patients, yet complication rates stay alarmingly high.

02 Bloodstream Infection
PIVCs are a leading source of hospital-onset bacteremia and mortality.

03 Underrecognized Risk
Harm is underreported because of failures in insertion, care, and removal. **Electronic Medical Records do not support a complete picture of the problem.**



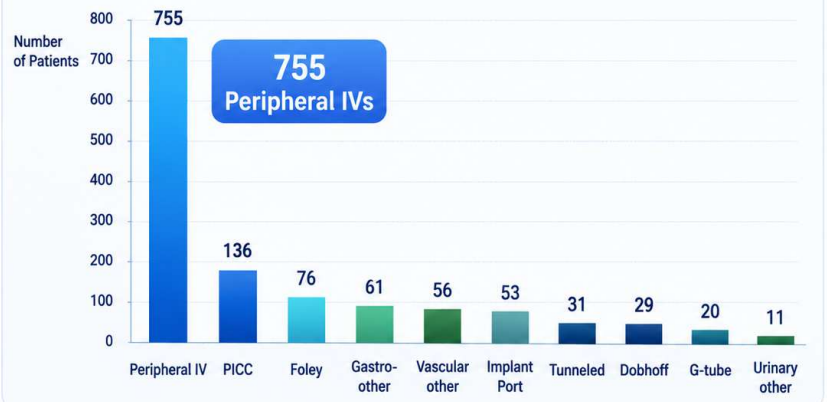
Helm RE, Klausner JD, Klemperer JD, Flint LM, Huang E. Accepted but unacceptable: peripheral IV catheter failure. *J Infus Nurs*. May–Jun 2015;38(3):189–203. doi:10.1097/NAN.0000000000000100

18

INDWELLING DEVICE PREVALENCE

Contemporary point prevalence study • 857 hospitalized adults

DEVICES



CLINICAL INSIGHTS

- Peripheral IVs represented the dominant vascular access device.
- PICC prevalence was more than double that of all other central vascular devices combined.
- Urinary and GI devices were comparatively uncommon.
- Supports prioritizing peripheral IV assessment, maintenance, and timely removal.

Adapted from Chen S, O'Malley M, Chopra V. *American Journal of Infection Control* (2021), Figure 1.

19

CONSEQUENCES OF PIVC FAILURE

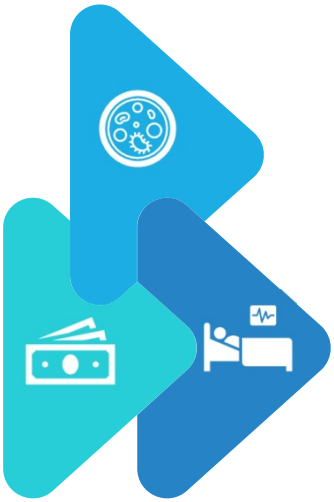


SEPSIS RISK

Failed PIVCs can seed the bloodstream, causing life-threatening sepsis

HIGHER COSTS

Restarts, infection, and ICU care add tens of thousands of dollars per episode.



LONGER STAYS

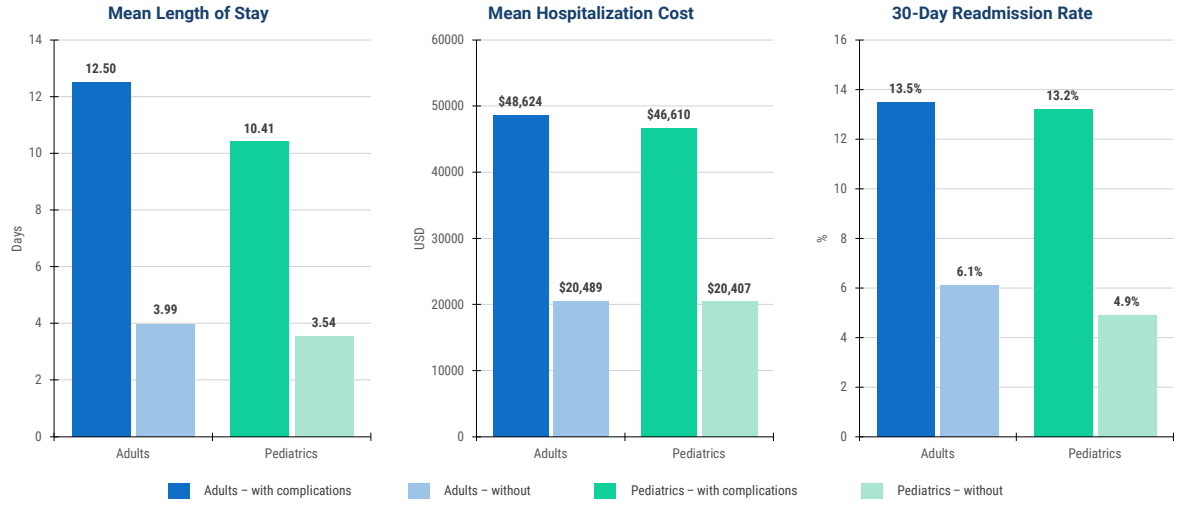
Phlebitis and catheter-related infections extend stays and cause further harm.

Lim S, Gangoli G, Adams E, et al. Increased Clinical and Economic Burden Associated With Peripheral Intravenous Catheter-Related Complications: Analysis of a US Hospital Discharge Database. *Inquiry*. Jan–Dec 2019;56:46958019875562. doi:10.1177/0046958019875562
Moon R, Gayle J, Pitts S, David J, Jacobs K, Rosenthal N. Peripheral Intravenous Catheters in Hospitalized Surgical Patients: A US Real-World Data Analysis. *Journal of Health Economics and Outcomes Research*. 2026;13(1):doi:10.36469/001c.156489

20

PIVC-Associated Complications: Clinical Outcomes Comparison

Moon et al. (2026) — Premier Healthcare Database, Jan 2019–Dec 2023 > 7.1 MILLION records; retrospective analysis



Adjusted differences (multivariable regression): Adult LOS +5.52 days | Adult cost +$19,074 | Adult readmission OR 1.46×
Pediatric LOS +4.50 days | Pediatric cost +$16,052 | Pediatric readmission OR 2.15×

Moon R, Gayle J, Pitts S, David J, Jacobs K, Rosenthal N. Peripheral Intravenous Catheters in Hospitalized Surgical Patients: A US Real-World Data Analysis. *Journal of Health Economics and Outcomes Research*. 2026;13(1)doi:10.36469/001c.156489

21

Peripheral IV Catheters: Comparable Bloodstream Infection Risk

Evidence supports extending infection prevention beyond central venous catheters.



EVIDENCE

University of California San Diego Health

Peripheral IV catheter-associated bloodstream infection rates were comparable to CLABSI rates outside the ICU.

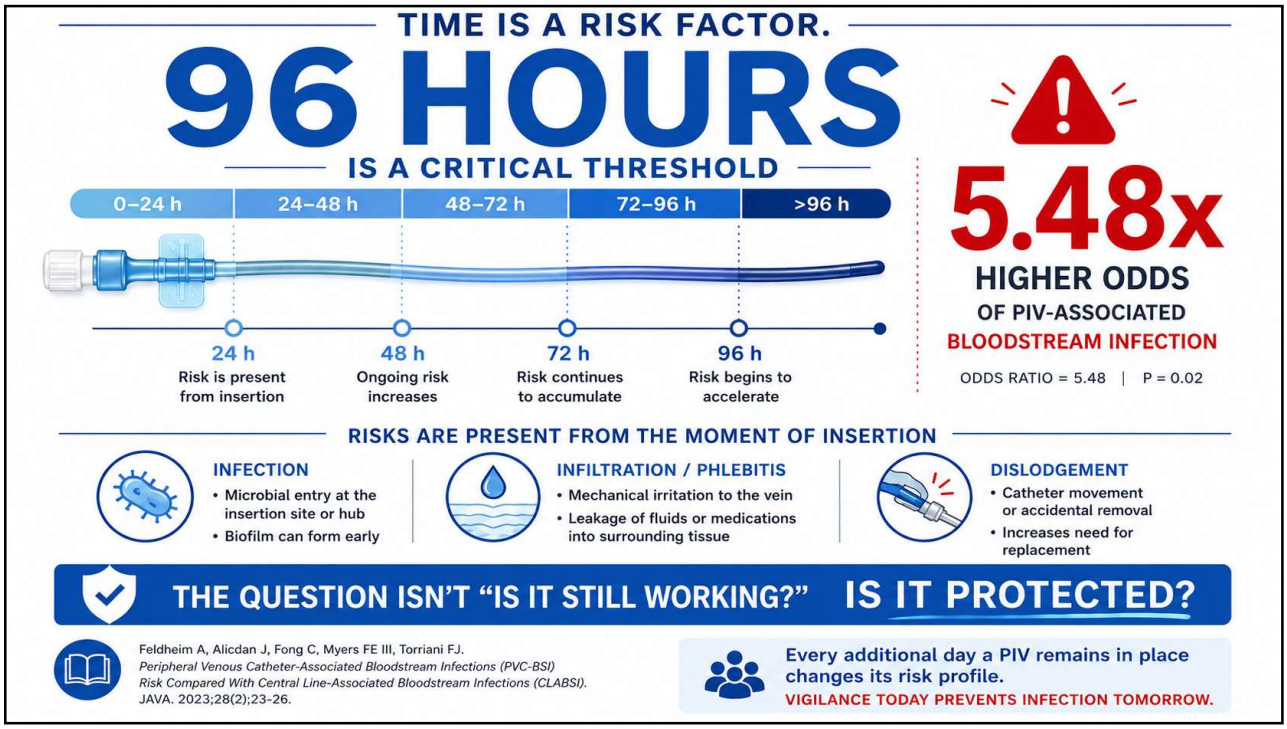


Clinical insertion-site complications illustrate that PIVCs are not inherently low-risk devices.

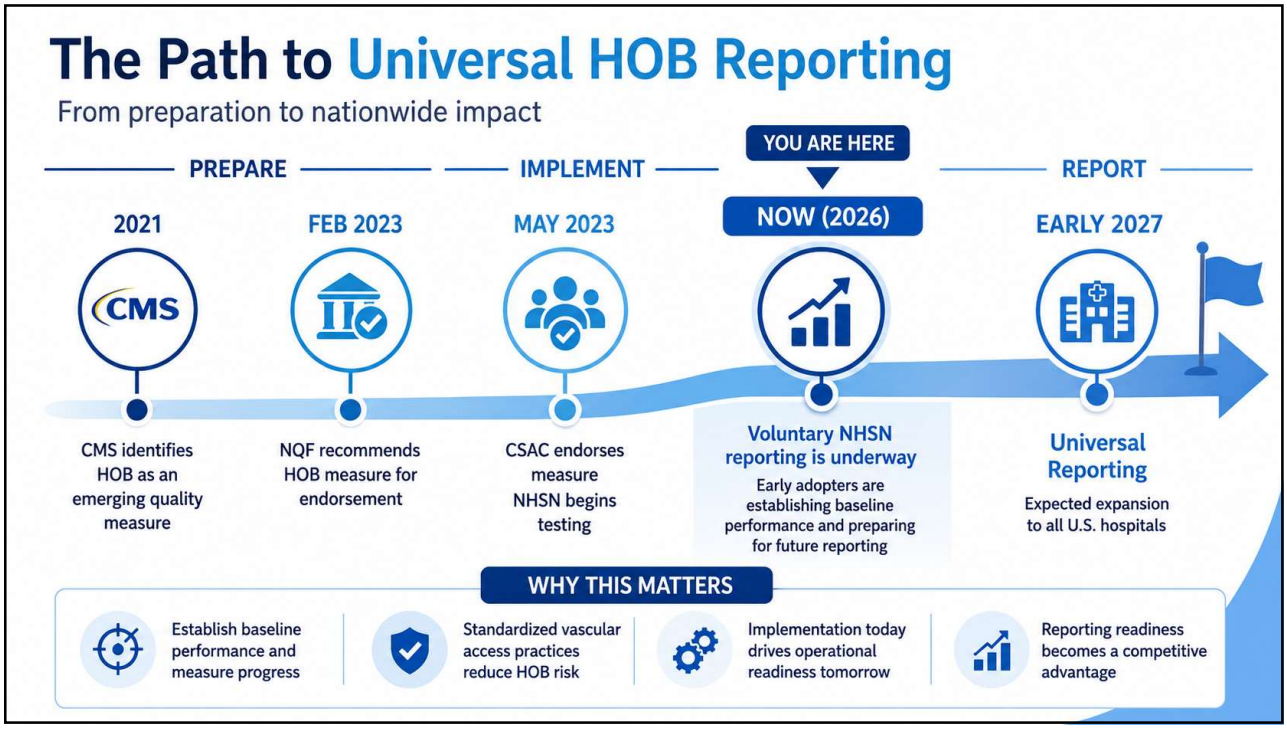
If bloodstream infection risk is comparable, why aren't peripheral IV catheters receiving the same level of infection prevention?

Feldheim A, Alicdan J, Fong C, Edward Myers F, Torriani FJ. Peripheral Venous Catheter-Associated Bloodstream Infections (PVC-BSI) Risk Compared With Central Line-Associated Bloodstream Infections (CLABSI). *Journal of the Association for Vascular Access*. 2023;28(2):23–25. doi:10.2309/java-d-23-00001

22


TIME IS A RISK FACTOR.
96 HOURS
IS A CRITICAL THRESHOLD
0–24 h
24–48 h
48–72 h
72–96 h
>96 h
24 h
Risk is present from insertion
48 h
Ongoing risk increases
72 h
Risk continues to accumulate
96 h
Risk begins to accelerate
5.48x
HIGHER ODDS
OF PIV-ASSOCIATED
BLOODSTREAM INFECTION
ODDS RATIO = 5.48 | P = 0.02
RISKS ARE PRESENT FROM THE MOMENT OF INSERTION
INFECTION
• Microbial entry at the insertion site or hub
• Biofilm can form early
INFILTRATION / PHLEBITIS
• Mechanical irritation to the vein
• Leakage of fluids or medications into surrounding tissue
DISLODGEMENT
• Catheter movement or accidental removal
• Increases need for replacement
THE QUESTION ISN'T "IS IT STILL WORKING?" IS IT PROTECTED?
Feldheim A, Alicdan J, Fong C, Myers FE III, Torriani FJ.
Peripheral Venous Catheter-Associated Bloodstream Infections (PVC-BSI) Risk Compared With Central Line-Associated Bloodstream Infections (CLABSI).
JAVA. 2023;28(2):23-26.
Every additional day a PIV remains in place changes its risk profile.
VIGILANCE TODAY PREVENTS INFECTION TOMORROW.

23


The Path to Universal HOB Reporting
From preparation to nationwide impact
PREPARE
IMPLEMENT
YOU ARE HERE
REPORT
2021
FEB 2023
MAY 2023
NOW (2026)
EARLY 2027
CMS
CMS identifies HOB as an emerging quality measure
NQF recommends HOB measure for endorsement
CSAC endorses measure NHSN begins testing
Voluntary NHSN reporting is underway
Early adopters are establishing baseline performance and preparing for future reporting
Universal Reporting
Expected expansion to all U.S. hospitals
WHY THIS MATTERS
Establish baseline performance and measure progress
Standardized vascular access practices reduce HOB risk
Implementation today drives operational readiness tomorrow
Reporting readiness becomes a competitive advantage

24

What is Hospital-Onset Bacteremia (HOB)?

Expanded Surveillance

Expanded healthcare-associated infection **surveillance** expected to begin voluntary reporting in **2027**

Hospital-onset bacteremia and fungemia (HOB) is any bloodstream infection in which bacterial or fungal pathogens are detected in a blood culture specimen collected **on day four or later of hospital admission**.

BSI = or > 4th day of admission

Regardless of Device

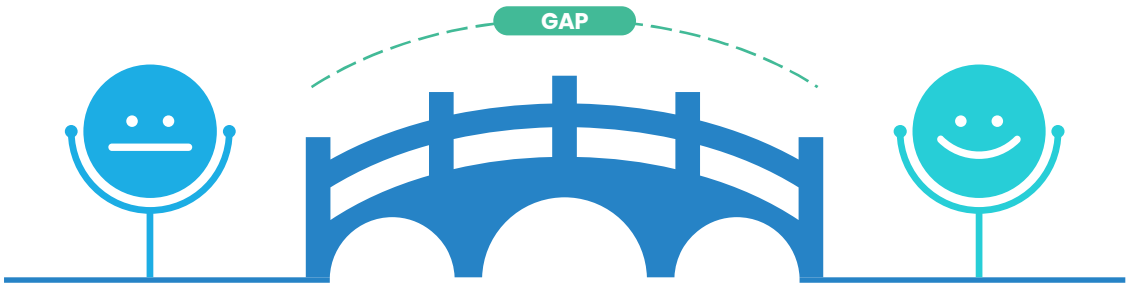
HOB includes bloodstream infections from all sources, **regardless of procedure or device.**

It covers a **wider range of infections** than the traditional targets of infection prevention and control and quality measurement efforts over the past two decades, e.g., CLABSIs, CAUTIs, and SSIs.

Wide Range of Infections

25

WHERE ARE THE GAPS?



CURRENT EVIDENCE

KEY STEPS TO BRIDGE GAP

RESEARCH

MORE RESEARCH

DESIRED STATE

26

How many phlebitis scales?

71 ways to rate the same thing

71

different published scales for assessing the **same** clinical sign



The "71 phlebitis assessment scales" figure continues to be cited in more recent literature, but importantly, **it originates from the 2014 systematic review by Ray-Barruel et al.**

I have not found a newer systematic review that has repeated the search and identified a different number of scales.

Instead, more recent publications reference the 2014 review as the definitive evidence that there is substantial heterogeneity in phlebitis assessment.

Source: *Ray-Barruel et al., systematic review, 2014*

Different tools. Different criteria. Same goal:
Assess phlebitis consistently.

27

20+



- More than 20 DIVA assessment instruments have been published across adult and pediatric populations.
- Yet no single DIVA assessment tool has achieved broad clinical standardization.
- In adults alone, a systematic review identified at least **16** instruments.
- The pediatric literature includes several additional tools.
- Despite their availability, published evidence suggests that routine clinical adoption remains limited and inconsistent.

Paterson RS, Schults JA, Slaughter E, et al. Review article: Peripheral intravenous catheter insertion in adult patients with difficult intravenous access: A systematic review of assessment instruments, clinical practice guidelines and escalation pathways. *Emerg Med Australas*. Dec 2022;34(6):862–870. doi:10.1111/1742-6723.14069

28

Evidence for CHG PIVC protection has largely focused on central lines—not the device we use most often.

Study	Device / intervention	Design	What it tells us
DeVries et al., 2016	PIVCs + **CHG disk** as part of a broader PIV protection bundle	Observational / implementation	Reported reductions in PIV-associated bloodstream infection but **cannot isolate the effect of the CHG disk** because it was part of a multimodal intervention.
Drugeon et al., 2026 – ProP Trial	PIVCs + **CHG-impregnated polyurethane dressing** vs standard polyurethane	Multicenter randomized trial, Phase I	**Most important newer evidence.** 300 adult/pediatric patients. Composite infectious complications/phlebitis: **20% CHG vs 19% control**; PIVC-BSI: **0 in both groups**. The trial stopped after Phase I because eligibility feasibility criteria were not met
ProP Trial protocol, 2024	PIVCs + CHG-impregnated transparent dressing	**Planned RCT**	Shows that investigators specifically identified the lack of PIVC evidence as a **knowledge gap** and designed the trial to assess infectious complications and cost-effectiveness

DeVries M, Valentine M, Mancos P. Protected Clinical Indication of Peripheral Intravenous Lines: Successful Implementation. *Journal of the Association for Vascular Access*. 2016;21(2):89–92. doi:10.1016/j.java.2016.03.001
Drugeon B, Ball DL, Kleidon TM, et al. An international randomised controlled trial of a novel antimicrobial dressing for peripheral intravenous catheters (ProP trial). *Antimicrob Resist Infect Control*. May 25 2026;doi:10.1186/s13756-026-01767-y

29

Cyanoacrylate Tissue Adhesive and PIVC: Considerably More Compelling; Infection prevention less definitive

Study	Population / N	Intervention	Primary finding	What it supports
Bugden et al., 2016	Adults; 360 patients / 380 PIVCs	Standard securement + cyanoacrylate glue	**PIVC failure: 17% vs 27%** at 48 h; 10% absolute reduction, P=.02. Dislodgement also reduced. No infections occurred.	**Strong early RCT evidence for reduced PIVC failure**
Marsh et al., 2015	Adults; 85 PIVCs	Tissue adhesive + polyurethane vs polyurethane alone and other securement methods	Failure **14% with tissue adhesive vs 38% with standard dressing**; pilot study, small sample. No BSI	Signal for **improved catheter survival**
Lešnik et al., 2021	Adults in ED	Tissue adhesive **alone** vs adhesive dressing	No significant difference in unplanned removal or phlebitis; **0 bloodstream infections in either group**.	Important **negative study**; tissue adhesive alone is not necessarily superior
Bahl et al., 2023	Adults; 350 ED patients	Standard dressing + cyanoacrylate vs standard dressing	Overall failure difference favored glue but did not reach significance; **when PIVC remained functional >48 h, failure risk was 43% lower** with glue (HR 0.57, P=.04). Costs were similar, with lower incremental rescue cost.	Benefit appears particularly relevant to **longer-dwell PIVCs**
Charters et al., 2024	Children; 383	Standard dressing vs integrated securement dressing vs integrated dressing + tissue adhesive	Failure: **34% standard vs 12% integrated + tissue adhesive**; aHR 0.47. **Total direct costs also significantly lower with the tissue-adhesive strategy.**	**Strong pediatric RCT evidence for failure reduction + economic benefit**
Van Rens et al., 2023	Neonates; **8,330 PIVCs**	Transparent dressing vs dressing + octyl-butyl cyanoacrylate	Premature failure OR **0.59** with cyanoacrylate; P<.001.	Large real-world evidence supporting **reduced premature failure**
Boyadzhiev et al., 2026	Neonates; 67 PIVCs	Conventional vs cyanoacrylate fixation	Similar dwell time; no skin injury or dressing displacement with glue. No significant outcome differences; infection not evaluated.	**Feasibility/safety**, but underpowered for effectiveness
Chaerunnisa et al.,2026 systematic review/meta-analysis	**15 RCTs / 5,542 participants**	Multiple PIVC securement methods	In adults, tissue adhesive reduced PIVC failure **17% relative** (RR 0.83), dislodgement **40%** (RR 0.60), and occlusion **27%** (RR 0.73) vs transparent polyurethane.	**Best overall synthesis of the RCT evidence**

30

References, previous slide: Cyanoacrylate Tissue Adhesive and PIVC

- Bugden S, Shean K, Scott M, et al. Skin Glue Reduces the Failure Rate of Emergency Department-Inserted Peripheral Intravenous Catheters: A Randomized Controlled Trial. *Ann Emerg Med*. 2016;68(2):196–201. doi:10.1016/j.annemergmed.2015.11.026
- Marsh N, Webster J, Flynn J, et al. Securement methods for peripheral venous catheters to prevent failure: a randomised controlled pilot trial. *J Vasc Access*. May–Jun 2015;16(3):237–44. doi:10.5301/jva.5000348
- Lešnik A, Gorenjak M, Žumer S, et al. Tissue adhesives for peripheral intravenous catheter securement: A prospective randomized controlled pilot trial. *The American Journal of Emergency Medicine*. 2021/02/01/ 2021;doi:10.1016/j.ajem.2021.01.088
- Bahl A, Mielke N, Xing Y. Risk of midline catheter-related thrombosis due to catheter diameter: An observational cohort study. *Thromb Res*. Aug 2023;228:172–180. doi:10.1016/j.thromres.2023.06.007
- Charters B, Foster K, Lawton B, et al. Novel Peripheral Intravenous Catheter Securement for Children and Catheter Failure Reduction: A Randomized Clinical Trial. *JAMA Pediatr*. Apr 1 2024;doi:10.1001/jamapediatrics.2024.0167
- van Rens MF, Spencer TR, Hugill K, Francia AL, van Loon FH, Bayoumi MA. Octyl-butyl-cyanoacrylate glue for securement of peripheral intravenous catheters: A retrospective, observational study in the neonatal population. *J Vasc Access*. 2023;doi:10.1177/11297298231154629
- Boyadzhiev S, Hoogendijk EO, van Rens M. Is cyanoacrylate fixation safe for neonatal IV access? A quality improvement evaluation of cyanoacrylate adhesive securement for short peripheral catheters. *Journal of Neonatal Nursing*. 2026;32(3)doi:10.1016/j.jnn.2026.101796
- Chaerunnisa A, Madhuvu A, Najm D, Fooladi E, Team V. Effectiveness and Safety of Different Dressing and Securement Methods for Peripheral Intravenous Catheters: A Systematic Review and Meta-Analysis. *Int Wound J*. Mar 2026;23(3):e70875. doi:10.1111/iwj.70875

31

VITAL SIGNS

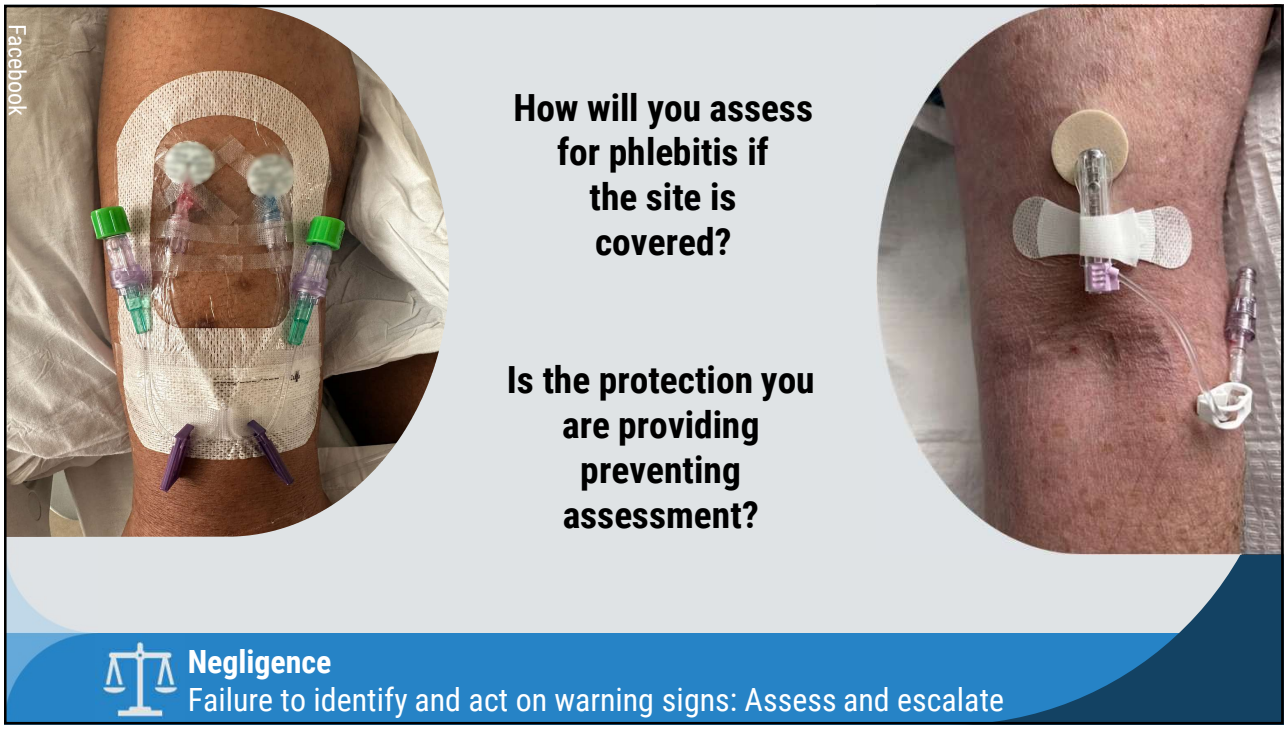


A-Original photograph of catheter insertion site as uploaded by local investigators.

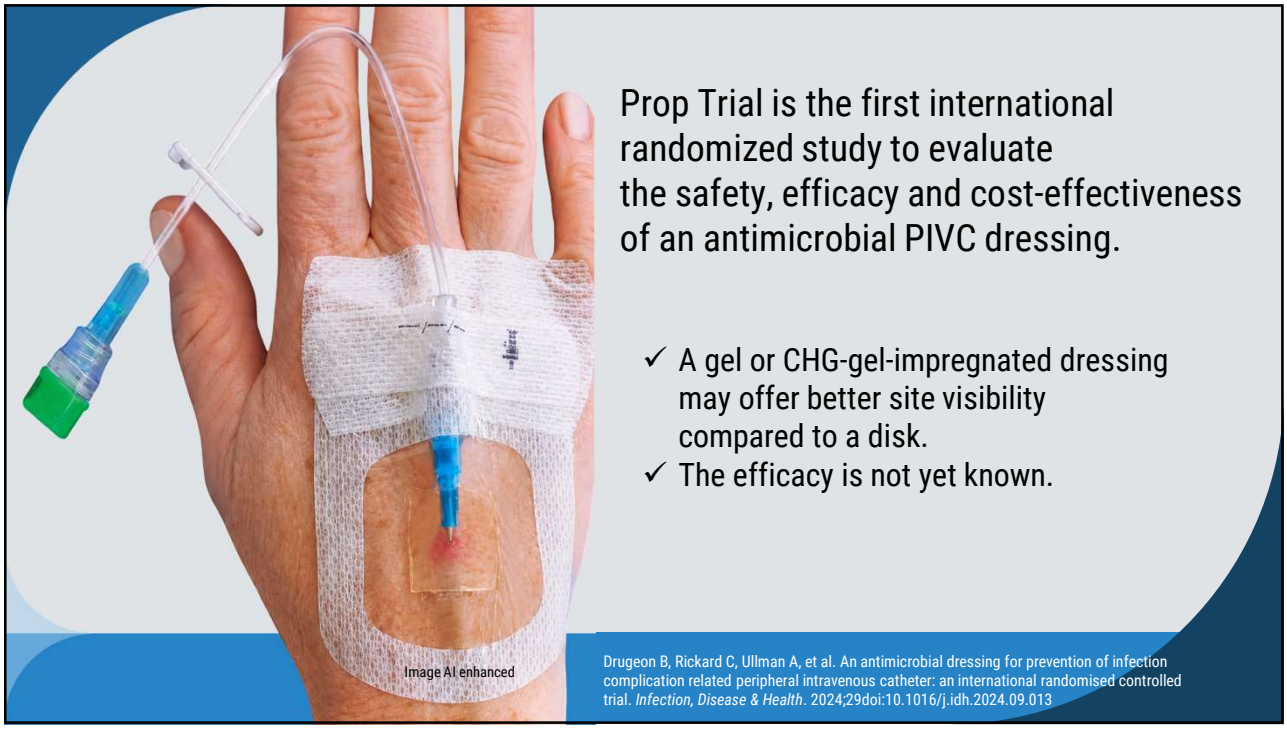


Buetti N, Ruckly S, Lucet JC, et al. Local signs at insertion site and catheter-related bloodstream infections: an observational post hoc analysis using individual data of four RCTs. *Crit Care*. Dec 14 2020;24(1):694. doi:10.1186/s13054-020-03425-0

32


Facebook
How will you assess for phlebitis if the site is covered?
Is the protection you are providing preventing assessment?
Negligence
Failure to identify and act on warning signs: Assess and escalate

33


Prop Trial is the first international randomized study to evaluate the safety, efficacy and cost-effectiveness of an antimicrobial PIVC dressing.
✓ A gel or CHG-gel-impregnated dressing may offer better site visibility compared to a disk.
✓ The efficacy is not yet known.
Image AI enhanced
Drugeon B, Rickard C, Ullman A, et al. An antimicrobial dressing for prevention of infection complication related peripheral intravenous catheter: an international randomised controlled trial. Infection, Disease & Health. 2024;29doi:10.1016/j.idh.2024.09.013

34



From Passive Patient to Active PIVC Partner

Pilot study | Single site | n = 54 analyzed

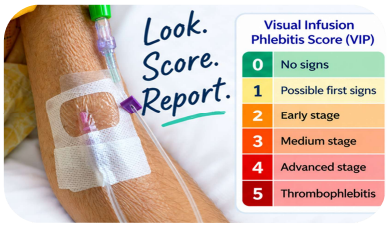
A pilot study shows that patients can accurately monitor their own peripheral IV catheters using the Visual Infusion Phlebitis (VIP) score.

Traditional model

Patient is a recipient of care

N → ▤ → ✓

Nurse assesses → Documents → Responds



Opportunity: An active partner

Patient becomes an additional observer

● → ◉ → ••• → N

Patient observes → Uses VIP score → Reports change → Nurse evaluates

94.5%

had no signs of phlebitis on day 1

Only 3 of 54 patients had a VIP score of 1 (early signs).

98.1%

agreed that education improved understanding

Patients reported improved knowledge and confidence using the VIP score.

<2%

patient–nurse scoring discrepancy

Patient scoring accuracy was comparable to nurses'.

Patient education + a simple visual assessment tool may add another layer of surveillance

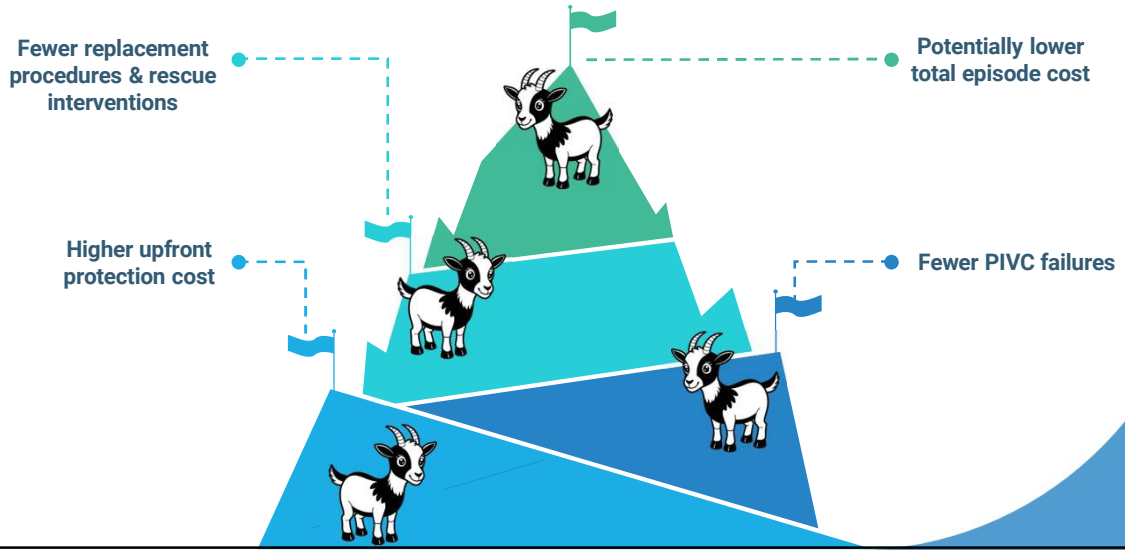
— not a replacement for clinical assessment.

Soo Hoo SY, Uy J, McDade A, et al. Patient Self-Monitoring of Peripheral Intravenous Catheters Using the Visual Infusion Phlebitis Score: A Pilot Study. *J Infus Nurs*. Sep–Oct 01 2026;49(5):282–297. doi:10.1097/NAN.0000000000000655

35

Protecting the PIVC: The Evidence Is Growing

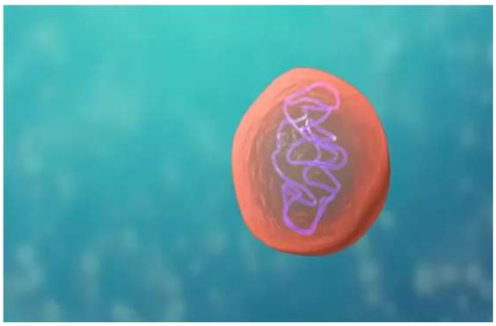
The strongest evidence for PIVC protection may not be infection prevention alone—it may be **preventing catheter failure**.



36

Chlorohexidine Gluconate (CHG)





Bacteriostatic and Bactericidal
Rapidly disrupts the cell membrane

Broad Spectrum
Broad-spectrum, Gram +, Gram -, fungi, variable on yeast

Biofilm
Can protect against biofilm development

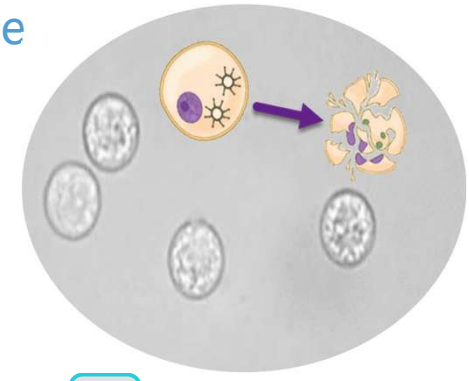
Log Reduction
Log reduction 4-5 (may vary by product)

Mohammadi Z, Abbott PV. The properties and applications of chlorhexidine in endodontics. *Int Endod J*. Apr 2009;42(4):288–302. doi:10.1111/j.1365-2591.2008.01540.x
Kuyyakanond T, Quesnel LB. The mechanism of action of chlorhexidine. *FEMS Microbiol Lett*. Dec 15 1992;100(1-3):211–5. doi:10.1111/j.1574-6968.1992.tb14042.x

37

Cyanoacrylate (CA) Tissue Adhesive

2-octyl cyanoacrylate (80%), N- butyl cyanoacrylate



ANHYDROUS
Low water activity is a limiting factor for microbial survival

BACTERICIDAL
Completely kills >/= 8 log of bacteria after a 3-minute contact time



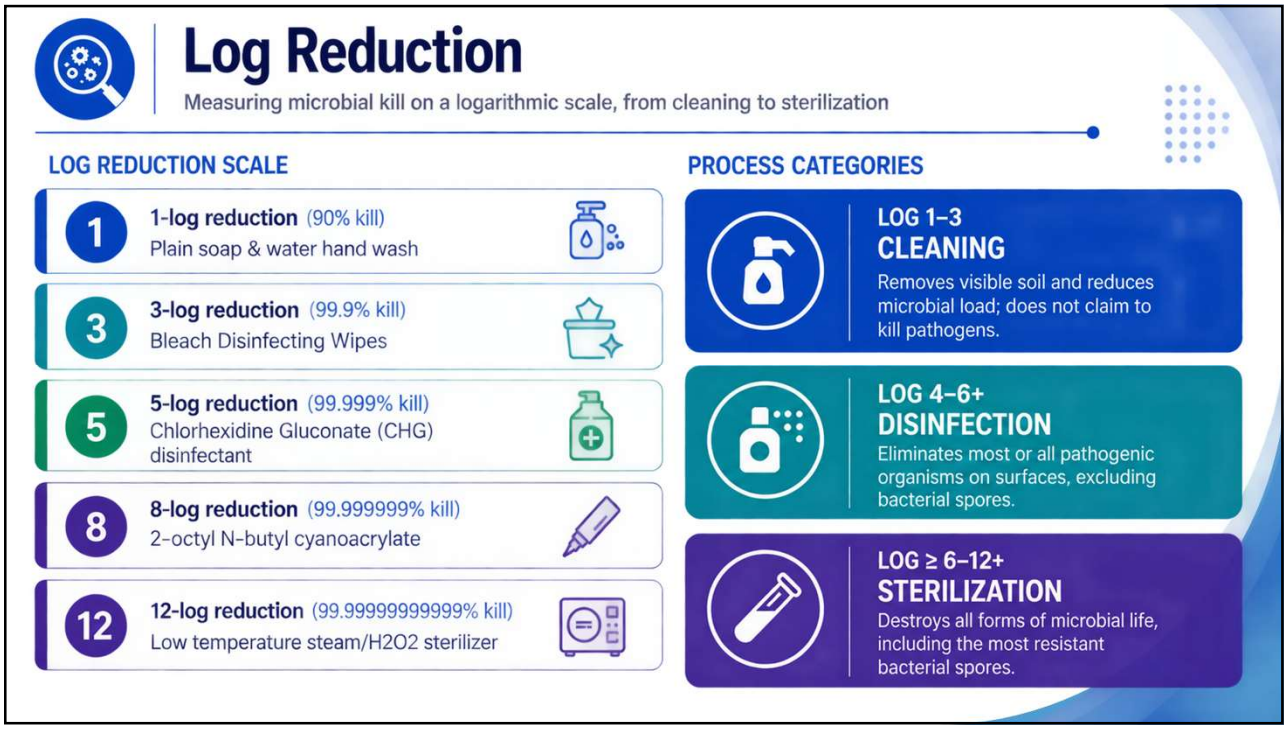
BROAD SPECTRUM 8-log reduction
Broad spectrum:
Gram –, Gram +, Yeast, Fungi;
3.47-log C. auris

Water diffusion from the microbe cell into CA causes cell lysis and death

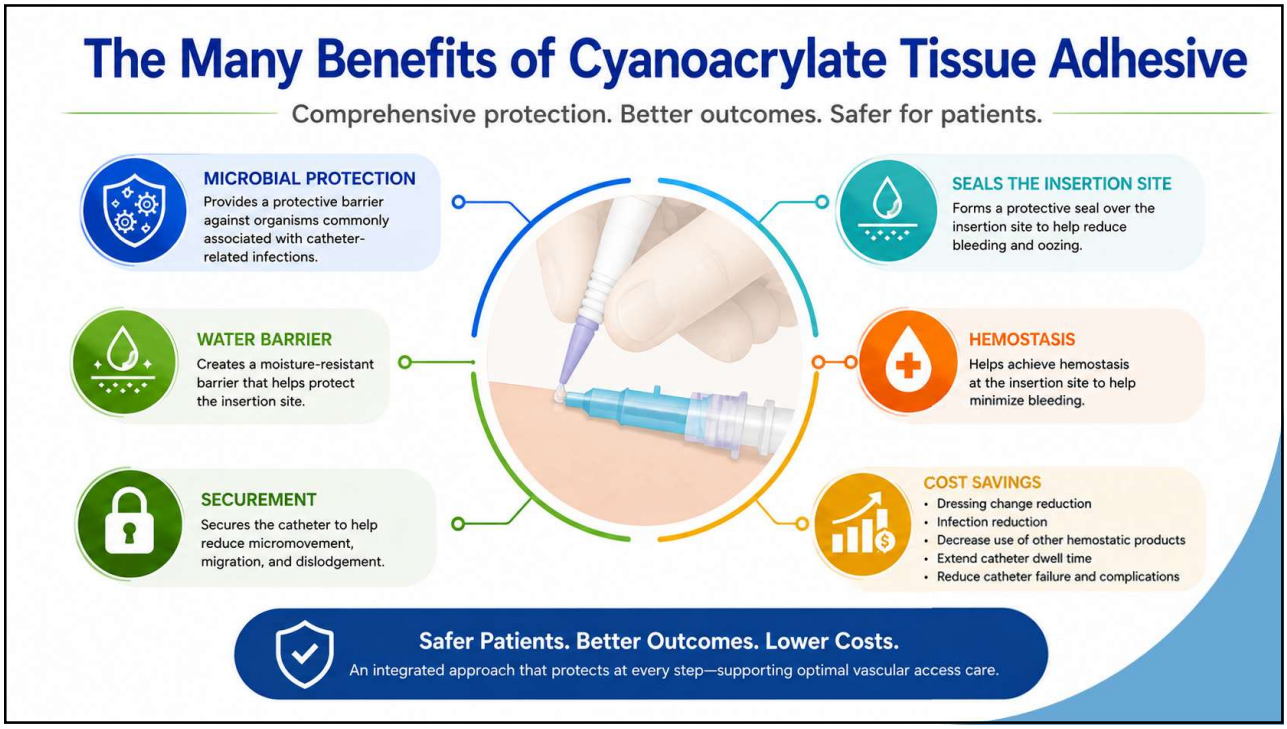
IMMOBILIZES
Organisms cannot move or migrate

Zhang S, Lingle BS, Phelps S. A Revolutionary, Proven Solution to Vascular Access Concerns: A Review of the Advantageous Properties and Benefits of Catheter Securement Cyanoacrylate Adhesives. *J Infus Nurs*. May–Jun 01 2022;45(3):154–164. doi:10.1097/NAN.0000000000000467
Prince D, Kohan K, Solanki Z, et al. Immobilization and Death of Bacteria by Flora Seal® Microbial Sealant. *International Journal of Pharmaceutical Science Invention*. 2017;6(6):45–49.

38


Log Reduction
Measuring microbial kill on a logarithmic scale, from cleaning to sterilization
LOG REDUCTION SCALE
1
1-log reduction (90% kill)
Plain soap & water hand wash
3
3-log reduction (99.9% kill)
Bleach Disinfecting Wipes
5
5-log reduction (99.999% kill)
Chlorhexidine Gluconate (CHG) disinfectant
8
8-log reduction (99.999999% kill)
2-octyl N-butyl cyanoacrylate
12
12-log reduction (99.99999999999% kill)
Low temperature steam/H2O2 sterilizer
PROCESS CATEGORIES
LOG 1–3
CLEANING
Removes visible soil and reduces microbial load; does not claim to kill pathogens.
LOG 4–6+
DISINFECTION
Eliminates most or all pathogenic organisms on surfaces, excluding bacterial spores.
LOG ≥ 6–12+
STERILIZATION
Destroys all forms of microbial life, including the most resistant bacterial spores.

39


The Many Benefits of Cyanoacrylate Tissue Adhesive
Comprehensive protection. Better outcomes. Safer for patients.
MICROBIAL PROTECTION
Provides a protective barrier against organisms commonly associated with catheter-related infections.
WATER BARRIER
Creates a moisture-resistant barrier that helps protect the insertion site.
SECUREMENT
Secures the catheter to help reduce micromovement, migration, and dislodgement.
SEALS THE INSERTION SITE
Forms a protective seal over the insertion site to help reduce bleeding and oozing.
HEMOSTASIS
Helps achieve hemostasis at the insertion site to help minimize bleeding.
COST SAVINGS
• Dressing change reduction
• Infection reduction
• Decrease use of other hemostatic products
• Extend catheter dwell time
• Reduce catheter failure and complications
Safer Patients. Better Outcomes. Lower Costs.
An integrated approach that protects at every step—supporting optimal vascular access care.

40

PREVENTING PIVC FAILURE

Four sequential strategies to reduce peripheral IV complications

SITE SELECTION
Prefer forearm veins; assess age, vessel quality, and therapy type

INSERTION
Use ANTT®, the smallest adequate gauge, and ultrasound for difficult access.



MAINTENANCE
Inspect each shift, secure the catheter and the dressing, and flush with preservative-free saline.

EARLY REMOVAL
Remove when no longer indicated; reassess daily on clinical signs only.

*Aseptic non-touch technique

Nickel B, Gorski L, Kleidon T, et al. Infusion Therapy Standards of Practice, 9th Edition. *J Infus Nurs*. Jan–Feb 01 2024;47(1S Suppl 1):S1–S285. doi:10.1097/NAN.0000000000000532
Hawes ML, Sochor A, Davis LN, McGlauflin W. Clinical Practice Guidelines for Adults. *Journal of the Association for Vascular Access*. 2026;31(1s):1–158. doi:10.2309/jvad-2026-supplement

41

Proven Results in Pediatric Patients

A randomized clinical trial demonstrated that using tissue adhesive for peripheral IV securement **significantly reduces IV failure** in children.

RANDOMIZED CLINICAL TRIAL
383 Pediatric Patients

- 3-arm, parallel group, superiority trial at 2 Australian hospitals
- Children 6 months to 8 years of age
- Data collected from Feb 2020 – Jan 2022
- Primary outcome: PIVC failure before treatment completion

PIVC FAILURE REDUCTION

65%*

REDUCTION IN PIV FAILURE RISK
with tissue adhesive securement
compared to standard care

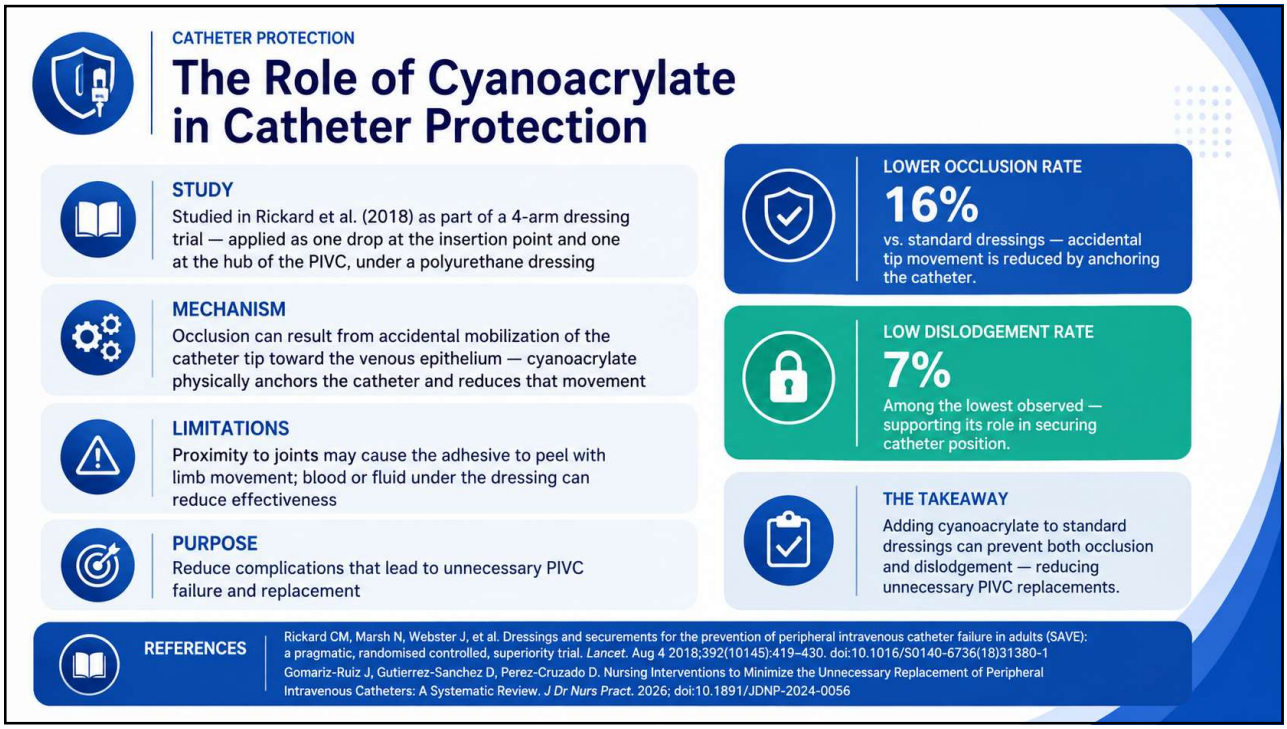
Fewer failures. Fewer interruptions.
Better outcomes for kids.



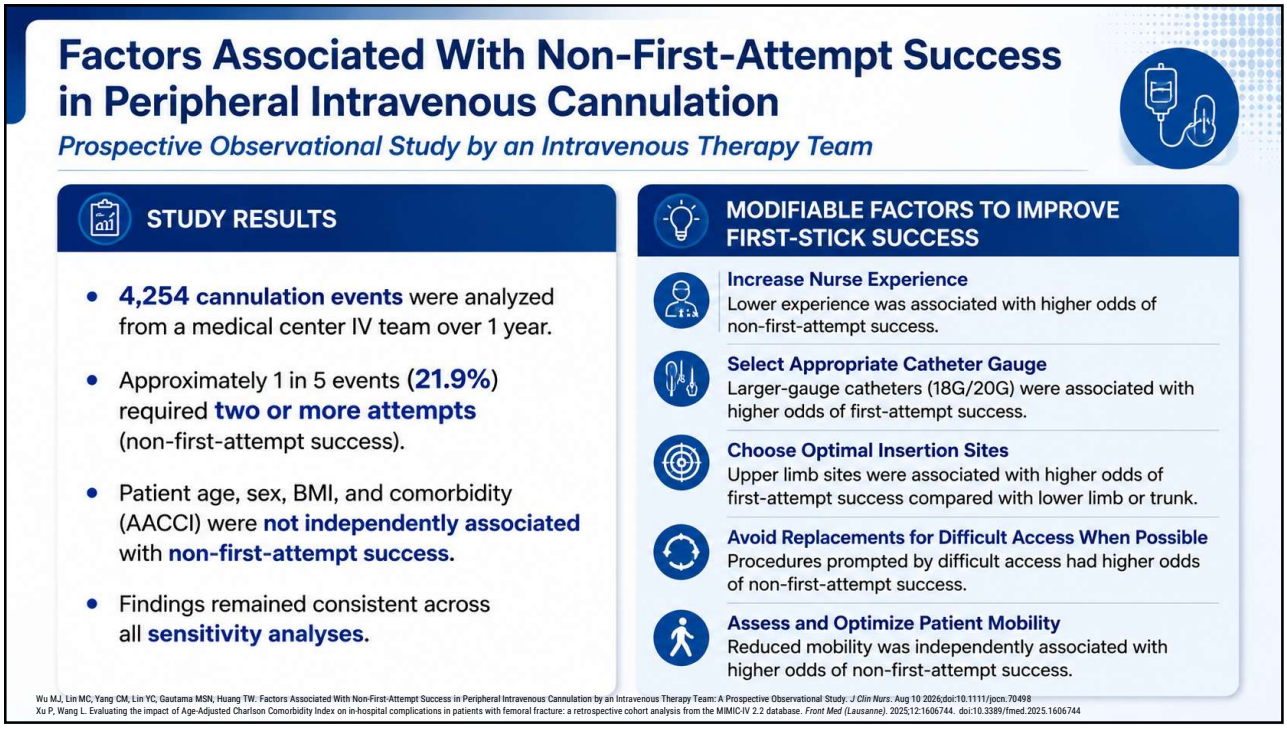
* 65% reduction in PIV Failure Risk with tissue adhesive securement vs. standard care

Charters B, et al.. JAMA Pediatr. Published online April 1, 2024. doi:10.1001/jamapediatrics.2024.0167

42


CATHETER PROTECTION
The Role of Cyanoacrylate in Catheter Protection
STUDY
Studied in Rickard et al. (2018) as part of a 4-arm dressing trial — applied as one drop at the insertion point and one at the hub of the PIVC, under a polyurethane dressing
MECHANISM
Occlusion can result from accidental mobilization of the catheter tip toward the venous epithelium — cyanoacrylate physically anchors the catheter and reduces that movement
LIMITATIONS
Proximity to joints may cause the adhesive to peel with limb movement; blood or fluid under the dressing can reduce effectiveness
PURPOSE
Reduce complications that lead to unnecessary PIVC failure and replacement
LOWER OCCLUSION RATE
16%
vs. standard dressings — accidental tip movement is reduced by anchoring the catheter.
LOW DISLODGEMENT RATE
7%
Among the lowest observed — supporting its role in securing catheter position.
THE TAKEAWAY
Adding cyanoacrylate to standard dressings can prevent both occlusion and dislodgement — reducing unnecessary PIVC replacements.
REFERENCES
Rickard CM, Marsh N, Webster J, et al. Dressings and securements for the prevention of peripheral intravenous catheter failure in adults (SAVE): a pragmatic, randomised controlled, superiority trial. Lancet. Aug 4 2018;392(10145):419–430. doi:10.1016/S0140-6736(18)31380-1
Gomariz-Ruiz J, Gutierrez-Sanchez D, Perez-Cruzado D. Nursing Interventions to Minimize the Unnecessary Replacement of Peripheral Intravenous Catheters: A Systematic Review. J Dr Nurs Pract. 2026; doi:10.1891/JDNP-2024-0056

43


Factors Associated With Non-First-Attempt Success in Peripheral Intravenous Cannulation
Prospective Observational Study by an Intravenous Therapy Team
STUDY RESULTS
4,254 cannulation events were analyzed from a medical center IV team over 1 year.
Approximately 1 in 5 events (21.9%) required two or more attempts (non-first-attempt success).
Patient age, sex, BMI, and comorbidity (AACCI) were not independently associated with non-first-attempt success.
Findings remained consistent across all sensitivity analyses.
MODIFIABLE FACTORS TO IMPROVE FIRST-STICK SUCCESS
Increase Nurse Experience
Lower experience was associated with higher odds of non-first-attempt success.
Select Appropriate Catheter Gauge
Larger-gauge catheters (18G/20G) were associated with higher odds of first-attempt success.
Choose Optimal Insertion Sites
Upper limb sites were associated with higher odds of first-attempt success compared with lower limb or trunk.
Avoid Replacements for Difficult Access When Possible
Procedures prompted by difficult access had higher odds of non-first-attempt success.
Assess and Optimize Patient Mobility
Reduced mobility was independently associated with higher odds of non-first-attempt success.
Wu MJ, Lin MC, Yang CM, Lin YC, Gautama MSN, Huang TW. Factors Associated With Non-First-Attempt Success in Peripheral Intravenous Cannulation by an Intravenous Therapy Team: A Prospective Observational Study. J Clin Nurs. Aug 10 2026;doi:10.1111/jocn.70498
Xu P, Wang L. Evaluating the impact of Age-Adjusted Charlson Comorbidity Index on in-hospital complications in patients with femoral fracture: a retrospective cohort analysis from the MIMIC-IV 2.2 database. Front Med (Lausanne). 2025;12:1606744. doi:10.3389/fmed.2025.1606744

44

The Impact of a Vascular Access Team

Better Outcomes. Fewer Complications. Greater Value.

Evidence shows that hospitals with dedicated vascular access teams achieve better results for patients and organizations.



Higher Insertion Success
Increased first-attempt insertion rates and overall cannulation success, especially in patients with difficult intravenous access.

Fewer Complications
Reduced catheter-related bloodstream infections, phlebitis, infiltration/extravasation, and other catheter-related complications.

Improved Patient Experience
Fewer insertion attempts, less pain and discomfort, and greater overall satisfaction.

Operational Efficiency
Less time spent on failed attempts and managing complications, allowing bedside staff to focus on other patient care priorities.

Cost Savings
Lower costs associated with complications, catheter replacements, extended length of stay, and resource utilization.

A vascular access team is an investment in patient outcomes, safety, and the future of care.

Fernandez-Fernandez I, Parra-Garcia G, Blanco-Mavillard I, Carr P, Santos-Costa P, Rodriguez-Calero MA. Vascular access specialist teams versus standard practice for catheter insertion and prevention of failure: a systematic review. *BMJ Open*. Jul 5 2024;14(7):e082631. doi:10.1136/bmjopen-2023-082631

45

Should every patient with a peripheral IV be decolonized like we do patients who have central lines?

New national data suggests: maybe not.

THE STUDY

National cross-sectional survey
94 tertiary acute hospitals in England

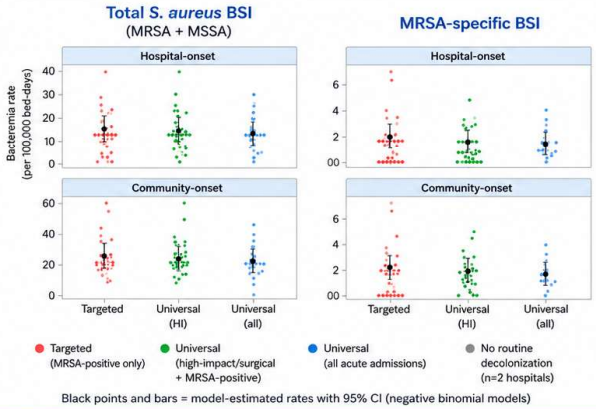
Study period
Policies and bacteremia rates (per 100,000 bed-days)

Decolonization policy groups
- Universal (high-impact/surgical admissions + MRSA-positive)
- Universal (all acute admissions)
- Targeted (MRSA-positive patients only)
- No routine decolonization

Outcomes
MRSA and total *S. aureus* bloodstream infection (BSI) rates by hospital- and community-onset

KEY FINDING

No reduction in *S. aureus* bloodstream infection rates with universal decolonization



Black points and bars = model-estimated rates with 95% CI (negative binomial models)

WHAT THIS MEANS

Across 94 hospitals, universal decolonization **did not** lower MRSA or total *S. aureus* BSI rates compared with targeted approaches.

Universal decolonization may **increase selection** pressure for antimicrobial **resistance.**

Benefits vs. risks should be re-evaluated—especially for lower-risk devices like **peripheral IVs.**

Topical antimicrobials used for decolonization should be included in antimicrobial stewardship frameworks.

BOTTOM LINE: Routine decolonization for every peripheral IV patient is not supported by current evidence.
Targeted strategies remain the more prudent, evidence-informed approach.

Source: Hijazi K, Sharaf S, Alapati S, Abbood H, Roos D, Trappetti C, Oggioni MR. Whole-body decolonisation policies and *Staphylococcus aureus* bacteraemia rates in acute hospitals in England: a national cross-sectional survey. Journal of Hospital Infection. 2026. https://doi.org/10.1016/j.jhin.2026.07.010

46

If we only count what we spend to *insert* the PIVC, we miss what we spend when the PIVC *fails*.

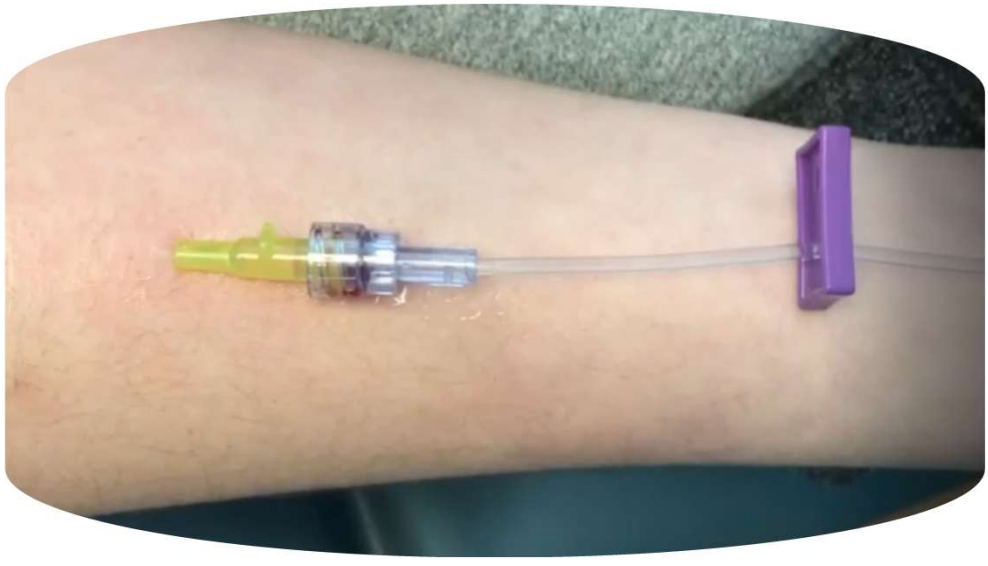


Upfront cost ≠ total cost of care	Adding securement and infection-prevention technology may reduce downstream costs associated with catheter failure and complications.
Think beyond the consumable	The true economic impact includes maintenance, replacement, complication management, staff time, and additional procedures.
Preventing PIVC failure can change the cost equation	Every avoidable PIVC replacement may mean another insertion attempt, supplies, nursing time, delayed therapy, and treatment of the resulting complication.
Investing in prevention may reduce episode-level costs	Adding securement and infection prevention increases consumable costs; however, total direct medical costs can be significantly lower because maintenance and complication-management costs decrease.

The economic target should be the entire PIVC episode—not the price of the prevention.

47

PIVC Sealed and Secured with Tissue Adhesive



VIDEO COURTESY OF HB FULLER MEDICAL ADHESIVE TECHNOLOGIES

48

The Blind Spot: Short PIVCs



Most used:
~90% of all vascular access devices

Shortest lived:
mean dwell
56 hours

Highest failure:
56.4%
removed for failure

Lower-failure alternatives were used far less:
midlines **31.0%**,
PICCs **32.9%**

The mismatch matters:
PIVCs often did not remain in place for the duration of hospitalization

And we have a data problem:
5–35%
missingness in key outcome variables

What this means:
For 5% to 35% of records, important data—such as dwell time or reason for removal—were not recorded, making comparisons across hospitals less reliable.

Bottom-line takeaway:
The device used most often was also the device that failed most often and remained in place for the shortest time.

Fernandez-Fernandez I, Castro-Sanchez E, Rodriguez-Calero MA, et al. Variability in Vascular Access Device Use, Dwell Time and Failure: Insights From Routine Nursing Documentation in a Multicentre Cohort Study. *J Clin Nurs*. Jun 18 2026;doi:10.1111/jocn.70397

49

The blind spot is not the PIVC itself—it's underestimating what happens when we fail to protect it.



PIVCs are not low-risk devices.

PIVC failure is more than an inconvenience.

Device selection should match the patient and the therapy.

Prevention starts with standardized insertion, securement, assessment, and maintenance.

"Just a peripheral" needs to become a prevention mindset.

The risk is underrecognized and undermeasured.

50