555, a Call to Action

Hospital-Onset Bloodstream Infections (HOBSI)

Kristopher Hunter BSN, RN, CRNI, VA-BC
Medical Liaison
July 7, 2025

Disclaimer

Important Information:

The content of this presentation is based on current United States standards, guidelines, and practices as of July 7, 2025.

Requirements in other countries may be different and US guidance may change in the future.

Always consult product *Instructions For Use* and follow local laws and regulations.

This presentation contains an overview of general information and should not be relied upon, in isolation, to make specific decisions.

Objectives

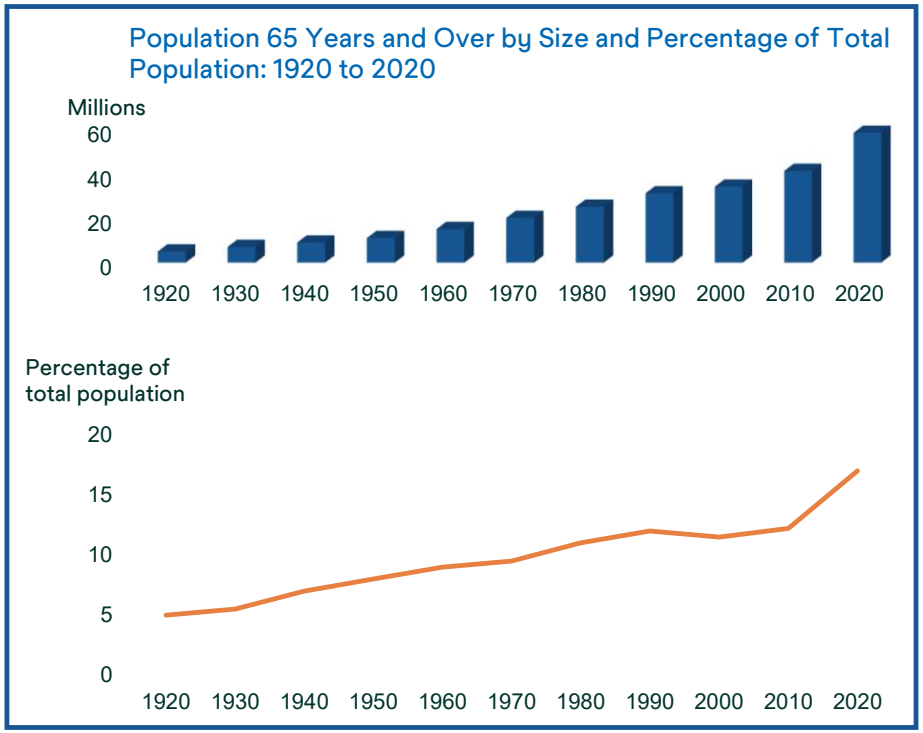
- Discuss the modern history of American healthcare policy
- Explore the background of Hospital-Onset Bacteremia & Fungemia (HOBSI)
- Identify interventions to prevent and control Hospital-Onset Bacteremia & Fungemia (HOBSI) for vascular catheters
- Describe the process to implement practice change for Hospital-Onset Bacteremia & Fungemia (HOBSI)

Financial Disclosures

Employed by Solventum

Trajectory of United States Healthcare

Patient Growth in the United States



1. Unites States Census Bureau. (2025. March 2nd). Census: 1 in 6 People in the United States Were 65 and Over. https://www.census.gov/library/stories/2023/05/2020-census-united-states-older-population-grew.html

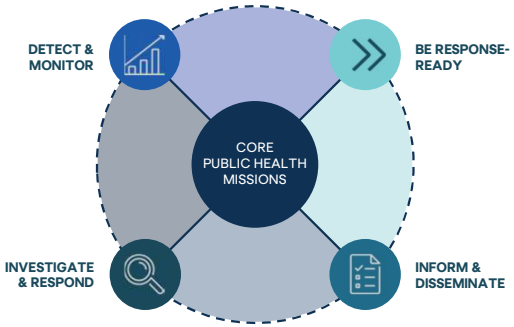
Regulatory Trajectory of Healthcare

- **1965 Medicare signed into law (Pres. Truman initiated, Pres. Johnson signed)**[2]
  - Private insurance struggling to keep up with a growing older population
- **1967 Patient-Centered Medical Home (PCMH) Value-based purchasing initiated for pediatrics**[3]
  - Created to manage complex care for sick children seeing a variety of specialists (HMO)
- **1973 HMO Act signed into law (Pres. Nixon)**[4]
  - Helps manage care, reduces healthcare cost
- **1983 Diagnosis Related Group (DRG) amendment passed**[5]
  - Financial incentive for hospitals to control healthcare costs.
- **2008 Medicare policy under the Value-Based Purchasing Program initiates certain limited penalties**[6]
  - 8 hospital acquired conditions, including CLABSI, would start to receive penalties
- **2013 Pay-for-performance launched under the Affordable Care Act (ACA)**[7]
  - HAI penalties codified, increased, and formerly rolled out
- **2019 Public comments for expanding the HAI program to include all bacteremia and fungemia**[8]
  - Program considerations paused due to COVID

CDC and the Data Modernization Initiative (DMI)

Data Modernization Initiative (DMI)

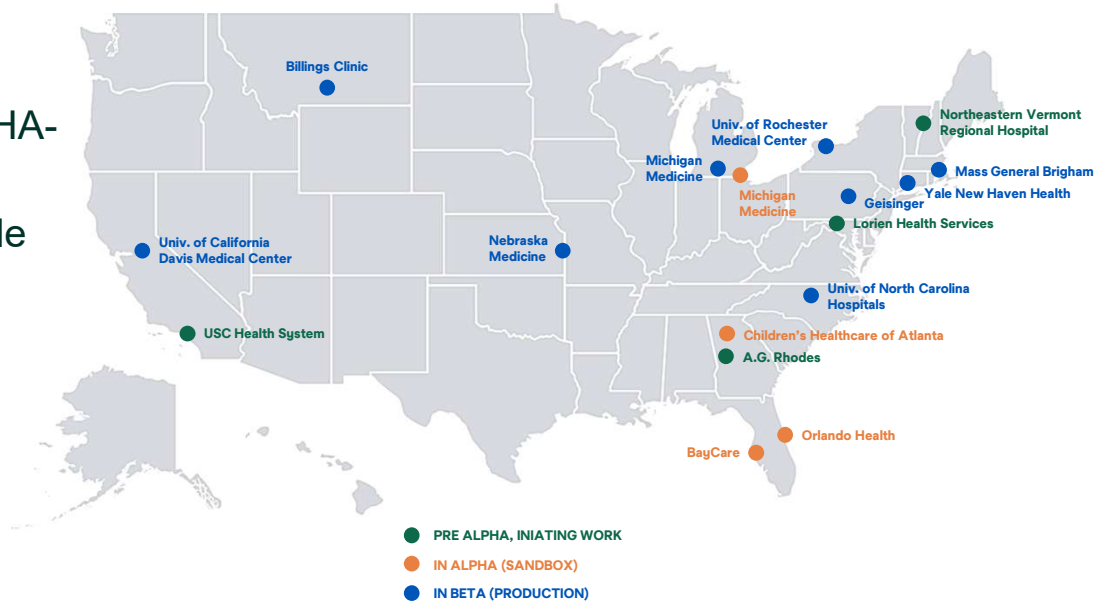
- Launched by the CDC in 2019, additional Congressional funding provided to help combat COVID
- Development and implementation of disease surveillance technologies
  - 2023 Public Health Data Strategy (PHDS)
    - Addresses gaps in public health data
    - Reduction of the complexity of data exchange
    - Improve the timeliness of actionable data
  - PHDS addresses the following issues;
    - Different disease reporting systems used different reporting systems
    - Healthcare providers and health departments had to report diseases to different areas
    - Public health was segregated from healthcare, did not utilize automatic reporting via electronic records



9. CDC (2025, March 4th) NHSNCoLab. https://www.cdc.gov/nhsn/nhsncolab/index.html

National Healthcare Safety Network (NHSN)

- Adult sepsis events (ASE) and sepsis outcome
- Antimicrobial use
- Glycemic control (inpatient medication-related hypoglycemia and inpatient hyperglycemia)
- Healthcare-associated venous thromboembolism (HA-VTE) and VTE prophylaxis
- Healthcare facility-onset, antibiotic-treated C. difficile infection (CDI)
- Hospital-onset acute kidney injury (AKI)
- **Hospital-onset bacteremia and fungemia (HOB)**
- Neonatal late onset sepsis / meningitis (LOS/MEN)
- Opioid-associated adverse events (ORAE)
- Respiratory pathogen surveillance (RPS)



9. CDC (2025, March 4th) NHSNCoLab. https://www.cdc.gov/nhsn/nhsncolab/index.html

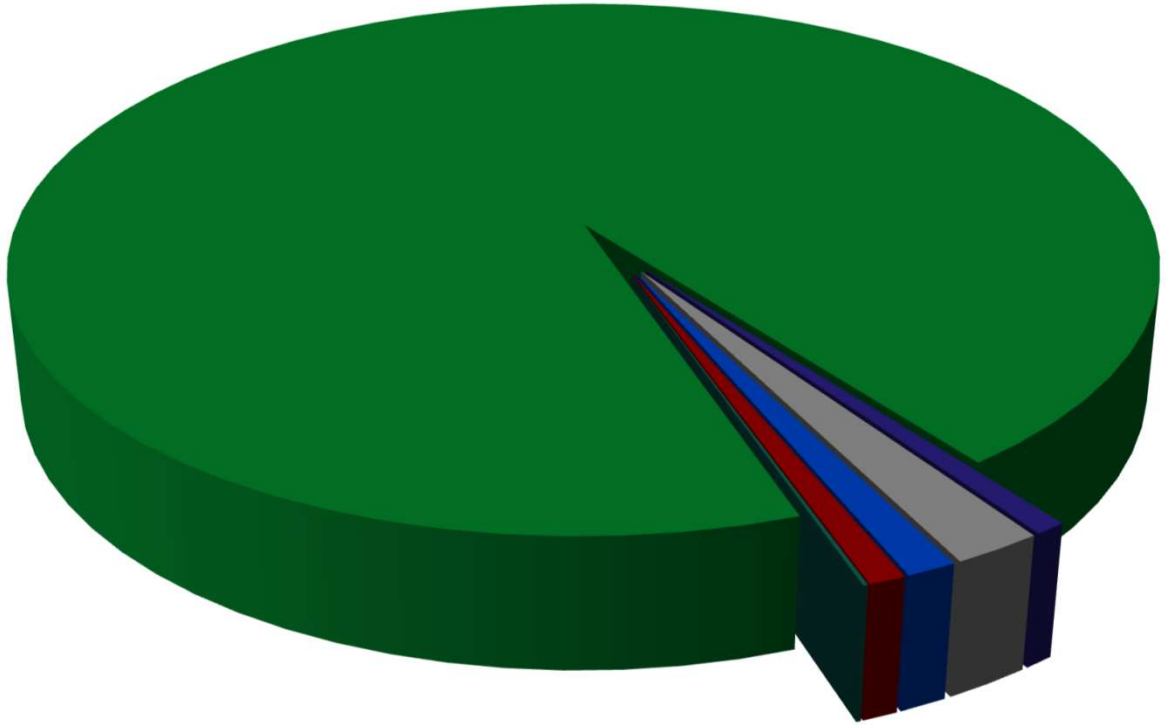
HOB Definition

Hospital-Onset Bacteremia and Fungemia (HOB): Detection of a positive blood culture with the growth of a bacterial or fungal pathogen on day four or later of a patient's admission to the hospital

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx

Basic Interventions to Reduce HOB

Estimated Vascular Access Device Market Data



10. Solventum™ internal data.

PIVC-Related BSI

Kovacs, et al. 2016
Hospital-acquired Staphylococcus aureus primary bloodstream infection: A comparison of events that do and do not meet the central line-associated bloodstream infection definition

Study period	4years
Primary SA HABSI	122
CLABSI	64% (78)
Non-CLABSIs	36% (44)
Non-CLABSI with documented PIV Infection	59% (26)
Non-CLABSI with a PIV present	100% (44)

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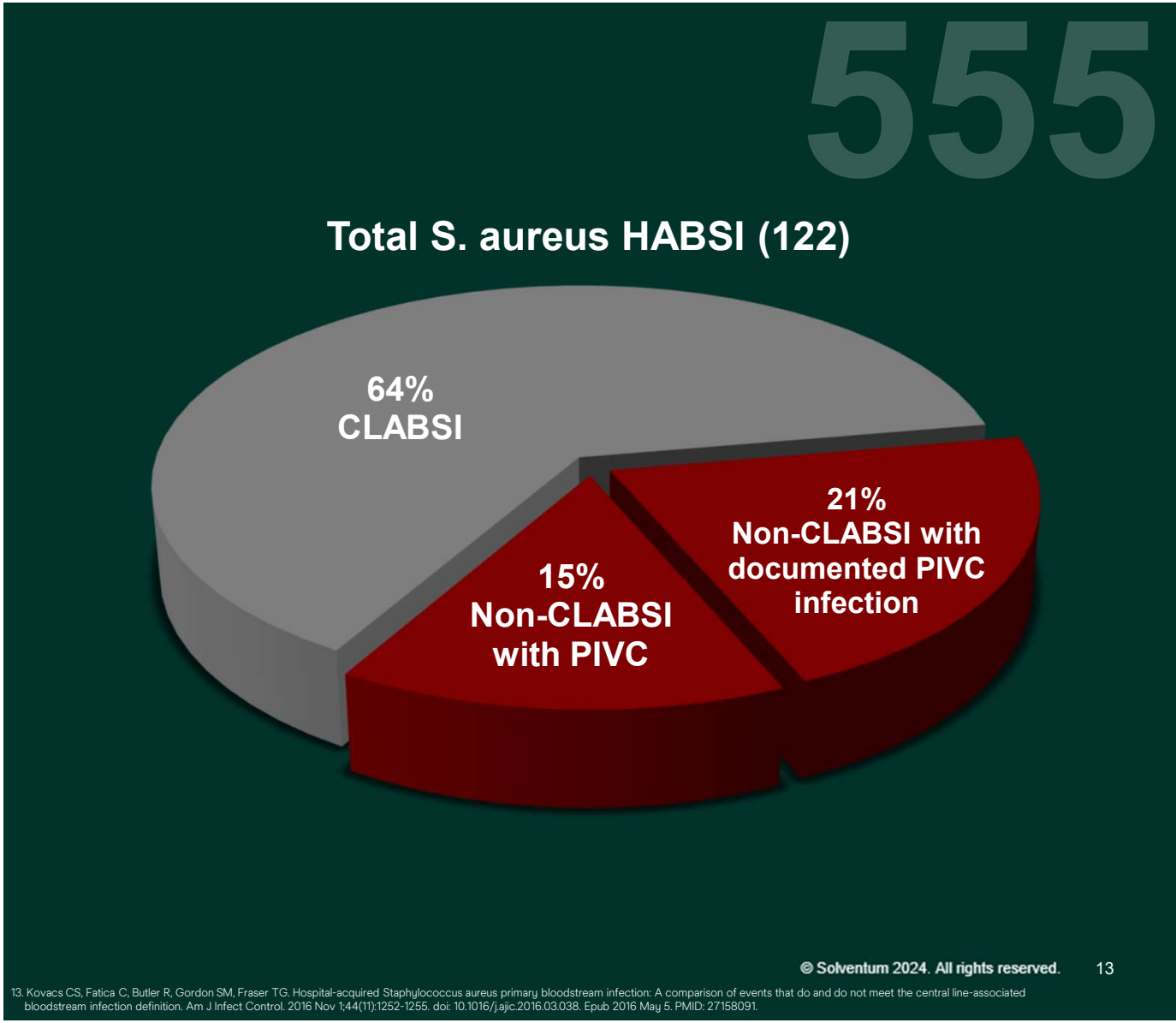
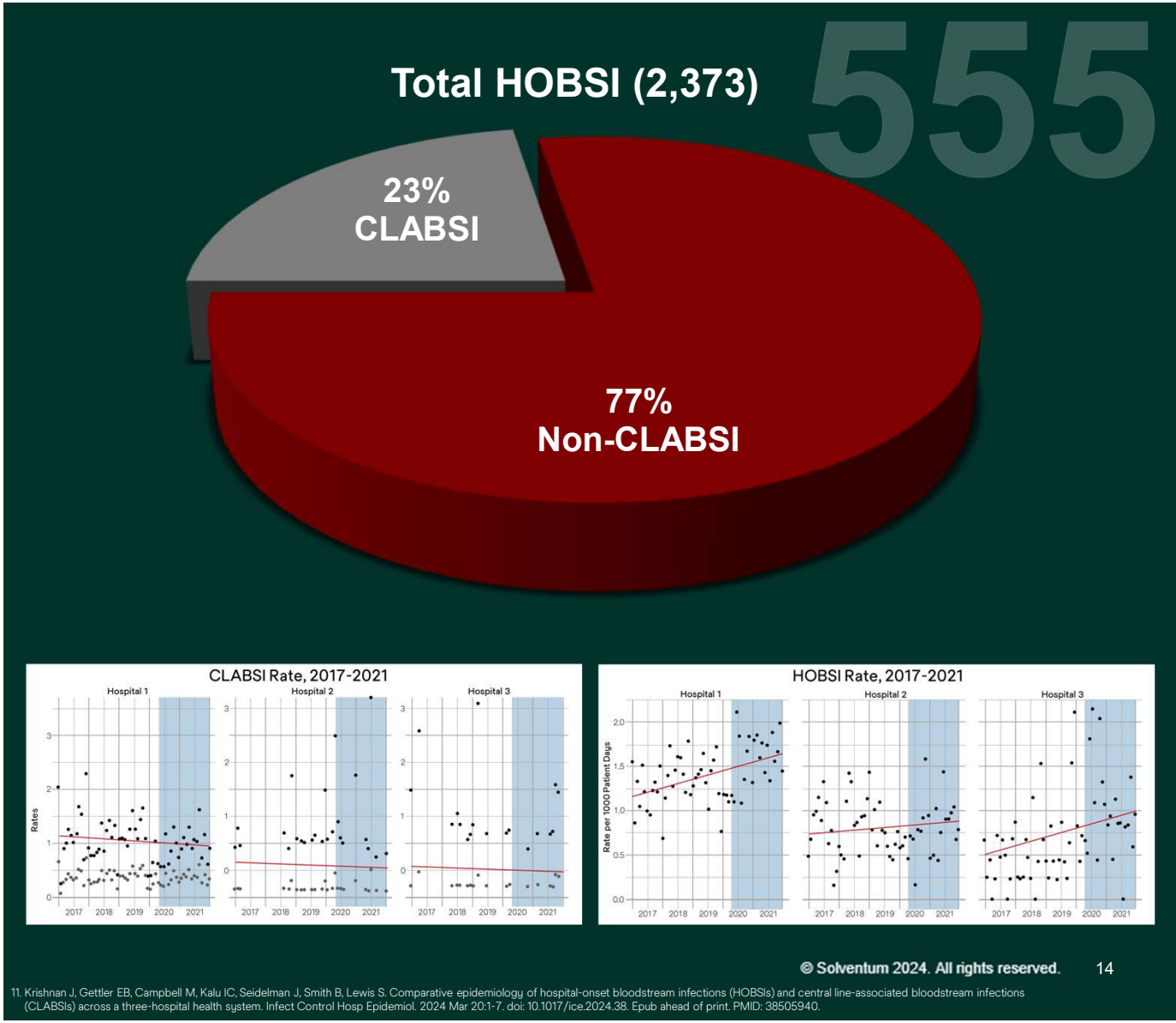


13. Kovacs CS, Fatica C, Butler R, Gordon SM, Fraser TG. Hospital-acquired Staphylococcus aureus primary bloodstream infection: A comparison of events that do and do not meet the central line-associated bloodstream infection definition. Am J Infect Control. 2016 Nov 1;44(11):1252-1255. doi: 10.1016/j.ajic.2016.03.038. Epub 2016 May 5. PMID: 27158091.

PIVC-Related BSI

Krishnan, et al. 2024
Comparative epidemiology of hospital-onset bloodstream infections (HOBSIs) and central line-associated bloodstream infections (CLABSIs) across a three-hospital health system

Study Period	2017 - 2021
Total positive cultures reviewed	15,876
Total HOBSI	2,373
Total CLABSI	550
Non-CLABSI HOBSI	1908



11. Krishnan J, Gettler EB, Campbell M, Kalu IC, Seidelman J, Smith B, Lewis S. Comparative epidemiology of hospital-onset bloodstream infections (HOBSIs) and central line-associated bloodstream infections (CLABSIs) across a three-hospital health system. Infect Control Hosp Epidemiol. 2024 Mar 20:1-7. doi: 10.1017/ice.2024.38. Epub ahead of print. PMID: 38505940.

PIVC-Related BSI

Yu, Jung, and Ai. (2023) Characteristics, costs, and outcomes associated with central-line–associated bloodstream infection and hospital-onset bacteremia and fungemia in US hospitals

Total facilities	41
Total admissions	756,637
CLABSI cost with ICU	$70,407
NC-HOB cost with ICU	$57,262
Adj. LOS all HOB	15.6
Adj. mortality all HOB	20%

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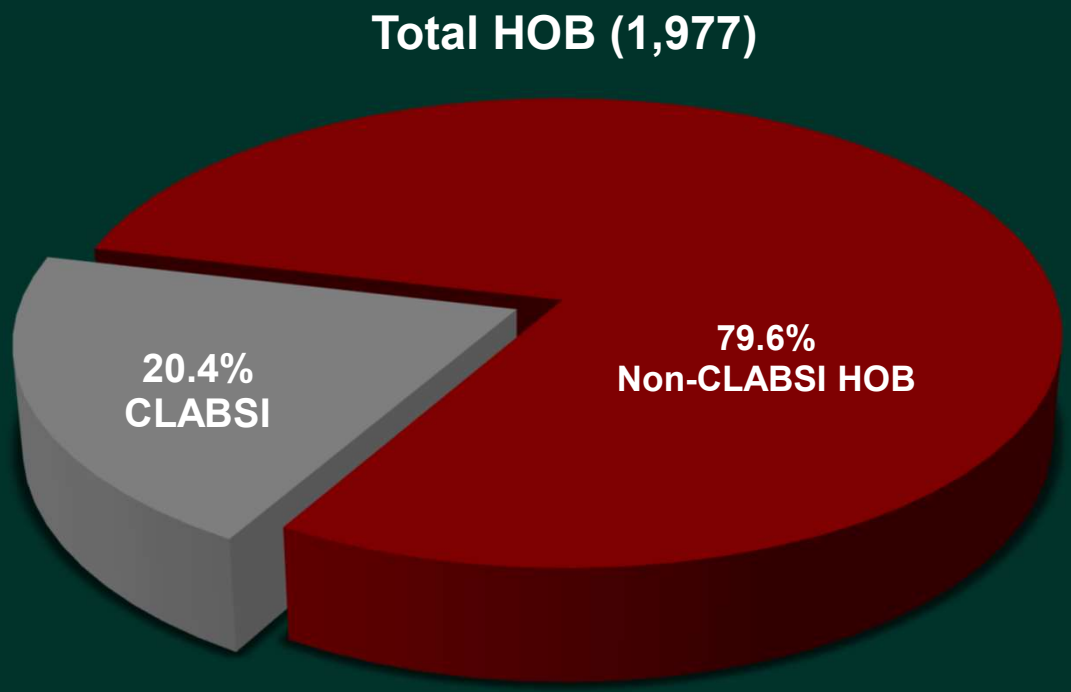

12. Yu KC, Jung M, Ai C. Characteristics, costs, and outcomes associated with central-line-associated bloodstream infection and hospital-onset bacteremia and fungemia in US hospitals. Infect Control Hosp Epidemiol. 2023 Dec;44(12):1920-1926. doi: 10.1017/ice.2023.132. Epub 2023 Jul 10. PMID: 37424226; PMCID: PMC10755163.

PIVC-Related BSI

Mermel. 2017
Short-tern Peripheral Venous Catheter-Related Bloodstream Infections: A Systematic Review

Articles Reviewed	65
PIVCs Reviewed	85,063
PIVC-BSI	0.18%
Nosocomial PIVC-BSI	6.3%
Nosocomial PIVC CRBSI	23%
S. Aureus PIVC CRBSI	33%

14. Mermel L. Short-tern Peripheral Venous Catheter-Related Bloodstream Infections: A Systematic Review. *Clinical Infectious Diseases. 2017*:65(10):1757-1762

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Let's do some napkin math…

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Let's do some napkin math…

Mermel, 2017
PIV-BSI rate

0.18% infection rate	per x100	100 PIVCs
18 infections	per ÷18	10,000 PIVCs
1 infection	**per**	**555 PIVCs**

PIVC-BSI Patient Impact

Saliba, et al. (2018)

13.2%

PIVC-BSI 30-Day Mortality


Journal of Hospital Infection

Interventions to decrease short-term peripheral venous catheter-related bloodstream infections: impact on incidence and mortality

15. Saliba P, Hornero A, Cuervo G, Grau I, Jimenez E, Berbel D, Martos P, Verge JM, Tebe C, Martínez-Sánchez JM, Shaw E, Gavaldà L, Carratalà J, Pujol M. Interventions to decrease short-term peripheral venous catheter-related bloodstream infections: impact on incidence and mortality. J Hosp Infect. 2018 Nov;100(3):e178-e186. doi: 10.1016/j.jhin.2018.06.010. Epub 2018 Jun 19. PMID: 29928942.

Zeineddin, et al. (2020)

13.26%

Single GSW Mortality

382,376 patients
106,538 Single GSW


Gunshot Injuries in American Trauma Centers: Analysis of the Lethality of Multiple Gunshot Wounds

16. Zeineddin A, Williams M, Nonez H, Nizam W, Olufajo OA, Ortega G, Haider A, Cornwell EE. Gunshot Injuries in American Trauma Centers: Analysis of the Lethality of Multiple Gunshot Wounds. Am Surg. 2021 Jan;87(1):39-44. doi: 10.1177/0003134820949515. Epub 2020 Sep 11. PMID: 32915073.

~~CVC~~ PIVC Maintenance Bundle

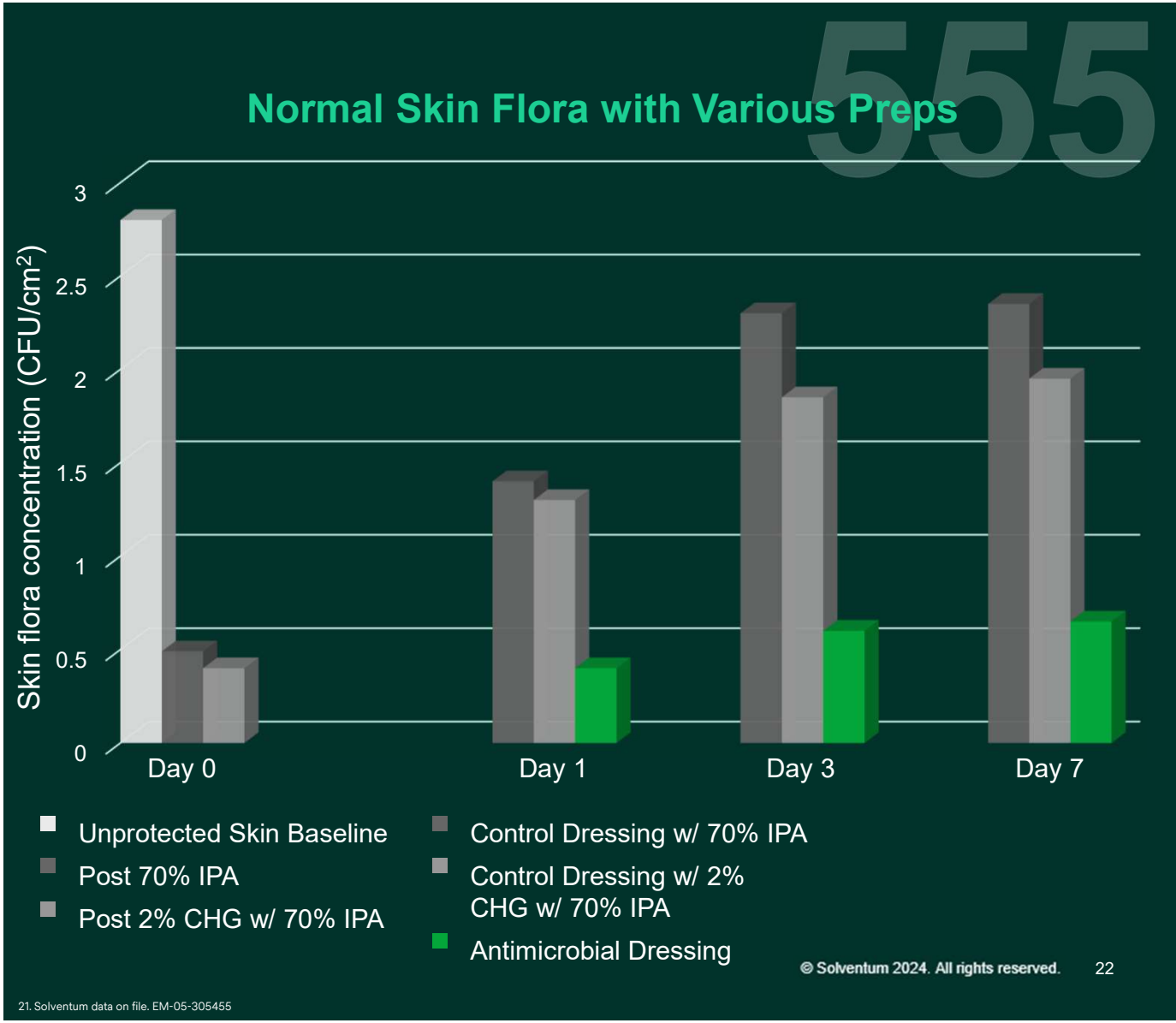
- Consider sterile barrier precautions
- Perform hand hygiene before manipulation of IV system
- Assess need for catheter daily
- Proper site assessment and removal for s/s of phlebitis or infection
- Use a securement device
- Dressing change recommendations and guidelines based on dressing type
- Use of disinfecting port protectors on all needleless connectors and Luers
- Use of antimicrobial at the insertion site

5

Antimicrobial Dressing Chain of Argument

Skin Flora

- The skin cannot be sterilized!
- Bacteria, or skin flora, reside on and under the skin surface
- Unsecured catheters may physically transport bacteria into the bloodstream
- Skin flora quickly regrow!

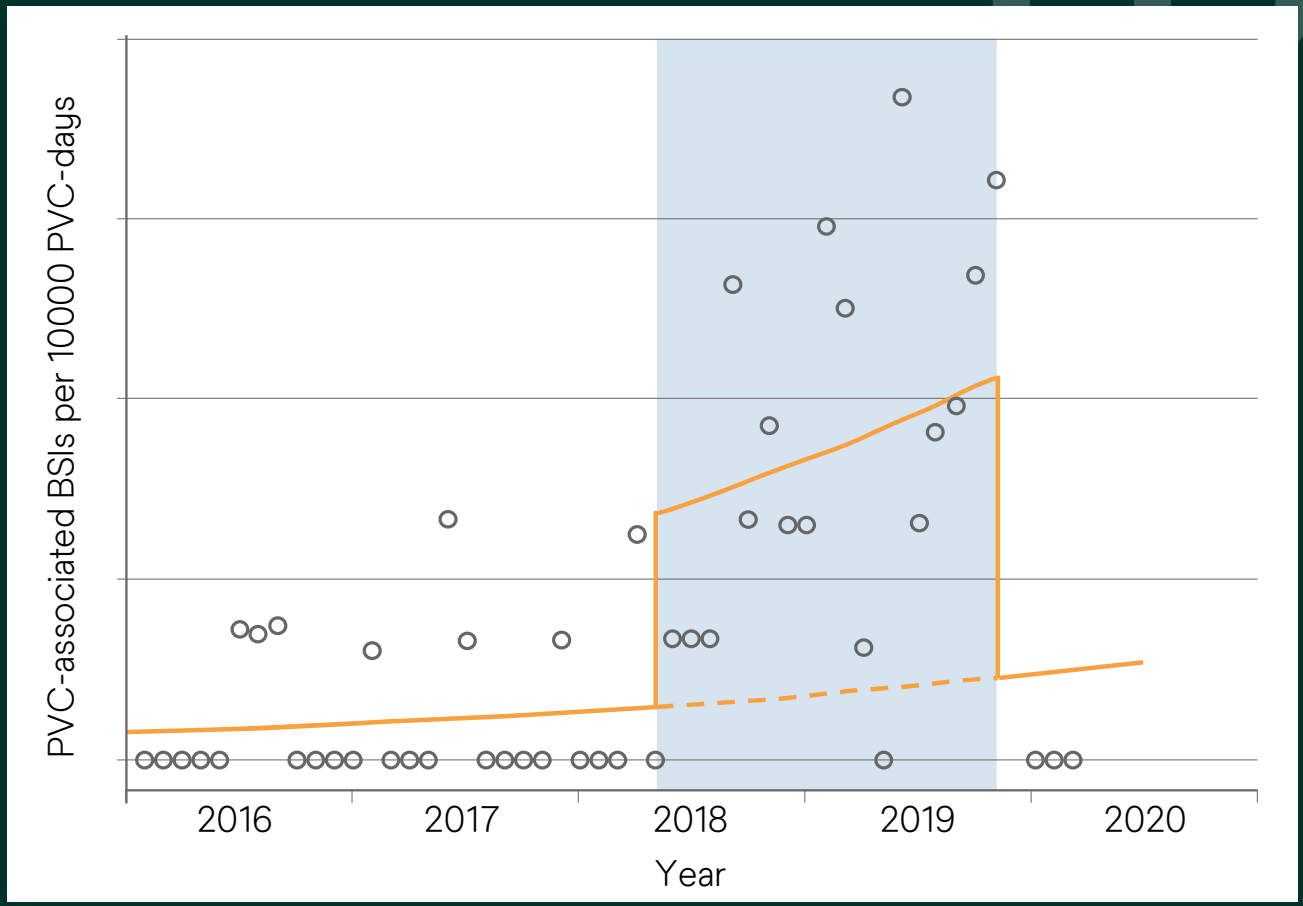


21. Solventum data on file. EM-05-305455

PIVC-Related BSI

Buetti, et al. 2021
Comparison of Routine Replacement With Clinically Indicated Replacement of Peripheral Intravenous Catheters

Study period	4years
Sites	10
Beds	2,008
PIVC Dwell >4 days Base	10.9%
PIVC Dwell >4 days Inter	20.4
PIVC Dwell >4 days Rev	12.8%
PIVC-BSI peak on day 5	29%



22. Buetti N, Abbas M, Pittet D, de Kraker MEA, Teixeira D, Chraiti MN, Sauvan V, Sauser J, Harbarth S, Zingg W. Comparison of Routine Replacement With Clinically Indicated Replacement of Peripheral Intravenous Catheters. JAMA Intern Med. 2021 Sep 17. doi: 10.1001/jamainternmed.2021.5345. Epub ahead of print. PMID: 34533191.

Let's do some more napkin math…

Assumptions;
- 1 infection per 555 devices (Mermel, 2017)
- NC-HOB cost non-ICU $34,243 (Yu, Jung, and Ai, 2023)

Cost of the Problem;
- 33,775 admissions (assume 1 PIVC per admission)
- 33,775 PIVCs ÷ 555 BSI rate = 61 PIVC-BSIs x $34,243 = **$2,088,823 PIVC-BSI**

Cost of the Solution;
- 33,775 PIVCs x $5 antimicrobial dressing = $168,875
- $168,875 ÷ $34,243 = 5 PIVC-BSI (8.2%) HOB reduction = In the green…

Considerations;
- (Devries, 2016) 19% PIVC-BSI reduction with bundle inc. antimicrobial dressing
- 61 PIVC-BSI x 0.19 = 12 PIVC-BSI reduction x $34,243 = $410,916 - $168,875 = $242,041 in savings

PIVC-Related BSI

Devries, et al. 2016
Protected Clinical Indication of Peripheral Intravenous Lines: Successful Implementation

Study period	12mo
Primary bacteremia reduction	37%
PIVC bacteremia reduction	19%
CLABSI reduction in the ICU	68%
PIVC kit reduction	48%
PIVC dwell >4days	35%
Average PIV dwell time	4.2days

Bundle Item	Reason
CHG Dressing	Indicated to reduce CRBSI, skin infection, and skin colonization. With extended dwell, apply same standard used for central lines
Securement Dressing	With ability to allow catheter to dwell until clinical reason for removal, securement was identified as a strong element in preventing catheter pistoning within the vein
Disinfection Cap	Provide intraluminal protection and help decrease variation in technique for disinfection of needleless connectors
Sterile Gloves	Centers for Disease Control and Prevention and Infusion Nurses Society both indicate sterile gloves for repalpation after skin prep. Direct observation preimplementation indicated an opportunity to enhance compliance
CHG Skin Prep	Adequate skin disinfection on clean skin
Intravenous catheter with integrated extension set	Reduces add-on sets and manipulation, consistent with Infusion Nurses Society standards. Also, integrated extension set avoids the need to perform additional dressing change before 7 d to meet tubing change policy

23. Devries, Michelle & Valentine, Mary & Mancos, Patricia. (2016). Protected Clinical Indication of Peripheral Intravenous Lines: Successful Implementation. Journal of the Association for Vascular Access. 21. 89-92. 10.1016/j.java.2016.03.001.

Let's do some more napkin math…

Summary;

- Example hospital has annually 33,775 PIVCs
- At 1 BSI per 555 PIVCs, this hospital has 61 PIVC-BSIs
- At $34,243 per PIVC-BSI, this hospital spends annually **$2,088,823**
- If the hospital brings in a $5 antimicrobial dressing, they will spend $168,875
- This hospital needs to prevent 5 PIVC-BSIs (8.2% reduction) to break even
- If they can reduce their PIVC-BSI rate by 19% (Devries) they will save a gross of $410,916, a net of $242,041 after purchasing the antimicrobial dressings
- 13.2% mortality rate, 19% PIVC-BSI reduction…

2 Lives

The HOBSI Playbook

Hospital-Onset Bacteremia and Fungemia Playbook

555

78 Pages

13 Action Areas

4 Phases

"HAIs result in more than 70,000 deaths and $28 billion in direct medical costs every year, and they can severely damage patients' trust and exacerbate clinician burnout.[2-5]"

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 1: Create a Shared Vision	**Phase 2:** Identify Priority Actions	**Phase 3:** Implement Change	**Phase 4:** Continuous Improvement
Action Area 1: Develop Buy-In and Ownership	**Action Area 5:** Define the Current State	**Action Area 8:** Engage Patients and Family	**Action Area 12:** Monitor Progress
Action Area 2: Review Data Infrastructure	**Action Area 6:** Identify Opportunities for Improvement	**Action Area 9:** Prevent HOB-Recognize and Mitigate Risk	**Action Area 13:** Promote Sustainability
Action Area 3: Assess Organizational Culture	**Action Area 7:** Set Organizational Goals	**Action Area 10:** Identify HOB-Assess and Recognize Symptoms	
Action Area 4: Build Awareness		**Action Area 11:** Treat HOB-Guide Timely and Accurate Care	

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 1: Create a Shared Vision

Define HOB as a priority

Why is HOB a top priority for the organization?

- CLABSI, CAUTI, VAP are not the only HAI in a hospital….

Findings	
Study Period	2017 - 2021
Total positive cultures reviewed	15,876
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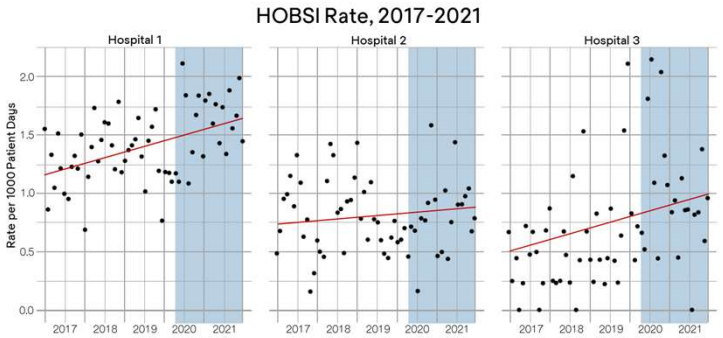

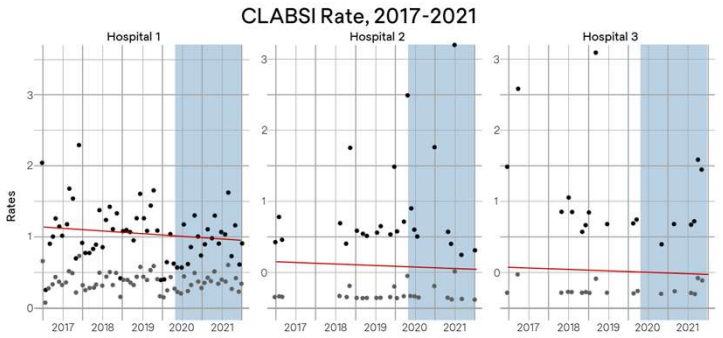

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11. Krishnan J, Gettler EB, Campbell M, Kalu IC, Seidelman J, Smith B, Lewis S. Comparative epidemiology of hospital-onset bloodstream infections (HOBSIs) and central line-associated bloodstream infections (CLABSIs) across a three-hospital health system. Infect Control Hosp Epidemiol. 2024 Mar 20:1-7. doi: 10.1017/ice.2024.38. Epub ahead of print. PMID: 38505940.

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 1: Create a Shared Vision

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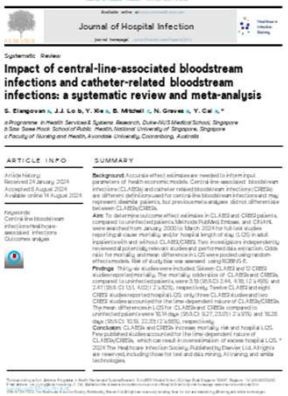
Why is HOB a top priority for the organization?

- CLABSI, CAUTI, VAP are not the only HAI in a hospital….
- Impact of HOBSI
  - Elangovan, et al. (2024)
    - LOS Mean Difference (CLABSI 16.14days, CRBSI 16.26days)
    - Mortality Odds Ratio (CLABSI 3.19, CRBSI 2.47)



Journal of Hospital Infection

Impact of central-line-associated bloodstream infections and catheter-related bloodstream infections: a systematic review and meta-analysis

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx

20. Elangovan S, Lo JJ, Xie Y, Mitchell B, Graves N, Cai Y. Impact of central-line-associated bloodstream infections and catheter-related bloodstream infections: a systematic review and meta-analysis. J Hosp Infect. 2024 Oct;152:126-137. doi: 10.1016/j.jhin.2024.08.002. Epub 2024 Aug 14. PMID: 39151801.

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 1: Create a Shared Vision

Define HOB as a priority

Why is HOB a top priority for the organization?

- CLABSI, CAUTI, VAP are not the only HAI in a hospital….
- Impact of HOBSI
  - Elangovan, et al. (2024)
    - LOS Mean Difference (CLABSI 16.14days, 16.26days)[25]
    - Mortality Odds Ratio (CLABSI 3.19, CRBSI and 2.47)[25]
- HOB management supports other initiatives such as patient safety and quality measures.

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx

25. Elangovan S, Lo JJ, Xie Y, Mitchell B, Graves N, Cai Y. Impact of central-line-associated bloodstream infections and catheter-related bloodstream infections: a systematic review and meta-analysis. J Hosp Infect. 2024 Oct;152:126-137. doi: 10.1016/j.jhin.2024.08.002. Epub 2024 Aug 14. PMID: 39151801.

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 1: Create a Shared Vision

Define HOB as a priority

How can leaders make HOB a top priority for their organizations?

- Identify organizational leaders already vested in quality measures.
- Build a business case.
- Align HOB reduction with existing quality and safety measures.
- Remind leadership this is not new, just different.
  - CLABSI reporting in the ICU expanded to the entire house.
  - Falls with hip fracture expanded to all falls with fracture.
  - Diagnosis-related readmission expanded to all cause readmission.
  - Ventilator-associated pneumonia expanded to all ventilator-associated events.

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx.

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 1: Create a Shared Vision

Assemble the HOB Team

What perspectives are needed on the HOB team?

- Leverage experts on existing committees; Sepsis, CLABSI, performance improvement, quality, etc.
- Identify your subject matter experts; epidemiology, infection prevention, vascular access, pharmacists, change management, etc.
- Recruit the legion of staff looking for projects; clinical ladder, those looking for promotions, new graduate nurses, etc.
- Ensure non-clinical patient advocates are included.

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 2: Identify Priority Actions

Review and Analyze Current Data

What HOB-related data are currently available?

- Antibiotic stewardship programs and microbiology, along with infection prevention, will have data available regarding organisms, positive cultures, and sources.
- Review well-established related metrics like CLABSI, MRSA, etc.
- Assess positive cultures; organisms, units, aLOS, patient demographics, vascular devices present, devices days, etc.

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx.

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 2: Identify Priority Actions

Identify Associated Processes and Practices

Review the HOB-related policies, procedures, and protocols.

- Collect all the vascular catheter-related policies, procedures, and protocols.
  - Do the vascular catheter policies amongst vascular catheters match? Why not?
  - Are vascular procedures well-defined or are generic 3rd party procedures used?
  - Are vascular protocols developed and comprehensive?
- Does clinical practice reflect the policies, procedures, and protocols?
  - How is compliance assessed?
  - Are assessments regularly performed?
  - Are clinical practice assessments distributed?

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx

Hospital-Onset Bacteremia and Fungemia Playbook

Phase 2: Identify Priority Actions

Set Organizational Goals

Identify specific outcomes

- SMART goals; specific, measurable, achievable, relevant, and time-bound
- Consensus on key high-impact goals.
- Include feedback mechanisms that include clinical staff input.
- Current HOB rate and a realistic goal.
- Identify what infections are preventable, largely preventable, and non preventable.

24. National Quality Forum. (Sep 2024). Hospital-Onset Bacteremia and Fungemia Playbook. https://www.qualityforum.org/Publications/2024/9/Hospital-Onset_Bacteremia_and_Fungemia_Playbook.aspx.

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APIC® CABSI Guide

APIC® Guide to Preventing CABSI

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Pages

7

Sections

The purpose of this guide is to provide an updated framework that Infection Preventionists (IPs) can leverage to reduce the risk of bloodstream infections (BSIs) associated with any vascular access device (VAD). The content throughout this guide aims to shift the current surveillance scope from only central line-associated bloodstream infections (CLABSIs) to addressing all catheter-associated bloodstream infections (CABSIs). Hospital-onset bacteremia and fungemia (HOB) will also be introduced.

26. Association for Professionals in Infection Control and Epidemiology (APIC). (April 2025). Guide to Preventing Catheter-Associated Bloodstream Infections. Pre-published draft.

Comparison of CLABSI, CABSI, and HOB by Definition, CMS Reporting Requirement, and Attributable Sources

Type of BSI	Definition	CMS Reporting Requirement	Attributable Sources
CLABSI	NHSN definition: Laboratory confirmed BSI in a patient who had a CVAD in place at the time of, or the day before, the onset of the infection, and the infection is not related to an infection at another site. The original catheter or a series of one or more CVADs must be in place for greater than 2 calendar days	Yes - Adult, Pediatric, and Neonatal ICUs; Adult and Pediatric Medical/Surgical wards	• CVADs
CABSI	Suggested definition: Laboratory confirmed BSI in a patient who has had any VAD in place at the time of, or the day before, the onset of the infection, and the infection is not related to an infection at another site. The original catheter or a series of one or more VADs must be in place for greater than 2 calendar days	No - Not unless associated with CVADs	• All VADs
HOB	NHSN definition: Bacterial or fungal pathogen identified from a blood culture on hospital day four or greater	No - Under development	• Vascular access devices • Urinary source • Respiratory/pneumonia • Surgical site infections • Skin and soft tissue infections

26. Association for Professionals in Infection Control and Epidemiology (APIC). (April 2025). Guide to Preventing Catheter-Associated Bloodstream Infections. Pre-published draft.

CABSI/CLABSI Risk Factors

Non-Modifiable Risks

- Immunocompromised status
- Chemotherapy treatment
- Parenteral nutrition (PPN/TPN)
- Poor skin integrity
- Prolonged hospitalization prior to catheterization
- Kidney disease
- Diabetes mellitus
- Body mass index >40
- Hematological malignancies
- Surgical complexity
- Length of ICU stay
- Neutropenia

Modifiable Risks

- Emergent v. elective/planned
- General v. specialist
- 70% IPA/10% povidone-iodine v. 2% CHG
- Multiple lumens v. single lumen
- Just-in-case v. Clinically indicated
- Longer dwell time v. Shorter dwell time
- Unplanned dressing changes v. Planned dressing changes
- Non-antimicrobial catheter v. Antimicrobial catheter
- More add-on devices v. Less add-on devices
- Higher nurse ratio v. Lower nurse ratio

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26. Association for Professionals in Infection Control and Epidemiology (APIC). (April 2025). Guide to Preventing Catheter-Associated Bloodstream Infections. Pre-published draft.

APIC® CABSI Guide to Preventing CABSI

Insertion Elements

Use VADs only when necessary and appropriately indicated	• Utilize an approved list of indications for VADs. • Use the EMR to require providers to enter the indication prior to insertion.	All VADs have risk of negative patient outcomes. It is prudent to ensure all VADs have a clinical indication and not inserted and/or maintained “just in case”.
Utilize vascular visualization technology for all VAD insertions (e.g., ultrasound, near infra-red)	• Ensure vascular visualization technology is readily available, and that staff are appropriately trained • Ensure appropriate supplies and disinfectant product(s) are readily available and staff are trained for use.	Vascular visualization technology increases insertion success.

26. Association for Professionals in Infection Control and Epidemiology (APIC). (April 2025). Guide to Preventing Catheter-Associated Bloodstream Infections. Pre-published draft.

APIC® CABSI Guide to Preventing CABSI

Insertion Elements

Perform clinical and venous assessments to identify the most appropriate insertion site and catheter

- **Use the appropriate catheter, insertion site, and insertion experts (e.g., vascular access specialist) to minimize repeat attempts and decrease complications**

Patient and venous assessments will allow the clinician to identify the catheter that is the least invasive, has the smallest diameter, and the fewest number of lumens based on the intended purpose, anticipated duration of use, known complications, and experience of individual catheter operators. Review MAGIC Guidelines and other literature for additional insertion considerations and details.

26. Association for Professionals in Infection Control and Epidemiology (APIC). (April 2025). Guide to Preventing Catheter-Associated Bloodstream Infections. Pre-published draft.

APIC® CABSI Guide to Preventing CABSI

Insertion Elements

Use appropriate insertion practices, including hand hygiene, glove use, aseptic and sterile technique, and sterile supplies	• Use a documented procedure for VAD insertion • Use a checklist in the EMR to improve reliability and monitoring of insertion protocols • Ensure appropriate sterile supplies are available	Appropriate use of aseptic and/or sterile technique minimizes the risk of introducing pathogens to the bloodstream.
Ensure appropriate securement and stabilization after insertion.	• Ensure securement devices are available and utilized appropriately.	Appropriate securement and stabilization decrease the risk of dislodgement, which decreases risk for microtrauma and the potential need for exchanging catheter. Stabilization can also impact the ease of VAD maintenance.

26. Association for Professionals in Infection Control and Epidemiology (APIC). (April 2025). Guide to Preventing Catheter-Associated Bloodstream Infections. Pre-published draft.

APIC® CABSI Guide to Preventing CABSI

Maintenance Elements

Use appropriate maintenance practices (based on VAD type), including hand hygiene, glove use, aseptic and sterile technique, and sterile supplies when manipulating the insertion site, catheter access point, or dressing.

- Use the EMR to prompt documentation of daily process metrics

Appropriate use of aseptic and/or sterile technique minimizes the risk of introducing pathogens to the insertion site or bloodstream.

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26. Association for Professionals in Infection Control and Epidemiology (APIC). (April 2025). Guide to Preventing Catheter-Associated Bloodstream Infections. Pre-published draft.

APIC® CABSI Guide to Preventing CABSI

Maintenance Elements

Ensure the dressing remains clean, dry, intact, and changed every seven days and immediately as needed when not clean, dry, or intact.

- **Use CHG containing dressings for adult patient with CVADs.**
- **Consider the potential benefit of CHG-containing dressings for PIVCs.**

- Implement routine auditing process to monitor compliance and ensure feedback is provided to frontline staff to improve practice as needed.
- Ensure supplies (e.g., dressing change kits) are readily available.
- Ensure staff who are performing dressing changes are trained and competent.

Dressings help reduce microbial growth near the VAD insertion site.

- Changing the dressing too frequently can introduce pathogens to the site and increase the risk of infection.
  - A high level of evidence exists demonstrating BSI reduction with use of CHG containing dressings for CVADs.
  - Less data is available to demonstrate the impact of CHG containing dressings for PIVCs.
  - If a gauze dressing is used, the dressing should be changed every 48 hours, or immediately when not clean, dry, or intact.

APIC® CABSI Guide to Preventing CABSI

Maintenance Elements

Ensure appropriate disinfection of the catheter access point prior to accessing and only attach sterile devices to the catheter hub.

- Establish a process for disinfection of the catheter hub/needleless connector.

Microbial burden of the catheter hub/ needleless connector is minimized with appropriate disinfection. This reduces the risk of introducing intraluminal pathogens when administering infusates.

APIC® CABSI Guide to Preventing CABSI

Maintenance Elements

Exchange administration set and addon devices at appropriate intervals, depending on the infusates.

- Implement an auditing process to monitor compliance and ensure feedback is provided to frontline staff to improve practice as needed.
- Ensure supplies are readily available.

It is important to change the administration set at appropriate intervals:

- Every 7 days for continuous infusions other than lipids, TPN/PPN, or blood/blood products.
- Every 24 hours for TPN/PPN.
- Every 6-12 hours for propofol and within 24 hours or when the vial is changed for other lipid emulsions.
- Every 24 hours for intermittent primary and secondary administration sets.*
- Every 4 hours for blood/blood products.
- It is important to ensure facility policy reflects instructions for use for medical devices when establishing replacement intervals for administration sets.

APIC® CABSI Guide to Preventing CABSI

Maintenance Elements

Provide daily CHG treatment for adult patients in an ICU setting.	• Implement auditing process to monitor compliance and ensure feedback is provided to frontline staff to improve practice as needed. • Ensure supplies are readily available.	Providing daily CHG treatments to ICU patients and those with a CVAD is well recognized to reduce CLABSI.
Use proper technique when collecting blood for lab tests, including transport and storage practices.	• Establish a blood specimen collection policy or procedure with clear steps. • Consider the use of blood culture collection kits.	Improper specimen collection can result in inaccurate results (e.g., false positive, false negative), potentially creating additional clinical needs and unnecessary treatment.

APIC® CABSI Guide to Preventing CABSI

Maintenance Elements

Ensure VAD remains patent for duration of use.	• Establish a process for frontline staff to ensure patency of VAD prior to use.	Catheter patency (i.e., flushed and aspirated for brisk blood return) helps ensure proper VAD function and decreases the risk of complications, including BSIs.
Remove VAD when no longer clinically indicated.	• Establish a process at the unit level to discuss the VAD indication daily. • Utilize the EMR to prompt daily reviews of VAD.	All VADs have a risk of negative patient outcomes. It is prudent to ensure all VADs have a clinical indication and are removed as soon as clinically indicated to minimize the risk of negative outcome(s).

APIC® CABSI Guide to Preventing CABSI

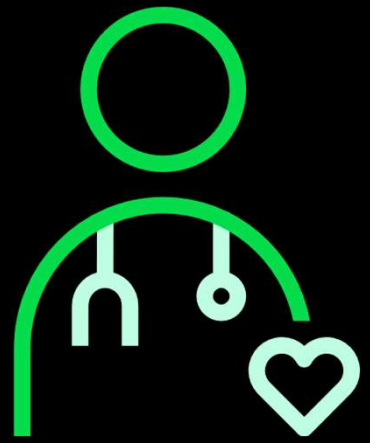
Maintenance Elements

Do not routinely replace VADs at set intervals.

- **Ensure facility policy does not specify a set timeframe for VAD replacement.**

VADs inserted under suboptimal conditions (i.e., without adherence to aseptic technique) should be removed as soon as possible, but within 48 hours. Consider utilizing EMR documentation to identify VADs inserted sub-optimally.

Routine replacement of VADs (clinically indicated removal) may be appropriate after a healthcare facility has successfully implemented appropriate insertion, care, and maintenance practices. Healthcare facilities should conduct assessments and surveillance of outcomes.



1 infection in every 555 PIVCs…

A call to action to prevent deadly hospital-onset bacteremia

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Contact Information

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Kristopher Hunter BSN, RN, CRNI, VA-BC
Medical Liaison
Solventum

Email: khunter3@solventum.com
Phone: 602-386-7375

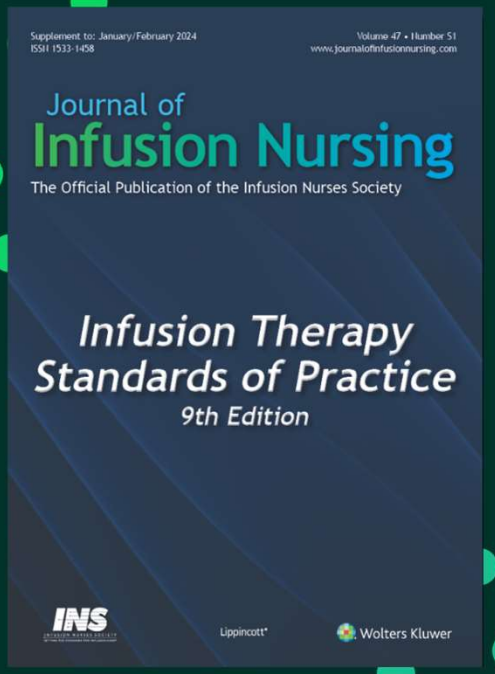
Infusion Therapy Standards of Practice

Infusion Teams

Use skilled clinicians to insert PIVCs. PIVC insertion in adults by infusion/vascular access specialist teams produced greater first-attempt insertion success and lower rates of complications (refer to Standard 4, Infusion and Vascular Access Services). S151

CHG Skin Prep

Perform skin antisepsis using alcoholic chlorhexidine gluconate (CHG) as the preferred antiseptic solution.[4-14] (I) S106



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Infusion Therapy Standards of Practice

Gloves

- Adhere to principles of Aseptic Non Touch Technique (ANTT®) for PIVC insertion (refer to Standard 19, Aseptic Non Touch Technique [ANTT®]).
  - Use Standard-ANTT for simple PIVC insertion.
    - Use single-patient-use tourniquets.[17,18] (III)
    - Don a new pair of disposable, nonsterile gloves or PIVC insertion; do not touch/palpate the insertion site after skin antisepsis.
    - Use sterile gloves if re-palpation of the vein is necessary after skin antisepsis. Contamination of nonsterile gloves is well documented.[3] (II) S108

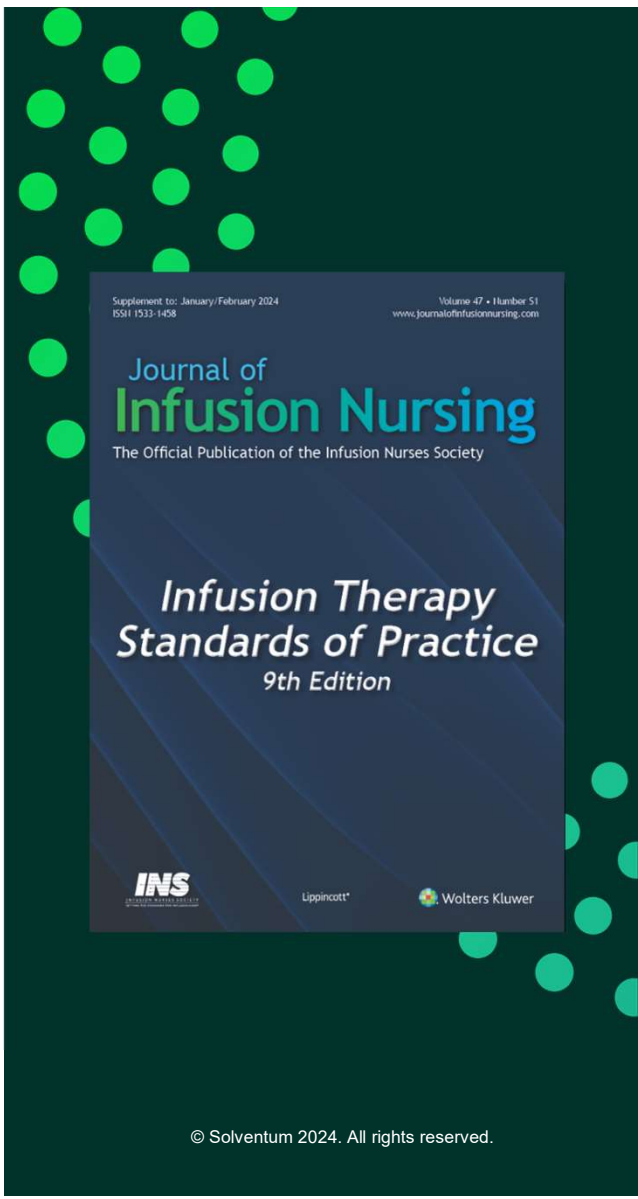
Gloves use during IV insertion

Seeking Advice

Hey y'all!

So one of the bad habits I have picked up over the years is not bothering with wearing gloves for IV insertion. I have honestly become complacent with it since I was always finding myself ripping a finger tip off since I have small but chubby fingers and gloves never fit me properly so I'd have a hard time palpating a vein with them, so eventually I figured what's the use? And just stopped altogether.

I am hoping to get some advice on how to incorporate gloves use again and help me gain a new perspective. Or make me feel like less a freak for not wearing gloves for IV insertion lol.



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Infusion Therapy Standards of Practice

Disinfecting Caps

Consider passive disinfection by applying a cap or covering containing a disinfectant agent (eg, 70% isopropyl alcohol, iodinated alcohol, chlorhexidine gluconate) over the needleless connector. A systematic review (of randomized and nonrandomized studies) has demonstrated high level of decontamination compliance and reductions in central line-associated bloodstream infection (CLABSI) rates and related health care costs associated with avoided harm. When using caps, follow manufacturers' directions for use regarding time for effectiveness after attaching and the maximum length of effectiveness. Once removed, discard used disinfection caps and do not reattach to the needleless connector. Use multidisciplinary implementation strategies, including staff education and leadership support, and provide consistent feedback to staff regarding outcomes, as this has been shown to decrease catheter-associated bloodstream infection (CABSI) rates.[34-37] (II) S115

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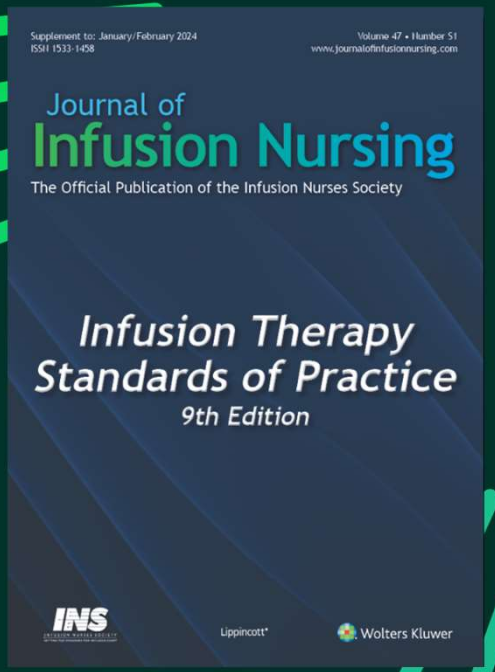
Infusion Therapy Standards of Practice

PIVC Securement

Evaluate the use of securement options, such as TA, in addition to a primary dressing or an ISD for enhanced catheter stabilization for peripheral intravenous catheters (PIVCs), particularly in high-risk patients such as those with difficult intravenous access (DIVA) and prolonged catheter dwell.[3,8,25-27] (II) S120



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Infusion Therapy Standards of Practice

Remove When Unused for 24hrs

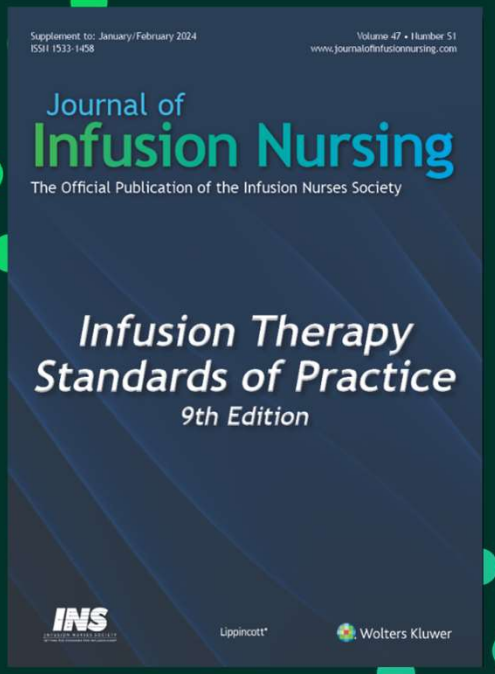
Remove if no longer included in the plan of care or if not used for 24 hours or more.[1-4] (III)

Remove When Clinically Indicated

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 and not solely on dwell time (refer to Standard 43, *Phlebitis*; Standard 44, *Infiltration and Extravasation*; Standard 45, *Nerve Injury*; Standard 47, *Vascular Access Device-Related Infection*).

Label and Remove Emergently Placed Catheters ASAP

Label catheters inserted under suboptimal aseptic conditions in any health care setting (eg, “emergent”). If peripheral access is still indicated, remove and insert a new catheter as soon as possible, within 24 to 48 hours.2,5 (IV)



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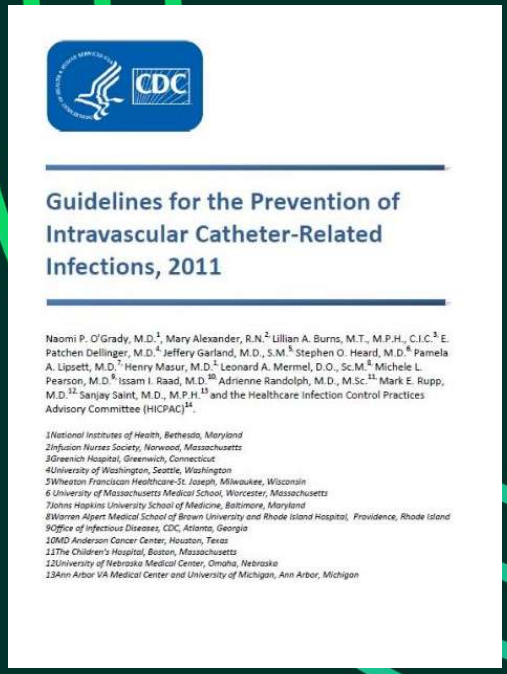
Infusion Therapy Standards of Practice

Sutureless Securement

Use a sutureless securement device to reduce the risk of infection for intravascular catheters [105]. Category II

Clinically Indicated Removal?

- There is no need to replace peripheral catheters more frequently than every 72–96 hours to reduce risk of infection and phlebitis in adults [36, 140, 141]. Category 1B
  - No recommendation is made regarding replacement of peripheral catheters in adults only when clinically indicated [142–144]. Unresolved issue
  - Replace peripheral catheters in children only when clinically indicated [32, 33]. Category 1B



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Disinfection Cap Chain of Argument

Human Factors Engineering

"Human factors and ergonomics is concerned with the application of what we know about people—their abilities, characteristics and limitations—to the design of products they use, environments in which they live and work and jobs they perform. Primary goals of the field of HF/E are to reduce human error, increase productivity and enhance safety, comfort and enjoyment for all people.

The field is a combination of numerous disciplines, such as psychology, sociology, engineering, biomechanics, industrial design, physiology, anthropometry, interaction design, visual design, user experience and user interface design."

Examples of Human Factors

- Removing the needle from certain PIVC catheters automatically engages the safety mechanism.
- Removing the back liner from some dressings encourages the hand placement.
- Ramirez (2012) increased disinfecting cap compliance from 63% to 80% simply by adding them to the point of use, the IV pole.

HUMAN FACTORS and ERGONOMICS SOCIETY

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Examples of Human Factors

- Removing the needle from certain PIVC catheters automatically engages the safety mechanism.
- Removing the back liner from some dressings encourages the hand placement.
- Ramirez (2012) increased disinfecting cap compliance from 63% to 80% simply by adding them to the point of use, the IV pole.

Hand Hygiene

18. Ramirez C, Lee AM, Welch K. Central venous catheter protective connector caps reduce intraluminal catheter-related infection. J Assoc Vasc Access. 2012;17(4):210-213.

INS Hand Hygiene Practice Recommendations

A. Mitigate the transfer of microorganisms by performing hand hygiene, as follows[1-4: (I)]

1. Before having direct contact with the patient (eg, entering a patient room, before donning gloves)
2. After having direct contact with the patient (eg, removing wound dressings, after removing gloves)
3. After body fluid exposure (eg, body excretions, including mucous membranes)
4. After touching the patient's surroundings (eg, medical devices, equipment, or furniture)
5. Before, during, as required, and after clinical procedures requiring Aseptic Non Touch Technique (ANTT®) (refer to Standard 19, Aseptic Non Touch Technique [ANTT®]), including the following: a. Insertion and removal of indwelling invasive medical devices, including vascular access devices (VADs) b. Ongoing management and manipulation of indwelling medical devices c. Infusion administration d. Immediately following the removal of gloves
6. Before/after eating and after using a restroom
7. Before moving from work on a soiled body site to a clean body site on the same patient.

B. Use an alcohol-based hand rub (ABHR) containing at least 60% ethanol or 70% isopropyl alcohol routinely for hand hygiene, unless the hands are visibly soiled or if the patient is suspected of having/or there is an outbreak of a spore-forming pathogen or norovirus gastroenteritis.[1,3-7 (I)]

1. Unless hands are visibly soiled, an ABHR is preferred over soap and water in most clinical situations due to evidence of better compliance compared to soap and water. Hand rubs are generally less irritating to hands and are effective in the absence of a sink.[1,8 (V)]
2. Perform hand hygiene using an ABHR for 15 seconds or according to manufacturer's recommendations.[3,7 (II)]
3. After handling hazardous drugs, avoid the use of ABHR until after hands have been washed with soap and water to avoid cutaneous absorption of hazardous drugs (refer to Standard 15, Hazardous Drugs and Waste).
4. Consider ethanol-based preparations at a high concentration between 70% and 95% in environments with high viral load.[5 (IV)]

19. Nickel B, Gorski L, Kleidon T, Kyes A, DeVries M, Keogh S, Meyer B, Sarver MJ, Crickman R, Ong J, Clare S, Hagle ME. Infusion Therapy Standards of Practice, 9th Edition. J Infus Nurs. 2024 Jan-Feb 01;47(1S Suppl 1):S1-S285. doi: 10.1097/NAN.0000000000000532. PMID: 38211609.

INS Needleless Connector Practice Recommendations

E. Disinfect the connection surface and sides of the needleless connector attached to any VAD to reduce introduction of intraluminal microbes. Use active or passive disinfection. Follow manufacturers' directions for use of both the needleless connector and disinfectant agent and/or product. Primary factors influencing this practice include the disinfection agent, the time required (ie, application and drying), and the method of application.

1. Perform active disinfection by a vigorous mechanical scrub using a flat swab pad containing 70% isopropyl alcohol or alcohol-based chlorhexidine suitable for use with medical devices.

   a. Laboratory simulation demonstrated greatest bacterial elimination rates associated with scrubbing in a straight line (compared with rotational scrubbing), using a force equal to that when applying arterial compression, and when the connector is scrubbed twice with a new swab each time.[27] (V)

   b. Recent studies show varied effectiveness of scrub time between 5 and 15 seconds with 70% isopropyl alcohol and alcohol-based chlorhexidine gluconate. One study showed comparable decontamination, and another demonstrated superior decontamination with longer decontamination time.[28,29] (III)

   c. Similarly, varied effectiveness has been reported with different solutions. Some studies showed comparable effectiveness in decontamination between 70% isopropyl alcohol or alcohol-based chlorhexidine and others demonstrated superior decontamination with alcohol-based chlorhexidine. International guidelines recommend either solution as part of good Aseptic Non Touch Technique (ANTT®) practice.[30-32] (II)

2. Adequate needleless connector drying time after disinfection is essential to reduce microbial load and potential for entry into the bloodstream, thus reducing bloodstream infections. Observational research demonstrated drying time with 70% isopropyl alcohol is 5 seconds; alcohol-based chlorhexidine requires 20 seconds. Povidone-iodine requires longer than 6 minutes to be thoroughly dry, making it less favorable to clinical practice. Drying times in clinical practice depend on the humidity and climate in the care setting.[33] (IV)

3. Consider passive disinfection by applying a cap or covering containing a disinfectant agent (eg, 70% isopropyl alcohol, iodinated alcohol, chlorhexidine gluconate) over the needleless connector. A systematic review (of randomized and nonrandomized studies) has demonstrated high level of decontamination compliance and reductions in central line-associated bloodstream infection (CLABSI) rates and related health care costs associated with avoided harm. When using caps, follow manufacturers' directions for use regarding time for effectiveness after attaching and the maximum length of effectiveness. Once removed, discard used disinfection caps and do not reattach to the needleless connector. Use multidisciplinary implementation strategies, including staff education and leadership support, and provide consistent feedback to staff regarding outcomes, as this has been shown to decrease catheter-associated bloodstream infection (CABSI) rates.[34-37] (II)

4. Studies comparing active and passive methods of disinfection show both processes to be effective.

   a. Active disinfection with alcohol-based chlorhexidine gluconate swab pads or passive disinfection with caps containing 70% isopropyl alcohol were associated with lower rates of CABSI, while swab pads containing 70% isopropyl alcohol were the least effective, according to a meta-analysis of quasi-experimental studies.[30] (II)

   b. Recent research has demonstrated that passive decontamination with 70% isopropyl alcohol– impregnated caps was associated with reduced phlebitis and infection. This may be associated with the improved consistency with decontamination practice and/or prolonged exposure to disinfectant agent.[38-45] (II)

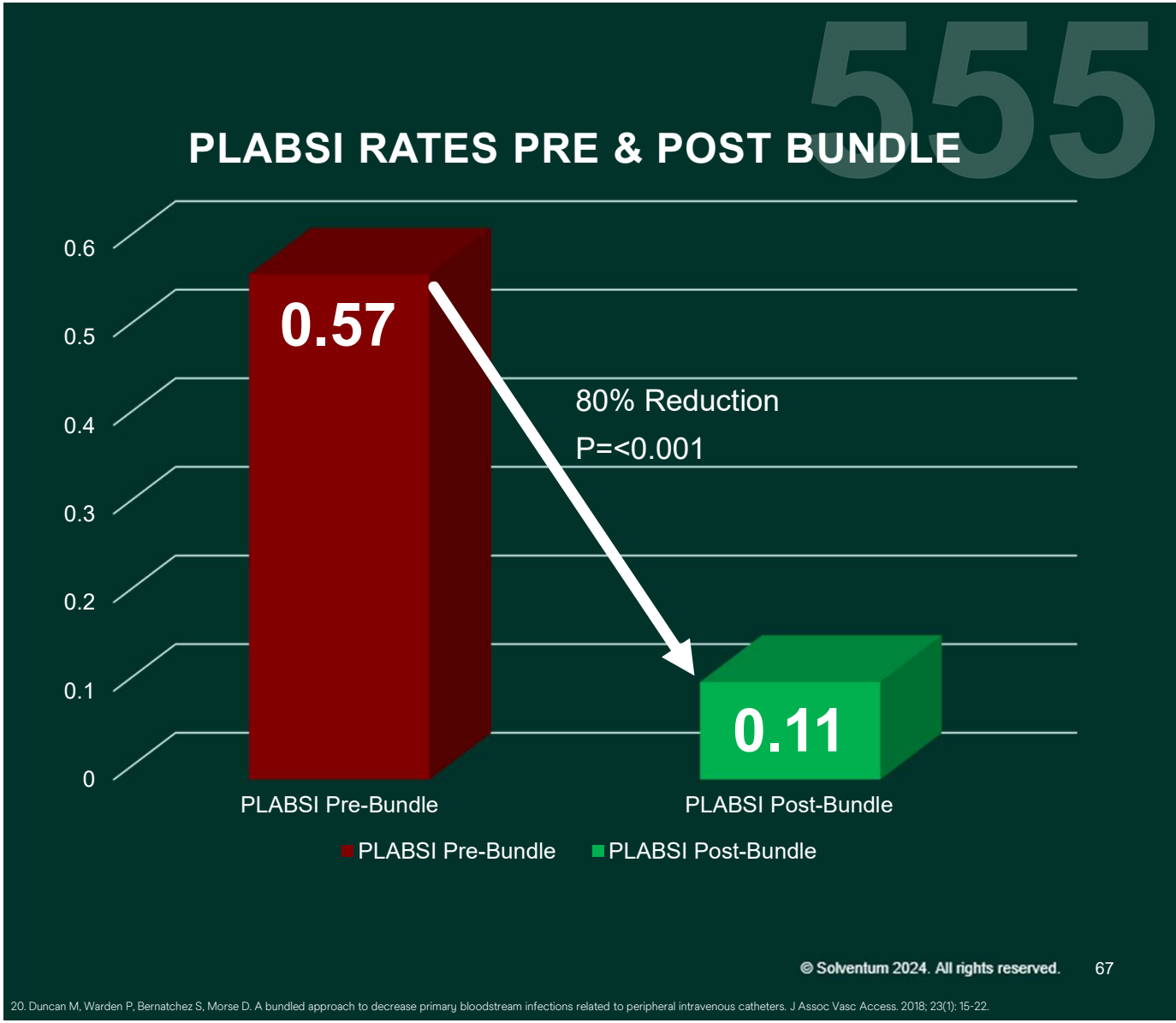
   c. Compared to active disinfection, passive disinfection has been associated with increased clinician compliance largely due to the continuous dwell nature of the device.[46,47] (IV)

19. Nickel B, Gorski L, Kleidon T, Kyes A, DeVries M, Keogh S, Meyer B, Sarver MJ, Crickman R, Ong J, Clare S, Hagle ME. Infusion Therapy Standards of Practice, 9th Edition. J Infus Nurs. 2024 Jan-Feb 01;47(1S Suppl 1):S1-S285. doi: 10.1097/NAN.0000000000000532. PMID: 38211609. © 2024 Infusion Nurses Society (INS). Excerpts used by explicit permission from INS. No endorsement is implied or given.

PIVC-Related BSI

Duncan. (2018)
A Bundled Approach to Decrease Primary Bloodstream Infections Related to Peripheral Intravenous Catheters

Disinfection caps for connectors	
Disinfection caps for male Luers	
Change all tubing 96hrs	
No convenience disconnection	
PLABSI pre-bundle	0.57
PLABSI post-bundle	0.11



20. Duncan M, Warden P, Bernatchez S, Morse D. A bundled approach to decrease primary bloodstream infections related to peripheral intravenous catheters. J Assoc Vasc Access. 2018; 23(1): 15-22.

+20

Published Studies

4
RCTs

2
Meta Analysis

2
Systematic Reviews

We can be right, or we can be effective

Hand Hygiene

Hub Hygiene