

# Case for Protecting Peripheral IVs

## Background

More than 300 million peripheral IV (PIV) catheters are sold each year in the United States alone, and 60% to 90% of hospitalized patients require an IV catheter during their hospital stay.<sup>1</sup>

Intravenous (IV) catheters are now reported to be the single most common source of bacteremia and fungemia, yet infections associated with short peripheral catheters receive very little attention.<sup>2</sup> Advances in training, monitoring, and documentation, as well as adoption of multifaceted policy “bundles,” have improved overall safety and reduced costs.<sup>3</sup>

## Impact Data

A retrospective, Premier database analysis was performed to estimate the clinical and economic impact of PIV-associated complications on hospitalized patients. More than 700 US hospitals' data was evaluated and 588,375 patients' records were included.<sup>4</sup>

**1.8%** of patients studied (n=10,354) **had a PIV-associated complication**



and rates varied by primary diagnosis pneumonia (2.67%) to COPD (0.98%)

**Blood Stream Infection (BSI)** was the most common PIV-associated complication

**82.2%** of all complications or **1.45%** of included patients

and ranged from 2.46% (pneumonia) to 0.67% chronic kidney disease (CKD)

### Patients with a complication were:

**more likely to be admitted to the Intensive Care Unit (ICU)**  
20.4% vs those without 11.0%.\*

**less likely to be discharged home**  
(62.4% vs 77.6%).\*

**and more likely to have died**  
(3.6% vs. 0.7%).\*



\* All statistically significant (P<0.0001)

## Conclusion:<sup>4</sup>

Patients with PIV-associated complications have **longer length of stay (LOS), higher costs, and greater risk of death** than patients without. Reducing these complications could improve clinical and economic outcomes.

## Clinical Importance of Protecting Peripheral IVs

Although most studies support the replacement of PIVs only when clinically indicated and not on a routine basis, a retrospective study in a U.S. hospital found that the median duration of catheterization of PIVs associated with *Staphylococcus Aureus* BSIs was 3 days (range 2-6 days) compared to a median dwell time of 1 day (range 1-2 days) observed in a point-prevalence study of PIV usage ( $p < 0.0001$ ).<sup>5</sup>

46 % of PIVs associated with *S. aureus* BSIs were in place for greater than 3 days.<sup>5</sup>

Patients with PIV BSIs had a **significantly higher proportion of *S. aureus*** infections than patients with central venous catheter related BSIs.<sup>6</sup>

*S. aureus* contributed to a **higher rate of complicated bacteremia and significantly higher overall mortality** than did the PIV BSIs caused by other pathogens.<sup>6</sup>

Thus despite the results of the Cochrane Review and the INS recommendations,<sup>7,8</sup> there still remain some concerns about transitioning to a protocol of replacing PIVs only when clinically indicated.

## PIV Replacement Frequency and Economic Outcomes

Clinical indication offers an economic benefit to help offset costs of an improved PIV bundle.

THE MEAN NUMBER OF ATTEMPTS PER SUCCESSFUL IV INSERTION WAS REPORTED TO BE **2.18** IN A CLINICAL STUDY.<sup>9</sup>

THE COST OF A PERIPHERAL CATHETER CAN BE

**\$2.99**  
EACH<sup>10</sup>

At a rate of 2.18 PIVs per successful insertion, a hospital incurs \$6.52 catheter cost with each start.

The cost of additional catheter supplies incurred with starting an IV can be \$5.50 per start.<sup>11</sup> (PIV start kit or single sterile supplies of dressing, skin prep, alcohol pads, as well as saline flush, connector, infusion cap, tape, gauze wrap, and gloves)



By forgoing one IV start by moving to clinical indication, **HOSPITALS MAY SAVE**

**\$12.02**  
**(\$6.52 + \$5.50)**

This can be reinvested in the IV bundle by way of BIOPATCH®, upgraded occlusive dressing, or vascular access and maintenance items.

BIOPATCH® provides ongoing antisepsis of the skin around the catheter insertion site which addresses a key risk factor for peripheral venous catheter related bloodstream infection (PVCBSI).<sup>12,13,14</sup>

**Consider BIOPATCH® as part of a PIV bundle to reduce risk of complications of peripheral IV catheters.**

# Potential Hospital Financial Impact

## Treatment of Infection

Previous research has identified that PIV catheters have BSI rates of 0.5/1000 device days.<sup>212</sup> A financial cost is incurred in the treatment of any peripheral IV related BSI.

Clinical and economic outcomes for sample 200, 400, and 600 bed hospitals:

Bed Size	Number of Patients Annually with Device	PIV BSI Rate	Number of Patients Impacted by BSI	Estimated \$ Impact of Infections
200	6,971	0.5	13	\$397,280
400	12,896	0.5	23	\$702,880
600	27,678	0.5	50	\$1,528,000

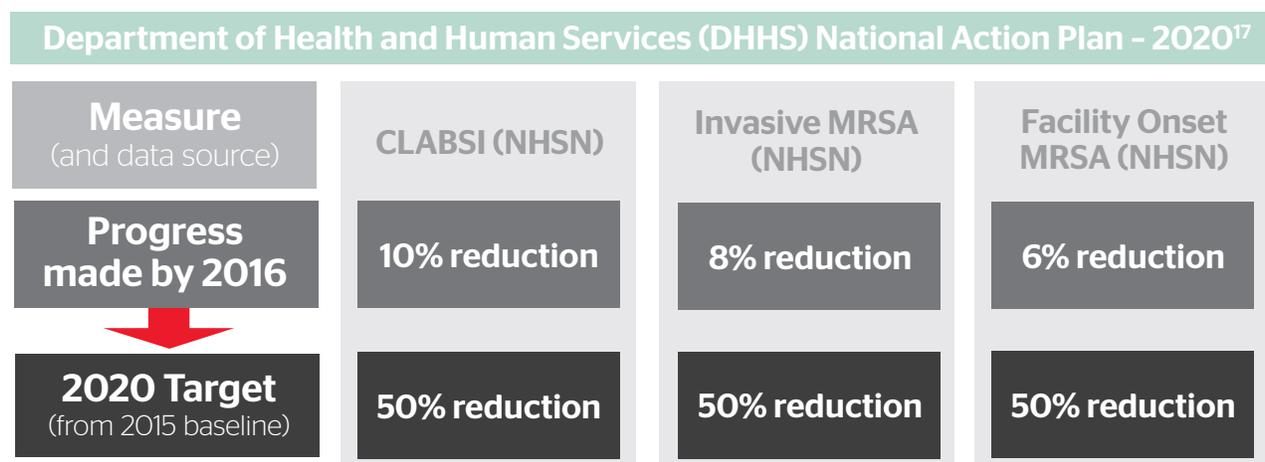
Assumes: 80% of patients require a PIV<sup>15</sup>; avg 3.64 days /device<sup>1516</sup>; cost per PIV infection is \$30,560 (Anderson inflated to 2013 dollars); Patients \* 80% with PIV \* device days \* BSI rate / 1000 device days = # infections; # of patients based on AHD.com: 200 = Littleton Adventist Colorado, 201 beds, 8714 discharges; 400 = Baptist Hospitals of Southeast TX, 406 beds, 16120 discharges; 600 = NY Presbyterian Brooklyn Methodist, 591 beds, 34598 discharges

## CMS Hospital Reimbursement and Performance

In 2008, the Centers for Medicare & Medicaid Services began its program of disallowing payment for treatment of certain hospital-acquired conditions. The current list includes *vascular catheter-associated infection* without any modifiers about the type or location of the catheter or the type of infection.<sup>2</sup>

To receive payment for treatment of these infections, the hospital must have adequate documentation that the infection was present on admission. *Vascular catheter-related infections* would encompass all devices used to access the vasculature without regard to the specific tip location or limiting this to only BSIs.<sup>2</sup>

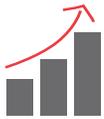
In October 2016 Department of Health and Human Services (DHHS) announced new targets for acute care hospitals for its Healthcare Associated Infection (HAI) Action Plan. The targets use data from calendar year 2015 as a baseline and are in effect for a 5-year period from 2015 to 2020.<sup>17</sup>



Targets require a 50% reduction in each of these measures by 2020 vs the hospital's 2015 baseline.<sup>17</sup>

# Delivering Value Beyond the Product

A suite of complimentary Ethicon Infection Risk Management services designed to help healthcare providers achieve better outcomes, improve patient experiences, and address costs.



**Value Proposition:** Customizable Economic Model showing resource utilization, Affordable Care Act impact, cost savings and more.



**Contracting:** Unique contracting options aligned to institutional needs.



**Custom Kits:** Custom kit assembler and original equipment manufacturer partnerships to maximize protocol compliance and improve efficiencies.



**Clinical Team Support:** Product education, competency training, and point prevalence surveys provided by a team of registered nurses to address outcomes and improve clinician experience.



## Healthcare Regulations & Reimbursement:

Tools and resources to navigate programs and requirements set by the Department of Health and Human Services and identify opportunities to improve performance.



**Peripheral IV Tool Kit:** Comprehensive references to support the adoption of protecting PIVs, the most frequently performed invasive procedure in hospitals.



**Professional Education:** Continuing education (CE) programs available to HCPs aiding in the education and understanding of infection risk management solutions. Customized speaker programs and events leveraging Key Opinion Leaders speaking on relevant healthcare related topics.

## Protect All Lines. Protect All Lives.™



### For complete indications, contraindications, warnings, precautions, and adverse reactions, please reference full package insert.

BIOPATCH® containing Chlorhexidine Gluconate is intended for use as a hydrophilic wound dressing that is used to absorb exudate and to cover a wound caused by the use of vascular and non-vascular percutaneous medical devices such as: IV catheters, central venous lines, arterial catheters, dialysis catheters, peripherally inserted coronary catheters, mid-line catheters, drains, chest tubes, externally placed orthopedic pins, and epidural catheters. It is also intended to reduce local infections, catheter-related blood stream infections (CRBSI), and skin colonization of microorganisms commonly related to CRBSI, in patients with central venous or arterial catheters.

**References:** 1. Helm R. Accepted but Unacceptable: Peripheral IV Catheter Failure Rate. *Journal of Infusion Nursing*. May/June 2015; Vol 38, 3:190-203. 2. Hadaway L. Short peripheral intravenous catheters and infections. *Journal of Infusion Nursing*. 2012; 35 (4):230-240. 3. Dychter SS, Gold DA, Carson D, Haller M. Intravenous therapy: a review of complications and economic considerations of peripheral access. *Journal of Infusion Nursing*. 2012;35 (2):84-91. 4. Lim S, Adams E, Hyde R, Broder M, Chang E, Reddy SR, Tarbox M, Bentley T, Ovington L. Clinical and Economic Burden of Peripheral Intravenous Catheter-Associated Complications in a U.S. Hospital Discharge Database. Poster presented at: 31st Annual Scientific Meeting of the Association for Vascular Access; 2017 Sep 16-19; Phoenix, AZ. 5. Trinh TT, Chan PA, Edwards O, Hollenbeck B, Huang B, Burdick N, Jefferson JA, Mermel LA. Peripheral venous catheter-related Staphylococcus aureus bacteremia. *Infect Control Hosp Epidemiology*. 2011;32 (6):579-583. 6. Pujol M, Hornero A, Saballs M, et al. Clinical epidemiology and outcomes of peripheral venous catheter-related bloodstream infections at a university-affiliated hospital. *J Hosp Infect*. 2007;67(1):22-9. 7. Webster J, Osborne S, Rickard CM, New K. Clinically-indicated replacement versus routine replacement of peripheral venous catheters. *Cochrane Database Systematic Review* 2013;4 CD007798. 8. Infusion Nurses Society. *Infusion Therapy Standards of Practice*. *Journal of Infusion Nursing* V39(1s). 9. Barton AJ, Danek G, Johns P, Coons M. Improving patient outcomes through CQI: vascular access planning. *Journal of Nursing Care Quality*. 1998;13 (2):77-85. 10. McGuff Medical Products. IV Sets and Access Devices: IV Catheter. BD Insyte Autoguard. <https://www.mcguiffmedical.com/iv-catheter-sterile-bd-insyte-autoguard-vialon-osha-2?productid=5168&gclid=EAlalQobChMI3vqNodf63QIVRyGCh3T%E2%80%A6>. Accessed 10/29/18. 11. Goff D. Resource utilization and Cost of Inserting Peripheral Intravenous Catheters in Hospitalized Children. *Hospital Pediatrics*. 2013 3(3): 185-191. 12. Zingg W, Pittet D. Peripheral venous catheters: an under-evaluated problem. *Int J Antimicrob Agents*. 2009;34:S38-42. 13. Shapiro JM, Bond EL, Garman JK. Use of a chlorhexidine dressing to reduce microbial colonization of epidural catheters. *Anesthesiology*. 1990 Oct;73(4):625-31. 14. Ryder, M. Evidence-Based Practice in the Management of Vascular Access Devices for Home Parenteral Nutrition Therapy. *Journal of Parenteral and Enteral Nutrition*. 2006; 30(1). S82-S93. 15. Maki DG, Kluger DM, Crnich CJ. The risk of bloodstream infection in adults with different intravascular devices: a systematic review of 200 published prospective studies. *Mayo Clinic Proceedings*. 2006; 81 (9):1159-1171. 16. Anderson DJ, Kirkland KB, Kaye KS. Underresourced hospital infection control and prevention programs: penny wise, pound foolish? *Infection Control Hospital Epidemiology*. 2007; 28 (7):767-773. 17. National Targets and Metrics. Health.gov, 6 May, 2018. <https://health.gov/hcq/prevent-hai-measures.asp>. Accessed April 25, 2018. 7. Anderson DJ, Kirkland KB, Kaye KS. Underresourced hospital infection control and prevention programs: penny wise, pound foolish? *Infection Control Hospital Epidemiology*. 2007; 28 (7):767-773.

## Infection Risk Management

