



Small Things Matter in Infection Prevention

Approaches to expanding infection prevention and
surveillance across vascular access devices

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Introduction

It's the small things that matter. That dictum applies to myriad situations, among them hospital and health system infection prevention and surveillance programs.

Vascular access devices play a critical role in ensuring safe and effective patient care by enabling the administration of medications, fluids, and blood products, as well as facilitating the removal of blood or other bodily fluids. At the same time, the insertion of these devices does have a potential risk of infection.

Given that clinicians at hospitals and health systems insert hundreds to thousands of IV catheters a day as a matter of course, their leaders are considering expanding their organizations' infection prevention surveillance programs to account for these routine procedures. Surveillance programs help protect patients and the organizations' performance under value-based, pay-for-performance and fixed reimbursement contracts.

This Trailblazers report from the American Hospital Association's Market Scan describes how hospitals and health systems can expand infection prevention efforts and surveillance in an effort to reduce infections. The report also profiles two health systems that are proactively examining their peripheral IV practices. ●

HAI measurement context

Hospitals and health systems measure and monitor many data points on health care-associated infections (HAIs), particularly where bloodstream infections are concerned. The Centers for Disease Control and Prevention (CDC), in turn, aggregates and publishes an annual progress report on hospital-reported HAIs.

Hospital and health system HAI infection surveillance programs have traditionally centered on six critical areas, according to Max Holder, an IV services nurse manager at Baylor, Scott & White Health.

- **Hospital-onset Clostridioides difficile infection (CDI).**
- **Ventilator-associated event (VAE).**
- **Surgical-site infection (SSI).**
- **Central line-associated bloodstream infection (CLABSI).**
- **Catheter-associated urinary tract infection (CAUTI).**
- **Hospital-onset methicillin-resistant Staphylococcus aureus (MRSA) bacteremia.**

The CDC and the Centers for Medicare & Medicaid Services

are also beginning to explore broader-based approaches to measuring HAIs. The CDC has developed a hospital-onset bacteremia and fungemia (HOB) measure that is designed to assess bloodstream infections occurring after inpatient admission. According to the CDC's National Healthcare Safety Network website, more than 19 health care sites have been pilot testing ways to monitor, collect and report HOBs as part of their infection surveillance programs. CMS included this measure on its pre-rulemaking measure list in 2019, but has not yet proposed to add the measure to its hospital measurement programs.

In contrast to a device-specific HAI rate, HOBs would encompass infections stemming from all vascular access devices, including peripheral IV catheters that are routine in patient care.

Clinicians insert an estimated 400 million peripheral intravenous catheter (PIVC) a year, according to Kristopher Hunter, medical liaison at Solventum, a medical products and services company based in Eagan, Minnesota. Solventum is the former health care division of 3M. Although the risk of an HOB from a PIVC is low, the volume of PIVCs potentially makes them a common cause of HOBs, he says ●

Why expanded infection surveillance matters

Infection prevention and vascular access specialists interviewed for this report point to patient safety as the leading reason why senior leaders at hospitals and health systems should actively support expanding their infection prevention programs to include surveillance of Catheter-associated bloodstream infection (CABSI) which includes PIVCs, and other vascular access devices.

Based on a well-known study published in 2017 in the Journal of Clinical Infectious Diseases, you could surmise that, based on a systematic review of other studies, there are 18 bloodstream infections (BSIs) for every 10,000 PIVCs or approximately one BSI for every 555 PIVCs. While the individual patient rate of getting a BSI from one peripheral IV is low, overall occurrence within a hospital may be high due to the sheer volume of peripheral IVs inserted. ●



“Hospitals should track and reduce their PIVC-BSIs because of the risk to the patient and the fact that it is not financially sustainable to continue to pay for them.”

— **KRISTOPHER HUNTER** —
Medical liaison, Solventum

How to expand infection surveillance programs

So, how can hospitals and health systems expand their infection surveillance programs to track PIVCs and prevent CABSIs? The answer comes down to the right mix of people, processes and technology.

to choosing the proper catheter, preparing insertion sites, dressing and securing PIVCs, and deciding how long PIVCs should stay in before clinicians remove or replace them.

“The indication of these lines should be assessed on a daily basis at the very least,” says Aryeh Feldheim, an infection preventionist at University of California San Diego Health.



1 | PEOPLE

Start with infection preventionists. Hospitals and health systems should look at their service complexity and the presence of higher risk areas when determining adequate infection prevention resources.

Infection preventionists should work closely with a hospital’s or health system’s vascular access team (VAT), according to Hunter. VAT team members typically are board-certified registered nurses who are specially trained and highly skilled at vascular access-device insertion and management. Infection preventionists and VAT team members should collaborate to develop and execute new protocols to prevent CABSIs from PIVCs.

Though nurses and other clinicians often insert and manage PIVCs, expanding infection surveillance to cover CABSIs could shift the insertion and maintenance of these devices to the VAT team members, according to Hunter. That could also mean potentially adding staff to VATs at many hospitals and health systems, he says.



3 | TECHNOLOGY

Technology in this case refers to the actual medical equipment and supplies used as well as the health information technology used in reporting. Enhanced equipment and supplies may include antimicrobial dressings, disinfecting caps at all connection points and sterile gloves during insertion — basically many of the components used with central lines but now applied to PIVCs.

Accurate, consistent and comprehensive clinical documentation of the use of upgraded protocols and enhanced equipment and supplies will be essential.

The case studies in this report demonstrate how two health systems are developing their own mix of people, processes and technology to expand their infection surveillance programs to prevent bloodstream infections associated with PIVCs. ●



2 | PROCESSES

The process changes to expand infection surveillance generally fall into two categories: who does what when, and what protocols they follow.

If the insertion of all vascular access devices is the sole purview of VAT members, front-line caregivers and clinicians would have to call them to insert even the most basic IVs. An alternative would be to significantly increase and maintain the training of front-line caregivers or clinicians so they practice using the same amount of care as a VAT member, according to Hunter.

Regardless of who does what when, anyone who inserts a vascular access device must follow the same protocols when it comes to preventing CABSIs from PIVCs. Infection preventionists and VATs put these standardized PIVC insertion and maintenance protocols in a “bundle” or “module.” The bundle or module covers everything from wearing the right personal protective equipment

12.1 to 17.4 days

Additional days in the

hospital for patients

who experienced

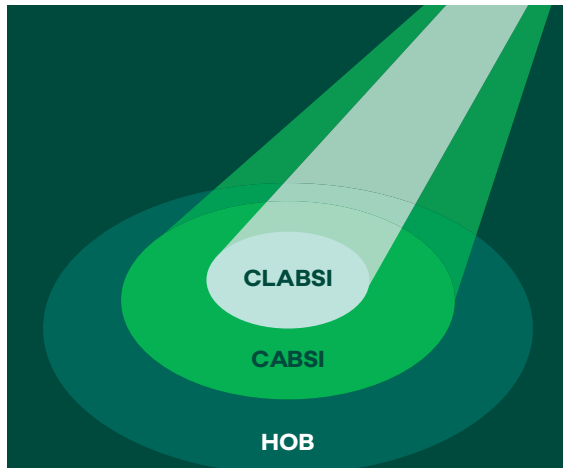
hospital-onset

bacteremia and fungemia

Source: “Characteristics, costs, and outcomes associated with central-line-associated bloodstream infection and hospital-onset bacteremia and fungemia in US hospitals.” Infection Control & Hospital Epidemiology, 2023

Moving from CLABSI to CABSIs

It's time to protect every IV line, every time



Catheter-associated bloodstream infections (CABSIs) are gaining attention as updated frameworks urge hospitals to expand their focus beyond central lines to include all vascular access devices.

This shift reflects a critical truth: **every IV line leads to the same bloodstream and carries the same risk when infection occurs.**



Solutions across the line

Prepare

Protect

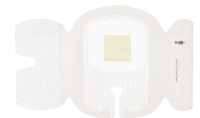
Secure



Our IV site management solutions are designed to support best practices, reduce risk across all vascular access devices, and empower clinicians to protect patients.

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To learn more about how Solventum can help you to reduce CABSIs and change patients' lives for the better, visit Go.Solventum.com/CABSIs.

For additional questions or to request an educational presentation, contact Kristopher Hunter at khunter3@solventum.com



Intervention is the best prevention

The University of California San Diego Health system (UC San Diego Health) is an academic medical center. The health system operates three acute care hospitals and four outpatient centers and pavilions. Aryeh Feldheim is an infection preventionist (IP) at the system.

In 2022, Feldheim was an IP intern at the system, and he participated in a research study that compared the risk of a bloodstream infection (BSI) from peripheral intravenous catheters, or PIVCs, with the risk of a BSI from a central line inserted into a patient. Confirming what earlier research had suggested, the risk of getting a BSI from a simple IV was comparable, outside of the ICU, to that from a complex central line. Feldheim and colleagues published the results of their study in May 2023 in the *Journal of the Association for Vascular Access*.

Three years later, Feldheim is working full time at the system, converting the study's results into actions to make care safer for UC San Diego Health patients.

The thread that connects all the specific actions and interventions is awareness: making every person on the patient care team aware that the proper insertion and maintenance of a PIVC is just as important as the insertion and maintenance of a central line and all vascular access devices.

"There is a cultural aspect to this. Maybe subconsciously we don't take PIVCs as seriously. That could mean an unintentional break in technique that increases the risk of an infection," Feldheim says.

Among the specific actions and interventions adopted by UC San Diego Health since the study's completion are:

- **Develop a clinical protocol "bundle," or checklist, for the proper maintenance of PIVCs.** Checklist items include: ensuring that alcohol-infused protective caps are used on unused ports of PIVCs where a central line is

CASE STUDY University of California San Diego Health

also present; that all dressings are clean, dry and intact; that all dressings are dated and changed every seven days or as needed; that all IV tubing is labeled with expiration dates; and, most importantly, assessing the continued indication use of the line.

- **Incorporate PIVC checks into the device rounds** of IPs and nurse educators to make sure that front-line nurses and other clinicians follow best practices for PIVC maintenance and critically assess the indications of all the patients' vascular access devices.

- **Review medical records of all inpatients with three or more PIVCs** and alert ordering clinicians via secure message if a PIVC hasn't been used for infusion in the last 24 hours and ask whether the PIVC is still indicated. The longer a PIVC stays in, the greater the infection risk. If

the clinician enters a discontinue order, Feldheim's team follows up to make sure the PIVC was actually removed.

- **Revamp the health system's root cause analysis process after a patient develops a BSI.** Feldheim's team requires that the care team submit scheduling availability within 48 hours of the confirmation of an infection. The care team then meets within seven to 10 days to review the potential causes of the BSI. That meeting now includes physicians in addition to IPs, nurse educators and nurses from the unit that treated the patient.

"The biggest thing I've learned in this job is how important relationships are between infection preventionists, nurses, physicians and all the different stakeholders within the health system. It's working together and reducing silos that will make our care safer for patients," Feldheim says. •



"The best way to prevent a bloodstream infection associated with a vascular access device is to not have that vascular access device. It sounds simple and almost silly, but it's the truth. This program has resulted in a lot of lines being discontinued because they weren't necessary. No line. No infection risk."

— ARYEH FELDHEIM —

Infection preventionist, UC San Diego Health



CASE STUDY Baylor Scott & White Health



Building a clinical and business case for action

Baylor Scott & White Health (BSW Health) is a 52-hospital health system based in Dallas and admits more than 200,000 patients each year to its inpatient sites. Max Holder is an IV services nurse manager at the health system.

In 2020, Holder and his team implemented systemwide “bundles” for the insertion and maintenance of peripheral intravenous catheters (PIVCs) into adult patients. The two bundles are evidence-based sets of best practices shown to improve outcomes based on the latest medical research available. BSW Health requires any clinician who inserts and/or maintains a PIVC to follow best practices in the bundles.

The approval and adoption of the bundles were the culmination of years of work by Holder and his team to connect PIVCs with blood stream infections (BSIs) and make the data-driven clinical case and business case to change BSW Health’s clinical practices and make the necessary financial investments to put them in place.

They began their effort several years ago when the Centers for Disease Control and Prevention (CDC) and the infection preventionist community began talking about what infections to track in the future. Hospital-onset bacteremia and fungemia (HOBs) were a common response, and that put PIVCs in play as a possible source given their sheer volume and frequency of use, Holder says.

“We decided to get ahead of this issue regardless of whether it ultimately becomes mandated or not. It’s something we need to be on [top of] for the good of our patients,” Holder adds.

Holder and his team began by digging into their methicillin-resistant *Staphylococcus aureus* (MRSA) infection rate, which was higher than expected. They knew from clinical research that the research often implicated PIVCs as one possible cause of MRSA infections. Higher-than-expected MRSA infections could correlate to higher-than-expected problems with the insertion and maintenance of PIVCs.

CASE STUDY Baylor Scott & White Health



“This organization has a very strong zero-harm culture. Your executive team has to be the one to drive that culture. We’re very lucky to have that here.”

— MAX HOLDER —

IV services nurse manager, Baylor Scott & White Health

Next, Holder and his team had BSW Health’s centralized infection surveillance team monitor how many PIVC-associated BSIs were occurring at two of the health system’s largest hospitals as proxies for all the system’s hospitals. After monitoring the two hospitals for three months, the infection surveillance team investigation revealed that the infection rate associated with PIVCs was higher than the rate associated with central lines. The BSI rate for PIVCs was 0.13 per 1,000 patient days compared with 0.09 per 1,000 patient days for central lines.

That evidence led to the development of the two PIVC best practices bundles, which worked their way up the corporate approval process. BSW Health implemented the bun-

dles systemwide and made a significant investment to implement them. The system’s care advisory council and chief nurse executive council ultimately signed off, and the bundles went into effect in 2020.

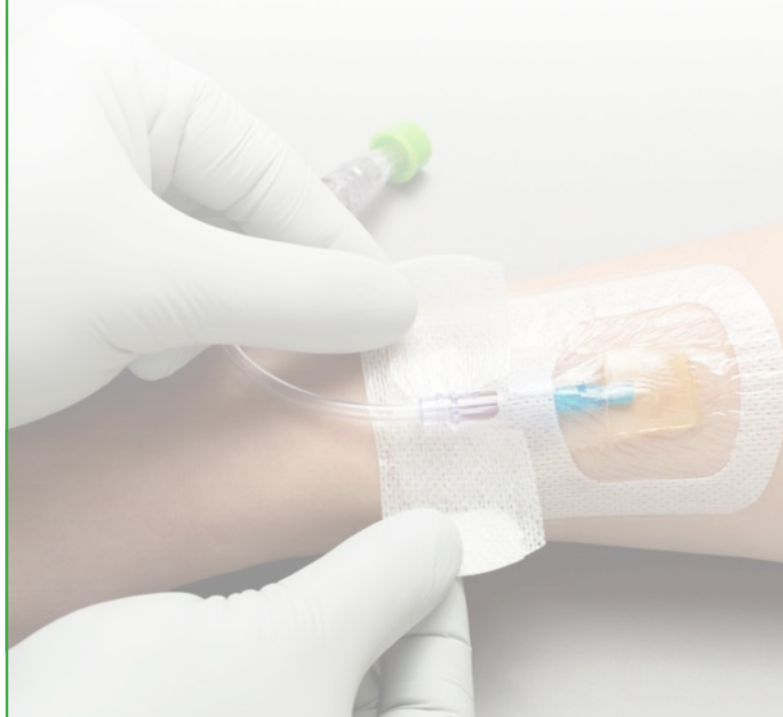
The investment included spending on better vascular access device products, creating staff e-learning modules, educating and training staff, building a dashboard to track PIVC and BSI key performance indicators and metrics, staging assessments in simulation labs to verify clinicians’ PIVC skill sets and more. The cost has been less than the cumulative average cost of about \$45,000 to successfully treat a central line infection, which likely is similar to the cost of treating a PIVC-associated BSI, Holder says. ●

DATA POINT

132.5 hours

Following the implementation of peripheral IV (PIV) best practices, the average PIV dwell time increased by nearly 64%, rising from 81 hours prior to implementation. This improvement reflected better insertion consistency, maintenance techniques and overall adherence to evidence-based protocols.

Source: BSW Health, 2025



Conclusion

Small things matter. Small microorganisms matter. Small vascular access devices matter. Small deviations in best practices for infection prevention and control matter.

With evidence showing the importance of addressing HOBs and PIVCs, seeking solutions to improve infection surveillance in these areas is more important than ever. The resulting outcomes are safer patient care and lower costs.

The case studies in this report illustrate how some hospitals and health systems are investing in people, processes and technologies to protect their patients as well as their own organizations. ●

INSIGHT

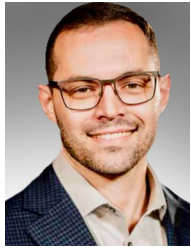
Many hospital leaders consider leading HOB sources to be at least partially preventable, particularly with better surveillance methods, implementation of prevention bundles, and identification and treatment guidance.

"Hospital-Onset Bacteremia and Fungemia Playbook." National Quality Forum, 2024



Contributors

The AHA's Market Scan thanks the following people and organizations for their insights, support and contributions to this Trailblazers report:



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MARKET SCAN

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