

Final Report High-Performance Work Practices in CLABSI Prevention Interventions: Executive Summary



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Final Report

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Introduction

This final project report summarizes the results of nine indepth case studies we completed as part of a modification to the ACTION (Accelerating Change and Transformation in Organizations and Networks) Task Order “Promoting Safety and Quality Through Human Resource Practices,” titled “Extending the Search for High-Performance Work Practices (HPWPs) in Healthcare-Associated Infection (HAI) Interventions.” Findings are based on 223 key informant interviews completed across the nine sites.

Sites studied in this project included one site originally studied during the first phase of this task order and eight new health care organizations selected based on their participation in the federally funded Comprehensive Unit-based Safety Program (CUSP) initiative, designed to reduce central line-associated bloodstream infections (CLABSIs). We used the case study format to explore whether and how the implementation of HPWPs facilitates successful reduction of CLABSIs.

Background

The research team consisted of researchers from The Ohio State University (Ann Scheck McAlearney, Sc.D., M.S., and Julie Robbins, Ph.D., M.H.A.) and Rush University (Andrew Garman, Psy.D.).

The project had two components:

1. A “project scan,” in which the research team reviewed the literature and research on HAI prevention to determine the most appropriate focus for our case study research; and
2. Comparative qualitative research to explore the role of management practices in facilitating HAI prevention and reduction efforts at nine case study hospitals.

This report presents the findings from both project components.

Project Scan Findings

The project scan was completed in fall 2010. At that time, numerous efforts were underway to reduce HAIs, but much of this work had not yet been well documented in the peer-reviewed literature. Therefore, our scan focused mainly on prepublication reports and conference presentations, which were supplemented by interviews with key researchers and practitioners in the field. With input from our Agency for Healthcare Research and Quality project officer and two clinical consultants to the team, we reached out to 14 experts and conducted a total of eight interviews, each lasting between 60 and 90 minutes.

Findings from the scan were organized around five key framing questions for our subsequent research design:

- How should sites be identified?
- Which HAI strategies should we focus on?
- In what ways are HPWPs most likely to matter?
- Which HPWPs are likely to matter most?
- What else should we keep in mind as we conduct this research?

Case Studies

For this task order we conducted indepth case studies of health care organizations and intensive care units (ICUs) within these organizations to study whether and how the implementation of HPWPs facilitates successful reduction in HAIs, focusing particularly on CLABSIs.

Research Questions

This exploratory research was guided by the following overarching research questions:

- Do HPWPs facilitate the adoption and consistent application of practices known to reduce or prevent HAIs? In what ways?
- Is there a direct link between the implementation and use of HPWPs and HAI intervention outcomes?
- What distinguishes health care organizations that are more successful in adopting evidence-based practices in HAI reduction efforts from organizations with less effective HAI reduction efforts?

Case Study Process

The case studies included site visits between June 2011 and October 2012 to nine organizations that were actively implementing initiatives to prevent and reduce CLABSIs. We interviewed multiple key informants at each site, ranging from 14 to 38 interviewees per site; reviewed appropriate documents; and observed HAI initiatives in operation (e.g., team meetings) when possible. Our indepth approach was designed to enhance our understanding of the implementation and impact of HAI interventions, paying particular attention to the role of HPWPs in HAI reduction efforts.

We studied organizations from four States that participated in the first cohort (3 States) or second cohort (1 State) of the CUSP initiative. Within each participating State, we selected a pair of hospitals to recruit for our study that were matched on key organizational characteristics (e.g., size, rural vs. urban, academic vs. community) but had contrasting outcomes for CLABSI reduction (i.e., one was successful, one less so).

While nearly all of the participating hospitals had made notable improvements in CLABSI rates postintervention, some hospitals had virtually eliminated CLABSIs and maintained those results for 6 months or longer. We classified these hospitals as higher performers and designated as lower performers the hospitals that demonstrated less consistent results (e.g., variation among units or occasional sharp upticks in their infection rate trends).

We used an iterative process, based on a combination of analysis of objective data and application of subjective insight, to select sites for participation. In addition to the CUSP sites, we elected to study one hospital that had not participated in the CUSP cohorts but was included in our original HPWP study. We chose this hospital because we knew that it had a strong focus on HPWPs and had made efforts in HAI prevention. Table 1 gives a summary description of each site, including organizational characteristics and categories of key informants interviewed.

Table 1. Case study sites

Site (Pair #)	CLABSI Reduction Record	Key Characteristics	Key Informants
Site 1 (1)	Higher performance	<ul style="list-style-type: none"> • Catholic safety net hospital,* metro area • 496 beds • 22 ICU beds 	<ul style="list-style-type: none"> • Executive (6) • Management (8) • Staff (14)
Site 2 (1)	Lower performance	<ul style="list-style-type: none"> • Community hospital in working-class suburb • 441 beds • 43 ICU beds 	<ul style="list-style-type: none"> • Executive (5) • Management (11) • Staff (14)
Site 3 (2)	Higher performance	<ul style="list-style-type: none"> • Regional multisite health system with university-affiliated teaching hospital • 1,192 beds • 259 ICU beds (9 units) 	<ul style="list-style-type: none"> • Executive (7) • Management (7) • Staff (11)
Site 4 (2)	Higher performance [†]	<ul style="list-style-type: none"> • Large tertiary AMC in midsize city • 815 beds • 147 ICU beds (4 units) 	<ul style="list-style-type: none"> • Executive (5) • Management (16) • Staff (17)
Site 5 (3)	Lower performance	<ul style="list-style-type: none"> • Community hospital affiliated with large AMC in small urban area • 373 beds • 53 ICU beds (2 units) 	<ul style="list-style-type: none"> • Executive (4) • Management (5) • Staff (12)
Site 6 (3)	Higher performance	<ul style="list-style-type: none"> • Community hospital, part of large Catholic system in small urban area • 376 beds • 52 ICU beds 	<ul style="list-style-type: none"> • Executive (2) • Management (4) • Staff (10)
Site 7 (4)	Higher performance	<ul style="list-style-type: none"> • Inner-city safety net hospital, part of regional system • 300 beds • 16 ICU beds; 32 NICU beds 	<ul style="list-style-type: none"> • Executive (3) • Management (9) • Staff (10)
Site 8 (4)	Lower performance	<ul style="list-style-type: none"> • Part of multistate system • 344 beds • 22 ICU beds 	<ul style="list-style-type: none"> • Executive (2) • Management (4) • Staff (8)
Site 9 (NA)	HPWP [‡]	<ul style="list-style-type: none"> • AMC in large metro area • 600 beds 	<ul style="list-style-type: none"> • Executive (5) • Management (11) • Staff (13)

Key: AMC=academic medical center; CLABSI= central line-associated bloodstream infection; CUSP=Comprehensive Unit-based Safety Program; HPWP=high-performance work practices; ICU=intensive care unit; NA=not applicable; NICU=neonatal intensive care unit.

* A safety net hospital or health system provides a significant level of care to low-income, uninsured, and vulnerable populations.

[†] Site 4 was initially classified as lower performing based on CUSP project data and input from the project liaison. However, as this hospital had made a successful turnaround since the conclusion of the CUSP project, we believe that it is more appropriately categorized as higher performing for the purposes of our study.

[‡] Site 9 was not a participant in the CUSP initiative; thus we designated this hospital as an HPWP site and did not classify its performance with respect to CLABSI rate reduction efforts.

Case Study Data Collection

Across the nine sites in this study, we interviewed 223 key informants. These interviewees represent a diverse mix of clinical and nonclinical informants from different levels of the organization, including executives (n=36), managers (n=80), and frontline staff (n=107). Table 2 shows the number and type of key informants who participated in this study.

Table 2. Summary of key informants, all sites

Position Level	Position Types/Titles	Number of Informants
Executive	<ul style="list-style-type: none"> • Physician (11) • Nursing (9) • Chief executive (6) • Quality/safety (4) • Other (6) 	36
Management	<ul style="list-style-type: none"> • Nursing (33) • Quality/safety (19) • Infection control (9) • Physician (6) • Other (13) 	80
Staff	<ul style="list-style-type: none"> • Nursing (72) • Infection control (13) • Quality/safety (10) • Other (12) 	107
Total		223

Note: n=9 sites.

To ensure consistency in our data collection, we used a standard guide to conduct interviews, recognizing that the specific focus of the questions would vary based on the informant’s role in the organization.

With informants’ permission, interviews were recorded and then transcribed verbatim to ensure accuracy and reliability. The research team then analyzed the interview transcripts to identify themes both within and across sites, including developing summaries of the organizations’ CLABSI prevention and reduction efforts, identifying facilitators and barriers to these efforts, and drafting an initial analysis of the role of HPWPs in CLABSI prevention efforts.

In addition to key informant interviews, the research team considered supplemental information obtained through project-related documents, such as reports, presentations, and observations of project operations (e.g., team meetings). Findings from these additional information sources were largely confirmatory and helped us to enhance or refine our primary findings from the key informant interviews.

Key Findings

Results from our case studies are summarized below. First, to set the context for our results, we provide a brief descriptive summary of the case study sites' CLABSI prevention efforts. Second, consistent with our stated research questions, we present findings from our exploration of the role of HPWPs in reducing or preventing CLABSIs. Finally, we present findings from our comparison of CLABSI prevention efforts among hospitals that had better versus less satisfactory CLABSI outcomes.

CLABSI Prevention Focus

We found that all of the sites' CLABSI prevention efforts focused on three main areas: clinical improvements, process improvements, and organizational improvements. While the organizations' approaches and specific foci varied, we found great similarity across sites. This finding is not surprising, given that the sites were selected based on participation in the CUSP initiative, and this was emphasized in many of the activities that we observed. The CLABSI prevention activities that we observed in each of these three main areas are summarized in Table 3.

Table 3. Types of HAI prevention activities

Focus	Activities
Clinical improvements	<ul style="list-style-type: none"> ● Standards for line insertion (e.g., checklists, sterile barrier precautions, avoidance of femoral line) ● Standards for line maintenance (e.g., schedule for dressing changes, "scrub the hub,"* use of chlorhexidine, biopatch, specialized lines/tubing) ● Routine assessment of line necessity ● Adoption of new/better products for infection prevention ● Hand-washing initiatives
Process improvements	<ul style="list-style-type: none"> ● Structured improvement processes (e.g., committee structure, root-cause analyses, learning from defects) ● Use of standardized line carts ● Multidisciplinary rounds and safety huddles
Organizational improvements	<ul style="list-style-type: none"> ● Strong leadership at multiple levels ● Focus on improving culture (e.g., emphasis on patient safety, transparency, improvement orientation, nurse empowerment) ● Visible identification of CLABSI prevention as a goal/priority ● Widespread communication of CLABSI rates (e.g., posted on units, on screensavers) ● Rewards and recognition for CLABSI prevention ● Empowerment of nurses and other staff to stop procedures if protocols are not followed ● Enhanced efforts to monitor and report rates; compliance with protocols

Key: CLABSI=central line–associated bloodstream infection; HAI=healthcare-associated infection.

* "Scrub the hub" refers to cleaning the hub of a central line prior to use. For examples of materials used to promote this practice, go to <http://www.ihl.org/resources/Pages/Tools/ScrubtheHubPosters.aspx>.

Role of HPWPs in HAI Reduction

This study is an extension of a previous task order in which the research team explored the link between HPWPs and quality-of-care outcomes in health care organizations. In this followup case study research, we used an HPWP framework to explore the role of management practices in reducing CLABSIs. (See Appendix 1 for detailed definitions; also see Garman, et al., 2011.) Consistent with our overarching research questions, our exploration focused on (1) whether HPWPs facilitate consistent application of practices known to reduce or prevent HAIs and (2) whether implementation of these practices could be linked to HAI outcomes. These findings are based on comparisons of activities at five higher performing sites and three lower performing sites and are summarized below by HPWP subsystem.

- **Subsystem #1: Engaging Staff.** Practices for *engaging staff* increase employees' awareness of and commitment to achieving organizational goals. We found evidence of these practices as a critical component of CLABSI reduction efforts at all of the sites in our study. We observed differences between the higher performing sites and the three lower performing sites in the content, scope, and impact of these engagement practices.
- **Subsystem #2: Acquiring and Developing Talent.** Practices for *acquiring and developing talent* focus on improving the quality of the workforce through recruitment, selection, and/or employee development. All of the sites within this study emphasized training and employee development in their CLABSI prevention efforts. Overall, we found that the sites with higher performing CLABSI outcomes not only focused on training to support implementation of clinical changes, such as introduction of new products and processes, but also emphasized the development of new knowledge and skills designed to support broader safety goals, such as a "culture of safety."
- **Subsystem #3: Empowering the Frontline.** Practices for *empowering the frontline* include efforts to reduce status distinctions, ensure employees' security in their positions (e.g., foster freedom to speak up), and decentralize decisionmaking to emphasize input from frontline caregivers. These practices are an important component of the CUSP initiative, which emphasizes the importance of establishing a culture of safety and enhancing team communication and collaboration. While we observed some evidence of frontline empowerment at all of the sites, the focus and degree of success varied considerably.
- **Subsystem #4: Aligning Leaders.** Practices for *aligning leaders*—such as leader development, succession planning, and performance-linked compensation—are designed to enhance leader capabilities and support achievement of organizational goals. The most visible alignment practice was the incorporation of CLABSI rates and rate reductions as performance goals at the unit level (done at all hospitals) and as contributors to an organizational-level goal in four of the hospitals we studied (two higher performing, one lower performing, one control). However, in none of these hospitals were incentive payments directly tied to the accomplishment of CLABSI-related goals.

Key Differences Among Sites With Varied CLABSI Outcomes

We identified several key “success factors” for HAI prevention and reduction. These factors are listed below. The key success factors were widely evident in the sites identified as higher performing based on CLABSI outcomes, and either missing or inconsistently implemented in the lower performing sites.

- Belief that “zero” is attainable
- Frontline accountability
- Strong leadership at all levels
- Infrastructure and resources to support improvement
- Supportive organizational culture
- Use of data

Challenges to HAI Prevention and Reduction Efforts

We also identified several common challenges to HAI prevention and reduction efforts, outlined below:

- Resource constraints
- Competing priorities
- Tracking/monitoring problems
- Changes in personnel
- Open ICU modelⁱⁱ

Conclusions

Successful implementation of evidence-based interventions can lead to dramatic and sustained reductions of CLABSIs in hospital ICUs. These evidence-based interventions have been widely disseminated in the clinical literature (e.g., Berenholtz, et al., 2004). Further, collaborative quality improvement initiatives have successfully supported widespread adoption of these evidence-based interventions in multiple hospitals (e.g., Pronovost et al., 2006), resulting in fewer CLABSIs for participating organizations. Our findings provide insight about both the management practices and factors associated with more successful implementation of these CLABSI reduction interventions and highlight challenges associated with CLABSI prevention efforts.

Our analyses suggest that HPWPs do, in fact, facilitate adoption and consistent application of practices known to prevent HAIs. We observed a wide range of employee engagement practices (e.g., communication of CLABSI goals, keeping staff informed of progress in preventing CLABSIs, involving staff in decisionmaking) that were important in motivating staff to accomplish CLABSI reduction goals. Combined, these practices emphasized the importance of,

ⁱⁱ Open ICU model—An ICU in which patients are admitted under the care of an internist, family physician, surgeon, or other primary attending of record, with intensivists available providing expertise via elective consultation. Intensivists may play a *de facto* primary role in the management of some patients, but only within the discretion of the attending of record.

and the organizations' commitment to, reducing CLABSIs. These efforts were supported by robust practices for acquiring and developing talent that were designed to make employees more knowledgeable about CLABSIs, to foster successful prevention, and to build employees' skills with an aim toward preventing CLABSIs. At the better sites, these development efforts were broader, seeking to enhance skills and commitment to safety among the wider workforce.

The success factors emphasized by the higher performing sites included (1) a belief that a rate of zero CLABSIs was attainable, (2) accountability for results, (3) strong leadership at all levels, (4) infrastructure and resources to support improvement efforts, (5) a supportive organizational culture, and (6) effective use of data. In contrast, several factors created challenges to CLABSI reduction efforts: (1) resource constraints, (2) competing priorities, (3) difficulties tracking/monitoring CLABSI data, (4) changes in personnel, and (5) an open ICU model. While it is difficult to eliminate other explanations for why success factors were more likely found among higher performing sites and barriers were more likely found among lower performing sites, these findings suggest that emphasizing CLABSI reduction goals and HAI prevention overall can help focus organizational improvement efforts and support initiatives designed to promote patient safety.

Our findings are consistent with those from a study of five collaborative regional HAI programs, which identified the following success factors: communication, frontline engagement, leadership support, and feedback and rewards (Welsh, et al., 2012). Further, in a study that demonstrated the sustainability of the Michigan Keystone Project, Pronovost and colleagues (2010) suggested that feedback about infection data, an “unremitting belief in the preventability of BSI [bloodstream infection],” and leadership involvement were critical to long-term success. Our research confirms these findings and provides additional evidence to support the importance of management practices in HAI prevention efforts.

An important limitation of this study is associated with our study design. Both our case study design and our purposive selection of sites to study created limitations with respect to generalization of our findings. In addition, without comparisons among a greater number of organizations with a diverse range of management practices linked to CLABSI prevention rates, it is difficult to conclude with certainty that specific HPWPs or HPWP subsystems are critical to outcomes. Although participants at all nine sites were able to provide illustrations of connections between management practices and CLABSI prevention interventions and outcomes, these links were not rigorously tested.

Future research can move beyond the limitations of this study by using larger and more diverse samples that would permit contrasts of management practices and allow for quantitative analyses of associations between HPWPs and CLABSI and other HAI outcomes. There is also an important future opportunity to reexamine these hospitals' management practices and CLABSI prevention efforts in order to improve our understanding about what may promote sustainability and success with respect to improved HAI outcomes over time.

Additional information about this project can be found in both the peer-reviewed and trade literature. Citations are provided in the Bibliography.

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Appendix 1. Definitions of High-Performance Work Practices

High-performance work practices (HPWPs) can be defined as *practices that have been shown to improve an organization's capacity to effectively attract, select, hire, develop, and retain high-performing personnel*. We refer to a set of specific HPWPs within an organization as a high-performance work system. Garman and colleagues (2011) identified the following HPWPs, organized into subsystems, as particularly relevant to health care providers.

Subsystem #1: Engaging Staff. The four practices in this organizational engagement subsystem share a common theme of ensuring employees' awareness of and personal stake in the organization's vision and its current level of success in pursuing that vision.

- *Conveying mission and vision*—Activities associated with communicating the organization's scope and purpose to employees, and clarifying their role in supporting that purpose.
- *Information sharing*—Practices through which current information on organizational performance and other information that could affect jobs is communicated to employees.
- *Employee involvement in decisionmaking*—Practices supporting employees' ability to influence the “decisions that matter” through mechanisms such as quality circles, process project teams, management/town hall meetings, and/or suggestion systems.
- *Performance-contingent compensation*—Policies and practices that link salary and/or bonuses to the employee's success in achieving organization-supportive goals. Examples include profit-related pay, gain-sharing, and goal-anchored bonuses.

Subsystem #2: Acquiring and Developing Talent. The four practices in this subsystem focus on building the quality of the organization's workforce through attention to attracting, selecting, and developing staff.

- *Rigorous recruiting*—Activities and outcomes associated with outreach to attract new employees. Examples include referral incentives to current employees, employee branding, and alumni programs. This category also includes strategic practices such as workforce planning and evaluation of recruiting systems.
- *Selective hiring*—Practices associated with ensuring that open positions are filled with the highest quality candidates available from the applicant pool. Examples include validated selection tools such as personality assessments, work samples, biodata, and/or assessment centers.
- *Extensive training*—Activities involving investment in staff development that is more than mandated/more than typical as another strategy to achieve greater relative organizational effectiveness.
- *Career development*—Practices that focus on identifying career opportunities/pathways for current employees, as well as providing training to support those opportunities. Practices related to career development also include an emphasis on internal labor pools for filling open positions.

Subsystem #3: Empowering the Frontline. These practices most directly affect the ability and motivation of frontline staff, clinicians in particular, to influence the quality and safety their care team provides.

- *Employment security*—Policies and practices that ensure employees greater than mandated security in their positions. They include policies supporting freedom from repercussion for speaking up about systems issues/concerns and practices that generally support stable employment (e.g., avoiding layoffs).
- *Reduced status distinctions*—Practices that emphasize egalitarianism across employee roles. Examples include policies and practices supporting open communication across disciplines.
- *Teams/decentralized decisionmaking*—Practices of formalizing/defining employees according to teams and providing those teams (and the individuals on them) greater latitude in decisionmaking related to how their work is organized and completed.

Subsystem #4: Aligning Leaders. These practices influence the capabilities of the organization's leadership in running and evolving the organization as a whole.

- *Management training linked to organizational needs*—Practices involving the alignment of leadership development resources with the strategic direction of the organization. Examples include use of core competency models and/or incorporation of goals to guide training, assessment, and feedback programs.
- *Succession planning*—Practices designed to proactively identify and address future leadership needs through leadership workforce analysis, leadership career planning, and development targeted toward preparing future leaders for promotion.
- *Performance-contingent compensation*—Practices that link a portion of leadership compensation to successful achievement of corporate, division, and/or departmental goals.

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