

Eliminating CLABSI, A National Patient Safety Imperative

Final Report on the National *On the CUSP: Stop BSI* Project

A Project of:

Health Research & Educational Trust

Johns Hopkins Medicine Armstrong Institute for Patient Safety and Quality

Michigan Health & Hospital Association Keystone Center for Patient Safety & Quality

Disclaimer: This report was developed with data collected and analyzed under contract with the Agency for Healthcare Research and Quality (AHRQ). The information and opinions expressed herein reflect solely the position of the authors. Nothing herein should be construed to indicate AHRQ support or endorsement of its contents.

October 2012



Table of Contents

EXECUTIVE SUMMARY.....	3
REPORT ORGANIZATION.....	6
PROJECT BACKGROUND.....	6
PROGRAM IMPLEMENTATION	8
National Project Team	8
Project Stakeholders.....	8
Education Program	9
Coaching.....	10
PROGRAM IMPACT	12
Project Participation	12
Project Results	15
WHAT WE LEARNED: FIVE KEY LESSONS	19
1. Have Well-Defined, Evidence-Based Interventions	19
2. Build a Solid Implementation Structure and Project Plan	19
3. Collect and Use Timely, Accurate, and Actionable Data to Improve Performance	20
4. Tailor National Program for Local and Unit Audiences.....	20
5. Evolve Project Strategies and Emphases Over Time.....	21
LESSONS ON HOW TO IMPROVE FUTURE NATIONAL COLLABORATIVES.....	23
Implementation Challenges.....	23
Key Success Factors.....	24
Improvement Opportunities for Future National Collaboratives.....	25
Sustainment.....	26
CONCLUSION	28
APPENDIX A: INTERVIEW QUESTIONS	29

EXECUTIVE SUMMARY

Health care-associated infections (HAIs) result in almost 100,000 deaths each year and cost the U.S. health system \$40 billion annually. Most of these deaths and costs are preventable. The U.S. Department of Health and Human Services' National Initiative to Reduce Healthcare-Associated Infections focuses on the need to dramatically reduce these infections. As part of this initiative, the Agency for Healthcare Research and Quality (AHRQ) funded a national effort to prevent central line-associated bloodstream infections (CLABSI) in U.S. hospitals beginning in 2008: *On the CUSP: Stop BSI*. AHRQ designed this project to replicate a highly successful State-based initiative in all 50 States, the District of Columbia and Puerto Rico. AHRQ's project goals were the reduction of CLABSIs to 1 per 1,000 central line days and to improve unit safety culture in intensive care units (ICUs) and non-ICUs. This final report summarizes project outcomes and lessons learned.

On the CUSP: Stop BSI was led by a unique partnership—the Health Research & Educational Trust (HRET) of the American Hospital Association, the Johns Hopkins Medicine Armstrong Institute for Patient Safety and Quality¹ (Armstrong Institute), and the Michigan Health & Hospital Association's Keystone Center for Patient Safety & Quality (MHA Keystone). HRET managed the national effort. The Armstrong Institute created an effective change package that consisted of two components: technical, evidence-based practice; and an adaptive, innovative, hospital unit-based patient safety program. MHA Keystone originally applied this change package to dramatically reduce CLABSIs in Michigan, and the Michigan experience formed the basis of *On the CUSP: Stop BSI*. HRET, the Armstrong Institute, and MHA Keystone comprised the National Project Team (NPT), which oversaw all aspects of the national program.

The national program was organized and implemented as a State- or region-level collaborative, structured around the hospital association in the State or region², with centralized education, data collection, and program management functions provided by the NPT. Recruitment of States began in 2008. Once hospital associations agreed to participate in the 2-year program, they were assigned to a group or cohort with other States/regions that began the program at the same time. At the State/regional level, hospital associations or State sponsors recruited and coordinated efforts with member hospitals and assigned a lead staff person, most often the senior quality manager in the association, to become the "State lead" to work directly with ICU and non-ICU teams, as well as the NPT. The State or regional association was also encouraged to invite State health departments, Quality Improvement Organizations (QIOs) and other State-based quality improvement and HAI prevention organizations to collaborate in the program and to help ensure coordination of HAI reduction activities.

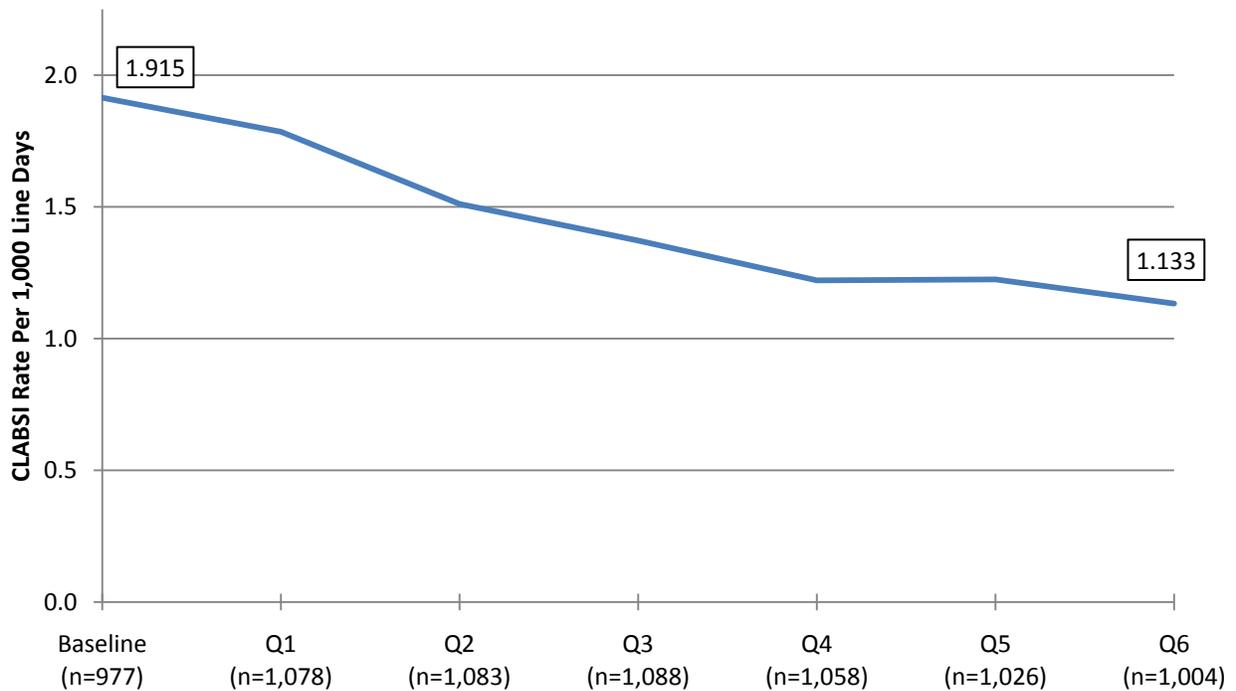
Participating in a total of 6 cohorts were 44 States, the District of Columbia, and Puerto Rico. Collectively, these States and regions recruited more than 1,000 hospitals and 1,800 hospital units to participate in the project. Twenty-three States began the project in 2009, 12 States and the District of Columbia began during 2010, and 9 States and Puerto Rico began the effort in 2011.

¹ Formerly known as the Johns Hopkins University Quality Safety & Research Group

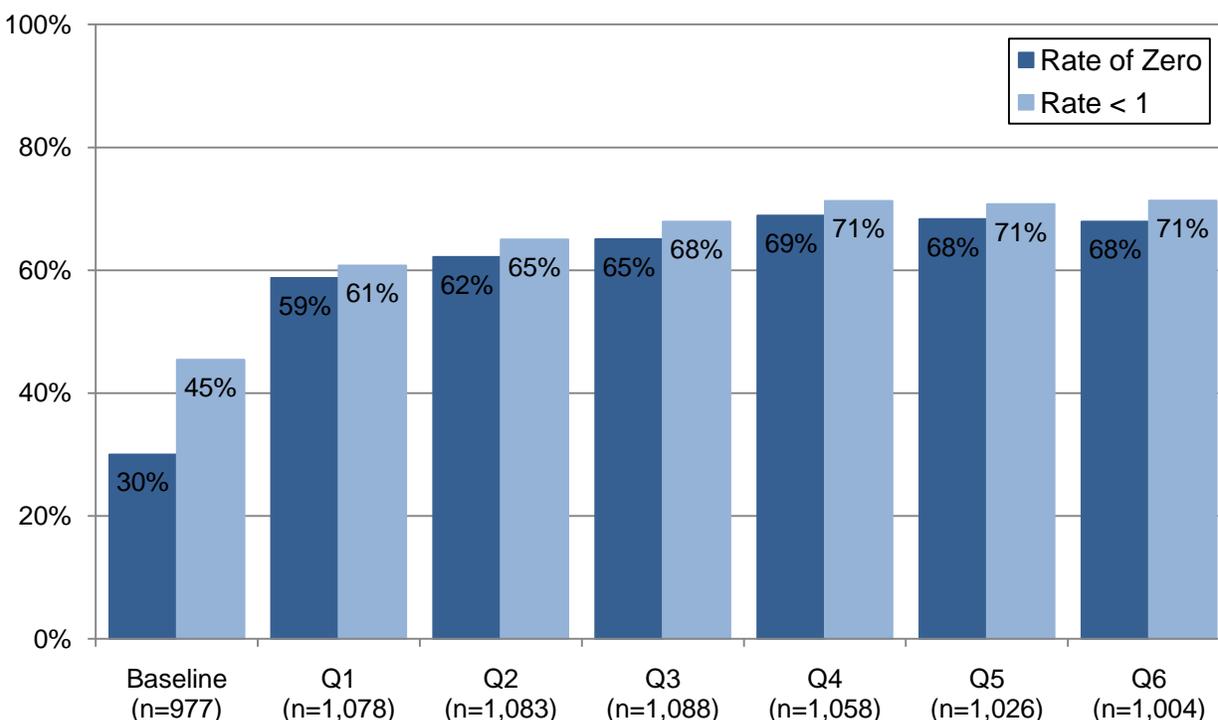
² Sometimes, the program was structured around a State sponsor as in the case of Hawaii.

On the CUSP: Stop BSI succeeded in reducing CLABSI nationwide. Analysis of available adult ICU data indicates that States reduced their rate from a baseline of 1.915 infections per 1,000 line days to one of 1.133 infections, or a relative reduction of 41 percent. The percentage of units with zero CLABSIs for at least one quarter increased from 30 percent at baseline to 68 percent at quarter six. Participating non-ICU and pediatric units had similar, impressive reductions in CLABSI rates. States that started with low CLABSI rates achieved additional improvements, again demonstrating that “getting to zero” was possible, a notion clinicians had not accepted until recently.

Adult ICU CLABSI Rate Overall Over Time



Percentage of Reporting Units with CLABSI Rate of 0/1,000 or Less than 1/1,000 CL



On the CUSP: Stop BSI is estimated to have saved an estimated 290 to 605 deaths assuming a 12-25 percent CLABSI mortality rate and an estimated \$97,777,123 to \$244,318,277 in excess costs averted to date, figures that are projected to continue to increase over time.

Project Summary of CLABSIs Prevented, Deaths Prevented and Excess Costs Averted

Prevented		Excess Costs Averted (in millions)	
CLABSIs	Deaths (Range)	Mean	Range
2,419	290 - 605	\$171 M	\$97 M - \$244 M

Drawing from their experiences, the *On the CUSP: Stop BSI* national project team and the State leaders identified five key lessons learned about how to implement a large, national quality improvement project:

1. Have well-defined, evidence-based interventions
2. Build a solid implementation structure and project plan
3. Collect and use timely, accurate, and actionable data to improve performance
4. Tailor national program for local and unit audiences
5. Evolve project strategies and emphases over time

The lessons learned contributed to the project's success and can be applied to future large scale interventions.

REPORT ORGANIZATION

After providing project background about the origins of *On the CUSP: Stop BSI*, this report is organized to answer three key questions:

1. How did the project work?
2. Did the project work?
3. What did we learn?

A final section summarizes lessons on how to improve future national collaboratives. This section includes the sustainment plans that have been developed, or are being developed, by States/regions to continue to eliminate CLABSI.

PROJECT BACKGROUND

In 2003, AHRQ funded a highly successful program to use evidence-based interventions and a patient safety model called the Comprehensive Unit-based Safety Program (CUSP) to prevent central line-associated blood stream infections (CLABSI) and ventilator-associated pneumonia, and to improve the culture of safety in 127 intensive care units (ICUs) across Michigan. MHA Keystone partnered with the Armstrong Institute on a 2-year initiative called the MHA Keystone: ICU project.

AHRQ heralded this effort as one of their most successful projects. The MHA Keystone: ICU project reduced CLABSI in the first 18 months by 66 percent. The median CLABSI rate was 2.7 at baseline and dropped to a median of 0.0 in that period. A follow-up study published in 2010 reported that this rate of reduction was sustained for more than three years.³ The MHA Keystone: ICU project achieved these results by using a patient safety platform developed by the Armstrong Institute called CUSP and an evidence-based change package to prevent CLABSI.

Based on this success, AHRQ contracted in fall 2008 with HRET to replicate this program nationally, starting with at least 10 hospitals in each of 10 States. The contract was expanded in fall 2009 to include all 50 States, the District of Columbia, and Puerto Rico. HRET's partners were the Armstrong Institute, MHA Keystone, and State and regional hospital associations, which in turn partnered with hospitals and units that they recruited into the program. HRET, the Armstrong Institute, and MHA Keystone staff comprised the national project team (NPT) which named the national initiative, *On the CUSP: Stop BSI*.

The AHRQ program goals were to: 1) reduce CLABSIs to a rate of no more than 1/1,000 central line days, and 2) to improve patient safety culture on hospital units. Each State and regional hospital association executive signed a letter committing to these goals, to assigning a staff member to serve as the State lead to coordinate the program in the State/region, to recruiting at least 10 hospitals, and to complying with data collection and performance monitoring requirements. Some States were unable to recruit 10 hospitals. For example, Delaware had only nine acute care hospitals in the State, and States in later cohorts had significant challenges recruiting hospitals because of previous work on CLABSI reduction and the perception that the

³ Pronovost PJ, Goeschel CA, Colantuoni E, Watson S., Lubomski LH, Berenholtz, SM, et al. Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: observational study. *BMJ*. 2010;340:c309.

On the CUSP: Stop BSI program would not be particularly beneficial. For larger States unable to recruit 10 hospitals, the NPT decided that it was preferable to include them in order to disseminate CUSP. This proved to be a valuable strategy as many of the States that are in the AHA/HRET Hospital Engagement Network have expressed interest in applying the CUSP model to their Partnership for Patients work to reduce hospital-acquired conditions.

AHRQ directed HRET and the NPT to work with States to recruit both ICUs and non-ICUs, include critical access hospitals, and to attempt to recruit all 50 States, the District of Columbia, and Puerto Rico.

In addition, AHRQ directed HRET to encourage participating hospital associations to coordinate their CLABSI prevention efforts with other regional stakeholders. HRET encouraged States/regions to develop consortia comprised of regional stakeholders such as the QIO, Department of Health, Patient Safety Organization (PSO), local infection prevention chapters, and other stakeholders. Many States used their regional HAI-prevention work groups developed as a result of the Centers for Disease Control and Prevention (CDC) American Recovery and Reinvestment Act (ARRA) grants or other mechanisms to inform key stakeholders of *On the CUSP: Stop BSI* activities and invite them to listen to teleconferences and attend in-person meetings. These included representatives from the State QIO, State health department, PSO, State infection prevention chapters, and in a few cases, private payers.

Over the course of the four-year period, HRET recruited 44 States, the District of Columbia, and Puerto Rico. Alaska, California, Maine and Vermont chose not to participate in the program. Michigan was not included as a participating State given its role as a national partner. Rhode Island ICUs participated in an effort similar to the MHA Keystone: ICU project prior to the AHRQ expansion contract and succeeded in eliminating virtually all CLABSIs.⁴

In order to best accommodate the readiness of hospital associations and their members to participate and to manage available project resources, the project was rolled out in a total of six cohorts of States/regions over the 4-year contract period. Each State/region and their participating hospitals participated in the *On the CUSP: Stop BSI* program for approximately 24 months, with the exception of the last cohort of States, Cohort 6, which participated for approximately 20 months.

⁴ DePalo VA, McNicoll L, Cornell M, Rocha JM, Adams L, Pronovost PJ. The Rhode Island ICU Collaborative: a model for reducing central line-associated bloodstream infection and ventilator-associated pneumonia statewide. *Qual Saf Health Care* 2010;19(6):555-61.

PROGRAM IMPLEMENTATION

This section of the report addresses the question, “*How did the project work?*” In other words, how was the project implemented? Overviews of the national project management structure and implementation processes are described, along with a brief summary of the education, coaching, and performance monitoring components of *On the CUSP: Stop BSI*.

The *On the CUSP: Stop BSI* project was a large quality improvement collaborative with many stakeholders and a complex implementation. Having an evidence-based change package was necessary but not sufficient to managing this large, multifaceted national project. Building and maintaining a solid implementation and project management structure crucially contributed to the project’s success. The following briefly describes the roles and responsibilities of the National Project Team—HRET, Armstrong Institute, and MHA Keystone—which oversaw all aspects of project implementation.

National Project Team

The National Project Team (NPT) united three organizations with distinctive expertise and experience to contribute to the overall national effort—HRET, the Armstrong Institute, and MHA Keystone. The lead responsibilities of each partner are listed in the chart below.

Partner	Role
HRET	HRET was the prime contractor of the project and was responsible for project administration and management, budget oversight, recruitment of States, and development of State lead resources.
Armstrong Institute	The Armstrong Institute provided educational content and resources for implementation at the hospital unit level. They conceived and developed CUSP and provided faculty who coached hospital teams and presented at educational meetings.
MHA Keystone	MHA Keystone coordinated data collection and reporting and provided project implementation and coaching support. They provided faculty who coached hospital teams and presented at educational meetings.

Project Stakeholders

Understanding the needs and potential contributions of all of the different stakeholders was also important at the national and State/regional levels. The following table describes the major stakeholder groups and their role in this project.

Stakeholder	Role
Department of Health and Human Services (HHS)	HHS is the United States Federal Government’s principal agency for protecting the health of all Americans and providing essential human services, especially for those who are least able to help themselves.
Agency for Healthcare Research and Quality (AHRQ)	One of the 12 agencies within HHS, AHRQ supports research that helps people make more informed decisions and improves the quality of health care services. AHRQ funded the <i>On the CUSP: Stop BSI</i> project.
Technical Expert Panel (TEP)	The TEP was comprised of clinicians, researchers, policymakers, and State hospital associations. TEP members provided input to the NPT on program implementation and evaluation.

Stakeholder	Role
Hospital Associations	State and regional hospital associations were responsible for the recruitment of hospital units, leading monthly coaching calls, convening statewide face-to-face educational meetings, and coordinating the project at the State or regional level.
Hospital Units	Hospital units were recruited by the State/regional hospital associations. Hospital units were responsible for collecting and submitting project data, implementing CUSP in their unit, participating in coaching and content calls, and attending face-to-face educational meetings with other units in their State/region.
Patients and Families	Patients and families were the ultimate target audience for this improvement collaborative.

To manage the range of activities and multiple deliverables associated with this large and complex project, HRET built an internal operations team and developed standardized processes to implement the program and monitor and report progress. HRET designed its project management structure based on six key functional areas: 1) State lead program management resources, 2) recruitment and State hospital association relationship management, 3) administration and analytic database management, 4) communications, and 5) contracts and financial management. Individual staff members were identified and responsible for overseeing each of the functional areas.

Education Program

Teleconferences and In-person Meetings

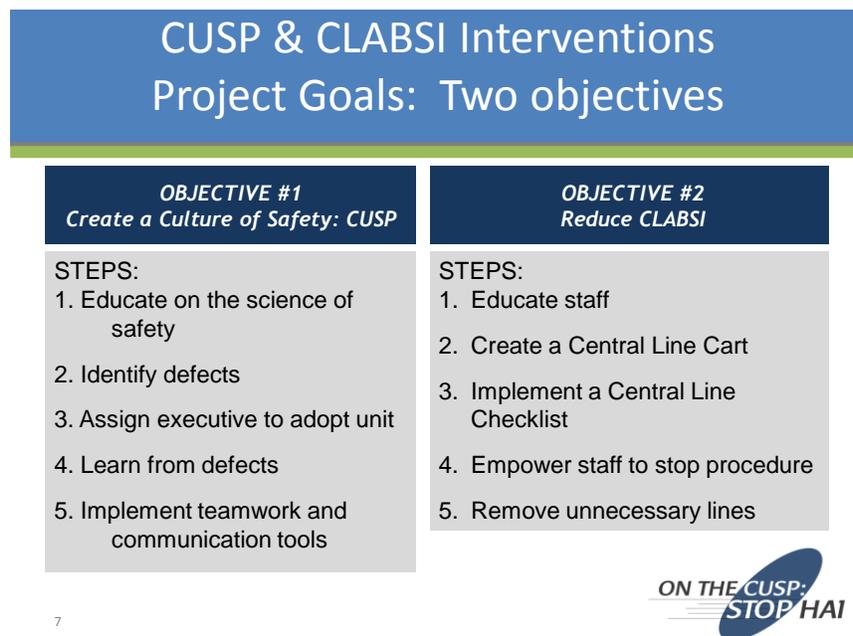
State leads and their participating hospital units were expected to attend or listen to archived recordings of five weeks of immersion calls as well as monthly didactic content calls, which began one month after the end of the immersion calls. Monthly supplemental calls were optional and provided information that was related, but not core, to the CUSP model or CLABSI elimination strategies and techniques. All calls were archived on the project website, www.onthecuspstophai.org. Unit teams began presenting on monthly supplemental calls after several months into the project and once State leads were able to identify excelling teams. State leads and the NPT received positive feedback from unit teams on this peer-to-peer teaching.

State leads were required to host at least two in-person meetings throughout the course of their two-year participation, and most States hosted three meetings. The kick-off meeting occurred approximately 1-3 months after the immersion calls, the mid-course meeting was approximately 12 months later, with the final meeting occurring any time between 24 and 28 months after the State/region's start of the program. States with low numbers of participating hospitals spread geographically far apart such as Idaho, Montana, Wyoming, and North Dakota held combined webinars for some of their meetings. In almost all cases, these meetings were attended by at least one Armstrong Institute faculty member and an HRET staff member. An MHA Keystone advisor typically only attended the kick-off meeting to help teams acclimate to the web-based data repository, Care Counts, maintained by MHA Keystone.

Manuals and National Program Web Site

The *On the CUSP: Stop BSI* change package had two major components—an adaptive portion and a technical portion. The adaptive work was to create a culture of safety using CUSP to improve teamwork and communication and to investigate and correct defects. The technical work was to reduce CLABSI through an evidence-based practice bundle or change package. Both objectives and the key steps to achieving them are listed in Figure 1 below. In addition to the immersion calls, monthly content and supplemental calls, and in-person meetings, all State leads and hospital units were instructed at the start of the program to review the CUSP Manual to improve safety culture and the CLABSI Implementation Guide to eliminate CLABSI, available on the national program website, www.onthecuspstophai.org. The CUSP Manual has been expanded and is now called the CUSP Toolkit. AHRQ publicly released the CUSP Toolkit in September 2012.

Figure 1. Project Objectives



Coaching

Each State/region was assigned two advisors—one from the Armstrong Institute and one from MHA Keystone—to coach teams on monthly calls and to be available to answer State lead and unit team questions between calls. Armstrong Institute advisors used the time on coaching calls to reinforce content from the most recent content call, whereas the MHA Keystone advisor helped teams focus on their teamwork and CLABSI rate data and share the Michigan experience.

These coaching calls were led by the State lead and always included a monthly review of CLABSI and teamwork data. The advisors would often dedicate time to a particular CUSP tool. Each call had ample time on the agenda to allow teams to ask questions about interventions and data collection and to share their experiences.

Given the limited number of faculty advisors and the need to encourage State leads to learn how to coach on their own, the NPT developed a schedule in which State leads coached teams on their own after a year's experience with NPT coaches. Some States combined their coaching calls with those of other States in order for State leads to support each other in the coaching process.

PROGRAM IMPACT

This section addresses the question, "Did the project work?" and describes project penetration, the impact of the project on reducing CLABSI rates, and estimates of lives saved and costs averted based on estimates of infections prevented. This section also summarizes findings related to units that submitted data on the Hospital Survey on Patient Safety Culture (HSOPS) and the Team Checkup Tool (TCT). A separate, data-related companion guide describes the data analysis methodologies and provides more detail regarding results.

Project Participation

A total of 44 States, the District of Columbia, and Puerto Rico participated in *On the CUSP: Stop BSI*. Collectively, these States and regions recruited more than 1,000 hospitals and 1,800 hospital units to participate in the project, representing over 25 percent of all adult ICUs in the nation. Twenty-three States began the project in 2009, 12 States and the District of Columbia began during 2010, and 9 States and Puerto Rico began the effort in 2011.

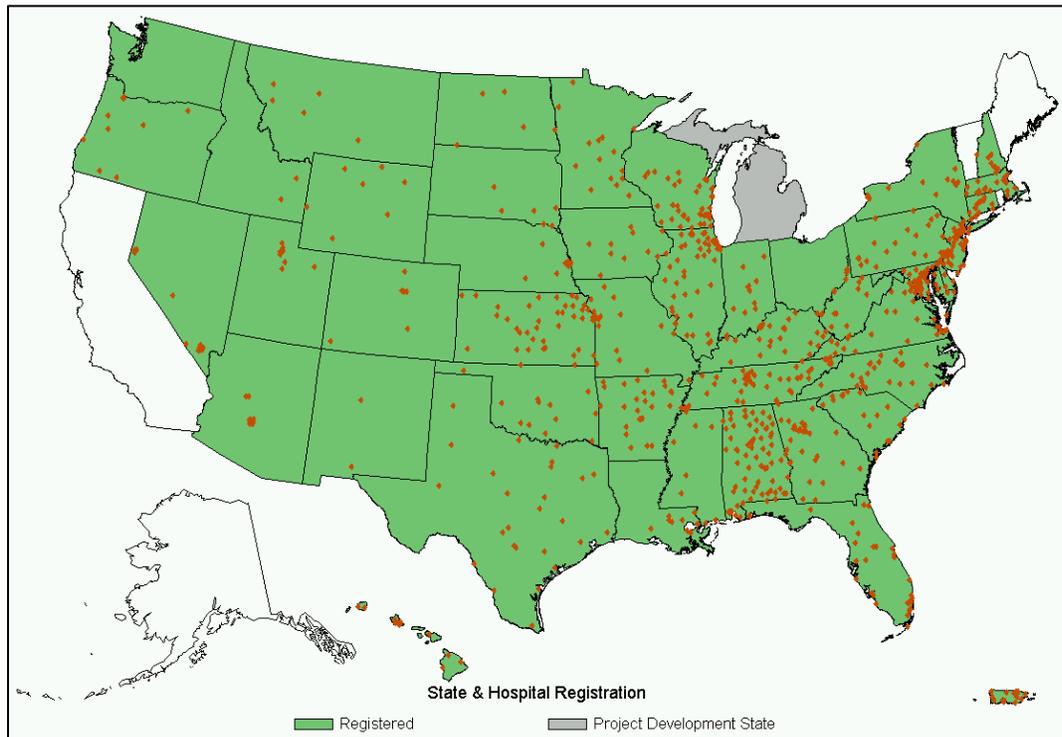
State Participation

Recruitment into the project was an ongoing process that began in fall 2008 and ended in summer 2011. Lead organizations in the States were encouraged to recruit as many teams of participants as they could and directed to recruit a minimum of 10 hospitals per State. The ongoing success of this program, awareness of impending Centers for Medicare & Medicaid Services (CMS) public reporting of CLABSI rates, and the 2011 requirement that hospitals submit CLABSI data into NHCN encouraged additional hospitals to enroll. Once States agreed to participate, they were placed into a project group or "cohort" along with other States beginning the project at the same time. Six cohorts, comprising 44 States, the District of Columbia, and Puerto Rico completed the project. Because some State hospital associations recruited hospitals at various periods, a State may have participated in more than one cohort. Although Michigan is not depicted as a formal project participant, Michigan hospitals continue to work with the MHA Keystone Center on sustaining the exceptionally low CLABSI rates they achieved in the initial MHA Keystone: ICU project.^{5,6} Figure 2 shows all States and hospitals registered in the project.

⁵ Pronovost P, Needham D, Berenholtz S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med* 2006 Dec 28;355(26):2725–32.

⁶ Pronovost P, Goeschel CA, Colantuoni E, et al. Sustaining reductions in catheter-related bloodstream infections in Michigan intensive care units: an observational study. *BMJ* 2010 Feb 4;340:c309.

Figure 2. States & Hospitals Registered in CLABSI*



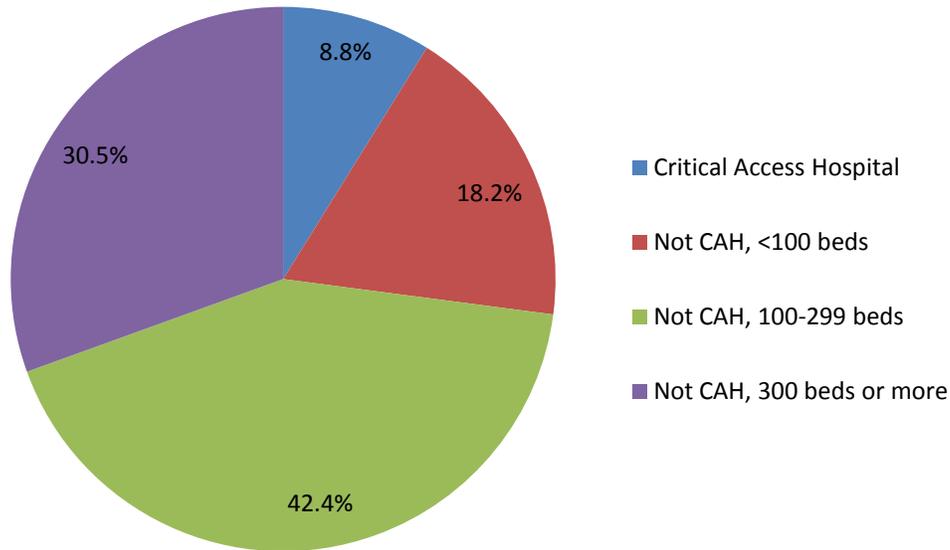
*Ohio and Washington State did not release the names of hospitals.

Hospital Participation

Levels of recruitment within States varied substantially. State and regional recruitment of hospitals ranged from 93.3 percent to 8.7 percent. Alabama, Delaware, Hawaii, and Maryland all had more than 50 percent of their hospitals participating in the project. Because some States have a higher percentage of very small hospitals that do not have an ICU or do not insert central lines, some variation in the percentage of hospitals in each State that may benefit from being involved in the project is to be expected.

Figure 3 illustrates the proportion of participating hospitals by bed size. The majority of hospitals that participated in *On the CUSP: Stop BSI* had between 100 and 299 beds, a little over 42 percent. Critical Access Hospitals (CAH) comprised of 25 beds or fewer represented almost 9 percent, the smallest percentage of participating hospital type.

Figure 3. Hospital Participation by Bed Size



Hospital Unit Participation

The majority of participating units were adult ICUs (71 percent), however some acute care, adult non-ICU and pediatric units also participated (24 percent and 5 percent respectively). Figure 4 and Figure 5 show the percentages of adult ICUs and adult non-ICUs by type, respectively.

Figure 4. Percentage of Adult ICUs by Type

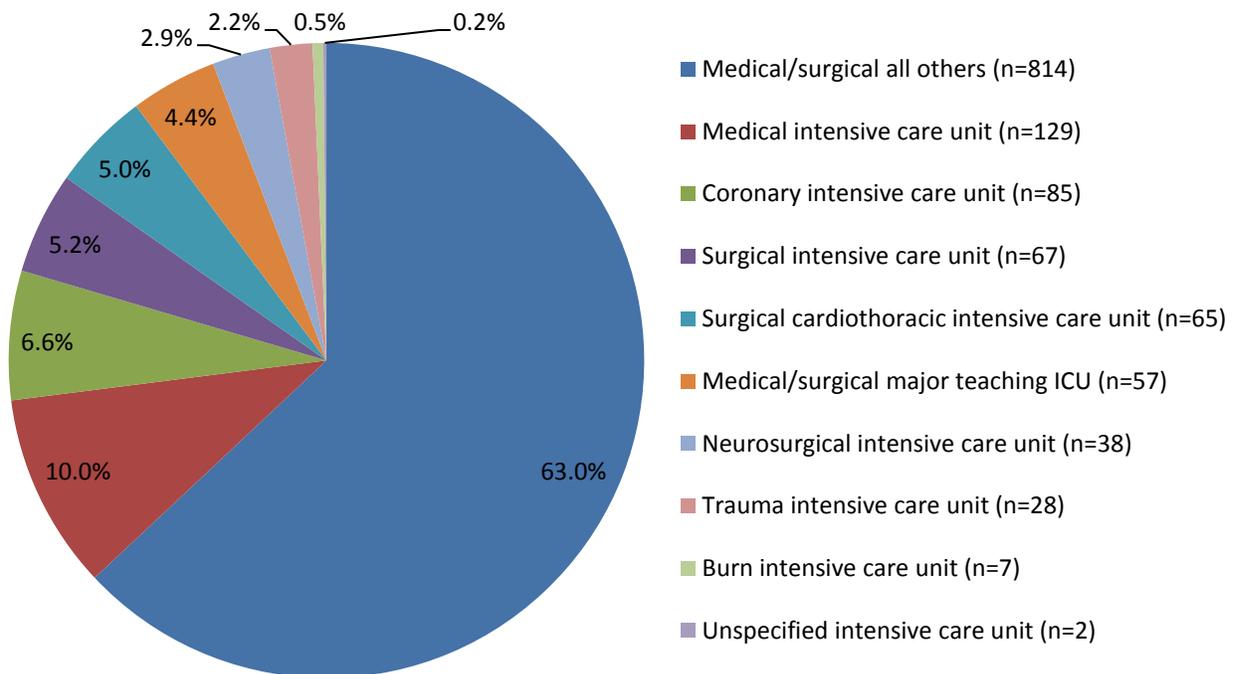
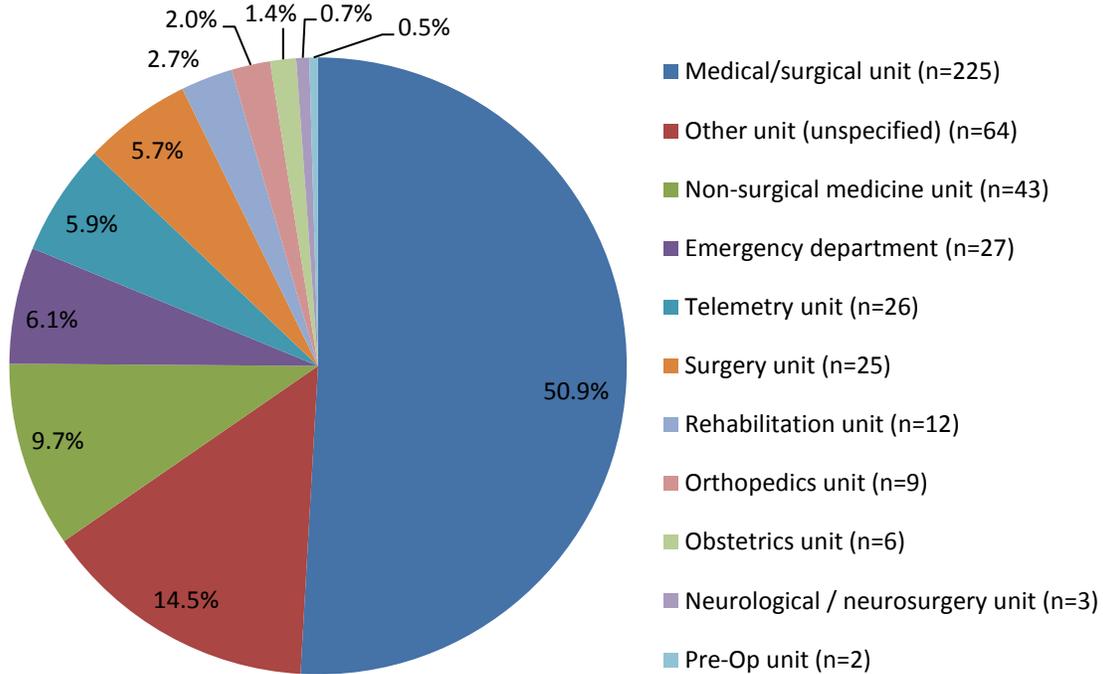


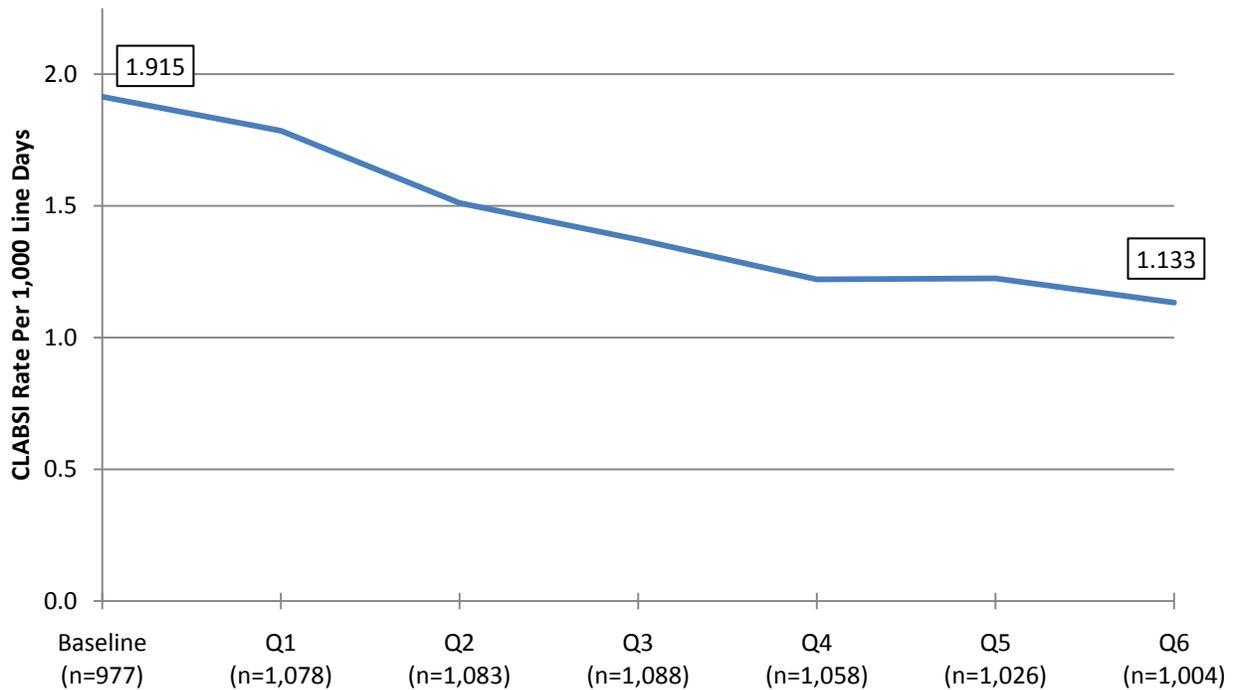
Figure 5. Percentage of Adult Non-ICUs by Type



Project Results

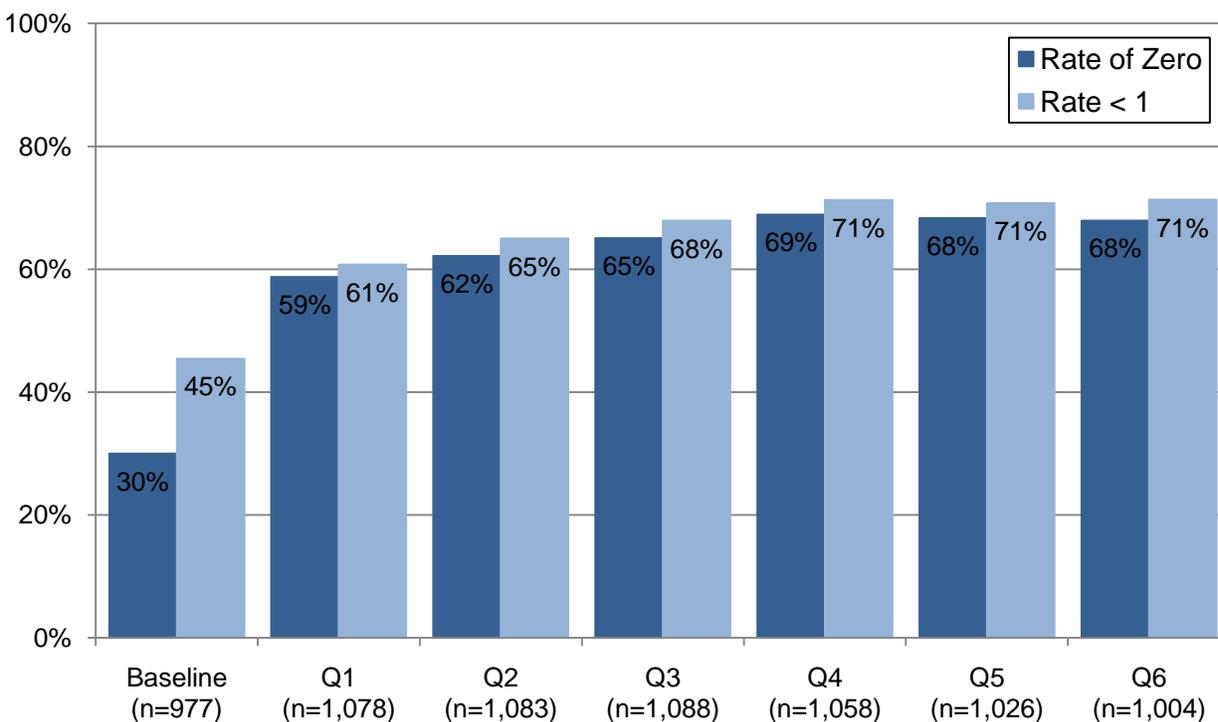
On the CUSP: Stop BSI succeeded in reducing CLABSIs nationwide. States reduced their adult ICU rate from a baseline of 1.915 infections per 1,000 line days to a rate of 1.133 infections, or a relative reduction of 41 percent. Figure 6 shows this reduction in adult ICU CLABSI rates overall over time. A total of 1,124 adult ICUs met inclusion criteria although some variability in data submission was found over time. A relatively small percentage of units with CLABSI rates over 3 per 1,000 central line days are the primary reason that the average CLABSI rate remains above 1.0. States that started with low CLABSI rates achieved additional improvements, again demonstrating that “getting to zero” was possible, a notion clinicians had not accepted until recently. Non-ICU and pediatric units had similar, impressive reductions in CLABSI rates.

Figure 6. Adult ICU CLABSI rate overall over time



In addition to decreasing CLABSI rates overall over the course of the project, the percentage of ICUs reporting a rate of zero or less than one per 1,000 central line days increased over time from 30 percent to 68 percent. The percentage of ICUs reporting a rate of less than 1 per 1,000 central line days increased over time from 45 percent to 71 percent. Figure 7 presents the percentage of units that achieved a CLABSI rate of zero and the percentage of units that achieved a CLABSI rate of less than one.

Figure 7. Percentage of Reporting Units with CLABSI Rate of 0/1,000 or Less than 1/1,000 CL



Estimates of Infections Avoided, Lives Saved, and Costs Averted

The NPT did a systematic review of the literature to arrive at a reasonable cost of CLABSI. Out of almost 850 abstracts and 150 articles, staff found 6 articles that met inclusion criteria. After weighting and adjusting to 2012 dollars, the average CLABSI cost reported in the literature was \$70,696 with a range (\pm two standard deviations) of \$40,412 to \$100,980. Assuming that baseline rates would have remained stable without the study intervention, an estimated total of 2,187 to 2,419 CLABSIs were prevented over the course of the project. Assuming a 12-25 percent mortality rate, an estimated 290 to 605 deaths were prevented during the project. Lastly, an estimated \$97,777,123 to \$244,318,277 in excess costs were averted as well during this time period. This range is similar to the range reflected in the Johns Hopkins CLABSI Opportunity Estimator website (range of \$40,000 to \$117,000 per infection).⁷

Other Findings

Hospital Survey on Patient Safety Culture

In order to measure the second major project goal of improving safety culture, teams administered the Hospital Survey on Patient Safety Culture (HSOPS) at project onset or baseline and then again near completion of the two-year participation period. The HSOPS is comprised of 10 dimensions assessing safety culture and 4 outcome variables. Among adult ICUs, a

⁷ Johns Hopkins CLABSI Opportunity Estimator at: http://www.hopkinsmedicine.org/quality_safety_research_group/our_projects/stop_bsi/toolkits_resources/clabsi_estimator.html, accessed on July 27, 2012.

statistically significant improvement was found in two dimensions: “feedback and communication about error” and “teamwork within unit.” No statistically significant difference was found among the remaining HSOPS dimensions. The *On the CUSP: Stop BSI Companion Guide* provides more information about the analyses conducted on the baseline and follow-up HSOPS scores for adult ICUs that completed the survey.

Team Checkup Tool

Units were requested to complete a monthly Team Checkup Tool (TCT) which was designed to help teams monitor progress in implementing CUSP tools and to assess unit teamwork and communication. Overall, unit teams undervalued the tool, and adult ICU units completed it only 18 percent of the time. However, results found an increase in “adoption of CUSP activities” and “implementation of CLABSI reduction steps” domains over time and a decrease in “progress barriers” with time.

WHAT WE LEARNED: FIVE KEY LESSONS

This section of the report addresses the question, “*What did we learn?*” by drawing on the experiences of the NPT over 4 years, and with interviews conducted with 11 State leads.⁸ To better understand the facilitators and barriers to the project, two HRET staff conducted semi-structured interviews lasting 60 to 90 minutes each with the State leads of six high-performing and five challenged States. One staff person led the interview, while another recorded and coded responses. High-performing and challenged States were defined by the degree of CLABSI rate reduction or the number of units in a State that sustained a zero CLABSI rate for the last two reporting periods and degree of unit team engagement determined by the number of recruited and retained hospitals, data submission rates, and unit attendance on content and coaching calls. The interview questionnaire was designed to elicit information about a number of topics: why the association joined the initiative; association leadership engagement; association experience with QI collaboratives; association QI infrastructure (staff, qualifications, and QI committees); State consortium stakeholders; educational programming, coaching calls, and overall faculty support; data collection and use; NPT support; key challenges and successes; and sustainability plans. The 40-question interview guide is provided in Appendix A.

1. Have Well-Defined, Evidence-Based Interventions

A national campaign has distinct requirements that do not exist in smaller-scale improvement efforts. Only well-defined interventions with demonstrated significant results can be successful in national efforts where there are limited resources and capacity to execute them. The published success of the MHA Keystone: ICU project contributed significantly to HRET’s ability to recruit States to *On the CUSP: Stop BSI*. The published results demonstrating the impact of the MHA Keystone: ICU project legitimized the *On the CUSP: Stop BSI* program in two ways: 1) by heightening awareness of the significant morbidity and mortality associated with central line infections, and 2) demonstrating that these infections could be reduced to almost zero. The magnitude of this success in 127 ICUs across the entire State of Michigan helped alleviate the skepticism and fatigue that surround many quality initiatives that have proliferated in recent years. *On the CUSP: Stop BSI* was adapted closely from the MHA Keystone: ICU project and had well-defined interventions--the CUSP model to address safety culture and the technical change package.

2. Build a Solid Implementation Structure and Project Plan

National Experts with Proven Ability

Having highly credible national experts with proven ability to achieve project goals is a critical element of any successful national quality improvement campaign, and this was certainly the case with *On the CUSP: Stop BSI*. All State leads interviewed by HRET stated that the national expertise and leadership of members of the NPT was a primary factor in their recruitment to this program.

Successful Implementer

⁸ HRET staff interviewed State leads from Florida, Georgia, Hawaii, Illinois, Maryland, Minnesota, Missouri, Nebraska, Oregon, South Dakota and Wisconsin.

The results of *On the CUSP: Stop BSI* demonstrate that MHA Keystone and the Armstrong Institute had developed an education and coaching program that could be scaled up nationally. The ability of MHA Keystone to clearly articulate what worked in their State was also extremely important. Knowing that a peer organization could and did achieve success encouraged other States/regions to try this in their home territory.

Endorsement and Coordination of Key Stakeholders

The NPT communicated frequently with leaders working on the elimination of HAIs at CDC and HHS in order to inform them of the goals and progress of *On the CUSP: Stop BSI*. National content calls and State lead meetings featured CDC and HHS as faculty to explain data definitions and discuss the HHS national campaign to eliminate HAIs. CDC and HHS representatives also served on the program's Technical Expert Panel (TEP) which, as mentioned earlier, provided periodic feedback to the NPT on the project's direction, implementation and evaluation. And as noted above, States/regions were strongly encouraged to work with State and regional stakeholders to coordinate successful strategies for eliminating CLABSI.

National Infrastructure

The creation of a national infrastructure to set goals, coordinate efforts, and assure accountability was vital to the successful implementation of *On the CUSP: Stop BSI* (see "National Project Team" and "Project Stakeholders" sections). As the project progressed, the NPT learned to improve communication channels to ensure effective coordination among all groups. To keep State leads informed, HRET created a weekly update, which State leads could use in turn to communicate with their unit teams. The NPT held monthly State lead calls in which State leads could share their experiences and strategies with their peers.

3. Collect and Use Timely, Accurate, and Actionable Data to Improve Performance

A Web-based data system that units could easily use to upload teamwork and CLABSI rate data and which States could use to generate reports was critical to the success of this initiative. At the start of the project, few hospitals were entering infection data into NHSN so most participants submitted data to the NPT through the Care Counts data repository operated by MHA Keystone. As time progressed, the NPT worked with State hospital associations and CDC so that participant data could be pulled directly from NHSN into Care Counts, avoiding the need for duplicate data entry. Once data was in the system, States/regions viewed data reports generated by the NPT on their monthly coaching calls to monitor progress. The NPT used these reports to track State and national progress. In addition to reporting progress to AHRQ on a semi-annual basis, the NPT was able to use the database to identify units with a rate of 3/1,000 central line days or higher in the last reporting quarter. The NPT provided an action planning kit for States and regions to assist them in doing one-on-one follow up with each of these units to reduce their CLABSI rates. Of the units identified, about half dropped their rates since targeted efforts were implemented.

4. Tailor National Program for Local and Unit Audiences

Hospitals and regions do not all begin improvement efforts with the same level of knowledge, attitudes, and skills, and it became apparent early on in the project that the NPT needed to accommodate these differences. Examples of how the NPT addressed local and special needs included holding Critical Access and Long-term Acute Care affinity group calls, developing a neonatal CLABSI elimination collaborative and holding conference calls on central line maintenance which surpassed line insertion as the biggest opportunity for CLABSI reduction. The NPT also made itself available to States and regions with less regional quality improvement experience, limited staff and/or those without clinical backgrounds. State leads in States with a history of successful quality improvement collaboratives were asked to share their experiences and resources with other States and asked their unit teams to present on national calls. In the case of Puerto Rico, it soon became apparent that Spanish translation services were needed on monthly coaching calls and that the CUSP Manual and CLABSI Elimination Toolkit needed to be translated into Spanish. The “Science of Safety” video was also made available in Spanish to support staff from participating Puerto Rican units.

States also asked for a focus on the neonatal intensive care unit (NICU). In fall 2011, HRET partnered with the Perinatal Quality Collaborative of North Carolina (PQCNC) to leverage existing, State-based neonatal networks to recruit nine States that registered 100 NICUs. Using a slightly different model than *On the CUSP: Stop BSI*, this national neonatal central line-associated bloodstream infection project, also known as the NCLABSI project, employed neonatologists and clinicians as the State leads. Participating NICUs received CUSP education on a shortened timeframe, a technical bundle that was geared for the neonatal population and submitted their rate and teamwork data into a database developed by PQCNC. A separate, final report on the results of NCLABSI was submitted to AHRQ.

Supplemental funds were provided by AHRQ to States/regions to support local needs. States/regions could apply for these supplemental funds by outlining their unique or local needs and a plan of action. For example, Missouri saw a need to tailor the CUSP curriculum for their hospital units, and Wisconsin decided to make improvements to their State hospital association listserv and database. For their final in-person meeting, Ohio focused the agenda on immunosuppressed patients and central line maintenance because they saw an opportunity to make large gains in that area. It was important to recognize and financially support States/regions and hospitals that had special content needs and to adapt the project to fit their interests and capabilities.

5. Evolve Project Strategies and Emphases Over Time

Work with Late Adopters

On the CUSP: Stop BSI was a multi-phase effort spanning four years. Over that time, there were changes that required the NPT to adjust its strategies and emphases. The knowledge, skills, and attitudes of the State and regional participants changed over time. For example, the last cohort of States did not consist of early adopters, and they needed additional support. The NPT met frequently to try to address the lower level of engagement of these State leads and their unit teams. And while no particular solution was developed, the NPT did attempt to focus

on the “late majority” and “laggards” of the Rogers Innovation Adoption Curve with a “higher intervention technique with more frequent tracking and communication and coaching services.”⁹

Seek New Opportunities to Reduce CLABSI

As rates declined, the NPT, States/regions, and unit teams looked for opportunities to reach zero CLABSIs. This included changing focus on central line insertion to central line maintenance and disseminating guidelines on dressing changes and hub scrubbing. It involved disseminating CUSP and CLABSI elimination interventions to different areas of the hospital such as non-ICUs and hemodialysis units, and focusing on special patient populations such as those who were immuno-suppressed.

Adapt to Changing External Environment

The NPT learned to be flexible in responding to the changing environment at all levels—from the national level to the unit level. This manifested itself in how the NPT advised States on monthly State lead calls and in using faculty from HHS and CDC to present to unit teams and at State lead meetings. States and unit teams worked to adapt, coordinate, and integrate other improvement techniques and tools such as TeamSTEPPS, Just Culture, Lean, and Six Sigma programs with the CUSP efforts.

In some States, there was competition for hospital recruitment with the State QIO. Many States made the decision to have some hospitals do the QIO CLABSI intervention and others participate in the *On the CUSP: Stop BSI* initiative. Other States were able to work with their QIO and not compete for hospital unit recruitment.

When CUSP became an explicit component of the 10th Scope of Work for QIOs around the country, members of the NPT met with CMS and developed a short series of national calls with QIOs to explain the CUSP model and make QIOs aware of all of the *On the CUSP: Stop BSI* resources located on the project website.

In States that had health departments with CDC contracts to reduce HAIs, State health department representatives attended and sometimes served as faculty at in-person meetings. By the end of the project, many participating hospitals were also being recruited to join a CMS-funded Hospital Engagement Network (HEN). Because the HENS have received considerable resources to promote improvement in 10 areas, including CLABSI, the NPT has worked to share resources and expertise with HEN contractors to support their CLABSI improvement activities.

⁹ Rogers EM. New Product Adoption and Diffusion. *Journal of Consumer Research*. 1976; 2(4):290-301. Available at: <http://www.jstor.org/stable/2488658>, accessed on August 1, 2012.

LESSONS ON HOW TO IMPROVE FUTURE NATIONAL COLLABORATIVES

The NPT learned several lessons in doing this work, both through its own experience working over four years with 46 States and regions, as well as through in-depth interviews conducted in May and June 2012 with 11 State leads.

Implementation Challenges

State Level Challenges

States that struggled the most with the project were those that joined the final cohort. These States had the lowest number of recruited hospitals and were States/regions with limited-to-no dedicated quality improvement staff and very limited experience in running State/regional quality improvement collaboratives. The low number of recruited hospitals reduced the opportunity for peer learning and provided less impetus for State leads to focus more attention on the initiative in the State.

A key feature of successful States was the ability to do one-on-one counseling and site visits to hospital teams. The lack of staffing in some States impeded their ability to do this necessary work. Another important challenge for some States was the lack of an effective quality council in the State staffed by hospital leadership. Such councils have played an important role in successful States by keeping the hospital leadership engaged in this work and accountable for achieving results. In more successful States, hospital CEOs had more experience in “backing up their staff” to create policy and practice changes, such as empowering nurses to stop physicians when sterile technique had been breached, and had board-level dashboards on which CLABSI data was routinely reported and scrutinized. Many of these States also had hospital association executives capable of motivating the executive leaders of hospitals to drive improvement within their organizations. Successful States also were more likely to have made zero CLABSIs an explicit improvement goal. All States had a difficult time getting their teams to use the monthly TCT. Teams reported to the State leads that the monthly data collection was too frequent and found the tool too static in terms of asking the same questions about the early implementation stages of CUSP.

Hospital Unit Challenges

All the States that were interviewed emphasized the importance of the engagement of senior hospital leaders. The lack of senior executive engagement was viewed as a critical missing element in teams that were less successful. The absence of visible and supportive physician and nurse champions was also a factor for less effective teams. Staff turnover was an equally important feature of struggling teams. Every State lead, whether from a high-performing State or a more challenged one, indicated turnover was a significant barrier.

Other challenges included the lack of dedicated, protected time for team members to do the CUSP work and/or collect CLABSI rate data and submit it to the Care Counts database. Some teams viewed *On the CUSP: Stop BSI* as just another quality “flavor of the month,” or focused solely on the technical side of CLABSI intervention without paying attention to CUSP. Teams in

most States undervalued the monthly TCT. However, a few States found it very useful in trending teamwork and communication and used the data on coaching calls to highlight strategies and tactics to improve these important aspects of safety culture.

Key Success Factors

Senior Management Engagement

Senior management engagement was a key factor for successful States and units alike. State leads cited the importance of enthusiastic hospital association executives who emphasized the importance of the project at the onset and who stayed engaged throughout the project by following participating hospital results and communicating with hospital CEOs to imbue a sense of accountability. All State leads further reported that senior leader engagement was very important to their successful units, and it was their perception that when units lacked this support they were often not able to incorporate CUSP into their daily work as much as other teams. They also suspected that teams without this support were less successful in lowering their CLABSI rates.

Understanding Hospital Team Needs and the Importance of Early Interventions

Many successful States took the time to get to know their teams' strengths and weaknesses and to tailor the tools and interventions based on individual team needs. Examples included taking the CUSP and CLABSI manuals and breaking them down into smaller sections for the teams to assimilate. Other States took the time to walk their teams through the project website, which seemed overwhelming to many teams, particularly when they were getting started.

High-performing States found early intervention with units experiencing high or spiking CLABSI rates an effective strategy. These States determined that meeting by phone and/or in-person with these teams was helpful in identifying and resolving barriers. Some State leads used small incentives like inexpensive food gift cards to encourage struggling teams to continue in the project.

Constant Communication with Hospital Units

States that used frequent and multiple forms of communication (group and individual e-mail, phone calls, and site visits) were more successful in engaging their teams in this work. State leads found the weekly updates from the NPT extremely helpful and used them as the basis for their own weekly updates to their hospital teams.

Celebrating Success

Teams generated enthusiasm to "get to zero" by keeping score on the number of days since their last CLABSI. They did this either by displaying banners or posting on bulletin boards the number of days or months since the last CLABSI on the unit. Many States acknowledged those teams that had low rates and had had zero CLABSIs for an extended period of time. Certificates of achievement or small, inexpensive gifts were also a way that some States celebrated

successful teams. This created positive competition for other units to improve so that they too could be recognized.

Other Unit-level Success Factors

Physician and Nurse Champions

In the view of all State leads, teams that had engaged and supportive physician and nurse champions were better able to adopt CUSP and lower their CLABSI rates. Nurse champions were vital in supporting the nurse manager and carving out release time. Physician champions were critical to empowering nurses to stop physicians when needed and for holding physicians accountable for not following evidence-based practice.

Multi-disciplinary Focus

State leads noted that multi-disciplinary teams were another key success factor. An important component of the CUSP methodology, multi-disciplinary teams made better decisions because of their diversity of perspectives and understood the importance of inter-disciplinary rounding. It was particularly important to shift ownership and knowledge of CLABSI rates from an infection preventionist to the team of clinicians responsible for providing patient care. Knowledge of CLABSI rates and recognition that the team could prevent them was an important cause of the project's success.

Strong SHA Engagement to Increase Unit Accountability

State leads who kept close contact with their unit teams were able to keep those teams more accountable. Monthly review of each unit's data and communication about those results was viewed as an important motivator for team leaders and their teams.

Improvement Opportunities for Future National Collaboratives

The interviews with State leads conducted in spring 2012 elicited insights to assist the NPT in improving future national collaboratives. These are listed below.

Better Communication of Project Requirements, Other State Lead Resources

Several State leads interviewed noted that they did not anticipate the amount of work entailed in this project, specifically, the amount of one-on-one team communication needed. They wished that HRET had communicated this at the time of State recruitment. States expressed appreciation when the AHRQ expansion contract provided funds for them to hire part-time staff on this project.

State leads expressed appreciation for the State Lead Manual, which was not available at the start of the program for the first two cohorts. They also appreciated refinements to the national project website, which could have been easier to navigate in the early stages of the project. State leads initially viewed the five weekly immersion or on-boarding calls as redundant to material presented at the first kick-off meeting. However, as they became more experienced in the project, the high-performing State leads understood that CUSP was the foundation for unit safety work, whether to eliminate CLABSI or to address any other safety issue. The State leads

asked that the NPT think about how to better sequence the introduction of the CUSP tools, which appeared overwhelming to their teams in the early phase of program implementation.

Although the NPT attempted to train State leads by providing sample monthly coaching call agendas and by modeling coaching techniques, State leads reported that specific training on how to coach teams would have been helpful. State leads felt unprepared to instruct their teams on how to use the HSOPS results to improve safety culture. In addition, some State leads realized that their unit teams were not taking full advantage of the project website and spent dedicated time to walk their teams through it and to show them where and how they could access CUSP and CLABSI elimination resources and archived content calls.

Sustainment

Sustaining the gains in each participating State/region will depend on three major factors: 1) people equipped to function independently as leaders of efforts to reduce HAIs and other unit-based quality improvement (QI) initiatives, 2) an adequate infrastructure to lead these QI efforts in the State/region, and 3) having the knowledge and materials to support ongoing efforts to train hospital personnel in unit-based QI approaches that can be used to reduce infections and to address other safety and quality challenges faced by their unit's patients.

Equipping People

The NPT has promoted sustainment in each State and region by training State association leads and other association staff in the CUSP model and methodology alongside their hospital units. Each month State leads were exposed to coaching techniques by the Armstrong Institute and MHA Keystone faculty advisors assigned to their State/region, and then weaned off the MHA Keystone advisors at month 9, and the Armstrong Institute advisors at month 18. After this point State leads led the coaching calls on their own.

In July 2012 the NPT held a day-long, interactive National Collaborative Meeting for State leads and other State/regional association staff. The purpose of the meeting was to prepare State leads to sustain this work in their State or region. The agenda focused on the skills needed to manage a successful State or regional collaborative and included sessions on sustainability planning, coaching principles, coaching struggling teams, interactive didactic teaching, and teaching via Webinars. All participants received a manual on how to run State/region-based QI collaboratives. The conference was led by faculty and facilitators from AHRQ, the Armstrong Institute, Cynosure Health, HRET, MHA Keystone, and Northwestern's Feinberg School of Medicine. Approximately 60 percent of the States and regions participated in the meeting: 27 States and Puerto Rico. Program materials have been distributed to all participating States and regions. HRET is hosting three follow-up coaching calls in September to further address different aspects of sustainment.

HRET has strongly encouraged each State and region to develop a sustainability plan. Eighteen States, the District of Columbia, and Puerto Rico have indicated their intent to submit sustainability plans to HRET, which are due September 10. These plans will address how States and regions will: 1) continue to promote CLABSI reduction by leveraging their experience and knowledge gained in the project and through stakeholder consortia, 2) spread the CUSP model and spread CLABSI prevention to non-ICUs, 3) regularly monitor CLABSI rate data, and 4)

continue to coach unit teams and/or leverage other patient safety networks and experts to facilitate peer learning and networking.

QI Infrastructure

The NPT has emphasized the importance of States and regions having adequate numbers of staff trained in QI and patient safety, preferably individuals with a clinical background, in addition to project management skills. For the past several months the NPT has encouraged States and regions to prepare for the project's end by monitoring CLABSI data captured in NHSN or in State-specific databases. HRET is currently asking States and regions if they require extended use of the MHA Keystone Care Counts database to monitor CLABSI rates while they create their own State or regional database if none currently exists.

Knowledge and Tools

Materials on CUSP and technical and clinical interventions to prevent CLABSI reside on the project website and will be transitioned to the AHRQ website soon after the contract ends in September 2012. A key sustainability resource is the CUSP Toolkit, which will be released after the AHRQ annual conference in September 2012. The Toolkit was designed for State leads and hospital unit staff to successfully design and implement a CUSP-based initiative. It demonstrates how CUSP works with existing patient safety frameworks such as TeamSTEPPS, Just Culture, and Sensemaking. The CUSP Toolkit is comprised of slide sets, facilitator notes, exercises, and videos. The videos include scripted vignettes, informational presentations, and interviews with CUSP teams. The toolkit was piloted among State leads to obtain feedback on clarity of content and ease of use.

CONCLUSION

On the CUSP: Stop BSI was an unprecedented national improvement collaborative that demonstrated that a national program could be replicated in multiple States and regions from one successful State implementation. Success factors at the national program level included having well-defined, evidence-based interventions; a solid implementation structure and project plan; the collection and use of timely, accurate and actionable data to improve performance; tailoring the national program for local and unit audiences; and the wisdom and flexibility to evolve project strategies and emphases over time. Strong hospital association engagement energized hospital leadership and unit teams.

Hospital units that significantly reduced CLABSI rates had strong leadership engagement from senior management and from physician and nurse champions, understood and embraced the adaptive and technical goals and techniques of the program, monitored their results monthly, and celebrated success. Similarly, State leads in States with the highest unit engagement and often significant CLABSI reduction had the support of their association leadership, took the time to understand the administrative and programmatic aspects of the program to effectively coach their teams, closely monitored each team's results, intervened early with those teams that were struggling, and celebrated successes on coaching calls and at in-person meetings.

The NPT believes that *On the CUSP: Stop BSI* has created a strong foundation for future State and regional quality improvement collaboratives by equipping people to function independently as leaders of future infection prevention and other unit-based QI efforts, demonstrating what is needed in terms of an adequate infrastructure at the State and regional level to support these activities, and by providing the knowledge and materials needed to support ongoing efforts to train hospital staff in unit-based approaches to improving safety and quality for all patients.

APPENDIX A: INTERVIEW QUESTIONS

Interview Questions for State Hospital Association Leads Participating in *On the CUSP: Stop BSI*

Purpose

To obtain lessons to inform the final *On the CUSP: Stop BSI* report to AHRQ, HRET is interviewing hospital association leads in a total of 10 States to learn what worked and didn't work in implementing this initiative in the States. Five top-performing and five low-performing States are being selected based on:

- Degree of improvement in CLABSI rates from baseline to latest reporting quarter, or for those States with a low baseline CLABSI rate like Virginia, the number of units in the State that have sustained a zero CLABSI rate for the last two reporting quarters
- Degree of engagement determined by: 1) number of hospitals recruited and retained throughout the 24-month participation period, 2) data submission rates, and 3) unit attendance on content and coaching calls.

States to be interviewed: *to be completed by June 1*

Interviewer: Deb Bohr

Team Support: Jasmine Davis

Estimated time to complete interview: 30-40 minutes

Background on Respondent

1. **Name:**
2. **Title:**
3. **Role on CUSP project:**

Opening Questions

1. Are there one or two things that stand out in your mind about your State's participation in this initiative? Anything really memorable?
2. How many FTEs are working on all patient safety initiatives in your State?
3. What are the QI/PS strategic priorities of your association?

SHA Engagement with *On the CUSP: Stop BSI*

4. How did your association decide to be part in this initiative? Who were the key decision-makers in that decision?
5. On a scale from 1-5, with 5 being the most engaged, how engaged has your association board and leadership been with *On the CUSP: Stop BSI*?

SHA Infrastructure to Support *On the CUSP: Stop BSI*

- 6. Staffing: Please discuss all of the staff in your association, including yourself, and contractors who are involved in this project. Please tell me the job title, percent time devoted to this work, their qualifications and skills, and prior experience with QI/PS initiatives and State-wide collaboratives.

Name/Title	% FTE	Qualifications & Skills	Prior experience with QI/PS

- 7. Are there other SHA systems, departments or committees in place to support your work with this initiative? For example, does your SHA have a quality council? How often does it meet? How involved are your member hospital CEOs in that council and/or other SHA quality initiatives?

SHA Consortium

- 8. What other State-based agencies are you collaborating with in eliminating CLABSI? (Prompt: QIOs, State Department of Health, local chapters on infection prevention, State Medical Societies, State Charter APIC, State Charter SHEA, Other.)

NPT Support to State Leads

- 9. What did the NPT do that helped you coordinate the program in your State?
- 10. What things did the NPT not do that would have been helpful?

CUSP & CLABSI Curriculum

- 11. First let me ask you your overall impression of how the content was rolled out. What are thoughts on how the content was rolled out? What was most helpful? What could be improved?

Calls

Immersion Calls

- 12. Did you and your teams find the immersion calls helpful? If so, why? If not, why not?

Monthly Content Calls

- 13. Did you and your teams find the monthly content calls helpful? Did they occur often enough? Anything else?
- 14. Did you review the monthly participation logs that we sent to you after each call? If so, did you follow-up with teams that missed calls?

Monthly Coaching Calls

15. Did you and your teams find the State coaching calls helpful? Did they answer your teams' questions? Keep them engaged? Occur frequently enough? Was it by E-mail or phone?
16. Did you review the monthly participation logs that we sent to you after each call? If so, did you follow-up with teams that missed calls? E-mail or phone?
17. Did you and your teams find the support of the JHU and MHA advisors helpful? Please explain how. Anything that you think could be improved?

Data Training

18. Was the training your teams received on how to collect and report CLABSIs helpful? If not, why not?

Supplemental Calls

19. Did you and your teams participate on the monthly Supplemental Calls? If so, did you and they find them helpful? If not, why not?

Recruitment and Retention

Recruitment

20. What methods did you use to recruit your hospitals? What worked? What didn't work?
21. Looking back, do you think there were things you would have done differently to increase recruitment?

Retention

22. How many units dropped out? What reasons did they give?
23. Were you successful in retaining any units that indicated they wanted to drop out? If so, how did you retain them?

Communication

Communication with Teams

24. How often did you communicate with your teams? What were the primary discussions with your teams? What forms of communication did you use to communicate with all teams? What forms of communication did you use to contact individual units? *Prompts: group and individual e-mail, group conference calls, individual phone*
25. Tell me about your communication with high outliers and late data submitters. How did you follow up with these teams? Who did you speak to? Did you ever contact a senior leader?
26. Did you communicate with teams that were "missing in action" on content calls and/or coaching calls? If so, how did you follow up?
27. Did you visit any of your participating hospitals? If you didn't visit all of them, how did you choose which teams to visit?

Communication with SHA Leadership, Board and Quality Council

28. How were SHA leaders involved in the project?
29. Did they communicate project results with the Hospital CEOs in the project?
30. Did you regularly communicate your results to the SHA top leadership, board and/or quality council? If so, how often?

Communication at National Meetings

31. Did you or another member of your SHA present your State's results at a State or national forum? If so, which one(s)?

Barriers and Challenges

32. What barriers and challenges did you hear about from your teams regarding the implementation of the CUSP model? Do you have examples of how these barriers were successfully overcome?
33. What barriers related to the technical aspects of CLABSI elimination? Do you have examples of how these barriers were successfully overcome?
34. What did you learn based on these barriers and challenges?

Successes

35. Overall, what would you say worked for your teams? For your successful teams, what components of the *On the CUSP: Stop BSI* program were most helpful to your teams? (Prompts: manuals and tools, content calls, coaching calls, face-to-face meetings)
36. What did you learn from this initiative that you hope to apply to future QI/PS work in your State?
37. Will you use CUSP for other QI/PS efforts in your State? Why or why not?

Sustainability

38. How will you sustain the CUSP program in your State? How will you sustain focus on eliminating CLABSI in your State?

Close out Questions

39. Were the expectations you had when you entered into this work met? If so, tell me more. If not, why not?
40. What advice would you like to give to the National Project Team (NPT) about running future national collaboratives?
41. Any final thoughts?

Thank you for your Time and Insights. This information will be shared with the NPT and included in summary form in our final report to AHRQ.