



Evidence-Based Programs and Strategies for Reducing Healthcare-Associated Infections in Critical Access Hospitals

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KEY FINDINGS

- Lack of trained infection control staff, multiple job responsibilities, and high turnover make it challenging to implement healthcare-associated infection (HAI) activities in Critical Access Hospitals (CAHs).
- Collaborating across hospitals and leveraging existing resources are effective ways to help CAHs implement HAI-prevention initiatives.
- CAHs have successfully participated in several national and state initiatives to reduce and prevent HAIs, including “On the CUSP” programs, Hospital Engagement Networks, and initiatives sponsored by Quality Improvement Organizations, state health departments, state hospital associations, and other key partners.
- Many resources and tools are available online to help CAHs decrease HAIs.

INTRODUCTION

An estimated 5-10% of hospitalized patients experience a healthcare-associated infection (HAI) every year, resulting in significant morbidity and mortality.¹ Prevention of HAIs is a top priority for the U.S. Department of Health and Human Services, and HAIs are the focus of multiple national and state reporting requirements and prevention initiatives.

The Centers for Disease Control and Prevention (CDC) provides national leadership to state public health departments in surveillance, outbreak investigations, laboratory research, and prevention of HAIs. The Centers for Medicare and Medicaid Services (CMS) currently requires Prospective Payment System (PPS) hospitals to report data on six HAI measures: central line-associated bloodstream infections

(CLABSI), catheter-associated urinary tract infection (CAUTI), surgical site infections (SSI) for colon surgery, SSI for abdominal hysterectomy, clostridium difficile (CDI), and methicillin-resistant staphylococcus aureus (MRSA).² Hospitals report data on these measures to the CDC National Healthcare Safety Network (NHSN) surveillance system, which shares it with CMS; CMS then makes the data publicly-available on the Hospital Compare website.

Critical Access Hospitals (CAHs) may voluntarily report data on these six HAI measures to CMS via NHSN. In addition, four HAI measures (CLABSI, CAUTI, CDI, and MRSA) are optional patient-safety measures for the Medicare Beneficiary Quality Improvement Project (MBQIP) in FY 2015-2017.³ State Flex Programs may choose to assist CAHs in their states with reporting data on these four measures and



implementing quality improvement activities to improve patient outcomes on the measures.

CAHs and other small rural hospitals generally have less experience in HAI reporting and fewer infection control staff resources than larger facilities, which can make implementing HAI programs challenging.

PURPOSE

The purpose of this policy brief is to synthesize and disseminate information on successful evidence-based programs and strategies for measuring, reducing and preventing HAIs that can be replicated in CAHs. It focuses on the following types of HAIs: CLABSI, CAUTI, MRSA, and CDI. Previous Flex Monitoring Team (FMT) policy briefs addressed evidence-based programs to prevent SSIs and reporting of HAIs by CAHs.⁴⁻⁵

APPROACH

We reviewed the literature on HAI reduction programs and strategies, including articles in peer-reviewed healthcare journals and reports from a variety of public and private organizations working on HAI issues in hospitals. We sought to identify programs and strategies that have been successfully implemented in CAHs and other small rural hospitals, as well as other programs and strategies that hold promise for adoption in the small rural hospital environment.

We also surveyed Flex Coordinators and key contacts for the State Health Care Infection Programs in the 45 Flex states by email, to ask about HAI reporting and prevention activities involving CAHs in their states. After multiple contacts, State Flex Coordinators in all 45 Flex states and 34 of the 45 State Infection Program contacts responded to the survey.

RESULTS

HAI Challenges Faced by CAHs

The problems most commonly reported by CAH staff are a lack of employees familiar with HAI infections and prevention and lack of necessary resources to

implement prevention activities.⁶⁻⁹ Infection control programs require knowledgeable and dedicated staff. CAH staff typically have multiple job responsibilities and little training in infection control; in addition, CAH infection control staff have a high turnover rate.¹⁰ These challenges make it difficult to implement infection control activities in CAHs.

Resource availability creates additional problems for CAH infection prevention programs. A survey of rural and urban hospitals in Colorado showed that CAHs are more likely to report they do not have access to Antimicrobial Stewardship Programs or other infection control resources.¹⁰ As a result, CAHs are often forced to focus on treatment of current infections rather than prevention of future problems.¹⁰ In order to reduce infection rates among CAHs and other small rural hospitals, the literature recommends addressing and improving current infection protocols as well as encouraging CAHs to participate in collaborative efforts.

National and State HAI Initiatives Implemented in Rural & Critical Access Hospitals

Working together across hospitals and leveraging existing resources are both excellent ways to help CAHs develop HAI initiatives and work to prevent infections. Collaboration between hospitals has been demonstrated by multiple systems as an effective way to develop best practices and peer learning.^{7, 11-12}

The Agency for Healthcare Research and Quality has funded comprehensive unit-based safety programs (CUSP) to reduce CLABSI and CAUTI.¹³⁻¹⁴ More than 1,000 hospitals in 44 states participated in the four-year “On the CUSP” CLABSI initiative; almost 9% were CAHs. Both participating ICUs and non-ICUs significantly reduced their CLABSI rates.¹³ As of July 2013, more than 850 hospitals located in 37 states were participating in the program to reduce CAUTIs, including 183 CAHs. Preliminary data demonstrates that CAUTI rates have decreased from baseline following implementation of the CAUTI program.¹⁴

Through the national “Partnership for Patients” initiative, CMS has funded 26 Hospital Engagement Networks (HENs) at the regional, State, national, or hospital level to help improve patient safety, including decreasing preventable hospital-acquired condi-



tions.¹⁵ The American Hospital Association (AHA) / Health Research and Educational Trust (HRET) HEN is a national partnership of over 1,500 hospitals; almost one-third (486) of the participating hospitals are CAHs.¹⁶ The goal of this network is to improve patient care in a number of areas, including HAIs such as CAUTI, CLABSI, and SSI, by creating partnerships and providing coaching to assist hospitals in adopting best practices. The AHA/HRET HEN participants reduced their rates of CAUTI, CLABSI, and SSI.¹⁶ In our survey, the Flex Coordinator and/or the State Infection Contact in 11 of the 45 Flex States reported that CAHs in their states were participating in HEN activities focused on HAIs.

In August 2014, CMS funded 14 Quality Innovation Network-Quality Improvement Organizations (QIN-QIOs) to work with providers, stakeholders and Medi-

care beneficiaries for the next five years to improve the quality of care for targeted health conditions. One of the CMS QIN-QIO tasks is to reduce HAIs in hospitals.¹⁷ In our survey, the Flex Coordinator and/or the State Infection Contact in 36 of the 45 Flex States reported that CAHs in their states were participating in QIO activities focused on HAIs.

The California Healthcare-Associated Infection Prevention Initiative (CHAIFI) is a statewide initiative designed to provide education regarding HAI best practices, training improvement, and reporting of results.¹⁸ The practices included in CHAIFI encompass three broad infection control processes including hand hygiene, contact precautions, and compliance with the Surgical Care Improvement Project. One-quarter (24%) of the hospitals participating in the CHAIFI initiative were rural. Participating in CHAIFI increased imple-

Figure 1. Examples of State Evidence-Based Initiatives Involving CAHs

State	Initiative
Washington	<p>Qualis Health, the Quality Innovation Network-Quality Improvement Organization for Washington and Idaho, is partnering with hospitals to improve basic infection prevention practices and reduce CAUTIs, CLABSIs, and CDIs. The purpose of the EQuIP (Education, Quality, and Infection Prevention) Program is to equip staff in small, rural, and critical access hospitals to improve quality and safety through education, support, and access to customizable tools, templates, sample policies, and other resources. The EQuIP Program was developed as a joint partnership between Qualis Health, the Washington State Department of Health, Washington State Hospital Association, and local chapters of the Association for Professionals in Infection Control (APIC).</p> <p>The EQuIP program is based on the APIC Competency Model for Infection Preventionists (http://bit.ly/1iePrqf). The program, which began in March 2015, provides web-based learning modules, access to experienced Infection Preventionists and mentors, collaborative improvement and benchmarking for HAIs, and downloadable tools, templates, sample policies, and other important resources. 37 of the 39 Washington CAHs have participated in one or more EQuIP events, along with 3 Idaho CAHs, and 24 are currently enrolled in their collaborative improvement initiative. (http://bit.ly/1lzqScH)</p>
Wyoming	<p>Wyoming has implemented an Infection Prevention Advisory Group (WIPAG), whose members include the Wyoming Department of Health (Infectious Disease Epidemiology Program, Aging Division, Licensing & Surveys), Mountain Pacific Quality Health (QIO), the Wyoming Hospital Association, the Intermountain End-Stage Renal Disease (ESRD) Network ESRD, and multiple hospitals, including CAHs. WIPAG has conducted numerous web-based and face-to-face training sessions for rural hospitals (including CAHs), to help them understand NHSN HAI definitions, establish NHSN access accounts, enter data through the NHSN portal, and interpret cumulative reports to identify and respond to significant trends in HAIs (http://bit.ly/1MY2Q1p).</p> <p>Mountain Pacific's HAI Prevention Learning and Action Network provides hospitals with evidence-based infection prevention practices related to CLABSI, CAUTI and CDI, and access to experts in infection prevention and control. The QIO and WIPAG sponsor state-wide face-to-face interventions and infection prevention program assessments, and an annual infection prevention conference.</p> <p>Multiple organizations including the Wyoming Department of Health, Mountain-Pacific, and WIPAG have collaborated to produce the Wyoming Infection Prevention Orientation Manual. The on-line manual contains 18 topic areas written by experts from Wyoming and across the nation (http://bit.ly/1N4MVjg).</p>



Figure 2. Resources and Tools Addressing Overall HAI Prevention

CDC’s “2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings” addresses all infections that are expected in a healthcare setting. It provides tools and suggestions to build programs for isolation, when needed, at individual hospitals (http://1.usa.gov/1JH8WCc).
CDC’s “Guidance for selection of Personal Protective Equipment (PPE) in Healthcare setting” is a presentation that can be used by hospitals in training personnel (http://1.usa.gov/1PH2KKJ).
CDC’s “Environmental Checklist for Monitoring Terminal Cleaning” is a checklist to accomplish adequate environmental cleaning to decrease the occurrence or spread of HAIs (http://1.usa.gov/1FcEGd7).
Qualis Health’s program to engage healthcare personnel, patients and families in hand hygiene is a practical strategy to increase hand hygiene measures as a way to decrease HAIs (http://bit.ly/1X6jJeU).
Primaris Health’s comprehensive toolkit addresses organizational leadership, culture, communication, and engagement along with practical tools for individual HAIs (http://bit.ly/1O3Txvt).
The Joint Commission has a series of protocols and tools to decrease HAIs (http://bit.ly/1hOQ3Df).
The Association of Professionals of Infection Control and Epidemiology (APIC) offers web-based learning modules for professionals in Infection Control activities, including one specifically for professionals working in CAHs (http://bit.ly/1Jx4Rze).

Figure 3. CDC Toolkits Addressing Individual HAIs

CAUTI	http://1.usa.gov/1JsbBvW
CLABSI	http://1.usa.gov/1LOeFbL
CDI	http://1.usa.gov/1O3U9kP
MRSA	http://1.usa.gov/1Kzi7Fg

mentation of evidence-based patient safety practices and compliance within all participating hospitals.

Infection control can be improved in CAHs by designing needs-specific interventions.¹⁹ Hand hygiene and related infection surveillance are feasible interven-

tion strategies in CAHs because they can be implemented in situations with limited resources. Successful implementation of a hand hygiene intervention in ten rural hospitals in Idaho and Utah demonstrated positive changes in hand hygiene protocol compliance as a way to significantly reduce the spread of infections in rural hospitals.¹⁹

Qualis Health, the QIN-QIO for Washington and Idaho, is partnering with other organizations to improve basic infection prevention practices and reduce HAIs in hospitals, including CAHs, through the EQuIP (Education, Quality, and Infection Prevention) Program. Wyoming has implemented an Infection Prevention Advisory Group (WIPAG), which provides training for rural hospitals, including CAHs, related to HAI prevention and NHSN reporting and surveillance. Figure 1 describes these initiatives in more detail. Table A-1 in the Appendix describes examples of evidence-based programs targeting HAIs that have been implemented by individual CAHs.

Resources and Tools to Help Prevent HAIs

A collaborative effort led by the Society for Healthcare Epidemiology of America, the Infectious Diseases Society of America, the American Hospital Association, the Association for Professionals in Infection Control and Epidemiology (APIC), and the Joint Commission, with major contributions from a number of organizations and societies with content expertise, including the CDC, resulted in publication of a compendium of strategies to prevent HAIs in acute-care hospitals.²⁰⁻²¹ The compendium concisely describes recommended strategies to prevent CAUTI, CLABSI, CDI, and MRSA, and assigns each recommendation a quality-of-evidence rating.

Many online resources and tools are available to help hospitals, including CAHs, decrease HAIs. Several organizations, including the CDC, QIOs, the Joint Commission, and APIC, provide resources and tools focused on overall strategies to prevent and treat HAIs (Figure 2). CDC also makes toolkits available that address individual HAIs, including CLABSI, CAUTI, CDI, and MRSA; they provide information on the epidemiology of each type of infection, core and supplemental prevention strategies, measurement, and evaluation considerations (Figure 3).



CONCLUSION

Although CAHs face challenges in implementing infection control activities, many have successfully participated in several national and state HAI prevention initiatives, and tools and resources are available online to help CAHs decrease HAIs. State Flex Coordinators can use these resources to assist CAHs in their states with implementing quality improvement activities to improve patient outcomes related to HAIs. ■

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REFERENCES

1. U.S. Department of Health & Human Services. National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination. April 2013. <http://1.usa.gov/1KycQcM>
2. Centers for Medicare and Medicaid Services (CMS). 42 CFR Parts 405, 412, 413, et al. Medicare Program; Hospital Inpatient Prospective Payment Systems for Acute Care Hospitals and the Long-Term Care Hospital Prospective Payment System and Fiscal Year 2015 Rates; Quality Reporting Requirements for Specific Providers; Final Rule. Federal Register Vol. 79, No. 163. August 22, 2014.
3. U.S. Department of Health and Human Services. Health Resources and Services Division, Federal Office of Rural Health Policy. Medicare Rural Hospital Flexibility Grant Program. CFDA No. 93.241. Funding Opportunity Announcement Fiscal Year 2015. Issuance Date: February 3, 2015.
4. Klingner J, Casey MM, Prasad S, Gregg W, Moscovic IS. Evidence-Based Surgical Care Quality Improvement Programs and Strategies for CAHs. Flex Monitoring Team Policy Brief #29, August 2012. <http://bit.ly/1KXFNix>
5. Casey MM, Distel E, Evenson A, Shailey Prasad S, Hung P. Reporting of Healthcare-Associated Infections by Critical Access Hospitals. Flex Monitoring Team Policy Brief #39, July 2015.
6. Herwaldt L, Appelgate D, Kuntz J, et al. (2007). Infection Control Resources in Iowa. American Journal of Infection Control, 35: 662-665.
7. Halpin H, Milstein A, Shortell S, Vanneman M, Rosenberg J. (2011). Mandatory public reporting of hospital-acquired infection rates: a report from California. Health Affairs, 30(4), 723-729.
8. Harrod M, Manojlovich M, Kowalski C, Saint S, Krein S. (2013). Unique factors rural Veterans' affairs hospital face when implementing health care-associated infection prevention initiatives. The Journal of Rural Health 30, 17-26.
9. Haun N, Hofer A, Green T, et al. (2014). Prevention of Clostridium difficile infection in rural hospitals. American Journal of Infection Control, 42:311-315.
10. Reese S, Gilmartin H, Rich K, Price C. (2014). Infection prevention needs assessment in Colorado hospitals: rural and urban settings. American Journal of Infection Control, 42, 597-601.
11. Kaye K, Engemann J, Fulmer E, Clark C, Noga E, Sexton D. (2006). Favorable impact of an infection control network on nosocomial infection rates in community hospitals. Infection Control and Hospital Epidemiology, 27, 228-232.
12. Ward M, Clabaugh G, Evans T, Herwaldt L. (2012). A successful, voluntary, multicomponent statewide effort to reduce health-care associated infections. American Journal of Medical Quality, 27, 66-73.
13. Agency for Healthcare Research and Quality. (2012). Eliminating CLABSI, A National Patient Safety Imperative. Final Report on the National On the CUSP: Stop BSI Project. <http://1.usa.gov/1LFVj5G>
14. Agency for Healthcare Research and Quality. (2013). Eliminating CAUTI: Interim Data Report. <http://1.usa.gov/1Jxj5jC>
15. CMS. About the Partnership: Hospital Engagement Networks. <http://1.usa.gov/1JHnAtc>
16. American Hospital Association/Health Research and Educational Trust Hospital Engagement Network. (2013, December). Annual Report. <http://bit.ly/1EtnXr17>.
17. Quality Improvement Organizations. Current Initiatives. <http://bit.ly/1044pcy>
18. Halpin H, McMenamin S, Simon L, et al. (2013). Impact of participation in the California Healthcare-Associated Infection Prevention Initiative on adoption and implementation of evidence-based practices for patient safety and health care-associated infection rates in a cohort of acute care general hospitals. American Journal of Infection Control, 41, 307-311.
19. Stevenson K, Searle K, Curry G, et al. (2014). Infection control interventions in small rural hospitals with limited resources: results of a cluster-randomized feasibility trial. Antimicrobial Resistance and Infection Control, 3, 1-7.
20. Yokoe DS, Classen D. (2008). A compendium of strategies to prevent healthcare-associated infections in acute care hospitals. Infection control and hospital epidemiology, 29, S12-S21.
21. Yokoe DS, et al. (2014). A Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals: 2014 Updates. American Journal of Infection Control 42:820-8.



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APPENDIX 1

Table A-1. Examples of CAH Implementation of Evidence-Based Programs Targeting HAIs

CAH / Citation	Targeted	Description	Results
First Light Health System Mora, MN http://bit.ly/1EtpCNb	CAUTI CLABSI	<ul style="list-style-type: none"> Partnered with QIO, state hospital association, and state health department to be part of a Collaborative Healthcare-Associated Infections Network (CHAIN). Developed a nurse-driven protocol to remove unnecessary catheters. 	23% reduction in CAUTI; 28% reduction in CLABSI
Sparrow Clinton Hospital St. Johns, MI http://bit.ly/1KXsGhn	All HAIs	<ul style="list-style-type: none"> Educated every patient on proper hand hygiene at admission. Provided staff and patients with easy access to the tools needed to cleanse and sanitize their hands. 	Hand hygiene before patient contact improved from 45% in 2008 to 92% in 2010.
Borgess Lee Memorial Hospital Dowagiac, MI http://bit.ly/1KXsGhn	CAUTI	<ul style="list-style-type: none"> Used pocket cards describing appropriate & inappropriate catheter usage. Used data-collection tool for daily monitoring of urinary catheters. Provided story board education at nursing skills fair. Created and implemented indwelling urinary catheter stickers. 	Unnecessary catheter use decreased from 50% to 9.38% in a year
Sunnyside Community Hospital Sunnyside, WA http://bit.ly/1hORH7M	CLABSI	<ul style="list-style-type: none"> Implemented central line insertion checklist. Provided continued education. 	CLABSI rate at 0%
Georgetown Memorial & Waccamaw Hospitals Murrells Inlet, SC http://bit.ly/1Ew4t58	CAUTI	<ul style="list-style-type: none"> Provided active training for physicians and nurses. Implemented “ex-Foley-ate” campaign to remind personnel. 	Near 0% CAUTI rates
Vernon Memorial Hospital Viroqua, WI http://bit.ly/1Jsdir	CAUTI	<ul style="list-style-type: none"> Implemented protocol, including bladder scan. Provided story boards for each department. 	11% drop in CAUTI rates (none since initiative started)
Reedsberg Area Medical Center Reedsburg, WI http://bit.ly/1hs2wMh	CLABSI	<ul style="list-style-type: none"> Shared patient card with information on the central line with providers. 	CLABSI rates at 0%
Ortonville Medical Center Ortonville, MN http://bit.ly/1Jsdir	All HAIs	<ul style="list-style-type: none"> Redesigned space for patient centered care. Increased nurse time at bedside. 	40% decrease in all infections