

## COMMENTARY

# Building Implementation Science for Veterans Affairs Healthcare Associated Infection Prevention: VA Healthcare-Associated Infection Prevention Network (VHIN)

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Healthcare-associated infections (HAIs) are a major cause of morbidity and mortality,<sup>1–6</sup> with an annual estimated 722,000 infections and 75,000 deaths in US acute-care centers, costing approximately \$6 billion in 2011 alone.<sup>7,8</sup> The Department of Veterans Affairs (VA) has led significant efforts for the prevention of HAIs, particularly those caused by multidrug-resistant organisms (MDROs). These initiatives include the incorporation of HAI prevention into the VA Blueprint for Excellence as a performance component of the organization healthcare chain,<sup>9</sup> directives for methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile* infection prevention,<sup>4</sup> and development of antimicrobial stewardship programs at all VA health facilities.<sup>10</sup> However, new and ongoing efforts to prevent HAIs and to promote antibiotic stewardship are necessary to maintain and accelerate momentum in this area.

Most studies on HAI prevention in the last decade have been efficacy studies; a few have included an implementation or patient activation component. These limitations hinder effective dissemination and replicability of evidence-based interventions across facilities.<sup>11–13</sup> A collaborative network focused on closing the gap between evidence and practice might be a useful addition to the field. Here, we describe the development and activities of such a network—VA Healthcare-associated Infection Prevention Network (VHIN). VHIN's mission is to promote HAI prevention by (1) conducting rapid implementation and evaluation of evidence-based interventions shown to reduce HAIs, (2) documenting the practices, barriers, facilitators, variabilities, and solutions in site-specific implementation strategies across the VA healthcare system, and (3) providing opportunities for timely collaborations on quality improvement implementation

and dissemination projects. VHIN is unique in its focus on quality improvement. It uses implementation science approaches to accelerate the translation of evidence into practice and to diffuse innovation throughout the VA healthcare system.

## Development

In 2015, VHIN was jointly funded by a VA-Quality Enhancement Research Initiative (QUERI) Partnered Evaluation Initiative and the VA National Center for Patient Safety. The VA Women's Health Practice-Based Research Network served as an example for the development of the VHIN as a community of practice collaborating on research and implementation toward a common healthcare goal.<sup>14,15</sup> The VHIN Steering Committee includes infection prevention, antibiotic stewardship, and patient safety experts from several VA partner sites who helped develop of the VHIN concept. A portion of the Committee's members have funded time to serve on the committee. A Coordinating Center was established at the Madison VA hospital. Frequent meetings of personnel and the Steering Committee have provided opportunities for network updates, resolutions, actions, and strategic planning.

VHIN's HAI prevention initiatives connect a broad network across multiple VA facilities, involving academic researchers, implementation scientists, clinicians, patients, and patients' families. VHIN incorporates clinical employees at all levels and at diverse facilities through involvement on the Steering Committee, stakeholder meetings with patients, and individual site meetings. Through meetings, interviews, and focus groups, VHIN has incorporated clinicians to facilitate employee engagement when implementing infection prevention evidence-based practices.<sup>16–18</sup>

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Incorporating veteran patients and their families not only has provided a unique perspective to VHIN’s work in the field but also has prepared patients to be active participants and stakeholders in their VA health care. Increased patient engagement in their healthcare is correlated with a variety of improved health outcomes.<sup>19,20</sup> Patient engagement resources were influenced by a Patient-Centered Outcomes Research Institute (PCORI) project to build a panel of older rural Wisconsin patients and caregivers with personal HAI experiences. This panel has completed its initial round of engagement; the findings are being compiled to build a curriculum for future patient engagement and a research agenda around HAI treatment and prevention from patient and caregiver perspectives.

VHIN also leveraged a partnership with the VA National Center for Patient Safety, which committed funding to create a Patient Safety Center of Inquiry in the Madison VA hospital: the Human-factors Engineering to Prevent Resistant Organisms Center (HERO). HERO uses the Systems Engineering Initiative for Patient Safety framework<sup>21–23</sup> to implement and evaluate evidence-based practices for HAI prevention. VHIN’s infrastructure provides opportunities for HERO to evaluate practices in different facilities and to rapidly disseminate findings on optimal methods for infection prevention. Figure 1 details the multiple interacting components that comprise VHIN and its interplay with PCORI and the HERO.

A secure SharePoint website on the VA intranet serves as the primary mode of communication for VHIN members. This secure application stores current practices in HAI prevention and will provide implementation toolkits and resources for VA facilities interested in implementing HAI prevention initiatives. In addition, SharePoint provides a solid and secure research collaboration environment including intranet portals, document and file management, team connections, and a place to report updates and results for VHIN initiatives.

VHIN engages in outreach opportunities, including virtual and in-person presentations to various interest groups such as infectious disease conference attendees and national VA groups including Patient Safety Managers, MDRO Prevention Coordinators, the Infection Preventionist Group, and the VA Patient Safety Center for Inquiry. These presentations have increased awareness and interest in joining the VHIN network, and they have supported the development process of the VHIN needs assessment instrument.

**Features**

VHIN aims to build an infrastructure in which all VA medical facilities can connect and participate in the manner that best fits their needs. Flexible and multifaceted communication strategies help to spread information to facilities with varying needs and profiles. By linking a diverse community, VHIN will be able to provide the expertise to assist VA health facilities, particularly those with constrained resources such as rural VA hospitals.<sup>24</sup>

VHIN supplies technical expertise, including infection prevention knowledge, implementation resources (eg, tools and toolkits), and coaching to meet the needs of specific sites, the VA healthcare system, and, ultimately, the infection prevention and control field in general. VHIN’s goal is to provide the following resources, which are currently under development.

*Networking resources*

- Access to diverse expertise and medical facilities within the infection prevention network, including a variety of professional categories and facility complexities.
- Partnership opportunities for researchers and frontline healthcare professionals.

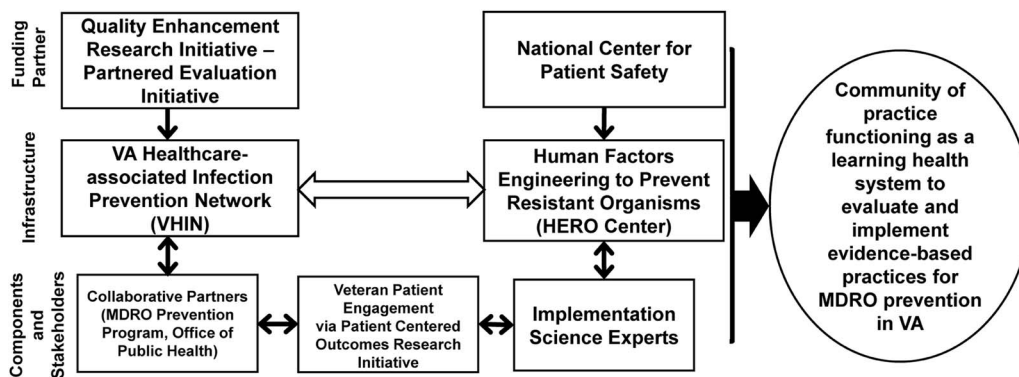


FIGURE 1. VHIN Components. The VA Healthcare-Associated Infection Prevention Network (VHIN) is a community of practice incorporating funding partners, related projects, patients and their families, and experts in infectious diseases, infection control and prevention, and implementation science fields. The Human-factors Engineering to Prevent Resistant Organisms Center (HERO) implements and evaluates evidence-based practices for healthcare-associated infection prevention, and the Patient Centered Outcomes Research Institute (PCORI) project has engaged a patient panel with personal healthcare-associated infection experiences. The VHIN identifies and engages expertise to assist in these projects and rapidly disseminates the findings from these partners. The interplay of these multiple components allows for more efficient evaluation, implementation, and dissemination of practices. NOTE. MDRO, multidrug-resistant organism; VA, Veterans Affairs.

- Collaborations to accelerate dissemination and improve implementation of evidence-based HAI prevention measures, more efficiently moving evidence to practice and policy.
- Opportunities to identify and overcome barriers and to measure practice variation and its impact on patient, family, and system processes.
- Repository for current practices and needs related to Veteran HAI prevention.

*Staff resources*

- Expertise to facilitate the design and execution of VA-oriented projects and regulations.

*Quality improvement resources*

- Methodological and mentorship expertise for HAI prevention research, quality improvement, and practice.
- Assistance with quality improvement study designs and implementation strategies, including proposal reviews, study management, and manuscript preparations.
- Opportunities for database development and maintenance.

While VHIN operates within the VA healthcare system, these resources and initiatives are widely applicable within the broader healthcare system. Table 1 aligns VHIN’s current and planned resources within the implementation strategy clusters identified by the Expert Recommendations for Implementing Change study.<sup>25</sup> The novel nature of VHIN as a research-into-practice program in combination with its use of defined implementation science principles allows for VHIN to serve as a model for HAI prevention initiatives in healthcare facilities and systems beyond the VA.

**Accomplishments**

*1. High-performing network.* In addition to the 5 original VHIN partner sites, VHIN continues to contact new partners. For example, individuals have expressed interest in joining

VHIN after presentations to national VA groups and at national infection prevention meetings. The VHIN Coordinating Center continues to update the partner site list on the SharePoint site to encourage collaborations between sites and facilitate additional outreach. These VHIN updates, such as new initiatives that partners can join, will also be posted for partner sites to review.

*2. VHA Healthcare-associated infection prevention practices in acute-care settings needs assessment survey.* This needs assessment was modeled after a highly successful survey that explored hand hygiene practices across the VA healthcare system.<sup>26</sup> Through tremendous collaboration with the Healthcare Analysis and Information Group (a field unit of the Office of Strategic Planning and Analysis) and the University of Wisconsin Survey Center, VHIN developed a needs assessment instrument for infection prevention. The needs assessment included interviews and an online questionnaire focusing on 4 content areas of interest: general infection prevention, chlorhexidine gluconate bathing, *Clostridium difficile* infection prevention practices, and carbapenem-resistant *Enterobacteriaceae* prevention practices. The findings from the needs assessment provide information on facility implementation of evidence-based practices, and they detail practice variations between VA acute-care sites and barriers and facilitators to the implementation of HAI prevention practices (manuscript in preparation; the report has been released internally to the VA<sup>27</sup>). Overall, the results of the needs assessment will inform future infection prevention quality improvement projects and will help set strategic priorities for VHIN and relevant VA offices, including the MDRO Program Office and National Center for Patient Safety.

The widespread dissemination of the needs assessment to VA health facilities across the country has also served as a key recruitment strategy, with self-identified infection control professionals requesting membership in VHIN.

TABLE 1. Veterans Affairs Healthcare-Associated Infection Prevention Network (VHIN) Resources by Implementation Strategy Cluster<sup>25</sup>

VHIN Resource	Implementation Strategy Cluster
Veteran engagement	Engage Consumers
Identify and overcome barriers in infection control and prevention practices	Use evaluative and iterative strategies
Measure practice variations and their impact on patient, family, and system processes	Use evaluative and iterative strategies
Conduct a needs assessment and use results to define a QI program agenda	Use evaluative and iterative strategies
Build collaborations to accelerate dissemination and improve implementation of evidence-based HAI prevention measures into practice and policy	Change infrastructure
Develop and maintain databases	Adapt and tailor to the context
Provide partnership opportunities for researchers and frontline healthcare professionals	Develop stakeholder interrelationships
Develop a network of VA healthcare facilities to facilitate collaboration and outreach	Develop stakeholder interrelationships
Provide assistance with QI study designs and implementation strategies, including proposal reviews, study management, and manuscript preparations	Provide interactive assistance
Facilitate the design and execution of VA-oriented projects and regulations	Provide interactive assistance
Provide methodological and mentorship expertise for HAI prevention research, QI, and practice	Train and educate stakeholders
Develop a repository for current practices and needs related to veteran HAI prevention	Train and educate stakeholders

NOTE. QI, quality improvement; HAI, healthcare-associated infection; VA, Veterans Affairs.

## Opportunities Ahead

*Disseminating infection prevention best practices.* VHIN will facilitate timely implementation and evaluation of evidence-based practices demonstrated to reduce HAIs and document VA-wide practice and variations in implementation strategies. Information on best practices will be shared within VA networks. The information gathered by VHIN regarding HAI prevention and control measures will also be disseminated beyond the VA healthcare system through national publications and presentations, dissemination partners, and direct connections with external facilities and academic affiliates.

*Expanding veteran engagement in patient safety initiatives.* We anticipate increasing veterans' involvement as consumers and stakeholders in this project. Patient and caregiver access and care experiences are a critical perspective to consider for effective implementation of infection prevention practices.

*Improving collaboration across the VA healthcare system.* An extant VA-secure internal collaboration site will serve as a communications platform for VHIN members, will house a repository of current practices in HAI prevention, and will provide guidance for VA facilities seeking to undertake pragmatic HAI prevention implementation studies.

We continue to formalize procedures to streamline collaboration between existing VHIN partners and to create straightforward ways for new sites to engage with VHIN. The VHIN Steering Committee is currently developing policies for how projects will be decided upon and how conflicts will be resolved, which will be finalized before soliciting new projects. As VHIN expands, we also anticipate including additional sites that have unique or broad expertise in infection prevention on the Steering Committee.

*Leaders developing leaders.* Through training, coaching, and tools, VHIN will engage and develop clinical staff to lead local infection prevention initiatives.

Overall, the bidirectional relationships between operational groups, patients and families, and researchers allow VHIN to collaboratively develop research agendas that reduce infections and improve care for veterans.

In conclusion, VHIN is a practice-based quality improvement network with an established patient advisory council. VHIN provides a platform where practitioners and researchers can (1) collaborate on emerging practice-based priority projects, (2) seek participating sites, identify site-specific solutions to recruitment, and expedite studies at these local facilities, (3) find resources and obtain information on the science of implementing infection prevention practices, and (4) expand veteran engagement in patient safety by linking with veteran patients and their family members on issues related to infection control and prevention. Furthermore, VA personnel will receive feedback of quality improvement implementation and research protocols from VHIN, and VHIN will support the development and use of qualitative or mixed methods approaches to address patient safety issues.

Because the VA is the largest integrated healthcare system in the United States, the VHIN community of practice (including patient engagement) can serve as a national model. The initiatives implemented and evaluated by the VHIN within the VA healthcare system will be applicable for healthcare facilities and systems across the country.

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