


Original Article

A mixed-methods evaluation of the national implementation of the Hospital-Acquired Pneumonia Prevention by Engaging Nurses (HAPPEN) initiative

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Abstract

Objective: To describe healthcare provider, veteran, and organizational barriers to, challenges to, and facilitators of implementation of the oral care Hospital-Acquired Pneumonia Prevention by Engaging Nurses (HAPPEN) initiative to prevent non-ventilator-associated hospital-acquired pneumonia (NV-HAP).

Design: Concurrent mixed methods. Qualitative interviews of staff and patients were conducted in addition to a larger survey of VA employees regarding implementation.

Setting: Medical surgical or extended care units in 6 high-complexity (01a–c) VA hospitals.

Participants: Between January 2020 and February 2021, we interviewed 7 staff and 7 veterans, and we received survey responses from 91 staff.

Intervention: Provide education, support, and oral care supplies to prevent NV-HAP.

Results: Barriers to HAPPEN implementation and tracking at the pilot sites included maintaining oral care supplies and completion of oral care documentation. Facilitators for HAPPEN implementation included development of supportive formal and informal nurse leaders, staff engagement, and shared beliefs in the importance of care quality and infection prevention. Nurses worked together as a team to provide consistent oral care. Oral care was viewed as an essential infection control practice (not just “a task”) and was considered part of the “culture” and “mission” in caring for veterans.

Conclusions: Nurse leaders and direct-care staff were engaged throughout HAPPEN implementation, and most reported feeling supported and well prepared as they walked through the steps. Veterans reported positive experiences and increased knowledge about prevention of pneumonia. Lessons learned included building a community of practice and sharing expertise, which led to the successful replication of the HAPPEN initiative nationwide, improving patient safety and care quality and influencing health policy.

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Hospital-acquired pneumonia (HAP) is a serious threat to patient safety with high mortality and morbidity rates in US hospitals and treatment costs of ~\$3 billion a year.¹ The many adverse consequences of missed oral care include non-ventilator-associated hospital-acquired pneumonia (NV-HAP), which frequently results in sepsis, increased length of stay, and higher costs.^{1,2} Hospital-Acquired Pneumonia Prevention by Engaging Nurses (HAPPEN) is a nurse-led interdisciplinary initiative within the Department of Veterans' Affairs (VA) designed to decrease the risk

of NV-HAP. HAPPEN utilizes consistently delivered oral care to reduce oral bacteria, lowering the risk NV-HAP.^{1,3,4} HAPPEN pilot studies have demonstrated a reduction of NV-HAP that improved veteran health and met a critical patient safety need.^{4,5}

In 2016, the HAPPEN team designed a VA oral-care tool kit, additional resources, step-by-step instructions and education for VA hospitals and long-term care facilities to begin national diffusion of HAPPEN. These materials were updated regularly and were available to any VA employee on the VA's internal SharePoint. A partnership between HAPPEN, the Quality Enhancement Research Initiative (QUERI), and the VA Collaborative Evaluation Center (VACE) was established in 2019 to evaluate (1) the quality of HAPPEN implementation (the impact on veteran health outcomes, and (3) cost from 2019 to 2021. Operations partners included the VHA Innovation Ecosystem, the Office of

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Discovery, Education, and Affiliated Networks (Diffusion of Excellence), the VHA Office of Nursing Services, the VHA Office of Dentistry, and the VHA Office of Rural Health.

Gaps in staff knowledge of oral care in prevention of NV-HAP were identified during baseline assessments of the initial pilot studies (2016–2017). The HAPPEN team noted (1) the few studies targeting NV-HAP among the veteran population, (2) that few studies addressed nursing staff engagement in the prevention of NV-HAP, and (3) a need for evaluation of pilot sites in the Veterans' Integrated Services Network 6 (VISN-6) to inform the dissemination of the practice on a larger scale. Learning more about gaps in knowledge, barriers, challenges, and facilitators was essential to improve the quality of care veterans receive and to inform program expansion.

Methods

Study design and sample

We used a concurrent mixed-methods approach utilizing semistructured qualitative interviews and surveys, that, when combined, can effectively inform the development of infection prevention interventions.^{6,7} We initially utilized a snowball sampling approach, beginning with the local HAPPEN champions, to identify and recruit providers (medical doctors and nurse practitioners), registered nurses, other staff (nurse managers and department chief), as well as veteran patients from each site. However, the coronavirus disease 2019 (COVID-19) pandemic and its impact on workload necessitated a change to a convenience sampling approach, including outreach to 2 additional VISNs (VISN-20 and VISN-10). Like VISN-6, all the same resources and efforts were provided for implementation of HAPPEN in VISN-20 and VISN-10. This addition provided a larger potential sample for the evaluation to adapt to the demands of staff related to the pandemic. We identified 4 providers, 4 nurses, 4 other staff, and 130 veterans for recruitment from 7 VISN-6 sites, 2 VISN-10 sites, and 1 VISN-20 site.

QUERI and the Diffusion of Excellence Initiative funded this program evaluation (*VHA Program Guide*, section 1200.21) conducted under the authority of the VHA Office of Nursing Services. This study was deemed quality improvement, voluntary, and not subject to research oversight. The outcome for this project was intended to inform VA operations and was thus exempt from institutional review board review in compliance with the *VA Handbook*, section 1058.05.

Setting and intervention

Seven VA medical centers (VAMCs) located in North Carolina and Virginia (VISN-6) volunteered to serve as pilot sites prior to the nationwide expansion of the HAPPEN initiative. A full-day, introductory, face-to-face kick-off meeting was held at the Salem VAMC to build supportive relationships between site HAPPEN champions (facilitators) and the HAPPEN team. Champions were given orientation regarding the implementation process, the tool kit, additional resources, team planning, goal setting, overcoming resistance to change, measuring outcomes, and reporting process measures. They watched demonstrations by dental professionals and discussed anticipated challenges with champions who had successfully launched and sustained the program. The HAPPEN leader then conducted a series of one-on-one and group calls to facilitate implementation and networking between teams. These calls evolved into larger community-of-practice calls during which

sites could receive information, ask questions, and learn from the expertise and experiences of others in the group.

Data collection and analysis

Qualitative interviews

Semistructured interview guides were designed to elicit rich descriptions of participant perceptions and experiences of HAPPEN implementation including barriers, challenges, and facilitators to providing or receiving oral care. Staff interview guides were informed by the consolidated framework for implementation research (CFIR),⁸ including engagement, state of project adoption, accountability, collaboration, and how implementation of HAPPEN and tool kit usability may be improved. Interviews with both providers and veterans were conducted via telephone and were then audio recorded and transcribed verbatim. Transcripts were analyzed using matrix analysis⁹ with separate matrix templates for staff and veteran data. A priori categories included acceptability, barriers, and facilitators. Emergent domains were developed to capture data that did not fit a priori categories. This matrix template analysis approach facilitated rapid and detailed analysis.¹⁰

Survey

A REDCap survey was sent to 319 providers, including RNs and NPs, within the VHA who were engaged in implementation of HAPPEN at their site. The survey assessed the value and impact of the HAPPEN tool kit and other materials available on the SharePoint site.

Results

We completed 7 interviews with VA staff (2 providers, 2 nurses, 3 other staff) across 7 sites (5 VISN-6 sites and 2 VISN-10 sites) between January and July 2020. We completed 7 interviews with Veterans within 6 months of their hospitalization in a facility where the HAPPEN initiative was introduced between October 2020 and February 2021. Illustrative quotations for the interview findings are listed in Table 1.

Provider surveys

In total, 91 participants responded to the online survey (response rate, 28.5%). Of those respondents, 72 (80%) used the tool kit provided for HAPPEN implementation. Among them, 31 participants (43.1%) accessed the tool kit through the national HAPPEN team, and 26 respondents (36.1%) accessed the tool kit through VA Pulse, which was replaced by the internal VA HAPPEN SharePoint (n = 26, 34.7%). Among those who used the tool kit, 56 (77.8%) found it very helpful for implementation. Also, 53 responding providers (74.6%) had used the tool kit 3 or more times. Respondents reported that the downloadable materials from the tool kit were valuable in supporting their efforts to implement the HAPPEN initiative at their site (Tables 2–4).

Provider interviews

Providers interviewed about the HAPPEN initiative reported that the program brought knowledge to the staff about the impact of oral care (eg, toothbrushing and denture cleaning) on reduction of NV-HAP cases and the health of their patients. Implementing the HAPPEN initiative was something that easily fit within the daily workflow and received little complaint or pushback from patients.

Table 1. Illustrative Quotes Identified from the Qualitative Interviews

Theme	Quotes
Provider interviews	
Fit to practice	“We kind of incorporated it in our daily work.” “I’d say it fits very well with our mission to care for our veterans.”
Initial barriers to implementation	“It’s been quite a headache to get some more [oral care] supplies in so I can remain compliant with this project.”
Facilitators to implementation	“So initially we were given [oral care] supplies . . . and they were distributed to each facility. And as those supplies dwindled our facility picked up the cost of providing those.”
Perceived veteran experience	“Yeah, I think it changed a lot of their lives. Because before this, we actually had residents that lived here that were the ones that had pneumonia one or two times a year and we had people with really nasty, rotten teeth that hadn’t been taken care of for a long time. And then once we started implementing oral care two to three times a day, and now they actually think about it. Like, after lunch, some of them go back to their room and brush their teeth. It’s crazy. I mean, that never happened before.” “ . . . One of the veterans did come back and was like, ‘Wow, I didn’t know that brushing your teeth could prevent pneumonia. Well, brushing your teeth twice a day could prevent pneumonia and when I came here and they told me this, that’s one thing I did take away and I’m going to continue to do that.’ ”
COVID-19 challenges	“It was like a ready-made project, it was awesome. And I can honestly tell you, the only difficulty I had was because of COVID.” “So once COVID began here at [CITY], everyone, all of our projects went on hold that were not COVID related. So, all forces went towards getting everything set.”
Sustainability	“We got nurses engaged . . . Keep it in the forefront [of their minds] to sustain it . . . It’s about quality and changing culture . . . a team effort. It’s a part of what we do as a nurse.” “It’s prevention of hospital complications. Our goal is to have zero pneumonias.” “Start off small and just say—Okay, let’s see if we avoid an infection for like 90 days.”
Expansion suggestions	“My only thing is if I can just get more . . . I know some sites they got involvement from their infection control. Because we get all the support we need from our nurse researcher” “ . . . Let the upper leadership and these ancillary chiefs people know, hey, what’s going on, I think it would be smoother.” “And we’ve actually recognized some opportunities to improve that [documentation tool]. But because we’re rolling out with [a new EMR] Cerner, hopefully those improvements will be noted there rather than changing the tool.” “I think the most vital suggestion I can give is when you roll it out, to be very positive. To speak about all of the success that the program has had, the lives that have been saved, the money that has been saved.”
Veteran interviews	
Education in the hospital	“They told me about brushing my teeth, you know, the best way to do it . . . all of the normal stuff you’d get from like a doctor giving you the 2- to 3-minute drill.” “I had heard before your mouth will bring disease in your body. And then I heard later on that pneumonia . . . seemed to be a concern. So then by the time I got this written material I guess I felt like I was up to speed, brush your teeth, do it right, 2 minutes, and help protect yourself.” “It didn’t bother me because I brush my teeth every day.”
Assistance with oral care	“Some of the nurses will ask, have you brushed twice a day? There was a much higher emphasis this last [hospitalization] . . . Enough that it struck my curiosity, that they were paying more attention and spending more time on the possibility of it preventing pneumonia.”
Oral care supplies	“They always make sure you’ve got a toothbrush and toothpaste.” “I do recall though that I wasn’t issued floss. And flossing is very important for me, because plaque builds up on my teeth very easily, especially in the rear of my mouth.” “I bring my [own] electric toothbrush.”
Oral care at home	“I still did it at home and try as best as I can.” “I tend to brush my teeth on my own, as I said, twice a day.” “It’s hard for me to even get out of bed in the morning, and that just robs me of motivation. So, if I’m not experiencing any indication of a dental problem, it just slips my mind. But I do have the intention to [engage in oral care at home].” “Yes, I do. I do, meaning that I have the intention to do that. But I don’t always follow through because . . . I have major depressive disorder and PTSD. And a lot of times it’s hard for me to even get out of bed in the morning, and that just robs me of motivation.”
Suggestions for improvement	“Just a little reminder might be just enough to motivate a vet to do these things.”
Advice for other veterans	“The VA is trying to take care of your problems [prevent pneumonia] and provide oral care supplies.” “Look at me, when I smile, you don’t see any missing teeth . . . I’ve got all my teeth. And I’m happy with that.”

Fit to practice

Participant providers reported that staff had to “work out the kinks” of who was documenting oral-care assistance provided during 12-hour nursing shifts. Once documentation responsibility was

sorted out, most providers felt that it was within their normal workflow. For some providers, the HAPPEN initiative fit well with other efforts they engage in for pneumonia prevention (eg, early and frequent ambulation).

Table 2. Provider Semistructured Interview Guide

1. First, I would like to ask you a few questions to help me understand your role in your facility. a. What is your title? b. What are your main responsibilities? c. What is your role with HAPPEN?
2. Tell me about HAPPEN a. Tell me about providing oral care for patients since HAPPEN started i. How much time you spend teeth brushing per patient? ii. How much time you spend denture cleaning per patient? iii. Besides teeth brushing and denture cleaning, is there other oral care you provide? iv. How much time do you spend on this other oral care per patient?
3. Tell me about the patients' experience with the project a. Any positive experiences? b. Any negative experiences? c. Do you think the project meets the needs of the patients?
4. How well does HAPPEN fit in your practice? a. Do you have enough flexibility or the ability to change aspects of the project/tool kit?
5. What is your overall impression of HAPPEN? a. What, if anything, has been positive? b. What, if anything, has been negative?
6. How did your site become involved with HAPPEN [the pneumonia prevention project]? a. How was the decision made to participate in this project? b. Who participated in the decision-making process?
7. Who is involved in the implementation and support of this project? a. Are clinical leaders at your facility involved in this project? b. How do you work together? c. Is there a recognized champion for this project?
8. How did you get involved?
9. What activities have been done to get HAPPEN implemented? a. How was this process tracked?
10. What kinds of information or evidence was shared about the project? a. What kind of resources or support have you received?
11. What, if anything has made it difficult to implement HAPPEN?
12. What if anything has made it easy to implement HAPPEN?
13. Do you have specific goals related to this project?
14. Do you collect any data on HAPPEN? a. How is that reported? b. Who gets the data? c. Do you receive any feedback on your participation in HAPPEN?
15. How confident are you that you can continue assisting patients with oral care?
16. Are there other kinds of pneumonia prevention services are offered at your facility? a. How does HAPPEN integrate with other programs? b. How does HAPPEN integration other units/departments?
17. Do you have any suggestions for changes or improvements to the project?
18. Is there anything else you would like us to know about the implementation of HAPPEN at your site?
Grounded Probes: If responses are limited or require clarification, probes may be used to illicit more detailed responses. Probes should use words or phrases presented by the participant using one of the following formats: • What do you mean by _____? • Tell me more about _____ • Give me an example of _____ • Tell me about a time when _____ • When did (they, you, it, etc) _____? • Where did (they, you, it, etc) _____? • Who _____?

Most providers reported that implementing the HAPPEN initiative and assisting with oral care tailored for their patients' needs required 5–10 minutes per person each shift and was incorporated into the normal routine. Most veterans can complete oral care independently with only a reminder from staff.

Barriers to implementation

Participants at pilot sites reported that implementing the HAPPEN initiative posed some challenges. Documentation was a challenge for some sites as they navigated new EMR oral-care templates and designated responsibility for documentation. Subsequently, a national standardized oral-care template was developed to provide

Table 3. Patient Telephone Interview Guide

1. Tell me about your hospital stay [insert date/location].
2. Did a nurse or hospital staff person assist you with oral care (brushing your teeth or dentures)?
3. Tell me about your experience learning about oral care while you were at the hospital.
4. Did you receive any information or materials about oral care while you were hospitalized? a. Did you take anything home about oral care? b. Did you talk to anyone from dental services?
5. Did you receive any supplies such as a toothbrush or toothpaste?
6. Is there anything that would have been helpful to you during your hospital stay to make sure you brushed your teeth or cleaned your dentures every day?
7. Do you brush your teeth at least once a day when you're not at the hospital? Twice? a. Is there anything that makes it difficult for you to brush your teeth?
8. What, if any, benefits are there from oral care in the hospital?
9. Is there anything else we should know about your oral care education or oral care that I haven't asked you about?
10. What would you tell another veteran about oral care?
11. Do you have any questions for me?

consistency across sites. Staff in the field had input into the design and testing of the templates; however, a few respondents wished these could be individualized for their site's needs.

Providers reported that some veterans who wear dentures do not want to take them out in front of anyone, which can create a barrier to effective oral care. Under these circumstances, veterans were resistant to assistance from staff to complete oral care.

During the initial pilot studies, oral care supplies were provided by the expansion project. Once those supplies ran out, some sites reported difficulty acquiring replacements and engaging voluntary services to collect donations or using funds to purchase needed supplies. Identification of this need allowed HAPPEN to require local facilities to provide supplies for the national rollout.

COVID-19 challenges

One site delayed implementation of the HAPPEN initiative due to changes in units in response to the COVID-19 pandemic (spring of 2020). At other sites, the addition of personal protective equipment (eg, masks and face shields) made interaction and education about oral health more challenging but did not prevent them from continuing to engage veterans in the program. One provider emphasized that the HAPPEN initiative and oral care were even more important considering the COVID-19 pandemic.

Facilitators to implementation

Oral care supplies provided as part of the HAPPEN initiative were described as helpful, and staff reported reproducing and distributing the HAPPEN education materials. Engaging leadership and nursing staff in the implementation process (eg, utilizing staff feedback to streamline processes and template development, encouraging champions to share outcomes) allowed for trouble shooting and workflow fit. Access to the national program team for questions and support was also an implementation facilitator. The tool kit and implementation timeline were facilitators to implementation as well for sites.

Providers reported that monthly quality improvement data showing a difference in pneumonia rates was a motivator for implementation and sustainment. Online training helped orient staff, particularly new staff, to the goals of the HAPPEN initiative and how to complete oral care. One HAPPEN champion asked staff to “go a night without brushing” their teeth to see how they felt the next day, which helped many to understand the importance of assisting patients achieve daily oral care.

Veteran experience (provider perspective)

Providers interviewed reported no complaints from veterans and noted improvements in pneumonia cases. One provider reported reductions “from 7 infections down to 1–2 or none” per month on their unit. For veterans who were not engaging in oral care prior to their hospitalization, HAPPEN provided education and encouraged the habit of consistent oral care. Another provider reported a reduction of thrush in their veterans since implementing HAPPEN.

Sustainability

Most participants described the HAPPEN initiative as important and sustainable and stated that documentation became easier with the national template and practice. The tool kit aided in the implementation and sustainment of the HAPPEN initiative. The tool kit is accessible on the internal VA SharePoint and is routinely updated based on the needs of the field and provides uniformity across sites. Most providers indicated that they would continue to provide education, oral care supplies, and supervision of oral care on their wards.

Expansion suggestions

One provider suggested engaging infectious disease departments to assist in collecting data to monitor NV-HAP cases and the impact of oral care. Another site recommended simplifying the criteria needed to facilitate clinicians gathering data. HAPPEN sites used Centers for Disease Control and Prevention National Healthcare Safety Network (NHSN) criteria to confirm, cases and most facilities had already tapped into the expertise of their infection control and prevention practitioners and quality managers.

Some staff recommended making HAPPEN education part of new staff orientation to ensure that all staff are aware of the importance of oral care for patient health. Another suggestion was to highlight successes and reduction of pneumonia infections to support further expansion through increased staff buy-in, continued education, and support for oral care. Those recommendations were included in the tool kit materials.

Using the NHSN criteria, VA medical centers began voluntarily reporting chart confirmed NV-HAP data to the inpatient evaluation center (IPEC) in March 2021.⁵ The process and outcome measures are currently under review by national healthcare policy makers and insurers for future reporting. Materials developed by the initiative have been shared outside the VA healthcare system, and several civilian hospitals have adopted similar initiatives.

Veteran interviews

Veterans had a range of reactions to HAPPEN oral care assistance. Some veterans mentioned having concern about oral health prior to hospitalization. Other veterans reported no concerns about oral care and feeling like the education was not necessary because they were not eligible for outpatient dental care, or they believed that oral care was unrelated to the reason for their hospital stay.

Table 4. Online Healthcare Provider Survey

1. Have you used the VHA oral care implementation tool kit for HAPPEN? a. Yes b. No
2. How did you locate the tool kit? a. VA pulse HAPPEN page (now out of service) b. HAPPEN SharePoint c. HAPPEN team d. Supervisor e. Another coworker f. Other/Don't recall
3. On a scale of 1–5, please indicate how useful the tool kit is: a. 1 = not helpful b. 2 c. 3 d. 4 e. 5 = very helpful
4. What features of the tool kit were most effective/useful?
5. What features of the tool kit were not effective/not useful?
6. How often have you referred to the tool kit contents? a. Never b. One time c. Two times d. Three or more
7. On a scale of 1 – 5, please indicate how you feel about the length of the tool kit? a. 1 = not enough detail b. 2 c. 3 d. 4 e. 5 = very detailed
8. What components of the tool kit, if any, did you adapt? a. Patient brochure b. Patient education posters c. Project charter d. Standard operating procedure e. Staff education power point presentations f. Other
9. Please explain any changes
10. What is missing from the tool kit, if anything, that would be helpful?
11. Have you used the VA HAPPEN SharePoint site? a. Yes b. No
12. What can we do to improve the VA HAPPEN SharePoint site?
13. Have you seen the HAPPEN page on the VA marketplace? a. Yes b. No
14. Did you reach out for additional information about HAPPEN through the Marketplace? a. Yes b. No
15. What features of the HAPPEN Marketplace page were effective/useful?
16. Is your facility a HAPPEN site? a. Yes b. No
17. Have you seen the “Healthy Teeth, Healthy You” public service announcements (videos) on you tube? a. Yes b. No
18. What are your thoughts on the messages shared?
19. Have you shared/used the videos? a. Yes b. No
20. If you have shared/used the videos, please describe
21. Do you have any additional comments?

Education in the hospital

Veterans described a wide range of experience with oral care education and supplies for NV-HAP prevention. One veteran participant felt that the pneumonia prevention messaging he received was very important, and he planned to share his newfound knowledge with other veterans. One veteran did not recall the education but stated it was due to the severity of their health during hospitalization and a focus on surviving. For another veteran, oral care was a high priority, so while this veteran did recall the materials, he reported not really paying attention because it was something he had heard before. One veteran wondered why staff would educate on oral care when routine dental services were not provided during inpatient admissions, indicating that he did not fully understand the purpose of the educational materials or the impact oral care might have on their physical health during their hospitalization.

Assistance with oral care

Much like providers reports, veterans who could engage in oral care did so on their own. Assistance provided during hospitalization ranged from inquiring whether they brushed their teeth to assistance with oral care. Some veterans reported having few or no teeth, or full dentures which they did not bring to their hospital stay, and they did not feel they needed assistance with oral care during their hospital stay.

Oral care supplies

The HAPPEN program provided oral care supplies to veterans to facilitate daily oral care, and some did recall receiving supplies. One veteran reported that he was able to and preferred to bring his own electric toothbrush for their stay. Another veteran reported that they normally would bring their own supplies, but his hospitalization was unexpected, so having access to the supplies made oral care possible during the hospital stay.

Oral care at home

Most of the veterans with their natural teeth reported brushing their teeth at home. Veterans with dentures reported cleaning them when they wore them, but that they did not wear their dentures every day. One veteran highlighted the impact that mental health had on the ability to engage in oral care activities at home, identifying that as a barrier to daily oral care. Oral care habits in the hospital seemed to mirror those reported at home. For those who did not engage regularly in oral care at home, their hospital stay represented an opportunity to receive education on the importance of regular oral care.

Suggestions for improvement

Veterans suggested that reminders to complete oral care while hospitalized are helpful. Engaging dental professionals to address acute issues during their admission was another suggestion. Outpatient VA dental care eligibility was mentioned as challenging for veterans. Resources on access to outpatient dental care services were useful to aid veterans in seeking routine care in addition to completing daily oral care at home following discharge. The positive experience of HAPPEN presented an excellent opportunity for addressing this gap.

Discussion

Oral care has historically been seen as an activity of daily living rather than an essential infection control intervention, and the HAPPEN initiative appears to have effectively raised staff

awareness of the impact of oral care on pneumonia prevention and health. Staff attributed a reduction in pneumonia rates at their sites to the implementation of the HAPPEN initiative. Although nationally implemented programs can encounter resistance, the HAPPEN tasks easily fit within the daily workflow for staff and received little complaint or pushback from veterans. Consistent with previous studies, providing tools, support, and American Dental Association (ADA) recommended supplies are ways to facilitate the successful implementation of the HAPPEN initiative.^{11–13} Engaging leadership and providing support to team members is critical to infection prevention efforts¹⁴ and was an important element of the HAPPEN initiative and NV-HAP prevention, leading to better integration into the workflow and access to supplies. Systemwide educational efforts to change provider, staff, and patient and family perceptions, like the highly successful hand washing campaigns of the last decade, were successful in improving buy in and uptake of the HAPPEN intervention.^{5,15} Hospitalization appears to be an excellent opportunity to educate veterans on the importance of oral care for general health in the VA.

This study had several limitations. Although the initial sites included in this analysis were voluntarily included in the pilot study, the program has expanded. The HAPPEN initiative spread to the entire VA by July 2021: 146 VA hospitals with acute-care beds and 134 facilities with long-term care beds, for a total of 155 facilities. Moreover, 49,774 VA direct-care staff have received oral-care instruction to date, including the use of a Talent Management System (TMS) course, “Healthy Smiles for Veterans” developed by the VA Office of Dentistry.¹⁶ The onset of the COVID-19 pandemic affected the implementation of the nationwide rollout of HAPPEN. With the need to adjust or change units to respond to COVID-19, some facilities delayed or needed to relaunch the initiative. COVID-19 affected the collection of data. Some providers and staff were unable to participate in interviews due to COVID-19–related duties. Furthermore, this evaluation only reflects of the experience within the VA with veteran patients. However, the HAPPEN initiative may also benefit patients outside the VA for NV-HAP prevention, and it can be easily integrated into the normal workflow for nursing staff.

Lessons learned from pilot testing and this evaluation supported scaling up this nurse-led initiative nationally. HAPPEN was integrated into standard practice as essential infection control and has demonstrated a steady and significant reduction in NV-HAP among acute-care hospitalized veterans, prior to the onset of the COVID-19 pandemic.² Nurse leaders and direct-care staff were engaged in implementation, and the majority reported feeling supported and well prepared. Veterans reported positive experiences and increased knowledge. Building a community of practice and sharing expertise led to the successful replication of HAPPEN nationwide improving patient safety and care quality and influencing health policy.

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