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EXPERIENCE REPORT

Learning Health Systems

Implementation experience and initial assessment of a rural women's health training program in support of the U.S. Department of Veterans Affairs as a learning health system

Aimee M. Sanders[1] | Rachel E. Golden[2] | Christine Kolehmainen[1,3] | Jonna K. Brenton[1] | Susan M. Frayne[2,4]

[1]U.S. Department of Veterans Affairs, Office of Women's Health, Washington, District of Columbia, USA

[2]VA HSR&D Center for Innovation to Implementation (Ci2i), U.S. Department of Veterans Affairs, Palo Alto Health Care System, Palo Alto, California, USA

[3]University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin, USA

[4]Division of Primary Care and Population Health, Department of Medicine, Stanford University, Stanford, California, USA

Correspondence
Aimee M. Sanders, Office of Women's Health, U.S. Department of Veterans Affairs, 810 Vermont Avenue, NW, Washington, DC 20420, USA.
Email: aimee.sanders2@va.gov

Rachel E. Golden, VA Palo Alto Health Care System, 795 Willow Road (152-MPD), Menlo Park, CA 94025, USA.
Email: rachel.golden@va.gov

Abstract

Introduction: The increasing number of women Veterans receiving health care from the Veterans Health Administration (VHA) has spurred the need for more women's health primary care providers (PCPs) and nurses, including in rural areas nationwide. Here we report on the implementation of a women's health rural workforce training program, demonstrate initial evidence of its effectiveness within VHA as a Learning Health System, and present lessons learned and implications for other workforce training programs.

Methods: The Women's Health Primary Care Mini-Residency for Rural Providers and Nurses (Rural WH-MR) is a mobile VHA training initiative adapted from a national training model. The Rural WH-MR uses asynchronous blended learning paired with in-person hands-on instruction delivered directly at rural VHA sites. Mixed methods evaluation using quantitative data, qualitative interviews, and observational feedback assessed the program's implementation feasibility, fidelity, acceptability, and appropriateness. Longitudinal survey data were used to assess the initial program impact via changes in participating PCP and nurse knowledge, attitudes, practices, and skills (KAPS).

Results: Inclusive of the pilot and fiscal years 2018 and 2019 Rural WH-MR trainings, 181 PCPs, and 320 nurses were trained through 56 training events nationwide. Cumulative survey data using 5-point measures showed high participant satisfaction, achievement of program-specific objectives, and usefulness of training activities to the rural practice of both PCPs and nurses. Both a pre-training and 6-month-follow-up survey were completed by 52 PCPs (32.9%) and 93 nurses (32.2%) and revealed significant sustained improvements in 18 out of 22 KAPS ($p < 0.01–0.03$) areas assessed for PCPs and all 17 KAPS ($p < 0.01$) areas assessed for nurses.

Conclusions: This adapted training program benefitted VHA's rural clinical workforce thereby contributing to the VHA goal of increasing the numbers of rural women Veterans with access to PCPs and nurses with women's health expertise.

KEYWORDS
rural, women's health, workforce training

1 | INTRODUCTION

The number of women Veterans (WVs) receiving Veterans Health Administration (VHA) health care has more than tripled over the past two decades, growing from 159 810 in 2000[1] to over 550 000 recently.[2] This has driven an increased need for gender-specific health care,[1] including in rural U.S. where approximately one in four of these WVs reside (VHA uses the Rural-Urban Commuting Areas system to define rurality).[3]

The U.S. Department of Veterans Affairs (VA) Office of Women's Health's (OWH) mission is to address the health care needs of WVs and work "to ensure that timely, equitable, high quality, comprehensive health care services are provided in a sensitive and safe environment at VHA facilities nationwide."[4]

VHA's policy for comprehensive primary care states that WVs should be assigned to Women's Health Primary Care Providers (WH-PCPs) who are primary care providers (PCPs; primary care physicians, nurse practitioners, and physician assistants) with specific training or experience in women's health. WH-PCPs are integral to a Women's Health Patient Aligned Care Team (WH-PACT),[5] VHA's version of the primary care medical home. It also states that primary care sites, including Community Based Outpatient Clinics (CBOCs), must have ≥2 WH-PCPs to ensure continuous coverage during absences.

WVs assigned to a WH-PCP report greater patient satisfaction and have higher quality of care measures than those assigned to other PCPs.[6,7] Furthermore, attrition from VHA for WVs assigned to a WH-PCP is half the rate of those assigned to other PCPs.[8] VHA strives to improve access to an adequately trained WH-PCP workforce as a means of increasing WVs' retention and improving the quality of care.

Despite aggressive training and hiring efforts, VHA has a continued WH-PCP and nurse workforce deficit. Indeed, registered nurse care managers and clinical associates such as licensed practical/vocational nurses are critical members of WH-PACTs with unique women's health training needs.[9] Although over the past decade more than 7500 clinical staff have completed VHA women's health trainings, gaps persist, particularly for clinical staff at rural health care sites. Such areas bear a disproportionate burden of the shortage, as shown in Table 1, with only 50% of rural CBOCs vs 70% of urban CBOCs having ≥2 WH-PCPs. Though WVs can still receive primary care services at sites without adequate WH-PCP staffing, they may need to travel to a VA Medical Center or use community care for gender-specific needs.

Since 2008, OWH has delivered a workforce training model for PCPs, the Mini-Residency on Primary Health Care for Women Veterans (herein the National WH-MR), to update clinical staff competencies. As described in the literature,[10] this national training traditionally follows a three-day, face-to-face format with programs offered biannually in large U.S. cities. The training curriculum incorporates principles of adult learning which includes primary care-focused lectures on gender-specific issues, case-based discussions, hands-on individual instruction with simulation equipment, and group learning with a live gynecologic model. Participants also develop an action plan to improve care for WVs at their health care site. Outcomes thus far reveal that WH-PCPs who participate in the National WH-MR are more likely to remain WH-PCPs in VHA than those who do not participate[11] consistent with other faculty development programs.[12]

Rural VHA health care sites, with fewer staff, face challenges sending staff off-site to distant training due to travel and time commitments that disrupt normal clinic operations and compromise Veterans' access to care.[12,13] As a result, rural site staff may forego training or may not be supported in attending distant programs. Limited access to continuing education for rural clinical staff may not only affect the care provided but may also add to feelings of isolation and lack of support for professional development.[14]

In partnership with VHA's Office of Rural Health (ORH), OWH adapted the curriculum and structure of the existing National WH-MR, by developing a blended, mobile delivery method, and targeting training to an expanded, interprofessional workforce of VHA PCPs and nurses who provide primary care for rural WVs. The program goal is to increase the number of PCPs and nurses with women's health expertise throughout VHA rural sites. (Specific program objectives are shown in Appendix S1).

TABLE 1 Percentage of Rural vs. Urban VHA[a] CBOCs[b] with 0, 1, or 2+ WH-PCPs[c] FY 2020[d]

		CBOC sites	
Rurality[e]	#WH-PCPs	#	%
Rural	0	43	9.8
	1	175	40.0
	2+	220	50.2
Total		438	100.0
Urban	0	30	6.8
	1	102	23.2
	2+	308	70.0
Total		440	100.0

[a]VHA—Veterans Health Administration.
[b]CBOCs—Community-Based Outpatient Clinics (excluding telehealth, mobile clinics, and VA Medical Centers).
[c]WH-PCPs—Women's Health Primary Care Providers.
[d]Women's Health Evaluation Initiative Women's Health Assessment of Workforce Capacity data fiscal year 2020.
[e]Rural CBOCs are those where ≥50% of all Veteran VHA outpatients reside in "highly rural" or "other rural" areas (excludes "Insular Islands"). VA uses the Rural–Urban Commuting Areas (RUCA) system to define rurality.

OWH modeled the Women's Health Primary Care Mini-Residency for Rural Providers and Nurses (herein the Rural WH-MR), after the National WH-MR with several key adaptations (Figure 1), resulting in a training program tailored to VHA rural site staff interests and logistical needs (Figures 2 and 3). To do so, OWH anticipated unique rural program implementation issues and responded with strategies designed by experienced professional staff (many from rural locations), corresponding to several ERIC (Expert Recommendations for Implementing Change) Strategies,[15] and used by other VA training programs.[16]

Atkins, Kilbourne, and Shulkin[17] highlight ways VHA performs as a Learning Health System (LHS) by valuing the collaboration, interaction, and synergies among researchers, clinicians, and educators—critical elements of an LHS.[18] Educators within an LHS contribute to "Real-time access to knowledge" and "Supportive system competencies" as outlined by the National Academy of Medicine LHS Principles.[19] Other aspects of VHA also contribute to its functioning as an LHS. For example, VHA hosts embedded researchers who conduct program evaluations and use research outcomes to increase evidence-based care.[20-22]

In this paper, we delineate (1) implementation and evaluation of the adapted Rural WH-MR; and (2) initial evidence of its effectiveness to support VHA as an LHS. We also present lessons learned and implications for other workforce training programs in support of an LHS.

2 | METHODS

2.1 | Questions of interest

To assess program implementation processes and preliminary outcomes, we ask whether our program (1) reflects feasibility (number of trainings completed each year), fidelity (trainer competence scores), acceptability (participant satisfaction scores), and appropriateness (program objectives scores), and (2) leads to an impact among participants' knowledge, attitudes, practices, and skills (KAPS). To address the questions of interest, we (1) reviewed our implementation timeline and process measures, monitoring methods, participant surveys, and staff responses to a semi-structured interview; and (2) conducted a single-arm pre-, post-, and six-month follow-up evaluation to detect changes in participants' self-reported KAPS.

2.2 | Program staffing

OWH partnered with the William S. Middleton Memorial VA Medical Center/University of Wisconsin School of Medicine & Public Health, the Women's Health Evaluation Initiative (WHEI) based in the VA Health Services Research & Development (HSR&D) Center for Innovation to Implementation (Ci2i) at the VA Palo Alto Health Care System, and VA's Employee Education System (EES) to evaluate the Rural WH-MR according to the Kirkpatrick Training Model[23,24] and to contextualize it within the Reach, Evaluation, Adoption, Implementation, and Maintenance (RE-AIM) Evaluation Framework.[25] The efforts described in this paper constitute VA program evaluation and are conducted as operations work rather than research. OWH provided the Determination of Non-Research for this program's evaluation.

OWH relied on three full-time staff to develop, organize, and implement the Rural WH-MR throughout the pilots and the trainings. Program delivery required contracted staff (physician and nurse instructors, live gynecologic models, and equipment support staff), all directly trained by OWH in a train-the-trainer event.

National WH-MR	Rural WH-MR
Face-to-face training, 3-days in-person (19 hours CME/CEU)	Blended training with online learning in advance of a face-to-face, one-day training (18.75 hours CME/CEU)
Live lectures on 12 (PCP) core women's health topics[a]	Online lectures on 12 (PCP) and 11 (nurse) core women's health topics; (nurse topics did not include the prescribing lecture)[a]
Facilitated case discussions on 7 women's health topics	Facilitated case discussions on 5 women's health topics [b]
All learning activities require faculty facilitation	Some learning activities are self-guided
Conducted on national level at central location; participants travel to the training location	Conducted on local level at/near participants' clinical sites; trainers travel to the participants' training location
Requires participant travel	Minimizes participant travel; requires travel by training team
PCPs and/or nurses participated depending on national training priorities	PCPs and nurses participated from the same patient-aligned care team (PACT) or clinic
Participants from any facility	Participants targeted from sites where ≥ 50% of Veterans reside in rural areas
Large number of participants (approx. 288 maximum)	Small number of participants (12 maximum)
Incorporates national VA OWH leadership to address issues related to national directives and policies	Incorporates local VA leadership to integrate local issues and create a knowledge reservoir for future women's health trainings conducted by these leaders at their sites
No rural health focus (no specific rural logistical issues raised)	Tailored case discussion to include focus on rural health logistical issues and accessing care; provides venue for local-/rural-focused discussion of specific barriers to care and cross-pollination of ideas among colleagues serving rural sites, while fostering local networks

FIGURE 1 Key differences in program delivery, content, and structure between National WH-MR and Rural WH-MR
[a]The original National WH-MR consisted of PCPs only, and the Rural WH-MR was adapted based on that training. The curriculum experts adapting the program removed the lecture on prescribing from the nurses' requirements and adapted the other topics accordingly. [b]The two topics not included in the case discussions were covered by other aspects of the curriculum (Chronic Pelvic Pain and Menopause).

PCP Lecture Topics	Nurse Lecture Topics
Abnormal Uterine Bleeding	Abnormal Vaginal Bleeding
Breast Issues	Breast Health
Chronic Pelvic Pain	Acute and Chronic Pelvic Pain
Contraception	Contraception
Gynecologic Emergencies	Cardiovascular Disease in Women
Innovation Diffusion Organizational Change	Innovation Diffusion Organizational Change
Interpersonal Violence	Interpersonal Violence
Menopause	Menopause
Pelvic Exam and Cervical Cancer Screening	Pelvic Exam and Cervical Cancer Screening
Pharmacy	Post-Deployment Issues
Post-Deployment Issues	Causes of Vaginal Discharge including Sexually-Transmitted Infection
Vaginitis & Cervicitis	

FIGURE 2 Rural WH-MR Online Learning: Pre-requisite Courses for PCPs and Nurses

7:45 – 8:00	Registration	
8:00 – 8:35	Welcome, introductions and program overview Action Plan introduction	
8:35 – 10:35 (break included)	Facilitated case discussions • Abnormal Uterine Bleeding • Cervical Cancer Screening and Sexually Transmitted Infections • Contraception	
10:35 – 11:05	**Simulation station**	
	PCPs Women's Health demonstration table	Nurses History-taking/Triage activity
11:05 – 12:00	Facilitated case discussions • Post-deployment Issues • Interpersonal Violence topics	
12:00 – 12:30	Lunch	
12:30 – 1:15	Prebrief of simulation activities Viewing of breast & pelvic exam videos, Question & Answer session Live Gynecologic Model introduction	
1:20 – 4:35 (break included)	**Simulation stations**	
	PCPs • Introduction to breast & pelvic exams • Pelvic simulation equipment • MammaCare® breast simulator & breast simulation equipment • Live gynecologic model activity • Action plan development	Nurses • Pelvic exam set-up activity • Women's Health demonstration table • Gynecologic procedural videos and patient education • Live gynecologic model activity • Action plan development
4:40 – 5:00	Debrief of simulation activities Program conclusion	

FIGURE 3 Rural WH-MR Face-to-face, onsite, one-day training component

2.3 | Training content and structure

The Rural WH-MR used asynchronous blended learning, or flipped classroom, approach. Participants viewed standardized National WH-MR curriculum online lectures by VHA faculty in advance of a one-day, face-to-face training. Online courses were assigned 60–90 days prior to participants' scheduled in-person training days, while site leadership committed to providing protected learning time. PCP and nurse participants viewed profession-oriented content (10.75 h) that included general women's health, Veteran-specific, and organizational change topics (Figure 2). After each course, participants took a post-test.

Upon completion of all pre-requisite courses, PCP-nurse teams attended a one-day (8 h) onsite training (Figure 3). During this, participants engaged in facilitated case discussions on lecture topics to reinforce and apply online learning to patient scenarios. All interprofessional discussions occurred with PCPs and nurses together. For hands-on activities, PCPs and nurses rotated through stations, some separated by profession, some done as a PACT, others facilitated by instructors, and some completed independently. All participants viewed VHA-developed instructional videos on standard breast and pelvic examination techniques, and patient and supply preparation. PCPs practiced techniques for breast and pelvic examinations using simulation equipment for exposure to abnormal findings. Nurses engaged in newly developed activities of facilitated history-taking and triage of gender-specific presentations and pelvic examination supply set-up. Nurses also viewed newly incorporated videos on common gynecologic procedures, coupled with an interactive patient education activity. Both PCPs and nurses participated in an expansive demonstration of gynecologic procedural instruments, pelvic examination supplies, contraceptives, and urogynecologic items. PCPs and nurses engaged as PACTs to interact with a live gynecologic model to obtain

a history and conduct breast and pelvic examinations, receiving constructive feedback from her during and after. PACTs also developed an action plan to resolve a deficiency related to women's health at their site, as identified and selected by each team via discussion of local site issues and consensus regarding what to prioritize (eg, improving the environment of care). OWH collected action plan progress reports six months post-training to continue the relationship with the site, support sites in their endeavors, and inform program evaluation of site action plan status.

The Rural WH-MR's small-scale design accommodated up to 12 PCP and nurse participants at each onsite training. Multiple training days were provided as needed. Participants received 18.75 h of accredited continuing professional education inclusive of online and onsite training components. OWH facilitated frequent communication with the site planning team and participants prior to, during, and after the one-day training. OWH also coordinated site observers to attend select trainings and shipped all necessary training equipment and supplies to/from each training location.

OWH ensured program fidelity by standardizing program implementation (flowcharts for all site engagement and implementation stages), content and procedures for hands-on activities (via training manuals), and checklists for onsite equipment set-up and dismantling. In addition, having site and Health Care System (HCS) leaders present during trainings allowed for answers to local logistics questions and created an opportunity for staff to meet with key women's health leaders. This differs significantly from the National WH-MR because it creates a more intimate atmosphere, incorporates more locally relevant information into the training, and fosters local networks. In contrast, the national training hosts VHA-wide experts in a large venue (Figure 1).

Upon completion of Rural WH-MR trainings, OWH provides a customized post-training site-specific report to each participating HCS highlighting the training's local impact (Appendix S1). This secures further buy-in from local HCS and site leadership because the report provides numbers and names (by profession) of staff trained; summative participant satisfaction, learning/skill acquisition, and job impact and performance; selected qualitative participant responses; and participant-developed action plans; giving leaders data showing their progress toward specific VHA women's health directives and policies, which they can in turn share with higher leadership. OWH also provides the site planning team with a customized 6-month post-training action plan status summary for easy leadership follow-up (Appendix S1).

2.4 | Site and participant selection

OWH selected the fiscal year (FY) 2017 and FY 2018 pilot sites using the ORH rurality calculator[26] to identify VHA HCSs with rural sites (defined as those where ≥50% of all enrolled Veterans had rural residences). Then, to form the FY 2018 and FY 2019 cohorts, OWH solicited interest from HCSs with rural sites by means of national announcements, meeting presentations, and both internal and public-facing communications that emphasized the program as a means for leadership to achieve requirements of VHA-wide women's health directives.

With ORH's approval, less-rural VHA sites (rurality <50%) in the selected HCSs received permission to send staff if training spots might have gone unfilled. In other words, rural sites dictated the training need and sent most participants, but at times, staff from less-rural sites attended alongside their rural site colleagues. In addition, OWH ensured that sites met 13 criteria qualifying them for participation (Appendix S1). Within each selected HCS, OWH worked with the site planning team to identify PCPs and nurses in need of training. An Implementation Process Plan (Appendix S1) was developed to clearly define OWH vs HCS responsibilities to support the training, and starting in FY 2019, HCS leadership had to agree to the plan before further arrangements ensued.

2.5 | Data sources

- ORH rurality calculator:[27] ORH provides an online calculator that OWH uses to determine site- and HCS-specific rurality.
- OWH tracking spreadsheets: To monitor the participating sites, OWH devised a complex spreadsheet listing communications with sites and other locale details. OWH also instituted an intensive course completion monitoring system to track participant progress with the online prerequisite lectures as well as the onsite training completion. OWH provided reports with participant completion status to the site's planning team at least weekly.
- EES evaluations: Similar to the National WH-MR, to assess post-training participant satisfaction, adherence to program-specific objectives, and course usefulness and appropriateness, EES used 23 and 19 questions for PCPs and nurses, respectively that reflect the Kirkpatrick Training Evaluation Model, which in turn describes four stages for training evaluation: Reaction, Learning, Behavior, and Results.[23,24] Participants complete the EES course evaluation (Likert scale and open-ended questions) electronically within 30 days post-training; this includes training team performance questions.
- Debriefing reports: Site planning teams, site observers, and contract training team members complete templated post-training assessment reports (Appendix S1). In addition, within one month of each training, OWH conducts a debriefing call with the site planning team to discuss successes and challenges, and review post-training site responsibilities (eg, designating trained PCPs as WH-PCPs).
- Qualitative semi-structured interviews: WHEI identified 111 eligible respondents (32 PCPs, 66 nurses, and 13 managers) and systematically sequentially sampled 32 PCPs, 28 nurses, and 6 managers; ultimately interviewing 5 PCPs, 12 nurses, and 6 managers. With these 23 participants, WHEI then conducted 46 FY 2018 and FY 2019 30-min telephone interviews (audio-recorded and transcribed) pre- or post-training to examine implementation approaches and other training dimensions. To analyze interview

content, respondent-by-domain matrix displays to summarize themes within qualitative domains were used.[16,28,29]

- OWH surveys: OWH administers surveys (Likert scale and open-ended questions; self-reported comfort level) to PCPs (22 questions) and nurses (17 questions) to assess KAPS at three time-points: (1) pre-training, (2) immediately post-training, and (3) six months following training to track individual-level changes over time. OWH also asked about the usefulness of specific training activities in the post-training surveys.

2.5.1 | Program implementation indicators

Feasibility and fidelity of the program

Four pilot trainings served as the preliminary feasibility assessments. The initial year (FY 2017) was a hiring, adaptation, development, and program pilot year. OWH documented process measures accomplished within established timeframe targets, primarily relying on the numbers of participants and HCSs served and the number of trainings conducted within each specified target time period to see whether it achieved program projections. OWH also enumerated barriers and facilitators and responded accordingly throughout implementation following a set of key strategies developed (Figure 4).

To ensure fidelity to the training's core elements, OWH used standardized curricular content during a train-the-trainer event for contract training teams learning to implement the in-person onsite trainings. Subsequently, the onsite trainings were audited by OWH or WHEI observers. Site planning team members also provided observations. Post-training feedback received by OWH from these sources via debriefing meetings and reports included implementation issues and trainer competence and job performance scores (Appendix S1). Collectively, these approaches led to OWH dismissing three of 20 training team members who did not perform consistently up to standard. Figure 4 elaborates and describes additional program implementation strategies for ensuring fidelity.

Acceptability and appropriateness of the program

To assess participant satisfaction, OWH and EES analyzed EES survey questions using Wilcoxon Signed Rank tests for each item (eg, "Overall I was satisfied with this learning activity"). Likert scale response options ranged from 1 = Strongly Disagree to 5 = Strongly Agree. OWH and EES also examined several EES survey responses for usefulness/appropriateness of all training activities (eg, "The learning activities and/or materials were effective in helping me learn the content").

These quantitative scores, in conjunction with the qualitative responses to the semi-structured interviews with staff, informed Lessons Learned, which were compiled by OWH and WHEI.

2.5.2 | Initial program impact measures

Twenty-two (22) PCP and 17 nurse OWH survey questions, asked at three timepoints, measured changes in KAPS with slightly different items for PCPs and nurses reflecting differing clinical roles. Questions covered participants' familiarity and comfort level with identifying and managing key women's health issues reviewed during the training (eg, contraception, menopause, abnormal uterine bleeding, etc.). Likert Scale survey responses were analyzed in Qualtrics where pre-, post-, and six-month follow-up training survey means and differences were calculated and compared using the Wilcoxon Signed Rank test to calculate P-values (SAS Version 9.4, NPAR1WAY procedure; pairwise deletion to address missing data.).

3 | RESULTS

3.1 | Implementation findings

3.1.1 | Feasibility and fidelity

Qualitative data and observational feedback from pilot trainings prompted modifications to the curriculum (eg, rural logistic issues were strengthened), structure, and implementation processes such as resolving functional glitches with the online components, adding more interactivity into the onsite nurse activities, improving onsite training flow, identifying supporting materials to share with participants (eg, lecture slides, cervical cancer screening test management tool), and requiring site women's health leaders to be present at onsite training. After conducting the last pilot, the Rural WH-MR officially launched in FY 2018, training its first cohort of PCP-nurse teams.

Tracking course completion rates was complicated due to changing site needs for replacing participants. Reasons for non-completion included deliberate substitutions (excluded from denominator) versus individual failure to complete training (included in denominator). Therefore, we do not report the online course completion rate for these early cohorts. However, we report onsite training day completion rates for FY 2018 and 2019 cohorts as 85% for PCPs and 82% for nurses.

Inclusive of the pilot and FY 2018 and 2019 trainings, 181 PCPs and 320 nurses were trained in 56 training sessions of the Rural WH-MR. Rates per year of training compare favorably to pre-set targets. Observers from OWH or WHEI attended 54% of trainings to monitor fidelity. Observers reporting on trainer competence using a 5-point Likert scale indicated a mean score of 4.9.

3.1.2 | Acceptability and appropriateness

Of 110 individual pilot and FY 2018 and 2019 sites that sent participants to the trainings, all met the program's 13 inclusion criteria; 70 were considered rural and 38 less-rural, while one mobile and one island clinic had missing rurality data (but served rural areas). Across all sites, the median rurality was 68% (rural site median: 98%; less-rural site median: 24%). EES course evaluation response rates for the FY 2018 and 2019 participants were 94% (PCPs) and 89% (nurses). Cumulative data from EES course evaluations show high participant

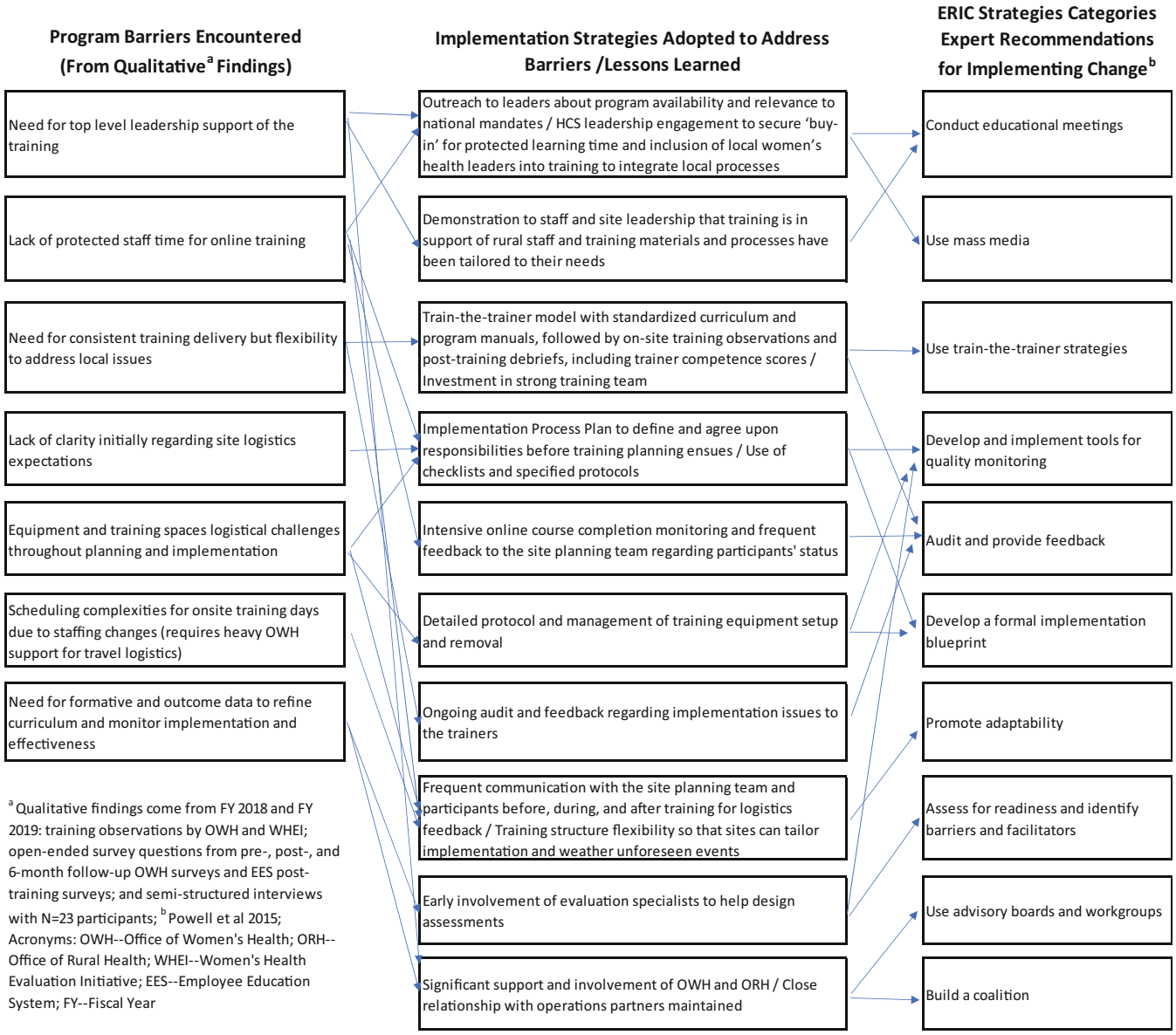

FIGURE 4 Implementation Barriers, Strategies, and Lessons Learned

satisfaction across nine PCP 5-point measures (mean range 4.32–4.50) and eight for nurses (mean range 4.42–4.55). Additionally, this data showed that the training met program-specific objectives via 10 PCP and eight nurse objective measures (mean ranges 4.21–4.40 and 4.25–4.36, respectively).

Response rates for OWH pre-, post- and 6-month-follow-up surveys were 64.7%, 61.1% and 34.7%, respectively for PCPs and 70.7%, 77.4%, and 37.4%, respectively for nurses. Usefulness of the training activities as ranked in the OWH post-training surveys showed that PCPs rated case studies, exam simulation equipment, live gynecologic model activity, and supply demonstration as 4.52–4.67 (1 = poor, 5 = excellent). Nurses rated case studies, simulation equipment, gynecologic procedure videos, live gynecologic model activity, and supply demonstration as 4.73–4.83. OWH post-training survey data also showed that participants felt the training was relevant to the rural practice of PCPs and nurses (means 4.45 and 4.7, respectively).

Analyses of the qualitative interviews of PCPs, nurses, and managers provided many examples supportive of the feasibility and acceptability of the Rural WH-MR to the participants and site planning teams (Figure 5). The interviews also identified challenges faced by rural clinical staff, motivators to participate in training, barriers related to online learning, facilitators to training implementation, receptiveness to hands-on activities, and opportunities the training provided for team building among the PCP-nurse teams.

3.1.3 | Lessons learned

OWH and WHEI learned through experience and qualitative and quantitative assessment that when hosting such a training program across a diverse country within a large LHS, the host agency

(N=23 Respondents with pre- and post-training interviews, for a total of 46 interviews)

HIGHLIGHTS FROM FINDINGS	EXAMPLE QUOTATIONS
Rural context makes it harder to provide good women's health care due to provider deficits, turnover, burnout and need for patients to be referred out/travel more.	"In the rural areas, we do not have as many resources on-site. We do not have an MST coordinator.... She's available by phone ... we don't have a women's healthcare provider here ... even weekly, and then as far as mental health ... we do have the social worker on-site, but as far as someone who specializes in different kinds of needs, we have to utilize VTEL or ... we would have to have them travel to [city]." (nurse, pre-training)
Motivators of managers' desire for their staff to participate included increasing WH-PCP workforce and getting more women Veterans on WH-PCP panels, keeping everyone competent in women's health, putting staff at ease for addressing women's issues, and taking advantage of training opportunities.	"Because right now, our VISN goal is to have 75% of our female Veterans assigned to a woman's health provider..." (manager, pre-training)
Online training was viewed as burdensome by some but valuable, a lot of material to absorb; getting protected time to complete the TMS trainings was cited as an implementation barrier.	"...I think it all went really well. I mean we didn't lose any time seeing patients." (nurse, post-training) "I mean you need to get the TMS done before. I don't know how else they would have done that." (nurse, post-training)
Onsite training day was highly positively received, both in content (especially practicing exam skills on breast models, triage and interviewing) and implementation (teamwork, opportunity to interact with colleagues, the learning environment, display table, action plans, the live gynecologic model). Participants found it engaging and re-invigorating, and the variety of learning techniques kept it interesting.	"...I think it was structured very well for how it, for all the benefits it had. It was here. We had less travel. We had less time away from clinic." (provider, post-training) "As a primary care doctor caring for patients in a more rural setting, I will need to be confident that I am able to provide the needed care at the front-line level. This course helped to solidify my knowledge base...it was a WONDERFUL training--thank you!" (provider, post-training) "I have to say I went to my manager, and I told her I would recommend this training for anybody that's doing women's health. I think this is the best training I have had, and I've been here almost 15 years. The best training that I've ever had by the VA. I'm not kidding. It was so well done." (nurse, post-training) "It was really nice to just kind of hang out with our colleagues in an educational setting." (provider, post-training)
Implementation facilitators included monthly logistics meetings with the OWH team and flexibility in online course scheduling.	"[It was]...helpful to have those monthly check in meetings with the team that was planning it..." (manager, post-training)
Meaningful topics from the training for providers included practicing on a live gynecologic model, learning about products available, getting information on abnormal mammograms, and hearing about Veteran-specific topics. Nurses valued discussing how to triage, especially with respect to bleeding, and the entire training.	"Oh, I think it was helpful when I did the pelvic exam on the lady that came, just because she was able to give me pointers while I was doing it, so that was nice. Patients don't usually do that. " (provider, post-training) "I'm a lot more comfortable than I was before starting." The training was "...an eye opener as to how many things we do have available for female Veterans." (nurse, post-training)
Positive outcomes post-training included team building, increased knowledge, comfort with women's health, and knowing how to seek expert advice. Participant practice changes as a result of the training included cervical cancer screening practices, the morning huddle, following the birth control algorithm, and making the clinical environment more welcoming, as well as becoming generally more pro-active.	"Yes. Working as a team was good. ... Sometimes you're kind of like solely responsible for making sure that all the information is available, and I think being able to have our nurses ... develop some of the history for us was really nice." (provider, post-training) "I definitely heard ... some conversation about that it changed people's practice." (manager, post-training)

Acronyms: WH-PCP--Women's Health Primary Care Provider; TMS--Talent Management System (online learning); OWH--Office of Women's Health; MST--Military Sexual Trama; VTEL--Video Teleconferencing; VISN--Veterans Integrated Services Networks

FIGURE 5 Qualitative Interview Findings on Key Perspectives of Managers, Providers, and Nurses ($N = 23$ Respondents with pre- and post-trainings interviews, for a total of 46 interviews)

should adhere to strategies and take note of the lessons described in Figure 4.

3.2 | Initial impact findings

OWH pre-, post-, and 6-month-follow-up training cumulative survey data from the FY 2018 and 2019 cohorts show improvements in comfort managing the topics taught. Fifty-two (52) PCPs completed both a pre- and 6-month-follow-up survey (32.9%) for longitudinal analyses. Wilcoxon Signed Rank test analyses revealed significant sustained improvements in 18 out of 22 KAPS areas assessed ($p < 0.01$–0.03) and four with non-significant sustained improved scores (Table 2). Ninety-three (93) nurses completed both a pre- and 6-month-follow-up survey (32.2%). Analyses for nurses indicate significant sustained improvements for all 17 KAPS areas assessed (all $p < 0.01$; Table 3).

TABLE 2 Pre- to 6-month-follow-up OWH survey mean score differences on comfort items providers trained by the Rural WH-MR in FY18 & FY19

Item $N = 52$ Providers Indicate your level of comfort for the items below.	Pre-Survey		Follow-up Survey		Pre- to Follow-up Difference		
	Mean	SD	Mean	SD	Mean	SD	*p*-value
Overall, how comfortable are you in caring for women Veterans?	3.98	0.92	4.02	1.04	+0.04	0.9	0.79
Discussing contraceptive options	3.42	1.21	3.79	1.19	+0.37	0.9	<0.01
Initiating contraception	3.46	1.26	3.69	1.23	+0.23	1.0	0.1
Managing an abnormal Pap result	3.37	1.14	3.81	1.19	+0.44	0.9	<0.01
Evaluating vaginal discharge	3.48	1.18	3.88	1.10	+0.4	0.9	<0.01
Managing vaginal infections and sexually transmitted infections (STI)	3.62	1.21	4.06	1.16	+0.44	0.9	<0.01
Initiating the workup for abnormal uterine bleeding	3.12	1.11	3.65	1.22	+0.54	0.8	<0.01
Managing abnormal uterine bleeding	2.83	1.17	3.21	1.21	+0.38	0.8	<0.01
Initiating the workup for abdominal/pelvic pain	3.21	1.14	3.75	1.06	+0.54	0.9	<0.01
Managing abdominal/pelvic pain	3.08	1.10	3.58	1.04	+0.5	0.9	<0.01
Identifying & managing post-deployment issues specific to women Veterans	2.52	0.94	3.40	1.03	+0.88	1.0	<0.01
Managing menopausal symptoms	3.12	1.06	3.69	0.96	+0.58	0.9	<0.01
Identifying & managing intimate partner violence (IPV), Military Sexual Trauma (MST) and/or acute sexual assault	2.73	1.01	3.42	1.00	+0.69	0.9	<0.01
Identifying & initiating management for gynecologic emergencies such as ovarian torsion and ectopic pregnancy	3.04	1.07	3.54	1.21	+0.5	1.0	<0.01
Managing a breast mass	3.58	0.85	3.88	1.06	+0.31	0.9	<0.01
Performing a breast exam	4.02	0.98	4.29	0.94	+0.27	0.9	0.02
Performing a pelvic exam	3.96	1.05	4.21	1.07	+0.25	0.9	0.03
Specimen collection for Pap testing and vaginal discharge	3.94	1.04	4.12	1.20	+0.17	1.0	0.18
Identifying normal & common abnormal pathologies of the breast & pelvis	3.54	1.07	3.92	0.86	+0.38	0.9	<0.01
Teaching trainees or colleagues about women's health topics	2.94	1.13	3.31	1.39	+0.37	1.1	0.01
Identifying factors and tools that influence organizational change in women's health care	2.67	0.98	3.35	1.10	+0.67	0.8	<0.01
Working as part of a team to provide women's health care	3.87	1.05	3.98	1.15	+0.12	0.9	0.28

Note: OWH–Office of Women's Health; "+" Indicates improvement from pre- to follow-up score; $p < 0.05$ (*p*-values calculated using Wilcoxon Signed Rank Test); Rural WH-MR—Rural Women's Health Mini-Residency Training; All questions on 5-point Likert scale with higher values indicating more comfort with the item; 22 questions in total; $N = 52$ providers responded to both the Pre- and 6-Month-Follow-up surveys for all questions.

4 | DISCUSSION

In this paper, we describe how the adapted Women's Health Mini-Residency for Rural Providers and Nurses was implemented within the VHA LHS and the results of the initial effectiveness assessment from the pilot and FY 2018 and 2019 trainings. The pilot trainings iteratively influenced enhancements and refinements to the content, structure, and logistics used to implement official program trainings. Ultimately, 181 PCPs and 320 nurses serving WVs in rural areas benefitted from this workforce training, thereby contributing to the VHA goal of increasing the numbers of rural WVs with access to PCPs and nurses with women's health expertise.

As highlighted throughout, OWH selected specific implementation strategies to address anticipated logistical barriers of rural training and further refined them based on pilot-site experience and qualitative findings as shown in Figure 4 which also diagrams how the strategies relate directly to the Lessons Learned by OWH. In summary, these strategies supported success and have implications for further improvements or future programs and include 10 ERIC strategies (Figure 4).

Our findings support the Rural WH-MR's feasibility, fidelity, acceptability, and appropriateness as a mobile women's health training program for PCP-nurse teams in rural areas. The robust longitudinal findings regarding KAPS improvements suggest the initial success of the Rural WH-MR; future multivariate work will also include

TABLE 3 Pre- to 6-month-follow-up OWH survey mean score differences on comfort items nurses trained by the Rural WH-MR in FY18 & FY19

Item *N* = 93 Nurses Indicate your level of comfort for the items below.	Pre-Survey		Follow-up Survey		Pre- to Follow-up Difference		
	Mean	SD	Mean	SD	Mean	SD	*p*-value
Overall, how comfortable are you in caring for women Veterans?	3.88	1.02	4.27	0.71	+0.39	0.9	<0.01
Describing advantages and disadvantages of contraceptive methods	3.13	1.13	3.62	0.94	+0.49	1.1	<0.01
Explaining Pap results and follow-up recommendations	3.18	1.13	3.85	1.00	+0.67	1.1	<0.01
Explaining the symptoms of sexually transmitted infections (STI)	3.27	1.04	3.88	0.91	+0.61	1.0	<0.01
History-taking or triaging for vaginal bleeding	3.43	1.08	4.12	0.75	+0.69	1.1	<0.01
History-taking or triaging for abdominal/pelvic pain	3.41	1.06	4.08	0.81	+0.67	1.1	<0.01
Providing nursing care for post-deployment issues specific to women Veterans	2.94	1.05	3.70	0.95	+0.76	1.1	<0.01
Discussing the clinical aspects of menopause	2.95	1.10	3.73	0.96	+0.78	1.2	<0.01
Providing nursing care to women who have experienced intimate partner violence (IPV), Military Sexual Trauma (MST), and/or acute sexual assault	2.73	1.14	3.53	1.01	+0.8	1.2	<0.01
Discussing common causes of breast pain and various breast screening techniques	3.11	1.07	3.71	0.92	+0.6	1.1	<0.01
Providing nursing care before, during, and after a breast exam	3.44	1.19	4.19	0.90	+0.75	1.2	<0.01
Providing nursing care before, during, and after a pelvic exam	3.51	1.27	4.22	0.86	+0.71	1.1	<0.01
Identifying equipment and supply needs for various women's health exams and tests	3.38	1.30	4.04	1.00	+0.67	1.1	<0.01
Explaining gynecologic tests and procedures such as transvaginal ultrasound and endometrial biopsy	2.89	1.30	3.65	1.13	+0.75	1.3	<0.01
Discussing women's health topics with trainees or colleagues	3.05	1.17	3.88	1.01	+0.83	1.2	<0.01
Identifying factors and tools that influence organizational change related to women's health care	2.91	1.07	3.75	0.96	+0.84	1.1	<0.01
Working as part of a team to provide women's health care	3.83	1.17	4.33	0.84	+0.51	1.0	<0.01

Note: OWH–Office of Women's Health; "+" Indicates improvement from pre- to follow-up score; $p < 0.05$ (*p*-values calculated using Wilcoxon Signed Rank Test); Rural WH-MR—Rural Women's Health Mini-Residency Training; All questions on 5-point Likert scale with higher values indicating more comfort with the item; 17 questions in total; $N = 93$ nurses responded to both the Pre- and 6-Month-Follow-up surveys for all questions.

patient-panel coverage rates and control group comparisons in order to address maturation bias and changes due to historical trends.

Collaboration with evaluation experts allowed for continued work within the Kirkpatrick framework and the RE-AIM model, which guided the program's assessment approach. Both qualitative and quantitative methods and multiple data sources informed the evaluation. Qualitative data supported quantitative findings and further elaborated on themes evidenced in the statistical analyses.

In reflecting on our lessons learned, we acknowledge that substantial multilevel engagement was required to implement the Rural WH-MR within a nationwide LHS. This would not have been possible without the support of high-level organizational leadership, the partnership with rural stakeholders, and the contracted services of a training team. Without access to programs like the Rural WH-MR, rural site staff may have their professional development needs overshadowed by competing clinical demands of delivering timely health care. OWH lifted logistical barriers for participants (eg, minimizing the need for staff travel, covering training costs, etc.) so that rural VHA clinical staff could access needed training.

Several limitations merit consideration. To begin, the cost of staffing for the program could be considered prohibitive, but hard-to-reach populations may sometimes warrant resource-intensive training delivery methods. Additionally, if implementors adapt the program we describe, they may not need as much formative evaluation and therefore may employ fewer staff. Also, while the inclusion of less-rural sites could affect the generalizability of results to rural sites, even those sites serve ample numbers of rural Veterans (median rurality: 24%). Next, some data we initially sought to collect proved too

burdensome for staff and was challenging in the face of fluid site dynamics and training day substitutions (eg, whether participants trained with their assigned PACTs or with teams consisting of participants from other PACTs). Furthermore, our bivariate analyses alone cannot determine whether the impacts differed by region or other contextual and provider factors (eg, years since clinical training). Also, self-selection bias is possible among those who agreed to be interviewed, and some may have come from the less-rural sites. The direction of such biases is unknown, but the strong positive training reviews from interviewees appeared almost universal in the interviews. In addition, we selected the trainings where observers attended by prioritizing those with first-time trainers and ease of observers to attend. This method of selection may have biased the observations but would likely increase reports of implementation errors since more of the trainers observed were new. It might also have meant more observations were conducted in less rural sites easier for observers to reach. Finally, without a comparison group, we cannot rule out maturation bias or external historical trends as the explanation for improved KAPS scores from pre- to post-training.

Despite limitations, our findings support the idea that an asynchronous training approach for rural clinical staff can succeed if it attends to principles of adult learning where spaced didactic learning precedes the application of knowledge in an interactive forum with skills-based activities and is conveniently delivered in their rural areas. And although not a direct comparison, longitudinal improvement in KAPS of Rural WH-MR participants as reported parallels findings OWH has observed in prior National WH-MRs for PCPs.[10]

Providing this Rural WH-MR as interprofessional training by including nurses in a mini-residency model that was historically targeted to PCPs, proved to an important aspect of the Rural WH-MR per qualitative responses and observational feedback. Training together as rural PCP-nurse interprofessional teams, aligned with how primary care is delivered in VHA, in PACTs, and fostered a collaborative learning environment in the VHA LHS. The small-scale structure of the Rural WH-MR allowed for an intimate and personalized training setting where HCS leadership and subject matter experts could be involved throughout the onsite training day, building connections among rural clinical staff.

Results reported here, to date, of OWH's mixed-methods evaluation suggest the initial effectiveness of this blended learning approach and attainment of program goals. Additional Rural WH-MR trainings are underway enabling more rural VHA PCP and nurse participants to benefit from this women's health continuing education and professional development opportunity. Further evaluation will assess the program's impact on VA as an LHS through analyses of select women's health quality measures (eg, percentage of rural WVs on PACT panels with women's health expertise) and related clinical outcomes such as changes in contraception provision rates.

AUTHOR CONTRIBUTIONS

All the authors listed meet authorship criteria and all who meet authorship criteria are listed. Below please find a summary of author contributions by specific activities. Individual authorship statements are available upon request.

The corresponding author, Aimee M. Sanders, agrees to serve as the primary correspondent with the editorial office, to review the edited manuscript and proof, and to make decisions regarding the release of information in the manuscript to the media, federal agencies, or both.

All authors certify that

- The manuscript represents original and valid work and that neither this manuscript nor one with substantially similar content under their authorship has been published or is being considered for publication elsewhere, except as described in an attachment, and copies of closely related manuscripts are provided; and
- They agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; and
- If requested, they will provide the data or will cooperate fully in obtaining and providing the data on which the manuscript is based for examination by the editor or the editor's assignees; and
- They agree to allow the corresponding author to serve as the primary correspondent with the editorial office, to review the edited manuscript and proof, and to make decisions regarding the release of information in the manuscript to the media, federal agencies, or both; and
- They have given final approval to the submitted manuscript.

In addition, the following authors, Aimee M. Sanders, Rachel E. Golden, Christine Kolehmainen, Jonna K. Brenton, and Susan M. Frayne, certify that they have participated sufficiently in the work to take public responsibility for all content; have made substantial contributions to the conception and design of the paper or the acquisition, analysis, or interpretation of the data; have made substantial contributions to the drafting or critical revision of the manuscript for important intellectual content; and have made critical contributions to the statistical analysis; obtaining funding; administrative, technical or material support; staff training; or monitoring and supervision of the program.

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CONFLICT OF INTEREST

None of the authors have relevant commercial associations that might pose a conflict of interest.

DISCLAIMER

The views expressed are those of the authors and do not necessarily reflect the position or policy of the U.S. Department of Veterans Affairs or the United States government. Individual disclosure statements are available upon request.

ORCID

Aimee M. Sanders https://orcid.org/0000-0002-5264-3687
Christine Kolehmainen https://orcid.org/0000-0002-5448-2928

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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