

# SimLEARN Musculoskeletal Training for VHA Primary Care Providers and Health Professions Educators

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A simulation-based training curricula applied to the primary care evaluation and management of shoulder and knee pain resulted in improved access to care for veterans and cost savings for the health care system.

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Diseases of the musculoskeletal (MSK) system are common, accounting for some of the most frequent visits to primary care clinics.<sup>1-3</sup> In addition, care for patients with chronic MSK diseases represents a substantial economic burden.<sup>4-6</sup> Unfortunately, despite the high prevalence and associated costs of these conditions, numerous reports have concluded that primary care providers (PCPs) are not well prepared to effectively address these problems due to gaps in health professions education (HPE) programs.<sup>7-12</sup> Among other effects, overutilization of high-cost diagnostic tools or specialty care providers are increasingly recognized as important drivers of unnecessary spending.<sup>13-16</sup>

In response to this clinical training need, the Veterans Health Administration (VHA) developed a portfolio of educational experiences for VHA health care providers and trainees, including both the Salt Lake City and National MSK “mini-residencies.”<sup>17-19</sup> These programs have educated more than 800 individuals. Early observations show a progressive increase in the number of joint injections performed at participant’s VHA clinics as well as a reduction in unnecessary magnetic resonance imaging orders of the knee.<sup>20,21</sup> These findings may be interpreted as markers for improved access to care for veterans as well as cost savings for the health care system.

The success of these early initiatives was recognized by the medical leadership of the VHA Simulation Learning, Education and Research Network (SimLEARN), who requested the Mini-Residency course directors to imple-

ment a similar educational program at the National Simulation Center in Orlando, Florida. SimLEARN was created to promote best practices in learning and education and provides a high-tech immersive environment for the development and delivery of simulation-based training curricula to facilitate workforce development.<sup>22</sup> This article describes the initial experience of the VHA SimLEARN MSK continuing professional development (CPD) training programs, including curriculum design and educational impact on early learners, and how this informed additional CPD needs to continue advancing MSK education and care.

## METHODS

The initial vision was inspired by the national MSK Mini-Residency initiative for PCPs, which involved 13 US Department of Veterans Affairs (VA) medical centers; its development, dissemination, and validity evidence for assessment methods have been previously described.<sup>17,18,23</sup> SimLEARN leadership attended a Mini-Residency, observing the educational experience and identifying learning objectives most aligned with national goals. The director and codirector of the MSK Mini-Residency (MJB, AMB) then worked with SimLEARN using its educational platform and train-the-trainer model to create a condensed 2-day course, centered on primary care evaluation and management of shoulder and knee pain. The course also included elements supporting educational leaders in providing similar trainings at their local facility (Table 1).

Curriculum was introduced through

**TABLE 1** Two-Day Schedule for the Initial SimLEARN Musculoskeletal Training Program

Time	Day 1	Day 2
8:00-9:00	Course introduction Precourse assessments	Shoulder observed structured clinical examination -assessment-
9:00-10:00	Shoulder physical exam	
10:00-11:00	Shoulder physical exam practice -hands-on skills-	
11:00-12:00	Evaluation and management of shoulder pain	
12:00-12:30	Lunch	Lunch
12:30-1:30	Shoulder pain simulation cases -hands-on skills-	Shoulder observed structured teaching experience -hands-on skills-
1:30-3:30	Evaluation and management of knee pain -didactic and hands-on skills-	
3:30-4:00	Introduction to arthrocentesis	Curriculum implementation at home institution
4:00-5:00	Simulation injections of the shoulder and knee -hands-on skills-	Postcourse assessment Course evaluation
5:00	Wrap-up	Wrap-up

didactics and reinforced in hands-on sessions enhanced by peer-teaching, arthrocentesis task trainers, and simulated patient experiences. At the end of day 1, participants engaged in critical reflection, reviewing knowledge and skills they had acquired.

On day 2, each participant was evaluated using an observed structured clinical examination (OSCE) for the shoulder, followed by an observed structured teaching experience (OSTE). Given the complexity of the physical examination and the greater potential for appropriate interpretation of clinical findings to influence best practice care, the shoulder was emphasized for these experiences. Time constraints of a 2-day program based on SimLEARN format requirements prevented including an additional OSCE for the knee. At the conclusion of the course, faculty and participants discussed strategies for bringing this educational experience to learners at their local facilities as well as for avoiding potential barriers to implementation. The course was accredited through the VHA Employee Education System (EES), and participants received 16 hours of CPD credit.

### Participants

Opportunity to attend was communicated through national, regional, and local VHA organizational networks. Participants self-

registered online through the VHA Talent Management System, the main learning resource for VHA employee education, and registration was open to both PCPs and clinician educators. Class size was limited to 10 to facilitate detailed faculty observation during skill acquisition experiences, simulations, and assessment exercises.

### Program Evaluation

A standard process for evaluating and measuring learning objectives was performed through VHA EES. Self-assessment surveys and OSCEs were used to assess the activity.

Self-assessment surveys were administered at the beginning and end of the program. Content was adapted from that used in the national MSK Mini-Residency initiative and revised by experts in survey design.<sup>18,24,25</sup> Pre- and postcourse surveys asked participants to rate how important it was for them to be competent in evaluating shoulder and knee pain and in performing related joint injections, as well as to rate their level of confidence in their ability to evaluate and manage these conditions. The survey used 5 construct-specific response options distributed equally on a visual scale. Participants' learning goals were collected on the precourse survey.

Participants' competence in performing and interpreting a systematic and thorough

**TABLE 2** Participant Demographics

Participant Credentials	No. (%)	Discipline, No.		Clinic Location, No.		Experience, y			
		Primary Care	Specialty Care	VAMC	CBOC	< 3	3-10	11-20	> 20
Physician	15 (63)	10	5	10	5	1	2	5	7
Advanced practice nurse	7 (29)	5	2	5	2	2	3	2	0
Physician assistant	2 (8)	1	1	2	0	0	1	1	0
<b>Total No. (%)</b>	<b>24 (100)</b>	<b>16 (67)</b>	<b>8 (33)</b>	<b>17 (71)</b>	<b>7 (29)</b>	<b>3 (13)</b>	<b>6 (25)</b>	<b>8 (33)</b>	<b>7 (29)</b>

Abbreviations: VAMC, Veterans Affairs Medical Center; CBOC, community-based outpatient clinic.

physical examination of the shoulder and in suggesting a reasonable plan of management were assessed using a single-station OSCE. This tool, which presented learners with a simulated case depicting rotator cuff pathology, has been described in multiple educational settings, and validity evidence supporting its use has been published.<sup>18,19,23</sup> Course faculty conducted the OSCE, one as the simulated patient, the other as the rater. Immediately following the examination, both faculty conducted a debriefing session with each participant. The OSCE was scored using the validated checklist for specific elements of the shoulder exam, followed by a structured sequence of questions exploring participants' interpretation of findings, diagnostic impressions, and recommendations for initial management. Scores for participants' differential diagnosis were based on the completeness and specificity of diagnoses given; scores for management plans were based on appropriateness and accuracy of both the primary and secondary approach to treatment or further diagnostic efforts. A global rating (range 1 to 9) was assigned, independent of scores in other domains.

Following the OSCE, participants rotated through a 3-cycle OSTE where they practiced the roles of simulated patient, learner, and educator. Faculty observed each OSTE and led focused debriefing sessions immediately following each rotation to facilitate participants' critical reflection of their involvement in these elements of the course. This exercise was formative without quantitative assessment of performance.

### Statistical Analysis

Pre- and postsurvey data were analyzed using a paired Student *t* test. Comparisons be-

tween multiple variables (eg, OSCE scores by years of experience or level of credentials) were analyzed using analysis of variance. Relationships between variables were analyzed with a Pearson correlation. All statistical analyses were conducted using IBM SPSS, Version 24 (Armonk, NY).

This project was reviewed by the institutional review board of the University of Utah and the Salt Lake City VA and was determined to be exempt from review because the work did not meet the definition of research with human subjects and was considered a quality improvement study.

### RESULTS

Twenty-four participants completed the program over 3 course offerings between February and May 2016, and all completed pre- and postcourse self-assessment surveys (Table 2). Self-ratings of the importance of competence in shoulder and knee MSK skills remained high before and after the course, and confidence improved significantly across all learning objectives. Despite the emphasis on the evaluation and management of shoulder pain, participants' self-confidence still improved significantly with the knee—though these improvements were generally smaller in scale compared with those of the shoulder.

Overall OSCE scores and scores by domain were not found to be statistically different based on either years of experience or by level of credential or specialty (advanced practice registered nurse/physician assistant, PCP, or specialty care physician)(Table 3). However, there was a trend toward higher performance among the specialty care physician group, and a trend toward lower performance among participants with less than 3 years' experience.

## DISCUSSION

Building on the foundation of other successful innovations in MSK education, the first year of the SimLEARN National MSK Training Program demonstrated the feasibility of a 2-day centralized national course as a method to increase participants' confidence and competence in evaluating and managing MSK problems, and to disseminate a portable curriculum to a range of clinician educators. Although this course focused on developing competence for shoulder skills, including an OSCE on day 2, self-perceived improvements in participants' ability to evaluate and manage knee pain were observed. Future program refinement and follow-up of participants' experience and needs may lead to increased time allocated to the knee exam as well as objective measures of competence for knee skills.

In comparing our findings to the work that others have previously described, we looked for reports of CPD programs in 2 contexts: those that focused on acquisition of MSK skills relevant to clinical practice, and those designed as clinician educator or faculty development initiatives. Although there are few reports of MSK-themed CPD experiences designed specifically for nurses and allied health professionals, a recent effort to survey members of these disciplines in the United Kingdom was an important contribution to a systematic needs assessment.<sup>26-28</sup> Increased support from leadership, mostly in terms of time allowance and budgetary support, was identified as an important driver to facilitate participation in MSK CPD experiences. Through SimLEARN, the VHA is investing in CPD, providing the MSK Training Programs and other courses at no cost to its employees.

Most published reports on physician education have not evaluated content knowledge or physical examination skills with measures for which validity evidence has been published.<sup>19,29,30</sup> One notable exception is the 2000 Canadian Viscosupplementation Injector Preceptor experience, in which Bellamy and colleagues examined patient outcomes in evaluating their program.<sup>31</sup>

Our experience is congruent with the work of Macedo and colleagues and Sturpe and colleagues, who described the effectiveness and acceptability of an OSTE for faculty develop-

**TABLE 3** Observed Structural Clinical Examination Performance

Domains	Average (95% CI)
Exam checklist	83.2 (77.9-88.5)
Differential diagnosis	44.7 (37.4-51.9)
Management plan	49.1 (41.5-56.8)
Global rating	68.8 (62.3-75.2)
Overall score	61.4 (56.9-65.8)

ment.<sup>32,33</sup> These studies emphasize debriefing, a critical element in faculty development identified by Steinert and colleagues in a 2006 best evidence medical education (BEME) review.<sup>34</sup> The shoulder OSTE was one of the most well-received elements of our course, and each debrief was critical to facilitating rich discussions between educators and practitioners playing the role of teacher or student during this simulated experience, gaining insight into each other's perspectives.

This program has several significant strengths: First, this is the most recent step in the development of a portfolio of innovative MSK CPD programs that were envisioned through a systematic process involving projections of cost-effectiveness, local pilot testing, and national expansion.<sup>17,18,35</sup> Second, the SimLEARN program uses assessment tools for which validity evidence has been published, made available for reflective critique by educational scholars.<sup>19,23</sup> This supports a national consortium of MSK educators, advancing clinical teaching and educational scholarship, and creating opportunities for interprofessional collaboration in congruence with the vision expressed in the 2010 Institute of Medicine report, "Redesigning Continuing Education in the Health Professions," as well as the 2016 update of the BEME recommendations for faculty development.<sup>36,37</sup>

Our experience with the SimLEARN National MSK Training Program demonstrates need for 2 distinct courses: (1) the MSK Clinician—serving PCPs seeking to develop their skills in evaluating and managing patients with MSK problems; and (2), the MSK Master Educator—for those with preexisting content expertise who would value the introduction to a national curriculum and connections with

other MSK master educators. Both of these are now offered regularly through SimLEARN for VHA and US Department of Defense employees. The MSK Clinician program establishes competence in systematically evaluating and managing shoulder and knee MSK problems in an educational setting and prepares participants for subsequent clinical experiences where they can perform related procedures if desired, under appropriate supervision. The Master Educator program introduces participants to the clinician curriculum and provides the opportunity to develop an individualized plan for implementation of an MSK educational program at their home institutions. Participants are selected through a competitive application process, and funding for travel to attend the Master Educator program is provided by SimLEARN for participants who are accepted. Additionally, the Master Educator program serves as a repository for potential future SimLEARN MSK Clinician course faculty.

### Limitations

The small number of participants may limit the validity of our conclusions. Although we included an OSCE to measure competence in performing and interpreting the shoulder exam, the durability of these skills is not known. Periodic postcourse OSCEs could help determine this and refresh and preserve accuracy in the performance of specific maneuvers. Second, although this experience was rated highly by participants, we do not know the impact of the program on their daily work or career trajectory. Sustained follow-up of learners, perhaps developed on the model of the Long-Term Career Outcome Study, may increase the value of this experience for future participants.<sup>38</sup> This program appealed to a diverse pool of learners, with a broad range of precourse expertise and varied expectations of how course experiences would impact their future work and career development. Some clinical educator attendees came from tertiary care facilities affiliated with academic medical centers, held specialist or subspecialist credentials, and had formal responsibilities as leaders in HPE. Other clinical practitioner participants were solitary PCPs, often in rural or home-based settings; although they may have been eager to apply new knowledge and skills in patient care, they neither anticipated nor desired any role as an educator.

### CONCLUSION

The initial SimLEARN MSK Training Program provides PCPs and clinician educators with rich learning experiences, increasing confidence in addressing MSK problems and competence in performing and interpreting a systematic physical examination of the shoulder. The success of this program has created new opportunities for practitioners seeking to strengthen clinical skills and for leaders in health professions education looking to disseminate similar trainings and connect with a national group of educators.

### Affiliations

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### Author disclosures

The authors report no actual or potential conflicts of interest with regard to this article.

### Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner*, Frontline Medical Communications Inc., the US Government, or any of its agencies.

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