



# Answering the call to address chronic pain in military service members and veterans: Progress in improving pain care and restoring health

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## ABSTRACT

Chronic noncancer pain (CNCP) in military and veteran populations mirrors the experience of chronic pain in America; however, these two populations have unique characteristics and comorbid conditions such as traumatic brain injuries, postconcussive syndrome, posttraumatic stress disorder, and behavioral health disorders that complicate the diagnosis and treatment of chronic pain. Military members and veterans may also be stigmatized about their conditions and experience problems with integration back into healthy lifestyles and society as a whole following deployments and after military service. The military and veteran health care systems have made chronic pain a priority and have made substantial strides in addressing this condition through advances in practice, education, research, and health policy. Despite this progress, significant challenges remain in responding to the wide-spread problem of chronic pain. The purpose of this article is to: (a) examine the state of CNCP in military and veteran populations; (b) discuss progress made in pain practice, education, research, and health policy; and (c) examine research, evidence-based practice guidelines, and expert consensus reports that are foundational to advancing pain care and improving health for military service members and veterans with CNCP. In addition, recommendations are proposed to address this widespread health problem through the expanded use of advanced practice registered nurses, the implementation of models of care, and use of national resources to educate health care providers, support practice, and promote effective pain care.

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Chronic pain, defined as noncancer related, intractable pain persisting for 3 months or longer beyond the time of expected normal healing that does not resolve with treatment (International Association for the Study of Pain, 1986), is a significant and widespread health problem among active duty military service members and veterans. Chronic pain disproportionately affects military personnel with a high rate of 44% among U.S. service members after combat deployment compared to 26% in the general public (Toblin, Mack, Perveen, & Paulozzi, 2011). The Institute of Medicine (IOM) estimates that 30% of the U.S. population suffers from chronic pain; however, the percentage of the veteran population with chronic pain is over 50% (Institute of Medicine, 2011). Common chronic noncancer pain (CNCP) types for military service members and veterans include musculoskeletal pain and combat-related polytrauma pain (Haskell et al., 2012; Higgins et al., 2014). The purpose of this article is to: (a) examine the state of CNCP in military and veteran populations; (b) discuss progress made in pain practice, education, research, and health policy; and (c) examine research, evidence-based practice guidelines, and expert consensus reports that are foundational to advancing pain care and improving health for military service members and veterans suffering with CNCP. In addition, recommendations are proposed to address this widespread health problem through the expanded use of advanced practice registered nurses (APRNs); the implementation of models of care; and use of national resources to educate health care providers, support practice, and promote effective pain care.

## Pain in Military and Veteran Populations

Pain among military service members and veterans represents a wide span of pain-related issues. In 2006, 743,547 injury-related musculoskeletal conditions were recorded for military service members with 82% attributed to inflammation and pain from exertional overuse (Hauret, Jones, Bullock, Canham-Chervak, & Canada, 2010). The overall rate for chronic arm and shoulder pain from 2003 to 2012 reflected a 25% increase possibly explained by a greater incidence of joint pain and higher rates of pain among older service members (Armed Forces Health Surveillance Center, 2013). Pain, typically low back pain, is the primary reason for military service members to seek health care (Childs, Wu, Teyhen, Robinson, & George, 2014). Military service requiring the operation of vehicles has contributed to high rates of low back pain (Knox et al., 2011). Complaints of pain in the spine area tend to

increase during training and combat deployments (Cohen, Gallagher, Davis, Griffith, & Carragee, 2012). Rates for chronic pain from combat injuries are higher than other sources of pain and much greater for those who sustained blast trauma from improvised explosive devices (Clark, Walker, Girona, & Scholten, 2009; Stratton, Hawn, Amstadter, Cifu, & Walker, 2014). A 2011 survey of 2,597 soldiers following deployments in Afghanistan or Iraq found that 44% were experiencing chronic pain and 15.1% had used opioids within the past month (Toblin, Quartana, Riviere, Walper, & Hoge, 2014). A retrospective review of fiscal year 2011 Veterans Health Administration (VHA) data on veterans with CNCP (N = 1,437,392) revealed the most common pain types to be arthritis pain (65.1%), back pain (42.1%), and neuropathic pain (13.5%) (Edlund et al., 2014). An executive summary report from the Department of Veterans Affairs, Office of Inspector General (2014) notes that the prevalence of hospitalized patients in VHA facilities discharged to home on opioid therapy for chronic pain ranges from 0.26% to 21.8% with an overall prevalence of 7.7% nationwide.

Table 1 summarizes six studies examining the incidence and prevalence of CNCP in military and veteran cohorts (Clark et al., 2009; Edlund et al., 2014; Higgins et al., 2014; Lew et al., 2009; Outcalt et al., 2014; Pugh et al., 2014). Evidence ratings were done using the rating system for the hierarchy of evidence (level 1—highest to level 7—lowest) from Melnyk and Fineout-Overholt (2011). Two studies used quasi-experimental designs for group comparisons (Clark et al., 2009; Outcalt et al., 2014) and were rated as level 3, whereas the remaining studies were assigned as level 4 evidence reserved for case-control or cohort studies employing descriptive-correlational designs. All these studies found concerning rates of CNCP and even higher rates in veterans of the Operation Enduring Freedom and Operation Iraqi Freedom wars with coexisting traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD) (Lew et al., 2009; Outcalt et al., 2014; Pugh et al., 2014).

## Complexity of Chronic Pain

Of importance is the understanding that unrelieved acute and acute persistent pain play a major role in the development of chronic pain. Chronic pain evolves from persistent moderate to severe acute pain that potentially evokes a cascade of cellular, molecular, and neuronal events causing enhanced neurotransmission between neurons and circuits in nociceptive pathways, which leads to "central sensitization." Central sensitization is a pathological state defined by the inability to effectively modulate pain

**Table 1 – Evidence for the Occurrence of Pain in Service Members and Veterans**

Author (Date)	Objective	Sample Size	Prevalence and Incidence of Pain	Level of Evidence*
Clark et al., 2009	Compare the physical and emotional presentations and pain treatment outcomes of service members who sustained polytrauma secondary to combat blast (CB) with those of service members with combat injuries involving no blast (CNB) or individuals injured in noncombat (NC) settings	128 service members	Participants with moderately severe to severe pain (NRS >7) per study group: CB (37.2%), CNB (29.4%), NC (30.2%)	3
Edlund et al., 2014	Characterize the dosing and duration of opioid therapy for patients with chronic noncancer pain (CNCP) in the VHA	VHA patients with CNCP annually Fiscal year 2009: 1,332,810 Fiscal year 2010: 1,405,563 Fiscal year 2011: 1,437,392	Most common CNCP among veterans were arthritis pain (65.1%), back pain (42.1%), and neuropathic pain (13.5%)	4
Higgins et al., 2014	Examine variations in demographics and prevalence of mental health conditions between OEF/OIF/OND veterans with persistent pain and no pain	5,242 OEF/OIF/OND veterans	73% of those in the total sample reported experiencing persistent pain (NRS ≥4) with a mean NRS of 6.4 (out of 10)	4
Lew et al., 2009	Studies the prevalence of symptoms consistent with chronic pain, PTSD, and persistent postconcussive symptoms (PPCS) among OEF/OIF veterans	340 OIF/OEF veterans	81.5% of sample reported chronic pain; 42.1% of the veterans were diagnosed with all three conditions simultaneously	4
Outcalt et al., 2014	Assess the physical, functional, and psychological experience of veterans with comorbid chronic pain and PTSD	241 OEF/OIF veterans with diagnosed chronic pain	PTSD group (28% of sample) experienced greater pain severity, more pain-related disability, greater pain interference, more pain catastrophizing, lower pain self-efficacy, higher pain centrality, than the no PTSD group	3
Pugh et al., 2014	Identify comorbidity clusters among diagnoses of deployment specific (traumatic brain injury, PTSD, pain) and chronic conditions, and to examine the association of these clusters with health care utilization and adverse outcomes	191,797 OEF/OIF veterans who received care in the VA between 2008 and 2010	Pain diagnoses, including chronic pain, were predominant in three of the six identified cohorts comprising 18.8% of the total sample	4

Note. NRS, numeric rating scale; OEF, Operation Enduring Freedom; OIF, Operation Iraqi Freedom; OND, Operation New Dawn; PTSD, posttraumatic stress disorder.

\* Level of evidence determined using rating system for the hierarchy of evidence (Melnik & Fineout-Overholt, 2011). The hierarchy is a seven-tier scale, with the best evidence receiving the strongest rating. The strongest evidence to base clinical practice on is rated level 1 and includes both systematic reviews and meta-analyses of randomized controlled trials or evidenced-based clinical practice guidelines based on systematic reviews of randomized controlled trials. Level 2 comprises evidence from well-designed randomized control trials, Level 3 evidence is produced by controlled trials with no randomization, and level 4 contains cohort and case-control research studies. Level 5 evidence is produced from systematic reviews of descriptive and qualitative studies, level 6 includes both single descriptive studies or qualitative work, and the weakest evidence, level 7, is limited to expert opinions.

within the peripheral and central nervous system, and this results in abnormal pain processes including sustained pain hypersensitivity (Latremoliere &

Woolf, 2009). This abnormal state is not only responsible for the transition of acute to chronic pain but explains why many patients continue to

experience chronic pain in the absence of documented pathology.

CNCP in military and veteran populations is associated with disruptions in physical activity, sleep, mood, and affective states such as anxiety and depression requiring more comprehensive assessments of pain (Brown, Berry, & Schmidt, 2013; Higgins et al., 2014; Lippa et al., 2015; van Liempt, van Zuiden, Westenberg, Super, & Vermetten, 2013). Pain is further complicated by the presentation of the "polytrauma clinical triad" characterized by the combat-associated constellation of chronic pain, TBI, and PTSD. Cifu et al. (2013) documented that among 613,391 veterans accessing VHA services, at least once during 2009 and 2011, 40.2% had pain and 6% were diagnosed with the full spectrum polytrauma triad. This polytrauma triad can present unique challenges in evaluating pain, especially in those with moderate to severe TBI who may not be capable of rating pain levels (Cifu et al., 2013; Lewis et al., 2009; Pugh et al., 2014). Moreover, the additional burden of mild TBI and PTSD contributes to greater severity of chronic pain compared to those without these comorbidities (Outcalt et al., 2014; Stojanovic et al., 2016).

### Prevention of Chronic Pain

As chronic pain originates from central sensitization, it is critically important to effectively treat acute pain in an effort to prevent, minimize, and even possibly reverse central sensitization thus reducing the likelihood for the development of chronic pain (Tighe et al., 2015). These approaches are outlined in a comprehensive expert consensus report on the state-of-the-science on acute pain (Tighe et al., 2015). However, even with aggressive pain intervention, acute pain can transition into a chronic state, and more research is needed to identify risks for chronic pain. Many of these risks have been isolated and estimated for surgical procedures carrying a higher likelihood for developing chronic postsurgical pain (CPSP) syndromes, e.g., thoracotomy, leg amputation, breast surgery, total hip and knee arthroplasty, inguinal hernia repair, and coronary artery bypass. Specific research-based estimated ranges for CPSP with each of these procedures are summarized by Tighe et al. (2015).

Relevant to military and veteran pain care, new discoveries by the Veterans Integrated Pain Evaluation Research (VIPER) study group were uncovered by conducting phenotypic profiling in veterans who sustained traumatic amputations in combat. VIPER investigators elucidated inherent risks for the development of chronic residual limb pain (Buchheit et al., 2015). Interestingly, the VIPER study demonstrated high rates of chronic neuropathic residual limb pain in veterans who did not receive regional anesthesia (RA) or peripheral nerve blocks in the early phase of recovery

from combat-related limb injury. RA has an important role in the prevention and treatment of acute and chronic pain and military Certified Registered Nurse Anesthetists (CRNAs) must be proficient in all types of RA. Findings from the VIPER study have significant implications for directing education and training of anesthesia providers including CRNAs to deliver RA in the deployment setting including forward surgical teams and combat support and military hospitals.

### A Need for Improvements in Pain Assessment Practices and Standardization of Patient-Reported Pain Outcome Measures

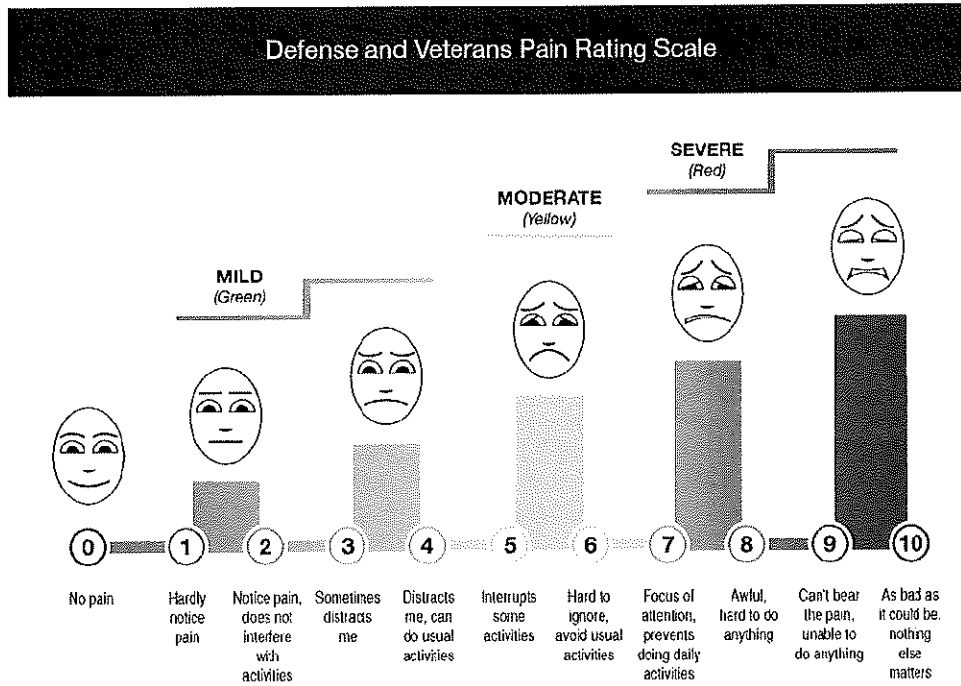
For over a decade, the VHA's pain as the "5th Vital Sign" initiative, enacted in 1999, and later adopted in 2001 as a standard by The Joint Commission, focused national attention on the importance of regular assessments of pain intensity (Veterans Health Administration Memorandum, 1999). Unfortunately, this initiative fell short of achieving measurable improvements in pain outcomes as anticipated (Helfand & Freeman, 2009; Lorenz et al., 2009; Mularski et al., 2006). Some attribute the lack of improvement in pain management from the 5th Vital Sign initiative to three factors: insufficient pain curriculum in health care professional training programs, inconsistent documentation of patients' pain levels, and a reluctance to take subjective reports of pain seriously (Morone & Weiner, 2013; Nworah, 2012; Zubkoff et al., 2010). Health care disparities may also contribute to variations in pain screening and assessment practices that fail to improve pain outcomes. The Veterans Affairs 2007 Survey of Health Care Experiences of Patients data identified racial differences in pain screening rates with blacks significantly less likely than whites to be screened for pain despite higher rates of outpatient visits within the previous 2 years among blacks (Burgess et al., 2013).

### Call for Action

In 2008, the Office of the Army Surgeon General chartered a 22-member Pain Management Task Force (PMTF) comprised of representatives from the Department of Defense (DoD) and VHA and charged this task force with examining pain practices and making recommendations to improve pain care. One area of focus was pain assessment. Members conducted a systematic evaluation of pain screening and assessment practices through interviews with hundreds of clinicians at 28 military, VHA, and civilian health care facilities. PMTF members observed significant variations in how pain was reported and documented and found numerous versions of numeric pain rating scales (0-10) and descriptive scales in use for patient-reported pain levels. According to informants, this created difficulties in interpreting patient reports of

pain and communicating this information in their settings and across transitions in care (Pain Management Task Force, 2010). To respond to these challenges, the PMTF designed a new pain scale, the Defense and Veterans Pain Rating Scale (DVPRS). The DVPRS uses a numeric rating scale (NRS) enhanced with functional word descriptors at each pain level,

“traffic light” color coded bars to delineate levels of pain (mild 1–4, green; moderate 5–6, yellow; and severe 7–10, red) and facial depictions of pain (Figure 1). Four supplemental questions screen for how much pain interferences with usual activity and sleep, and how pain affects mood and contributes to stress (Figure 1).



### DoD/VA PAIN SUPPLEMENTAL QUESTIONS

For clinicians to evaluate the biopsychosocial impact of pain

1. Circle the one number that describes how, during the past 24 hours, pain has interfered with your **ACTIVITY**:

0  1  2  3  4  5  6  7  8  9  10

Does not interfere Completely interferes

2. Circle the one number that describes how, during the past 24 hours, pain has interfered with your **SLEEP**:

0  1  2  3  4  5  6  7  8  9  10

Does not interfere Completely interferes

3. Circle the one number that describes how, during the past 24 hours, pain has affected your **MOOD**:

0  1  2  3  4  5  6  7  8  9  10

Does not affect Completely affects

4. Circle the one number that describes how, during the past 24 hours, pain has contributed to your **STRESS**:

0  1  2  3  4  5  6  7  8  9  10

Does not contribute Contributes a great deal

\*Reference for pain interference: Cleeland CS, Ryan KM. Pain assessment: global use of the Brief Pain Inventory. Ann Acad Med Singapore 23(2): 120-138, 1994.

**Figure 1 – Defense and veterans pain rating scale.**

Preliminary validation of the DVPRS done with 350 inpatient and outpatient active duty and retired service members demonstrated acceptable internal consistency reliability, alternate forms reliability, and concurrent validity for mean scores for supplemental questions correlated to Brief Pain Inventory-Short Form Interference subscale mean scores, respondents' rater reliability for alignment of word descriptors to the NRS, and construct validity (Buckenmaier et al., 2013a). A subsequent revised version of the DVPRS incorporating new graphic facial expressions was further tested for concurrent validity in a population of over 200 veteran outpatients showing significant correlations (Spearman's rho) with Pain Disability Questionnaire, Veterans RAND 36-item Health Survey physical and mental component scales (Nassif, Hull, Holliday, Sullivan, & Sandbrink, 2015).

The PMTF currently directs work to leverage the National Institutes of Health \$1 million investment in the Patient-Reported Outcomes Measurement Information System (PROMIS) by creating a military- and veteran-specific set of pain-related PROMIS measures referred to as the Pain Assessment Screening Tool and Outcomes Registry (PASTOR) (Cook, Buckenmaier, & Gershon, 2014). PASTOR is intended to: (a) standardize pain-related patient-reported outcomes (PROs) across transitions in care including military to veteran care, (b) generate data for the comprehensive evaluation of treatment effectiveness, and (c) provide a uniform set of PROs for pain research with military and veteran populations. PASTOR/PROMIS measures span a wide range of biopsychosocial domains such as pain intensity (DVPRS), pain quality, pain interference, physical function, sleep, anxiety, depression and anger, PTSD, opioid misuse and abuse, alcohol abuse, and social role satisfaction. An extensive item bank tailored to patient responses using computer adaptive testing can present an item set of 40–70 questions with each completion of PASTOR, and each domain is scored and standardized to a common mathematical metric. The integration of PASTOR measures into military health care is currently being funded by a U.S. Army Medical Research and Materiel Command contract awarded to Northwestern University, Illinois, in collaboration with the Defense and Veterans Center for Integrative Pain Management (DVCIPM) (Cook et al., 2014). The status of progress with PASTOR as a proposed standard set of pain-related PROs for health care systems within the DoD and VHA is detailed in a report to the Committees on Armed Services of the Senate and the House of Representatives in September 2015 (Office of the Secretary of Defense, 2015).

## Treatment for Chronic Pain

Multimodal strategies that combine pharmacological and nonpharmacological therapies, spinal, epidural and peripheral interventional techniques, and pain-

related patient education focused on self-management and holistic approaches to alleviating pain are recommended as an integrated approach to chronic pain management (American Association of Nurse Anesthetists, 2014). Integrated chronic pain care requires an interdisciplinary focus capitalizing on the expertise of physical therapists, occupational therapists, psychologists, and chiropractors who can also offer treatment regimens to augment pain care.

Pharmacological therapies, e.g., nonsteroidal anti-inflammatory agents, opioids, adjuvant analgesics (e.g., gabapentinoids [gabapentin and pregabalin] and antidepressants [tricyclics and serotonin–norepinephrine reuptake inhibitors]) and antispasmodics, are recommended for certain types of CNCP (Arnstein & St. Marie, 2010; Chapman et al., 2010; Chou et al., 2009a; Dowell, Haegerich, & Chou, 2015; Tighe et al., 2015). APRNs prescribe many of these agents in the treatment of CNCP both in acute care and outpatient settings. With the expanded scope of practice of CRNAs in chronic pain management, it is vital that CRNAs are adequately prepared to prescribe multimodal analgesic regimens and are able to provide pain care within their full scope of practice (American Association of Nurse Anesthetists, 2014; Massie, 2014).

The use of intravenous (IV) subanesthetic or low dose ketamine, a N-methyl-D-aspartate (NMDA) receptor antagonist, is widely used in military hospitals as an analgesic to treat acute and chronic pain to prevent or minimize central sensitization occurring from NMDA receptor activation. In a nurse-led descriptive study, subanesthetic doses of ketamine by continuous IV infusion effectively relieved chronic pain from major limb injuries sustained in combat (Polomano et al., 2013). More studies, however, are needed to establish ketamine's efficacy as an analgesic, especially with complex regional pain syndrome (CRPS) that accompanies traumatic injury (Connolly, Prager, & Harden, 2015). Because CRNAs regularly prescribe and administer ketamine for perioperative anesthetic and pain management, these APRNs are well positioned to conduct clinical trials and studies in routine practice on the effectiveness of subanesthetic doses of ketamine for chronic pain outside operating suites (e.g., pain clinics/centers, emergency departments, and general care units). CRNAs are also trained in the delivery of spinal interventional therapies for neuropathic, inflammatory, and sympathetically maintained pain disorders such as CRPS.

Table 2 is an evidence table for several studies testing various biobehavioral interventions for chronic pain in military, veteran, and civilian populations and assigned evidence ratings using the rating system for the hierarchy of evidence from Melnyk and Fineout-Overholt (2011). A systematic review of 10 randomized-controlled trials using stimulation (transcutaneous electrical nerve stimulation) and manipulation (acupressure) therapies demonstrated lower overall pain scores and increases in physical function with these techniques (Crawford et al., 2014). Home

**Table 2 – Evidence for Intervention-Based Studies of Pain**

Author (Date)	Type of Article	Objective	Sample Size	Interventions for Pain	Relevant Findings	Level of Evidence*
Bair et al., 2015	RCT	Determine whether a stepped-care intervention is more effective than usual care in reducing pain-related disability, pain interference, and pain severity	241 veterans	12 weeks of analgesic therapy optimization according to an algorithm coupled with pain self-management strategies followed by 12 weeks of CBT	A statistically significant decrease in pain disability, interference, and severity was seen among those receiving the intervention compared to the controls receiving usual care demonstrating the effectiveness of interventions	2
Berry et al., 2014	RCT	Determine the effectiveness of heart rate variability coherence biofeedback (HRVCB) as a pain and stress intervention	14 veterans	A self-regulation technique, quick with computer-based HRVCB	Treatment group demonstrated improved HRV coherence, lower pain severity scores, lower levels of stress, and fewer physical activity limitations compared to control group	2
Boldt et al., 2014	Systematic review	Appraise evidence on the effects of nonpharmacological interventions for the treatment of chronic neuropathic and nociceptive pain for spinal cord injury	616 participants across 16 RCT studies	Electrical brain stimulation, repetitive transcranial magnetic stimulation, exercise programs, acupuncture, self-hypnosis, transcutaneous electrical nerve stimulation, CBT	Few serious or long-lasting effects demonstrated from all included interventions for managing pain among spinal cord injury patients	1
Chiesa & Seirretti, 2011	Systematic review	Review of controlled studies investigating the efficacy of mindfulness-based interventions (MBI) for reducing pain and improving depressive symptoms	951 participants across 10 studies	MBI	Limited and insufficient evidence that MBIs are effective in reducing pain and improving depressive symptoms	2
Crawford, Lee, May, and Active Self-Care Therapies for Pain (PACT) Working Group, 2014	Systematic review	Review the full range of active self-care patient-centered complementary and integrative medicine	1,087 participants across 10 RCT studies	Acupressure, self-correcting exercises, transcutaneous electric nerve stimulation	Reduction in chronic pain across all three interventions was demonstrated but no recommendation	2

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**Table 2 – (Continued)**

Author (Date)	Type of Article	Objective	Sample Size	Interventions for Pain	Relevant Findings	Level of Evidence*
Fu, Li, & Wu, 2009	Systematic review and meta-analysis	(ACT-CIM) therapies for chronic pain management Assess the effectiveness and efficacy of acupuncture in the treatment of neck pain	14 RCT	Acupuncture	could be provided for endorsing them as self-management tools for chronic pain given the limited literature Most studies demonstrate acupuncture improve short-term pain reduction compared to sham acupuncture but no effect seen on improving disability and long-term neck pain relief	1
Groessl et al., 2012	Pre-post study	Assess the impact of a yoga intervention for chronic low back pain	53 veterans	8 yoga classes over 10 weeks	Average pain scores decreased in the entire sample; however, female veterans were more likely to participate and have more significant benefits compared to male veterans	3
Katzman et al., 2014	Pre-post study	Details a telementoring CME/CPD innovation, project ECHO pain, used for developing chronic pain expertise among health professionals	763 individuals at 191 sites	Using telehealth technology to access rural providers, interdisciplinary teams present case studies and guide discussion-based learning	Telementoring through project ECHO develops chronic pain expertise among health professionals through CME/CPD; participation in ECHO improved competence and practice among providers	3
Maceo et al., 2010	Systematic review and meta-analysis	Determine efficacy of web-based cognitive behavioral interventions for the treatment of patients with chronic pain	2,953 participants across 11 RCT studies	Web-based cognitive behavioral interventions	Web-based interventions implementing cognitive and behavioral treatments are associated with small reductions in pain scores and improve pain-related	1

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**Table 2 — (Continued)**

Author (Date)	Type of Article	Objective	Sample Size	Interventions for Pain	Relevant Findings	Level of Evidence*
Matthias, Miech, Myers, Sargent, & Bair, 2012	Qualitative	Ascertain perceptions among participants who completed a multicomponent intervention for OEF/OIF/OND veterans with chronic musculoskeletal pain	26 veterans	Analgic management, pain self-management, instruction, and brief CBT	Patients in both the control and intervention groups reported that nurses facilitated their self-management by helping patients find what works for their pain, holding patients accountable for their pain management and motivating them and providing emotional support	3
Matthias et al., 2015	Pre-post study	Pilot test, a peer support involving peer delivery of pain self-management strategies, for veterans with chronic musculoskeletal pain	Nine veteran peer coaches and 17 veteran patients	Peer coaches attended a 3-hour training session co-led by the psychologist and nurse and after training, each peer coach was assigned two patients to "coach" and support for 4 months	Patients with chronic musculoskeletal pain who were paired with a peer coach for 4 months improved on all self-efficacy, pain centrality, and patient activation measures	3
McGeary et al., 2012	Cohort study	Identify cost benefit for functional restoration treatment of chronic musculoskeletal pain as a function of posttreatment changes in costly medical intervention utilization	66 active duty military personnel	Functional occupational restoration treatment	Participants receiving the intervention had significantly fewer procedures including emergency department intervention, injections, and radio frequency nerve ablation compared to participants receiving usual care	3
Watson et al., 2014	Pre-post study	Asses patient satisfaction with a "Pain Education School" program using a mixed-methods approach	219 veterans	12 week program to learn pain relief and prevention, understand pharmacologic and nonpharmacologic interventions, and	Patients reported the program as helpful, informative, and would recommend to others; participant reported cognitive skills as the most	3

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**Table 2 – (Continued)**

Author (Date)	Type of Article	Objective	Sample Size	Interventions for Pain	Relevant Findings	Level of Evidence*
				promote self-management strategies	important item learned, and that patients were open to using complementary and alternative medicine	

Note. CBT, cognitive behavioral therapy; CME/CPD, continuing medical education/continuing professional development; OEF, Operation Enduring Freedom; OIF, Operation Iraqi Freedom; OND, Operation New Dawn; RCT, randomized control trial.

\* Level of evidence determined using rating system for the hierarchy of evidence (Melnyk & Fineout-Overholt, 2011). The hierarchy is a seven-tier scale, with the best evidence receiving the strongest rating. The strongest evidence to base clinical practice on is rated level 1 and includes both systematic reviews and meta-analyses of randomized controlled trials, or evidenced-based clinical practice guidelines based on systematic reviews of randomized controlled trials. Level 2 comprises evidence from well-designed randomized control trials, level 3 evidence is produced by controlled trials with no randomization, and level 4 contains cohort and case-control research studies. Level 5 evidence is produced from systematic reviews of descriptive and qualitative studies, level 6 includes both single descriptive studies or qualitative work, and the weakest evidence, level 7, is limited to expert opinions.

exercise programs such as yoga were found to be more beneficial to women in the military than men (Groessl, Weingart, Johnson, & Baxi, 2012). Biopsychosocial interventions including biofeedback (Berry et al., 2014), mindfulness therapy (Chiesa & Serretti, 2011), self-hypnosis (Boldt et al., 2014), and cognitive behavioral therapy (Macea, Gajos, Calil, & Fregni, 2010) not only reduced pain but also resulted in the alleviation of stress and depression. Finally, a 12-week Pain Education School offered to veterans who were not responding to traditional pain therapies and experiencing problems with medication management was viewed favorably by participants who reported learning new and useful information, which led to greater acceptance of holistic care and alternative and complementary therapies (Watson, Cosio, & Lin, 2014).

### Evidence-Based Clinical Guidelines and Expert Consensus Reports

APRNs who prescribe opioids for CNCP and nurses who care for and monitor patients with CNCP receiving analgesics should align care with recommended practices from evidence-based guidelines. Table 3 provides a brief summary of published pain guidelines and expert reports including those generated by the military and VHA that highlight state-of-the-science and consensus recommendations for the treatment of CNCP. Most evidence-based guidelines and expert reports recommend that opioid analgesics not be used as first-line therapy for CNCP due to serious risks for opioid misuse, abuse, and addiction. Significant concerns regarding the staggering statistics for opioid-related deaths and opioid abuse and dependence associated with CNCP treatment prompted the Centers for Disease Control to issue new guidelines (Dowell et al., 2015). These guidelines emphasize that prolonged use of opioids often starts with treatment for acute pain. If opioids are indicated for acute pain, a short course of no more than 7 days should be considered.

Most CNCP guidelines address responsible prescribing and administration of long-term opioids and offer risk reduction strategies to mitigate opioid misuse, abuse, and addiction. While the strength of evidence for proven effectiveness of risk mitigation strategies is weak, nonetheless, clinicians are strongly encouraged to implement such strategies. These include: opioid management plans; patient education; regular urine drug screens, use of state-wide prescription drug monitoring programs; use of opioid risk screening and monitoring instruments noting the importance of interpreting findings and noting their limitations; frequent monitoring visits; and use of abuse-deterrent opioid formulations to reduce overdose, addiction, abuse, or misuse (Chapman et al., 2010; Chou et al., 2009b; Dowell et al., 2015; Management of Opioid Therapy for Chronic Pain

**Table 3 — State-of-the-Science and Consensus Recommendations Related to Pain**

Author (Number of Pages)	Title/Organization(s)	Type of Document	Major Recommendations/ Number of Recommendation Categories	Recommendation Highlights Relevant to Military and Veteran Care
American Association of Nurse Anesthetists, 2014 (7 pages)	Chronic pain management guidelines American Association of Nurse Anesthetists	Expert consensus	<ul style="list-style-type: none"> <li>(1) CRNAs practice in accordance with their professional scope of practice, federal and state law, and facility policy</li> <li>(2) Patient evaluation, management, imaging technology, documentation, communication, and continuous quality improvement</li> </ul> <p>Number of major recommendation categories: 6</p>	<ul style="list-style-type: none"> <li>• States that CRNAs are integral to care of patients with drug seeking behaviors</li> <li>• Advises that CRNAs should develop a pain management treatment agreement with the patient, when applicable</li> <li>• Instructs clinicians to monitor, measure, and evaluate pain, functionality, and response to the treatment plan so as to modify treatment plan accordingly</li> <li>• Urges providers to document pertinent information on the patient's medical record in an accurate, complete, legible, and timely manner</li> <li>• Recommends imaging technology as appropriate to enhance patient safety and improve accuracy of pain management</li> </ul>
Chou, et al., 2009a (40 pages)	Clinical guidelines for the use of chronic opioid therapy in chronic noncancer pain American Pain Society and American Academy of Pain Medicine	Evidence-based guideline	<ul style="list-style-type: none"> <li>(1) Guidance on patient selection and risk stratification and informed consent for opioid therapy</li> <li>(2) Monitoring for opioid side effects and adverse events</li> <li>(3) Use of cointerventions</li> <li>(4) Identify a medical home and when to obtain consultation</li> </ul> <p>Number of major recommendation categories: 14</p>	<ul style="list-style-type: none"> <li>• Encourages the use of psychological therapy</li> <li>• States that cognitive behavioral therapy is consistently demonstrated to be effective for CNCP (strong recommendation, moderate-quality evidence)</li> <li>• Recommends the patient receive coordinated interprofessional care with access to clinicians who provide comprehensive care (strong recommendation, moderate-quality evidence)</li> <li>• Advises that opioid selection, initial dosing, and titration be modified according to the patient's health status, opioids naivety, therapeutic goals, and</li> </ul> <p>(continued on next page)</p>

**Table 3 – (Continued)**

Author (Number of Pages)	Title/Organization(s)	Type of Document	Major Recommendations/ Number of Recommendation Categories	Recommendation Highlights Relevant to Military and Veteran Care
Chou, et al., 2009b (12 pages)	Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain American Pain Society	Evidenced-based guidelines	<ul style="list-style-type: none"> <li>• (1) Recommendations on use of interventional diagnostic tests and therapies, surgery, and interdisciplinary rehabilitation</li> <li>• (2) Important trade-offs between potential benefits, harms, costs, and burdens of alternative therapies</li> <li>• (3) Shared decision-making is an important component of a number of the recommendations</li> </ul>	<ul style="list-style-type: none"> <li>• possible or observed harms (strong recommendation, low-quality evidence)</li> <li>• Demonstrates that sufficient evidence exists to recommend short acting vs. long-acting opioids or as needed vs. around-the-clock dosing of opioids (strong recommendation, moderate-quality evidence)</li> <li>• Recommends clinicians reassess patients on chronic opioid therapy (COT) frequently and adjust treatment in necessary circumstances (strong recommendation, moderate-quality evidence)</li> <li>• Encourages providers to monitor and include documentation of pain intensity and level of functioning, progress toward achieving therapeutic goals, adverse events, and adherence to therapies (strong recommendation, low-quality evidence)</li> <li>• Recommends that providers and their patients, in persistent pain following surgery for herniated disc, enter into a shared decision-making process to discuss risks, such as frequent device-related complications, and benefits regarding spinal cord stimulation</li> <li>• Advocates for interdisciplinary rehabilitation as a treatment option for persistent pain</li> <li>• Recommends that the shared decision-making process</li> </ul>

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**Table 3 — (Continued)**

Author (Number of Pages)	Title/Organization(s)	Type of Document	Major Recommendations/ Number of Recommendation Categories	Recommendation Highlights Relevant to Military and Veteran Care
Chapman et al., 2010 (23 pages)	Opioid pharmacotherapy for chronic noncancer pain in the United States: A research guideline for developing an evidence-base Expert Panel	Expert consensus	<p>Number of major recommendation categories: 8</p> <ol style="list-style-type: none"> <li>(1) Improvements to research strategy to study the effectiveness of long-term opioid pharmacotherapy</li> <li>(2) Improvements in evidence-generation methodology</li> <li>(3) Potential research topics for generating new evidence</li> </ol> <p>Number of major recommendation categories: 4</p> <ol style="list-style-type: none"> <li>(1) When to initiate or continue opioids for chronic pain</li> <li>(2) Opioid selection, dosage, duration, follow-up, and discontinuation</li> <li>(3) Assessing risk and addressing harms of opioid use</li> </ol> <p>Number of major recommendation categories: 12</p>	<p>include discussion of risks, moderate average benefits, and treatment alternatives guide patient decisions regarding surgery for persistent pain</p> <ul style="list-style-type: none"> <li>• Encourages frequent monitoring for patients prescribed methadone for chronic pain and have a history of substance abuse, an unstable social environment, and those with comorbid psychiatric conditions</li> <li>• Provides recommendations on how to enhance participation for opioid research</li> <li>• Recommends the use of the VA database, which contains a vast amount of longitudinal information, on opioid pharmacotherapy in CNCP patients and it merits for research</li> <li>• Encourages the use of large databases for routine care and resource sharing via internet</li> <li>• Recommends that opioids should not be considered first line or routine therapy for chronic pain due to limited benefits</li> <li>• Advises providers to establish treatment goals with all patients before starting opioid therapy for chronic pain</li> <li>• Encourages the utilization of multimodal analgesia</li> <li>• Demonstrates that insufficient evidence exists to determine how harmful effects of opioids differ depending on patient demographics or patient comorbidities</li> </ul>
Dowell et al., 2015 (56 pages)	CDC guidelines for prescribing opioids for chronic pain United States, 2016 Centers for Disease Control and Prevention	Evidence-based guideline		

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Table 3 – (Continued)

Author (Number of Pages)	Title/Organization(s)	Type of Document	Major Recommendations/ Number of Recommendation Categories	Recommendation Highlights Relevant to Military and Veteran Care
Furlan et al., 2010 (764 pages)	Complementary and alternative therapies for back pain II University of Ottawa Evidence-Based Practice Center, Ottawa, Ontario, Canada available on <a href="http://www.AHRO.gov">www.AHRO.gov</a>	Evidenced-based guidelines	<p>(1) Efficacy/effectiveness and cost-effectiveness of complementary and alternative (CAM) therapies compared to no treatment, placebo, and other active CAM/non-CAM therapies in management of back, neck, and/or thoracic pain</p> <p>(2) Harms of CAM therapies</p> <p>Number of major recommendation categories: 2</p>	<ul style="list-style-type: none"> <li>Identifies certain risk factors are likely to increase susceptibility to opioid-associated harms and additional pain management strategies to mitigate risk</li> <li>Recommends providers assess risk factors periodically, with frequency varying by risk factor and patient characteristics, such as alcohol use, which requires more frequent follow-up</li> <li>States that nonpharmacologic therapy and nonopioid pharmacologic therapy are preferred for chronic pain, and providers should only consider adding opioid therapy if expected benefits outweigh risks to the patient</li> <li>Encourages continued collection of data from long term and large head-to-head trials with sufficient duration of CAM treatments and comparing CAM treatment to other treatments in order to gather clinically relevant and validated outcomes, such as pain intensity, which are critical for definitive conclusions on CAM</li> <li>Recommends that studies control for or examine the influence of treatment dose/duration, care provider, and population-specific variables on treatment effect</li> <li>Determines that the degree of clinical importance for the differences in pooled pain intensity observed between the</li> </ul> <p>(continued on next page)</p>

**Table 3 — (Continued)**

Author (Number of Pages)	Title/Organization(s)	Type of Document	Major Recommendations/ Number of Recommendation Categories	Recommendation Highlights Relevant to Military and Veteran Care
<p>Management of Chronic Multisymptom Illness Guideline Working Group, 2014 (9 pages)</p>	<p>VA/DoD clinical practice guideline for the management of chronic multisymptom illness Available at: <a href="http://www.AHRQ.gov">www.AHRQ.gov</a></p>	<p>Evidenced-based guideline</p>	<p>(1) Acupuncture as part of the management of patients with pain-predominant symptoms of chronic multisymptom illness (CMI)</p> <p>(2) Nonsteroidal antiinflammatory drugs (NSAID) for treating certain peripheral pain symptoms associated with CMI, although these do not necessarily lead to beneficial effects</p> <p>(3) Tramadol for treating certain pain symptoms associated with CMI that fail to respond to other nonopioid analgesic medications or non-pharmacologic approaches</p> <p>(4) Serotonin-norepinephrine reuptake inhibitor (SNRI) for the treatment of patients with clinical symptoms of pain-predominant CMI</p> <p>(5) Tricyclic antidepressants, selective serotonin reuptake inhibitor (SSRI), and/or pregabalin for the treatment of patients with clinical symptoms of pain-predominant CMI</p>	<p>treatment groups for low back pain was small (acupuncture vs. placebo; mobilization vs. physical therapy), medium (acupuncture vs. no treatment; massage vs. relaxation), or large (acupuncture vs. manipulation, in favor of manipulation; massage vs. physical therapy)</p> <p>Suggests the use of multimodal therapies in patients with pain-predominant symptoms of CMI</p> <p>Recommends pharmacological and nonpharmacological therapies for patients with clinical pain symptoms</p>
<p>Number of major recommendation categories: 5</p>			<p>(continued on next page)</p>	

**Table 3 — (Continued)**

Author (Number of Pages)	Title/Organization(s)	Type of Document	Major Recommendations/ Number of Recommendation Categories	Recommendation Highlights Relevant to Military and Veteran Care
Management of Opioid Therapy for Chronic Pain Working Group, 2010 (159 pages)	VA/DoD clinical practice guideline for management of opioid therapy for chronic pain Department of Veterans Affairs and Department of Defense		<ul style="list-style-type: none"> <li>(1) Indications for opioid therapy and how to obtain a comprehensive health history and pain assessment</li> <li>(2) Determining appropriateness of opioid therapy</li> <li>(3) Starting opioid therapy requires implementing appropriate drug and formulation for patients at relatively low doses</li> <li>(4) Providers must assess for adverse events, adherence, and identify complications or co-occurring conditions in patients</li> <li>(5) Therapy adjustment may need to occur based on assessment findings</li> <li>(6) Considerations for when consultation or referral to addiction specialty or pain specialist are needed</li> <li>(7) Regular scheduling of follow-up visits</li> <li>(8) Discontinue opioid treatment if treatment goals are unmet</li> <li>(9) Use caution when using opioids in special patient populations</li> </ul>	<ul style="list-style-type: none"> <li>• All recommendations are relevant to military and veteran health providers implementing opioid therapies</li> <li>• Guideline algorithms provide a structured approach to chronic opioid assessment and treatment which align with patient and provider goals to optimize quality of care and improve clinical outcomes</li> </ul>
Pain Management Task Force, 2010 (163 Pages)	Pain Management Taskforce	Expert consensus report	<p>Number of major recommendation categories: 9</p> <ul style="list-style-type: none"> <li>(1) Provide tools and infrastructure that support and encourage research advancements in pain management</li> <li>(2) Build a full spectrum of best practices for the continuum of acute and chronic pain</li> <li>(3) Focus on the warrior and family</li> </ul>	<ul style="list-style-type: none"> <li>• Provides recommendations that are all relevant including the standardization of patient reported outcomes, interprofessional education and the integration of the complementary care for pain</li> <li>• Recommends the stepped care model be implemented as well</li> </ul> <p style="text-align: right;"><i>(continued on next page)</i></p>



**Table 3 – (Continued)**

Author (Number of Pages)	Title/Organization(s)	Type of Document	Major Recommendations/ Number of Recommendation Categories	Recommendation Highlights Relevant to Military and Veteran Care
			(4) Synchronize a culture of pain awareness, education, and proactive intervention  Number of major recommendation categories: 4	as the musculoskeletal action plan for chronic pain patients

Note. CDC, Centers for Disease Control; CNCP, chronic noncancer pain; CRNAs, Certified Registered Nurse Anesthetists; DoD, Department of Defense; VA, Veterans Affairs.

Working Group, 2010). Universal precautions for risk-deterrent approaches should be implemented for all patients with CNCP receiving long-term opioid analgesics and tailored to risk stratification criteria (Webster, Brennan, Kwong, Levandowski, & Gudin, 2016). Risks for opioid misuse, abuse, and addiction are certainly higher in patients with an active substance abuse problem, history of prescription opioid abuse, and previously exhibiting aberrant behaviors, whereas lower risk would be defined by no history of substance abuse and minimal, if any, risk factors (Webster & Fine, 2010).

### New Health Policy: Strategic Plan for Pain

The National Pain Strategy developed by the Interagency Pain Research Coordinating Committee (IPRCC) and released in early 2016 provides a comprehensive population health-level plan (National Pain Strategy: A Comprehensive Population Health-Level Strategy for Pain, 2016). The IPRCC was established by the National Institute of Health (NIH) to advance pain research, care, and education in response to the 2010 Patient Protection and Affordable Care Act. The national strategic initiatives outlined in this plan are aligned with the core recommendations from IOM's report *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research* (2011) and promotes tangible objectives and targeted plans for pain care. Federal stakeholders in this plan include the DoD and VHA. Strategies focus on professional training, public education and communication, service delivery and reimbursement, prevention and care, disparities in pain management and access to care, and population studies. This report will have important implications for the adoption of universal and standard approaches to addressing pain as a major health problem. The plan includes a strategic focus on interprofessional pain education to achieve defined competencies in the delivery of pain care.

### Nursing and Interprofessional Pain Education

The National Defense Authorization Act of 2010 mandated the development and implementation of targeted efforts to address the crisis of pain treatment in military and veteran populations. This legislation drew attention to the inadequacy of formal education in chronic pain management in nursing and medical schools. Experts have called for the need to systematically integrate pain content into curriculum, conduct competency-based evaluations of learning, utilize interprofessional and interactive learning, and better prepare faculty teaching pain content as solutions to improving pain education and training (Arwood et al.,

2015; Mezei, Murinson, 2011; Tellier, Belanger, Rodriguez, Ware, & Posel, 2013).

In 2012, the American Association of Colleges of Nursing announced a collaboration with the Department of Veterans Affairs, American Nurses Association, National League for Nursing, and other nursing stakeholders to engage schools of nursing in the Joining Forces initiative, spearheaded by First Lady Michelle Obama and Dr. Jill Biden (American Association of Colleges of Nursing, 2014). Currently, 660 schools of nursing in all 50 states have pledged their support to expand learning opportunities for students and nurses in the care of military service members, veterans, and their families. Some schools of nursing have already published their experiences in integrating military and veteran health content into their curricula. To evaluate the impact of this curricular integration, one school provided testimonies from BSN students reflecting on the powerful nature of learning about the challenges faced veterans, which inspired students to want to pursue careers in working with veterans (Jones & Breen, 2015). Another school's commitment to military and veteran health enabled doctoral students to secure Jonas Center for Nursing and Veteran Healthcare funding and active duty service members, veterans, and military spouses to be eligible for Pat Tillman Scholarships (Morrison-Beedy, Passmore, & D'Aoust, 2015).

In 2010, the Nurse Practitioner Healthcare Foundation (NPHF) published a white paper to address barriers to adequately treating chronic pain, which targeted inadequate professional education in the "pathophysiology, assessment, treatment and monitoring requirements" as a primary barrier to effectively managing chronic pain (Arnstein & St. Marie, 2010). The NPHF also called for "Core Curricula" to standardize pain education and define requirements for program accreditation and endorsements from professional organizations and societies. Progress has been made in APRN academic programs with the integration of specific courses and content on pain. Curriculum for advanced practice education has shifted from a unimodal treatment approach to advanced instruction in multimodal therapies; rationally combining analgesics and interventions to target-specific mechanisms and pathways for pain, e.g., opioids and adjuvant pharmacotherapy, RA, trigger point injections, and behavioral, cognitive, and complementary and alternative therapies. It is imperative that this momentum in advanced practice nursing education demonstrate curricular rigor and the attainment of specific competencies in evidence-based pain management practice standards.

The Council on Accreditation of Nurse Anesthesia Educational Programs (COA) (2015) currently requires that nurse anesthesia programs include content on acute and chronic pain management in their curriculum. Information compiled by the American Association of Nurse Anesthetist (AANA) on Nurse Anesthesia Programs nationwide shows that several programs

now incorporate 2 or 3 credit hours to address the expanding scope of practice for CRNAs in chronic pain management. The AANA has also developed chronic pain management guidelines (American Association of Nurse Anesthetists, 2014) and sponsors chronic pain management workshops with didactic and cadaveric experiences for CRNAs to advance their skills in managing patients with chronic pain.

In 2015, AANA publicized its partnership with Texas Christian University's Nurse Anesthesia Program, in offering a postgraduate certificate through completion of an Advanced Pain Management Fellowship training program in chronic pain practice (Schoneboom, 2015). This program accredited by the COA allows graduates to take a subspecialty certification examination in nonsurgical pain management (NSPM) administered by the National Board on Certification and Recertification of Nurse Anesthetists. The University of South Florida College of Nursing, Tampa, Florida, now offers a four-course postmaster's pain fellowship curriculum in NSPM. Other nurse anesthesia programs are also developing their own postgraduate curriculum for acute and chronic pain management. The NPHF has joined the AANA in early discussions to establish recommendations for competency-based continuing education in pain management.

### Interprofessional Pain Education

The IOM's report on *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research* (2011) underscores the importance of interprofessional education to achieve goals in improving pain care. A recent expert report has defined interprofessional pain education competencies, which have been endorsed by seven professional organizations including American Association of Colleges of Nursing and the American Society for Pain Management Nursing (Fishman et al., 2013). These competencies are organized into four domains: multidimensional nature of pain, pain assessment and measurement, management of pain, and clinical conditions. Each domain presents a curricular emphasis for pain-related content. In addition, the International Association for the Study of Pain (IASP) has taken these domains and expanded pain core curriculum for interprofessional education which can be accessed on the IASP website (<http://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2057>) along with the curriculum for nursing education (<http://www.iasp-pain.org/Education/CurriculumDetail.aspx?ItemNumber=2052>).

Several interprofessional pain education initiatives strive to achieve defined pain competencies. In 2012, the NIH Pain Consortium launched its interprofessional Center of Excellence in Pain Education (CoEPE) program designating 12 academic institutions across the country as CoEPEs, and funding them to develop interactive, case-based, online, interprofessional pain modules for posting on the NIH Pain Consortium's website ([http://painconsortium.nih.gov/NIH\\_Pain\\_](http://painconsortium.nih.gov/NIH_Pain_)

**Table 4 – Recommendations for Call for Actions**

	Supporting Research, Evidence-based Practice Guidelines, and Expert Consensus Reports, Policy Reports, and Other Resources
<b>Practice</b>	
(1) APRNs practicing in military health care and VHA systems should practice to the fullest extent of the law and within their scope of practice. For CRNAs, this includes the delivery of regional anesthesia and ketamine as an analgesic in both United States and during deployment settings.	IOM Report: <i>The Future of Nursing</i> , 2011 American Association of Nurse Anesthetists, 2014 Conover & Richards, 2015
(2) Clinical care for chronic pain treatment must be aligned with evidence-based guidelines, expert consensus reports, clinical practice resources (algorithms), and current research.	National Pain Strategy, 2016 Chapman et al., 2010 Chou et al., 2009a Dowell et al., 2015 Management of Opioid Therapy for Chronic Pain Working Group, 2010
(3) Nurses should access and utilize resources from the Defense and Veterans Center for Integrative Pain Management (DVCIPM) and VHA Pain Management websites to support practice.	Pain Management Task Force, 2010 DVCIPM resources, available at: <a href="http://www.dvcipm.org/clinical-resources">www.dvcipm.org/clinical-resources</a> VHA Pain Management, available at: VHA Pain <a href="http://www.va.gov/painmanagement">http://www.va.gov/painmanagement</a>
(4) APRNs should design, implement, and lead collaborative pain care models that integrate pharmacological, complementary and alternative, and behavioral and cognitive therapies.*	
(5) Patient-reported outcomes (PROs) for pain screening and assessment at military health care and VHA facilities should incorporate the Defense and Veterans Pain Rating Scale (DVPRS), and if available, the Pain Assessment Screening Tool and Outcomes Registry (PASTOR) measures.	Pain Management Task Force, 2010 Office of the Secretary of Defense, 2015
<b>Education</b>	
(6) Educational online resources on the National Institutes of Health (NIH) Pain Consortium, VHA Pain Management, and DVCIPM (Joint Pain Education Project—JPEP) should be integrated into nursing undergraduate and graduate curriculum. Students, clinical nurses, APRNs, nurse leaders, and nurse educators should utilize these educational resources for independent-guided learning and continuing education in pain management.	NIH resources available at: <a href="http://painconsortium.nih.gov/NIH_Pain_Programs/CoEPES.html">http://painconsortium.nih.gov/NIH_Pain_Programs/CoEPES.html</a> DVCIPM resources, available at: <a href="http://www.dvcipm.org/clinical-resources">www.dvcipm.org/clinical-resources</a>
(7) Academic institutions should engage in the American Association of Colleges of Nursing (AACN) Joining Forces Initiative, and incorporate, track, and report content related to military and veteran health. Requirements should be established for the number of hours and/or credits devoted to pain content.	American Association of Colleges of Nursing Joining Forces: Enhancing Veterans' Care Tool Kit, available at: <a href="http://www.aacn.nche.edu/joining-forces">http://www.aacn.nche.edu/joining-forces</a>
(8) Nursing undergraduate and graduate programs should include interprofessional pain education and training as part of their curriculum.	Pain Management Task Force, 2010 IOM Report: <i>Relieving Pain in America</i> , 2011 Centers for Disease Control, 2015
(9) Nursing faculty teaching pain content should be educated in current pain assessment and management practices.	IOM Report: <i>Relieving Pain in America</i> , 2011 American Association of Colleges of Nursing, 2014
(10) Military service members, veterans, and their families should be directed to patient education materials and resources for understanding pain and its treatment and strategies for self-management of pain.	Bair et al., 2015 Matthias et al., 2012 Watson et al., 2014
(11) Evidence-based pain guidelines and expert consensus reports should be widely disseminated to all health care professionals managing patients with pain.	See Table 3 Katzman et al., 2014
<b>Research</b>	
(12) The DoD and Department of Veterans Affairs should increase funding for nurse scientists to investigate the biological basis of chronic pain and outcome-based research in the treatment of chronic pain.	Gereau et al., 2014

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Table 4 – (Continued)

## Supporting Research, Evidence-based Practice Guidelines, and Expert Consensus Reports, Policy Reports, and Other Resources

(13) The military nurse corps and services should develop a cadre of nurse scientists who focus their programs of research on chronic pain.*	
(14) The implementation of evidence-based guidelines and guideline-concordant care should be evaluated with high-quality research methods to demonstrate the impact on patient outcome.	National Pain Strategy, 2016 Bair et al., 2015
(15) The DoD and VHA should continue to establish research agendas and priorities for chronic pain that target funding for nurse-led models of care.	National Pain Strategy, 2016 Bair et al., 2015
(16) Research should be conducted to measure the impact of DoD and VHA national interprofessional pain education programs on patient outcomes.	Gilman et al., 2014
Health policy	
(17) The DoD and VHA should fund APRNs to attend accredited chronic pain management fellowship programs.	American Association of Nurse Anesthetists, 2014
(18) The VHA regulations should provide for full scope of practice authority for all APRNs.	IOM Report: The Future of Nursing, 2010
(19) Health systems integration should promote coordinated transitions from the military to VHA health care systems for pain care.	Pain Management Task Force, 2010
(20) The development of health policy for chronic pain should engage health care professionals, and specifically more nurses, representing disciplines and specialties within the DoD, Department of Veteran Affairs, VHA, and civilian health care sectors.	National Pain Strategy, 2016

Note. APRNs, advanced practice registered nurses; CRNAs, Certified Registered Nurse Anesthetists; DoD, Department of Defense; IOM, Institute of Medicine.

\* Authors' recommendations based on their experiences and analysis of literature.

Programs/CoEPES.html). The CoEPE program was abruptly discontinued in 2013 and reinstated in 2015 with 11 academic institutions now designated and funded as CoEPES.

Specific to military and veteran pain education, the Joint Pain Education Project (JPEP) is underway through collaborative efforts between the DoD and Department of Veterans Affairs to standardize pain management curriculum, strengthen interprofessional pain education, and provide content unique to military and veteran populations. An extensive core curriculum addresses a broad range of common acute and chronic pain problems and pain therapeutics delivered via JPEP instructional, interactive audio, and graphic module productions. JPEP products can be accessed on the DVCIPM website (<http://www.dvcipm.org/clinical-resources/joint-pain-education-project-jpep>).

Project ECHO (Extension for Community Healthcare Outcomes) is an evidence-based model that uses telementoring and comanagement of patients with primary care providers (PCPs). Developed in 2003 for delivering high-quality health profession education on various health conditions, this model was recently replicated by the U.S. Army's Pain Initiative to bridge the gap between PCPs and pain specialists by enhancing knowledge, skills, confidence, and practice in pain care (Katzman et al., 2016). Its overarching goal

is to prepare PCP Pain Champions through an ongoing intensive four-phase tiered program including a 2-day video/teleconferencing pain boot camp. The initial rollout of the Army Pain ECHO model engaged primary care clinics at over 40 military health care facilities and reached 150 PCPs (18% included NPs, physician assistants, pharmacists, or psychologists). From its inception in 2012 to 2014, a total of 9,688.75 continuing medical education hours were granted across all attendees. The impact of the program was measured by valuing the instructional program, motivation to deliver the best care, learning new concepts, and opportunity to learn from and educate others. All areas received high ratings, and qualitative data showed positive impressions of the program. Some of the challenges in engaging clinicians in the Army Pain ECHO Program were poor attendance of clinicians due to time constraints from clinical demands, competing care issues for clinicians, and competing missions for military leaders in primary care (Katzman et al., 2016).

A major gap in conducting interprofessional pain education is the lack of research evaluating pain competencies, demonstrating the impact on patient outcomes, and documenting challenges with this type of instructional redesign. Gilman, Chokshi, Bowen, Rugen, and Cox (2014) speak to all these issues encountered with interprofessional education, in

general, within the VHA systems. These authors propose numerous potential solutions to overcoming challenges in engaging interprofessional learners, evaluating learning, and measuring patient experiences and outcomes. They also advocate for substantial changes in policy and the health care culture to support interprofessional education, and the need to advance team-based models of care to realize the benefits of this type of education on provider and patient outcomes.

### **Pain Educators**

A requisite for successfully preparing students and clinicians to care for patients with chronic pain is to have qualified faculty to teach pain content. The American Society of Pain Educators (ASPE) is a multidisciplinary organization that joins health care professionals to share "best practices" for pain education to inform its membership. This organization disseminates resources and promotes dialog among clinicians from multiple disciplines and practice areas and educators to address critical pain curriculum. ASPE has instituted a certification examination for pain educators, and the Certified Pain Educator Program sets eligibility criteria and competencies for pain educators that are universal across all disciplines to foster an interdisciplinary peer approach to pain management. Faculty and clinician educators should take advantage of this program and the multiple interprofessional instructional resources available for pain education.

### **Military and Veteran Health Systems Models for Pain Care**

Several nurse driven and interdisciplinary models of care in military and VHA facilities demonstrate how structured and goal-oriented pain care can lead to optimal patient outcomes. For example, a randomized trial of an interdisciplinary functional restoration (FR) program for active duty military service members with chronic musculoskeletal pain was conducted at Wilford Hall Medical Center and Brooke Army Medical Center, San Antonio, Texas. Nurse supervision of FR interventions in collaboration with a physician team resulted in significant improvements in self-reported pain, disability, functional status, and fitness for military duty compared to service members receiving standard treatment in an Anesthesia Pain Clinic (Gatchel et al., 2009).

For veterans, Wiedemer, Harden, Arndt, and Gallagher (2007) instituted a nurse practitioner (NP)-directed Opioid Renewal Clinic at the Philadelphia Veterans Affairs Medical Center to support PCPs in managing patients with CNCP at risk for substance abuse through PCP training, NP and pharmacist oversight of an evidence-based opioid prescribing algorithm, patient counseling, and stringent opioid abuse

and misuse detection measures. Of the 171 (51% of 335 enrolled in the program) who initially exhibited opioid-related aberrant behaviors, 77 (45%) successfully maintained adherence to opioid regimens and reduced their aberrant behaviors. The Evaluation of Stepped Care for Chronic Pain Program measured the efficacy of nurse care manager interventions in a randomized clinical trial with 241 Iraq and Afghanistan veterans with chronic musculoskeletal pain exposed to a stepped-care intervention program or usual care (Bair et al., 2015). The intervention consisted of 12 weeks of optimization of analgesic therapy followed by 12 weeks of instructional self-management strategies and brief cognitive behavioral therapy. Statistically significant reductions in pain-related disability, pain interference, and pain severity were observed in the intervention group compared to the usual care group (Bair et al., 2015).

On a larger scale, the VHA has developed its own system of integrated pain care using a Stepped Care Model of Pain Management (SCM-PM), which employs an evidence-based framework to promote guideline-concordant care. The SCM-PM starts with pain care delivered by PCPs, followed by secondary care with consultation in pain medicine clinics that includes interventional, rehabilitation and behavioral therapy, and finally, referral to tertiary interdisciplinary pain centers (Murphy, Clark, Dubyak, Sanders, & Brock, 2012; Rosenberger, Philip, Lee, & Kerns, 2011). Progression to higher level pain care is based on the complexity of pain issues, conditions refractory to standard treatments, risks for substance abuse and addiction, and the need for more integrative care from pain specialists. Key elements of this model include: pain assessment and treatment, evaluation of outcomes and quality of pain management, clinician competence and expertise in pain management, research, and coordination of a national VHA pain management strategy. Frontline nurses in primary care are integral to the success of this model by delivering and coordinating pain care. A qualitative study of nurses' experiences and perceptions with the VHA SCM-PM care model revealed positive impressions with patient-centered and team-based care; however, nurses expressed challenges related to the pervasive and time consuming demands around managing patients receiving opioid therapy and navigating systems barriers, e.g., insufficient options for alternative therapies, staff shortages, and lack of patient education materials (Pellico, Gilliam, Lee, & Kerns, 2014).

Within the VHA, patient-centered medical homes are emerging for diagnosis- and population-specific care. The concept of "pain medical home" and integrated care models within military health and VHA systems has tremendous potential to drive patient-centered chronic pain care with its focus on team-based care and holistic approaches in coordinating chronic pain treatment that integrate pharmacological, cognitive and behavioral, complementary and alternative, and physical therapies. Cheatle, Klocek, and

McLellan (2012) were among the first to suggest medical home models as prime health care environments to manage pain in patients at high risk for substance abuse and addiction. The Veterans Affairs Connecticut Healthcare System reported higher rates of success with engagement in specialty and multimodal pain care services and patient and provider (including nurses) satisfaction when implementing an Integrated Pain Clinic and Opioid Reassessment Clinic (Dorflinger et al., 2014). Novel integrative, specialty care programs and models can be instructive in supporting PCPs in the use of multimodal therapies, evidence-based practices, and risk mitigation and pain management strategies for patients with substance abuse and addiction. The optimal use of pain specialist-guided nonopioid therapies can ultimately reduce the use of or requirements for opioids as recommended by evidence-based guidelines and expert consensus reports. These models and programs also expand practice opportunities for pain-trained APRNs who can make substantial contributions to advancing pain care through outreach to primary care practices.

## Discussion

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Chronic pain places enormous demands on U.S. military health care and VHA systems not only in terms of health care resource utilization but also at a significant cost. The IOM projected that cost for the estimated 100 million Americans suffering from chronic pain is well over \$600 billion (Institute of Medicine, 2011). Military and veteran populations share in the burden of suffering, and their unique experiences in military service can increase risks for CNCP and greater pain severity. Complicating care are coexisting problems such as PTSD, TBI, and persistent postconcussive syndrome, which often require intensive, interdisciplinary, and ongoing health care (Bosco, Gallinati, & Clark, 2013). The military and VHA have made strides in advancing work to better understand challenges in treating chronic pain, improve pain education for health care professionals, standardize pain-related PROs, and transform health care delivery. However, more work is needed to ensure the highest level of pain care and success in achieving optimal physical, psychosocial, and spiritual health for military service members and veterans who have sacrificed so much for the freedoms Americans enjoy every day.

Several recommendations are proposed for nurses in the areas of practice, education, research, and health policy to improve the health and welfare of military service members and veterans with chronic pain and to strengthen nursing's position to influence changes in pain care (Table 4). These recommendations emerge from research, evidence-based guidelines and consensus reports, and health policy and address current gaps in practice, education, research, and policy by capitalizing on the unique expertise and

contributions of nurses, specifically APRNs, nursing faculty, and nurse scientists in continuing progress to improve pain care.

Changes to the existing military health care and VHA systems would improve the efficiency and quality of pain care, and many changes are already in progress. Ongoing work to coordinate the seamless exchange of health information between the two systems now underway will reduce the stress encountered by service members in transitioning to the VA health system following retirement or separation from the military. Currently, evaluations of health and pain status at retirement or separation from the military and disability ratings are separate processes requiring service members or veterans to repeat what often end up being complicated health evaluations. The integration of portable DoD and VHA electronic health records would substantially improve efficiencies in accessing health and pain status information. Expanding the APRN workforce in both primary care military and VHA settings with NPs trained in delivering evidence-based pain care and CRNAs positioned to broaden their scope of practice will likely substantially improve pain outcomes and reduce the need for higher level care. Mundell, Friedberg, Eibner, and Mundell (2013) contend that greater numbers of NPs in primary care settings would improve the efficiency and quality of health care and cite the existing medical home model within the military health care system that utilizes NPs as a means to achieve these outcomes.

New paradigms for pain education in prelicensure and postlicensure academic programs and service-based settings must incorporate interprofessional learning and competency-based evaluations of learners in effective team-based care, collaboration, and communication to establish goals of care, develop pain treatment plans, and build trust and understanding in the value each discipline brings to the care of service members and veterans suffering from chronic pain.

Both the military health care and VHA systems must continue to advance state-of-the-science practices in the prevention and effective treatment of chronic pain. Similar to the preparation of surgical and combat stress teams far forward in military or humanitarian operations, predeployment training should incorporate basic pain management techniques to reduce the amount of acute traumatic pain that transitions into chronic pain phenomena. In times of warfare, Acute Pain Services (APS) should be deployed to combat support hospitals (CSHs) as research shows the impact of an APS on immediate improvements in pain outcomes after major limb trauma (Buckenmaier, Mahoney, Anton, Kwon, & Polomano, 2013b). Anesthesia providers, including CRNAs, deployed to CSHs and forward surgical teams should have expertise in ultrasound-guided RA techniques to place peripheral nerve blocks and catheters before air evacuation. Alternative therapies, such as battlefield acupuncture, now gaining rapid acceptance in military health care should be taught to deployed health care providers and

used in austere battlefield environments to minimize the effects of traumatic pain (Plunkett, Turabi, & Wilkinson, 2012).

To prepare nursing pain specialists, it will be important for the DoD to offer and fund pain fellowships to train military nurses in the management of chronic pain. For instance, congressional language in the National Defense Authorization Act could contain provisions for support of military APRNs to complete accredited fellowship programs in chronic pain. This would expand a more qualified nursing workforce, NPs and CRNAs, and build a pipeline of a broad base of practitioners who could assume responsibilities for the management of pain in both acute and primary care settings.

Clearly, there is a compelling need to support nurse scientists in the military health care and VHA systems to conduct pain research and to increase research budgets to fund this research. Despite the significant prevalence of chronic pain across civilian, military, and veteran populations, federal agencies, including the DoD and VHA, allocate only a very small percentage of their annual research budgets to pain research (Gereau et al., 2014; Office of Pain Policy NINDS, 2012). As recently as 2012, only \$21 million of the DoD budget and only \$13.4 million of the Department of Veterans Affairs budget was spent on funding pain research. In contrast, the NIH, the largest funder of pain research, earmarked \$396 million dollars to pain research which in turn equates to only about \$4 spent to advance current understanding and science of pain research per individual living with chronic pain; the lowest amount per living person distributed across persons with major health conditions (Office of Pain Policy NINDS, 2012).

Above all, APRNs must be allowed to practice within the full scope of the law or federal regulation as recommended by the report by the Institute of Medicine, 2011 *"The Future of Nursing: Leading Change, Advancing Health"* (Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine, 2011). A comprehensive report from Duke University outlines the economic benefits of less restrictive practice for APRNs on economic benefits to health care expenditures, quality of health care, and local growth of the economy. An analysis of various studies indicates that expanded use of APRNs under less restrictive practice regulations can potentially translate into health system savings ranging from 0.63 percent to 6.2 percent (Conover & Richards, 2015). In a systematic review, Newhouse et al. (2011) examined 37 studies for NP and certified midwives practices finding a high level of evidence to support equivalent levels of patient satisfaction, self-reported health status, and functional status outcomes, and mortality rates. These authors were unable to find studies for CRNAs that met criteria for inclusion, and no studies specifically captured outcomes for chronic pain. As such, there is a compelling need to demonstrate the cost benefit and quality outcomes for APRN delivered pain care.

The military health system has made strides in addressing barriers to APRNs' extent of practice, and the VHA has opportunities to maximize the scope of practice for APRNs by updating their regulations for APRN practice. Currently, the VHA is proposing new regulations for APRN practice, including the four recognized roles of clinical nurse specialists, NPs, certified nurse midwives, and CRNAs, that grant full practice authority (Frontlines to Lifelines Act of 2015). This proposed rule would affect over 6,000 APRNs (Veterans Access to Quality Healthcare Alliance, n.d.) including more than 4,000 NPs (American Academy of Nurse Practitioners, 2015) and over 900 CRNAs (data from the AANA) employed within the VHA, and increase access to primary and specialty care for veterans, including veterans suffering from chronic pain. In addition, veterans would have more choices in selecting the type of providers to manage their chronic pain conditions and potentially reduce VHA financial expenditures for quality pain care. The VHA would also be better positioned to recruit health professionals leaving or retiring from the military health system. Just like the portability of patient electronic health records between the two systems, the ability to transfer credentialing and privileging requirements would substantially improve efficiencies in onboarding military health professions into the VHA system. Many military APRNs have a passion to serve this patient population and look for opportunities to continue to care for military members and veterans through employment within the VHA after separating or retiring from the military.

## Conclusions

In summary, preparing and empowering qualified health care professionals across all transitions in military and veterans care and strengthening health systems to deliver comprehensive chronic pain care require both a nursing and interprofessional coordinated effort. Clearly, more nursing pain specialists are needed to not only implement aggressive acute pain care to prevent chronic pain but also to effectively treat chronic pain with evidence-based integrative therapies that include multimodal analgesia, interventional techniques, and complementary and alternative approaches to pain management. Nurses should continue to develop, lead, and test interventions for CNCP and existing and new models of pain care that achieve greater efficiency in access to care and patient encounters and better quality care outcomes.

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