

Pain management strategies and lessons from the military: A narrative review

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BACKGROUND: Wounded soldiers often experience substantial pain, which must be addressed before returning to active duty or civilian life. The United States (US) military has instituted several guidelines and initiatives aimed at improving pain management by providing rapid access to medical care, and developing interdisciplinary multimodal pain management strategies based on outcomes observed both in combat and hospital settings.

OBJECTIVE: To provide a narrative review regarding US military pain management guidelines and initiatives, which may guide improvements in pain management, particularly chronic pain management and prevention, for the general population.

METHODS: A literature review of US military pain management guidelines and initiatives was conducted, with a particular focus on the potential of these guidelines to address shortcomings in chronic pain management in the general population.

DISCUSSION: The application of US military pain management guidelines has been shown to improve pain monitoring, education and relief. In addition, the US military has instituted the development of programs and guidelines to ensure proper use and discourage aberrant behaviours with regard to opioid use, because opioids are regarded as a critical part of acute and chronic pain management schemes. Inadequate pain management, particularly inadequate chronic pain management, remains a major problem for the general population in the US. Application of military strategies for pain management to the general US population may lead to more effective pain management and improved long-term patient outcomes.

Key Words: *Chronic pain; Military; Pain management*

Over the past decade of military operations in Afghanistan and Iraq, >51,000 United States (US) soldiers have been wounded in action in military operations (1), and these soldiers often experience significant pain. In a recent study involving 2597 active-duty soldiers who had been deployed to Iraq or Afghanistan, 44% reported experiencing chronic pain lasting at least three months; of the 1130 soldiers reporting chronic pain, 55.6% reported experiencing pain almost daily or constantly (2). Given the widespread impact of pain affecting veterans, the US military has made a substantial effort to collect information regarding the consequences and treatment of pain, and to apply that knowledge to provide better care for returning wounded soldiers. Appropriate pain management also represents a major challenge in the general US civilian population (3).

The pain management strategies used by military health care providers for both acute and chronic pain are increasingly based on a multimodal approach, which involves combining multiple pain management interventions, possibly both pharmacological and non-pharmacological, to provide more comprehensive management of pain

Analyse narrative des stratégies de gestion de la douleur et des leçons tirées des forces armées

HISTORIQUE : Les soldats blessés ressentent souvent des douleurs importantes, qui doivent être soulagées avant qu'ils reprennent le service actif ou la vie civile. Les forces armées américaines ont adopté des directives et des initiatives pour améliorer la gestion de la douleur grâce à un accès rapide aux soins médicaux. Elles ont créé des stratégies de gestion de la douleur multimodales interdisciplinaires en fonction des résultats cliniques observés à la fois au combat et en milieu hospitalier.

OBJECTIF : Fournir une analyse narrative des directives et des initiatives de gestion de la douleur dans les forces armées américaines, dans l'espoir d'améliorer la gestion de la douleur, particulièrement la gestion et la prévention de la douleur chronique, dans l'ensemble de la population.

MÉTHODOLOGIE : Les chercheurs ont réalisé une analyse bibliographique des directives et des initiatives de gestion de la douleur dans les forces armées américaines. Ils se sont particulièrement intéressés à la possibilité de les utiliser pour corriger les lacunes en matière de gestion de la douleur chronique dans l'ensemble de la population.

RÉSULTATS : Il est démontré que les directives de gestion de la douleur des forces armées américaines améliorent la surveillance, et le soulagement de la douleur, de même que l'éducation s'y rapportant. En outre, les forces armées américaines ont commencé à adopter des programmes et des directives pour assurer la bonne utilisation des opioïdes et décourager les comportements aberrants, car les opioïdes sont un volet essentiel de la gestion de la douleur aiguë et chronique.

CONCLUSION : La gestion insuffisante de la douleur, particulièrement celle de la douleur chronique, demeure un problème important dans l'ensemble de la population américaine. Le recours aux stratégies militaires pour y gérer la douleur pourrait susciter une gestion de la douleur plus efficace et améliorer le sort des patients à long terme.

(4-6). These strategies address many of the problems associated with acute and chronic pain management in the general civilian population in the US. Military pain management strategies are generally focused on aggressive treatment to control pain and improve function, as well as to prevent the development of further physical and psychological complications (7). The US military perspective regarding pain and pain management, which may be used to guide improvements in pain management for the general population, will be reviewed in the present article, with a particular focus on the prevention and management of chronic pain.

THE PREVALENCE AND EPIDEMIOLOGY OF PAIN IN ACTIVE-DUTY SOLDIERS AND VETERANS

Pain represents a serious and widespread problem both over the short term for wounded soldiers on the battlefield and during rehabilitation, and over the long term for many veterans (2,8-10). The incidence of chronic pain is high among active-duty soldiers, affecting >40% of soldiers following deployment (2). In a study involving veterans treated at

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a primary care clinic at the Western New York Veterans Administration Health System (10), 71% reported experiencing pain; of those patients, 35% reported that their pain was constant and 85% reported that pain had been ongoing for a number of years.

The prevalence of certain conditions associated with the development of chronic pain, including traumatic brain injury and post-traumatic stress disorder (PTSD), is higher among military veterans than among the general civilian population (11-14). Traumatic brain injuries may be associated with the development of chronic pain, in part due to injury-related alterations in cognitive functioning or perception (11). The association of chronic pain with traumatic brain injury may be of particular relevance to the military population, due to the high prevalence of this type of injury in returning combat veterans. An estimated 10% to 20% of veterans returning from Iraq and Afghanistan will have experienced a traumatic brain injury (13). In an analysis of data from three studies that included 917 combat veterans with brain injuries, 43.1% reported chronic pain (13). A similar high prevalence of chronic pain has been observed in civilians who have experienced traumatic brain injury; results of an analysis of data from 20 studies that included 3289 civilian patients with traumatic brain injuries revealed that 51.5% of these patients had developed chronic pain (13).

The lifetime prevalence of PTSD has been shown to be up to six times higher among military veterans than in the general civilian population (14). In a study involving 241 veterans who had been involved in military operations in Iraq and Afghanistan, approximately 28% were identified as having PTSD (12). Chronic pain is often comorbid with PTSD (12,15). In a study involving veterans who received treatment for PTSD (n=85), 66% experienced a chronic pain condition; the most common types of chronic pain among these veterans were chronic low back pain, osteoarthritis pain and chronic pain associated with other conditions (eg, diabetic neuropathy, cancer) (15). In addition, veterans with PTSD typically experience more severe chronic pain, with greater pain-related disability and interference with normal activities of daily living (12).

MILITARY ATTITUDES TOWARD ACUTE AND CHRONIC PAIN MANAGEMENT

Because of the high prevalence of pain among returning soldiers and veterans receiving care through the US Department of Veterans Affairs (VA), the appropriate and timely management of pain has been recognized as a priority by the military (16). The President's Commission on Care for America's Returning Wounded Warriors (established in 2007) has guided improvements in care for wounded soldiers through a multifaceted strategy designed to address the various needs of wounded soldiers, to provide support during recovery and return to service or civilian life, and to facilitate the provision of appropriate medical care and disability programs to wounded soldiers (3,17). By providing adequate analgesia, military health care services aim to provide immediate control of pain and restore function, as well as to reduce the risk of developing complications associated with under-managed pain, which may be serious and require extended care. For example, under-managed acute pain may be associated with an increased risk of certain complications (eg, myocardial ischemia, deep vein thrombosis, pneumonia, stroke) and an increased risk of transition to a chronic pain state (18-21), while under-managed chronic pain may be associated with a risk of psychological complications, social isolation, sleep disturbance, fatigue and disability (22-24). Inadequate analgesia may be associated with an increased risk of PTSD following combat-related injuries (25). In addition, chronic pain has been identified as an independent risk factor for suicidal ideation and behaviour among military veterans (26).

To address these concerns, the military has implemented measures to research pain in wounded soldiers and veterans, and to improve the management of acute pain resulting from combat-related injuries and surgery, and the management of chronic pain in veterans (21,27-29). These measures are consistent with a recent recommendation in the 2011 report from the Institute of Medicine (3) suggesting the development of

a comprehensive strategy that integrates prevention, treatment and management of pain, along with measures addressing pain education, reimbursement for pain services and pain research.

In 2009, a Veterans Health Administration Pain Management Directive was issued advocating a multidisciplinary stepped-care approach to the treatment of acute and chronic pain that addressed not only adequate pain control, but improved quality of life and function (30). In 2010, a Pain Management Task Force chartered by the Army Surgeon General completed a detailed report outlining pain management strategies to improve the care of active military personnel and veterans (21). In addition, guidelines addressing specific aspects of pain management (eg, the use of opioids in chronic pain therapy, pain management in military personnel injured during combat) have been developed by the US military (31,32).

The 2010 report of the US Army's Pain Management Task Force provides 109 recommendations for a comprehensive approach to achieve improved pain management for active military personnel and veterans (21). These recommendations, which incorporate multimodal and interdisciplinary pain management strategies, are divided based on four major goals: providing appropriate resources for continued research and progress in the management of acute and chronic pain; developing a broad base of evidence-based best practices for the use of different modalities for acute and chronic pain management; maintaining a patient- and family-based focus for pain management; and developing appropriate pain management educational content and establishing services to assist with and coordinate pain management at a local and regional level (21). In the extensive series of recommendations, some key strategies that are recommended for addressing the four major goals outlined by the Task Force include: standardizing patient care at all levels of treatment; implementing the stepped-care approach recommended by the Veterans Health Administration to provide optimal pain management across the continuum of care for military personnel; incorporating a multimodal and interdisciplinary approach to pain management; and addressing the risks of opioid abuse and misuse at different levels of health care (21).

Based on the findings and recommendations of the US Army Pain Management Task Force, the US Department of Defense (DoD) developed a comprehensive pain management policy to address the needs of patients experiencing pain in the military health care system (33). This comprehensive pain management policy addresses the care of patients experiencing pain using both primary care providers and specialists. For the primary care of patients experiencing pain, the comprehensive pain management policy describes the use of a Patient-Centered Medical Home (PCMH) model (33). In this model, the primary care provider serves as the head of a team of medical professionals who are involved in the comprehensive ongoing care of each patient (33). The primary care provider addresses the needs of the patient in pain personally, or refers the patient for specialty care as needed. The PCMH model allows for improved patient and family education regarding the nature of the pain condition, whether acute or chronic, and its treatment. As of September 2014, there were approximately 440 PCMH practices in the Military Health System's Direct Care System (33).

For specialty care referral of patients experiencing pain, this pain management policy advocates the use of the Stepped-Care Model of Pain Management established by the US Veterans Health Administration in 2009 (30,33). This stepped-care approach, which is briefly summarized in Figure 1, can be used for the management of acute pain or chronic pain conditions (30). The approach is based on a biopsychosocial model, which assumes that the causes and treatment outcomes of many health conditions, including pain, are influenced by a variety of different physical, pathological, psychological, social and environmental factors. In order to adequately manage pain, all of these factors must be addressed to the furthest extent possible (30). Although the primary care provider is intended to serve as the main contact for patients with pain and to manage many simple pain conditions (step 1) in this stepped-care approach, patients must be provided

with timely access to specialty care as needed (step 2), including care by pain specialists, behavioural health care providers, and physical and rehabilitation services (30). To properly implement this stepped-care approach and provide patients with access to specialized pain management as needed, the US Military Health System has increased the number of pain specialists at each military treatment facility. In addition, the US Army has continued to develop Interdisciplinary Pain Management Centers, which represents step 3 in the stepped-care approach, at each of its medical centres (33).

MILITARY PAIN MANAGEMENT STRATEGIES

Postoperative pain and injury-related pain

A multidisciplinary group of health care providers, pharmacists and ethicists from the US Veterans Health Administration and US DoD developed guidelines in 2003 for the management of postoperative pain, intended to address shortcomings in knowledge about pain and recovery (29). Key recommendations from those guidelines are summarized in Figure 2 (29). As part of the 1998 Veterans Health Administration National Pain Management Strategy, a joint collaborative effort to improve pain management for Veterans Health Administration patients was conducted from May 2000 to January 2001, by the Veterans Health Administration and the Institute for Healthcare Improvement (16). Subsequent chart reviews from Veterans Integrated Service Networks revealed that this initiative resulted in a significant decrease in the percentage of patients with moderate or severe pain from June 2000 (24%) to December 2000 (17%; $P < 0.0001$), as well as significant increases in the percentages of patients evaluated for pain (75% to 85%; $P < 0.004$), the percentage of patients with mild or worse pain who had pain treatment plans (58% to 78%; $P < 0.0001$), and the percentage of patients provided with pain education (53% to 62%; $P < 0.0001$) (16).

Improvement of acute pain management for combat-related injuries in the military has largely focused on determining which pain control methods can be readily administered and provide adequate pain relief during immediate field hospital care, transport and subsequent care at military treatment facilities (16,31,34). The care that an injured service member receives can be divided based on the location and level of care. Level I care is the first-responder medical care that an injured service member receives on the battlefield, administered by either a service member or combat medic. The patient is then transported to a level II care facility (or battlefield medical facility) or a level III facility (or off-battlefield medical facility). Level IV (outside the US) and level V (in the US) medical care facilities represent definitive care facilities; patients who will not be immediately returning to active duty are transported to these facilities. Pain management options for levels I and II care are fairly limited, and treatment modalities depend on the level of pain and comorbid conditions. For mild pain, nonsteroidal anti-inflammatory drugs (NSAIDs) are typically used, while for moderate to severe pain, either oral transmucosal fentanyl or ketamine may be used, depending on the presence of comorbid respiratory distress or hemorrhagic shock (34). Pain management options and strategies are more complex at level III, IV and V facilities. In 2013, the US Military Joint Theater Trauma System developed a clinical practice guideline for the management of pain, anxiety and delirium in military personnel injured during combat, primarily addressing care at level III or above facilities (31). These guidelines advocate the development of an Acute Pain Service (APS) at all level III, IV and V facilities. This APS should include an interdisciplinary team of physician pain consultants, pain nurses and pharmacists, that are involved in coordinating care with the medical care providers who treated the patient on the battlefield, during evacuation and at the current facility (31). These guidelines also recommend the use of multimodal pain therapy for injured service members, which may reduce the occurrence of side effects associated with the exclusive use of opioid analgesics and addresses the needs of injured patients with other comorbidities (eg, anxiety and delirium) (31). These guidelines advise that injured service personnel at level III or higher facilities should be continually monitored for pain and that

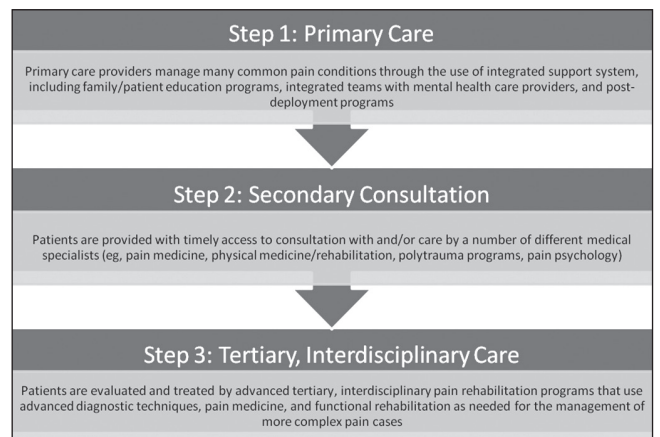


Figure 1 Stepped-care model of pain management from the Veterans Health Administration (30)

the APS provide input for standing orders, which include the following analgesic options: continuous peripheral or epidural nerve catheter infusion, single injection epidural or intrathecal opioids, intravenous patient-controlled analgesia with opioids (eg, hydromorphone, fentanyl, morphine) or low-dose ketamine infusions (31).

The use of nonopioid analgesic options in a multimodal pain management approach, advocated by these guidelines, has been shown to be a preferred and often-used option. A survey of 122 United Kingdom Defense Medical Services and US Medical Corps health care providers involved in early management of severe, traumatic combat-related injuries revealed that a multimodal approach to analgesia for soldiers with severe trauma was preferred during evacuation and early treatment (35). In a study involving 110 injured soldiers evacuated from Iraq and Afghanistan to a level III military treatment facility in Germany (36), the percentage of pain relief reported by patients who received continuous peripheral nerve block (74%) was significantly higher than that reported by patients who did not (62%; $P = 0.029$). In addition, the percentages of patients who received nonopioid analgesics as part of a multimodal pain management strategy at level IV and V military treatment facilities was relatively high, with approximately 50% to 56% of patients receiving NSAIDs and 20% to 41% receiving anticonvulsants or antidepressants (34).

Chronic pain

For the management of persistent pain, efforts by the military have also focused on the development of multifaceted pain management strategies, with a concerted effort to improve patient education about pain, increase the frequency of pain assessments, and improve the long-term, monitored use of opioid analgesics (16). Improving the education of patients with chronic pain regarding their pain management options has been recognized as an important goal to enhance the overall care of patients with pain (3). Patient education topics should include lifestyle changes and self-management techniques that may improve pain, differences in the types of pain and mechanisms of pain, reasons that obtaining appropriate pain relief is important, health professionals who may address pain, pain measurement, reimbursement policies and the right to pain relief (3).

In 2007, the US VA/DoD Evidence-Based Practice Workgroup, in conjunction with the American College of Physicians and the American Pain Society, released a clinical practice guideline for the diagnosis and treatment of low back pain (37). The use of nonpharmacological treatments for low back pain, including self-care, in conjunction with pharmacological therapy with proven benefits (as needed) is recommended in these guidelines (37). For the majority of patients with low back pain, acetaminophen or NSAIDs are recommended as the first-line analgesic option (37). Opioid analgesics are recommended for patients who experience severe or disabling pain that is

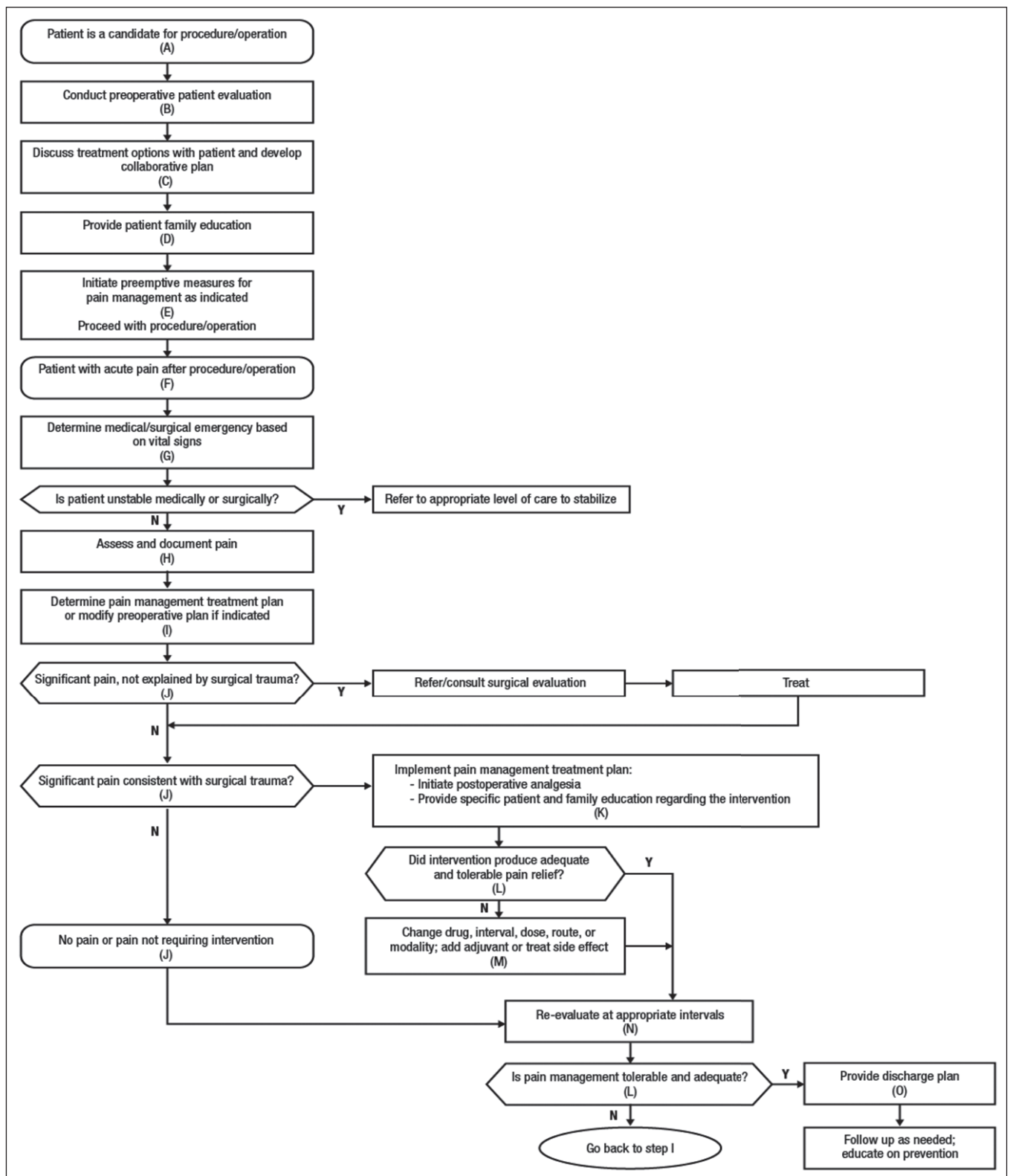


Figure 2) Veterans Affairs Health Administration/Department of Defense guidelines for the management of postoperative pain. Adapted with permission from reference 29. N No; Y Yes

insufficiently controlled with acetaminophen or NSAIDs (37). In addition, these guidelines recommend the potential use of skeletal muscle relaxants for acute low back pain, tricyclic antidepressants for chronic low back pain and gabapentin for patients with radiculopathy (37). The use of antidepressants has been significantly associated

with an improvement in pain symptoms and comorbid depression symptoms ($P < 0.001$ for both outcomes) in a population of 474 US Marine Corp veterans with chronic pain (38).

Although the recommendations and guidelines for pain control issued by the US military advocate the use of an integrative, multimodal

TABLE 1
Preferred treatment settings for opioid therapy for chronic pain

Risk of opioid misuse	Condition/situation	Treatment setting for opioid therapy
Low	<ul style="list-style-type: none"> No history of substance use disorder No psychiatric comorbidity Previous good adherence to treatments with the primary care provider Existence of social support system 	<ul style="list-style-type: none"> Primary care setting
Moderate	<ul style="list-style-type: none"> History of substance use History or co-occurring psychiatric disorder History of suicide attempt Any positive urinary drug test Any history of legal problems Young age (<25 years) 	<ul style="list-style-type: none"> Primary care with escalated monitoring and caution Consider consultation with substance abuse disorder or behavioural health specialty
High	<ul style="list-style-type: none"> Unstable or untreated substance use or mental health disorder Persistent or repeated troublesome aberrant behaviour or a history of alcohol or aberrant drug-related behaviours 	<ul style="list-style-type: none"> Advanced structured pain clinic/program Comanaged with substance use disorder or mental health specialty

Adapted from reference 32

approach to pain management (21,31,37), these guidelines are not intended to suggest that opioid therapy, which often serves as the cornerstone of severe pain management, should not play a role in the pain control scheme. Rather, the military has outlined specific strategies for using opioids appropriately, while mitigating the risks associated with opioid analgesic treatment (eg, abuse, misuse) (21,32). In 2010, a clinical practice guideline for the management of chronic pain with opioid therapy was developed by the US VA/DoD. This guideline recommends a trial of opioid therapy for patients with moderate-to-severe chronic pain, who have not responded to nonopioid treatment, who have the potential to receive greater benefits from therapy than risks, who are fully informed about opioid therapy and have consented to treatment, and for whom definite treatment goals have been established (32). According to this guideline, one of the key considerations when determining the appropriateness of opioid therapy for the management of chronic pain is a risk for abuse or misuse of controlled substances based on any previous history of substance abuse, current or previous history of behavioural or psychiatric disorders, and other factors. Based on the level of risk for opioid misuse, these guidelines from the US VA/DoD recommend the appropriate setting for the administration of opioid therapy (Table 1) (32).

Opioid use is relatively prevalent among military patients with chronic noncancer pain. In an analysis of Veterans Health Administration data for 2009 to 2011, approximately 50% of patients with chronic noncancer pain received opioids (median daily dose, 21 mg morphine equivalents) for a median of 115 to 120 days during a single year (39). The successful use of long-term opioid therapy for the management of chronic pain has been demonstrated in a veterans health setting (40). In a records review from the Veterans Integrated Service Network for 2195 patients who were receiving long-term oxycodone/acetaminophen treatment for chronic pain, daily doses were relatively low and stable, indicating that patients did not need additional increases in their analgesic doses to achieve adequate pain relief (40).

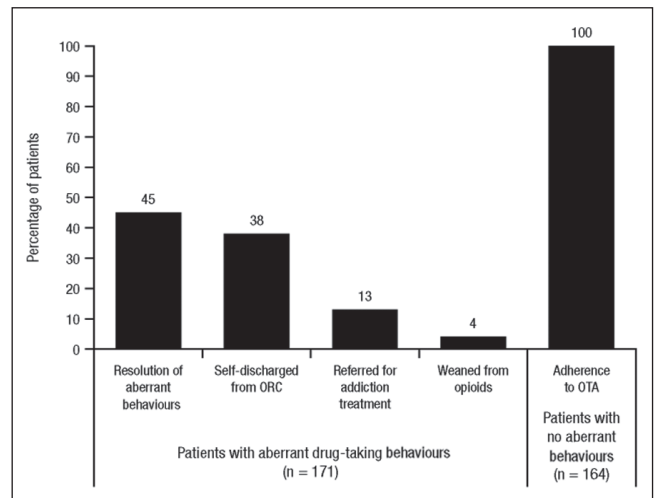


Figure 3) Opioid compliance outcomes for the Opioid Renewal Clinic (ORC) at the Veterans Affairs Medical Center in Philadelphia (Pennsylvania, USA) (44). OTA Opioid treatment agreement

Opioid misuse and abuse are a concern; however, the majority of military veterans who receive prescription opioids for pain management do not misuse them. In a study involving 269 military veterans who had recently returned from deployment in Iraq or Afghanistan and were interviewed about their prescription opioid use, the overall reported rate of opioid use for pain management (33%) was substantially higher than the overall rate of misuse (6%) (41). The majority of these military veterans who received prescription opioids (87%) reported using their drugs for pain management alone; only 3% of veterans who received prescription opioids reported that they misused these drugs and did not take them for pain (41). There were a number of extenuating factors that were associated with an increased risk for abuse in this study, including traumatic brain injury, other substance abuse disorders (eg, alcohol or drug use disorders), unemployment and homelessness (41).

Nevertheless, similar to the trend observed in the civilian population, the misuse of opioids appears to be increasing among active-duty service members (42) and veterans (43). A survey by the US DoD revealed that the rate of opioid misuse among active-duty service members tripled from 2005 to 2008 (42). Measures have been taken to address this issue (42,44), including the development of a landmark structured program, the Opioid Renewal Clinic (ORC), to assist primary care providers at an urban academic veterans hospital who are managing patients with chronic noncancer pain that requires opioid analgesia (44). These strategies are in keeping with the WHO and Institute of Medicine recommendations for pain management with opioids, which indicate that opioids should be available for those patients who would benefit from opioid-based pain management, while efforts should be made to recognize the potential for abuse and institute measures to minimize abuse and addiction (3,22). Within the structure of the ORC, primary care providers who were trained in the use of opioid treatment agreements and random urine drug testing worked with a prescription management clinic that was run by a pharmacist and supported by a nurse practitioner and multidisciplinary pain management team. Primary care providers demonstrated increased patient monitoring when working with the ORC, and specific improvements in patient adherence to treatment were also demonstrated. In a study involving 171 patients with documented aberrant drug-use behaviours who were referred to the ORC, 45% adhered to the opioid treatment agreement and aberrant behaviours were resolved (Figure 3) (44). Although the use of the ORC and other opioid risk mitigation strategies address concerns associated with opioid use for pain therapy, these programs should be expanded to improve the safety of opioid prescribing for military personnel (42).

Defining the role of the primary care provider in military pain management

The primary care provider plays a critical role in the management of chronic pain and is often the central prescriber of opioid analgesics, which are an integral part of most acute and chronic pain management schemes. In a study involving young veterans (18 to 30 years of age) receiving long-term opioid therapy, approximately 80% of opioid prescriptions were provided by primary care providers, while <1% were from pain specialists (45). The comfort of primary care providers and attitudes toward managing the care of veterans with chronic pain have been explored in several recent studies. In a survey of 45 VA primary care providers, 71% of respondents were moderately or strongly confident that they could adequately manage chronic pain and 77% moderately or strongly agreed that the skilled management of chronic pain should be prioritized (46). Conversely, 38% of respondents reported moderate or greater dissatisfaction with their ability to provide optimal care for patients with chronic pain, and 73% cited patients with chronic pain as a major source of frustration (46). A lack of confidence on the part of primary care providers in their ability to manage patients with chronic noncancer pain has also been observed among nonmilitary primary care providers. Results of a 2007 survey revealed that of 572 primary care physicians who responded, only 34% were comfortable in managing the care of patients with chronic noncancer pain (47).

There is currently a drive to provide more extensive physician education regarding pain management to improve the long-term management of patients with chronic pain by primary care providers (3). The 2011 Institute of Medicine report regarding the relief of pain recommends that educational programs with a standardized curriculum be developed to provide specific pain education, which covers pain assessment and treatment (specifically, the safe and effective use of opioids in pain management strategies), to primary care providers and other health care professionals (3). In addition to improving the confidence of primary care providers with managing patients with chronic pain through education, these programs should also stress the importance of pain management (3). As evidenced from the previously discussed survey of VA primary care providers (46), physicians may view patients with chronic pain as a source of frustration and may be dismissive of the needs of those patients (3).

In addition to negative attitudes toward patients with chronic pain and a lack of education regarding appropriate methods for assessing and managing chronic pain, the absence of multidisciplinary support for patients with pain often poses a barrier to achieving optimal pain relief. A survey involving 279 VA primary care providers revealed that 77% identified pain control as a top treatment priority, and that 74% were satisfied with the quality of care they provided for patients with chronic pain; however, only 20% of respondents reported that multidisciplinary pain clinics were available at their clinic sites (48). This shortcoming in health care service for patients with pain is particularly striking given the increasing recognition of interdisciplinary multimodal pain management strategies as critical to addressing the various aspects of pain (4,5) and the evident success of these methods (49-51).

Addressing this gap in pain management will require promoting the use of ancillary services for patients with chronic pain, including specialty pain clinics, psychology clinics and physical therapy (48). The US military has provided guidance for the central role of the primary care provider in the management of patients with pain (30,33). As described previously, the PCMH, in which the primary care provider serves to coordinate the efforts of an interdisciplinary team of medical professionals to provide comprehensive care for the patient, serves as the central model in primary care in the military (33). In addition to the PCMH, the Army is promoting the development of Primary Care Pain Management Clinics (PCPMCs) at military treatment facilities to meet the increasing demand for the treatment of chronic pain in these facilities (52). The structure of the PCPMC is analogous to that of the PCMH, and includes an interdisciplinary

team of health care providers, other patient care professionals and military representatives, including pharmacists, psychiatrists, social workers, surgeons, a Warrior Transition Battalion team and Command representation. The PCPMC may complement the services of the PCMH, improving patient- and family-centred care of active-service members and military veterans (52).

Similarities and differences between pain management strategies in military and civilian populations

Military-focused pain management guidelines and strategies are similar with regard to the types of pharmacological and nonpharmacological interventions recommended more generally, including the 2011 Institute of Medicine report (3) and a report from the 2014 "National Institutes of Health Pathways to Prevention Workshop: The Role of Opioids in the Treatment of Chronic Pain" (53). Both of these emphasize the biopsychosocial model of pain and the importance of multidisciplinary/multimodal/holistic pain management. Similarly, for the management of postoperative pain, the guidelines developed by both the US VA/DoD and the American Society of Anesthesiologists Task Force on Acute Pain Management recommend the use of multimodal analgesic regimens (54,55). Both sets of guidelines recommend that, in appropriate patients, NSAIDs, regional blockade or local anesthetics should be used to complement opioid analgesics (54,55). Similarly, for chronic pain, recommendations for pharmacological management are similar for the military population and the general civilian population. The guidelines used by the military for the management of low back pain were developed in conjunction with the American College of Physicians and the American Pain Society (37). The major development in US military pain recommendations that may be applied to pain care in the general civilian population is the use of a well-defined structure for the medical management of pain.

Through the use of the biopsychosocial Stepped-Care Model of Pain Management, which positions the primary care provider at the centre of patient care while providing timely access to specialized medical care as needed, the US military ensures that integrated medical care is available to patients with pain, providing a holistic approach to treatment (33). The US military has also integrated additional support for primary care providers treating chronic pain patients in military treatment facilities. In the general civilian population, >50% of patients with chronic pain are treated by their primary care provider (3); however, many primary care providers are not comfortable with managing chronic pain (47,56). In the stepped-care approach used by the military, the primary care provider is the major point of contact for patients with pain and directs the management of many common, uncomplicated pain conditions; this approach incorporates an integrated support team that provides patient and family education, mental health care and postdeployment care (30,33). Furthermore, in 2009, the Assistant Secretary of Defense directed all military treatment facilities to incorporate the PCMH model in their primary care facilities, in which the majority of the patient's health care needs are addressed in a primary care setting (33). This type of primary care requires an interdisciplinary team of providers that may include physicians, nurses, physician assistants, nutritionists, social workers and educators. In this type of primary care practice, primary health care is patient-centred and focused on meeting each individual patient's unique needs. In this model, the primary care provider is involved in coordinating patient care across all levels of health care, including referral to specialists as necessary, home health care, hospitalizations and community services (57). The US Agency for Healthcare Research and Quality also advocates the use of this type of PCMH model for primary care in the general civilian population; however, as of 2014, only approximately 10% of all primary care practices had adopted this model (58). The PCMH model has demonstrated benefits in improving primary care. In a study involving family medicine residents (59), participation in a PCMH program improved resident attitudes toward the management of chronic pain patients. In a separate study involving >380,000 primary care patients, patients

receiving care in PCMH practices had lower odds of hospitalization or treatment in an emergency department than those receiving care in a non-PCMH practice (60). In addition, the US Military has advocated the need for establishing pain management clinics within primary care. This PCPMC may be an integral part of the PCMH and may serve to further improve the medical management of patients with chronic pain seen in primary care (52). The PCPMC is a team-based approach involving a multidisciplinary team, which includes pharmacists, psychiatrists, social workers, surgeons, physicians and others who play a role in the continuum of patient care (eg, the Warrior Transition Battalion team for military personnel) (52). In this approach, the team has regular meetings to discuss the care of chronic pain patients and eases the burden of caring for difficult chronic pain patients that would otherwise be placed solely on the primary care provider. By integrating similar pain management clinics in general primary care practices serving the civilian population, the overall care of patients may be enhanced (52).

CONCLUSIONS

Given the focus of military health care on returning patients to active duty and minimizing the long-term disability and psychological distress associated with chronic pain, the measures implemented to achieve adequate pain relief in a military setting are generally focused on rapid, aggressive and multimodal pain management, resulting in improved patient outcomes and a reduction in long-term sequelae. Following the development of an initiative by the Veterans Health Administration and Institute for Healthcare Improvement to enhance pain management, substantial improvements were observed in pain monitoring, pain education, and achieving and maintaining adequate pain relief (16). Additionally, the military has instituted the development of programs and guidelines to discourage aberrant behaviours with

regard to opioid use because opioids are regarded as a critical part of acute and chronic pain management schemes (44). The US military has also developed a uniquely structured approach to pain management in the health care setting. In particular, the military has ensured that primary care providers, who are often the first point of contact for patients with pain, have an established system of support to provide comprehensive care for these patients (33). The military strategies for pain management may serve as a good model for the management of pain in the general population, given the focus on improving patient outcomes and ensuring the holistic care of these complex pain conditions (3,33,52).

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