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Chronic Pain Among Service Members

Using Administrative Data to Strengthen Research and Quality Improvement

Chronic pain is prevalent among U.S. military personnel and is frequently comorbid with behavioral health disorders and other medical conditions that further complicate its management. Injuries and medical conditions that cause pain—particularly those that result in chronic pain—can reduce service members’ medical readiness and performance (Abraham et al., 2020; Bernard et al., 2019; Fodeh et al., 2018; Molloy et al., 2020b; Nayback-Beebe et al., 2017) and can increase their risk of longer-term adverse health outcomes (McGeary et al.,

2016). Effective treatment of chronic pain can mitigate these harms by improving services members’ pain symptoms, functioning, and readiness for military duty (Gatchel et al., 2009). Accordingly, the U.S. Department of Defense (DoD) and Military Health System (MHS) have invested in research and clinical innovations to support the adoption of evidence-based models of chronic pain treatment, with the goal of improving service members’ health and readiness through improved pain management (DoD, 2021; Westfall, 2019).

Quality measurement is an essential component of efforts to improve chronic pain treatment for service members. The Institute of Medicine defines *health care quality* as “the

KEY FINDINGS

- Pain—most often from musculoskeletal conditions and injuries—is the leading cause of disability and reduced readiness for military duty. Research suggests that chronic pain accounts for a disproportionate number of pain-specific disability days and decreased work effectiveness.
- Conditions that are frequently comorbid with chronic pain, such as traumatic brain injury and behavioral health disorders, can complicate both patients’ experiences of chronic pain and providers’ approaches to pain treatment.
- In response to emerging evidence, the U.S. Department of Defense (DoD) and Military Health System (MHS) have emphasized multimodal, multidisciplinary, stepped treatment for chronic pain that prioritizes nonpharmacologic therapies and non-opioid pain medications.
- Published evidence on chronic pain treatment patterns and quality in the MHS is limited. Research using MHS administrative data can address gaps in the evidence base on chronic pain, guide efforts by the MHS to improve the quality of chronic pain care, and inform DoD investments in research and clinical interventions to enhance the outcomes and military readiness of service members with chronic pain.

degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (Institute of Medicine, 1990, p. 21; Donaldson, 1999, p. 3). Quality measurement therefore assesses the extent to which health care delivery practices that are believed to improve health outcomes have been adopted by providers or health care delivery organizations (Derose and Petitti, 2003). Quality measurement and the use of quality measures to improve care are the foundations of a learning health system (Agency for Healthcare Research and Quality, 2019). By identifying gaps in the adoption of evidence-based pain management practices by MHS providers, as well as gaps in service members’ receipt of high-quality pain care, quality measurement gives MHS leaders and providers the information necessary to drive care improvement.

MHS administrative data—generated during health care encounters and capturing information about service utilization—are supporting quality measurement and care improvement at military treatment facilities (MTFs), including for chronic pain. Accurate quality measurement is critical to achieving buy-in from providers, ensuring that MHS care improvement resources are targeted appropriately, and evaluating the success of quality improvement initiatives. Accurately measuring quality is challenging, however. There is an extensive body of literature on the difficulties of developing accurate quality measures using administrative data (Iezzoni, 1997; MacLean et al., 2006; Tang et al., 2007; Torchiana and Meyer, 2005), and there are additional complexities in measuring the quality of chronic pain care specifically.

This report examines how MHS administrative data can be used to measure the quality of chronic pain care delivered by MTFs to support DoD’s goal of improving service members’ health and readiness through improved pain care. We drew lessons from prior studies that have used MHS administrative data to assess pain care, as well as the civilian literature on measuring the quality of chronic pain treatment using administrative data from health care claims and electronic health record (EHR) databases. We identified relevant literature through targeted searches of both the peer-reviewed literature (via PubMed) and gray literature, including DoD reports on chronic pain among active-duty U.S. service members.

We begin by providing additional context on the significance of chronic pain among services members and its effects on their health and readiness. We then discuss approaches to using MHS administrative data to measure the prevalence of chronic pain and the quality of pain care, as well as some limitations of these data. We conclude by identifying research priorities for better understanding the causes, consequences, and treatment of chronic pain using administrative data, along with opportunities to strengthen quality measurement and improve chronic pain treatment for service members.

Abbreviations

DoD	U.S. Department of Defense
DVCIPM	Defense and Veterans Center for Integrative Pain Management
DVPRS	Defense and Veterans Pain Rating Scale
EHR	electronic health record
ICD	International Classification of Diseases
MHS	Military Health Service
MTF	military treatment facility
NSAID	nonsteroidal anti-inflammatory drug
PASTOR	Pain Assessment Screening Tool and Outcomes Registry
PROMIS	Patient-Reported Outcomes Measurement Information System
PTSD	posttraumatic stress disorder
TBI	traumatic brain injury
VA	U.S. Department of Veterans Affairs

Chronic Pain Among Service Members

Pain Prevalence, Etiologies, and Risk Factors

Chronic pain is defined as pain that persists for at least three months.¹ The estimated prevalence of chronic pain among active-duty service members ranges from 31 to 44 percent (Reif et al., 2018; Toblin et al., 2014), which is considerably higher than in the civilian population. In 2016, 20 percent of U.S. civilian adults were estimated to have chronic pain (Dahlhamer et al., 2018). The substantially higher prevalence of pain among service members has been attributed to a high rate of injuries from deployments (Clark, 2004; Girona et al., 2006), the mental and physical demands of military service (Reif et al., 2018), and a possible tendency to delay care-seeking for painful conditions (Office of the Army Surgeon General, 2010).

Musculoskeletal pain—particularly back pain and joint disorders—has been consistently identified as the most common chronic pain etiology among service members (Bader et al., 2018; Gatchel et al., 2009; Reif et al., 2018). Chronic pain is more common among those age 30 and older, as well as among those injured in combat or exposed to higher-intensity combat. The majority of service members' medical encounters are for noncombat injuries that resemble the pain etiologies seen in civilian populations (Cohen et al., 2005; Molloy et al., 2020a). Because of the unique occupational exposures associated with deployments, however, service members are also at risk of more-complex chronic pain syndromes. For example, combat injuries, particularly blast injuries, can result in complex polytrauma, with a higher number, severity, and diversity of wounds and a high incidence of concurrent traumatic brain injury (TBI) (Clark et al., 2009). Figure 1 provides an overview of the prevalence, sources, characteristics, and implications of service members' chronic pain.

¹ Studies cited in this section focused on chronic pain among active-duty U.S. service members. We excluded studies on nonmilitary populations but included research on veterans when it examined the relationship between prior active-duty service experiences and chronic pain.

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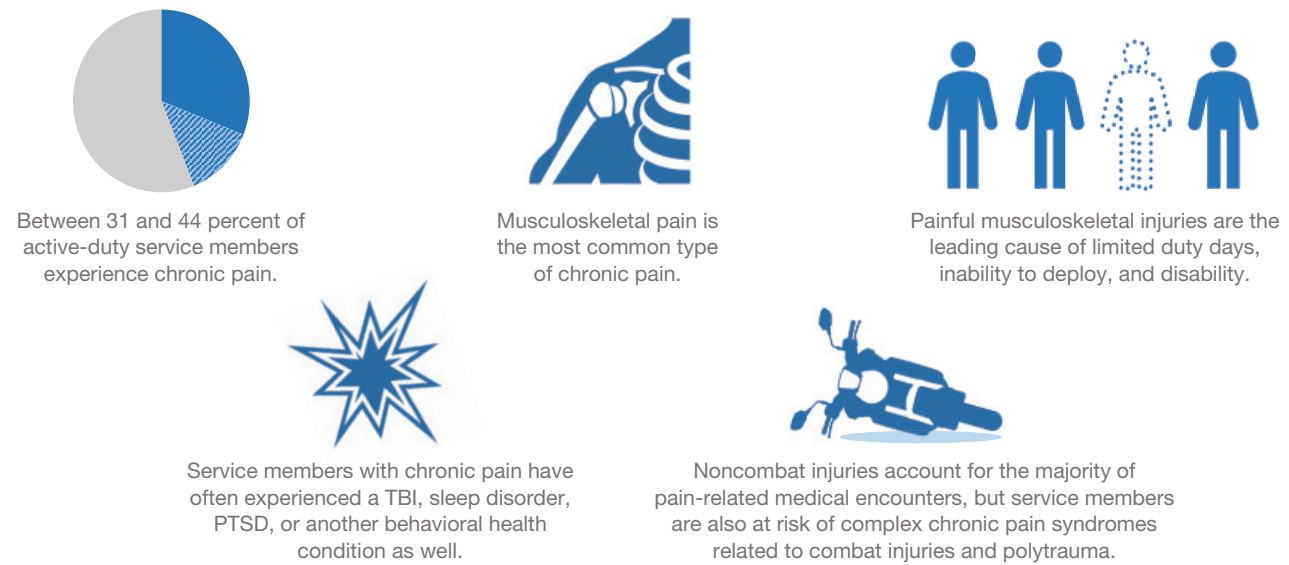
Comorbid Conditions

Among service members, chronic pain is often comorbid with TBI and a range of behavioral health conditions, such as posttraumatic stress disorder (PTSD), major depressive disorder, anxiety, substance use disorder, and sleep disorders (Higgins et al., 2014; McGeary et al., 2016). One study found that as many as 40 percent of veterans who deployed to Operation Enduring Freedom and Operation Iraqi Freedom and had a history of polytrauma suffered from the “polytrauma clinical triad” of comorbid chronic pain, PTSD, and TBI (Giordano et al., 2018; Lew et al., 2009). These comorbidities can complicate both patients' experiences of chronic pain and providers' approaches to pain treatment. For example, service members with chronic pain and comorbid behavioral health conditions might derive added benefit from multimodal pain treatment that includes evidence-based behavioral therapies (Clark et al., 2009).

Impact of Chronic Pain on Service Member Readiness

Pain is a leading cause of disability and reduced readiness for military duty (Gatchel et al., 2009; Molloy et al., 2020a). Musculoskeletal conditions and injuries are the leading cause of pain among service members (Reif et al., 2018), and their effects on readiness have been studied more closely than those of other pain-related conditions. A study of U.S. Army personnel data suggests that noncombat musculoskeletal injuries account for almost 60 percent of soldiers' limited duty days. Among soldiers who are medically unable to deploy (Molloy et al., 2020a), for 65 percent noncombat musculoskeletal injuries are the

FIGURE 1
Characterizing Service Members' Chronic Pain



reason. Musculoskeletal conditions are also among the most common reasons that service members seek outpatient medical care (Clark and Hu, 2015; Nayback-Beebe et al., 2017), and they are the leading cause of hospitalizations and disability among service members, accounting for 40–50 percent of DoD disability payments (Gatchel et al., 2009).

Most research on the impact of pain and pain-related medical conditions on military readiness has not clearly distinguished between acute and chronic pain. Thus, there is limited evidence on the unique impact of chronic pain conditions on readiness. However, research suggests that chronic pain compromises service members' functioning and medical readiness to a greater degree than acute pain (Helmer et al., 2009). This is based on evidence from military profiles, which are recommendations from health care providers to military commanders regarding service members' health-related functional limitations and whether those limitations affect their ability to deploy or otherwise carry out their duties (Klein, Hall, and Greenwood, 2017). Profile days are the number of days during which a service member has a profile recommending a modification in duties for health reasons. In 2016, 4 percent of active-duty Army personnel had profiles related to chronic mus-

culoskeletal problems that limited their duties for at least 90 days. However, this 4 percent of service members accounted for 51 percent of all musculoskeletal profile days across the Army's active-duty force that year, indicating that chronic musculoskeletal pain conditions account for a disproportionate share of disability and reduced readiness (U.S. Army, 2017).

As noted earlier, chronic pain is commonly comorbid with other medical and behavioral health conditions that may further compromise service members' functioning and reduce readiness. For example, in a study of veterans with chronic pain, the presence of comorbid PTSD was associated with a nearly twofold increase in the number of health-related disability days in the prior month compared with chronic pain alone. Comorbid PTSD was also associated with a 75-percent increase in the number of pain-specific disability days and a significant decrease in work effectiveness among patients with chronic pain (Outcalt et al., 2015).

Service members with chronic pain are often treated with prescription opioids (Golub and Bennett, 2013; Kazanis et al., 2018). A 2011 study of Army infantry soldiers found that 23 percent who experienced chronic pain had received prescription opioids in the prior month (Toblin et al., 2014). A

A subset of patients who receive prescription opioids are at risk of developing opioid dependence, misuse, and addiction.

subset of patients who receive prescription opioids—particularly long-term or high doses—are at risk of developing opioid dependence, misuse, and addiction, with negative consequences for their health and readiness (Ganem et al., 2016; Phillips, Ford, and Bonnie, 2017; U.S. House of Representatives, 2016).

Caring for Service Members with Chronic Pain

Principles of Chronic Pain Treatment

Increasing awareness of the high prevalence and costs of chronic pain has reinvigorated efforts by the medical and policy communities to identify evidence-based pain treatment strategies and facilitate their adoption. At the same time, the opioid crisis has drawn attention to the negative consequences of certain pain management practices and the need to balance pain relief with patient safety. Accordingly, chronic pain treatment guidelines emphasize the following principles, illustrated in Figure 2 (Edmond et al., 2018; Mueller et al., 2016; Rosenquist et al., 2010):

- Multimodal and multidisciplinary treatment that combines evidence-based pharmacologic and nonpharmacologic therapies is a cornerstone of chronic pain care.
- Stepped pain care models, in which low-intensity interventions are trialed first, followed by increasingly advanced therapies and specialty consultation if no improvement is noted.
- Opioid treatment for chronic pain should be considered only when other therapies have

been exhausted and after careful assessment of patients' risks for adverse outcomes. If used, opioids should be offered at the lowest effective dose, with frequent reassessment.

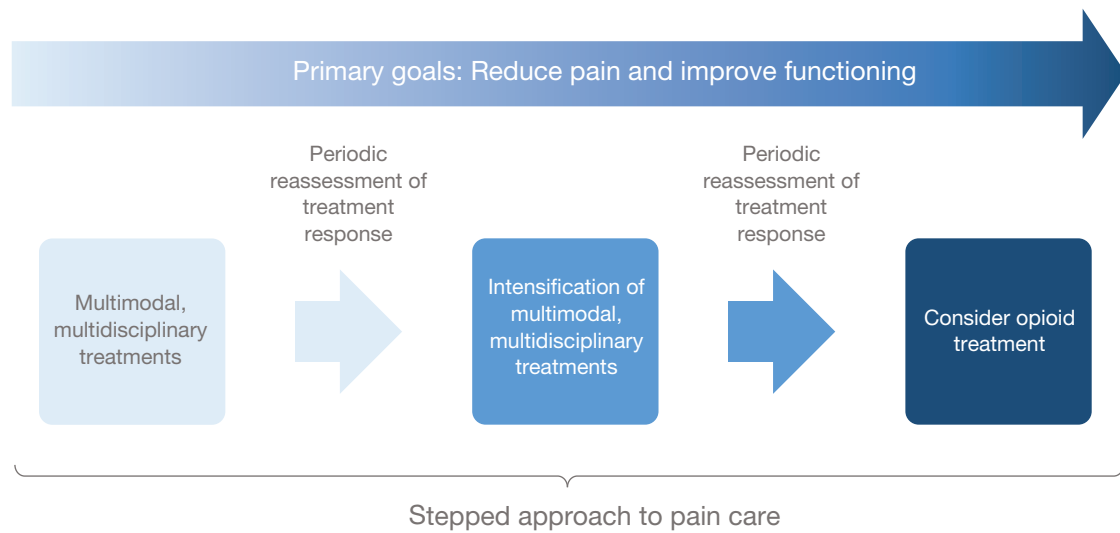
- Regardless of the specific treatment modality, periodic reassessments are recommended to evaluate treatment response, with the primary goals of treatment being to reduce pain and improve functioning.

Nonpharmacologic therapies for pain include physical therapy, occupational therapy, exercise therapy, manipulative therapy (e.g., chiropractic treatment), cognitive behavioral therapy, and complementary and alternative therapies (e.g., acupuncture).

Pharmacologic treatments include topical and oral nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, anticonvulsants, antidepressants, and muscle relaxants. Specific pharmacologic agents and nonpharmacologic therapies have varying degrees of evidence to support their use for particular pain-related conditions (McDonagh et al., 2020; Skelly et al., 2018).

Notably, studies evaluating opioid therapy for chronic pain have found little evidence of efficacy in improving patients' functional status, but the risk of negative health consequences is considerable (Krebs et al., 2018). Therefore, more-recent guidelines recommend avoiding opioid therapy unless other treatments have been ineffective. More-intensive pain treatment modalities also reserved for severe pain include ablative techniques, injections, nerve stimulation, and intrathecal drug therapies (Rosenquist et al., 2010).

FIGURE 2
Principles of Chronic Pain Treatment



Can Effective Pain Treatment Improve Readiness?

There is emerging evidence on whether effective treatment can mitigate the negative effects of chronic pain for service members and improve their medical readiness. Recent studies have found that nonpharmacologic therapy for chronic pain among service members is associated with a decreased risk of subsequent opioid use, a decreased risk of developing alcohol and other drug use disorders, and a decreased incidence of accidental poisoning with opioids or other controlled substances, as well as reductions in suicidal ideation and self-harm (Crawford, Penzien, and Coeytaux, 2017; Meerwijk et al., 2020). A small randomized controlled trial examining the effect of functional restoration, a type of interdisciplinary pain treatment approach, on military service members with chronic musculoskeletal pain found significant improvements in pain symptoms, functioning, disability, and military readiness among those who participated in functional restoration relative to those who received usual care (Gatchel et al., 2009). Evidence that directly links specific chronic pain treatments to readiness is otherwise very limited.

Quality of Chronic Pain Treatment in the Military Health System

Given the promising emerging findings that evidence-based chronic pain treatment might improve service members' health outcomes and readiness, DoD and the MHS have identified improving the quality of pain care as a priority (Vallerand et al., 2015). The MHS tracks performance related to pain care internally, including pain care quality measures similar to those used in civilian settings (e.g., avoidance of high-dose opioid therapy). It also uses MHS-specific metrics to measure outcomes and utilization (Office of the Army Surgeon General, 2010; OSD, 2019; DoD, 2020). Published evidence on the quality of chronic pain management in military health settings remains limited. However, there is encouraging evidence that certain pain management practices have improved at least somewhat in recent years. Specifically, the prevalence of long-term opioid use among service members fell from a peak of 12.3 percent in 2007 to 3.9 percent in 2018 (OSD, 2019).

In 2017, 83 percent of MTFs offered complementary and alternative therapies for pain management (Herman, Sorbero, and Sims-Columbia, 2017). Still, there is room for further improvement. For example,

access to specific types of nonpharmacologic therapy varies by service branch (Herman, Sorbero, and Sims-Columbia, 2017). A recent audit of several MTFs also identified instances of possible opioid overprescribing, despite ongoing DoD and MHS efforts to improve prescribing safety (DoD, 2020).

Efforts to Improve the Quality of Chronic Pain Treatment in the Military Health System

DoD and the MHS have made significant investments in improving the quality of chronic pain treatment for service members through the following channels (OSD, 2019):

- research to identify effective chronic pain treatment modalities
- clinical practice guideline development and dissemination
- provider education
- implementation and scaling up of evidence-based models of chronic pain management.

DoD's chronic pain treatment guidelines and clinical care models reflect an integrated, holistic, and multidisciplinary approach to pain management that discourages reliance on opioid analgesics, emphasizes the need to improve the safety of opioid prescribing when it is necessary, and encourages the broader use of nonpharmacologic therapies and non-opioid medication. The Defense and Veterans Center for Integrative Pain Management (DVCIPM) is DoD's lead organization focusing on the management of service members' pain conditions. Its activities include providing screening tools and guidance for pain management practice (DVCIPM, undated). Some specific examples of DoD initiatives to improve the quality of chronic pain care are listed in the box.

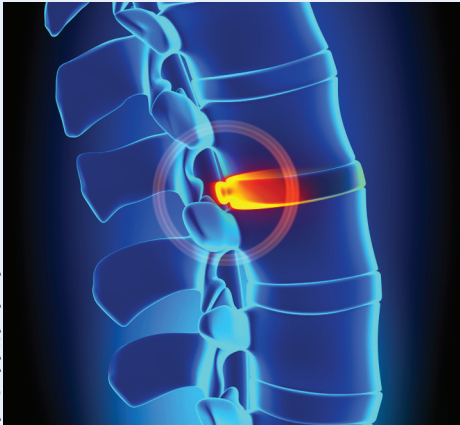
One key component of recent efforts to improve the quality of pain care for service members has been to strengthen the measurement of clinical outcomes. The most notable examples include the Defense and Veterans Pain Rating Scale (DVPRS) and the Pain Assessment Screening Tool and Outcomes Registry (PASTOR), both of which are patient-reported out-

come measures. The DVPRS is a validated patient-reported pain scale developed by DoD that measures not only pain severity but also its impact on physical functioning, sleep, and mood (Polomano et al., 2016). Its use in MHS clinical settings is growing, and it is being integrated into MHS EHR databases (OSD, 2019).

PASTOR is a patient survey that incorporates the DVPRS and several pain-related Patient-Reported Outcomes Measurement Information System (PROMIS) measures, questions about physical functioning and activity goals, and screening for behavioral health conditions (Flynn et al., 2017). PASTOR is used to measure the effectiveness of various MHS pain management initiatives and also serves as a clinical decisionmaking tool (OSD, 2019). The military services have also developed their own metrics for assessing the effectiveness of pain management services. The Navy, for example, tracks the proportion of service members on limited duty due to chronic pain who later return to full duty status (OSD, 2019).

In summary, there is emerging evidence that evidence-based chronic pain treatments can improve readiness among service members. Accordingly, DoD and the MHS have supported numerous initiatives to strengthen the delivery of pain care in a manner consistent with current clinical guidelines emphasizing multimodal, multidisciplinary, stepped pain care

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U.S. Army

Examples of DoD and MHS Pain Care Quality Improvement Initiatives

- U.S. Department of Veterans Affairs (VA)/DoD clinical practice guidelines for the diagnosis and treatment of lower back pain, nonsurgical management of hip and knee osteoarthritis, and management of opioid therapy for chronic pain
- DoD and VA's Joint Pain Education Program
- MHS stepped care model of pain management
- Army Comprehensive Pain Management Campaign Plan
- Army interdisciplinary pain management centers
- MHS CarePoint Opioid Registry
- Telemedicine and telementoring, including Project ECHO (Extension for Community Healthcare Outcomes) for physicians and pharmacists who treat pain
- Air Force Invisible Wounds Initiative
- Navy Long-Term Opioid Therapy Safety Program
- DVCIPM Acupuncture Training Across Clinical Settings
- Low Back Pain Care Pathway Pilot
- MHS Prescription Drug Monitoring Program

SOURCE: DVCIPM.

that prioritizes nonpharmacologic therapy and non-opioid pain medications. Accurately measuring the quality of pain treatment is an essential step toward improving care. DoD and the MHS have supported initiatives to measure chronic pain care quality and patient outcomes, although published evidence is limited.

Knowledge Gaps

Existing research has clearly established the high prevalence of chronic pain among active-duty service members, described its causes, and identified clinically important chronic pain comorbidities, including the polytrauma triad. Still, several important dimensions of chronic pain in military populations

remain incompletely understood—notably, the effects of chronic pain and specific pain treatments on readiness and the quality of pain care across the MHS.

Limited Evidence on How Pain and Pain Treatment Affect Readiness

The adverse effects of painful injuries on military readiness have been well documented, but these studies have not typically distinguished between the short-term effects of acute injuries and the longer-term effects of chronic pain. Most research on the consequences of chronic pain in military populations has involved retrospective analyses of VA cohorts, who are likely not representative of the population of service members receiving care through the MHS.

However, the limited available evidence indicates that the effects of chronic pain on service members' readiness are likely substantial. Further characterizing the specific ways in which chronic pain influences service members' performance, including which subpopulations of service members are at highest risk for disability and subsequent separation from the military, could inform efforts by the MHS to identify and direct support toward the most vulnerable individuals earlier.

There is also very limited evidence on the impact of specific chronic pain treatments on military readiness. This information could assist the MHS in connecting service members with the most effective and appropriate treatments for chronic pain. The development and use of patient-reported outcome measures of service members' functional status (e.g., DVPRS, PASTOR), as well as direct measures of readiness, such as the proportion of service members with chronic pain requiring limited duty, represent critical data infrastructure to support research on the effects of chronic pain therapies on readiness.

Limited Evidence on the Quality of Pain Care Received

Although the MHS internally tracks certain pain care quality metrics, there is limited published evidence on health care utilization or the quality of care that service members with chronic pain receive. The published evidence focuses largely on the use of pharmacologic treatments for chronic pain, particularly opioids. Few studies have examined the extent to which evidence-based nonpharmacologic therapy, multimodal pain treatment, multidisciplinary team-based care, and stepped care are used to manage chronic pain.

Research to address these gaps in the evidence base could guide efforts by the MHS to improve the quality of chronic pain care, as well as inform DoD's investments in chronic pain research and clinical interventions to enhance the military readiness of service members with chronic pain. MHS administrative data can support these activities in several ways.

Using Administrative Data to Enhance Understanding of Chronic Pain Prevalence and Treatment

By providing insight into the health care use of service members, MHS administrative data serve as a valuable resource and are often used in research and to support health care quality improvement, including for chronic pain care. When using administrative data to study chronic pain care, key objectives include the following:

- understanding the characteristics of the chronic pain patient population
- assessing the quality of chronic pain treatment.

MHS administrative data have notable strengths that can be leveraged to answer questions about chronic pain treatment and its consequences for military populations. However, like any other data source, they have limitations that must be considered when designing and interpreting studies of chronic pain treatment and when making decisions about quality measurement. We reviewed the strengths and limitations of health care administrative data for chronic pain research and quality improvement, as well as common approaches that have been used to identify individuals with chronic pain and to assess the quality of chronic pain care. We drew lessons from literature that used MHS administrative data, as well as studies that relied on civilian administrative data.

Key Distinctions Between Military and Civilian Administrative Data Sources

Health care administrative data contain information about health care utilization and limited information on patient characteristics. Administrative data are produced during each encounter with a health care provider or organization (Cadarette and Wong, 2015). In civilian settings, health care claims data are the primary source of administrative data and are used to track service use for the purposes of billing insurers. EHRs also contain administrative data, typically

in combination with additional clinical data elements (e.g., laboratory results, clinical documentation).

The MHS differs from civilian health care settings in several important ways, and there are also some noteworthy differences between MHS and civilian administrative data. Briefly, the MHS provides those who are eligible for TRICARE coverage with two potential sources of health care: direct care provided at the MTFs and private-sector care provided by a network of contracted providers and facilities. Some beneficiaries receive all of their care from one source or the other, depending on location, eligibility, and availability, but many use both sources. Administrative data from both sources of care are stored in the Military Health System Data Repository. For private-sector care, MHS administrative data contain information about services received that is typical of what is found in civilian claims data. For direct care, however, MHS administrative data also combines information drawn from MTF EHRs and appointment and referral systems. This breadth of information available for direct care is a key advantage of MHS data. In drawing lessons from the existing literature, we therefore distinguish between the types of administrative data that were used.

Strengths and Limitations of Administrative Data for the Study of Chronic Pain

Health care administrative data are neither designed nor collected with the intention of being used for health care research or quality measurement. Nonetheless, they are commonly used to analyze health care utilization and inform quality improvement efforts in both civilian and military settings. They are increasingly used to study chronic pain because they offer several distinct advantages relative to other types of chronic pain data (Iezzoni, 1997; Reif et al., 2018). Specifically, they allow researchers to

- analyze larger patient and provider samples at lower cost than primary data collection efforts (e.g., patient or provider surveys or interviews, abstraction of medical record clinical notes, direct clinical assessments of patients with chronic pain)

- directly observe health care utilization and providers' practice patterns, as well as measure some aspects of care quality without the need to rely on patient or provider self-reports that can be subject to bias.

Administrative data also have limitations that are important to consider when selecting the type of data and approach used to address a given research question. One significant limitation is that administrative data only capture the use of health services that are covered, in whole or in part, by insurers. This limitation is particularly relevant to research on chronic pain because several widely used pharmacologic pain treatments can be purchased over the counter (e.g., acetaminophen, NSAIDs) and therefore might not be associated with a prescription drug claim. Moreover, many popular complementary and alternative medicine treatments for chronic pain are often not reimbursed by insurance (e.g., acupuncture) or are not routinely coded (e.g., exercise instructions or other self-care). Administrative data might therefore systematically underestimate the use of these therapies.

Administrative data also contain little information about the content of medical encounters beyond the specific services that have been coded for insurance and payment purposes. Several key components of chronic pain management therefore cannot be readily identified in such data, such as functional assessments or specific behavioral therapies delivered. Most types of administrative data also do not identify services offered by providers that are declined by patients. For example, prescription drugs are included only if the prescription is filled by the patient, and referrals for specialist consultation are included only if the patient subsequently completes a visit with the specialist. Administrative data that combine EHR data elements, as is the case for MHS direct care data, can address some of these gaps. In practice, however, structured EHR data fields may provide limited supplemental information about encounters. For example, it is not possible to accurately identify the specific type of behavioral therapy (e.g., cognitive behavioral therapy) delivered during a psychotherapy session at an MTF using MHS direct care data. Unstructured EHR fields (e.g., free-text

progress notes) can provide additional information about the content of medical encounters, but extracting usable data on a large scale can be challenging and resource-intensive.

Another important limitation of administrative data is that they typically do not include pain-related patient-reported outcome measures, which are important for assessing pain severity, functional status, and response to treatment. Administrative data derived from EHRs may address some of these gaps; MHS direct care data, for example, increasingly include DVPRS data.

Finally, administrative data capture health care diagnoses, utilization, and outcomes only for individuals who receive medical care. Thus, these data are well-suited to examining patterns of health service utilization, but they may not as accurately reflect underlying population health, given known differences in access to health care across subpopulations and challenges associated with the underdiagnosis and undertreatment of certain medical conditions. Chronic pain is one such condition for which there is evidence of undertreatment in certain settings, as well as disparities in treatment by sex and race (Bonham, 2001; Cleeland et al., 1994; Ringwalt et al., 2015; Todd, Samaroo, and Hoffman, 1993). Administrative data therefore measure chronic pain prevalence and treatment among patients seeking care only.

How Are Patients with Chronic Pain Identified in Administrative Data?

Limitations notwithstanding, administrative data can still be effectively leveraged for chronic pain research and quality improvement. The first key step in doing so is identifying individuals with chronic pain.

Approaches to Defining Chronic Pain in Research

Currently, there is no “gold standard” or universally accepted approach to defining chronic pain using

administrative data. However, key considerations include the following:

- Which diagnosis codes indicate “chronic pain”?
- How many pain-related diagnoses are required to establish the presence of chronic pain and over what time period?
- Should treatment receipt be used to identify individuals with chronic pain?

We reviewed the approaches used in prior research to identify individuals with chronic pain and compared the strengths and limitations of different strategies.

Diagnosis Codes: Which Ones?

Chronic pain is most commonly identified through the presence of pain-related International Classification of Diseases (ICD) codes, with earlier studies using the ninth revision (ICD-9) and more-recent studies using the tenth revision (ICD-10). *There is currently no consensus or standard set of ICD-9/ICD-10 codes that are used to define chronic pain.* Qualifying codes vary substantially across studies (a companion online appendix to this report provides more detail on these studies and the codes used in the analyses). Much of the research on chronic pain that has used administrative data has focused on a subset of chronic pain conditions and developed lists of qualifying ICD-9/ICD-10 codes specific to those conditions (Braden et al., 2008; Denis et al., 2019; Janakiram et al., 2019; Owen-Smith et al., 2019). Musculoskeletal conditions associated with pain (e.g., chronic low back pain, osteoarthritis) have been among the most commonly examined (Abraham et al., 2020; Bernard et al., 2019; Fodeh et al., 2018). Far fewer studies have developed an exhaustive list of diagnosis codes covering all possible causes or manifestations of chronic pain. Of the studies reviewed, Von Korff and colleagues presented among the most comprehensive groupings of pain diagnoses (Von Korff et al., 2016).

In choosing whether to examine a comprehensive set of chronic pain conditions versus a narrower subset, the “right” approach for a given research study or quality improvement initiative may depend

on the specific objective. Evidence-based treatment recommendations vary across different types of chronic pain conditions (McDonagh et al., 2020; Skelly et al., 2018). Therefore, for studies examining the quality of pain management, it might be reasonable to focus on specific pain conditions for which the evidence base is stronger. The trade-off is that a condition-specific approach might exclude individuals with more ill-defined chronic pain syndromes that affect multiple, diffuse bodily systems.

Diagnosis Codes: How Many?

Chronic pain is defined as pain that persists for at least three months (International Association for the Study of Pain, 2012). Determining the duration of a pain-related condition is therefore of critical importance in studies examining chronic pain. However, this can be particularly challenging when using administrative data because many ICD-9 and ICD-10 codes do not clearly distinguish between acute and chronic pain conditions. A subset of ICD codes do explicitly refer to chronic pain (e.g., the 338.2 series in the case of ICD-9, and the G89.2 and G89.4 series in the case of ICD-10) but are not used frequently or consistently, particularly when the underlying medical condition causing chronic pain is known (e.g., arthritis, migraine, etc.) (Sherry, Sabety, and Maestas, 2018; Tian, Zlateva, and Anderson, 2013).

Investigators working with administrative data have generally taken one of two approaches to addressing this challenge. The first approach restricts the list of qualifying diagnoses to those that unambiguously represent chronic pain (e.g., “chronic pain due to trauma,” “other chronic pain”), and requires only a single instance of one of these diagnoses for the patient to qualify as having chronic pain. An example from the civilian literature is a 2019 study of opioid prescribing patterns to patients with pain in Oregon’s Coordinated Care Organizations, which used Medicaid claims data (Abraham et al., 2020).

The second approach allows a broader set of qualifying diagnosis codes, including codes for pain-related conditions with uncertain chronicity (e.g., “lumbago”), but it requires that these codes appear in the record for multiple encounters within a specified time frame to establish that the condition is chronic.

An example from the civilian literature is a 2019 study of the relationship between chronic pain, sleep disturbance and suicide, which required patients to have a minimum of two related pain diagnoses (e.g., two diagnoses indicating some type of back pain) recorded between three and 12 months apart to qualify as having chronic pain (Owen-Smith et al., 2019). Reif and colleagues followed a similar approach using MHS administrative data to study chronic pain among service members (Reif et al., 2018). A 2016 study of pain-related health care utilization used even more stringent criteria, requiring individuals to have at least 12 visits with related pain diagnoses over a period of two years (Von Korff et al., 2016). These and similar studies have typically not required the same diagnosis code be used across multiple encounters; rather, they group similar diagnoses into “clusters” (e.g., back pain, migraine, neuropathy, arthritis) and require that codes from the same cluster be recorded for different encounters (e.g., two codes from the arthritis cluster would be required to meet criteria for chronic pain due to arthritis).

Using civilian administrative data derived from EHRs, Tian and colleagues developed and validated a hybrid strategy combining elements of both these approaches (Tian, Zlateva, and Anderson, 2013). They designated certain ICD-9 codes that explicitly referred to chronic, pain-related conditions as being “highly likely” to represent chronic pain and required only a single instance of one of these codes for an individual to qualify as having chronic pain. Other pain-related ICD-9 codes for which chronicity was uncertain were designated as “likely” to represent chronic pain. For these codes, at least two occurrences of a given code separated by at least 30 days were required to meet the criteria for chronic pain. This approach has been used in a number of subsequent studies (Herman et al., 2019; Malon et al., 2018; Tonelli et al., 2015). All the studies discussed here are described in the accompanying online appendix.

Treatment Receipt as an Indicator of Chronic Pain

Several studies have used a combination of diagnosis codes and the receipt of specific chronic pain treatments (e.g., opioid analgesics) to identify a

chronic pain cohort. When treatment receipt and ICD-9/ICD-10 codes are combined, they may help researchers identify chronic pain with greater specificity than diagnosis codes alone (Tian, Zlateva, and Anderson, 2013), particularly because pain-related diagnoses are not always consistently or accurately documented in administrative data (Rose et al., 2018; Sherry, Sabety, and Maestas, 2018).

Still, there are several reasons for caution in using measures of treatment receipt to assess chronic pain prevalence. First, given that chronic pain is believed to be undertreated in some settings (Institute of Medicine, 2011), receipt of a specific pain treatment is not a sufficiently sensitive measure of chronic pain prevalence, particularly because the most commonly used analgesics are available over the counter and therefore are not always captured in administrative data. Second, there is considerable practice variation in the use of specific pain treatment modalities, both across providers and over time, independent of the prevalence of pain (Barnett, Olenski, and Jena, 2017; Ladha et al., 2016; Zhu et al., 2019). Opioid analgesics are a prime example. Opioid treatment for pain has fallen significantly in recent years, but this has been driven by changes in attitudes toward opioid prescribing and policies to limit

opioid use—not by changes in chronic pain prevalence. There are also marked variations in opioid prescribing behavior across physicians, independent of patient characteristics (Eid et al., 2018; McDonald, Carlson, and Izrael, 2012). Using prescription opioid use as a marker of true underlying pain prevalence is therefore potentially misleading. There are therefore important pitfalls to be aware of in using the receipt of specific treatments as part of any definition of a chronic pain cohort, such as temporal and geographic variations in providers’ pain treatment preferences.

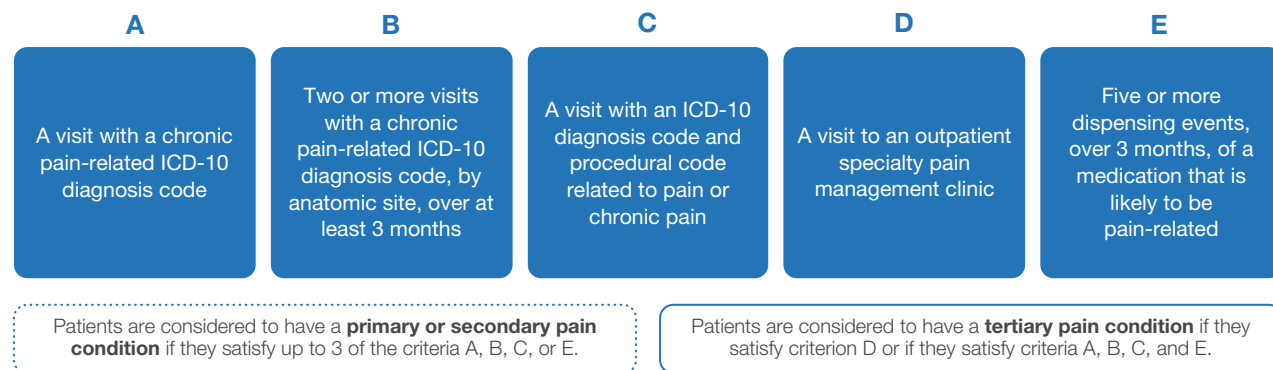
Figure 3 highlights one example of how MHS administrative data have been used in practice to identify service members with chronic pain.

How Can the Quality of Chronic Pain Treatment Be Assessed Using Administrative Data?

In addition to identifying and describing the characteristics of patients with chronic pain who seek medical care, administrative data also provide the opportunity to assess the quality of the pain care they receive. Several approaches have been used to

FIGURE 3
The Navy’s Five Criteria for Chronic Pain

Since 2015, the Navy Comprehensive Pain Management Program (NCPMP) has identified seamen with chronic noncancer pain using five criteria—the Chronic Pain Five (CP5)—that reflect many of the principles described in this report. Seamen are classified as having primary, secondary, or tertiary pain conditions according to the severity of their condition, its duration, and utilization of pain care. The Navy uses the CP5 to track the care and outcomes of chronic pain patients (Office of the Secretary of Defense, 2019). The five criteria are as follows:



SOURCE: OSD, 2019.

measure the quality of pain care using administrative data. Although we primarily draw examples from the research literature, we note that many of these approaches are also used by payers and health care organizations to measure quality in clinical settings.

General Challenges in Quality Measurement for Chronic Pain

Before describing some of the challenges associated with measuring the quality of chronic pain treatment using administrative data specifically, it is important to acknowledge several general complexities inherent in quality measurement for chronic pain care:

- *Limited evidence indicating effective treatment modalities:* Chronic pain is understudied relative to its high prevalence and impact on health and well-being. Thus, evidence identifying effective therapies is limited, although it is emerging.
- *Evolution of treatment guidelines and quality standards:* The limited evidence on effective therapies for chronic pain has created challenges in developing clinical guidelines with broad support (Dowell, Haegerich, and Chou, 2019), most notably guidelines associated with opioid prescribing. This has, in turn, hampered the development of validated quality measures.
- *Quality measures that are narrow in scope:* Existing quality metrics tend to be specific to a particular pain condition (e.g., chronic back pain) and focus heavily on the use of opioid analgesics, with relatively little attention paid to non-opioid treatments.
- *Importance of measuring functional status:* Recent guidelines for the assessment and treatment of chronic pain emphasize the importance of functional assessment to inform treatment decisions, but this has not yet been widely incorporated into chronic pain quality measures.
- *Importance of shared decisionmaking:* Chronic pain is clinically heterogenous, and there is an important role for shared decisionmaking

between the provider and the patient in selecting a treatment approach. Establishing quality measures that are appropriate across patients with different preferences and clinical circumstances is therefore challenging.

In addition to these general challenges to chronic pain care quality measurement, each data source adds its own unique complexities. We explored how administrative data has been used to measure the quality of chronic pain care, and we discuss some specific challenges that have arisen in this context.

Common Approaches and Challenges in Measuring the Quality of Chronic Pain Treatment Using Administrative Data

Key considerations when developing and applying chronic pain care quality measures using administrative data include the following:

- Over what period should quality be assessed?
- What therapies should be included?
- How should researchers account for the stage of chronic pain treatment (i.e., initial treatment versus subsequent treatments)?
- How should researchers account for patient “churn” (i.e., patients entering and exiting the administrative data at different times)?

Assessment Period

In descriptive studies characterizing chronic pain treatment, investigators typically assess pain care received at any time in the same year that the qualifying chronic pain diagnosis was recorded (Abraham et al., 2020). When measuring the *quality* of pain care, however, care is assessed within a specified period of time related to the qualifying chronic pain diagnosis, and with an equal duration of follow-up for each individual whose care is assessed. The time frame for recommended care may be specifically defined by a clinical practice guideline (e.g., follow-up visit within three months) or may be left undefined (e.g., treatment with a nonpharmacologic therapy). A common length of follow-up used in

research studies of chronic pain is 12 months, but depending on the types of pain treatment or services being assessed, investigators might wish to consider a shorter, or even longer, length of follow-up.

Specific Treatments Evaluated

The majority of studies that have evaluated the quality of chronic pain care using administrative data have focused on characteristics of opioid treatment, as do the large majority of validated quality measures that are used by payers and health care organizations. Table 1 summarizes quality measures for the treatment of chronic, noncancer pain for non-institutionalized patients from the National Quality Forum’s (NQF’s) Quality Positioning System that were NQF-endorsed as of August 2020 and can be calculated using administrative data alone. The limited number of quality measures that meet these criteria focus on opioids. Fewer validated quality measures incorporate information about other types of chronic pain treatment, with nonpharmacologic therapies and stepped care being particularly under-

examined. To some degree, this reflects broader limitations in the evidence base for chronic pain treatments. Evidence to support specific types of nonpharmacologic therapies is limited and emerging (Skelly et al., 2018), and this has delayed the development of quality measures that examine their use for chronic pain.

The emphasis on pharmacotherapy is also complicated by certain limitations of administrative data. Information about prescriptions filled or dispensed is readily available and straightforward to interpret, whereas such detail is lacking for most types of non-pharmacologic therapies. For example, among behavioral therapies for chronic pain, cognitive behavioral therapy currently has the strongest evidence base (Skelly et al., 2018). However, MHS administrative data only identify whether an individual or group psychotherapy session took place, not which specific behavioral treatments were provided. Exercise therapy is recommended for chronic low back pain and other chronic pain conditions, but administrative data often do not capture whether it is recommended

TABLE 1
Performance Measures for Chronic Pain Treatment Using Administrative Data and Endorsed by the National Quality Forum

Measure Name	Description
Annual Monitoring for Persons on Long-Term Opioid Therapy	Percentage of adults on long-term opioid therapy who have not received at least one drug test during the measurement year
Safe Use of Opioids—Concurrent Prescribing	Adults prescribed two or more opioids, or an opioid and a benzodiazepine, at discharge from an inpatient or emergency department stay
Use of Opioids at High Dosage in Persons Without Cancer	Percentage of adults receiving opioids who receive a prescription for a dose greater than 120 daily morphine equivalents for at least 90 days
Use of Opioids from Multiple Providers in Persons Without Cancer	Percentage of adults receiving opioids who receive prescriptions from 4 or more prescribers and 4 or more pharmacies
Use of Opioids from Multiple Providers and at High Dosage in Persons Without Cancer	Percentage of adults receiving opioids who receive a prescription for a dose greater than 120 daily morphine equivalents for at least 90 days, and who receive prescriptions from 4 or more prescribers and 4 or more pharmacies

SOURCE: National Quality Forum, Quality Positioning System, data as of August 2020.

by a provider or tried by a patient. Accurately identifying the elements of integrated, multidisciplinary care delivery models that have been recommended for the treatment of chronic pain may be challenging using administrative data. Components that are not typically reimbursed by insurance, such as follow-up with a nurse care manager, may not be captured in claims or MHS private-sector care data. Data limitations have therefore hindered the development and use of quality measures for the treatment of chronic pain with nonpharmacologic therapies or other recommended delivery models.

Finally, administrative data may not capture all types of pharmacologic treatment for chronic pain. Over-the-counter medications, such as acetaminophen and NSAIDs, for example, are a mainstay of chronic pain treatment and are recommended as first-line therapy for many chronic pain conditions. However, they will not appear in MHS administrative data if they are dispensed outside of an MTF and are not billed to TRICARE (e.g., if purchased out of pocket at a commercial pharmacy). This complicates efforts to assess the quality of pharmacologic treatment for chronic pain.

Stage of Chronic Pain Treatment

An inherent challenge in using observational data of any type to study chronic pain is that it can be difficult to determine how long pain has been present. This is relevant to measuring the quality of chronic pain care because some therapies are considered more appropriate for later stages of treatment, and only if pain is refractory to first-line, evidence-based therapies with a lower risk of adverse effects. This is the key concept underlying “stepped care” approaches to chronic pain management. Opioid analgesics are one example. Long-term opioid treatment has been shown to be ineffective for most types of chronic pain, and, thus, its use is considered acceptable only when other treatments have failed to mitigate pain and improve functioning (Dowell, Haegerich, and Chou, 2016). Evaluating the appropriateness of opioid treatment for chronic pain would therefore ideally take into account the duration of chronic pain and prior therapies used, but this can be difficult to ascertain from administrative data

sources. Duration may be challenging to determine if the development of a chronic pain condition precedes the date an individual first appears in an administrative data set. Prior treatments used may not be fully observable if they included therapies that were not captured by administrative data. It is important to consider these limitations when interpreting quality measures that examine treatment of chronic pain across a diverse cohort of individuals at different stages of their chronic pain condition and treatment.

To address the challenge of accurately measuring quality of care across chronic pain patients at varying stages of treatment, some research teams have focused on identifying patients with “initial” episodes of pain and examining the quality of their early pain care. One example is an analysis by Kim and colleagues of the management of new low back or lower extremity pain in civilian settings (Kim et al., 2019). The researchers proposed an approach to identifying “new” pain episodes that required no low back pain or lower extremity pain diagnosis in the preceding 12 months and no opioid prescription in the prior six months. This and similar approaches could be adapted to identify new or early episodes of pain that may become chronic, in turn allowing researchers, clinicians, and health care administrators to measure the quality of early pain care and stepped approaches to treatment.

Patient Churn

A limitation of administrative and other “real-world” secondary data sets that are collected outside of the context of a prospective research study is that when individuals enter and exit the data set is not under the control of the investigator. The history of their chronic pain condition, treatments received, and chronic pain sequelae therefore may not be fully observed. In research studies, investigators have typically tried to account for such patient “churn” by specifying a minimum required length of continuous observation (Choong et al., 2017; Ramachandran et al., 2021; Woolley et al., 2017). In military settings, one trade-off is that this approach may exclude some individuals with shorter durations of military service overall, and in particular those who are discharged early from the military for medical reasons, includ-

ing conditions related to chronic pain. It is therefore important to understand the extent to which the remaining population is representative of active duty service members as a whole (Jensen et al., 2015).

Trade-Offs of Different Approaches

Different approaches to measuring the quality of chronic pain care using administrative data each have advantages and disadvantages. Selecting an optimal approach therefore requires an understanding of the limitations and trade-offs between different quality measurement strategies, which may vary depending on the objective. Some key considerations include the following:

- *What types of chronic pain treatment are of greatest interest, and how accurately can treatment receipt be measured?* As discussed, non-pharmacologic therapies and over-the-counter analgesics may be incompletely or inconsistently captured by administrative data.
- *Is the sequencing or history of chronic pain treatment important in assessing quality?* Evaluation of the quality of stepped care models, or the appropriateness of a decision to prescribe opioid treatment, may require a deeper understanding of the patient's chronic pain treatment history than evaluating the quality of services that are indicated at every stage of chronic pain treatment (e.g., the frequency of follow-up for individuals on chronic opioid therapy).
- *How high a bar should be established for satisfying a chronic pain quality measure, particularly where evidence is still emerging?* Should providers not be rewarded for offering nonpharmacologic therapies with a weaker evidence base or that are not explicitly recommended for a particular chronic pain condition, even if the treatment allows the patient to avoid opioid therapy and its associated risks? Given the importance of shared decision-making in chronic pain care, should quality measures explicitly allow greater flexibility and choice in treatment approaches?

- *What are the potential unintended consequences of chronic pain quality measures, and how can the MHS balance the goal of incentivizing improvement without increasing the risk of harm?* A notable example of the challenges in striking this balance comes from quality measures that discourage the use of high-dose opioid analgesic therapy. Such measures are intended to improve opioid prescribing safety, but concerns have been raised that they might inadvertently encourage excessively rapid tapering of long-term opioid therapy and pose a risk to affected patients (Dowell, Haegerich, and Chou, 2019).

Additional Considerations in Using Military Administrative Data Sources to Measure the Quality of Chronic Pain Care

When using MHS administrative data to study chronic pain populations and treatment, it is critical to understand the differences in what can be measured for direct care versus private-sector care. A 2014 DoD review of health care access, quality, and safety in the MHS found that data on these two sources of care were substantially different, complicating efforts to compare care across settings (DoD, 2014). Some differences between data from direct and private-sector care include the following:

- *Access to care:* A centralized appointment and referral system allows the MHS to monitor measures of access for service members who receive care at MTFs, such as waiting time to appointments and rates of cancellations or no-shows. Similar data are not available for private-sector care other than self-reported data collected through surveys (DoD, 2019).
- *Comprehensiveness of clinical data:* Direct care is documented in a centralized EHR, which includes some data elements that are not available in typical claims data sources, such as vital signs and lab values. These data facilitate the use of some quality of care measures for direct care that cannot be used for private-

sector care (e.g., maintenance of blood pressure control).

- *Patient-reported outcome measures:* The Behavioral Health Data Portal is a secure, web-based system for collecting behavioral health symptom data directly from patients. It was developed by the Army's Behavioral Health Division, but it is being rolled out to all the services and to primary care medical homes (Hoge et al., 2016). The Behavioral Health Data Portal allows direct care providers to monitor several measures of patient symptoms (e.g., depression, PTSD, sleep disorders, level of functioning) over time that support behavioral health diagnoses, the development of treatment plans, and the assessment of patient responses to treatment. Such data can also support efforts to assess the impact of chronic pain treatment on service members' functional status and readiness. Equivalent data are not available for care delivered by private-sector providers.

The differences in the available data on direct and private-sector care continue to complicate efforts to compare the quality of care across these two settings. The MHS continues to use its Purchased Care Dashboard to guide quality improvement efforts and increase the transparency of private-sector care (DoD, 2019).

Research and Quality Assessment Priorities and Recommendations

Our review of existing approaches to identifying patients with chronic pain using administrative data, and approaches to assessing treatment quality, reveals that there are several ways for the MHS to strengthen and expand its efforts to track the quality of chronic pain care. At the same time, we identify important gaps in the evidence on chronic pain treatment that should also be addressed to optimize these quality improvement initiatives. In this section, we first describe several priorities for chronic pain research in military settings, to both enhance our understand-

The differences in the available data on direct and private-sector care continue to complicate efforts to compare the quality of care across these two settings.

ing of the relationship between pain treatment and readiness and also support better approaches to quality measurement using MHS administrative data. We then discuss potential improvements to quality measurement that could be implemented in the MHS based on existing research.

Continued Investments Needed in Chronic Pain Research, Particularly Related to Military Populations and Readiness

DoD has already made substantial investments in chronic pain research. As of 2019, chronic pain research accounted for the majority of funds allocated to DoD's pain management research portfolio (OSD, 2019). Given that pain-related conditions are the leading cause of disability and reduced military readiness among service members, continued investment in pain research is needed to inform and improve MHS clinical strategies for pain treatment. Our review identified several specific areas where additional research attention would be particularly valuable, given their clinical and public health significance and the limited existing evidence base:

- *Describing the distinctive features of chronic pain, its comorbidities, and sequelae among military service members.* While many service members with chronic pain have underlying

etiologies that resemble etiologies in civilian populations, there are also distinctive syndromes of chronic pain and related comorbidities that are unique to military personnel. Examples include chronic pain caused by polytrauma from blast injuries and chronic pain that is comorbid with TBI or behavioral health conditions, such as depression and PTSD. Evidence on these distinctive chronic pain profiles is emerging and still limited.

- *Examining which treatment approaches improve readiness.* Improving functional status is increasingly recognized as one of the most important objectives of chronic pain treatment, and it is an essential step toward strengthening military readiness. Evidence regarding which specific therapies are most efficacious in improving readiness among service members with chronic pain is limited. More research is needed to guide DoD's investments in treatment modalities and care processes that target chronic pain specifically, as well as the most common comorbidities experienced by service members with chronic pain (e.g., behavioral health conditions). Addressing both will be critical to improving health and readiness.
- *Assessing the quality of chronic pain care provided in the MHS.* Although DoD and the military services internally track chronic pain care processes and assess quality, specific approaches to quality measurement may vary, and it is not always clear to what extent valid and reliable performance metrics are used. Opioid prescribing also remains a heavy focus of existing quality measures despite representing just one dimension of chronic pain treatment. There is therefore a need for more research on the validity and comprehensiveness of approaches used to measure the quality of chronic pain care so that care models and processes that are associated with improved quality can be identified and enhanced or adopted more broadly, as needed.

Additional Investments Needed in Validating Administrative Data-Based Approaches to Identifying Chronic Pain Patients

Several approaches to identifying individuals with chronic pain have been used in studies of care in both military and civilian settings. Yet, with the exception of Tian and colleagues' algorithm for identifying a chronic pain cohort in administrative data (Tian, Zlateva, and Anderson, 2013), these studies have generally not examined the validity of these approaches. It is also uncertain whether approaches that accurately identify civilians with chronic pain would be valid when applied to military populations and health care settings. Validating different approaches to using MHS administrative data to identify individuals with chronic pain is therefore a worthwhile investment that will subsequently enable higher-quality research on chronic pain treatment, and, in turn, support quality measurement and performance improvement.

Additional Investments Needed in Administrative Data-Based Quality Measure Development and Validation

Validated quality measures based on administrative data alone are quite limited in both number and scope, with important aspects of evidence-based chronic pain treatment (e.g., nonpharmacologic therapies, stepped care) remaining largely unaddressed. Developing additional measures to characterize the quality of chronic pain treatment is an essential step toward care improvement. Given that MHS administrative data on direct care visits already incorporate some additional clinical data and patient-reported outcome measures that are relevant to chronic pain care (e.g., DVPRS), the MHS is well positioned to support research on how these data elements can be leveraged to improve quality measurement. A key challenge in developing quality measures that use MHS administrative data is how to consistently collect similar information for private-sector care. Therefore, another priority should be constructing and validating identical measures for use in both direct and private-sector care settings.

Recommendations for Chronic Pain Quality Assessment in Military Populations Based on Existing Research

There remains much to learn about the optimal approaches to treating and measuring the quality of care for service members with chronic pain. However, the existing research literature does suggest that there are several principles that might guide the use of administrative data to study chronic pain in this population:

- When using ICD-9/ICD-10 diagnosis codes to identify individuals with chronic pain, it is important to recognize that many codes do not clearly distinguish the chronicity of pain or pain-related conditions. Approaches that require multiple qualifying diagnosis codes over a specified observation period, as summarized in this report, can help identify individuals with chronic pain with greater specificity.
- Researchers and clinicians should be cautious about using the receipt of specific pain treatment modalities as criteria for identifying chronic pain, given known practice variation in chronic pain care and difficulties in identifying certain pain therapies in administrative data.
- In selecting quality measures to assess chronic pain treatment, there is no single “right” or “wrong” approach. The most appropriate quality measure may vary according to the research question or clinical setting. Thus, what is important is understanding and weighing the trade-offs associated with various candidate approaches.

Conclusion

Chronic pain is highly prevalent among service members and is a leading cause of reduced readiness. In military populations, in particular, chronic pain is commonly associated with other medical and psychiatric comorbidities, such as TBI, PTSD, and depression, that may complicate treatment. Accordingly, DoD has recognized the need for effective chronic pain care in the MHS and invested in both research and clinical infrastructure in furtherance of this goal. Quality measurement is an essential component of this strategy, as it can identify areas of success and where improvement in pain treatment is needed. The MHS is already using its administrative data to support chronic pain quality measurement and numerous quality improvement activities. Based on a review of research on chronic pain treatment in both civilian and military settings, we described several promising approaches to identifying patients with chronic pain and measuring the quality of their care. These findings could inform and strengthen MHS initiatives to improve the quality of chronic pain care and inform DoD investments in research and clinical interventions that enhance the military readiness of service members with chronic pain. By optimizing the use of administrative data to study chronic pain, the MHS will be even better positioned to identify effective chronic pain treatments and improve the delivery of chronic pain care at MTFs.

An appendix providing an overview of chronic pain research drawing on administrative data accompanies this report online at www.rand.org/t/RRA1160-1.

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About This Report

Chronic pain affects between 31 and 44 percent of active-duty service members and is a leading cause of disability and reduced readiness. Providing high-quality chronic pain care to U.S. military personnel and supporting research to guide chronic pain care quality improvement efforts are priorities for the Military Health System (MHS). MHS administrative data, which capture service members' health care utilization, are an important resource and are already being used to support research and quality improvement initiatives. However, there are considerable challenges to using these data to accurately measure the prevalence of chronic pain and the quality of chronic pain care provided to service members. This report reviews existing approaches to leveraging administrative data to study the prevalence and treatment of chronic pain, drawing on lessons from both military and civilian settings about the opportunities these data present, as well as their limitations. The findings and recommendations are intended to support policy and decisionmaking about the use of MHS administrative data to improve chronic pain research, quality measurement, and care improvement, as well as to help meet the health care needs of service members with chronic pain.

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