JMR JOURNAL *of* MEDICAL REGULATION

VOLUME 101
NUMBER 2
2015

# A Census of Actively Licensed Physicians in the United States, 2014

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# A Call for Differential Diagnosis of Non-Specific Low Back Pain To Reduce Opioid Abuse

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ABSTRACT: The vast majority of Americans experience low back pain at some point in their lives. For some, it is a fleeting nuisance that can be remedied with over-the-counter treatments, but others suffering from chronic low back pain require more advanced treatments, including opioids, biologics, or surgery. Studies have shown trends of overtreatment of chronic back pain, using opioids without a corresponding improvement in patient outcomes. This article examines the impact of misdiagnosis and improper treatment of chronic low back pain, taking a specific focus on the impact of inappropriate opioid treatment. It instructs practitioners to make a differential diagnosis and sets forth policy recommendations to ensure that practitioners are properly educated on this topic.

**Keywords:** differential diagnosis, low back pain, mechanical back pain, inflammatory back pain, chronic low back pain, opioids, controlled substance, substance use disorder, misdiagnosis

## Introduction

Approximately 85% of Americans experience some form of back pain during their lifetimes,[1] and for approximately 14%, such pain is chronic.[2] Moreover, research shows that chronic back pain is expected to accelerate, with an estimated 22 million U.S. adults expected to experience chronic back pain by 2020, resulting in a significant rise in health care costs and lost productivity.[2] External contributing factors for this increase include misdiagnosis and mismanagement of back pain.[3] Studies have also shown a trend of overtreatment of chronic back pain without an overall improvement in patient outcomes.[4] This overtreatment includes a significant increase in the use of opioids.[4]

Opioids—a class of controlled substances prescribed to treat moderate to severe pain—remain among the most commonly prescribed medications for low back pain.[5] In fact, nearly half of all people with chronic back pain are prescribed opioids.[6] While some studies have shown that opioids are effective for certain types of low back pain,[7] others have shown that long-term opioid treatment of chronic low back pain may cause adverse effects, including an increase in the duration and severity of back pain,[3] poor quality of life,[4] and addiction.[8] A fraction of patients who receive long-term treatment with opioids abuse the medication, develop a substance use disorder, or give the drug to others (diversion),[9] thereby contributing to the opioid abuse epidemic.[10] In fact, the misuse or abuse of opioids was a contributing factor in over 488,000 emergency department visits in 2011,[11] and the deaths of approximately 16,500 people in 2012.[12]

It is imperative that health care practitioners receive training and education on properly diagnosing chronic low back pain and prescribing treatment that is the safest and most effective for each patient in order to improve quality of life for patients and control health care costs. This paper examines the impact of misdiagnosis and improper treatment of chronic low back pain, taking a specific focus on the impact of inappropriate opioid treatment. It offers input to practitioners on how to make a differential diagnosis and sets forth policy recommendations to ensure practitioners are properly educated on this topic.

## Background

### *Overview of Mechanical and Inflammatory Chronic Back Pain*

It is important to understand how pain is defined in order to manage it properly. Low back pain is usually categorized as either acute or chronic. Acute low back pain is typically caused by a sudden injury and lasts less than six months. Treatment for acute low back pain typically includes cessation of physical activities, applying heat or ice packs, and pain relievers, such as acetaminophen, aspirin, or opioids.[13] Goals in treating acute low back pain include relieving pain and restoring movement.

This article focuses on chronic low back pain, which typically lasts longer than six months and usually requires more intensive treatment. Chronic back pain is one of the most common complaints among Americans who seek medical care,[4] and according to the Centers for Disease Control and Prevention (CDC), low back pain is the most frequently reported pain condition among Americans, regardless of age, education, income level, gender, or geography.[14] The goals in treating chronic low back pain may change over time, but often include reducing pain, minimizing symptoms, preventing long-term skeletal damage, increasing function and ability to perform daily activities, and improving quality of life.[15]

Often, a specific cause for the pain cannot be identified, and in such a case, it is labeled as non-specific low back pain.[16] Non-specific low back pain is classified generally as mechanical or inflammatory.[16] It is important to distinguish the two because they require significantly different treatment, and improper treatment can worsen the disorder.[17]

Mechanical back pain is the most common type of back pain and is caused by abnormal stress and strain placed on spinal structures, such as spinal stenosis, herniated discs, zygapophysial joint pain, discogenic pain, vertebral fractures, sacroiliac joint pain, and myofascial pain.[18] The most common cause of mechanical back pain is age-related, degenerative disc and facet processes, and muscle- or ligament-related injuries.[19] Mechanical back pain occurs suddenly and is characterized by less than 30 minutes of stiffness in the morning, increased pain with activity, and no nocturnal pain.[17] Treatments typically include mobilization, manipulation, traction, exercise, opioid and non-opioid pain relievers (e.g., oxycodone, hydrocodone, acetaminophen), and surgery (typically, as a last option).[20]

Inflammatory back pain is caused by inflammation of the spinal joints,[21] and can be associated with more serious conditions like spondyloarthritis (SpA), a group of inflammatory disorders characteristically involving the spine.[22,23] Inflammatory back pain affects approximately one in three patients with chronic low back pain.[24] Inflammatory back pain is characterized by an insidious onset, nocturnal pain, more than 30 minutes of stiffness in the morning, and decreased pain with activity.[17] Inflammatory back pain can be treated using anti-inflammatory treatments, such as non-steroidal, anti-inflammatory medications (NSAIDs), corticosteroid injections, exercise aimed at maintaining flexibility and range of motion, and tumor necrosis factor (TNF) blockers, which are a form of biologic therapy.[16] Biologics are medical products made from various natural resources (e.g., humans, animals, and microorganisms) that are used to prevent, diagnose, or treat diseases and medical conditions.[25]

Among adults in the U.S. with a history of back pain, 6.7% are diagnosed with inflammatory back pain.[26] Inflammatory back pain can be a sign of a more serious issue, such as ankylosing spondylitis (AS), a chronic inflammatory condition and a subset of SpA, that can lead to pain, stiffness, and, in severe cases, fusion of spinal joints.[17] The onset of inflammatory back pain related to AS is typically early in life.[27]

## Opioids

### *Indications*

Opioids are a class of controlled substances prescribed to relieve pain.[28] Opioids can "effectively change the way a person experiences pain," making the pain more tolerable.[29] However, opioids may also result in a heightened sense of pleasure, making such medication prone to abuse.[30] Due to the risk of misuse and abuse, opioid labeling warns that such products "should be prescribed and

**Differentiating Characteristics of Chronic Back Pain[18]**

| | Inflammatory back pain | Mechanical back pain |
|---|---|---|
| **Population affected** | Patients aged < 40 | Patients aged 20–65 |
| **Causes** | Underlying inflammatory disease (e.g., inflammatory arthritis, inflammatory bowel disease, SpA) | Abnormal stress/strain on spinal structures (e.g., spinal stenosis, herniated discs, zygapophysial joint pain, discogenic pain, vertebral fractures, sacroiliac joint pain, and myofascial pain) |
| **Symptoms** | Insidious onset; less likely to be acute; > 30 minutes of morning stiffness; nocturnal pain; pain improves with movement; usually prolonged | Variable onset; < 30 minutes of morning stiffness; no nocturnal pain; pain worsens with movement; usually minor |
| **Treatments** | Mobilization, manipulation, traction, exercise, opioid and non-opioid pain relievers, and surgery | NSAIDs, corticosteroid injections, exercise, and (TNF) blockers |

administered with caution."[31] When treating low back pain, the American College of Physicians/American Pain Society guidelines state:

> Opioid analgesics are an option when used judicially in patients with . . . chronic low back pain who have severe, disabling pain that is not controlled (or is unlikely to be controlled) with acetaminophen and [non-steroidal anti-inflammatory drugs] NSAIDs. Because of substantial risks . . . potential benefits and harms of opioid analgesics should be carefully weighed before starting therapy. Failure to respond to a time-limited course of opioids should lead to reassessment and consideration of alternative therapies or referral for further evaluation.[32]

A study published in 2013, based on evidence collected in 2004, examined opioid prescribing patterns for patients with low back pain and how opioids impacted such patients' lifestyles, psychological distress, and health care utilization over time.[33] The patient population consisted of adult ambulatory patients aged 18 and over, diagnosed with low back pain, and who had used electronic pharmacy and medical record data during a one and half year period.[33] The study found that opioid prescribing was common among patients with back pain: 16,830 of 26,014 patients (61%) received at least one opioid prescription during the year.[33] Almost 20% of the patients received long-term opioid prescriptions even though more than one-fourth of the patients had been diagnosed with a substance use disorder the previous year.[33] Moreover, 78% received non-specific diagnoses, such as "low back pain" or "sprains and strains."[33] Increasing duration of opioid use was associated with increasing age and comorbidity.[33] This study remains relevant today with the continuing need to balance adequate treatment for chronic pain with the risk of substance use disorders or overdose deaths in light of the current opioid abuse epidemic.[34]

### *Opioid Abuse Epidemic*

Opioid abuse, misuse, and diversion have increased at an alarming rate. In 2013, approximately 1.9 million people reported abusing opioids for the first time.[35] Improper treatment with opioids increases the supply of opioids and is correlated with increased opioid abuse.[36] Greater supply creates opportunities for diversion: In 2013, more than 53% of individuals aged 12 or older who abused prescription drugs reported that they received the medications from a friend or relative with a prescription.[35] Among those individuals who obtained the drugs from a friend or relative, 83.8% of the friends and relatives obtained the drugs from just one physician.[35]

To prevent diversion, it is incumbent on practitioners as gatekeepers to medications to determine if a patient is taking opioids as prescribed or exhibits drug-seeking behavior. When a physician appropriately prescribes a controlled substance, the physician should utilize drug testing as a method of closely monitoring the patient to ensure the continuing suitability of the treatment. If a patient shows risk signs or has begun to abuse the medication, the physician must change the treatment and follow up with the patient periodically.[37]

TO PREVENT DIVERSION, IT IS INCUMBENT ON PRACTITIONERS AS GATEKEEPERS TO MEDICATIONS TO DETERMINE IF A PATIENT IS TAKING OPIOIDS AS PRESCRIBED OR EXHIBITS DRUG-SEEKING BEHAVIOR.

### *Importance of Preserving Access to Treatment*

A 2011 report by the Institute of Medicine found that an estimated 100 million Americans experienced chronic pain[14] and have a legitimate need for treatment. Approximately 26.4% of Americans report low back pain lasting at least one day in the last three months,[38] the most frequently reported pain condition.[39] People with back pain are commonly prescribed opioids—from 1997 to 2004, there was a 108% increase in opioid prescriptions for spinal disorders alone.[28]

Yet, access to opioids for legitimate users has become increasingly constrained as policy makers take steps to reduce prescription drug abuse, as well as health care practitioners' concerns about civil and criminal liability for improper prescribing.[40, 41] Similarly, in response to recent regulatory enforcement actions, pharmacies are increasingly refusing to fill legitimate prescriptions for controlled substances for individuals with pain.[42]

Patients must be able to rely on prescribers to make correct diagnoses and provide proper treatments for their specific causes of pain.[43] They must be able to obtain their medications from their pharmacies without unjust suspicion or delay.

## The Problem

### *Misdiagnosis, Delayed Diagnosis, and the Consequences*

Practitioners must make accurate diagnoses promptly in order to avoid unnecessary harm to patients. Early diagnosis and appropriate management are particularly important in patients with SpA and AS, in particular, because most loss of function occurs within the first 10 years of the disease.[44, 45] Early treatment with TNFs can stop the progression of the disease, reduce pain and fatigue, and improve function, spinal mobility, peripheral arthritis, enthesitis, bone density, and acute inflammation.[20]

...IN RESPONSE TO RECENT REGULATORY ENFORCEMENT ACTIONS, PHARMACIES ARE INCREASINGLY REFUSING TO FILL LEGITIMATE PRESCRIPTIONS FOR CONTROLLED SUBSTANCES FOR INDIVIDUALS WITH PAIN.

Differentiating between inflammatory back pain and mechanical back pain is vital because the long-term outcomes and treatment approaches are significantly different.[46] For instance, while rest may help alleviate and exercise may worsen mechanical back pain, the reverse is true for inflammatory back pain.[46] A misdiagnosis and incorrect treatment can have detrimental consequences, including worsening of a disease, bodily damage, and avoidable health care expenses.[47] Back pain exerts a significant economic impact on the health system in both direct and indirect costs totaling an estimated $100 billion per year.[2, 48] Costs include lost wages, hospital expenses, prolonged suffering, and loss of function.[49] In fact, back pain causes more disability than any other condition[50] and is one of the most common reasons that people miss work.[51] In addition to economic burdens, low back pain also results in substantial personal and social burdens.[16] One survey found that 72% of individuals with back pain gave up on exercising and sports-related activities, and 60% said they were unable to perform activities of daily living.[52]

Yet, practitioners often have difficulties differentiating between inflammatory back pain and mechanical back pain, leading to delayed diagnosis or misdiagnosis.[53] More specifically, inflammatory back pain is often misdiagnosed as mechanical back pain,[54] and diagnosis of SpA, in particular, often has a lengthy delay.[45] For example, a recent study revealed that it takes approximately eight years between the onset of the first symptom of SpA and an accurate diagnosis of the disease,[45] and a separate survey of patients with AS revealed a nine-year diagnostic delay.[55] Moreover, studies have shown that multiple referrals often do not yield a correct diagnosis, and during this prolonged diagnostic delay, many unnecessary and invasive investigations are performed and less effective treatments are used through a process of trial and error.[56]

Patients with inflammatory back pain who receive delayed diagnoses and who are inappropriately treated with opioids are exposed to the additional risks of drug abuse, which also has broad societal impacts.[4] Patients treated with opioids are more likely to develop a substance use disorder,[57] and those with substance use disorders experience higher rates of crime, infectious diseases, lost work productivity, and fatal overdose.[58, 59] A 2008 study found that "the prevalence of lifetime substance use disorders ranges from 36% to 56% in patients treated with opioids for chronic back pain." Of this population, 43% reported a current substance use disorder.[60] Moreover, unused opioid medications may be diverted.

### *Causes of Misdiagnosis and Delayed Diagnosis*

Misdiagnosis, delayed diagnosis, and the resulting trial and error in treatment are caused by a shortage of pain specialists[61] and a lack of health care practitioner training,[55, 62] among other reasons. The shortage of pain specialists in the United States is due in part to the relative newness of the specialty, and therefore, the responsibility of managing pain increasingly falls on primary care physicians who nearly doubled the number of opioid prescriptions written between 2000 and 2010, with "simultaneous increases in the incidence of abuse, addiction, injury, and death."[63]

### Possible Effects of Misdiagnosis

| Inflammatory Back Pain | Mechanical Back Pain |
|---|---|
| Risk of substance use disorder or overdose if improperly prescribed an opioid | Risk of substance use disorder or overdose if improperly prescribed an opioid |
| No pain improvement or relief | Increased pain |
| Worsening symptoms | Worsening symptoms |
| Permanent damage | Prolonged suffering |
| Poor quality of life | Poor quality of life |

According to an Institute of Medicine report, many health professionals lack training in guiding, coaching, and assisting patients with day-to-day self-management for chronic pain care, resulting in its call for "increased access to education in pain assessment and treatment in primary care to improve their knowledge and skills in pain assessment and treatment, including safe and effective opioid prescribing."[14] Although various screening tools exist to help health care practitioners to make a differential diagnosis and identify the underlying cause of pain (*e.g.*, Calin, ASAS, Berlin),[64] many practitioners are unaware of such tools, thereby delaying diagnosis and appropriate referrals.[53, 62]

The lack of universal understanding about pain and proper treatments exacerbates the social stigma and discrimination that patients with chronic pain often face.[14, 65] Yet, according to the Institute of Medicine, adequate pain treatment and follow-up "may be thwarted by a mix of uncertain diagnosis and societal stigma consciously or unconsciously applied to people reporting pain, particularly when they do not respond readily to treatment."[14]

### Impact of Proper Diagnosis on Public Health

Proper diagnoses may be made sooner if health care practitioners are adequately educated to make accurate differential diagnoses. The health care practitioner must think beyond the most common causes of low back pain, and consider the full spectrum of possible underlying issues, choose the most appropriate and cost-effective evaluations, and select the safest and most effective therapy.[66]

Various tools are available to make a differential diagnosis based on observation of key criteria. Diagnostic tools can improve screening, classification

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of patients with mechanical back pain versus inflammatory back pain, and referrals to proper treatment. They include IPAIN,[67] Calin,[68] ESSG,[69] and Amor, among others.[70] These tools remind the practitioner to consider certain criteria in making an assessment. The practitioner should interview the patient to distinguish between inflammatory and mechanical back pain based on the differentiating symptoms listed in the chart below.

### Differentiating Characteristics of Chronic Back Pain[18]

| Inflammatory Back Pain | Mechanical Back Pain |
|---|---|
| Age of onset < 40 | 20–65 |
| Insidious onset; less likely to be acute | Variable onset; may be acute |
| > 30 minutes of morning stiffness | < 30 minutes of morning stiffness |
| Nocturnal pain | No nocturnal pain |
| Pain gets better with movement | Pain worsens with movement |
| Pain does not improve with rest | Pain improves with rest |
| Usually prolonged | Usually minor |

By making a proper diagnosis of the underlying cause of inflammatory back pain, the progression of disease can be stopped, and patients improperly treated with opioids can be shifted to less risky treatments that are clinically indicated for their disease. In rheumatoid arthritis patients, for example, "researchers found that opioid use decreased after initiation of biologic therapy."[71] Moreover, both the individual and societal costs addressed above can be reduced.

### Recommendations

#### *Professional Education*

Awareness among health care practitioners of the signs and symptoms causing inflammatory back pain and mechanical back pain are essential for early diagnosis.[45] Therefore, to the extent that they are authorized to do so, state medical boards, voluntary medical associations, third-party payers, and medical malpractice insurers should take a lead in preventing delayed diagnosis by ensuring that general practitioners, pain specialists, rheumatologists, orthopedic surgeons, and other physicians receive proper education in order to identify and diagnose inflammatory back pain accurately. Additionally, educational courses should include information on providing appropriate, safe, and efficient treatment, and re-diagnosing existing patients taking opioids who may have inflammatory back pain.[47]

In New Mexico, for instance, the state legislature amended its Pain Relief Act in 2012[72] to require the medical board to implement continuing medical education (CME) for pain management for practitioners who hold a federal Drug Enforcement Administration registration.[73] Through Senate Bill 215, the legislature mandated the change so that practitioners would "be familiar with and employ screening tools as appropriate, as well as the spectrum of available modalities, in the evaluation and management of pain."[73, 74] A medical board advisory council established by the law drafted clinical guidelines for the prescribing of treatments for pain, and in its final regulations, the medical board provided prescribers in pain management a host of sample screening tools to conduct a proper differential diagnosis.[73, 75, 76] Data from a recent survey of New Mexico health care practitioners indicates that the medical board's actions have increased knowledge and self-efficacy, resulting in safer, more responsible prescribing behaviors.[77] This integrative approach to pain management and safer prescribing standards is a promising strategy toward reducing prescription drug abuse nationwide.

In addition to mandatory continuing education requirements, education and training can be incorporated into professional school curricula, as well as voluntary CME course offerings. Licensing boards can cooperate with professional associations

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to distribute screening tools and guidelines for diagnosis to association members. Outreach can be conducted at professional conferences, and opioid-averse professional groups can be engaged as messengers.

Given that patients with inflammatory back pain are often misdiagnosed and prescribed opioids,[54] which may then lead to addiction,[36] education and training on pain management and safer prescribing of controlled substances should include how to conduct a proper diagnosis of pain. In states where medical boards do not require education and training, voluntary medical associations should do so. Additionally, many professional societies have their own best practices and voluntary professional guidelines for prescribing controlled substances and treating pain, which can be updated to include identifying, diagnosing, and properly treating inflammatory back pain. Training on correcting a misdiagnosis can also be incorporated into Screening, Brief Intervention, and Referral to Treatment (SBIRT), an early intervention approach that targets individuals with nondependent substance use to intervene prior to the need for more extensive or specialized treatment.[78]

Costs associated with opioid abuse have been estimated to create losses of over $72.5 billion per year for private and public health care payers.[78]

COSTS ASSOCIATED WITH OPIOID ABUSE HAVE BEEN ESTIMATED TO CREATE LOSSES OF OVER $72.5 BILLION PER YEAR FOR PRIVATE AND PUBLIC HEALTH CARE PAYERS.

To reduce these costs, payers should implement coverage policies, conduct educational trainings and outreach, and provide resources and materials to encourage practitioners to follow best practices in differential diagnosis of chronic low back pain before prescribing opioids.[79]

### *Patient and Caretaker Education*

Patients and their caretakers must be encouraged to take an active role in health care.[80] They must be educated on symptoms, informed of the benefits and risks of each type of treatment, and encouraged to get a second opinion if a treatment is not working.[80] Priorities for the pain community, including health care providers, patient advocacy groups, public awareness organizations, and pain treatment manufacturers, among others, should include the development of high quality inflammatory back pain-specific resources that educate patients and encourage them to engage in the medical decision-making process.

### *Federally-Funded Awareness Campaigns*

The National Institutes of Health established the Pain Consortium to enhance pain research and support initiatives to promote collaboration. The Pain Consortium should initiate a public awareness campaign to disseminate the recommendations set forth herein.

## Conclusion

Chronic low back pain is a debilitating disorder with severe social and economic impacts. Many of these impacts are worsened due to a lack of education and training of health care practitioners in making a differential diagnosis. In some patients, other modalities besides medications could be effective in treating pain, such as physical therapy, acupuncture, or chiropractic care. Lack of training can cause a delayed diagnosis and use of medications, such as opioids, that may cause unnecessary risks of misuse, abuse, and diversion and may not treat the underlying disease. Therefore, practitioners, patients, and policy makers alike must be properly educated on screening tools to make an early diagnosis and stop the progression of diseases and disorders underlying inflammatory back pain. ■

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