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# Improving Pain Management In a Managed Care Setting

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An innovative quality initiative based on  
PAIN (Patient Population Assessment to Identify Need)  
Indicators

## HIGHLIGHTS

- Persistent Nonmalignant Pain:  
Implications and Opportunities for Managed Care

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- Identifying Suboptimal Management of Persistent Pain  
From Integrated Claims Data: A Feasibility Study

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- Health Care Costs Associated  
With Suboptimal Management of Persistent Pain

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- Applying the PAIN Indicators in a Managed Care Setting  
To Improve Pain Management

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S U P P L E M E N T T O

M A N A G E D

# Care

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## Improving Pain Management In a Managed Care Setting

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PAIN (Patient Population Assessment to Identify Need) Indicators

**Persistent Nonmalignant Pain:  
Implications and Opportunities for Managed Care.....2**

Matthew F. Emons, MD, MBA

**Identifying Suboptimal Management of Persistent Pain  
From Integrated Claims Data: A Feasibility Study .....8**

George A. Goldberg, MD; Susan S. Kim, PharmD; Raafat Seifeldin, PharmD, PhD;  
Merle Haberman, MHA; Donald Robinson Jr., MSPH

**Health Care Costs Associated With  
Suboptimal Management of Persistent Pain .....14**

George A. Goldberg, MD; Susan S. Kim, PharmD;  
Raafat Seifeldin, PharmD, PhD; Mary P. Patton, MIS; Merle Haberman, MHA

**Applying the PAIN Indicators in a Managed Care Setting  
To Improve Pain Management.....18**

Matthew F. Emons, MD, MBA

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# Persistent Nonmalignant Pain: Implications and Opportunities for Managed Care

**Matthew F. Emons, MD, MBA**

Constella Health Strategies

**P**ersistent nonmalignant pain is a major challenge facing the health care system in the United States. Persistent pain is highly prevalent in the U.S. population, affecting an estimated 50 million Americans (American Pain Foundation 2003). Chronic pain, a primary reason why individuals seek medical care, is a significant driver of direct and indirect health care costs. Patients have increased lengths of hospital stays, prolonged recovery times, and poorer health outcomes. In the workplace, persistent pain is a leading cause of disability, absenteeism, and decreased productivity. Combined direct and indirect costs related to persistent pain in America are estimated to exceed \$100 billion annually (National Institutes of Health 1998).

Despite the significant effect of persistent pain on the managed care industry in the United States, few managed care organizations (MCOs) have implemented interventions or programs to address this key topic. In 2002, the American Pain Society issued the equivalent of a call to action, challenging the managed care industry to adopt a disease management approach to persistent pain (Ross 2002). With employers affected by both direct and indirect costs related to persistent pain, there is also speculation that the National Committee for Quality Assurance (NCQA) may introduce one or more Health Plan Employer Data and Information Set (HEDIS) measures reflecting the appropriate management of chronic pain.

In this series of articles, we focus on persistent pain related to osteoarthritis (OA) and low-back pain (LBP). These are key diagnoses among those that are associated with persistent pain. Both conditions are well described in the medical literature and are identifiable from claims data. Many study

findings concerning these conditions are also applicable to other types of persistent nonmalignant pain. Migraine headaches and other persistent headaches are not addressed here, because the associated patterns of treatment are different (e.g., abortive versus prophylactic therapy). Similarly, neuropathic pain is treated differently, and well-established, evidence-based practice guidelines are lacking. Also excluded is cancer pain, because end-of-life treatment is considered a separate topic that has distinct considerations.

Both OA and chronic LBP are common diagnoses. These and other musculoskeletal conditions are significant drivers of inpatient and outpatient health care utilization. According to the National Center for Health Statistics, diseases of the musculoskeletal system were the third most common diagnoses for physician and outpatient department visits, accounting for approximately 8 percent of all visits. Specific diagnoses for OA and back pain accounted for half of all musculoskeletal disease diagnoses (NCHS 1997).

## Prevalence and economic implications

### OSTEOARTHRITIS

Data from the Centers for Disease Control and Prevention estimate that approximately one third of adults in the United States — or nearly 70 million individuals — suffer from some type of arthritis or chronic joint symptoms (“Prevalence” 2002). These projections are significantly larger than previous estimates. Because OA disproportionately affects older individuals, the public health burden of arthritis will increase with the aging of the U.S. population.

Direct health care costs associated with OA are significant (Figure 1). In a study of a managed care population (1993 data), the total cost for patients with OA who were younger than age 65 was \$5,294 per patient per year. This is more than twice the cost for age-matched non-OA patients. Most of this cost differential is attributable to inpatient hospital costs, which accounted for 61 percent of the difference (MacLean 1998).

OA is also a significant driver of indirect medical costs, including work absenteeism, lost productivity, disability, and other nonmedical costs such as trans-

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portation, custodial care, and child care. A comparison of randomly selected, community-based population samples shows that the total indirect and nonmedical costs attributable to OA were approximately \$726 per person per year, in comparison with \$335 for nonosteoarthritic patients (Gabriel 1997).

### LOW-BACK PAIN

LBP is an extremely common condition in the United States (Figure 2). Approximately half of all U.S. adults report having some type of back pain in a given year, and two thirds of adults have back pain at some time in their lives. For most individuals, back pain quickly improves. Nevertheless, approximately 15 percent of the U.S. population report having frequent LBP or pain that lasted for at least 2 weeks during the previous year (Lawrence 1998).

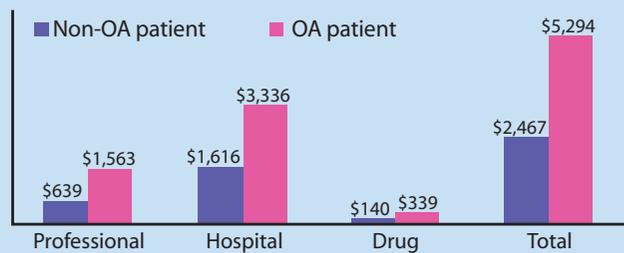
Direct health care costs associated with LBP are significant (Figure 3). In 1994, total direct costs from LBP were estimated to be \$33 billion. Approximately one-third of these expenses were hospital charges, and 29 percent were charged by physicians and other providers (Lee 1994).

Researchers estimate that indirect costs attributable to LBP are 2 to 4 times higher than direct costs (Frymoyer 1997). Back pain, the majority of which is LBP, accounts for one-third of all lost days from work (Lee 1994). Back pain is also the most common reason for filing a workers' compensation claim, accounting for one-fourth of all workers' compensation claims and one-third of all workers' compensation costs (Guo 1999).

### Treatment standards

Most disease management and quality improvement interventions are based on nationally accepted practice guidelines. Despite the significant economic and societal costs of persistent nonmalignant pain, there are few widely accepted evidence-based guidelines (Joint Consensus Statement 2003). A paradigm shift in pain-management strategies gained increased attention in 1996, as a result of the consensus statement issued by the American Academy of Pain Medicine and the American Pain Society — "The Use of Opioids for the Treatment of Chronic Pain" (Joint Consensus Statement 2003). This publication highlighted the widespread sub-optimal management of persistent pain and

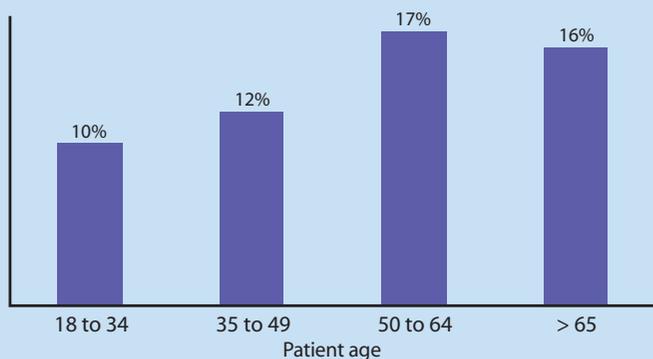
**FIGURE 1**  
Costs per person per year for OA and non-OA (1993 dollars)



OA=osteoarthritis.

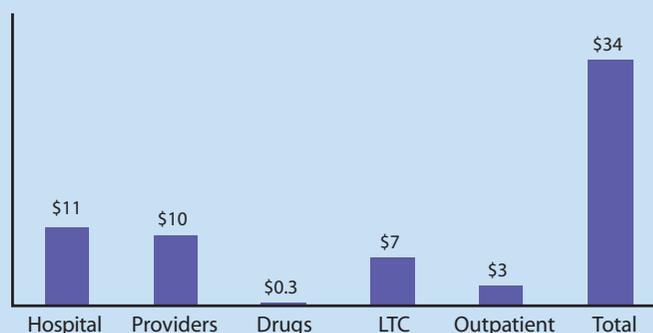
SOURCE: MACLEAN 1998

**FIGURE 2**  
Back pain prevalence (>2 weeks' duration)



SOURCE: LAWRENCE 1998

**FIGURE 3**  
Low-back pain: direct costs (1994 dollars, in billions)



LTC=long-term care.

SOURCE: FRYMAYER 1997

refuted several commonly held assumptions that contribute to undertreatment. It emphasized the difference between tolerance and addiction and cautioned about the exaggerated concerns regarding side effects related to opioids. Although practitioners and regulatory bodies recognize the importance of opioids in cancer pain and palliative end-of-life care, the role of opioids in treating persistent nonmalignant pain still is not widely recognized.

More recent practice guidelines, most of which address certain pain-related diagnoses or selected patient populations, incorporate the new paradigm reflecting the appropriate role of opioids in the treatment of persistent pain. Even though these guidelines address different causes, the standards of care for pain assessment and treatment are very similar.

In Table 1, guidelines from three leading organizations (the American Pain Society, the American College of Rheumatology, and the American Geriatrics Society) are compared with regard to key elements in pain assessment, nonpharmacologic therapy, and pharmacologic therapy. In general, pain assessment must take into consideration multiple factors, including the patient's social support system, attitudes and perceptions regarding pain (which are affected by the cultural environment), and psychological state. Nonpharmacologic therapy recommendations from the three organizations are also similar, with consideration given to exercise, assistive devices, orthotics, weight reduction (when appropriate), and adjunctive therapies (e.g., heat and cold applications, physical and occupational therapy).

Recommendations for pharmacotherapy also have considerable overlap. Acetaminophen is generally recommended as a first-line agent for mild pain. The three guidelines tend to recommend cyclooxygenase-2 (COX-2) inhibitory selective nonsteroidal anti-inflammatory drugs (NSAIDs) rather than nonselective NSAIDs because of their safety profile. Nonselective agents may be appropriate, however, if a risk assessment has been performed with regard to potential adverse gastrointestinal effects.

Each of the guidelines recognizes the appropriate role of opioids. Tramadol, a noncontrolled synthetic opioid agonist, is a reasonable choice, particularly for intermittent breakthrough pain. More potent opioids, including sustained-release or long-acting agents, are appropriate for moderate to severe pain when other therapies have not provided adequate relief. Side effects should be anticipated and can generally be managed.

### **Barriers to effective pain management**

Studies have identified a number of factors that

contribute to the ineffective management of persistent pain. Suboptimal training of health care providers, misperceptions regarding the risks and benefits of opioid use, and lack of a standard assessment tool have been singled out as factors that may lead to suboptimal evaluation of a patient's pain, selection of pain medications, or medication dosing (Von Roenn 1993). In addition, fear of regulatory action has been identified as a deterrent to prescribing controlled substances (Joint Consensus Statement 2003).

Patients also may hinder the application of appropriate pain-management interventions because of exaggerated fears of addiction, tolerance, and side effects; a pessimistic belief that pain cannot be adequately controlled; and a reluctance to discuss pain with treating practitioners (Ward 1993). The third point has a variable effect: Depending on gender and ethnicity, complaints of pain may be perceived as a sign of weakness. The description and expression of pain also are affected by cultural factors that may be misinterpreted by practitioners.

Suboptimal clinical approaches to pain management result in decreased patient satisfaction, poor quality of care, and duplication of services. Many pain patients have difficulty finding physicians who can effectively address their symptoms. Approximately 50 percent of patients with persistent pain have found it necessary to change physicians, and nearly 25 percent have changed 3 or more times (American Pain Society 2003). This contributes to poor coordination of care, with duplication of services and inefficient utilization of resources. If suboptimal care continues, many patients choose to discontinue actively receiving care from a physician. Forty percent of patients with persistent pain no longer see their physicians because, they report, the physician cannot do anything for the pain, they have learned to live with the pain, or they would rather deal with the pain themselves (American Pain Society 2003). Table 2 summarizes barriers to the effective management of persistent nonmalignant pain.

### **Regulatory, legislative concerns**

There is growing concern in professional, governmental, and accreditation organizations about the suboptimal treatment of persistent pain. Actions by state legislatures, such as the Intractable Pain Treatment Act in the State of Texas (Texas Board of Medical Examiners 2003) and California's Pain Patient's Bill of Rights (Official California Legislative Information 2003), have addressed access to opioids for patients with intractable pain. The Joint Commission on the Accreditation of Healthcare Or-

**TABLE 1** Comparison of key aspects of three prominent guidelines for conditions associated with persistent pain

Focus of guidelines	American College of Rheumatology guidelines for osteoarthritis of hip and knee	American Pain Society guidelines for the management of pain in osteoarthritis, rheumatoid arthritis, and juvenile chronic arthritis	American Geriatrics Society guidelines for the management of persistent pain in older persons
<b>Pain-assessment considerations</b>	Not addressed	<ul style="list-style-type: none"> <li>• Contributing biologic factors: comorbid conditions, joint stress that is related to usual activities</li> <li>• Psychological factors: pain-coping strategies, perception of self-efficacy, attitude of helplessness</li> <li>• Social factors: level of social support</li> </ul>	<ul style="list-style-type: none"> <li>• Descriptive history to include pain-related physical and social impairments, attitudes and beliefs regarding pain, analgesic history, effectiveness of prior treatment</li> <li>• Quantitative assessment of pain on a standard pain scale that is sensitive to cognitive, language, and sensory impairment</li> <li>• Evaluation of social support, caregivers, work history, cultural environment, and spirituality</li> <li>• Evaluation of psychological function: mood, self-efficacy, pain-coping skills, helplessness, and pain-related fears</li> </ul>
<b>Nonpharmacologic strategies</b>	<ul style="list-style-type: none"> <li>• Self-management programs</li> <li>• Personalized social support</li> <li>• Weight loss (if overweight)</li> <li>• Joint protection and energy conservation</li> <li>• Exercise: aerobic and strengthening (especially quadriceps)</li> <li>• Physical therapy for range of motion, occupational therapy</li> <li>• Assistive devices for ambulation and activities of daily living</li> <li>• Appropriate footwear                             <ul style="list-style-type: none"> <li>◦ Lateral-wedged insoles (for genu varum)</li> <li>◦ Patellar taping</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Patient education and self-management programs                             <ul style="list-style-type: none"> <li>◦ Joint conservation</li> <li>◦ Exercise</li> <li>◦ Relaxation</li> <li>◦ Nutrition</li> <li>◦ Methods of heat/cold application</li> </ul> </li> <li>• Cognitive-behavioral therapy to enhance self-efficacy and pain coping</li> <li>• Weight reduction (if over ideal body weight)</li> <li>• Orthotics                             <ul style="list-style-type: none"> <li>◦ Wedged insoles to realign weight-bearing load</li> <li>◦ Assistive and adaptive aids</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Physical-activity program</li> <li>• Self-help strategies such as relaxation</li> <li>• Cognitive-behavioral strategies</li> <li>• Adjunctive therapies such as heat/cold applications, massage</li> </ul>
<b>Pharmacologic strategies for analgesia</b>	<ul style="list-style-type: none"> <li>• APAP may be appropriate for mild to moderate joint pain</li> <li>• COX-2 inhibitors are appropriate for patients if APAP fails</li> <li>• Nonselective NSAIDs may be considered as an alternative after a risk assessment for upper-gastrointestinal adverse events</li> <li>• Intra-articular hyaluronan may be indicated for patients not responding to nonpharmacologic interventions and simple analgesics</li> <li>• Intra-articular glucocorticoids are of value for acute knee pain, particularly in the setting of local inflammation</li> <li>• Tramadol may be used as an adjunctive therapy in patients whose pain is uncontrolled with NSAIDs</li> <li>• More potent opioid therapy may be considered for patients who continue to have severe pain that fails to respond to other pharmacologic therapies</li> </ul>	<p><i>For Osteoarthritis</i></p> <ul style="list-style-type: none"> <li>• APAP is first choice for mild pain</li> <li>• For moderate to severe pain or inflammation, COX-2 selective inhibitory agents are preferred but should be used with caution in patients at risk for hypertension or edema</li> <li>• If patient is intolerant of or unresponsive to COX-2 inhibitory selective NSAIDs, nonselective NSAIDs can be considered after a risk analysis for gastrointestinal complications</li> <li>• Intra-articular glucocorticoids may be used for pain flares limited to one or several joints</li> <li>• Intra-articular hyaluronan acid supplements may be considered for patients unresponsive to or intolerant of APAP and to nonselective and selective COX-2 inhibitory NSAIDs</li> <li>• Tramadol (with or without APAP) can be used when NSAIDs alone produce suboptimal relief</li> <li>• Other opioids are appropriate when pain adversely affecting quality of life continues despite the use of other medications and nonpharmacologic interventions</li> </ul>	<ul style="list-style-type: none"> <li>• APAP is first drug to consider</li> <li>• COX-2 inhibitory agents or nonacetylated salicylates are preferred over traditional NSAIDs for long-term therapy</li> <li>• Opioids may be used to help relieve moderate to severe pain                             <ul style="list-style-type: none"> <li>◦ Opioids can be prescribed for episodic pain on an as-needed basis</li> <li>◦ Long-acting or sustained-release opioid analgesic preparations should be used for continuous pain</li> <li>◦ Side effects, including constipation, nausea, and mild sedation, can usually be managed</li> </ul> </li> </ul>

APAP=acetaminophen; COX-2=cyclooxygenase-2; NSAIDs=nonsteroidal anti-inflammatory drugs.

**TABLE 2** Barriers to effective pain management

Patient barriers	Physician/practitioner barriers
<ul style="list-style-type: none"> <li>• Stoicism: reluctance to discuss pain</li> <li>• Difficulty expressing or describing pain because of cultural barriers or cognitive deficits (e.g., dementia)</li> <li>• Fear of addiction</li> <li>• Fear of medication side effects</li> <li>• Pessimism regarding effectiveness of pain treatment</li> </ul>	<ul style="list-style-type: none"> <li>• Deficient knowledge regarding effective pain assessment</li> <li>• Bias against use of opioids for persistent pain</li> <li>• Concerns about regulations regarding controlled substances</li> <li>• Misinterpreting cultural differences in patients' descriptions and expressions of pain</li> </ul>

ganizations has mandated the inclusion of pain assessment as the “fifth vital sign.” The National Medical Association has raised concerns that pain is undertreated disproportionately in minorities (National Medical Association 2003). In 1998, the Federation of State Medical Boards issued “Model Guidelines for the Use of Controlled Substances for the Treatment of Pain” (Federation of State Medical Boards 1998). A number of state boards have updated their prescription-monitoring programs to reflect current recommendations for persistent pain management. Much of the focus, however, has been on end-of-life issues. MCOs should ensure that regulatory concerns do not prevent members with intractable pain from getting appropriate treatment, regardless of their prognosis or anticipated longevity. Through the introduction of one or more pain-management quality indicators into HEDIS, the NCQA could prompt health plans and employer groups to prioritize efforts to ensure the appropriate management of persistent pain.

**Challenges facing MCOs**

In the context of increasing interest in disease-management strategies and population health improvement, the managed care industry, in general, has not addressed persistent nonmalignant pain for a number of reasons. Challenges that MCOs face in this area include:

- Difficulty identifying members with persistent nonmalignant pain
  - Multiple diagnoses are possible
- Difficulty in risk stratification, specifically, identifying members with poorly controlled pain
- Need for evidence supporting the potential impact of interventions
  - Evidence of potentially avoidable services
  - Evidence of suboptimal outcomes
- Limited resources and lack of effective intervention tools

- Lack of standard outcome measures for persistent nonmalignant pain
- Paucity of widely accepted practice guidelines for persistent nonmalignant pain

In addition, in the area of pain management, many health care professionals in the managed care industry face the same misconceptions and biases as practitioners, including:

- Poor understanding of the differences among tolerance, physical dependence, and addiction
- Skepticism regarding the appropriateness of opioid use in the management of persistent nonmalignant pain

**Strategies: the PAIN (Patient Population Assessment to Identify Need) intervention program**

To address the challenges listed earlier, the PAIN Intervention Program has incorporated the following strategies, which are outlined in detail in the remainder of this supplement:

- Select a limited number of key diagnoses that represent a significant portion of persistent nonmalignant pain.
- Develop a scientific approach to identify individuals with poorly controlled pain by using an administrative claims database in a managed care environment, and verify that the identified patients have had high resource utilization.
- Compile a menu of interventions that MCOs could use to address the key barriers or root causes affecting outcomes in persistent nonmalignant pain.
- Develop outcome measures that can be used to measure the effectiveness of the interventions.
- Format the program in a manner that is consistent with quality-improvement interventions that are used to support an MCO’s accreditation strategy.

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# Identifying Suboptimal Management Of Persistent Pain From Integrated Claims Data: A Feasibility Study

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**A**mong professional, governmental, and accreditation organizations, there is growing concern regarding the undertreatment of persistent pain. Numerous treatment guidelines for improving pain management have been developed (American College of Rheumatology 2000, American Geriatric Society 2002, Bigos 1994, Task Force on Pain Management 1997). Furthermore, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) released comprehensive pain-assessment management accreditation standards for the inpatient setting in 2001 (Adamski 2001, Curtiss 2001, JCAHO 2001). These standards have provided a new incentive for all who deliver health care — including managed care organizations (MCOs) — to reexamine their pain-management strategies. Because employers are affected by both direct and indirect costs related to persistent pain, there is also speculation that the National Committee for Quality Assurance may introduce one or more Health Plan Employer Data and Information Set (HEDIS) measures reflecting the appropriate management of chronic pain.

Options for managing disease in MCOs include medical review, provider and patient education, and disease management. A prerequisite for successful application of these strategies, however, is the ability to identify providers and patients who would benefit the most from interventions. Consequently, a method of identifying providers and patients who

would benefit from MCO-directed programs to improve the management of persistent, nonmalignant pain is needed.

We studied two conditions associated with persistent nonmalignant pain: osteoarthritis (OA) and chronic low-back pain (LBP). Recent estimates indicate that 33 percent of adults in the United States (approximately 70 million adults) have some form of arthritis or chronic joint symptoms (U.S. Centers for Disease Control and Prevention 2002). Moreover, the direct cost of arthritis was estimated to be as high as \$42.6 billion in 2000 (Dunlop 2003). Because age is the greatest risk factor for osteoarthritis, the cost to society is expected to increase with the continued growth of the older population in the United States (Elders 2000).

Estimates of lifetime prevalence of persistent LBP range from 8 to 37 percent of the United States population (Andersson 1999; Borenstein 1997), and direct LBP treatment costs were estimated at \$33.6 billion in 1995 (Frymoyer 1997). Because persistent pain can be associated with fatigue, sleep disturbances, mood disorders, and even compromised immune function, it has a substantial impact on quality of life and on indirect costs related to lost productivity (Chapman 1999). LBP accounts for approximately a third of lost workdays and a third of workers' compensation payments; total indirect costs related to lost workdays were estimated at \$14 billion in 1995 (Guo 1999).

In this article, we describe how an expert panel developed Patient Population Assessment to Identify Need (PAIN) indicators of a high probability of undertreated pain that were then overlaid on medical claims data to identify patients who were probably in need of improved pain management.

## Methods

Expert clinical opinions were used to develop patient-care PAIN indicators for patient who were

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probably in need of more appropriate management of persistent pain. Medical claims data were then used to estimate the number of patients in each indicator.

### Indicator development

PAIN indicators consistent with patient behavior and medical treatment patterns observed in patients with suboptimal pain control were developed by a panel of four physicians specializing in anesthesiology, neurology, rheumatology, and pain medicine. The panel identified patterns of care that were suggestive of suboptimal pain management (e.g., duplication of diagnostic imaging procedures, a high volume of office visits for OA or LBP, visits to multiple physicians, and the use of potentially avoidable services such as pain-related emergency-room visits and nonsurgical inpatient admissions). Pain-medication progression, multiple trials of opioids or nonsteroidal anti-inflammatory drugs (NSAIDs), use of multiple adjuvant pain medications, and consistently early renewal of prescriptions were identified as prescription or refill patterns suggesting that a patient's pain may not have been sufficiently controlled.

The panel limited PAIN indicators to patients with a diagnosis of OA and LBP because of the high prevalence of these conditions and the availability of several treatment guidelines for these conditions. Both conditions are also major drivers of direct and indirect costs related to chronic nonmalignant pain. PAIN indicators for cancer patients were excluded because pain management for cancer is varied and complex. Similarly, migraine and chronic headache management involves clinical strategies distinctly different from those for other conditions associated with nonmalignant pain.

Each panelist assigned an overall rating to each indicator that reflected (1) its ability to identify patients receiving suboptimal pain management, (2)

the administrative feasibility of intervening with patients identified by the indicator, and (3) the expected medical and economic benefits from a successful intervention. The ratings were on a scale of 1 to 3, with 1 being the most favorable score.

### Application of the PAIN indicators to the database

The numbers of patients matching the criteria for each indicator and the distribution of patients across PAIN indicators were estimated with data from Constella Health Strategies' (formerly Protocare Sciences) managed care database. These data consist of private health care claims and enrollment data representing health care services provided through HMO, PPO, and specialty products to approximately 3 million medical members annually. The plans cover a wide geographic distribution (members reside in more than 20 states), are marketed to employers and other commercial groups, and cover a large percentage of fully insured Medicare-eligible individuals.

From these data, we selected a cross-sectional sample of patients who were at least 18 years old and who filed at least one facility or professional service claim with a diagnosis of OA or LBP (Cherkin 1992) in 1998 (Table 1); the first of these claims was designated the "index date." Patients were further required (1) to have been eligible for medical and pharmacy benefits in the 180-day period on or after their index date; (2) to not have filed inpatient, outpatient facility, or professional claims indicating pregnancy in the 180-day period after the index date (to allow a consistent follow-up period for all patients participating in the study) (International Classification of Diseases, Ninth Edition, Clinical Revision [ICD-9-CM] codes 630.xx to 677.xx, V22.xx, and V23.xx); and (3) to not have filed inpatient, outpatient facility, or professional claims indicating the presence of selected cancers in the 181-day period

**TABLE 1 International Classification of Disease, Revision 9 (ICD-9-CM)**

*Codes for osteoarthritis and low-back pain used to identify patients in the claims database*

Diagnosis	ICD-9-CM code						
OA	715xx						
LBP	307.89	721.3	721.42	721.5-.9x	722.1x-.2	722.30	722.32
	722.52	722.6	722.70	722.73	722.80	722.83	722.90
	722.93	724.00	724.02	724.09	724.2-.6	724.8	724.9
	737.10-.19	737.2x	737.3	737.30	738.4	738.5	793.3
	793.4	756.10-.19	805.4	805.6	805.8	846.x	847.2
	847.3	847.9					

LBP=low-back pain; OA=osteoarthritis.

**TABLE 2 Patient Population Assessment to Identify Need (PAIN) indicators of patients who may benefit from improved persistent-pain management and panelists' importance rating\*†**

**Based on medication utilization**

*Opioid use:*

1. Concomitant opioid use: patients who filled two or more opioid prescriptions for the same ingredient that overlapped by at least 7 days and were written by two or more physicians. Panelists' rating = 1.5.
2. Uncoordinated opioid use: patients who filled three or more opioid prescriptions of any ingredient written by at least two physicians in any 3-month period. Panelists' rating = 1.3.
3. Multiple opioid trials: patients who filled four or more opioid prescriptions in any 3-month period. Panelists' rating = 1.8.
4. Early opioid refills: patients who filled opioid prescriptions when 25 percent or more of an existing prescription should have remained available. Panelists' rating = 1.8.
5. Opioid progression: patients who received progressively stronger opioid prescriptions in any 3-month period. Panelists' rating = 2.0.
6. Excessive postsurgical opioid use: patients who received opioid prescriptions 8 to 16 weeks after spinal fusion or spinal reexploration procedures. Panelists' rating = 1.8.
7. Excessive nonopioid dose: patients who received high doses of nonopioid ingredients (e.g., acetaminophen, aspirin) contained in combination with opioid products. Panelists' rating = 2.3.
8. Concomitant-agonist and mixed agonist-antagonist use: patients who were simultaneously prescribed pure agonists and mixed opioid agonist-antagonist agents. Panelists' rating = 1.5.
9. Concomitant long-acting opioid use: patients who were simultaneously prescribed two or more long-acting opioid medications. Panelists' rating = 2.0.

*NSAID/COX-2 inhibitor use:*

10. Concomitant NSAID/COX-2 inhibitor use: patients who filled two or more NSAID/COX-2 inhibitor prescriptions for the same ingredient that overlapped by at least 7 days and were written by two or more physicians. Panelists' rating = 2.0.
11. Uncoordinated NSAID/COX-2 inhibitor use: patients who filled three or more NSAID/COX-2 inhibitor prescriptions of any ingredient written by at least two physicians in any 3-month period. Panelists' rating = 1.8.
12. Multiple NSAID/COX-2 inhibitor trials: patients who filled three or more different NSAID/COX-2 inhibitor prescriptions within any 4-month period. Panelists' rating = 2.0.
13. Early NSAID/COX-2 inhibitor refills: patients who filled NSAID/COX-2 inhibitor prescriptions when 25 percent or more of an existing prescription should have remained available. Panelists' rating = 2.5.
14. Gastrointestinal complications: patients who used NSAIDs/COX-2 inhibitors and required hospitalization or surgery or an upper-gastrointestinal endoscopy in any setting. Panelists' rating = 2.5.

*Miscellaneous use:*

15. Excessive muscle relaxant use: patients who filled two or more muscle relaxant prescriptions within any 60-day period. Panelists' rating = 2.0.
16. Excessive pain-related injections: patients who had four or more pain-related injections (e.g., facet, epidural steroids, nerve blocks, intra-articular injections) in any 4-month period. Panelists' rating = 1.9.
17. Concurrent adjuvant therapies: patients who received three or more adjuvant therapy prescriptions (e.g., tricyclic antidepressants, selective serotonin reuptake inhibitor antidepressants, corticosteroids, muscle relaxants) within any 90-day period. Panelists' rating = 1.8.
18. Undermedication: patients who received no opioid, NSAID, or COX-2 medications and were not admitted to an inpatient facility but whose charges were in the top 10 percent of those for outpatient services. Panelists' rating = 2.3.

**Based on medical service utilization**

19. Visits with multiple specialists: patients who visited two or more pain medicine specialists, orthopedists, rheumatologists, anesthesiologists, neurosurgeons, or neurologists in any 3-month period. Panelists' rating = 1.5.
20. Visits with multiple primary care providers: patients who visited three or more primary care providers (e.g., family medicine, internal medicine, obstetrics and gynecology, chiropractic, osteopathy, nurse practitioner) in any 3-month period. Panelists' rating = 1.5.
21. Excessive OA-/LBP-related office visits: patients who had four or more office visits with an OA or LBP diagnosis, or chiropractic or osteopathic manipulation encounters, or specified pain-relief procedures within a 3-month period. Panelists' rating = 1.8.
22. OA-/LBP-related inpatient admissions: patients who were admitted to an inpatient facility for whom the principal diagnosis was for LBP or OA (excluding joint replacement surgery and back or disk surgery). Panelists' rating = 1.5.
23. Pain-related emergency room visits: patients who had an emergency-room visit in which the diagnosis was for LBP or OA. Panelists' rating = 1.8.
24. Repeated OA-/LBP-related surgical procedures: patients who had any repeated surgical procedures related to OA or LBP (i.e., spinal fusion or spinal reexploration). Panelists' rating = 1.0.
25. Repeated diagnostic testing: patients who received two or more of the same type of diagnostic test (defined as imaging tests, electromyograms, and nerve conduction studies) on different days. Panelists' rating = 1.8.
26. Complicating comorbid conditions: patients who had conditions that could complicate pain management or could present a challenge to the physician prescribing pain medications (e.g., substance use disorders, alcohol use disorders, mental disorders). Panelists' rating = 1.8.

\* 1.0 = highest possible rating.

† Score provided by four expert panelists.

COX-2=cyclooxygenase-2; NSAID=nonsteroidal anti-inflammatory drugs; LBP=low-back pain; OA=osteoarthritis.

after the index date (ICD-9-CM codes 140.xx to 172.xx and 174.xx to 208.xx). Finally, LBP patients were required to have had at least two claims that were at least 90 days apart to ensure that patients with chronic LBP were selected.

Patients who were described by each indicator were identified in the claims data by a translation of each indicator's written description into Statistical Analysis System (SAS) version 8.0 programming code. The numbers of patients and their characteristics were then tabulated.

## Results

The panel identified 26 PAIN indicators identifying patients who were probably in need of improved management (Table 2); 18 were based on patterns of medication use, and eight were based on the use of health care services. Of the 18 medication-based PAIN indicators, eight address opioid use; five address the use of NSAIDs, including cyclooxygenase-2 (COX-2) inhibitors; four address the use of muscle relaxants, injections, adjuvant therapies, and undermedication; and one addresses the use of high-dose nonopioid medications. The eight service-based PAIN indicators address excessive visits to providers, potentially avoidable inpatient admissions or emergency-room visits, repeated OA- or LBP-related surgical procedures or tests, and co-existing conditions that complicated the pain management.

The PAIN indicators also reflect specific behavior patterns that the panel considered to indicate suboptimal pain management. PAIN indicators for concomitant or uncoordinated use of medications (opioids, NSAIDs, or COX-2 inhibitors), visits with multiple specialists, and visits with multiple primary care providers were intended to address "doctor-shopping" behavior related to patients' dissatisfaction with their treatment. PAIN indicators reflecting situations suggestive of pain that was difficult to manage included (1) multiple trials of opioids, NSAIDs, or COX-2 inhibitors; (2) early refills of NSAID or COX-2 inhibitor prescriptions; (3) concomitant use of opioids and NSAIDs or COX-2 inhibitors or both; (4) opioid progression (i.e., receiving progressively stronger opioid prescriptions in any 3-month period); (5) the extended use of post-operative opioids; (6) exces-

sive use of muscle relaxants or pain-related injections; and (7) concurrent adjuvant therapies. Potential medication safety issues were recognized by the panel through PAIN indicators for concomitant agonist use and the use of mixed agonist-antagonist opioids, the use of concomitant long-acting opioids, the use of high-dose nonopioid medications (e.g., acetaminophen or aspirin), and gastrointestinal complications related to NSAIDs or COX-2 inhibitory agents.

PAIN indicators representing potentially suboptimal pain management included the high use of ambulatory or medical and diagnostic services (e.g., excessive OA- or LBP-related office visits, repeated OA- or LBP-related surgical procedures, and repeated diagnostic testing procedures). Potentially avoidable use of services (e.g., pain-related, non-surgical inpatient admissions and emergency-room visits) was also considered indicative of suboptimal patient care. Finally, patients with comorbid conditions, such as alcohol or drug abuse or mental disorders, were identified by the panel as high-risk patients who had a poor prognosis or who could be difficult to treat.

The numbers and characteristics of OA and LBP patients meeting the selection criteria are given in Table 3, along with the estimated prevalence of patients with each diagnosis in the database. We identified 1,151,094 candidate patients who were at least 18 years old, who were continuously eligible for medical and pharmacy benefits in 1998, and who filed no claims indicating pregnancy or the presence of a selected cancer in 1998. Of these, 72,902 (6.3 percent) had either OA or LBP.

The number of patients identified by at least one indicator was 31,489: 43.2 percent of all OA or LBP patients and 2.74 percent of all candidate patients

**TABLE 3** Demographic characteristics of patients with osteoarthritis, low-back pain, or both

*Patients identified from the claims database*

Characteristic	OA only	LBP only	OA and LBP	All patients
Number (%)	53,749 (74)	16,096 (22)	3,057 (4)	72,902 (100)
% Women	65	58	67	63
Mean age, years	67	53	65	64
Median age, years	69	51	67	67
Prevalence, %*	4.7	1.4	0.3	6.3

\* Based on a population of 1,151,094 candidate patients who were ≥18 years old, who were continuously eligible for medical and pharmacy benefits in 1998, and who filed no claims indicating pregnancy or the presence of a selected cancer in 1998.

LBP=low-back pain; OA=osteoarthritis.

(Table 4). The most prevalent PAIN indicators were visits with multiple specialists (0.79 percent of candidate patients), complicating comorbid conditions (0.65 percent of candidate patients), excessive OA- or LBP-related office visits (0.60 percent of candidate patients), multiple opioid trials (0.58 percent of candidate patients), and uncoordinated opioid use (0.53 percent of candidate patients). Fewer than 0.05 percent of candidate patients were identified by PAIN indicators for the use of concomitant agonists and mixed agonist-antagonists, the use of concomitant long-acting opioids, opioid progression, the excessive use of postsurgical opioids, and the use of concomitant opioids.

## Discussion

This study demonstrated the feasibility of (1) using expert clinical opinions to define PAIN indicators representing patients who might benefit from improved pain management and (2) using these PAIN indicators to identify patients from medical claims data. These findings are important, because MCOs and other organizations that are interested in implementing programs to improve pain management need a mechanism to identify patients most likely to benefit from such programs. Risk stratification of a target population with highly prevalent conditions, such as OA or LBP, is essential for population-based quality improvement or disease management initiatives.

From an implementation perspective, PAIN indicators with high qualitative scores, relatively high prevalence, and high costs should have the most utility in an intervention program. These PAIN indicators are concurrent adjuvant therapies, excessive OA- or LBP-related office visits, excessive pain-related injections, multiple opioid trials, OA- or LBP-related inpatient admissions, repeated diagnostic testing, uncoordinated opioid use, visits with multiple pri-

mary care providers, and visits with multiple specialists.

Some PAIN indicators would not be as suitable for use in an intervention program. Low-prevalence

**TABLE 4** Number and percentage of patients identified by each indicator

Indicator	No. of patients identified	% of OA/LBP patients	% of all patients in database*
Any indicator	31,489	43.2	2.74
<b>Based on medication utilization</b>			
<i>Opioid use</i>			
Concomitant opioid use	391	0.5	0.03
Uncoordinated opioid use	6,151	8.4	0.53
Multiple opioid trials	6,683	9.2	0.58
Early opioid refills	631	0.9	0.05
Opioid progression	85	0.1	0.01
Excessive postsurgical opioid use	147	0.2	0.01
Concomitant agonist use; mixed agonist-antagonist use	5	0.0	0.00
Concomitant long-acting opioid use	34	0.0	0.00
<i>NSAID/COX-2 inhibitor use</i>			
Concomitant NSAID/COX-2 inhibitor use	1,265	1.7	0.11
Uncoordinated NSAID/COX-2 inhibitor use	2,424	3.3	0.21
Multiple NSAID/COX-2 inhibitor trials	531	0.7	0.05
Early NSAID/COX-2 inhibitor refills	1,570	2.2	0.14
Gastrointestinal complications	1,005	1.4	0.09
<i>Miscellaneous use</i>			
Excessive muscle relaxant use	3,814	5.2	0.33
Excessive nonopioid dose	831	1.1	0.07
Excessive pain-related injections	965	1.3	0.08
Concurrent adjuvant therapies	2,468	3.4	0.21
Undermedication	3,691	5.1	0.32
<b>Based on medical service utilization</b>			
Visits with multiple specialists	9,144	12.5	0.79
Visits with multiple primary care providers	866	1.2	0.08
Excessive OA-/LBP-related office visits	6,932	9.5	0.60
OA-/LBP-related inpatient admissions	1,061	1.5	0.09
Pain-related emergency-room visits	2,606	3.6	0.23
Repeated OA-/LBP-related surgeries	532	0.7	0.05
Repeated diagnostic testing	3,347	4.6	0.29
Complicating comorbid conditions	7,508	10.3	0.65

\* Based on a population of 1,151,094 candidate patients who were ≥18 years old, were continuously eligible for medical and pharmacy benefits in 1998, and filed no claims indicating pregnancy or the presence of a selected cancer in 1998.

COX-2=cyclooxygenase-2; LBP=low-back pain; NSAIDs=nonsteroidal anti-inflammatory drugs; OA=osteoarthritis.

PAIN indicators (e.g., the use of concomitant agonists and mixed agonist-antagonists or concomitant long-acting opioids) would characterize such a small number of patients that the costs of intervening would, in all likelihood, outweigh any benefits. Low-rated PAIN indicators (e.g., early NSAID or COX-2 inhibitor prescription refills or gastrointestinal complications) have less face validity than highly rated PAIN indicators, which would hinder their acceptance by health care organizations and clinicians. Finally, low-charge PAIN indicators (e.g., undermedication or concomitant agonist use and mixed agonist-antagonist use) offer less of an opportunity for MCOs to affect costs vis-à-vis PAIN indicators that represent a significant expense.

### Limitations

The PAIN indicators described in this article, although comprehensive, should not be considered definitive. First, they have not been validated by formally assessing the quality of pain management received by individual patients targeted by each indicator. Second, replication of our methods could result in the development of a somewhat different set of PAIN indicators because of differences in the training, experience, and judgments of the expert panel. Finally, it has not yet been established whether interventions directed toward these patients would have a measurable effect on pain.

There are two logical extensions of our study. First, a subset of the PAIN indicators could be selected for use in a pain-management intervention program to test their feasibility and utility. Second, the validity of these PAIN indicators could be examined by using patient interviews, chart reviews, and physician interviews to determine whether patients identified by the PAIN indicators were, in fact, receiving suboptimal pain management.

### Conclusion

The research reported here is a rational process for identifying patients with persistent pain who might benefit from improved pain management. MCOs, employers, and other groups interested in responding to calls for improved pain management from professional and governmental organizations (through guidelines) and accrediting bodies (through quality standards) can combine these PAIN indicators with intervention programs to improve quality of care and reduce unnecessary health care costs. Because they are independent of each other, health plans may also choose to customize their inter-

vention programs by using all or only some of the indicators we developed.

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# Health Care Costs Associated With Suboptimal Management of Persistent Pain

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**M**anaged care organizations (MCOs) have several strategies for managing disease and disability among their members, including medical reviews, provider and patient education, and disease management. A prerequisite of successful application of these strategies, however, is the ability to identify providers and patients who would benefit the most from them.

In a previous study, we created 26 Patient Population Assessment to Identify Need (PAIN) indicators by using integrated medical claims data to identify patients with osteoarthritis (OA) or chronic low-back pain (LBP) whose pain management might have been suboptimal (see article beginning on page 8). When applied to a database of approximately 3 million MCO members, these PAIN indicators identified close to 31,500 patients (2.7 percent of the total eligible population) at risk for suboptimal pain management. In the current study, the next phase of the investigation, we estimated the costs incurred by patients identified by these PAIN indicators. Cost data provide important information about the relative fiscal importance of each indicator to MCOs that are interested in improving quality of care and managing costs.

## Methods

The processes of creating the PAIN indicators and applying them to the database are described in our previous article (page 8). In brief, a panel of four physicians specializing in anesthesiology, neurology, rheumatology, and pain medicine developed 26 PAIN indicators, based on patterns of medication and

health-service use that were consistent with suboptimal pain control. The panel limited PAIN indicators to patients with a diagnosis of OA and LBP because of their high prevalence and the availability of several treatment guidelines for these conditions. Both conditions are also major drivers of direct and indirect costs related to persistent nonmalignant pain.

The same data that were used to develop these 26 PAIN indicators were used to estimate their costs. These data were taken from Constella Health Strategies' managed care database, which consists of private health care claims and enrollment data representing health care services provided through HMO, PPO, and specialty products to approximately 3 million medical members annually. The plans cover a wide geographic distribution, with members residing in more than 20 states; are marketed to employers and other commercial groups; and cover a large percentage of fully insured Medicare-eligible individuals.

From these data, we selected a cross-sectional sample of patients who were at least 18 years old and who filed at least one facility or professional service claim with a diagnosis of OA or LBP in 1998; the first of these claims was designated the "index date." Patients were further required (1) to have been eligible for medical and pharmacy benefits in the 180-day period on or after their index date; (2) to not have filed inpatient, outpatient facility, or professional claims indicating pregnancy in the 180-day period after the index date (required to allow a consistent follow-up period for all patients participating in the study) (International Classification of Diseases, Ninth Edition, Clinical Revision [ICD-9-CM], codes 630.xx to 677.xx, V22.xx, and V23.xx); and (3) to not have filed inpatient, outpatient facility, or professional claims indicating the presence of selected cancers in the 180-day period after the index date (ICD-9-CM codes 140.xx to 172.xx and 174.xx to 208.xx). Finally, LBP patients were required to have had at least two claims that were at least 90 days apart, so as to ensure that patients with chronic LBP were selected.

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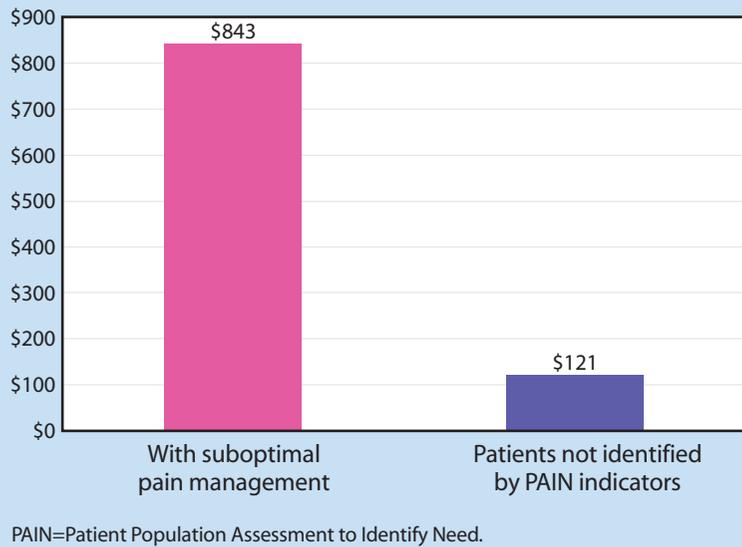
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We estimated total, medical, and pharmacy charges from these data for patients identified by each indicator by summing all their charges for the pain-related services they received. Pain-related services were identified separately for medical (professional and facility) and pharmacy claims as follows:

- **Professional claims.** We identified a list of pain-related services derived from the American Medical Association's Current Procedural Terminology code 4 (CPT-4) and ICD-9-CM procedure coding schemes (available on request) and summed all charges for these services that were incurred in the 180-day period on or after the date of the first OA or LBP diagnosis in 1998.
- **Facility claims.** We identified all facility claims incurred in the 180-day period on or after the date of the first OA or LBP diagnosis in 1998 that either had a diagnosis of OA or LBP listed or included a pain-related service (as defined previously).
  - For facility claims with a first-listed diagnosis for OA or LBP, we summed all charges for that claim. For facility claims with a diagnosis of OA or LBP in any other position, we apportioned charges on the basis of the number of diagnostic conditions listed. Diagnostic conditions are logical groupings of similar ICD-9-CM diagnosis codes to enable aggregation of all ICD-9-CM diagnoses into one of approximately 200 conditions. For example, if a claim included four conditions (OA and LBP were collapsed into one condition for this purpose) and one of those conditions was for OA or LBP, then we summed only one-fourth of the charges on that claim.
  - For facility claims with no OA or LBP diagnoses, we summed all charges for all pain-related services that were incurred in the 180-day period on or after the date of the first OA or LBP diagnosis in 1998.
  - For facility claims with both an OA or LBP diagnosis and one or more pain-related services, we used the larger of the sums of pain-related service charges or the attributed portion of the total facility charge.
- **Pharmacy claims.** We summed charges for all

**FIGURE 1 Total per-member per-month costs for patients with osteoarthritis or low-back pain**

*Identified/not identified with suboptimal pain management*



primary pain medication claims — for example, opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), and cyclooxygenase-2 (COX-2) inhibitors — incurred in the 180-day period on or after the first OA or LBP diagnosis in 1998.

We used Constella Health Strategies' proprietary fee schedule to determine unit costs for all pain-related services, and we reported costs on a per-patient, per-month (PPPM) basis. Billed charges were used as a proxy for cost, because no reliable cost data were available.

## Results

Total PPPM costs for patients with OA or LBP and who were identified by at least one indicator as having suboptimal pain management had pain-attributable costs that were nearly seven times higher (\$843 versus \$121) than those patients with OA or LBP who were not identified with suboptimal pain management (Figure 1). Medical costs (facility and professional) for OA or LBP patients who had at least one indicator for suboptimal pain management were \$829 PPPM but only \$116 PPPM for OA or LBP patients who were not identified as having suboptimal pain management (Table 1). Finally, PPPM pharmacy costs for OA or LBP patients who were identified as having suboptimal pain management (\$14) were 3.5 times as high as pharmacy costs among OA or LBP patients who were not identified

as having suboptimal pain management (\$4).

Costs for each of the 26 indicators of suboptimal pain management are reported in Table 1. With the exception of one algorithm (concomitant agonist use; mixed agonist–antagonist use), costs were driven almost exclusively by utilization of medical rather than pharmacy services.

As would be expected, the two PAIN indicators that addressed surgical procedures had the highest PPPM charges, because the surgical costs were included in the calculations. After these PAIN indicators, the PAIN indicators with the highest mean PPPM charges were inpatient admissions (\$3,022), repeated diagnostic testing (\$2,504), and opioid progression (i.e., patients who received progressively stronger opioid prescriptions in any 3-month period) (\$2,192). In contrast, the least expensive PAIN indicators were undermedication (\$260), concomitant agonist use and mixed agonist–antagonist use (\$346), and early NSAID or COX-2 inhibitor refills (\$488).

## Discussion

This study provided cost estimates for 26 PAIN indicators that identified patients who had suboptimal pain management. PAIN indicators associated with high costs are more likely to be attractive intervention targets for MCOs, because they have the greatest cost savings potential. In contrast, low-cost PAIN indicators may be unattractive to MCOs, because the potential cost savings from intervention are smaller. Patient-targeting PAIN indicators accompanied by interventions designed to change the behavior of targeted providers and patients are likely to lead to increased quality of care, increased pa-

tient satisfaction, and decreased cost of care. Because these PAIN indicators are modular, they can accommodate various payer models and allow for client-specific customization.

Two limitations to the study are noteworthy. First,

**TABLE 1** Charges associated with 26 PAIN indicators

*Indicators are designed to identify patients with osteoarthritis or low-back pain who may be receiving suboptimal pain management (n=31,489)*

Indicator	Total	Medical	Pharmacy
Any indicator	\$843	\$829	\$14
No indicator	\$121	\$116	\$4
<b>Based on medication utilization</b>			
<i>Opioid use</i>			
Concomitant opioid use	\$1,598	\$1,529	\$69
Uncoordinated opioid use	\$1,464	\$1,433	\$30
Multiple opioid trials	\$1,317	\$1,282	\$35
Early opioid refills	\$1,657	\$1,551	\$106
Opioid progression	\$2,192	\$2,020	\$172
Excessive postsurgical opioid use	\$7,688	\$7,652	\$36
Concomitant agonist use or mixed agonist–antagonist use	\$346	\$144	\$203
Concomitant long-acting opioid use	\$1,721	\$1,491	\$230
<i>NSAID/COX-2 inhibitor use</i>			
Concomitant NSAID/COX-2 inhibitor use	\$608	\$581	\$27
Uncoordinated NSAID/COX-2 inhibitor use	\$615	\$586	\$29
Multiple NSAID/COX-2 inhibitor trials	\$569	\$540	\$28
Early NSAID/COX-2 inhibitor refills	\$488	\$463	\$25
Gastrointestinal complications	\$554	\$530	\$24
<i>Miscellaneous use</i>			
Excessive muscle relaxant use	\$885	\$859	\$26
Excessive nonopioid dose	\$1,601	\$1,541	\$60
Excessive pain-related injections	\$1,651	\$1,632	\$19
Concurrent adjuvant therapies	\$1,057	\$1,027	\$30
Undermedication	\$260	\$260	\$0
<b>Based on medical service utilization</b>			
Visits with multiple specialists	\$1,765	\$1,750	\$14
Visits with multiple primary care providers	\$1,646	\$1,630	\$16
Excessive OA-/LBP-related office visits	\$1,188	\$1,172	\$16
OA-/LBP-related inpatient admissions	\$3,022	\$3,006	\$16
Pain-related emergency-room visits	\$877	\$861	\$16
Repeated OA-/LBP-related surgical procedures	\$7,013	\$6,993	\$20
Repeated diagnostic testing	\$2,504	\$2,490	\$15
Complicating comorbid conditions	\$574	\$561	\$13

COX-2=cyclooxygenase-2; NSAID=nonsteroidal anti-inflammatory drug; PAIN=Patient Population Assessment to Identify Need; OA=osteoarthritis; LBP=low-back pain.

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cost estimates reported here may be overstated, because they represent billed rather than actual costs incurred. Second, the study makes no statement about the potential cost savings that might be realized through an intervention program to reduce costs. Nevertheless, as in other disease states, interventions have proved effective with patients who incur high costs. Additional analyses designed to estimate the potential cost savings associated with each algorithm would be a logical and useful extension of the study.

## **Conclusion**

Health care costs for patients identified with sub-optimal persistent pain management can be measured from medical claims data, vary considerably between PAIN indicators, and are often substantial. MCOs may use this information to prioritize their pain management intervention initiatives. The approach is relatively simple and economical to implement and has the potential to improve patient care and to reduce costs.

# Applying the PAIN Indicators in a Managed Care Setting To Improve Pain Management

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**P**atient-targeting tools can facilitate patient and provider behavior changes and thus affect overall quality of care. The Patient Population Assessment to Identify Need (PAIN) indicators to which the previous articles referred provide a powerful platform for many health plan-sponsored initiatives. The initiatives outlined here can bring value to health plans by improving management of persistent nonmalignant pain and can provide important outcome measurements for overall quality programs and for accreditation-related quality initiatives.

## The challenge

Numerous challenges arise in attempting to manage persistent nonmalignant pain in a health plan. A significant challenge has been the lack of a simple but accurate way to identify patients with persistent nonmalignant pain. Patients with poorly controlled pain are often “hidden” in the system and may not be routinely identified through other risk-stratification programs used by health plans.

## The opportunity

According to the results of the feasibility study outlined in the previous articles, there is an opportunity to use integrated claims data to identify patients whose persistent nonmalignant pain is suboptimally controlled. Identifying these patients is the initial step in improving their overall pain management. The patients identified are likely to be those who use resources extensively; as a result, there is value both in identifying the patients and in implementing various intervention initiatives directed toward these patients and their providers. The PAIN indicators provide health plans with an evidence-based process to identify patients with

osteoarthritis (OA) or persistent low-back pain (LBP) whose pain is suboptimally controlled.

## Leveraging the PAIN indicators

The PAIN indicators were developed to provide health plans with a tool that had broad utility and value. The initial step of applying the PAIN indicators to a health plan’s integrated claims data provides a baseline assessment of how effectively pain is controlled in patients with OA and persistent LBP. Determining the total number of patients identified by the PAIN indicators within a health plan and comparing that number to the benchmark statistics identified in the feasibility study assist the plan in prioritizing this initiative relative to other key initiatives.

Patients identified by the PAIN indicators are a subset of the overall target population that includes adults with claims evidence of OA or persistent LBP. More detailed data analysis of the group identified by the PAIN indicators may increase understanding of the cost drivers in the patient subset identified by multiple indicators and the subset participating in other health plan intervention programs. There is also value in analyzing the physician prescribers to determine whether a customized intervention is needed for a provider subset with a significant number of patients identified by the PAIN indicators.

Once the target or the high-risk patients have been identified, the health plan can implement various intervention initiatives on behalf of these patients and their providers as well as on behalf of a larger, nontargeted audience. These initiatives can include:

- Pain-management member education
- Pain-management provider education
- Pain-management quality improvement
- Pain-management case management (standing alone or integrated into an existing program)
- Management of disease-related pain

An overview of the potential initiatives follows.

## PAIN MANAGEMENT MEMBER-EDUCATION INITIATIVE

Member interventions may include both targeted and nontargeted interventions. If a health plan is implementing a stand-alone pain-management member-education program, nontargeted interventions

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can include general health education about persistent pain and may be incorporated into existing member communications (newsletters or Web site content). Such articles should address the factors that contribute to poorly controlled pain management, including:

- Ineffective communication with practitioners about pain symptoms and their effect on quality of life (leading to inadequate pain assessment)
- Exaggerated fear of addiction to opioids and fear of medication side effects
- Pessimism regarding the effectiveness of pain management

As part of a pain-management member initiative, educational mailings can be directed to the high-risk group. Such targeted interventions should contain practical information to help patients with both describing their symptoms and documenting their treatment response more effectively. Content may include:

- Pain-assessment scales and tools to assist in characterization and localization of pain
- Pain diaries to identify factors that aggravate or alleviate symptoms and to track treatment response
- General information regarding appropriate usage of analgesic medications and expectations about pain control
- Practical suggestions to improve care coordination, including:
  - Informing practitioners about prior evaluation and treatment and obtaining copies of relevant diagnostic test results before an appointment
  - Informing physicians of all medications currently or recently taken, including over-the-counter medicines and medications prescribed by other practitioners
- Mailings or other targeted communications that may also include other patient resources for persistent pain, such as additional educational material and patient support services

#### **PAIN-MANAGEMENT PROVIDER-EDUCATION INITIATIVE**

Provider interventions also include both targeted and nontargeted communications. A provider newsletter article can be used to announce the health plan's focus on improving pain management and to provide general information about the management of persistent nonmalignant pain. Content may focus on the following items:

- The importance of effective pain management as articulated by numerous professional organ-

izations, accreditation organizations, and regulatory bodies

- The link between effective pain management and patient satisfaction
- Coordination-of-care issues related to persistent nonmalignant pain
- The importance of an initial pain assessment and a complete medication history
- References or links to additional resources for professions to improve the management of persistent pain

Managers of the health plan also may consider adopting and implementing a practice guideline as a component of provider intervention. The following guidelines should be considered in that process:

- American Pain Society. Guideline for the management of pain in osteoarthritis, rheumatoid arthritis and juvenile chronic arthritis. 2002. Available at: «[www.ampainsoc.org/pub/arthritis.htm](http://www.ampainsoc.org/pub/arthritis.htm)»
- American Geriatrics Society Panel on Persistent Pain in Older Persons. The management of persistent pain in older persons: Clinical practice guidelines. *J Am Geriatr Soc.* 2002;50(suppl 6): 205–224
- American College of Rheumatology Subcommittee on Osteoarthritis Guidelines. Recommendations for the medical management of osteoarthritis of the hip and knee. *Arthritis Rheum.* 2000;43:1905–1915. Available at «[www.rheumatology.org/research/guidelines/oamgmt/oa-mgmt.html](http://www.rheumatology.org/research/guidelines/oamgmt/oa-mgmt.html)»

As a targeted intervention, practitioners can be sent a list of their patients who, according to data analysis, have evidence of poorly controlled pain. In addition, general information should be included to highlight the following barriers to the effective management of persistent nonmalignant pain:

- Inadequate pain assessment
- Incomplete medication history
- Concern regarding use of opioids in persistent nonmalignant pain

Additional educational tools can be included for practitioners with a significant number of patients who have been identified by the PAIN indicators. These tools can include resources to promote more effective pain management, such as:

- Pain-assessment tools to localize and characterize symptoms
- Screening tools to identify comorbid clinical depression and substance abuse
- Documents promoting informed consent about chronic opioid therapy and educational material describing measures to avoid or manage potential side effects

- Educational tools for an individualized exercise program

In addition, the health plan's medical management team may choose to visit selected providers who have large populations identified by the PAIN indicators to discuss strategies for enhancing communication with patients about pain management. Resources can be delivered personally and can be made available to the office staff involved in screening patients and identifying chief complaints before the practitioners' assessment and examination.

#### **PAIN-MANAGEMENT QUALITY-IMPROVEMENT INITIATIVE**

The PAIN indicators translate well into a stand-alone quality-improvement initiative for pain management. The member and provider interventions outlined previously can be used as components of the quality-improvement initiative. The key is to establish the measurement associated with the quality-improvement initiative. For a stand-alone quality-improvement intervention, primary outcome measures are reported with the target population as the denominator. Measurement would generally be repeated 12 months after baseline data collection. Outcome measures (for baseline and repeated measurement) are described as follows:

##### **Quantifiable outcome measure 1:**

- **Numerator:** Members meeting any of the service-focused PAIN indicator criteria
- **Denominator:** Members in the target population (adults with OA or persistent LBP)

##### **Quantifiable outcome measure 2:**

- **Numerator:** Members meeting any of the medication-focused PAIN indicator criteria
- **Denominator:** Members in the target population (adults with OA or persistent LBP)

As a result of the interventions, there should be a decrease in the proportion of patients in the target population who meet the PAIN indicator criteria.

Health plan managers may specifically evaluate members in the high-risk group at baseline who are continuously enrolled, to identify the proportion of high-risk members who continue to meet PAIN indicator criteria at the time of later measurement:

##### **Quantifiable outcome measure 3:**

- **Numerator:** Continuously enrolled members who meet one or more of the service- or medication-focused PAIN indicator criteria at baseline and at repeat measurement
- **Denominator:** Continuously enrolled members who meet one or more of the service- or

medication-focused PAIN indicator criteria at baseline

The latter outcome can be compared with a historical-control situation (e.g., the 6 months before the baseline measurement). The health plan could also use an alternative-control situation, such as a similar market in the same national health plan (if the outcome is unaffected by the interventions).

Utilization patterns may provide additional outcome measures:

##### **Quantifiable outcome measure 4:**

- **Numerator:** Number of emergency-room visits by patients with a primary diagnosis of OA or LBP during the 6 to 12 months after program implementation
- **Denominator:** Total number of members (or member months) in the target population (adults with OA or persistent LBP)

Results of this measure would also need to be compared to a control situation (e.g., the 6- to 12-month period before the program implementation). To assess the effectiveness of the interventions, the health plan managers also may perform an additional analysis to determine prescription patterns in the high-risk group after implementation (e.g., therapeutic substitutions made and/or adjunctive pain medications added).

##### **Quantifiable outcome measure 5:**

- **Numerator:** Number of members within the target population who received services from at least one practitioner in a pain-related specialty (e.g., rheumatology, anesthesiology, neurology, orthopedic surgery, or a pain-management program)
- **Denominator:** Total number of members in the target population (adults with OA or persistent LBP)

Results of this measure also would need to be compared with a control situation (e.g., the 6- to 12-month period before program implementation).

The health plan also has the option to collect additional outcomes data to assess the effectiveness of the interventions in improving outcomes:

**Patient-reported outcomes:** Data can be collected to document the level of pain and its effect on activities before and after interventions. These data could be collected from a sample of the high-risk population by means of a variety of assessment tools, including a vali-

dated pain scale, an assessment of physical functioning, and general health-related quality-of-life instruments.

**Prescribing patterns:** Prescribing patterns for high-volume physicians can be analyzed to identify changes in prescribing for high-risk patients before and after the interventions. Such analyses may document changes in the use of analgesics and adjunctive medications used for the treatment of chronic or persistent pain.

The pain-management quality-improvement initiative can be applied to the health plan's accreditation activities, with the PAIN indicators serving as the foundation. A quality-improvement intervention based on the PAIN indicators may be used as a clinical improvement initiative, unrelated to the Health Plan Employer Data and Information Set (HEDIS), that can be applied to National Committee for Quality Assurance (NCQA) standard QI 11 (Intervention and Follow-up for Clinical Issues; 2003 NCQA MCO Standards). Because of its inclusion of material specifically addressing continuity of care, it also can be used as supporting documentation for standard QI 9 (Continuity and Coordination of Medical Care). As with other accreditation activities, program implementation should be reviewed by the health plan's quality-improvement committee (or its equivalent). In the event that the PAIN indicators are incorporated into a full disease management program, the potential exists for independent providers to have the full program accredited through NCQA. As pain management increasingly becomes an area of focus for accreditation organizations, the PAIN indicators may function as a practical approach to support those initiatives.

#### **PAIN-MANAGEMENT CASE-MANAGEMENT INITIATIVES (STANDING ALONE OR INTEGRATED INTO AN EXISTING PROGRAM)**

If the health plan is incorporating this initiative into an existing care management program for patients with complex care needs, further risk stratification may be used to identify a subset of patients within the high-risk group, the "high-intervention group." These patients can be identified through their prior resource utilization or as those who meet the criteria of multiple or selected PAIN indicators that are associated with the highest health care costs. Alternatively, the health plan may use other tools for risk stratification or predictive modeling to identify the high-intervention group. Interventions in this group would be consistent with the procedures used by the health plan for other members with

complex care needs. In most cases, they would include direct member contact for identification of barriers to effective treatment, including nonadherence, poor coordination of care, and knowledge gaps with regard to the recommended treatment plan. For interventions incorporated into existing care-management programs, the health plan should already have outcome measures defined for tracking the effectiveness of the broader program.

#### **PAIN DISEASE MANAGEMENT PROGRAM**

The interventions described comprise the first steps toward a more coordinated approach to pain management. As the PAIN indicators and respective intervention initiatives are implemented and measured to determine effect, added refinements can transform the program into a more comprehensive disease management intervention for persistent pain.

#### **Coordination of health plan communications**

As with any coordinated member- or provider-education, quality-improvement, or any disease management intervention, it is essential to keep the organization informed about the program. Member services and network management-provider relations should be notified in advance of the program's implementation. One or more key contacts should be identified to address specific questions that may arise. As a courtesy, the health plan may also give advance notification to key employer groups and key providers (independent practice associations or group practices). Provider communications should generally precede member communications.

#### **Summary**

The PAIN indicators create an excellent platform for identifying appropriate patients for whom pain management should be improved within a health plan. The PAIN indicators can be applied efficiently to standard health plan integrated claims data from which a health plan can implement a flexible, phased approach to improving pain management. The program also can be expanded beyond OA and persistent LBP to affect a broader high-risk group with evidence of poorly controlled pain.

Pain management has traditionally been an area that has been difficult to target; therefore, pain-specific quality-management initiatives have not been implemented in most health plans. The PAIN indicators can serve as a valuable health plan tool that can be readily implemented and will allow a health plan to advance its overall quality of care in the important area of pain management.