

Pain Primer for Primary Physicians: Essential Concepts



Larry C. Driver, MD
Professor, Anesthesiology and Pain Medicine,
The University of Texas M.D. Anderson Cancer Center, Houston

Diane M. Novy, PhD
Professor, Anesthesiology and Pain Medicine,
The University of Texas M.D. Anderson Cancer Center, Houston

Brian M. Bruel, MD
Assistant Professor, PM&R and Interventional Pain Management,
The University of Texas Southwestern Medical Center, Dallas



Physician Oncology Education Program
Physicians Caring for Texans



Expiration Date: July 1, 2011

Table of Contents:

Target Audience.....	2
Accreditation.....	2
Learning Objectives.....	2
Introduction.....	3
Psychological Approaches for Managing Chronic Pain.....	5
Physical Therapeutics for the Treatment of Pain.....	7
<hr/>	
Table 1: Barriers to Pain Management.....	9
Table 2: Comprehensive Assessment of Pain.....	10
Table 3: Commonly Prescribed Nonopioid Analgesics.....	11
Table 4: Oral Analgesics.....	12
Table 5: Adjuvant “Coanalgesics”.....	13
Table 6: Potential Issues for Risk Management in Pain Care.....	14
Table 7: Useful Internet Resources.....	14
Self Assessment Questions.....	15
Evaluation.....	16

Target Audience

“Pain Primer for Primary Physicians: Essential Concepts” is designed for primary care physicians and physician assistants.

Accreditation

The Texas Medical Association is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Hour Designation

The Texas Medical Association designates this educational activity for a maximum of 1.5 *AMA PRA Category 1 Credits*[™]. Physicians should only claim credit commensurate with the extent of their participation in the activity.

TMA has designated “Pain Primer for Primary Physicians: Essential Concepts” for 1.5 hours of education in medical ethics and/or professional responsibility.

Learning Objectives

Upon completion of the activity, the physician should be able to do the following:

1. Define the major clinical types of pain,
2. Outline a systematic approach to pain assessment and evaluating outcomes,
3. List and discuss several categories of medications useful for pain management,
4. Describe the models of therapy used by psychologists for chronic pain,
5. Summarize various physical and procedural interventions for managing pain, and
6. Define potential adverse outcome issues of which clinicians should be aware.

Author Disclosures of Commercial Affiliations

Policies and standards of the American Medical Association and the Accreditation Council for Continuing Medical Education require that authors of continuing medical education articles disclose any relevant financial interest, relationships, or affiliations they may have with commercial entities whose products, devices, or services may be discussed in their articles. They also must disclose discussion of investigational or unlabeled uses of a product. Brian M. Bruel, MD, disclosed the following relevant relationships:

Honoraria for Speaking:
Elan Pharmaceuticals

Alpharma Pharmaceuticals

The remaining planners and authors of this module have advised the Texas Medical Association that they have nothing to disclose.

Date of Original Release

July 1, 2008

Expiration Date

July 1, 2011

Introduction

Pain is a great equalizer — causing distress and suffering among those in its grip. The impact of pain and its management is affected by underlying pathophysiology and comorbidities, and is subject to differences in age, gender, ethnicity, and socioeconomic status, among other intangible factors.

Because pain is an individual, complex, subjective experience with multidimensional perceptions and variable expressions, the management of pain requires rigorous multidisciplinary assessment, reasoned differential diagnoses, and rational polytherapy. This article provides an overview of key concepts and processes for defining and assessing pain, and outlines useful information, principles, and approaches for managing pain using multiple treatment strategies.

What Is Pain?

Random House Webster's Dictionary defines pain as “bodily, mental or emotional suffering, as due to injury or illness.” The International Association for the Study of Pain defines pain as a “sensory and emotional experience associated with tissue damage or described in terms of such damage.”¹ For practical clinical purposes, pain is “whatever the patient defines it to be.”²

Acute pain is usually a self-limited issue due to specific illness, inflammation, injury, or surgery. It is of short duration, typically resolving as healing progresses. It may be accompanied by vital sign changes such as tachypnea, tachycardia, hypertension, or diaphoresis. The patient may display obvious signs of discomfort. Acute pain may serve a physical warning or protective role that alerts one to injury, and may mitigate further injury or insult. Assertive management of acute pain may thwart the development of a chronic pain syndrome.³

Chronic pain is a persistent problem that may be constant or intermittent, lasting long after healing has occurred and an illness, injury, or wound has resolved.⁴ It may last for months or years, rarely abating on its own. It may be associated with cancer or chronic nonmalignant illness such as arthritis, spine pathology, headaches, or neuropathy; or, it may become its own source of distress with no obvious underlying cause. It serves no protective function and is not accompanied by vital sign changes, and the sufferer may show no obvious signs of distress. However, it may be accompanied by social withdrawal and isolation, chronic fatigue, dysomnia, anxiety and depression, and impaired cognitive and physical function.

Nociceptive pain results from stimulation of afferent nociceptors, and may

be somatic (skin, soft tissue, muscle, or bone) or visceral (cardiac, pulmonary, gastrointestinal, urinary tract). Nociceptive pain usually arises from tissue damage from injury or surgery or perhaps encroachment by tumor. It typically is described as aching or throbbing somatic pain, or gnawing, squeezing, or cramping visceral pain. Management usually involves nonopioid or opioid analgesics.⁵

Neuropathic pain arises from invasion or injury to peripheral or central neural tissue, and may persist long after an initial problem resolves.¹ It may involve a single peripheral nerve as a mononeuropathy, or multiple nerves as a polyneuropathy. Sympathetic nervous system dysfunction may underlie pain and concomitant distal trophic changes. Neuropathic pain is described as burning, stinging, tingling, shooting, electrical pain, or numbness. It may follow the anatomic distribution of the involved nerves. Management may require combinations of various analgesics, including opioids and especially adjuvant medications.

Cancer pain often has intermingled nociceptive and neuropathic aspects.⁶ It usually is due to direct effects of tumor, but may be a long-lasting aftereffect of treatment such as neuropathy after chemotherapy, radiation treatment, or surgery. Cancer patients often suffer from collateral pain that is unrelated to their malignancy, and patients will have a varying mix of pains at different times. Pain may herald the onset of cancer, may wax and wane during the course of the disease and its treatment, may signal recurrence or spread of disease, and may worsen with progression of disease. Cancer survivors may have chronic pain as a lingering and bothersome reminder of their experience.

Total pain is what the patient actually perceives and expresses, and is a

1 Part III: Pain Terms, A Current List with Definitions and Notes on Usage (pp 209-14). Classification of Chronic Pain, Second Edition, IASP Task force on Taxonomy, edited by H. Merskey and N. Bogduk, IASP Press, Seattle, © 1994.

2 McCaffery M. Nursing management of the patient in pain. Philadelphia, PA: JB Lippincott, 1972.

3 Federation of State Medical Boards of United States, Model Guidelines for the Use of Controlled Substances for the Treatment of Pain, Euless, Texas. 1998.

4 Shipton EA, Tait B (2005). Flagging the pain: preventing the burden of chronic pain by identifying and treating risk factors in acute pain. *European Journal of Anaesthesiology* 22 (6): 405-12.

5 Merskey, H. (1994) Logic, truth and language in concepts of pain. *Quality of Life Research: an International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*. 3 Suppl 1: S69-76.

6 Caraceni A, Portenoy RK. An international survey of cancer pain characteristics and syndromes. IASP Task Force on Cancer Pain. *International Association for the Study of Pain. Pain*. 1999 Sep, 82(3): 263-74.

complex interaction of physical pains, underlying psychosocial problems, and existential or spiritual distress.⁷ The complexity of the pain experience means that there are multiple ways to intervene that require effective teamwork.⁸

Who Has Pain?

The scope of the problem of undertreated or untreated pain is enormous. An estimated 50 million Americans (10-11 million Texans) suffer from and seek treatment for chronic pain.⁹ Almost 90 percent of Americans report pain at least once a month, with 83 million adults reporting that pain affects their participation in some activities. About 22 percent report persistent pain, and 26 percent of nursing home residents report having pain daily. Sadly, 4.5 million patients die with uncontrolled pain annually. Back pain affects more than 54 million Americans, arthritis pain affects more than 43 million, at least 40 million have chronic headaches, 25 million have potentially painful osteoporosis, and more than 2 million have fibromyalgia. About 75 percent of adults state that they have pain often or at least sometimes.¹⁰

The direct and indirect financial costs of pain are staggering. At least \$100 billion related to health care expenses or due to lost income and decreased productivity impacts our annual national economy. More than 50 million workdays are lost yearly due to untreated or undertreated pain. This certainly contributes to diminished quality of life for individuals and society.¹¹

Despite these daunting numbers, 40 percent of patients do not get adequate pain relief. One reason for this disparity is the lack of educated and trained pain specialists. There are more than 20,000 patients for every pain specialist, highlighting the need for primary care and other practitioner involvement in pain care.¹²

Why Treat Pain?

Relief of pain is important for several compelling reasons. Health care practitioners have moral and ethical obligations as prescribed in the Hippocratic Oath and other codes of professional

conduct. Controlling pain mitigates the physical and other consequences mentioned above in the descriptions of acute and chronic pain, and improves independence and functionality. Individual and societal well-being and productivity are influenced by pain and its management with accompanying direct and indirect economic impacts. Institutional guidelines and standards set by the Joint Commission on Accreditation of Health-care Organizations and other regulatory bodies must be satisfied for compliance and certification. The bottom line is that control of pain improves patient outcomes and satisfaction, and enhances quality of life for the individual, his or her family, and society in general.

Barriers to Pain Management

Patient fears and misunderstanding, clinician attitudes and knowledge deficiency, and low prioritization in the health care system all may pose barriers to adequate pain management. Table 1 (see pg. 9) summarizes several of these barriers.

Assessment of Pain

Effective management begins with systematic, multidisciplinary evaluation of the person's multidimensional experience of pain, including physical, psychological, sociocultural, spiritual, and situational factors. Initial data collection includes the pain history in the context of the overall medical history, physical examination appropriate to the problem, and indicated imaging studies.¹³ Findings are integrated to formulate a working differential diagnosis and a rational

therapeutic strategy. The patient should have regular follow-up for reassessment of treatment response and outcomes, with further therapy tailored to address those outcomes.

Because we have no means to measure and quantify pain objectively, we still rely upon the patient's self-report of pain as the standard of assessment. Pain is "whatever the patient says it is, as bad as they say it is" despite that reports may be inconsistent, influenced by a variety of factors, and in conflict with caregiver or family observations. In order to try to quantify the pain experience, we utilize a variety of pain assessment scales as tools to measure pain. It is important to use pain scales consistently to document trends and responses.¹⁴ Table 2 (see pg. 10) outlines a systematic approach to pain assessment, including measurement tools and outcomes evaluation that may prompt changes in therapeutic strategies.

Clinicians should be mindful of pain assessment in special populations that may require extra attention to subtleties of pain expression. The very young or old, minorities and non-English speakers, substance abusers, and the cognitively impaired may not be readily evaluated using standard approaches.¹⁵ Nonverbal evidence of pain includes grimacing or other facial expressions; splinting or immobilization of a painful area; purposeful, protective, or rhythmic movements; restlessness; and increased confusion.

Medical Pain Management

Pharmacotherapy is typically the initial approach to treating pain of various types and duration. Acute pain may require only a brief period of treatment

-
- 7 Banks, James W. The importance of incorporating faith and spirituality issues in the care of patients with chronic daily headache. *Current Pain and Headache Reports*. Vol. 10, No. 1/January 2006.
 - 8 Eccleston, C. Role of Psychology in Pain Management. *British Journal of Anaesthesia*, 2001, Vol. 87, No. 1 144-152.
 - 9 Hardt, J, Jacobsen C, Goldberg J, Nickel R, Buchwald, D. Prevalence of chronic pain in a representative sample in the United States. *Pain Med*. 2008 March 11 [Epub ahead of print].
 - 10 Joint Commission on Accreditation of Health Care Organizations. Design, education and change programs to maintain pain consistently. *Jt Comm Benchmark* (3):4-5, May 1999.
 - 11 Stewart WF, Ricci JA, Chee E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. *JAMA* 2003; 290:2443-54.
 - 12 Pain and Policy Studies Group, WHO Collaborating Center for Policy and Communications in Cancer Care, University of Wisconsin Comprehensive Cancer Care Center. Opioid Analgesics — Trends, Guidelines.
 - 13 *Cancer Medicine*, 6th ed. Kufe, Donald W.; Pollock, Raphael E.; Weischelbaum, Ralph R.; Bast, Robert C., Jr.; Gansler, Ted S.; Holland, James F.; Frei III, Emil, editors. Hamilton (Canada): BC Decker Inc; © 2005. Cancer Medicine, Section 21: Pain and Palliation, Strategy for Assessment and Treatment.
 - 14 *Handbook of Pain Assessment*, 2nd ed., Turk, Dennis C.; Melzack, Ronald, The Guilford Press; 2nd edition © 2001, Chapter 2, Self-report Scales and Procedures for Assessing Pain in Adults.
 - 15 Bruckenthal P. Assessment of pain in the elderly adult. *Clin Geriatr Med*. 2008, May; 24(2):213-236.

with simple, short-acting medications. Persistent pain may need extended care with combinations of long-acting and immediate-release opioids along with adjuvant medications that enhance the effect of opioids or provide relief themselves. In addition, supportive psychological strategies, physical medicine and rehabilitative approaches, and procedural interventions may be needed. More and more people are accessing complementary and alternative approaches such as acupuncture, tai chi, Qi-Gong, yoga, meditation, and massage therapy, and these treatments can be integrated into the overall plan of care.¹⁶ Complex treatment regimens are beyond the scope of this article. Suffice it to say that the primary practitioner should not hesitate to consult with appropriate specialists for assistance. Tables 3 (nonopioids), 4 (opioids), and 5 (see pg. 11-13) (adjuvants) summarize commonly used medications for treating pain. Each class of medications as well as each individual drug has its own side effect and toxicity profile with which the clinician should be familiar in order to anticipate and proactively address adverse issues. The clinician should know and educate the patient about adverse effects, precautions, and potential drug interactions.

Outcomes

Beneficial outcomes of adequate pain management include meaningful pain relief that leads to improved functionality,¹⁷ acceptable side-effect profiles, and awareness of aberrant behaviors that may signal medication misuse, or abuse or diversion of controlled substances.¹⁸ Vigilant patient follow-up and full documentation will benefit both the patient and the clinician in managing the pain

as well as complying with legal and regulatory aspects of pain care.

Adverse Issues

Several potentially problematic areas of controlled substance use warrant clear understanding. Table 6 (see pg. 14) summarizes definitions important to appropriate opioid and other controlled substance management. Various risk management as well as legal and regulatory issues must be addressed. Table 7 (see pg. 14) lists several important resources that should be useful to the diligent and vigilant clinician who wishes to acquire ongoing education and remain compliant while providing competent care.

Psychological Approaches for Managing Chronic Pain

Psychologists have had an important impact on the treatment of chronic pain. During the 1960s and 1970s, operant behavioral and cognitive behavioral therapies gained attention for pain management.^{19,20,21} It was not until the 1990s that the application of motivational interviewing and motivational enhancement therapy were recognized as important complements to operant behavioral and cognitive behavioral therapies.¹⁹ These models of treatment are guides for psychologists as they tailor therapy to individual patients.

Operant Behavioral Therapy

In 1976, Fordyce successfully applied principles of operant behavioral theory to the field of pain medicine. His focus

was on pain behaviors (operants) that are verbal (e.g., complaining) and nonverbal (e.g., limping, using a cane or brace, grimacing, rubbing, general activity level, and consumption of medications to control pain). From Fordyce's perspective, pain behaviors that may have originated in the acute phase of an injury (e.g., inactivity) may come to occur totally or in part in response to reinforcing environmental events (e.g., family members or coworkers doing certain activities for patients rather than patients learning how to do the activities appropriately). This happens when pain behaviors are rewarded or reinforced and well behaviors (e.g., activity, working) are insufficiently reinforced. The result is not only maintenance of pain behaviors but also excessive suffering and disability.^{19, 20}

A basic process of operant behavioral treatment involves identifying target pain behaviors (or the lack of well behaviors), their controlling antecedent (discriminative stimuli), and consequent reinforcers or punishments. Behaviors are identified through direct observation of patients,²² behavioral assessment questionnaires, interviews with patients and family members, and/or self-monitoring by patients. The resulting information is integrated with a full history and physical outlining patients' pathophysiology. Understanding patients' pathophysiology makes it possible to set realistic upper limits for overall physical function.

The use of systematic removal of the contingent relationship between an overt behavior and its positive or negative consequences (i.e., extinction) to reduce overt pain behaviors is one application of operant behavioral principles. For example, Nelson et al²³ demonstrated a reduction of medication-taking behavior by using time-contingent delivery while reducing the amount of medication per dose or day. Another application of operant behavior principles involves the use of positive and negative reinforcement and shaping to increase well behaviors. For example, Cairns and Pasino²⁴ demonstrated an increase in general activity and exercise by using reinforcement and setting of exercise quotas (i.e., starting at a baseline level of activity that is not associated with increased pain and then increasing by preset amounts).

16 Use of complementary alternative medicine for low back pain consulting in general practice: a cohort study. *BMC Complement Altern Med.* 2007, Dec. 18;7:42.

17 Effectiveness of physical therapy for low back pain. *Am Fam Physician.* 2008, Mar 15; 77(6):746, 748; author reply 748.

18 Chronic pain and opiates: balancing pain control and risks in long-term opioid treatment. *Arch Phys Med Rehabil.* 2008 March; 89 (3 Suppl 1): S577-82.

19 Novy, DM. Psychological approaches for managing chronic pain. *J. Psychopathology & Behavioral Assessment.* 2004;26(4):279-288.

20 Fordyce, WE. *Behavioral Methods for Chronic Pain and Illness.* Mosby, St. Louis, MO. 1976.

21 Turk, DC; Meichenbaum D, Genest M. *Pain and Behavioral Medicine: A Cognitive-behavioral Perspective.* New York: Guilford Press, 1983.

22 Sanders, SH. Operant conditioning with chronic pain: back to basics. In R.J. Gatchel & D. C. Turk, (eds). *Psychological Approaches to Pain Management: A Practitioner's Handbook.* New York: Guilford Press, pp 112-130, 1996.

23 Nelson, DV, Yoder PJ, Hare BD, et al. Patient-controlled versus staff-controlled narcotic detoxification schedule in chronic pain management [Summary]. *Pain* 1987; (Suppl. 4):S59.

24 Cairns, D; Pasino, J. Comparison of verbal reinforcement and feedback in the operant treatment of disability due to chronic low back pain. *Behavior Therapy.* 1977;8:621-630.

Cognitive Behavioral Therapy

Although cognitive behavioral therapy (CBT) recognizes the role of affective, behavioral, cognitive, and sensory-physical dimensions of chronic pain, as well as the social context in general, and the family context in particular, the role of patient beliefs about and meanings attributed to various aspects of the experience of pain is considered most important.¹⁹ The CBT approach to chronic pain is based on the idea that patients enter treatment with the belief that many of their problems are unmanageable. Treatment goals are to help patients develop the expectation that they can learn to manage their problems effectively, and then to provide them skills to respond effectively both to their current problems and to new difficulties that might arise.¹⁹

Treatment focuses on providing patients techniques to gain a sense of control over the effects of pain on daily living as well as modifying the affective, behavioral, cognitive, and sensory-physical dimensions of the experience. There is emphasis on teaching coping self-statements, problem solving, and goal setting. There also is emphasis on helping patients acquire skills such as relaxation, imagery, biofeedback, pacing, and behavioral goal setting.¹⁹ Psychologists also help patients identify high-risk situations that are likely to tax their coping resources, identify the early signs of relapse (e.g., increase in pain or depression), rehearse cognitive and behavioral skills for responding to these early relapse signs, and use self-reinforcement for effective coping with possible relapse. Patients also are helped to view setbacks as cues for which they should use their coping skills more effectively or for developing new goals and behavioral strategies.¹⁹

Although CBT has effectively addressed the suffering and disability of many patients with chronic pain, recent developments have called for an expansion of CBT that will include basic principles of psychopathology and a new model of human suffering. This expansion places greater focus on helping patients develop psychological flexibility (i.e., acceptance of their condition, capable of focusing on the present moment in a

nonjudgmental manner, allowing what is held as important to guide action, and not over-regulation by verbal/cognitive processes).²⁵

Motivational Interviewing and Motivational Enhancement Therapy

Despite the supportive evidence of operant behavioral therapy and CBT for chronic pain, there remain patients who do not improve or who improve and then relapse.¹⁹ A possible explanation is lack of sustained motivation on the part of patients. Hence, during the 1990s there was a focus on using the principles and strategies of motivational interviewing (MI) and motivational enhancement therapy (MET) as complements to operant behavioral therapy and CBT to help elicit patients' own motivation and solutions.^{26, 27}

DiClemente and Prochaska identified specific stages and challenges patients experience as they change maladaptive behaviors into adaptive behaviors.²⁸ To describe the stages of this model and the associated clinicians' stage-specified tasks, physical inactivity can be considered as an example of a possible maladaptive behavior for patients with chronic pain. In the precontemplation stage patients are not considering change from the current level of inactivity. At this stage, the clinicians' task is to increase the perception of the risks and problems associated with inactivity (e.g., weight gain, increased pain, social isolation, depression). In the next stage, contemplation, the goal is to help patients conclude that the risks of inactivity outweigh the perceived benefits. The next stage, preparation, requires clinicians to help patients determine the best course of action for becoming more active (e.g., identifying an appropriate program or physical activity, such as structured physical therapy, flexible gym program, or walking group). In the action stage, clinicians help patients to take steps toward becoming more active

in their selected activity. This stage is followed by maintenance where the task is to help patients stay motivated and committed. As patients progress through the stages, there is always the possibility of relapse. Should relapse occur, clinicians help patients review the processes of contemplation, determination, and action without becoming stuck or demoralized because of relapse.^{19, 27}

Fitting the motivational strategies to patients' stage of readiness to change is essential to MET. Clinicians probe for responses that are appropriate to patients' stage of readiness to change and that will help patients progress through the stages toward maintenance of adaptive behavior. Clinicians may assist patients in determining which behaviors seem to be most adaptive for them. This requires flexible and timely application of therapeutic strategies that are individually tailored for each patient. In the precontemplation and contemplation stages, clinicians provide therapeutic responses (e.g., eliciting self-motivational statements, listening with empathy, asking open-ended questions, presenting personal feedback, affirming the patient, and handling resistance) that will facilitate movement into the preparation and action stages. In the preparation stage, the strategies include helping the patient develop a plan for change, communicating free choice, discussing the consequences of changing vs. not changing, providing information and advice as requested, and completing a change plan worksheet (e.g., list steps to take in becoming more active). In the action stage, patients are given encouragement. In the maintenance and relapse stages, the strategies include reviewing progress, and renewing motivation and commitment as needed.^{19, 26}

The effectiveness of MI and MET for pain medicine is not as well documented as for operant behavioral therapy and CBT. Current thinking is that MI and MET are useful complements to operant behavioral therapy and CBT.²⁶ Taken together with medical and physical modalities for pain management,

25 McCracken & LM, Vowles, KE. Psychological flexibility and traditional pain management strategies in relation to patient functioning with chronic pain: an examination of a revised instrument. *Pain*. 2007;8(9):700-707.

26 Jensen, MP. Enhancing motivation to change in pain treatment. In R.J. Gatchel & D. C. Turk (eds). *Psychological Approaches to Pain Management: A Practitioner's Handbook*. New York: Guilford Press, 2002.

27 Miller, WR & Rollnick, S. *Motivational Interviewing: Preparing People for Change* (2nd ed). New York: Guilford Press, 2002.

28 DiClemente, CC & Prochaska, JO. Self-change and therapy change of smoking behavior: a comparison of process of change in cessation and maintenance. *Addictive Behaviors*, 1982;7:133-144.

the psychological therapies discussed in this article have broadened the available treatment for chronic pain.

Physical Therapeutics for the Treatment of Pain

Physical therapeutics to lessen pain symptoms includes stretch, strengthening and endurance exercise, thermal and electrical modalities, bracing, assistive devices, and patient education.²⁹ These interventions promote soft tissue healing, but more importantly, physical medicine and rehabilitation interventions aim to restore function and prevent recurrent injury. These therapeutic options are vital for a comprehensive approach in the treatment of pain.

A therapeutic exercise program for pain can be divided into muscle flexibility and strength training, and an aerobic and endurance program. Adherence to a stretching program improves flexibility within one to two months.³⁰ Stretching has been found to provide immediate relief for sore muscles after isometric contractions (Lewit, 1984). The use of the systematic stretching maneuvers by a physical therapist improves the functional gains in patients with chronic low-back pain (Khalil, 1992). Strength training improvements are observed within the first two weeks and are related to neuromuscular education and more efficient recruitment of muscles (Benzon-200). Strength training may have benefits on some fibromyalgia syndrome (FMS) symptoms (Busch, 2007). Lower neck muscle strength in all directions has been found in females with chronic neck pain, and this should be considered when planning physical rehabilitation programs (Ylinen, 2004). Aerobic fitness and endurance have been found to be effective in FMS. There is evidence that supervised aerobic exercise training has beneficial effects on physical capacity and FMS symptoms (Busch, 2007).

Physical modalities are agents used to produce therapeutic tissue responses and are most effective when applied to a specific diagnosis (Benzon-198). They are used to complement a comprehensive rehabilitation program and not as an isolated treatment. Physical modalities include heat, cold, water, sound, electricity and electromagnetic waves (Benzon-198). Comprehensive rehabilitation programs for pain will utilize physical modalities, therapeutic exercise, assistive devices, and bracing as appropriate. These programs focus on patient education and functional improvement.

Procedural Pain Management

Comprehensive pain management may include a variety of interventional techniques commonly performed by appropriately trained physicians. Many of these procedures are minimally invasive and are used to complement medication, and psychological and physical rehabilitative therapies. They can be used for both diagnostic and therapeutic purposes. These interventional procedures include the use of muscle, nerve, and joint blocks; ablative techniques; and the use of augmentative technologies.

Muscle, nerve, and joint blocks can be utilized to identify pain generators and are valuable in the diagnosis of certain pain syndromes. After a thorough clinical examination, it often is still difficult discerning the exact pain generator. By performing precise anesthetic blockade of the likely pain generating structures, an accurate diagnosis can be made. These procedures are helpful in the diagnosis of muscle- and joint-mediated pain such as, but not limited to, pain originating from the piriformis muscle or sacroiliac joint. Blockade of the stellate and lumbar sympathetic ganglia are helpful in the diagnosis of complex regional pain syndrome and is an

example of diagnostic blockade of neural structures. Differential neural blockade is an extremely useful diagnostic tool and is effective in delineating the neural mechanisms subserving puzzling pain problems.³¹

Epidural steroid injections often are used to control and diagnose pain of neurogenic spinal origin and have been used for more than 40 years.³⁰ Although controversy remains with regard to the efficacy of epidural steroid injections, these procedures are commonly utilized, often in conjunction with other treatment modalities. The rationale for injecting steroids is to suppress inflammation in the nerve and adjacent soft tissues that are thought to be the cause of radicular pain.³² A variety of approaches are described for performing epidural steroid injections; large, randomized, placebo and active treatment-controlled trials assessing the efficacy are lacking.

Provocative discography is another example of a common diagnostic pain procedure. A precision injection of contrast dye into the disc nucleus and the mechanical stimulus from fluid distention stress replicates the noxious stimulus responsible for the patient's symptoms³³ Provocation of the patient's clinical symptoms confirms that the targeted disc is the source of pain.

Diagnostic anesthetic blocks and provocation discography often can help identify anatomic etiologies for pain. Therapeutic procedures that are performed to control pain from spinal and nonspinal structures can be divided into ablative and augmentative. Ablation of neural structures and tissues using radiofrequency, cryoneurolysis, lasers, and chemical neurolysis are modalities utilized for the treatment of cancer-related and nonmalignant pain, and pain of spinal origin. Radiofrequency ablation techniques are commonly used to treat facet joint-mediated pain. This ablative treatment can produce significant pain reduction of 50 percent or more lasting at least three months³² for facet-mediated pain. A recent large, prospective clinical audit indicated that proper patient selection and anatomically correct radiofrequency denervation of the lumbar zygapo-

29 Schramm-Bloodworth DM. Physical therapy in the pain clinic setting. In: Abram SE, Haddox D. *The Pain Clinic Manual*. Philadelphia, Lippincott Williams and Wilkins, 2000, pp. 85-102.

30 Benzon HT. Epidural steroid injections for low back pain and lumbosacral radiculopathy. *Pain* 1986; 24:277.

31 Waldman SR, Winnie AP (Eds). *Interventional Pain Management*. Saunders, 1996.

32 J. Rathmell, Benzon H. *Regional Anesthesia and Pain Medicine*. 29(5): 397-99.

33 O'Neill C, Derby R, Kenderes L. Precision injection techniques for diagnosis and treatment of lumbar disc disease. *Sem Spine Surg*. 1999 1993;11:104-118.

physial joints provide long-term pain relief lasting from six to 24 months.³⁴

Intractable cancer and benign pain refractory to short-term conventional nerve blocks and pharmacologic therapy can be treated with chemical neurolysis. Neurolytic agents commonly used include 6-10 percent phenol in glycerin or ethyl alcohol greater than 95 percent concentration. Neurolytic celiac plexus blocks have been most commonly performed for pancreatic cancer, and 90 percent of patients have partial to complete pain relief for greater than 12 weeks (Eisenberg, 1995). The most devastating complication of this commonly performed destructive procedure is paraplegia. The actual incidence of this procedure is unknown, but appears to be less than 1:1,000.³²

Augmentation procedures have focused on neural or bony tissues and have an important role in the treatment of pain. Vertebral augmentation procedures include vertebroplasty and kyphoplasty. Pain reduction and stabilization are of primary importance with osteoporotic and malignant vertebral compression fractures. Conservative treatment consists of rest or activity modification, analgesics, and bracing.³⁵ Percutaneous vertebroplasty is a minimally invasive procedure in which polymethylmethacrylate (PMMA) is injected through a needle placed in a collapsed vertebral body to stabilize the fracture. Most experts believe that pain relief is achieved through mechanical support and stability provided by the bone cement. The semisolid mixture of PMMA has been shown to restore strength and stiffness in vertebral bodies in postmortem studies.³⁶

Percutaneous kyphoplasty utilizes a balloon tamponade to create a cavity within the collapsed vertebra and restore vertebral height. Once a cavity is created, PMMA is then injected to strengthen and stabilize the vertebral body. Both vertebroplasty and kyphoplasty reduce the amount of pain in the immediate postoperative period by approximately 50 percent.³⁵ Pain relief rates in excess of 90 percent have been reported with both vertebroplasty and kyphoplasty, and procedural complication rates are in the 1-2-percent range in patients with vertebral compression fractures.³⁷

Spinal cord stimulation (SCS) is an example of a neuroaugmentation procedure that applies direct electrical stimulation to the dorsal columns and has proven effective, particularly in the treatment of chronic radicular pain.³² Several proposed mechanisms for the efficacy of this modality for painful syndromes remain under investigation; however, the scope of conditions where it is being used is expanding. SCS has been used to treat painful peripheral vascular disease, and it has been found that limb salvage rates are increased compared with medical management only.^{38,39} Reduction of pain in failed back surgery syndrome patients treated with SCS result in diminished analgesic use; increased physical activity; and in some, return to meaningful employment.⁴⁰ SCS has been shown to be highly effective in the treatment of complex regional pain syndrome (CRPS) type I. There is a significant, long-term reduction in pain, improvement in quality of life, and restoration of function in affected extremities.⁴¹ SCS also has been used successfully for painful peripheral neuropathic pain secondary to chemotherapy.^{42, 43}

Pain from a malignant etiology often requires high-dose opioid medications and optimization of adjuvant therapy. Neuraxial delivery of analgesic agents is another procedural option for the treatment of intractable pain. Spinal opioid delivery has been used in clinical practice routinely since the late 1970s for postsurgical, obstetric, and cancer-

related pain. Over the last 10 years, this modality has been utilized increasingly for chronic nonmalignant pain.⁴⁴

Continuous delivery of analgesic agents can be performed using percutaneous epidural or intrathecal catheters, but the risk of infection from external delivery systems limits them from chronic use. Implantable technology allows for long-term drug delivery to the intrathecal space. A permanent intrathecal catheter and subcutaneous programmable pump are implanted to deliver medications at a fixed or variable rate or constant flow. The pump reservoir can be accessed and refilled periodically using a percutaneous approach. Intrathecal drug delivery systems can be highly effective in cases of refractory pain, diminished performance status, poor tolerability of oral medications, polyanalgesia for complex pain, and inadequate dosing due to addiction concerns.⁴⁵ Opioid medications such as morphine, hydromorphone and fentanyl are commonly used for intrathecal delivery. Other intrathecal agents include marcaine and clonidine that can be used in combination with opioids. Ziconotide is a nonopioid N-type calcium channel antagonist and is the most recently introduced therapeutic agent for intrathecal administration. As the options for intrathecal analgesic agents improve with continued research and clinical experience, procedural pain management will play a more important role in facilitating analgesia when all other modalities have failed.

34 Gofeld M, Jitendra J, Faclier G. Radiofrequency denervation of the lumbar zygapophysial joints: 10-year prospective clinical audit. *Pain Physician*. 2007 Mar;10(2):291-300.

35 Gill JB, Kuper M, Chin PC, Zhang Y, Schutt R, Jr. Comparing pain reduction following kyphoplasty and vertebroplasty for osteoporotic vertebral compression fractures. *Pain Physician*. 2007 Jul; 10(4):583-90.

36 Tomeh AG, Mathis JM, Fenton DC, Levine AM, Belkoff SM. Biomechanical efficacy of unipedicular versus bipedicular vertebroplasty for the management of osteoporotic compression fractures. *Spine* 1999; 24:1772-6.

37 Haccin-Bey L, Baisden JL, Lemke DM, Wong SJ, Ulmer JL, Cusick JF. Treating osteoporotic and neoplastic vertebral compression fractures with vertebroplasty and kyphoplasty. *J Palliat Med*. 2005 Oct; 8(5):898-9.

38 Huber SJ, Vaglienti RM, et al. Spinal Cord Stimulation in severe inoperable peripheral vascular disease. *Neuromodulation* 2000; 3:131-143.

39 Claeys, IG. Spinal cord stimulation in the treatment of critical limb ischemia: review of clinical experience. *Neuromodulation* 2000; 3:59-74.

40 Wetzel FT, Hassenbush S, Oakley JC, et al. Treatment of chronic pain in failed back surgery patients with spinal cord stimulation: a review of current literature and proposal for future investigation. *Neuromodulation* 2000; 3:59-74

41 Stanton-Hicks M. Complex regional pain syndrome: Manifestations and the role of neurostimulation in its management. *J Pain Symptom Management*. 2006 Apr; 31(4 Suppl):S20-4.

42 Bruel BM, Burton AW, et al. Dorsal column stimulation for severe chemotherapy induced peripheral neuropathy. NANS 2006 abstract presentation.

43 Cata JP, Cordella BS, Burton AW, Hassenbusch SJ, Weng HR, Dougherty PM. Spinal cord stimulation relieves chemotherapy-induced pain: a clinical case report. *Journal of Pain and Symptom Management*. 2004; 27:72-78.

44 Du Pen S, Du Pen, A, Hillyer, J. Intrathecal Hydromorphone for Intractable Nonmalignant Pain: A Retrospective Study. *Pain Medicine* 2006;7 (1):10-15. doi:10.1111/j.1526-4637.2006.00083.x.

45 Stearns L, Boortz-Marx R, DuPen S, Friehs G, Gordon M, Halyard M, Herbst L, Kiser J. Intrathecal drug delivery for the management of cancer pain: a multidisciplinary consensus of best clinical practices. *J Support Oncol*. 2005 Nov-Dec;3(6):399-408.

Conclusion

This article is aimed at the “front-line” practitioner who frequently encounters patients with new or persistent pain problems. The objectives include providing an overview of key concepts to initiate treatment of acute pain while resolution of the offending injury occurs, to facilitate transition to long-term care of chronic pain, and to understand collateral issues surrounding pain treatment. The overarching goal is to provide needed pain management at the primary level so that patients do not suffer or have a transient problem evolve into an intractable challenge that consumes inordinate time and resources and adversely impacts patient and clinician quality of life. Despite being competent at managing common pain scenarios, the skilled clinician also should have a network of specialists for consultation and referral. This holds true to the ideal concept of multidisciplinary pain management, which yields the best outcomes for patients.

Table 1 Barriers to Pain Management

Patient –

- * Concern about being a “good” patient and not misusing the doctor’s time
- * Concern about complicating treatment
- * Fear of new medications
- * Fear of addiction
- * Concern about “saving” the effectiveness of opioid medications
- * Concern about the meaning of new symptoms

Clinician –

- * Inadequate education about pain management
- * Inadequate assessment, dosage titration, coanalgesics
- * Inadequate side-effect management
- * Inadequate follow-up

System –

- * Lack of practitioner education
- * Low priority of pain management (low expectations, limited resources)
- * Lack of positive rewards for good pain management and negative sanctions for poor management





Table 2 Comprehensive Assessment of Pain

1. History

- Pain history
 - Where does it hurt?
 - How bad is it? 0-10 (0 = no pain, 10 = worst pain imaginable)
 - When did it start? Duration? Diurnal variation?
 - What does it feel like? (aching, throbbing, gnawing, squeezing, cramping, burning, stinging, tingling, electrical, numbness)
 - What makes it better? ... worse?
 - Past/current treatments? Side effects?
 - Impact of pain on life? ... activities, function?
 - Pain context/concurrent symptoms?
- Overall medical history

2. Physical examination

- Painful site and surrounding area exam
- Musculoskeletal and neurologic exams
- Comprehensive medical exam

3. Indicated imaging and laboratory studies

4. Indicated consultations

5. Integration of all findings to formulate a working diagnosis

6. Treatment strategy (multidisciplinary)

7. Follow-up pain relief and functional outcomes assessment: the "four A's":

- Analgesia — meaningful pain relief
- Activity — improved functionality
- Adverse effects — adequately managed
- Aberrant behaviors — observed for signs of misuse, abuse, or diversion of controlled substances

8. Care plan adjustment based upon response to treatment and side-effect profile

9. Regular follow-up clinic visits as indicated

Table 3**Commonly Prescribed Nonopioid Analgesics**

(acetaminophen, selective COX-2 inhibitor, nonsteroidal anti-inflammatory drugs) for mild to moderate pain

Medication	Recommended Starting Dose	Recommended Maximum Daily Dose
Acetaminophen	325-650 mg q 4-6 h	4,000 mg
Aspirin	325-1000 mg q 4-6 h	4,000 mg
Celecoxib	100 mg bid	400 mg
Diclofenac	50 mg q 8-12 h	200 mg
Etodolac	200-400 q 6-8 h	1,200 mg
Ibuprofen	200-400 mg q 4 h	3,200 mg
Indomethacin	25-50 mg q 8-12 h	200 mg
Ketoprofen	25-75 mg q 6-8 h	300 mg
Meloxicam	7.5 mg/day	15 mg
Nabumetone	1,000 mg bid	2,000 mg
Naproxen	250-500 mg q 12 h	1,500 mg
Piroxicam	10-20 mg/day	20 mg
Sulindac	150-200 bid	400 mg

(Prescribing clinicians should be familiar with indications, contraindications, precautions, adverse effects, and potential drug interactions. Patients should receive adequate education to facilitate compliance and benefit, and to avoid potential adverse impact from medications.)



Table 4**Opioid (Oral) Analgesics** for mild to moderate to severe pain

Medication	Estimated Equianalgesic Ratio	Recommended Starting Dose*	Caution!
Morphine	1	5-15 mg q4h prn	Renal insufficiency
Codeine-APAP	0.15	15-30 mg q4h prn	Acetaminophen toxicity
Hydrocodone-APAP	0.5-1	5-10 mg q4h prn	Acetaminophen toxicity
Tramadol	0.2	25-50 mg q4h prn	Seizures, serotonin syndrome
Tramadol-APAP	0.2	1-2 375/325 tablets q4h prn	Seizures, serotonin syndrome
Oxycodone	1.5	5-10 mg q4h prn	
Oxycodone-APAP			Acetaminophen toxicity
Oxycodone			Aspirin toxicity
Oxymorphone	3	5-10 mg q4h prn	
Hydromorphone	5	2-4 mg qrh prn	
Fentanyl	(very potent)		
transmucosal lozenges		200 mcg q4h prn	
buccal tablets		100 mcg qrh prn	

(Indicated only for treating breakthrough pain in opioid-tolerant cancer patients. Contraindicated for acute and postoperative pain.)

* The starting dosage must always be individualized with consideration of patient age, comorbidities, and other risk factors.

Several opioids also are available as long-acting formulations variably termed sustained-release (SR), controlled-release (CR), or extended-release (ER). These include morphine, oxycodone, oxymorphone, and tramadol preparations. Fentanyl is available in a transdermal patch. These agents allow for opioid combinations to address persistent baseline pain while episodic breakthrough pain can be treated with the immediate-release medications.

Methadone is intrinsically long-acting due to its half life. Its variable potency, pharmacokinetics, and potential toxicity pose risk elements that must be considered, and it should be prescribed and managed by clinicians expert in its use.

(Prescribing clinicians should be familiar with indications, contraindications, precautions, adverse effects and potential drug interactions. Opioids have a common side-effect profile that should be anticipated and proactively managed. Patients should receive adequate education to facilitate compliance and benefit, and to avoid potential adverse impact from medications.)

Table 5

Adjuvant “Coanalgesics” commonly used for neuropathic pain, diabetic neuropathy, postherpetic neuralgia, fibromyalgia, other chronic pain

Medication	Recommended Starting Dose	Usual Effective Dose
<u>Tricyclic antidepressants (TCAs)</u>		
Amitriptyline	10-25 mg hs	50-150 mg hs
Nortriptyline	10-25 mg hs	50-150 mg hs
Desipramine	10-25 mg hs	50-150 mg hs
<u>Selective serotonin reuptake inhibitors (SSRIs)</u>		
Escitalopram	10 mg daily	10-20 mg/day
Fluoxetine	10-20 mg daily	20-40 mg/day
Paroxetine	10-20 mg daily	20-50 mg/day
<u>Serotonin-norepinephrine reuptake inhibitors (SNRIs)</u>		
Duloxetine	20-30 mg daily	60 mg/day
Venlafaxine	375 mg daily	150-300 mg/day
<u>Antiepileptic drugs (AEDs)</u>		
Gabapentin	100-300 mg daily	300-1,200 mg tid
Pregabalin	25-75 mg bid	75-200 mg tid
Carbamazepine	100 mg daily-bid	300-800 mg bid
Oxcarbazepine	150-300 mg daily	150-600 mg bid
Topiramate	25-50 mg bid	50-200 mg bid
Tiagabine	4 mg hs	4-12 mg bid
<u>Muscle relaxants</u>		
Baclofen	5 mg bid-tid	10-20 mg tid
Cyclobenzaprine	5 mg tid	10-20 mg tid
Metaxalone	400 mg tid	800 mg tid-qid
Methocarbamol	500 mg qid	500-750 mg qid

(Prescribing clinicians should be familiar with indications for specific pain types, contraindications, precautions, adverse effects, and potential drug interactions. Patients should receive adequate education to facilitate compliance and benefit, and to avoid potential adverse impact from medications.)

Table 6

Potential Issues for Risk Management in Pain Care

Addiction is a psychological and behavioral disorder characterized by loss of control, obsession with obtaining, and compulsive use of a controlled substance despite adequate analgesia, and continuing drug use despite adverse consequences and harm, with no improvement in quality of life. (Schneider JP. *J Care Manage.* 1998)

Pseudoadddiction is characterized by continued requests for increased opioid analgesics, which may be perceived as drug-seeking behavior with the patient mislabeled as an addict, while the real problem is inadequate analgesia. The patient is not drug-seeking, but rather relief-seeking.

Physical dependence on a controlled substance is a physiologic state of neuroadaptation that is characterized by the emergence of a withdrawal syndrome if drug use is stopped or decreased abruptly, or if an antagonist is administered. Physical dependence is an expected result of opioid use and, by itself, does not equate with addiction. (Federation of State Medical Boards of the United States, Inc. Model Guidelines for the Use of Controlled Substances for the Treatment of Pain. 1998)

Tolerance is a physiologic state resulting from regular use of a drug in which an increased dosage is needed to produce the same effect, or a reduced effect is observed with a constant dose. Tolerance does not usually develop to the pain-relieving effects of opioids. (Federation of State Medical Boards of the United States, Inc. Model Guidelines for the Use of Controlled Substances for the Treatment of Pain. 1998) (Schneider JP. *J Care Manage.* 1998)

Pseudotolerance is the need to increase dosage that is due not to tolerance but to such factors as disease progression; increased activity; lack of compliance; change in medication; or drug interaction, addiction, or diversion. (Pappagallo M. *J Pharm Care Pain Symptom Control.* 1998)

Universal precaution is a risk management approach that includes use of opioid screening tools, urine drug screening, opioid trials with exit strategies, informed consent for opioid treatment, and pain treatment agreement to facilitate compliance and care. (Heit, Gourlay)

Table 7 Useful Internet Resources

American Academy of Pain Management: www.aapainmanage.org

American Academy of Pain Medicine: www.painmed.org

American Pain Society: www.ampainsoc.org

American Society of Interventional Pain Physicians: www.asipp.org

CMEZone (Applied Clinical Education): www.CMEZone.com

Department of Pain Medicine and Palliative Care, Beth Israel Medical Center: www.stoppain.org

International Association for the Study of Pain: www.iasp-pain.org

The Legal Side of Pain (J. Bolen Group, LLP): www.legalsideofpain.com

National Pain Education Council: www.npecweb.org

Pain.com: www.pain.com

PainKnowledge.org: www.painknowledge.org

Partners Against Pain (Purdue Pharma, LP): www.partnersagainstpain.com

Texas Medical Board: www.tmb.state.tx.us

The Virtual Lecture Hall (Medical Directions, Inc.): www.vlh.com

Physician Oncology Education Program

Making Every Physician's Office a Cancer Detection and Prevention Center

History

The Texas Medical Association formed the Physician Oncology Education Program (POEP) in 1987 to carry out the recommendations of the Texas Cancer Plan regarding physician education. The POEP is funded by the Texas Cancer Council and is directed by a steering committee of experts interested in and knowledgeable about all facets of cancer prevention, detection, and control.

Focus

Educating primary care physicians about state-of-the-art and science in cancer prevention, screening, early detection, and control, including the physician role in influencing patient behavior.

Available Resources

Educational Materials

The POEP has developed a number of cancer education resources and clinical tools for the practicing physician. These materials have been designed by physicians and cancer experts to enhance the primary care physician's ability to reduce cancer morbidity and mortality in Texas.

Speakers' Bureau

One of the strongest projects of our nonprofit organization is our Speakers' Bureau. Volunteer physicians and other cancer experts travel around the state to give requested lectures on more than 100 cancer-related topics, including pain management, the human papillomavirus vaccine, and new therapies and treatment options. The POEP reimburses the speaker for travel expenses. There is no fee to the requesting organization.

For a full listing of materials or speaker's bureau topics, please visit www.poep.org.

Self Assessment Questions

1) Acute pain is

- A. Due to specific illness, inflammation, injury, or surgery
- B. Short in duration
- C. Accompanied by vital sign changes
- D. All of the above

2) Chronic pain is

- A. A self-limited issue
- B. A persistent problem
- C. A physical warning or protective role
- D. None of the above

3) Nociceptive pain results from stimulation of afferent nociceptors and may be somatic or severe.

- A. True
- B. False

4) Neuropathic pain is described as aching or throbbing pain.

- A. True
- B. False

5) Tools exist to objectively measure and quantify pain.

- A. True
- B. False

6) Fordyce focused on pain behaviors that were

- A. Verbal
- B. Nonverbal
- C. A and B
- D. None of the above

7) MI and MET are complements to operant behavioral therapy and CBT.

- A. True
- B. False

8) Physical therapeutics can be divided into muscle flexibility and strength training along with an aerobic endurance program.

- A. True
- B. False

9) Examples of interventional techniques are

- A. Use of muscle
- B. Nerve and joint blocks
- C. Ablative techniques
- D. Use of augmentative techniques
- E. All of the above

Answers:
1. D
2. B
3. A
4. B
5. B
6. C
7. A
8. A
9. E

Evaluation for "Pain Primer for Primary Care Physicians: Essential Concepts"

Will this education improve the quality of patient care in your office? Yes _____ No _____

What barriers do you see in the implementation of this education in your practice?

What oncology-related education would you like to receive?

Please rate each of the following aspects of the article by circling your response at the right.

	Agree	Mostly Agree	Mostly Disagree	Disagree
The content met objectives.	4	3	2	1
The content was free of commercial bias.	4	3	2	1
The level of material was appropriate for the audience.	4	3	2	1

Name: _____ Med. License No.: _____

Address: _____ City, State, ZIP: _____

E-mail: _____ Specialty: _____

Statement of completion: I attest to having completed the CME activity.

The time I spent was _____ hour(s), _____ minutes.

Signature: _____

Please return the completed form to

Texas Medical Association, Attn: POEP, 401 W. 15th St., Austin, TX 78701; or fax to (512) 370-1693. Expiration Date: July 1, 2011.