

The Health Workforce Delivering Evidence-Based Non-Pharmacological Pain Management

February 2020

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KEY FINDINGS

Chronic pain is widespread among U.S. adults, and overreliance on pharmacological approaches to managing this pain has contributed to the nation's opioid addiction crisis. There is growing recognition of the importance of directing patients towards non-pharmacological approaches to manage pain. The Mayo Clinic and the Agency for Healthcare Research and Quality (AHRQ) conducted systematic reviews of research on non-pharmacologic pain management for the most commonly reported chronic pain types in the U.S.: low back pain, chronic neck pain, knee osteoarthritis, fibromyalgia, and tension headache. This study describes the professions that are able to deliver evidence-based non-pharmacologic pain management, and how education-, policy- and practice-related factors serve as barriers or facilitators to further leverage these professions to effectively provide collaborative pain management.

Some of the key findings of this study include:

- In a review of the literature, we found that the AHRQ and Mayo reports were the most comprehensive in identifying effective interventions for the treatment of chronic pain. Through comparison of these systematic reviews, we identified a set of interventions that a range of health care professionals are educated and trained to provide.
- Health care occupations in addition to the traditional medical providers (physicians, nurse practitioners and physician assistants) able to deliver evidence-based non-pharmacologic pain management include physical therapists and assistants, occupational therapists and assistants, massage therapists, athletic trainers, chiropractors, psychotherapists (licensed psychologists, licensed therapists/counselors and clinical social workers), as well as practitioners (either as stand-alone occupations or health care providers with additional training) of acupuncture, yoga, tai chi, qigong, and Alexander Technique.
- Non-pharmacologic pain management approaches may be effectively delivered independently or in combinations, and by individual providers as well as by multidisciplinary teams. Education and credentialing requirements for this workforce varies widely, depending on the occupation and specialty.

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KEY FINDINGS *continued*

- Several factors influence access to the workforce able to deliver evidence-based non-pharmacologic pain treatment, including health care providers' and patients' knowledge of these resources, inconsistent health insurance coverage, and variability in states' regulation of professionals' licensing and scope of practice of the involved occupations.

As society works to reduce opioid addiction, efforts are increasing to improve access to the workforce providing non-pharmacologic pain management. Better education about the availability of these practices is needed, as well as ongoing support for effectiveness research. Information about which occupations can provide evidence-based non-pharmacological pain treatment, where they are located, and which populations they are able to serve, may improve access to these services as well as identify where gaps in the pain treatment workforce occur across the U.S. and illuminate where there is greater risk for overuse of pharmaceutical treatment of chronic pain.

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INTRODUCTION

Twenty percent of adults in the U.S. reported having chronic pain in 2016.¹ The most common chronic pain conditions in the U.S. include low back pain, neck pain, severe headache or migraine, osteoarthritis, and fibromyalgia.^{2,3} Pain management may involve both pharmacological and non-pharmacological approaches delivered by many different types of health care providers. Overreliance on pharmacological approaches to manage pain has contributed to the current opioid crisis whereby 10.3 million Americans in 2018 were identified as misusing prescription pain relievers such as oxycodone, hydrocodone, codeine and morphine.⁴ While the role of the prescriber in this crisis has been much explored, there is growing recognition of the importance of directing patients towards non-pharmacological approaches to manage pain. In addition to the roughly 6,500 physicians that are board certified in pain management by the American Board of Medical Specialties,⁵ many other allied health professions also deliver non-pharmacological pain treatments supported by evidence. In this report, we provide a landscape analysis of these professions by drawing from the peer-reviewed and gray literature as well as professional organization websites. We examine how factors such as state scope-of-practice laws, insurance practices, clinical practice models, and training and educational opportunities serve as barriers or facilitators to further leverage these health professions to effectively manage pain.

PAIN AND ITS TREATMENT

There are many different types of pain occurring in various parts of the body that range in severity and require different management approaches. One type is acute pain, often resulting from an underlying illness or injury, which is frequently treated with analgesics and resolves once the underlying condition has healed.⁶ Another type, chronic pain, can be characterized by cyclical, recurring pain episodes that persist longer than six months. Patients with chronic pain may develop depression and anxiety stemming from the fear, anger, and stress of experiencing these chronic symptoms, which in turn can stress the nervous system, and perpetuate ongoing pain.⁶ Adult response patterns and behavioral reactions to pain may stem from early childhood experiences and environments (exposure to adverse or unpredictable experiences, living in an unpredictable environment leading to loss of control), and these developmental influences can affect a patient's reactivity to pain.⁷

EVIDENCE-BASED NON-PHARMACOLOGICAL PAIN TREATMENTS

Given the complexity of pain due to the influence of many factors, pain management should be addressed using some combination of physical, psychological, and behavioral approaches. We examined the literature and found many studies showing how non-pharmacological pain interventions can be effective in treating both acute and chronic pain.⁸ In this report, we focus on chronic rather than acute pain to highlight the need for ongoing engagement by one or more providers. To guide this study, we selected two recent systematic reviews that covered a large volume of the literature that identify non-pharmacological pain management solutions. In addition, we sought input from experts in non-pharmacological pain management to review our findings.

The systematic reviews produced by the Mayo Clinic in 2016² and the Agency for Healthcare Research and Quality (AHRQ) in 2018³ looked at pain management for chronic low back pain, chronic neck pain, knee osteoarthritis, fibromyalgia, and tension headache. These are among the most commonly reported chronic pain types by adults in the U.S.⁹ Several interventions were

identified as effective, with some variability in the evidence, for improving each pain type (Table 1). The interventions reflect the physical, psychological, and emotional components of chronic pain by showing that the evidence base supports not just medical but psychosocial interventions. The Mayo Clinic and AHRQ reviews both examined randomized controlled trials (RCTs) to assess the efficacy and safety of various widely used approaches for pain. Both reports are organized according to pain type, echoed in our summary in Table 1. The Mayo Clinic summarized RCTs as either positive if there were statistically significant improvements in severity of pain in the trial group versus the control group, or negative if there were no statistically significant observed differences between the control and trial groups. The AHRQ review employed a more stringent grading system to assess the strength of the evidence, which included a study quality rating (poor, fair, or good) and a Strength of Evidence rating (insufficient, low, moderate, and high). Additionally, AHRQ used stricter inclusion criteria. An RCT was only included in the AHRQ review if there was evidence of improved function or pain level for at least one month post-treatment. The Mayo review had no such inclusion criteria and only limited studies to those conducted in the U.S. or including U.S. participants (AHRQ included trials from other countries as long as the intervention was available in the U.S. and the publication was in English). These criteria resulted in 105 publications (130 RCTs) covered in the Mayo review, and 218 publications covering 202 RCTs in the AHRQ review.

Patients with chronic low back pain benefited from all categories of interventions identified, with acupuncture, yoga, spinal manipulation, and massage therapy being among the modalities identified by both reports. All conditions had evidence of benefiting from acupuncture and some type of manual therapy. Evidence for effective non-pharmacological treatment for tension headache was primarily identified by the Mayo report.

Table 1: Evidence-based non-pharmacological chronic pain interventions according to the Mayo Clinic² and AHRQ³ systematic reviews.

Intervention*	Pain Types Addressed by Interventions				
	Chronic Low Back Pain	Chronic Neck Pain	Knee OA ^a	Fibromyalgia	Tension Headache
Complementary & Integrative					
Acupuncture	Both ^b	AHRQ	Mayo	Both	Mayo
Yoga	Both	—	Mayo	Mayo	—
Tai Chi	—	—	Mayo	Both	—
Qigong	—	—	—	AHRQ	—
Alexander Technique	—	AHRQ	—	—	—
Behavioral Health Approaches					
Cognitive Behavioral Therapy	AHRQ	—	—	AHRQ	—
Relaxation Approaches ^c	—	—	—	Mayo	Mayo
Mindfulness-based Stress Reduction ^d	AHRQ	—	—	—	—
Restorative Therapies					
Osteopathic Manipulation	Mayo	—	—	—	—
Spinal Manipulation	Both	—	—	—	Both
Massage Therapy	Both	Mayo	Mayo	—	Mayo
Myofascial Release Massage	—	—	—	AHRQ	—
Ultrasound	—	—	AHRQ	—	—
Low-level Laser Therapy	AHRQ	AHRQ	—	—	—
Exercise					
General	AHRQ	AHRQ	AHRQ	AHRQ	—
Multidisciplinary Rehabilitation (MDR)^e					
Treatment with combined interventions and professions	AHRQ	—	—	AHRQ	—

*Intervention categories organized according to HHS report: Pain Management Best Practices Inter-agency Task Force Report.

^aOA=Osteoarthritis.

^b"Both" refers to mention in both the Mayo Clinic and AHRQ systematic reviews.

^cIncludes guided imagery, biofeedback, meditation, self-hypnosis, and deep-breathing exercises.

^dCombination of meditation, body awareness and yoga.

^eCombination of physical and psychological components.

APPROACHES TO TREATMENTS

To better categorize the different types of approaches covered in the Mayo and AHRQ reviews, we referred to the Department of Health and Human Services' (HHS) report on Pain Management Best Practices.⁵ The HHS report outlines five different categories of approaches to pain management that we used to map the evidence-based interventions reviewed by Mayo and AHRQ. In addition to medications (including those containing opioids) to treat pain, there are restorative therapies, interventional therapies, behavioral health approaches, and complementary and integrative health approaches. Restorative therapies include treatments such as massage therapy, therapeutic exercise, spinal manipulation and ultrasound. HHS defines interventional pain management as “minimally invasive interventions that can alleviate pain and minimize the use of oral medications.”⁵ As these procedures are not strictly non-pharmacological pain interventions, interventional therapies are not included in our report because they are not included in either the Mayo Clinic or AHRQ systematic reviews. Behavioral health approaches are those that address emotional, behavioral, social, and cognitive factors that play a role in chronic pain. They include such treatments as cognitive behavioral therapy, mindfulness-based stress reduction and relaxation therapies. Finally, the non-pharmacological approaches covered in both reviews encompass complementary and alternative medicine, also called CAM, and integrative health. In the literature, CAM includes many of the mind-body practices included in both the AHRQ and Mayo reviews—tai chi, yoga, acupuncture, chiropractic medicine, massage, and osteopathic manipulation. Approaches can be considered complementary if they are used in tandem with conventional methods, and alternative if used as a replacement for conventional medical treatments.¹⁰ Integrative medicine approaches make use of conventional and CAM therapies.

While there is some overlap, the HHS-defined categories and those covered by the Mayo and AHRQ reviews do not precisely align. For example, massage therapy and osteopathic manipulation can be considered CAM as well as restorative therapies. Ultrasound and low-level laser therapy are physical modalities that can be applicable across approach categories. Although HHS specifically categorizes therapeutic ultrasound as a restorative therapy and does not include low-level laser therapy in the report, we chose to include both modalities together under “restorative therapies” to reflect the similar nature of these interventions as physical modalities used across therapies. Multidisciplinary rehabilitation and exercise are additional evidence-based non-pharmacological pain interventions covered in the AHRQ review but not mentioned in the HHS report. In the case of multidisciplinary rehabilitation, we retained this intervention as a separate category because it functions as a way of connecting several modalities across treatment categories.

OCCUPATIONS ENABLED TO DELIVER EVIDENCE-BASED NON-PHARMACOLOGICAL CHRONIC PAIN INTERVENTIONS

For each of the evidence-based interventions listed in **Table 1**, we drew upon our team’s expertise and a review of professional organization websites to identify the professionals that are trained and legally enabled to deliver these interventions, as described in **Table 2**. Every evidence-based intervention that either the AHRQ or the Mayo review identified has at least one occupation type whose scope of practice includes that intervention. The training and education for these occupations is described below and also summarized in **Table 3**. They include health care occupations with skill sets involving pain management, and practitioners of specific treatment modalities that may be delivered by multiple types of occupations, including some outside of health care.

OCCUPATION DESCRIPTIONS

While their scope of practice may be broader, these descriptions focus on the training and skills specific to chronic pain management among the selected health occupations.

Physical Therapists (PTs) and Physical Therapy Assistants (PTAs): PTs and PTAs use exercise as therapy for pain management and perform manual therapy on joints and soft tissue to help with pain, swelling, inflammation, and mobility. Additional modalities

such as ultrasound can be used in combination with these manual therapies and therapeutic exercises. PTs and PTAs can also deliver psychological therapy by teaching patients relaxation techniques such as deep breathing and meditation, muscle relaxation, guided imagery, and self-hypnosis.¹¹ PTAs practice under the supervision of a PT and perform components of the treatment delegated by the PT, including exercise, manual therapy such as therapeutic massage, and modalities such as ultrasound.¹² Practicing as a PT currently requires earning a clinical doctorate degree from an accredited program which includes didactic and clinical education, passing a national exam, and obtaining and maintaining state licensure. Similarly, practicing as a PTA requires earning an associate degree from an accredited program that includes didactic and clinical education, passing a national exam, and obtaining and maintaining state licensure.¹²

Occupational Therapists (OTs) and Occupational Therapy Assistants (OTAs): OTs and OTAs use self-management education, exercise, and activity and environmental modification to help patients manage chronic pain and reduce its effects on performing everyday activities at home and in the community.¹³ Training in behavioral health also enables them to employ behavioral strategies such as cognitive behavioral therapy, meditation, and relaxation approaches for managing and redirecting pain.¹⁴ Much like the relationship between PTAs and PTs, OTAs work under the supervision of OTs to put the treatment plan developed by the OT into action. Practicing as an OT requires earning a master's degree or clinical doctorate degree from an accredited program that includes didactic and clinical education, passing a national certification exam, and obtaining and maintaining state licensure.^{15,16} Practicing as an OTA requires an associate degree from an accredited program which includes didactic and clinical education, passing a national certification exam, and obtaining and maintaining state licensure.¹⁷

Massage Therapists: Massage therapists perform manual therapies, including treatment for chronic pain through practices such as myofascial release massage.¹⁸ Massage therapist education and training requirements are specific to each state licensing board, but most states require candidates to have a minimum 500 hours of training and to pass the Massage and Bodywork Licensing Exam (MBLEx).¹⁹ Some states have additional requirements such as liability insurance or a jurisprudence exam.

Athletic Trainers (ATs): ATs recognize and treat patients with injuries that cause chronic pain and provide acute care to prevent chronic pain from developing after injuries, especially sports-related injuries likely to lead to osteoarthritis.²⁰ ATs also promote and provide self-management programs that teach patients skills for managing chronic pain, and they are also trained in evaluating and screening for the presence and severity of pain.²¹ ATs currently require a bachelor's degree from an accredited program.²² ATs need to pass a national exam to obtain a license or registration in all states except California, and they can work in a variety of practice settings, beyond sports medicine clinics and schools.²³

Chiropractors: Chiropractors deliver spinal manipulation and other manual therapies, including for the treatment of chronic low back pain.^{24,25} They are trained to “care for patients with health problems of the neuromusculoskeletal system,” and focus on how such problems can affect a patient's overall health.²⁶ Chiropractors require a doctorate degree and passage of a state or national board exam, but specific licensure requirements vary by state.^{27,28} They can become certified in performing acupuncture through the American Board of Chiropractic Acupuncture, but some states require additional training or state-regulated licensure to legally practice acupuncture.²⁹

Psychotherapists: The term “psychotherapist” encompasses many professions, such as psychologists, licensed counselors, therapists, and social workers. These professions share the role of helping patients cope with pain through mental health care, although their scope of practice encompasses more than pain management. Psychotherapists can help patients cope with pain through one of the evidence-based behavioral health approaches in **Table 1** to address stress, anxiety, and depression that may be pain-related.^{30,31} Becoming a **licensed psychologist** requires a doctoral degree, with specific licensure requirements varying by state.³² There are varying requirements to become a **licensed therapist or counselor**, also depending on the occupation type and practice state.³³ Most licensed therapists and counselors require at least a bachelor's degree, while a master's degree may be required for certain specialties such as school counseling, rehabilitation counseling, mental health counseling, or marriage and family therapy.³⁴ **Clinical social workers** must have a Master's of Social Work (MSW), complete supervised clinical experience post-MSW, and pass a licensing board exam. Supervised experience in a field placement is also a licensure requirement for

psychologists, mental health counselors, and marriage and family therapists.³⁵ The exact amount of supervised hours varies by profession and state licensure requirements.

PAIN TREATMENT MODALITIES THAT MAY BE DELIVERED BY MULTIPLE OCCUPATIONS

There are several non-pharmacological pain treatment modalities that may be delivered by multiple professions, including those described above if they attain the required additional training, or that can also be the roles of stand-alone occupations.

Acupuncture: Acupuncture is an evidence-based mind-body practice that can be delivered by qualified, licensed acupuncturists, as well as medical doctors (MDs), doctors of osteopathy (DOs), chiropractors and PTs that have achieved acupuncture certification through additional education and training.³⁶ The title of licensed acupuncturist (LAc) is a state designation based on meeting state board requirements for licensure.³⁷ LAcS must obtain a master's degree requiring a minimum of three years of full-time education at an accredited program that includes 1,500-2,000 clinical training hours.³⁸ While state requirements vary, LAcS generally must pass a national exam administered by the National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM) or become board-certified through NCCAOM.³⁹ Many states allow acupuncture within physician scope of practice, though eleven states require additional clinical training for certification in medical acupuncture practice.⁴⁰

Yoga, Tai Chi, Qigong, and Alexander Technique: Certified practitioners of yoga, tai chi, qigong, and Alexander Technique can also guide patients through mind-body practices to help manage chronic pain. These certified practitioners have obtained a certificate in a specific method (e.g., yoga, tai chi, qigong, and Alexander Technique) denoting that they have received training and education to uphold a certain level of practice and quality of care in these methods. These certified practitioners may combine their certificate with another occupation or specialty. Individuals certified in yoga teach specific methods of relaxation and meditation, ways to reduce muscle tension, and practices to increase mobilization and flexibility.⁴¹ Registered yoga teacher certification is available, but not required to be a yoga instructor. The Yoga Alliance has set guidelines for a teacher-training course, which usually involves 200 hours minimum of training.⁴² Individuals can be certified in tai chi and qigong, Chinese practices in which patients learn slow balanced motion and weight shifting that can improve joint stability and strength.⁴³ Tai chi involves aerobic exercise, meditation, and deep breathing performed as a choreographed sequence to address chronic pain conditions. Qigong refers to the specific slow movements, postures, and breathing practices that may be practiced on their own or be incorporated into the practice of tai chi.⁴⁴ Certification is offered through associations such as the American Tai Chi and Qigong Association and requires a minimum of 150 hours of training.⁴⁵ Individuals can also be a certified practitioner in the Alexander Technique, an approach that teaches patients how to release muscle tension.⁴⁶ While there is no legal requirement for certification or training, usually Alexander Technique instructors complete a three-year course (with a minimum of 1,600 hours of instruction) to become a certified member of professional society such as the American Society for the Alexander Technique (AmSAT).⁴⁶ There is no legal requirement for Alexander Technique certification or training.

Mind-body practices also include mindfulness practices. One type of evidence-based mindfulness practice is mindfulness-based stress reduction (MBSR),⁴⁷ which involves focused meditation, stretching, and yoga to help patients decrease stress and pain intensity through gaining awareness of their body.⁴⁸ A certified practitioner, regardless of profession or previous experience, can deliver MBSR. Certification to guide patients through these activities is available from the Center for Mindfulness at the University of Massachusetts and various MBSR organizations across the U.S.

MULTIDISCIPLINARY REHABILITATION

In addition to modalities that are delivered independently, treating chronic pain may incorporate several approaches (physical therapies, psychological interventions, and/or mind-body practices) using multiple professionals from different occupations working together in a multidisciplinary rehabilitation (MDR) team.⁴⁹ Identified by AHRQ as an evidence-based non-pharmacological chronic pain management treatment, MDR can include any combination of health care workers, (e.g., physician, psychologist, nurse,

social worker, PT, and OT) depending on the patient's needs and specific medical condition.⁵⁰ This coordinated, interprofessional care requires efficient communication among the practitioners to maximize functional mobility and promote mental health in patients suffering from chronic pain.⁵¹ According to the American Pain Society, each member of the MDR team "has a clearly defined place in the overall care of the patient, contributing their expertise in relative isolation from one another."⁵²

Table 2: Occupations that may deliver evidence-based non-pharmacological pain interventions based on entry-level training or additional certification^{25, 53-58}

Intervention	Athletic Trainer (AT)	Psychotherapist ^a	Physical Therapist (PT), Physical Therapy Assistant (PTA)	Massage Therapist	Occupational Therapist (OT), Occupational Therapy Assistant (OTA)	Chiropractor	Licensed Acupuncturist (LAc)	Physician, NP and PA ^b	Certified Practitioner ^c
Complementary & Alternative									
Acupuncture			X*			X*	X	X*	
Yoga					X				X
Tai Chi									X
Qigong									X
Alexander Technique								X	X
Behavioral Health Approaches									
Cognitive Behavioral Therapy		X			X			X	
Relaxation Approaches ^d	X	X	X		X			X	
MBSR ^e		X							X
Restorative Therapies									
Osteopathic Manipulation								X**	
Spinal Manipulation			X			X		X**	
Massage Therapy	X		X	X	X	X			
Myofascial release massage				X	X*	X		X**	
Ultrasound	X		X		X*	X*			
Low-level Laser Therapy	X						X	X	
Exercise									
General	X		X		X	X		X	
Multidisciplinary Rehabilitation									
Treatment with combined interventions and professions	X	X	X	X	X	X	X	X	X

^a Psychotherapists include: psychologists, licensed clinical social workers, licensed therapists, and counselors

^b Physicians include: medical doctors and/or doctors of osteopathy; NP=Nurse Practitioner; PA=Physician Assistant

^c Practices delivered by multiple occupations, including certified practitioners of yoga, tai chi, qigong, and Alexander Technique

^d Includes guided imagery, biofeedback, meditation, self-hypnosis, deep-breathing exercises

^e MBSR=Mindfulness-based stress reduction

* May perform with additional education, training, or certification

** Part of the basic medical training of osteopathic clinicians

Table 3: Education and Licensing/Certification Requirements for Occupations Involved in Non-Pharmacological Pain Interventions

Occupation/Role	Accrediting/Certifying Body	Minimum Education	Qualifying Exam	Credential Required ^a	Board Certification
Tai Chi or Qigong Instructor⁴⁵	American Tai Chi and Qigong Association certification (ATCQA)	Minimum 150 hours of training to be a certified practitioner, at least 200 hours to be a Certified Associate Instructor, with varying instructor levels until Master Instructor, which requires 5000 hours of teaching experience	N/A	N/A-Do not need a license to practice, not regulated by federal government or states	From ATCQA, some other organizations offer certification
Alexander Technique Instructor⁴⁶	American Society for the Alexander Technique (AmSAT)	3-year course (minimum 1600 hours of instruction)	N/A	N/A-No legal requirement needed to practice or train	Must complete the 3-year course to become certified with AmSAT
Yoga Instructor⁴²	N/A	Complete a 200-hour or 500-hour level teacher training course with a Registered Yoga School (200-hour minimum guideline set by Yoga Alliance)	N/A	N/A-No state licensure needed to practice	Registered Yoga Teacher (RYT) certification available, but not necessary to teach yoga classes
Athletic Trainer (AT)²³	Commission on Accreditation of Athletic Training Education (CAATE)	Bachelor's degree from CAATE-accredited athletic training program	National Board of Certification (BOC) Exam	Pass BOC exam to get Athletic Trainer Certification (ATC) Credential for licensure or registration in all states except CA	Available from BOC
Psychologist³²	American Psychological Association (APA)	Doctoral degree: PhD or PsyD Master's degree in Psychology can become licensed in some states	Examination for Professional Practice in Psychology (EPPP)	State license Pass EPPP	Optional board certification in specialty area
Licensed Therapist or Mental Health Counselor^{33,34}	National Board for Certified Counselors (NBCC)	Master's degree in many different subjects, e.g. mental health counseling, marriage and family therapy	National Counselor Examination For Licensure and Certification (NCE)	Licensed mental health counselor (LMHC)- minimum 1500 clinical hours, take exam (state-specific or NBCC exam)	Optional certifications available in specialty areas, not required to practice, can become board-certified from NBCC
Licensed Clinical Social Worker⁵⁹	Council on Social Work Education (CSWE)	Master's degree in social work (MSW)	Licensing exam given by the Association of Social Work Boards (ASWB)	State licensure regulated by state boards—must pass ASWB exam, complete an accredited MSW program and minimum two years post-MSW supervised clinical experience	Professional or advanced practice specialty social work credentials available from the National Association of Social Workers (NASW)
Physical Therapist (PT)⁶⁰	Commission on Accreditation in Physical Therapy Education (CAPTE)	Doctor of Physical Therapy with clinical internship; program must be accredited by CAPTE	National Physical Therapy Exam (NPTE) for PT	State-specific license based on passing NPTE and completion of accredited program	Optional specialty residency and certification exam to become board-certified
Physical Therapy Assistant (PTA)^{12,61}	Commission on Accreditation in Physical Therapy Education (CAPTE)	Associate's degree with clinical internship; program must be accredited by CAPTE	National Physical Therapy Exam (NPTE) for PTA	State-specific license based on passing NPTE and completion of accredited program	N/A
Massage Therapist^{19,62,63}	National Certification Board for Therapeutic Massage and Bodywork (NCBTMB)	Minimum 500 hours training in most states	Massage & Bodywork Licensing Exam (MBLEx)	Pass the MBLEx	Board Certification in Therapeutic Massage and Bodywork (BCTMB) from NCBTMB

Table 3: *Continued*

Occupation/Role	Accrediting/Certifying Body	Minimum Education	Qualifying Exam	Credential Required ^a	Board Certification
Occupational Therapist (OT) ^{15,16}	Accreditation Council for Occupational Therapy Education (ACOTE®)	Master's degree from an accredited program	National Board for Certification in Occupational Therapy (NBCOT) Exam	Required by all states, exact requirements vary, but all require passing the NBCOT	Optional board and specialty certifications for advanced practice offered by American Occupational Therapy Association (AOTA)
Occupational Therapy Assistant (OTA) ¹⁷	Accreditation Council for Occupational Therapy Education (ACOTE®)	Associate degree from an accredited program	NBCOT Certified Occupational Therapy Assistant (COTA) Exam	Required by all states, exact requirements vary, but all require passing the NBCOT	Optional specialty certifications for advanced practice offered by AOTA
Chiropractor ^{27,28}	Council on Chiropractic Education	Doctor of Chiropractic (DC) (4-5 year graduate-level education)	National Board of Chiropractic Examiners (NBCE) exam	Required by all states, must complete accredited DC program and pass the NBCE exam. All but 5 states also require additional state-level exams	Post-doctoral certifications in subspecialties available through the American Chiropractic Association and the American Board of Chiropractic Acupuncture
Licensed Acupuncturist (LAc) ^{38,39}	Accreditation Commission for Acupuncture and Oriental Medicine (ACAOM)	Master's degree in Acupuncture or Oriental Medicine-minimum 3 years at an accredited program that includes 500-3000 clinical hours, depending on the state	National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM) exam	NCCAOM exam and/or certification for licensure in most states. CA has its own separate exam and requirements	Available from NCCAOM
Physician (MD or DO)	MD: Liaison Committee on Medical Education (LCME) DO: American Osteopathic Association (AOA)	4-year program plus minimum 3-year residency	MD: United States Medical Licensing Exam (USMLE) DO: USMLE or Comprehensive Osteopathic Medical Licensing Examination of the United States (COMLEX-USA)	Licensure by state licensing boards, requirements vary by state, but all states require a post-graduate residency for licensure	Optional specialty board certification
Nurse Practitioner (NP) ⁶⁴	Commission on Collegiate Nursing Education (CCNE)	Licensed RN and graduate-level nursing program, minimum requirement is a Master of Science in Nursing (MSN) degree, doctoral degree is also available (DNP)	American Academy of Nurse Practitioners (AANP) exam, other certification agencies also offer exams	Advanced Practice Registered Nurse (APRN) state licensure	National certification as Certified Nurse Practitioner (CNP) required for state licensure, available through several NP certification boards, depending on concentration
Physician Assistant (PA) ⁶⁵	The Accreditation Review Commission on Education for the Physician Assistant (ARC-PA)	Graduation from an accredited PA program	Physician Assistant National Certifying Examination (PANCE)	State-specific, all require graduating from accredited PA program and passing the PANCE. Some states also require current National Commission on Certification of Physician Assistants (NCCPA) certification	Available through NCCPA

^a Credentialing includes state licensure, certification, or registration

FACTORS INFLUENCING ACCESS TO THE EVIDENCE-BASED NON-PHARMACOLOGICAL PAIN MANAGEMENT WORKFORCE

Insufficient provider training and awareness of non-pharmacological pain management interventions, patient perceptions, as well as lack of adequate insurance coverage, are barriers for delivering these interventions.

PROVIDERS' AND PATIENTS' KNOWLEDGE AND ACCEPTANCE

While many medical providers such as physicians, NPs, and PAs are able to deliver evidence-based non-pharmacological pain management interventions to the extent they are authorized by state practice regulations, medical providers' education and training in these interventions is often minimal. A 2019 systematic review identifying characteristics of physicians who prescribe opioids for chronic pain found that inadequate training in pain management was among the main factors associated with prescribing opioids.⁶⁶ Researchers also found that physicians across multiple studies identified a lack of access to pain specialists for referral resources or clinical support as a major barrier to managing their patients' chronic pain.⁶⁶ Even when referrals are available, one study noted that there could be at least 15 possible specialists to whom a general practitioner could refer a patient for the treatment of low back pain.⁶⁷

Additionally, the limited time in a typical patient visit may hinder these providers' ability to adequately address all of the conditions presented by their patients, including pain.^{68,69} As a result, medical providers may be more likely to turn to pharmacological interventions and/or refer patients with pain to specialists who may treat pain acutely. While guidelines for evidence-based non-pharmacologic pain treatment are available (such as those referenced in this report), more research and dissemination of guidelines are needed in order to increase patients' and providers' knowledge of other services and practitioners who might be suitable to join their pain management team.

Limited patient understanding and/or skepticism about the efficacy of non-pharmacological treatments also make it difficult for providers to promote these treatments, especially for patients already using opioid therapy.⁷⁰ Data from the 2012 National Health and Interview Survey show that being poor, being from an underrepresented minority group (including Hispanics and non-Hispanic blacks), and having less education are characteristics associated with lower use of integrative therapies.⁷¹ The barriers for these patients included lack of knowledge and/or awareness, affordability, availability, and accessibility of the therapies. A qualitative study of patients in the Veterans Health Administration (VHA) with chronic pain found similar barriers to seeking non-pharmacological treatments including their higher cost, challenges in scheduling, lack of transportation, and patients' low motivation to pursue the treatments.⁷⁰ Another study of veterans found that patients who were prescribed opioids were less likely to participate in a non-pharmacological intervention for chronic back pain, compared to patients who were not prescribed opioids.⁷² Increasing patient knowledge through coordinated communication across providers using appropriate messaging on the efficacy of non-pharmacological treatment options could help facilitate providers ability to motivate patients.⁷⁰

INFLUENCES OF HEALTH INSURANCE ON ACCESS

Insurance coverage plays an important role in determining which providers patients can access for pain treatment. Often the providers enabled to deliver evidence-based non-pharmacological pain management interventions (identified in **Table 3**) are less likely to be covered by insurance plans (e.g., massage therapy, yoga, acupuncture). If covered, access to their services may be restricted through referrals and visit caps (e.g., PTs).

Coverage can depend on the relationship between providers and insurance (e.g., whether they are in-network), the procedure performed, the patient's condition being treated, and even the setting in which the treatment is received.⁷³ A review of non-

pharmacologic treatment options for low back pain found that insurance coverage is often inconsistent with evidence in the literature: non evidence-based therapies were typically covered (e.g., steroid injections) but many plans did not cover acupuncture despite evidence supporting its efficacy in treating back pain.⁷⁴ An analysis of insurance coverage for CAM services based on the 2012 National Health Interview Survey found that 75% of adults who saw a practitioner for acupuncture (for any condition – not necessarily pain-related treatments for which evidence of effectiveness was determined) had no insurance coverage for this service. Of the 25% of adults surveyed who received acupuncture covered by health insurance, only 8.5% had full insurance coverage. For massage therapy, 85% of adults seeing a practitioner for this service had no insurance coverage, and of the 15% with coverage, only 7% had complete coverage. Chiropractic services were relatively well covered compared to acupuncture and massage therapy, with 60% of surveyed adults reporting having insurance coverage (either partial or complete) for this service.⁷⁵

A 2017 study on health claims data in New Hampshire found that compared to primary care providers, the likelihood of reimbursement for services was 69% lower for acupuncturists and 71% lower for chiropractic medicine.⁷⁶ Another study reviewed 26 different health policies and their guidelines for reimbursement of massage therapy and found barriers that included limiting treatment to 15-minute increments, requiring a physician referral, and restrictions on provider type. While chiropractors, PTs and OTs were found to be able to bill insurance directly for massage therapy, massage therapists were not considered covered providers in 27% of the plans reviewed.⁷⁷ This is in stark contrast to insurance coverage of pharmacological treatments of pain (both opioid and non-opioid prescription drugs). A recent analysis of prescription drug coverage for the treatment of low back pain found that of 30 prescription opioids, 72% of them were covered across 50 examined insurance plans (mix of Medicaid, Medicare, and commercial).⁷⁸

Medicare and Medicaid

Medicare, the federal insurance program for older (age 65+) and disabled populations, covers few of the non-pharmacological interventions that occupations other than typical medical providers (physicians, PAs and NPs) can provide to treat chronic pain. Medicare Part B, a part of the Medicare program that covers medically necessary services and supplies, including outpatient, ambulatory, and preventive services, includes coverage of chiropractic services, mental health services, and physical therapy or occupational therapy treatments, but with specific definitions of the services that may be provided and the provider type able to be reimbursed to deliver the treatment. Medicare patients may also end up paying more out-of-pocket if their provider recommends a higher number of services than Medicare will cover, or if the provider does not think a specific therapy is medically necessary above a certain dollar amount.⁷⁹ Visit caps on outpatient physical therapy and occupational therapy services were removed in 2018, but monitoring of services above a certain level still applies, with the provider needing to confirm that OT or PT services above a certain amount are still medically necessary for them to be covered under Medicare Part B.

Table 4 details some of the evidence-based non-pharmacological treatments and the associated Medicare coverage that providers may deliver to patients with chronic pain. Some services delivered in either inpatient or outpatient settings by a physician, PA, NP, OT, PT, clinical psychologist or clinical social worker may be covered if the services are deemed “medically necessary.” The Centers for Medicare and Medicaid Services (CMS) define a medically necessary health care service as one “needed to diagnose or treat an illness, injury, condition, disease, or its symptoms and that meet accepted standards of medicine.”⁸⁰ The “accepted standards of medicine” often refer to the body of peer-reviewed literature that provides evidence of the efficacy of a health care service, which can be lacking for certain CAM treatments. This may contribute to the relative lack of coverage for CAM services compared to traditional health care services under Medicare. As of January 2019, CMS has started researching the benefits of reimbursing acupuncture as a means to treat low back pain in recognition of the importance of CAM for the treatment of chronic pain.⁸¹

Table 4: Medicare Insurance Coverage for Occupations Involved in Non-Pharmacological Pain Interventions, according to the Centers for Medicare & Medicaid Services (CMS)⁷⁹

Occupation	Medicare Part B Coverage	Applicable Evidence-Based Interventions (from Table 1)	Patient Costs for Services	Notes
Athletic Trainer (AT)	NO	N/A	100%	Not recognized as providers by CMS
Tai Chi or Qigong Instructor	NO	N/A	100%	Not recognized as providers by CMS
Yoga Instructor	NO	N/A	100%	Not recognized as providers by CMS
Massage Therapist	NO	N/A	100%	Not recognized as providers by CMS
Licensed Acupuncturist (LAc)	NO	N/A	100%	Not recognized as providers by CMS
Psychologist	YES	Cognitive Behavioral Therapy	20% of the Medicare-approved amount	Other covered outpatient mental health services may include: depression screening, psychotherapy, family counseling.
Psychotherapist	YES	Cognitive Behavioral Therapy	20%	Coverage for mental health services w/ clinical social worker clinical nurse specialist, if licensed
Physical Therapist (PT), Physical Therapy Assistant (PTA)	YES	“medically necessary outpatient physical therapy”	20%	No limit on coverage in calendar year; may also be covered as part of eligible home health services
Occupational Therapist (OT), Occupational Therapy Assistant (OTA)	YES	“medically necessary outpatient occupational therapy”	20%	No limit on coverage in calendar year; may also be covered as part of eligible home health services
Chiropractor	YES	Spinal manipulation only, “if medically necessary to correct subluxation when provided by a chiropractor or other qualified provider.”	20%	Other tests/services ordered by the chiropractor are NOT covered, i.e. massage therapy, acupuncture.
Physician (MD or DO), Nurse Practitioner (NP), Physician Assistant (PA)	YES	Mental health services (CBT) Osteopathic manipulation(DO)	20% for most services	“Medically necessary doctor services,” All covered for mental health services

Medicaid, the federal government’s state-administered health insurance for low-income and vulnerable populations, has strict guidelines for the types of services and providers it will cover. Where Medicaid coverage is available, it is frequently limited by high out-of-pocket expense for complementary health approaches, and low reimbursement rates for providers of CAM services. In a 2012 review of Medicaid coverage, all except six states reimbursed for at least one of the following categories of non-pharmacologic pain management services: physical therapy, psychotherapy, occupational therapy, and chiropractic care.⁸² In a 2016 survey of states, only 12 states out of 41 surveyed said that their Medicaid agencies had started programs or policies encouraging non-opioid pain management services.⁸² In a 2018 cross-sectional study of 45 Medicaid, Medicare, and commercial plans for low back pain management options, most covered physical and occupational therapy and chiropractic care services for chronic pain, but two-thirds of all plans did not cover acupuncture.⁷⁴ Although commercial plans usually recognize physical medicine and rehabilitation services delivered by athletic trainers and reimburse for these services (if “medical necessity” is first established), CMS does not recognize athletic trainers as health care providers.⁸³

STATE REGULATORY PRACTICE VARIATION

State scope of practice laws can be a barrier to access for several forms of non-pharmacologic pain treatment. For example, although patients have direct access (without referral from another provider) to PTs in all 50 states, many states have specific provisions that may limit patient access for some types of services or under specific conditions. Twenty-eight states limit the number of PT visits, and have specific referral requirements for some treatments such as spinal manipulation. Three states limit access to PTs based on treatment limits to certain types of patients (such as those seeking services only “for the purpose of injury prevention, reduction of stress, or promotion of fitness”) or have requirements for certain circumstances to be met, such as having had a previous diagnosis or physician referral.⁸⁴ Twenty states allow unrestricted patient access to PTs, meaning that

state law does not restrict or limit patients' direct access to PTs for any type of service. Despite state regulations that enable patient access to PT services, insurance companies often require provisions for the services to be covered, such as requiring physician referrals.

Similar state scope of practice regulations apply to chiropractors, although chiropractors can be directly accessed by patients in all states. As with PTs, insurers or employers may impose restrictions on the type of procedures a chiropractor can perform by not reimbursing for specific services, even if a chiropractor is educated in and legally allowed by the state to perform the procedure.²⁵ A survey of state chiropractic licensing boards regarding state practice laws for 97 procedures found that Missouri and New Mexico allowed the highest number of services per patient to be performed by a chiropractor, while New Hampshire had the least.²⁵

An example of a procedure that PTs and chiropractors can practice in some states is dry needling, an acupuncture technique in which needles are inserted directly into muscles to treat musculoskeletal pain, which the National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM) has said is no different than traditional acupuncture.⁸⁵ While some states have ruled that dry needling falls within PT scope of practice or allow it with additional training, there is no standardized, national training curriculum for PTs to learn this technique. Seven states have explicitly ruled that PTs are not allowed to perform dry needling.⁸⁶ For chiropractors, most states require 100-300 hours of additional clinical and didactic training to practice chiropractic acupuncture (acupuncture integrated into a chiropractic practice) under their current chiropractic license. Sixteen states do not allow chiropractic acupuncture, and require chiropractors to have a separate acupuncture license in addition to their chiropractic license to practice acupuncture.²⁹ Other states, such as Kansas, allow acupuncture within a chiropractor's scope of practice and do not have additional requirements to practice.

EFFORTS TO INCREASE ACCESS TO THE HEALTH WORKFORCE THAT CAN DELIVER EVIDENCE-BASED NON-PHARMACOLOGICAL PAIN MANAGEMENT

RESPONDING TO THE OPIOID CRISIS

Too few guidelines on how to appropriately treat patients with chronic pain coupled with a lack of knowledge by many clinicians of appropriate chronic pain interventions have likely contributed to an over-reliance on prescription drugs as pain treatment. For example, although frequently prescribed for pain of any type (chronic or acute), there is actually a lack of evidence for the use of opioids to effectively treat chronic pain.⁸⁷ There is also limited evidence of which provider guidelines and recommendations for patient pain management are most effective.⁸⁸ Furthermore, the clinical guidelines that are available for the treatment of chronic pain are not easily implementable given the fragmentation of the U.S. healthcare system and inconsistent insurance coverage of non-pharmacological treatments.

As the current epidemic of opioid addiction mobilizes the health care system to minimize patients' prolonged use of opioid-containing medications, there is a concurrent push to identify alternative pain-management strategies. In 2017, the National Association of Attorneys General encouraged America's Health Insurance Plans to promote health care providers' prioritization of non-opioid pain management over opioid prescriptions.⁸⁹ The Pain Task Force of the Academic Consortium for Integrative Medicine and Health in 2018 similarly called for federal and state policies to increase access to and reimbursement for non-pharmacological therapies.⁹⁰

STATE-BASED MEDICAID APPROACHES

Nationwide, Medicaid populations are prescribed opioids for pain twice as often as non-Medicaid populations and some states have responded by promoting the importance of non-pharmacological therapies for pain treatment.⁸² Examples of states that have expanded coverage for non-pharmacological pain management include Oregon and Rhode Island, which have both increased Medicaid coverage for CAM therapies to treat pain. Oregon's Medicaid program covers acupuncture, chiropractic, osteopathic manipulation, PT, and CBT for back conditions, as of 2016.⁸² Under a section 1115 Demonstration, Rhode Island's Medicaid enrollees who have visited the Emergency Room four or more times within a year are eligible for coverage of acupuncture, chiropractic services and massage therapy to treat chronic pain.⁸²

PRIVATE HEALTH INSURANCE PILOTS

Commercial health plans are also recognizing the effectiveness of non-pharmacological pain treatment. On July 1, 2019, UnitedHealthcare (UHC) began a pilot program for its enrollees in Connecticut, Florida, Georgia, North Carolina, and New York that promotes physical therapy for patients with low back pain. This pilot involves UHC waiving copay and deductible costs for three visits to a PT for the treatment of low back pain.⁹¹ UHC began the pilot based on findings from a 2019 study that found health plan design was a major factor in determining a patient's provider choice for low back pain.⁹² Having fewer provider restrictions in a plan was associated with a patient being more likely to choose a PT or chiropractor than a primary care provider for low back pain, and having high copayments and deductibles were associated with lower odds of seeing a PT or chiropractor.⁹²

MOBILIZING TEAM-BASED CARE

The importance of effective interprofessional team-based care is gaining recognition and emphasis in health care delivery,⁹³ and there is growing evidence that team-based approaches that address the physical, psychological, and social components of chronic pain can be effective. A 2017 study of VA patients found that a team-based treatment approach and access to a larger variety of non-pharmacological treatment options helped chronic pain patients overcome access-related barriers such as scheduling and resources.⁷⁰ A systematic review of 41 randomized control trials of multidisciplinary rehabilitation (MDR) programs to treat chronic low back pain found moderate evidence that MDR (which had to include physical plus psychological and/or social components delivered by at least two different healthcare professionals) was more effective than usual care for chronic low back pain.⁹⁴ The trials included in the review were those that compared MDR to physical treatment, MDR to surgery, and MDR to usual care.⁹⁴ A 2018 study of the effectiveness of MDR for women with chronic musculoskeletal pain found that MDR involving a pain management team comprised of PTs, physicians, and psychologists, among others, can have improvements lasting long after treatment.⁹⁵ The study group showed significant improvements in quality of life indicators and decreased pain intensity compared to a traditional treatment group six months after treatment ended.⁹⁵

New models of care delivery such as the Osher Centers for Integrative Medicine at six national academic health systems are combining multiple treatment practices into a holistic care plan delivered by a team of health professionals.⁹⁶ The goal of the Osher Centers is not only to reduce pain, but also to improve patients' function and quality of life by using an integrative health care model that "treats the whole person."⁹⁷ These integrative health care clinics treat chronic pain by using a combination of evidence-based therapies such as chiropractic, acupuncture, psychiatric, mind-body, and physician-administered care.⁹⁶ A 2018 study compared chronic low-back pain outcomes in Osher Center patients versus non-Osher Center patients and found an improvement in the mean level of "bothersomeness of pain" (BOP) and a decrease in functional limitation score related to back pain at 12 months, although no statistically significant differences were found at an earlier six-month follow up.⁹⁸ This supports deploying ongoing health practices provided by a comprehensive pain management team that includes providers of primary care, physical therapy, chiropractic, acupuncture, massage, and mind-body care, in order to promote sustained healing.

CONCLUSIONS

Many health care occupations and certified practitioners are able to provide non-pharmacological pain management treatments to patients with chronic pain. Not only do a wide range of professions frequently obtain training in many evidence-based non-pharmacological methodologies that fall within their scope of practice, but many may pursue additional training to be certified or credentialed in specific evidence-based non-pharmacological therapies. If more health care providers and patients, however, had improved knowledge of the range of occupations able to deliver evidence-based treatments, there would be increased access to these services. While physicians (allopathic and osteopathic), NPs, and PAs may be knowledgeable about, and some able to deliver, non-pharmacological interventions, many may not be familiar with other occupations that provide evidence-based pain management services and how these providers might support their efforts to prevent dependence on potentially addicting pharmaceutical treatments.

This study identified three key factors affecting access to non-pharmacological pain management services. First, insurance coverage and related reimbursement can enable or limit access. Coverage of evidence-based pain therapies is inconsistent among private and different public insurance programs, hindering consistent use and/or the amount of use of these services. Second, insufficient provider training and awareness of effective alternatives to pharmacologic pain treatment, and the types of providers who can provide them, limit use of these therapies and referrals to other appropriate providers. Finally, patients' perceptions of the acceptability of non-pharmacological interventions and patient education about pain management options influences their effective use. This includes approaches such as engaging patients in therapy plans that include self-management (where appropriate), conveying the limits and risks of pharmacologic treatment, and engaging patients with teams of providers to treat and manage chronic pain.

More peer-reviewed research to provide evidence about the effectiveness of non-pharmacologic therapies and their applications across additional types of chronic pain are needed to support the uptake of non-pharmacological pain interventions. The National Institutes of Health (NIH) has already recognized this need by funding several projects dedicated to effectiveness research on non-opioid pain interventions through the Helping to End Addiction Long-term (HEAL) Initiative. These funded projects include the Pain Management Effectiveness Research Network (ERN), and the Pragmatic and Implementation Studies for the Management of Pain to Reduce Opioid Prescribing (PRISM) project.⁹⁹ The goal of the ERN is to build the evidence base for the most effective non-pharmacological pain treatments across a range of chronic pain types,¹⁰⁰ while the PRISM project will evaluate the implementation of these evidence-based interventions in real-world health care settings.¹⁰¹

To fully utilize the professionals identified in this report that are able to deliver effective pain care, the health care community requires greater education about the variety of evidence-based, non-pharmacological pain management practices available to patients and the range of providers able to deliver them. Ongoing support to expand and strengthen effectiveness research and disseminate findings is needed to support sound policymaking. To facilitate appropriate pain management referrals and integrative practice, and ensure transparent and consistent coverage of evidence-based non-pharmacological approaches to pain management, easily accessible information is needed about the providers who can deliver evidence-based pain treatment, where they are located, and which populations they are able to serve. This information could be used to improve our understanding of where gaps in the pain treatment workforce occur across the U.S. and potentially illuminate where there is greater risk for overuse of pharmaceutical treatment of chronic pain.

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FUNDING

This publication was supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of an award totaling \$601,188 with zero percentage financed with non-governmental sources. The contents are those of the authors and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS or the U.S. Government. For more information, please visit [HRSA.gov](https://www.hrsa.gov).

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ACKNOWLEDGEMENTS

We would like to thank the following individuals for contributing their time and expertise in review of this report: Lucille Marchand, MD, BSN, AAHPM, Executive Director, University of Washington Osher Center for Integrative Medicine; Iman Majd, MD, MSA, LAc, Director, Osher Center for Integrative Medicine Clinic, Seattle, WA; Tracy Mroz, PhD, OTR/L, Assistant Professor, Department of Rehabilitation Medicine, University of Washington; and Kimberly Harmon, MD, Professor, Departments of Family Medicine and Orthopedics, and Section Head, Sports Medicine. We also thank Anne Basye for editing and Bev Marshall for report production.

SUGGESTED CITATION

Pollack SW, Skillman SM, Frogner BK. *The Health Workforce Delivering Evidence-Based Non-Pharmacological Pain Management*. Center for Health Workforce Studies, University of Washington, Feb 2020.

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