IMPROVING PAIN MANAGEMENT AND SUPPORT FOR WORKERS WITH MUSCULOSKELETAL DISORDERS

Policies to Prevent Work Disability and Job Loss

Volume 2: A Resource Compendium for Musculoskeletal Disorders and Pain Management

IMPROVING PAIN MANAGEMENT AND SUPPORT FOR WORKERS WITH MUSCULOSKELETAL DISORDERS:

Policies to Prevent Work Disability and Job Loss

Volume 2: Resource Compendium for Musculoskeletal Disorders and Pain Management

August 18, 2017

Authors:
William S. Shaw, PhD
Robert J. Gatchel, PhD
Jennifer Christian, MD
Linda Toms Barker, MA (ed.)

Prepared for:
U.S. Department of Labor
200 Constitution Ave.
Washington, DC 20210

Prepared by:
IMPAQ International, LLC
10420 Little Patuxent Parkway, Suite 300
Columbia, MD 21044
www.impaqint.com

Citation: Shaw, W., Gatchel, R., Christian, J., Toms Barker, L. (ed.) (2017). Improving Pain Management and Support for Workers with Musculoskeletal Disorders: Policies to Prevent Work Disability and Job Loss, Vol. 2 – Resource Compendium. For SAW/RTW Policy Collaborative, U.S. Department of Labor, Office of Disability Employment Policy, IMPAQ International, LLC.

Preparation of this document was funded by the Office of Disability Employment Policy, U.S. Department of Labor, Contract Number DOLQ121A21885/DOL-OPS-16-U-001782. This document does not necessarily reflect the views or policies of the Office of Disability Employment Policy, U.S. Department of Labor, nor does the mention of trade names, commercial products, or organizations imply endorsement by the U.S. government.

TABLE OF CONTENTS

List of Figures

1. INTRODUCTION

The Stay-at-Work/Return-to-Work (SAW/RTW) Policy Collaborative was established by the U.S. Department of Labor's Office of Disability Employment Policy (ODEP) to support the development of policies, programs, and practices that encourage the continued employment of workers likely to leave the workforce due to injury, serious illness, or disability. Supported by IMPAQ International, LLC (IMPAQ), the SAW/RTW Policy Collaborative consists of a Community of Practice (COP) to provide input and real-time feedback on specific policy topics related to SAW/RTW and Policy Working Groups (PWGs) led by subject matter experts who work together to explore effective SAW/RTW practices, inform policy recommendations to key stakeholders, and develop resources to support policy action.

This Resource Compendium was developed by IMPAQ International with input from the Musculoskeletal Conditions and Pain Management Policy Working Group as a companion volume to the policy action paper prepared by the PWG: *Improving Pain Management and Support for Workers with Musculoskeletal Disorders: Policies to Prevent Work Disability and Job Loss*[1]. This compendium provides the reader with an annotated collection of a wide range of articles, documents and weblinks for additional information about the issues discussed in the paper.

[1] See http://www.impaqint.com/stay-workreturn-work-policy-collaborative-swr2w

2. MUSCULOSKELETAL DISORDERS AND RETURN TO WORK

This part of the resource compendium includes research on programs and interventions to help people with returning to work, barriers to returning to work among people with pain due to musculoskeletal (MSK) disorders, and factors that make returning to work more likely. Also included is an evidence review of return-to-work (RTW) and workplace-based disability management interventions. In general, the research seems to suggest that barriers are found in many different domains of life (financial, physical, and psychological, for example), and that programs and interventions that address several of these domains concurrently seem to be more effective in getting people back to the workforce after an injury.

The following resources are listed in reverse chronological order. Note: In some cases, the author(s)' abstract or document description is presented verbatim.

Effectiveness of Workplace Interventions in Return-to-Work for Musculoskeletal, Pain-Related and Mental Health Conditions: An Update of the Evidence and Messages for Practitioners
Cullen, K. L., Irvin, E., Collie, A., F. Clay, Gensb, U., Jennings, P.A., Hogg-Johnson, S., et al.
(2017). *Journal of Occupational Rehabilitation,* 1-15.
https://www.ncbi.nlm.nih.gov/pubmed/28224415
The objective of this systematic review was to synthesize evidence on the effectiveness of workplace-based RTW interventions and work disability management (DM) interventions that assist workers with musculoskeletal and pain-related conditions or mental health (MH) conditions with RTW. While there is substantial research literature focused on RTW, there are only a small number of quality workplace-based RTW intervention studies that involve workers with MSK or pain-related conditions or MH conditions. The authors recommend implementing multi-domain interventions (i.e. with healthcare provision, service coordination, and work accommodation components) to help reduce lost time for MSK or pain-related conditions and MH conditions. The authors recommend practitioners implement these programs to improve work functioning and reduce costs associated with work disability.

A Participatory Return-to-Work Program for Temporary Agency Workers and Unemployed Workers Sick-Listed Due to Musculoskeletal Disorders: A Process Evaluation Alongside a Randomized Controlled Trial
Van Beurden, K. M., Vermeulen, S. J., Anema, J. R., & Van der Beek, A. J.
(2012). *Journal of Occupational Rehabilitation, 22*(1), 127–140.
http://link.springer.com/article/10.1007%2Fs10926-011-9314-4
This study involved a process evaluation of a newly developed participatory RTW program for workers without an employment contract, sick-listed due to MSK disorders. The program's stepwise process, guided by an independent RTW coordinator, aimed at making a consensus-based RTW plan with the possibility of a temporary (therapeutic) workplace – one that creates an opportunity to practice (new) work skills and get work experience. The study described the reach and extent of implementation of the new program, satisfaction and experiences of all stakeholders, and perceived barriers and facilitators for implementation of the program in daily practice. The results indicate overall feasibility for implementation of the participatory RTW program in daily practice. However, to overcome important barriers, more attention should be paid to improve timely offering of suitable temporary work opportunities, to describe more clearly the program goals and the professional's roles, and to offer additional support for workers suffering from complex multi-causal health problems.

Long-term return to work after a functional restoration program for chronic low-back pain patients: a prospective study
Poulain, C., Kernéis, S., Rozenberg, S., Fautrel, B., Bourgeois, P., & Foltz, V.
(2010). *European Spine Journal, 19* (7), 1153–1161.
http://link.springer.com/article/10.1007/s00586-010-1361-6
Functional restoration programs (FRP) have been developed to promote the socio-professional reintegration of low-back pain patients with significant work absenteeism. The aim of this study was to determine the long-term effectiveness of functional restoration programs (FRP) in a group of 105 chronic low-back pain patients and to determine the predictive factors of RTW. Fifty-five percent of the patients returned to work after mean follow-up time of 3.5 years, compared with 9% of the patients at work at baseline. Quality of life, functional disability, psychological factors, and fear and avoidance beliefs were all significantly improved. Three predictive factors were found: younger age at the onset of low-back pain, practice of sports, and shorter duration of sick leave at baseline. FRP show positive results in terms of RTW for chronic low-back pain patients with prolonged work absenteeism. The authors recommend FRP programs at an earlier stage of the disease.

Coordinated and Tailored Work Rehabilitation: A Randomized Controlled Trial with Economic Evaluation Undertaken with Workers on Sick Leave Due to Musculoskeletal Disorders
Bültmann, U., Sherson, D., Olsen, J., Hansen, C. L., Lund, T., & Kilsgaard, J.
(2009), *Journal of Occupational Rehabilitation*, *19*, (1), 81–93.
http://link.springer.com/article/10.1007/s10926-009-9162-7
In Denmark, the magnitude and impact of work disability on the individual worker and society has prompted the development of a new "coordinated and tailored work rehabilitation" (CTWR) approach. The aim of this study was to compare the effects of CTWR with conventional case management on return-to-work of workers on sick leave due to MSK disorders. Workers on leave for four to 12 weeks due to MSK disorders who underwent "CTWR" by an interdisciplinary team had fewer absence hours than controls. The economic evaluation showed reduced productivity loss and cost savings for society.

Barriers to rehabilitation and return to work for unemployed chronic pain patients: A qualitative study
Patel, S., Greasley, K., & Watson, P. J.
(2007). *European Journal of Pain, 11*(8), 831-840.
http://onlinelibrary.wiley.com/doi/10.1016/j.ejpain.2006.12.011/full
This paper explores barriers to RTW presented by unemployed patients with chronic MSK pain. Several themes were identified as barriers to RTW including pain related issues, uncertainty (both financial and physical), inefficiencies in the healthcare system, interaction with benefits providers, perceptions of employers and personal limitations. The uncertainty and the pain condition itself were the overarching barriers from which other obstacles stemmed. The themes identified can help with the planning and development of future initiatives for returning chronic pain patients to employment.

Concepts of rehabilitation for the management of low back pain
Waddell, G., & Burton, A. K.
(2005). *Best Practice & Research Clinical Rheumatology*, *19*(4), 655–670.
http://www.sciencedirect.com/science/article/pii/S1521694205000318
This chapter develops rehabilitation principles for the clinical and occupational management of non-specific low back pain. Most patients with lower back pain do not have any irremediable impairment and long-term incapacity is not inevitable: given the right care, support and opportunity, most should be able to RTW. Rehabilitation should then address obstacles to recovery and barriers to (return to) work. The

authors suggest that rehabilitation should not be a separate, second stage after 'treatment' is complete: rehabilitation principles should be integral to clinical and occupational management. It should be possible to reduce sickness absence and long-term incapacity by at least 30–50%, but this will require a fundamental shift in management culture.

Is there a right treatment for a particular patient group? Comparison of ordinary treatment, light multidisciplinary treatment, and extensive multidisciplinary treatment for long-term sick-listed employees with musculoskeletal pain

Håland Haldorsen, E. M., Grasdal, A. L., Sture Skouen, J., Erling Risa, A. E., Kronholm, K., & Ursin, H. (2002). *Pain, 95* (1–2), 49–63

http://www.sciencedirect.com/science/article/pii/S0304395901003748

A randomized controlled study assigned 654 individuals with MSK pain into three groups based on prognosis for RTW using standardized screening of psychological and physiotherapy findings. They were then randomly assigned to outpatient treatments with three different levels of intensity (ordinary treatment, light multidisciplinary, and extensive multidisciplinary treatment with interdisciplinary planning and coordination). Patients with good prognosis for RTW did equally well with ordinary treatment as with the two more intensive treatments. Patients with medium prognosis benefited equally from the two more intensive treatments. Patients with poor prognosis receiving extensive multidisciplinary treatment returned to work at a higher rate than those receiving ordinary treatment. Cost–benefit analysis showed positive net present social value of the treatment, suggesting a simple, standardized, screening instrument including only psychological and physiotherapeutic observations may be a useful clinical tool for allocating patients with MSK pain to the right level of treatment.

Goal setting as a predictor of return to work in population of chronic musculoskeletal pain patients

Tan, V., Cheatle, M. D., Mackin, S., Moberg, P. J., & L. Esterhai, J. L. Jr. (1997). *International Journal of Neuroscience, 92*(3-4)

http://www.tandfonline.com/doi/abs/10.3109/00207459708986399

This study assessed the association between personal attributes, vocational factors, and the RTW outcome for patients with chronic, nonmalignant MSK pain, as well as RTW motivation though an open-format listing of treatment goals in 59 chronic pain patients admitted to a university pain management program. Patients were then followed (average of 17.9 months) in the posttreatment period to determine whether they had in fact returned to employment. Results indicated marital status, education and decreased length of unemployment were predictive of RTW outcome. Overall, RTW goal was the single best predictor of RTW outcome. In contrast, increased number of premorbid jobs, compensation status, patient's race and sex were not predictive. The study suggests that the assessment of an individual's motivation as defined by goal-setting may be a key factor in predicting a favorable outcome for MSK patients.

3. USE OF OPIOIDS FOR MUSCULOSKELETAL PAIN

The United States is widely acknowledged to be in an opioid crisis, which involves both prescription opioid analgesics and illicit drugs such as heroin. As noted in a Pew Charitable Trusts report:[2]

> *The prescription opioid epidemic poses major threats to the nation's health. According to the Centers for Disease Control and Prevention, approximately 19,000 people in the United States died from overdoses involving prescription opioids in 2014—a 16 percent increase from the previous year, and the highest number ever recorded.[3] Emergency room visits by people using opioids for nonmedical reasons, such as taking a higher-than prescribed dose or a prescription intended for another person, increased 117 percent between 2005 and 2011.[4] Furthermore, people who are addicted to prescription opioids are 40 times more likely to become addicted to heroin.[5] And the rate of deaths involving heroin increased nearly fivefold between 1999 and 2014,[6] with more than 10,500 people dying of heroin-related overdoses in 2014.*
>
> *Because increased prescribing of opioids has been a primary driver of the prescription opioid epidemic, reducing the overprescribing of these therapies is a primary focus of efforts to reverse these trends.[7]*

The research in this part of the resource compendium looks at several topics related to the management through prescription opioids of pain associated with MSK disorders. Articles uncover correlations of opioid treatment with long-term disability, chronic work loss, and ineffectiveness in pain management for some types of injuries and conditions. Based on the research, opioids seem to address pain in the short term, particularly with acute conditions, but also are associated with risks of dependency and misuse, that may outweigh the benefits. These resources are listed in reverse chronological order.

Early Prescription Opioid Use for Musculoskeletal Disorders and Work Outcomes: A Systematic Review of the Literature
Carnide, N., Hogg-Johnson, S., Côté, P., Irvin, E., Van Eerd, D., Koehoorn, M., & Furlan, A. (2016). *Clinical Journal of Pain, 33(*7), 647-658.
http://journals.lww.com/clinicalpain/Abstract/publishahead/Early_Prescription_Opioid_Use_for_Musculoskeletal.99095.aspx
MSK disorders are a common source of work disability. Opioid prescribing for MSK disorders has been on the rise, despite a lack of data on effectiveness. This article presents results of a systematic review to determine whether early receipt of opioids is associated with future work outcomes among workers with

[2] The Pew Charitable Trusts. (2016, December). *Prescription drug monitoring programs: Evidence-based practices to optimize prescriber use.*
http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf
[3] Centers for Disease Control and Prevention, "Number and Age-Adjusted Rates of Drug-Poisoning Deaths Involving Opioid Analgesics and Heroin: United States, 2000–2014," http://www.cdc.gov/nchs/data/health_policy/AADR_drug_poisoning_involving_OA_Heroin_US_2000-2014.pdf.
[4] Elizabeth H. Crane, "Emergency Department Visits Involving Narcotic Pain Relievers," The CBHSQ Report, Substance Abuse and Mental Health Services Administration (2015), http://www.samhsa.gov/data/sites/default/files/report_2083/ShortReport-2083.html.
[5] Centers for Disease Control and Prevention, "Today's Heroin Epidemic," http://www.cdc.gov/vitalsigns/heroin.
[6] Centers for Disease Control and Prevention, "Number and Age-Adjusted Rates."
[7] Centers for Disease Control and Prevention "CDC Guideline for Prescribing Opioids for Chronic Pain—United States, 2016," Morbidity and Mortality Weekly Report 65, no. 1 (2016): 1–49, http://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm.

MSK disorders compared to other analgesics, no analgesics, or placebo. The review suggests opioids provided within the first 12 weeks of onset of MSK disorders are associated with prolonged work disability. However, the conclusions of these studies need testing in a high-quality study that addresses the methodological shortcomings identified in the current review (which include inconsistent exposure measurement and control of confounding.)

Long-Term Opioid Prescribing and the Risk of Adverse Events in Patients with Musculoskeletal Pain: A Cohort Study

Bedson, J., Chen, Y., Haywood, R., Dunn, K. M., & Jordan, K. P.
(2016). *Rheumatology,* 55 (suppl_1): i51.
https://academic.oup.com/rheumatology/article-abstract/55/suppl_1/i51/1793750/O35-Long-Term-Opioid-Prescribing-and-the-Risk-of

Each year over 20% of adults in the UK seek primary care for MSK pain. Increasingly they are prescribed opioid analgesics. In the USA, long-term use has been associated with adverse events, including substance abuse, self-poisoning and bone fractures. It is unclear if this is the case in the UK, because of differences in the health care systems and prescribing guidelines between the two countries. The study assessed whether using long-term opioid analgesics for MSK pain is related to increased risks of adverse events in the UK and identified characteristics of patients who might be at greatest risk. The result was a significant association between long term opioid use and adverse events, especially among females and patients with high co-morbidity. The risks of adverse events appear highest in the first year of use. Authors recommend that doctors tailor long term opioid use to the patient's risk profile and adopt a policy of regular review in the early stages of treatment.

Assessment of Pre-, Post-, And Change in Opioid Use: Evaluation of Hydrocodone as Part of Functional Restoration Treatment in a Chronic Disabling Occupational Musculoskeletal Pain (CDOMP) Population

Worzer, W. E.
(2015). University of Texas Arlington (thesis)
https://uta-ir.tdl.org/uta-ir/bitstream/handle/10106/25040/Worzer_uta_2502D_13072.pdf?sequence=1&isAllowed=y

This study examined the relationship between pre-treatment, post-treatment, and change in opioid use among 1,601 chronic pain patients who participated in a functional restoration program. In the initial phase of treatment, patients were weaned from opiate medications. Those with lower levels of pre-treatment opioid use were more likely to complete the functional restoration program. When analyzing one year socioeconomic outcomes such as RTW, work retention, and healthcare utilization, opioid use at pre-treatment was found to be a predictor of RTW, and an even better predictor of work retention. The author concludes that individuals with limited opioid use showed similar benefits from a functional restoration program as those who report no opioid use. However healthcare utilization is significantly greater for chronic pain patients who complete treatment on higher doses of opioid medications, and those reporting higher levels of opioid use showed poorer socioeconomic and health outcomes at one-year follow-up.

Opioids for low back pain

Deyo, R. A., Von Korff, M., & Duhrkoop, D.
BMJ 2015; 350
http://www.bmj.com/content/350/bmj.g6380

Opioids do not seem to expedite RTW in injured workers or improve functional outcomes of acute back pain in primary care. For chronic back pain, systematic reviews find scant evidence of efficacy.

Randomized controlled trials have high dropout rates, brief duration (four months or less), and highly selected patients. Opioids seem to have short-term analgesic efficacy for chronic back pain, but benefits for function are less clear. Given the brevity of randomized controlled trials, the long-term effectiveness and safety of opioids are unknown. Screening for high-risk patients, treatment agreements, and urine testing have not reduced overall rates of opioid prescribing, misuse, or overdose. Newer strategies for reducing risks include more selective prescription of opioids; lower doses; use of prescription monitoring programs; avoidance of co-prescription with sedative hypnotics; and reformulations that make drugs more difficult to snort, smoke, or inject.

Opioid use among low back pain patients in primary care: Is opioid prescription associated with disability at 6-month follow-up?

Ashworth, J., Green, D. J., Dunn, K. M., & Jordan, K. P.

(2013). *PAIN, 154*(7), 1038–1044

http://www.sciencedirect.com/science/article/pii/S0304395913001012

Opioid prescribing for chronic non-cancer pain is increasing, but there is limited knowledge about longer-term outcomes of people receiving opioids for conditions such as back pain. This study aimed to explore the relationship between prescribed opioids and disability among patients consulting in primary care with back pain. The findings indicate that even after adjusting for a substantial number of potential confounders, opioids were associated with slightly worse functioning in back pain patients at six-month follow-up. Further research may increase understanding of the mechanisms underlying these findings and inform clinical decisions regarding the usefulness of opioids for back pain.

Biopsychosocial function analysis changes the assessment of the ability to work in patients on long-term sick-leave due to chronic musculoskeletal pain: The role of undiagnosed mental health comorbidity

Olaya-Contreras, P., & Styf, J.

(2013). *Scandinavian Journal of Public Health*, *41*(3).

http://journals.sagepub.com/doi/abs/10.1177/1403494812473380

This study focuses on the prevalence of somatic and mental health comorbidity and the use of opioid medication among patients on long-term sick-leave due to chronic MSK pain, compares an orthopaedic-based assessment of ability to work with a team assessment, and investigates the relationship between intensity of pain and psychosocial characteristics. The authors conclude that an evaluation based on biopsychosocial function is valuable in reaching an accurate assessment of the patient's diagnosis and ability to work, and that ability to work and length of sick-leave is determined to a large extent by undiagnosed mental health comorbidities, and not solely somatic complaints.

Shorter Time Between Opioid Prescriptions Associated With Reduced Work Disability Among Acute Low Back Pain Opioid Users

Cifuentes, M., Powell, R, Webster, B.

(2012). *Journal of Occupational & Environmental Medicine, 54*(4), 491–496.

http://journals.lww.com/joem/Abstract/2012/04000/Shorter_Time_Between_Opioid_Prescriptions.17.aspx

This study explored whether average time between opioid prescriptions is associated with shorter time off work. The study found that fewer days between opioid prescriptions were associated with shorter time off work. The mechanism of this effect is unknown but may be related to the provider's close monitoring of the patient's pain and function, as well as addressing barriers that may prevent workers from returning to work.

Increases in the Use and Cost of Opioids to Treat Acute and Chronic Pain in Injured Workers, 1999 to 2009
Bernacki, E., Yuspeh, L., Lavin, R., & Tao, X.
(2012). *Journal of Occupational & Environmental Medicine, 54*(2).
http://journals.lww.com/joem/Abstract/2012/02000/Increases_in_the_Use_and_Cost_of_Opioids_to_Treat.15.aspx
The authors analyzed claim and prescription data for Louisiana Workers' Compensation Corporation claims open from 1999 and 2009 by claim age and type of opioid. The purpose was to quantify temporal changes in opioid use. The analysis showed a significant cumulative yearly increase in morphine milligram equivalents prescribed for acute pain, and chronic pain. The annual cumulative increases in dose and cost of opioids per claim over the study period were related to an increase in prescriptions for long-acting opioids.

The course of opioid prescribing for a new episode of disabling low back pain: Opioid features and dose escalation
Cifuentes, M., Webster, B., Genevay, S., & Pransky, G.
(2010). *PAIN, 151*(1), 22–29.
http://www.sciencedirect.com/science/article/pii/S0304395910002186
Little information is available on opioid prescribing for acute, disabling low back pain and how opioid features and dose change over time. This study found that number of days between the initial report and the first opioid prescription had the greatest association with subsequent dose escalation. Dose escalation was greater with pure formulations, and was not related to clinical severity or surgery. In contrast to previous and current guideline recommendations, opioid prescribing for acute low back pain was often prolonged, and longer for surgical cases. These results reinforce recommendations to limit opioid duration, and suggest that consideration of opioid features can be part of a strategy to prevent escalating dosages.

Adverse effects of chronic opioid therapy for chronic musculoskeletal pain
Crofford, L. J.
(2010). *Nature Reviews* Rheumatology (6), 191-197.
http://www.nature.com/nrrheum/journal/v6/n4/abs/nrrheum.2010.24.html
The use of opioids for the treatment of chronic pain has increased dramatically over the past decade, but it is unclear if these drugs provide pain reduction and improved function to balance the risks associated with their use. Of particular concern is opioid-induced hyperalgesia, the activation of pain reception pathways that results in central sensitization to pain. Patients with chronic MSK pain should avoid the long-term use of opioids unless the benefits are determined to outweigh risks, in which case, the use of chronic opioids should be regularly re-evaluated.

MMPI Disability Profile Is Associated with Degree of Opioid Use in Chronic Work-related Musculoskeletal Disorders
Kidner, C. L., Gatchel, R., & Mayer, T.
(2010). *Clinical Journal of Pain, 26*(1), 9-15
http://journals.lww.com/clinicalpain/Abstract/2010/01000/MMPI_Disability_Profile_Is_Associated_With_Degree.2.aspx
The purpose of this study was to examine the relationship between level of opioid use and Minnesota Multiphasic Personality Inventory (MMPI) findings among chronic pain patients about to begin a functional restoration program. The results support show that increasing levels of opioid use is associated with less desirable MMPI profiles (towards the “neurosis” or “disability” end of the scale) and greater levels of pretreatment psychopathology.

Opioid Use for Chronic Low Back Pain: A Prospective, Population-based Study among Injured Workers in Washington State, 2002–2005

Franklin, G. M., Rahman, E. A., Turner, J. A., Daniell, W. E., & Fulton-Kehoe, D.
(2009). *Clinical Journal of Pain, 25*(9).
http://journals.lww.com/clinicalpain/Abstract/2009/11000/Opioid_Use_for_Chronic_Low_Back_Pain__A.1.aspx

The purpose of this study was to determine the predictors of long-term opioid use and the association between opioid dose and pain and function in a large cohort of workers with recent back injuries. Results show that (1) for the small group of workers with compensable back injuries who receive opioids longer-term (6%), opioid doses increase substantially and only a minority shows clinically important improvement in pain and function, and (2) the amount of prescribed opioid received early after injury strongly predicts long-term use. The authors also conclude that more research is needed to understand clinical decisions to continue or increase opioid therapy after back injury.

Opioid therapy for nonspecific low back pain and the outcome of chronic work loss

Ernest Volinn, E., Fargo, J. D., & Fine, P.G.
(2008). *PAIN, 142*, (3).
http://www.sciencedirect.com/science/article/pii/S0304395908007355

This study explored associations between opioid therapy for back pain and chronic work loss. Using data on workers' compensation claims for nonspecific low back pain, the authors used multivariate analyses to control for diverse covariates and a reference group of workers with no opioid prescriptions. The study found that compared with the reference group, odds of chronic work loss were six times greater for claimants with schedule II opioids (narcotics with a high potential for abuse and that can engender severe psychological or physical dependence); odds of chronic work loss were 11–14 times greater for claimants with opioid prescriptions of any type during a period of ⩾90 days; and three years after injury, costs of claimants with schedule II opioids averaged $19,453 higher than costs of claimants in the reference group. The results suggest that for most workers, opioid therapy did not arrest the cycle of work loss and pain.

Predicting Opioid Misuse by Chronic Pain Patients: A Systematic Review and Literature Synthesis

Turk, D. C., Swanson, K. S., & Gatchel, R. J. PhD
(2008). *Clinical Journal of Pain, 24*(6), 497-508.
http://journals.lww.com/clinicalpain/Abstract/2008/07000/Predicting_Opioid_Misuse_by_Chronic_Pain_Patients_.4.aspx

The purpose of this review was to synthesize the evidence of published strategies for identifying at-risk patients to guide clinicians' decisions and practices for prescribing opioid treatment for chronic pain patients. Review of the published studies reveals that no one procedure or set of predictor variables is sufficient to identify chronic pain patients at-risk for opioid misuse or abuse. There is a scarcity of evidence regarding characteristics that predict aberrant behavior before beginning long-term opioids. Several predictors have been identified. Strong predictors include a personal history of illicit drug and alcohol abuse. Demographic factors have also been reported, but the results are not consistent. The authors recommend prospective studies, especially those including patients who have not already been started on chronic opioid therapy.

Early Opioid Prescription and Subsequent Disability among Workers with Back Injuries: The Disability Risk Identification Study Cohort

Franklin, Gary M., Stover, B. D., Turner, J. A., Fulton-Kehoe, D., & Wickizer, T.
(2008). *Spine, 33*(2), 199-204.
http://journals.lww.com/spinejournal/Abstract/2008/01150/Early_Opioid_Prescription_and_Subsequent.14.aspx

This study examined whether prescription of opioids within six weeks of low back injury is associated with work disability at one year. The authors conclude that prescription of opioids for more than seven days for workers with acute back injuries is a risk factor for long-term disability, and that further research is needed to elucidate this association.

Relationship Between Early Opioid Prescribing for Acute Occupational Low Back Pain and Disability Duration, Medical Costs, Subsequent Surgery and Late Opioid Use

Webster, B. S., S. K. Verma, S. K., & Gatchel, R. J.
(2007). *Spine*, *32*(19), 2127-32.
https://www.ncbi.nlm.nih.gov/pubmed/17762815

This study examined the association between early opioid use for WC claimants with acute disabling low back pain and several outcomes: disability duration, medical costs, "late opioid" use (⩾five prescriptions from 30 to 730 days), and surgery in a two-year period following onset. The study found a negative association between receipt of early opioids and outcomes, suggesting that the use of opioids for the management of acute lower back pain may be counterproductive to recovery.

Systematic Review: Opioid Treatment for Chronic Back Pain: Prevalence, Efficacy, and Association with Addiction

Martell, B. A., O'Connor, P. G., Kerns, R. D., Becker, W. C., H. Morales, K. H., Kosten, T. R., & Fiellin, D. A.
(2007). *Ann Intern Med*., *146*(2), 116-127.
http://annals.org/aim/article/732048/systematic-review-opioid-treatment-chronic-back-pain-prevalence-efficacy-association

The purpose of this review was to examine the prevalence of opioid treatment, whether opioid medications are effective, and the prevalence of substance use disorders among patients receiving opioid medications for chronic back pain. The authors conclude that opioids are commonly prescribed for chronic back pain and may be efficacious for short-term pain relief, but long-term efficacy is unclear. Substance use disorders are common in patients taking opioids for back pain, and aberrant medication-taking behaviors occur in up to 24% of cases.

Factors Associated With Early Opioid Prescription among Workers with Low Back Injuries

Stover, B. D., Turner, J. A., Franklin, G., Gluck, J. V., Fulton-Kehoe, D., Sheppard, L., Wickizer, T. M., Kaufman, J., & Egan, K.
(2006). *Journal of Pain, 7* (10), 718–725.
http://www.sciencedirect.com/science/article/pii/S1526590006006730?np=y&npKey=b93b4258625b1a4d03ebb88301c5025cedb3c0ccb4d9f86ce334c9375c9a3cca

This study examined associations between worker sociodemographic and other characteristics and opioid prescription within six weeks of the first medical visit for workers' compensation claims for work loss due to back injury. For a sample of 1,067 cases, the study examined administrative, pharmacy, and worker-reported data, and found that Hispanics were less likely than non-Hispanic whites to receive opioid prescriptions. Adjusting for demographics, pain intensity, and physical disability, opiate prescription was significantly associated with daily tobacco use, pain radiating below the knee, and injury severity

categories (major sprain and radiculopathy). Knowledge of worker characteristics associated with early opioid prescription may be useful in future studies of the role of early pain treatment in influencing subsequent course of pain and disability among workers with back injuries.

Patterns and Trends in Opioid Use among Individuals with Back Pain in the United States
Luo, X., Pietrobon, R., & Hey, L.
(2004). *Spine, 29(*8), 884-890.
http://journals.lww.com/spinejournal/Abstract/2004/04150/Patterns_and_Trends_in_Opioid_Use_among.12.aspx
Variation in overall opioid use among individuals with back pain with different sociodemographic characteristics and from different geographic regions suggested an opportunity to improve opioid prescribing patterns. The increase in the use of hydrocodone and oxycodone indicate a need to better assess the efficacy and safety associated with these drugs among individuals with back pain.

Chronic non-malignant musculoskeletal pain in older adults: clinical issues and opioid intervention
Podichetty, V. K., Mazanec, D. J., & Biscup, R. S.
(2003). *BMJ Post Graduate Medical Journal, 79(*937)
http://pmj.bmj.com/content/79/937/627.short
MSK pain is common, frequently under-reported, and inadequately treated in the older adult. This article reviews the management of MSK pain syndromes in older adults emphasizing the potential role of opioid agents in carefully selected patients. The authors present an algorithm for MSK pain emphasizing a stepwise pharmacological approach in combination with an array of non-pharmacological therapies. Comorbid conditions may limit therapeutic choices, particularly in the elderly. Repeated assessment of pain levels as well as functional status is critical for optimal pain management.

4. BIOPSYCHOSOCIAL PAIN MANAGEMENT STRATEGIES

Perhaps the pain management strategy with the greatest potential for addressing musculoskeletal pain is the interdisciplinary pain management approach that has emerged from an understanding of the biopsychosocial model of pain. The biopsychosocial approach sees pain as a complex and dynamic interaction among physiological, psychological and social factors. Evidence suggests the integration of medical, psychosocial and physical rehabilitation into a comprehensive treatment strategy results in effective clinical care and may be the most cost-effective long-term treatment option[8]. However, there are significant barriers to widespread use of this interdisciplinary approach including lack of common definition of the model and reluctance of payers to invest in comprehensive care.

4.1 Biopsychosocial Interventions and Pain Management Strategies

This section provides additional information about range of biopsychosocial interventions including multi-disciplinary and interdisciplinary pain management strategies. Some of these reference include information about the evidence of effectiveness of these approaches. For more articles on evidence of effectiveness, see Section 4.6. These resources are listed in reverse chronological order.

American Chronic Pain Association (ACPA) Resource Guide to Chronic Pain Medication & Treatment: An Integrated Guide to Medical, Interventional, Behavioral, Pharmacologic and Rehabilitation Therapies
American Chronic Pain Association
(2017). Rocklin, California.
https://www.theacpa.org/uploads/documents/ACPA_Resource_Guide_2017.pdf
Rehabilitation through cognitive, behavioral, and physical reactivation treatments (also called functional restoration) often lessens or avoids the need for medications and other more invasive procedures. For each person, the combination of therapies and interventions needed may differ, based on individual need. The ACPA believes it is the responsibility of the person in pain to decide whether any particular health care professional has actually helped them and if not, to make a change. People with chronic pain benefit from being well informed about the range of possible treatments available to them. This knowledge may relieve the fears that can interfere with receiving maximum benefits from carefully and appropriately selected treatments and medications. Education can also prevent unrealistic expectations that lead to disappointment with no benefit or even a bad outcome from treatment. The information in this ACPA Resource Guide to Chronic Pain Management is compiled from multiple sources, updated yearly and includes web links for certain medications and treatments and relevant Internet sites of interest.

OEM Essentials Curriculum
American College of Occupational and Environmental Medicine
Retrieved July 2017 from
https://www.acoem.org/uploadedFiles/Continuing_Education/OEM%20Essentials%20for%20Web.pdf
The American College of Occupational and Environmental Medicine offers a certificate of completion in Occupational and Environmental Medicine (OEM) Essentials. This document describes the curriculum and requirements participants must meet within four years of enrollment. These include Foundations of Occupational Medicine – Segments 1 & 2, Work Disability Prevention for Clinicians: Mastering your Role in the Stay-at-Work/Return-to-Work Process, and Musculoskeletal Exam and Treatment Techniques.

[8] Robert J. Gatchel, Donald McGeary, Cindy McGeary, Ben Lippe, Interdisciplinary Chronic Pain Management" Past, Present and Future. *American Psychologist* February- March 2014, Vol 69, No. 2.

OxyContin maker teams up with Geisinger Health System to launch Apple Watch study on pain management

Mack, H.

(2017). *MobiHealthNews.* Retrieved July 2017 from http://www.mobihealthnews.com/content/oxycontin-maker-teams-geisinger-health-system-launch-apple-watch-study-pain-management

Many pharmaceutical companies are now turning to digital tools to improve medication adherence, augment clinical trials, or develop parallel therapies with digital health companies. Pennsylvania's Geisinger Health System and Purdue Pharmaceuticals are partnering on a study of 200 patients with severe chronic osteoarthritis or back pain who currently take a range of medications, including non-opioids. A new Apple Watch app will feature algorithms calculating when pain is going up or down along with mobility or medication usage, which will provide opportunities for members of that patient's care team to reach out and make adjustments. Participants will be divided into four groups: the intervention group getting an Apple Watch and three comparison groups, which includes those that have been through Geisinger's pain management treatment plan without the Watch, those who are in a standard pain clinic, and those who are only seeking treatment at a primary care clinic. The goal of the ResearchKit study is to track how pain impacts the patient's life and how medication is being used to manage it, which will hopefully provide insights on when and how alternative methods of pain management could be integrated into the patient's care.

Interdisciplinary Chronic Pain Management vs. Back Surgery: Which is Right for You?

Block, A. R.

*(*2017). *Spine-Health.* Retrieved July 2017 from http://www.spine-health.com/treatment/pain-management/interdisciplinary-chronic-pain-management-vs-back-surgery-which-right-you

This online page compares chronic pain management with back surgery, finding that for some patients, the benefits of a chronic pain management program outweigh the potential risks of spine surgery. The web page defines chronic pain management, offers links to various studies comparing patient surgery results with pain management results, and details conditions under which chronic pain management would be a better choice than back surgery. It goes further by detailing how physicians can educate back surgery candidates about chronic pain management and offers supporting links to both patients and physicians.

The Personal Physician's Role in Helping Patients With Medical Conditions Stay at Work or Return to Work

Jurisic, M., Beam, M., Harbaugh, J., Cloeren, M., Hardy, S., Hanlin, L., Cameron Nelson, C., & Christian, J. (2017). *Journal of Occupational and Environmental Medicine*, *59*(6), 125-131. http://journals.lww.com/joem/Fulltext/2017/06000/The_Personal_Physician_s_Role_in_Helping_Patients.21.aspx

This document outlines the role that physicians play in helping patients stay at work or return to work. ACOEM believes by following the principles outlined in this document, physicians can help their patients continue enjoying the salutary effects of being productive members of society, mitigate the impact of health conditions on the quality of everyday life, and avoid the manifold adverse consequences of prolonged worklessness. While paying attention to occupational issues may require extra time and effort on the physician's part, it is vital to the patient's wellbeing.

Implementation of the Medical Provider Network & Expansion of the Centers for Occupational Health and Education: 2016 Report to the Legislature
Washington State Department of Labor & Industries
(2016). Retrieved July 2016 from
http://www.lni.wa.gov/Main/AboutLNI/Legislature/PDFs/Reports/2016/ImpMPNexpCOHE.pdf
This report to the Washington State legislature examines the progress of implementing the requirements of RCW 51.36.010, which aims to reduce disability among injured workers by improving the quality of medical care they receive. To do this, the law requires L&I to increase access to high quality health care for injured workers by establishing a medical provider network and expanding the number of centers of occupational health and education (COHEs). In 2015, L&I actuaries finalized a comparison of claim costs for injured workers treated by providers who did not apply or were denied admission to the medical provider network. The final analysis shows the program is successful in improving patient outcomes, preventing high-cost disabilities and generating savings that meet the fiscal note estimates.

Establishing Accountability to Reduce Job Loss After Injury or Illness, for U.S. Department of Labor
Christian, J.
(2015). *Mathematica Policy Research*. Retrieved July 2017 from
https://www.dol.gov/odep/topics/pdf/SAW-RTW_Est.%20Accountability_2015-10.pdf
This is one of three policy action papers prepared as part of the Stay-at-Work/Return-to-Work Policy Collaborative, an initiative funded by the Office of Disability Employment Policy in the U.S. Department of Labor. Each year, millions of workers in the United States lose their jobs or leave the workforce after their ability to work is disrupted by a medical condition. Keeping these workers in the labor force could help them stay productive, maintain their standard of living, and avoid dependency on government programs. This paper presents actionable policy recommendations for keeping more people at work by: 1) establishing the preservation or restoration of work and full participation in life as key outcomes and important indicators of the value delivered by medical care and other health-related services; 2) making three key stakeholders who directly influence those outcomes more accountable—health care delivery organizations, employers, and insurers; and 3) designing and implementing an array of strategies to make the accountability strong, disrupt the current status quo, and deliver transformational social change.

Occupational Musculoskeletal Pain and Disability Disorders: An Overview
Gatchel, R. J., Nancy D. Kishino, N. D., & Strizak, A. M.
(2014). *Handbook of Musculoskeletal Pain and Disability Disorders in the Workplace,* Pages 2198 -7084
https://link.springer.com/chapter/10.1007%2F978-1-4939-0612-3_1
This important report from the Institute of Medicine (IOM), Relieving Pain in America (Institute of Medicine of the National Academy of Science, 2011), highlights the urgent need for the development of better methods for pain management, because he ever-increasing costs associated with current treatment approaches cannot be sustained. This report also highlights the fact that musculoskeletal pain is the most common single type of chronic pain.

Interdisciplinary Rehabilitation Programs in Chronic Pain Management
Chrvala, C. A.
(2013). *MedPage Today*. Retrieved July 2017 from
http://www.medpagetoday.com/resource-center/pain-management/rehabilitation/a/38478
Interdisciplinary pain rehabilitation programs (IPRPs) adopt a biopsychosocial approach rather than a biomedical model to improve the treatment of patients with chronic pain. The interdisciplinary programs concomitantly identify the areas within the psychological, social and medical domain that are contributing

to the patient's chronic pain syndrome. These comprehensive programs rely on a collaborative approach that integrates multiple disciplines, including physical and occupational therapy, pain psychology, medical management, and vocational rehabilitation, among others. Long-term evaluation data suggest that the IPRP model achieves significant and sustained improvements in pain levels, medication use, and psychosocial functioning.

The Role of Health Care Providers in Long Term and Complicated Workers' Compensation Claims
Kosny, A., MacEachen, E., Ferrier, S., & Chambers, L.
(2011). *Journal of Occupational Rehabilitation*, *21*(4), 582-590.
https://link.springer.com/article/10.1007/s10926-011-9307-3
Health care providers play a central role in workers' compensation systems. In most systems, they are involved in the legitimization of work-related injury, are required to provide information to workers' compensation boards about the nature and extent of the injury, give recommendations about return-to-work capability, and provide treatment for injury or illness. This study identifies problems that occur at the interface between the health care system, injured workers, and workers' compensation boards that may complicate and extend workers' compensation claims, as well as the mechanisms that underlie the development of these problems.

Focus on Health, Motivation, and Pride: A Discussion of Three Theoretical Perspectives on the Rehabilitation of Sick-Listed People
Svensson T., & Bjorklund, A.
(2010). *Work*, *36*(3), 273-282.
https://www.diva-portal.org/smash/get/diva2:358596/FULLTEXT01.pdf
During the last decades sickness absence from work has become a great societal problem. Questions of how rehabilitation processes should become successful and how peoples' ability to work can be improved have become of great public interest. In this paper we discuss three well-known theoretical perspectives regarding their usefulness when it comes to research on rehabilitation for return to work. The three perspectives are: Antonovsky's salutogenic model of health, Kielhofner's model of human occupation and Scheff's sociological theory of "shame and pride". Each of these can be applied to increase understanding and knowledge concerning sickness absence and return to work. We discuss points of affinity among the three perspectives, as well as significant differences, and we propose that a very essential common denominator is the importance of self-experience.

Interdisciplinary Pain Management
Turk, D., et al.
(2009). *American Pain Society*. Retrieved July 2017 from
http://americanpainsociety.org/uploads/about/position-statements/interdisciplinary-white-paper.pdf
This article highlights the complementary roles and responsibilities of members of teams of health care providers, the integration of the knowledge and skills, communication, conjoint problem solving, collaboration, consensus-based decisions, and shared accountability that are the hallmarks of interdisciplinary care. The authors identify and describe six key components of effective interdisciplinary care: communication, assessment, treatment, documentation, education, and continuation- of-care planning. They also point out a paradox: "in the days when there are calls for evidence-based health care and when pay-for-performance has become something of a mantra, there is continuing refusal to pay for the care with the best evidence." Although there may be circumstances where individual health care providers can provide adequate care and situations where there is a lack of available resources for truly

integrated interdisciplinary care, the authors recommend that optimal care for patients with pain is best provided within in interdisciplinary mode.

Barriers and Facilitators to Chronic Pain Self-Management: A Qualitative Study of Primary Care Patients with Comorbid Musculoskeletal Pain and Depression

Bair, M. J., Matthias, M. S., Nyland, K. A., Huffman, M. A., Stubbs, D. L., Kroenke, K., Damush, T. M.
(2009). *Pain Medicine*, *10*(7), 1280–1290.
http://onlinelibrary.wiley.com/doi/10.1111/j.1526-4637.2009.00707.x/full

The purpose of this study was to identify barriers and facilitators to self-management of chronic MSK pain among patients with comorbid pain and depression. The study identified four facilitators to improve pain self-management: 1) encouragement from nurse care managers; 2) improving depression with treatment; 3) supportive family and friends; and 4) providing a menu of different self-management strategies to use. The authors conclude that future research is needed to confirm these findings and to design interventions that capitalize on the facilitators identified while at the same time addressing the barriers to pain self-management.

Overtreating Chronic Back Pain: Time to Back Off?

Deyo, R. A., Mirza, S. K., Turner, J. A., & Martin, B. I.
(2009). *Journal of the American Board of Family Medicine, 22*(1).
http://www.jabfm.org/content/22/1/62.short

Recent studies document increases in epidural steroid injections, opioids for back pain, lumbar magnetic resonance images, and spinal fusion surgery rates, without population-level improvements in patient outcomes or disability rates. The authors suggest a need for a better understanding of the basic science of pain mechanisms, more rigorous and independent trials of many treatments, a stronger regulatory stance toward approval and post-marketing surveillance of new drugs and devices for chronic pain, and a chronic disease model for managing chronic back pain.

Management of MSK pain

Bergman, S.
(2007). *Best Practice & Research Clinical Rheumatology, 21*(1), 153–166.
http://www.sciencedirect.com/science/article/pii/S1521694206001227

Chronic MSK pain is a major public health problem affecting about one third of the adult population. Pain is often present without any specific findings in the MSK system and a strictly biomedical approach could be inadequate. A biopsychosocial model could give a better understanding of symptoms and new targets for management. Identification of risk factors for chronicity is important for prevention and early intervention. The cornerstones in management of chronic non-specific, and often widespread, MSK pain are non-pharmacological. Physical exercise and cognitive behavioral therapy, ideally in combination, are first line treatments in e.g. chronic low back pain and fibromyalgia. Analgesics are useful when there is a specific nociceptive component, but are often of limited usefulness in non-specific or chronic widespread pain (including fibromyalgia).

Integrating Psychosocial and Behavioral Interventions to Achieve Optimal Rehabilitation Outcomes

Sullivan, Michael J.L., Feuerstein, M., Gatchel, R., Linton, S. J., & Pransky, G.
(2005). *Journal of Occupational Rehabilitation*, *15*(4), 475-489.
https://link.springer.com/article/10.1007%2Fs10926-005-8029-9

Psychosocial factors are important contributors to work disability associated with musculoskeletal conditions. The primary objectives of this paper were review scientific literature on psychosocial and

behavioral interventions and work disability to: 1) describe different psychosocial interventions that have been developed to prevent prolonged work disability, and 2) identify future research directions that might enhance the impact of programs targeting psychosocial risk factors for work disability. Most prior interventions focused on psychosocial risk factors that exist primarily within the individual. Successful disability prevention will require methods to assess and target psychosocial risk factors "outside" of the individual using cost-effective, multipronged approaches. Research to explore interactions among different domains of psychosocial risk factors in relation to RTW outcomes is needed. Challenges to effective secondary prevention of work disability include developing competencies to enable a range of providers to deliver interventions, standardization of psychosocial interventions, and maximizing adherence to intervention protocols. Effective secondary prevention of work disability will require research to develop cost-effective, multipronged approaches that concurrently target both worker-related and workplace psychosocial risk factors.

Prevention of Work Disability Due to Musculoskeletal Disorders: The Challenge of Implementing Evidence

Loisel, P., Buchbinder, R., Hazard, R., KellerInger, R., van Tulder, S., & Webster, B.
(2005). *Journal of Occupational Rehabilitation*, December 2005, *15*(4), 507-524.
https://link.springer.com/article/10.1007/s10926-005-8031-2

The process of returning disabled workers to work presents numerous challenges. Despite the growing evidence regarding work disability prevention, little uptake of this evidence has been observed. One reason for limited dissemination of evidence is the complexity of the problem, as it is subject to multiple legal, administrative, social, political, and cultural challenges. A literature review and collection of experts' opinion is presented on the current evidence for work disability prevention, and barriers to evidence implementation. Recommendations are offered for enhancing implementation of research results.

Patient Expectations of Treatment for Back Pain: A Systematic Review of Qualitative and Quantitative Studies

Verbeek, J., Sengers, M. J., Riemens, L., & Haafkens, J.
(2004). *Spine*, *29*(20), 2309-2318.
http://journals.lww.com/spinejournal/Abstract/2004/10150/Patient_Expectations_of_Treatment_for_Back_Pain__A.21.aspx

This article summarizes evidence from qualitative and quantitative studies among patients with low back pain on their expectations and satisfaction with treatment as part of practice guideline development. Twelve qualitative and eight quantitative studies were found. Qualitative studies revealed the following aspects that patient expectation from treatment for back pain or with which they are dissatisfied. Patients want a clear diagnosis of the cause of their pain, information and instructions, pain relief, and a physical examination. Next, expectations are that there are more diagnostic tests, other therapy or referrals to specialists, and sickness certification. They expect confirmation from the healthcare provider that their pain is real. Like other patients, they want a confidence-based association that includes understanding, listening, respect, and being included in decision-making. The results from qualitative studies are confirmed by quantitative studies. Patients have explicit expectations on diagnosis, instructions, and interpersonal management. New strategies need to be developed in order to meet patients' expectations better. Practice guidelines should pay more attention to the best way of discussing the causes and diagnosis with the patient and should involve them in the decision-making process.

Clinical effectiveness and cost effectiveness of treatments for patients with chronic pain.
Turk, D. C.
(2002). *Clin J Pain,* 18, 355–365.
https://www.ncbi.nlm.nih.gov/pubmed/12441829
This review addresses the question of the clinical effectiveness and cost-effectiveness of the most common treatments for patients with chronic pain. There are limitations to the success of all the available treatments. Pain rehabilitation programs provide comparable reduction in pain to alternative pain treatment modalities, but with significantly better outcomes for medication use, health care utilization, functional activities, return to work, closure of disability claims, and with substantially fewer iatrogenic consequences and adverse events. Surgery, spinal cord stimulators, and IDDSs appear to have substantial benefits on some outcome criteria for carefully selected patients. These modalities are, however, expensive. Pain rehabilitation programs are significantly more cost effective than implantation of spinal cord stimulators, IDDSs, conservative care, and surgery, even for selected patients.

Psychological Approaches to Pain Management: A Practitioner's Handbook
Turk, D. C., & Gatchel, R. J. (Ed.)
(2002). New York: The Guilford Press.
https://books.google.com/books?hl=en&lr=&id=ngBPAgAAQBAJ&oi=fnd&pg=PP1&dq=musculoskeletal+%22pain+management%22+work&ots=zX6XoPt6g1&sig=Fpnr5SrmS8v3n_IRBsobUCzu50Y#v=onepage&q=musculoskeletal%20%22pain%20management%22%20work&f=false
Designed for maximum clinical utility, this volume describes how to tailor psychological treatment programs to patients suffering from a wide range of pain problems. Conceptual and diagnostic issues are discussed, widely used clinical models reviewed, and a framework presented for integrating psychological treatment with medical and surgical interventions.

Analysis of the Physician Variable in Pain Management
Green, C. R., Wheeler, J., Marchant, B., LaPorte, F., Guerrero, E.
(2001). *Pain Medicine*, *2*(4), 317–327.
http://onlinelibrary.wiley.com/doi/10.1046/j.1526-4637.2001.01045.x/full
The purpose of this analysis was to assess the role of physician variability in the management of pain and provide quantitative data regarding the status of pain management in Michigan. Lower expectations for relief and less satisfaction in its management may contribute to the under treatment of chronic pain. Perceptions of regulatory scrutiny may contribute to suboptimal pain management. These preliminary data highlight physician variability in pain decision making while providing insights into educational needs.

A New Clinical Method for the Treatment of Low Back Pain
Waddell, G.
(1987). *Spine*, *12*(7), 632-644.
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwi5htSj4qzVAhUEej4KHc_0CcQQFggoMAA&url=http%3A%2F%2Fstatic1.1.sqspcdn.com%2Fstatic%2Ff%2F746226%2F10962503%2F1298828193587%2FWaddell%252B1987.pdf%253Ftoken%253DO57Qmfy3gaPSt6n96Ts15Mz1tG8%25253D&usg=AFQjCNEMMpddScLKkwc8ftes32Hutzr-CA
Because there is increasing concern about low-back disability and its current medical management, this analysis attempts to construct a new theoretic framework for treatment. Observations of natural history and epidemiology suggest that low-back pain should be a benign, self-limiting condition, that low back-disability as opposed to pain is a relatively recent Western epidemic, and that the role of medicine in that epidemic must be critically examined. The traditional medical model of disease is contrasted with a

biopsychosocial model of illness to analyze success and failure in low-back disorders. To achieve the goal of treating patients rather than spines, low-back disability should be approached as an illness rather than as a purely physical disease. Pain must be distinguished from disability, the symptoms and signs of distress and illness behavior from those of physical disease, and nominal from substantive diagnoses. Management must change from a negative philosophy of rest for pain to more active restoration of function. Only a new model and understanding of illness by physicians and patients alike makes real change possible.

4.2 Biopsychosocial Factors in the Workplace

This section provides information about biopsychosocial factors in the workplace, with a specific focus on musculoskeletal disorders. This includes workplace factors affecting recovery, job accommodations and workplace modifications, and workplace-based interventions. These resources are listed in reverse chronological order.

Effectiveness of Workplace Interventions in Return-to-Work for Musculoskeletal, Pain-Related and Mental Health Conditions: An Update of the Evidence and Messages for Practitioners
Cullen, K. L., Irvin, E., Collie, A., Clay, F., Gensb, U., Jennings, P.A., S. Hogg-Johnson, et al.
(2017). *Journal of Occupational Rehabilitation, 21,* 1-15.
https://www.ncbi.nlm.nih.gov/pubmed/28224415
The objective of this systematic review was to synthesize evidence on the effectiveness of workplace-based return-to-work interventions and work disability management interventions that assist workers with MSK and pain-related conditions or mental health conditions with RTW. While there is substantial research literature focused on RTW, there are only a small number of quality workplace-based RTW intervention studies that involve workers with MSK or pain-related conditions or mental health conditions. The authors recommend implementing multi-domain interventions (i.e. with healthcare provision, service coordination, and work accommodation components) to help reduce lost time for MSK or pain-related conditions and mental health conditions. The authors also recommend practitioners implement these programs to improve work functioning and reduce costs associated with work disability.

Employer policies and practices to manage and prevent disability: Conclusion to the Special Issue
Main, C. J., Shaw, W. S., et al.
(2016). *Journal of Occupational Rehabilitation*, 26(4), 490-498.
https://link.springer.com/article/10.1007/s10926-016-9655-0
Research of employer policies and practices to manage and prevent disability spans many disciplines and perspectives, and there are many challenges related to stakeholder collaboration, data access, and interventions. This article synthesizes the findings from a conference and year-long collaboration among a group of invited researchers intended to spur new research innovations in this field. Emphasis was placed on organizational and social factors, employer roles and responsibilities, methods of implementation, non-clinical approaches, and facilitating SAW as well as RTW. Based on the conference proceedings, future research in this area should strive for: 1) broader inclusion of workers and workplaces; 2) attention to multilevel influences in the workplace; 3) a focus on social as well as physical aspects of work; 4) earlier employer collaboration efforts; 5) more attention to implementation factors; and 6) a broader assessment of possible outcome domains.

Sustaining work participation across the life course

Pransky G. S., Fassier J. B., Besen E., Blanck P., Ekberg K., Feuerstein M., Munir F., et al.
(2016). *Journal of Occupational Rehabilitation*, *26*, 465-479.
https://link.springer.com/article/10.1007/s10926-016-9670-1

There will be growing challenges for employers to manage circumstances of recurrent, chronic, or fluctuating symptoms in an aging workforce. This article summarizes existing peer-review research in this area, compares this research with employer discourse in the grey literature, and recommends future research priorities. Cancer and mental illness were selected as examples of chronic or recurring conditions that might challenge conventional workplace return-to-work practices. Workplace problems included fatigue, emotional exhaustion, poor supervisor and co-worker support, stigma, discrimination, and difficulties finding appropriate accommodations. There is preliminary support for improving workplace self-management strategies, collaborative problem-solving, and providing checklists and other tools for job accommodation, ideas echoed in the literature directed toward employers. Future research of work disability should focus on earlier identification of at-risk workers with chronic conditions, the use of more innovative and flexible accommodation strategies matched to specific functional losses, stronger integration of the workplace into on-going rehabilitation efforts, and a better understanding of stigma and other social factors at work.

The Importance of Workplace Social Relations in the Return to Work Process: A Missing Piece in the Return to Work Puzzle?

Tjulin, A. & MacEachen, E.
(2016). *Handbook of Return to Work*; 81-97.
https://link.springer.com/chapter/10.1007%2F978-1-4899-7627-7_5

The chapter elaborates on how workplace social relations influence practice in RTW. The social conditions in which the RTW is embedded, and the way social interaction and relations between the sick-listed worker and other workplace actors (supervisor and coworkers) evolve, have only been researched to a limited extent. This book discusses critical new dimensions of social relations research in the field of RTW that can “make” or “break” a workplace return-to-work process. These critical new dimensions highlight the importance of viewing RTW as a dynamic process over time, where supervisors and coworkers display shifting roles depending on phases of the process. The chapter conveys new dimensions of social relations, acknowledging the positive contribution of coworker efforts in the process, which may have an important impact on workplace-based return to work interventions.

Workplace interventions to prevent disability from both the scientific and practice perspectives: A comparison of scientific literature, grey literature, and stakeholder observations

Williams-Whitt, K., Bultmann, U., Amick, B. 3rd, Munif, F., Tveito, T.H., Anema, J.R., et al.
(2016). *Journal of Occupational Rehabilitation, 26*(4), 417-433.
https://link.springer.com/article/10.1007/s10926-016-9664-z

The significant individual and societal burden of work disability could be reduced if supportive workplace strategies were added to evidence-based clinical treatment and rehabilitation to improve RTW and other disability outcomes. This article summarizes existing research on workplace interventions to prevent disability, relates these to employer disability management practices, and recommends future research priorities. Evidence from randomized trials and other research designs has shown general support for job modification, RTW coordination, and organizational support, but evidence is still lacking for interventions at a more granular level. While the scientific literature is focused on facilitating improved coping and reducing discomforts for individual workers, the employer-directed grey literature is focused on making group-level changes to policies and procedures. Future research might better target employer practices

by tying interventions to positive workplace influences and determinants, by developing more participatory interventions and research designs, and by designing interventions that address factors of organizational change.

Work Accommodation in Musculoskeletal Disorders: Current Challenges and Future Directions in Research and Practice

Kwan, H. C., & Schultz, I. Z.

(2014). *Handbook of Musculoskeletal Pain and Disability Disorders in the Workplace*, 417-430.

https://link.springer.com/chapter/10.1007/978-1-4939-0612-3_23

Work accommodations have been shown to be effective in assisting injured workers in returning to work, and employers and workers' compensation and insurance systems are using them more frequently. As such there is a large body of return-to-work and emerging accommodations research that is often difficult to analyze, compare, and synthesize. This chapter reviews the accommodation research from research disciplines that address the intersection of RTW and accommodations with a concentration on factors affecting RTW for workplace-injured workers with musculoskeletal disorders. The importance of key stakeholders and the social factors that influence RTW accommodations are also highlighted. The authors conclude that more research is needed on the work accommodation process toward developing evidence-based practice.

Perceptions of the Work Environment Among People with Experience of Long Term Sick Leave

Ekbladh, E., Thorell, L. H., & Haglund, L.

(2010). *Work – A Journal of Prevention Assessment*, *35*(2), 125-136.

http://content.iospress.com/articles/work/wor009

The purposes of this study were to describe and analyze how people with experience of long-term sick leave perceive that factors in their work environment support or interfere with work performance, satisfaction, and well-being. The study involved interviewing 53 participants using the Work Environment Impact Scale (WEIS) and looking at differences by gender, those with physical versus mental conditions, and current work status (working or on full-time sick leave). The most supportive factors concerned social interactions at work, and the value and meaning of work. The factors perceived as most interfering concerned work demands and rewards. The social relations at work were perceived as more supportive by the working group than by those on full-time sick leave. Knowledge about the interaction between the worker and the work environment could reveal useful information about the complex phenomenon of reducing sick leave. The researchers wrote that the WEIS seemed useful in providing information about how alterations and accommodations in the work environment could support individual workers.

Early Employer Response to Workplace Injury: What Injured Workers Perceive as Fair and Why These Perceptions Matter

Hepburn, C. G., Kelloway, E. K., & Franche, R. L.

(2010). *Early Journal of Occupational Health Psychology*, *15*(4), 409-420.

http://ohpsychology.ca/wp-content/uploads/2011/02/hepburn-et-al.pdf

The authors examined whether early employer response to workplace injury affects injured workers' subsequent attitudes and mental health. At one month and six months post injury, telephone surveys were conducted with 344 workers from Ontario, Canada, who had experienced an MSK lost-time workplace injury. One-month reports of initial supervisor reaction to the injury and the use of workplace-based return-to-work strategies (early contact with worker, ergonomic assessment, presence of designated coordinator, accommodation offer) were hypothesized to predict reports of fairness, affective commitment, and depressive symptoms measured at six months post injury. Structural equation modeling

supported a model wherein fairness perceptions fully mediated the relationship between early responses and injured workers' attitudes and mental health. Early contact and supervisor reactions were significant predictors of fairness perceptions. The implications for early employer response are discussed.

Behavioral Determinants as Predictors of Return to Work After Long-Term Sickness Absence: An Application of the Theory of Planned Behavior

Brouwer, S., Krol, B., Reneman, M. F., Bültmann, U., Franche, R. L., van der Klink, J. J. L., & Groothoff, J. W. (2009). *Journal of Occupational Rehabilitation*, *19*(2), 166-174.
https://link.springer.com/article/10.1007/s10926-009-9172-5

The aim of this prospective, longitudinal cohort study was to analyze the association between the three behavioral determinants of the theory of planned behavior (TPB) model--attitude, subjective norm and self-efficacy--and the time to return-to-work (RTW) in employees on long-term sick leave. Median time to RTW was 160 days. This study showed that work attitude, social support and willingness to expend effort in completing the behavior are significantly associated with a shorter time to RTW in employees on long-term sickness absence. This provides suggestive evidence for the relevance of behavioral characteristics in the prediction of duration of sickness absence.

Systematic review of the qualitative literature on return to work after injury

MacEachen, E., Clarke, J., Franche, R. L., Irvin, E., & Workplace-based Return to Work Literature Review Group (2006). *Scandinavian Journal of Work, Environment & Health,* (4), 257-269.
http://www.jstor.org/stable/40967575?seq=1#page_scan_tab_contents

This paper reports on a systematic review of the international qualitative research literature on RTW. This review was undertaken to better understand the dimensions, processes, and practices of RTW. Because RTW often includes early return before full recovery while a person is undergoing rehabilitation treatment, physical recovery is embedded in complicated ways with workplace processes and practices and social organization. These process-oriented dimensions of RTW are well described in the qualitative literature. RTW extends beyond concerns about managing physical function to the complexities related to beliefs, roles, and perceptions of many players. Good will and trust are overarching conditions that are central to successful return-to-work arrangements. In addition, there are often social and communication barriers to RTW, and intermediary players have the potential to play a key role in facilitating this process. This paper identifies key mechanisms of workplace practice, process, and environment that can affect the success of RTW.

Workplace-based return-to-work interventions: Optimizing the role of stakeholders in implementation and research

Franche, R. L., Baril, R., Shaw, W., Nicholas, M., & Loisel, P.
(2005). *Journal of Occupational Rehabilitation*, *15*(4), 525-542.
https://link.springer.com/article/10.1007/s10926-005-8032-1

This article contrasts the diverse paradigms of workers, employers, insurers, labor representatives, and healthcare providers when implementing and studying workplace-based RTW interventions. The challenges of engaging and involving stakeholders in return-to-work (RTW) intervention and research have not been well documented. Analysis of RTW stakeholder interests suggests that friction is inevitable; however, it is possible to encourage stakeholders to tolerate paradigm dissonance while engaging in collaborative problem solving to meet common goals. We review how specific aspects of RTW interventions can be instrumental in resolving conflicts arising from differing paradigms: calibration of stakeholders' involvement, the role of supervisors and of insurance case managers, and procedural

aspects of RTW interventions. The role of the researcher in engaging stakeholders, and ethical aspects associated with that process are discussed.

Concerns and expectations about returning to work with low back pain: Identifying themes from focus groups and semi-structured interviews

Shaw, W. S., & Huang, Y. H.

(2005). *Disability and Rehabilitation*, 27(21), 1269-1281.

http://www.tandfonline.com/doi/abs/10.1080/09638280500076269

Studies of occupational low back pain have shown that RTW after injury is influenced by workers' concerns and expectations; however, these theoretical constructs have not been explored. The specific aim of this study was to identify themes related to self-efficacy and outcome expectancy for returning to work using qualitative research methods. Two primary self-efficacy constructs emerged from this study: self-efficacy for resuming physical activity, and self-efficacy for resuming work. Hesitation to return to work after occupational low back pain involves concerns about pain and re-injury, as well as the perceived ability to perform physical tasks, meet role expectations, obtain workplace support, and maintain job security.

Women on sickness absence--views of possibilities and obstacles for returning to work. A focus group study

Holmgren, K., & Dahlin Ivanoff, S.

(2004). *Disability and Rehabilitation, 26*(4), 213-222.

http://www.tandfonline.com/doi/abs/10.1080/09638280310001644898

The focus of this study was to learn how women on sickness absence due to work-related strain perceive and describe their possibilities and obstacles for returning to work. The study included five focus groups, each of which met one time. Twenty women participated in total. Three different themes were found. In "the process of losing control," the participants described the process from controlling everyday living, to total loss of control of private and working life. The second theme, "not finding alternatives," dealt with the difficulties of finding an alternative way back to work. The "mastering life as a whole" theme included strategies for regaining control over daily activities and life as a whole. The results show that personal as well as environmental factors have an impact for returning to work.

Employee Perspectives on the Role of Supervisors to Prevent Workplace Disability After Injuries

Shaw, W. S., Robertson, M. M., Pransky, G., & McLellan, R. K.

(2003). *Journal of Occupational Rehabilitation, 13*(3), 129-142.

https://link.springer.com/article/10.1023%2FA%3A1024997000505?LI=true

After workplace injuries, supervisors can play an important role in aiding workers, accessing health care services, and providing reasonable accommodation. However, few studies have identified those aspects of supervisor involvement most valued by employees for postinjury recovery and return to work. As part of needs assessment for a supervisory training program, 30 employees from four companies were interviewed about the role of supervisors to prevent workplace disability after injuries. From interview notes, 305 employee statements were extracted for analysis. An affinity mapping process with an expert panel produced 11 common themes: accommodation, communicating with workers, responsiveness, concern for welfare, empathy/support, validation, fairness/respect, follow-up, shared decision-making, coordinating with medical providers, and obtaining coworker support of accommodation. Interpersonal aspects of supervision may be as important as physical work accommodation to facilitate return to work after injury.

4.3 Screening and Identification of Biopsychosocial Factors

Early Identification and Management of Psychological Risk Factors ("Yellow Flags") in Patients with Low Back Pain: A Reappraisal

Nicholas, M. K., Linton, S. J., Watson, P. J., & Main, C. J.
(2011). *Physical Therapy, 91*(5), 1–17.
https://www.researchgate.net/publication/50936537_Early_Identification_and_Management_of_Psychological_Risk_Factors_Yellow_Flags_in_Patients_With_Low_Back_Pain_A_Reappraisal

Originally the term "yellow flags" was used to describe psychosocial prognostic factors for the development of disability following the onset of MSK pain. The identification of yellow flags through early screening was expected to prompt the application of intervention guidelines to achieve secondary prevention. In recent conceptualizations of yellow flags, it has been suggested that their range of applicability should be confined primarily to psychological risk factors to differentiate them from other risk factors, such as social and environmental variables. This article addresses two specific questions that arise from this development: 1) Can yellow flags influence outcomes in people with acute or subacute low back pain? and 2) Can yellow flags be targeted in interventions to produce better outcomes? Consistent evidence has been found to support the role of various psychological factors in prognosis, although questions remain about which factors are the most important, both individually and in combination, and how they affect outcomes. Published early interventions have reported mixed results, but, overall, the evidence suggests that targeting yellow flags, particularly when they are at high levels, does seem to lead to more consistently positive results than either ignoring them or providing omnibus interventions to people regardless of psychological risk factors. Psychological risk factors for poor prognosis can be identified clinically and addressed within interventions, but questions remain in relation to issues such as timing, necessary skills, content of treatments, and context.

Identification of prognostic factors for chronicity in patients with low back pain: a review of screening instruments

Melloh, M., Elfering, A., Egli-Presland, C., Roeder, C., Barz, T., Rolli-Salathe, C. et al.,
(2009). *International Orthopedics, 33*(2), 301-313.
https://link.springer.com/article/10.1007/s00264-008-0707-8

Low back pain (LBP) is currently the most prevalent and costly musculoskeletal problem in modern societies. Screening instruments for the identification of prognostic factors in LBP may help to identify patients with an unfavorable outcome. In this systematic review, screening instruments published between 1970 and 2007 were identified by a literature search. Nine different instruments were analyzed, and their different items grouped into 10 structures. Finally, the predictive effectiveness of these structures was examined for the dependent variables including "work status," "functional limitation," and "pain." The strongest predictors for "work status" were psychosocial and occupational structures, whereas for "functional limitation" and "pain" psychological structures were dominating. Psychological and occupational factors show a high reliability for the prognosis of patients with LBP. Screening instruments for the identification of prognostic factors in patients with LBP should include these factors as a minimum core set.

Biopsychosocial factors that perpetuate chronic pain, impairment, and disability
Theodore, B. R., Kishino, N. D., & Gatchel, R. J.
(2008). *Psychological Injury and Law, 1*(3), 182-190.
https://link.springer.com/article/10.1007/s12207-008-9016-1
The biopsychosocial model provides the most heuristic account of the complex multifaceted nature of chronic pain and its associated impairment and disability. Although chronic pain, impairment, and disability are related, these are three separate constructs. In order to understand how these three constructs are interrelated, the development of pain from the acute to the chronic stage is discussed. Psychosocial factors as barriers to recovery are emphasized, including those that commonly manifest among patients receiving disability compensation. This is complemented by a review of psychometric instruments used to assess these psychosocial factors in chronic pain. Finally, the major delineation in levels of care for chronic pain is highlighted, emphasizing an interdisciplinary approach that is consistent with pain as a biopsychosocial phenomenon.

Barriers to rehabilitation and return to work for unemployed chronic pain patients: A qualitative study
Patel, S., Greasley, K., & Watson, P. J.
(2007). *European Journal of Pain, 11*(8), 831-840.
http://onlinelibrary.wiley.com/doi/10.1016/j.ejpain.2006.12.011/full
This paper explores the perceived barriers to RTW presented by unemployed patients with chronic MSK pain. Several themes were identified as barriers to RTW from the data collected, including pain related issues, uncertainty (financial and physical), the healthcare system, interaction with benefits providers, perceptions of employers and personal limitations. The uncertainty and the pain condition itself were the overarching barriers from which other obstacles stemmed. This is the first qualitative study of long term unemployed benefit recipients with chronic pain. Others authors have reported psychosocial factors as barriers to work among disabled populations however, this qualitative study has identified barriers specific to unemployed chronic pain patients. The themes identified will help with the planning and development of future initiatives for returning chronic pain patients to employment.

Universal Precautions in Pain Medicine: A Rational Approach to the Treatment of Chronic Pain
Gorlay, D. L., Heit, H. A., & Almahrezi, A.
(2005). *Pain Medicine, 6*(2), 107–112.
http://onlinelibrary.wiley.com/doi/10.1111/j.1526-4637.2005.05031.x/full
This article describes a "universal precautions" approach to the assessment and ongoing management of the chronic pain patient and offers a triage scheme for estimating addiction risk that includes recommendations for management and referral. By taking a thorough and respectful approach to patient assessment and management within chronic pain treatment, stigma can be reduced, patient care improved, and overall risk contained.

Early identification and intervention in the prevention of musculoskeletal pain
Linton, S. E.
(2002). *American Journal of Industrial Medicine*, *41*(5), 433–442.
http://onlinelibrary.wiley.com/doi/10.1002/ajim.10052/full
The authors describe a series of studies where a screening procedure based on psychological risk factors was used to help identify people at risk for developing long-term work disability. The utility of a cognitive-behavioral group intervention that focuses on coping strategies as prevention was assessed in three randomized-controlled studies where participants had low, medium, and high risk, respectively. The studies with medium- and high-risk populations demonstrated significantly lower work disability after

participating in the intervention than control groups receiving treatment as usual. The authors conclude that it appears to be feasible to identify patients with high levels of risk and to subsequently lower the risk for work disability by administering a cognitive-behavioral intervention focusing on psychological aspects of pain.

A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain
Pincus, T., Burton, A. K., Vogel, S., & Field, A. P.
(2002). *Spine*, 27, E109-E120.
http://journals.lww.com/spinejournal/Abstract/2002/03010/A_Systematic_Review_of_Psychological_Factors_as.17.aspx
This study used a systematic review of prospective cohort studies in low back pain to evaluate the evidence implicating psychological factors in the development of chronicity in low back pain. Psychological factors (notably distress, depressive mood, and somatization) are implicated in the transition to chronic low back pain. The development and testing of clinical interventions specifically targeting these factors is indicated. In view of the importance attributed to other psychological factors (particularly coping strategies and fear avoidance) there is a need to clarify their role in back-related disability through rigorous prospective studies.

4.4 Biopsychosocial Factors in Insurance and Medicolegal Systems

Biopsychosocial Considerations in Unnecessary Work Disability
Caruso, G. M.
(2013). *Psychological Injury and Law*, *6*, 164-182.
https://link.springer.com/article/10.1007/s12207-013-9162-y
The current definition and management of medical conditions causing impairment and unnecessary disability in workers' compensation systems are suboptimal. Once claims are established in workers' compensation, administrative and medical management of both identifiable pathologic conditions and unexplained symptoms are fragmented, not based on available scientific evidence, and adherent to a biomedical care approach which is not appropriate for a significant number of cases. These obstacles prevent effective understanding and management of many workers' compensation cases and may contribute to eventual recovery failure and unnecessary work disability. This article explores biopsychosocial factors in workers' compensation claimants and elements that may contribute to or ameliorate progression to unnecessary work disability. The author offers a heuristic diathesis-stress model of work-related disability as a framework for general and specific interventions to improve system performance and outcomes for all stakeholders.

Guideline for prescribing opioids to treat pain in injured workers
Washington State Department of Labor & Industries
(2013). Retrieved July 2017 from:
http://lni.wa.gov/ClaimsIns/Files/OMD/MedTreat/FINALOpioidGuideline010713.pdf
The Washington State Department of Labor & Industries (L&I, or the department) is officially adopting the Interagency Guideline on Opioid Dosing for Chronic Non-Cancer Pain as developed by the Agency Medical Directors' Group (AMDG Guideline) and revised in June 2010. The AMDG Guideline represents the best practices and universal precautions necessary to safely and effectively prescribe opioids to treat patients with chronic non-cancer pain. This guideline is a supplement to both the AMDG Guideline and the

Department of Health's (DOH) pain management rules, and provides information specific to treating injured workers covered by Washington State workers' compensation. Both the AMDG Guideline and this guideline are intended for use by health care providers, the department, insurers, and utilization review staff.

A Developmental Conceptualization of Return to Work
Young, A. E., Roessler, R. T., Wasiak, R., McPherson, K. M., van Poppel, M. N. M., & Anema, J. R.
(2005). *Journal of Occupational Rehabilitation, 15*(4), 557-568.
https://link.springer.com/article/10.1007%2Fs10926-005-8034-z?LI=true
Although RTW is a phenomenon that has been researched for many years, the ability to understand and improve outcomes is still limited. As an avenue for advancing the field, this paper presents an alternative way of thinking about RTW. RTW is presented as an evolving process, comprising four key phases: 1) "off work;" 2) "work re-entry;" 3) "retention;" and 4) "advancement." In addition, multiple phase-specific outcomes that may be used to evaluate RTW success are advanced. Broadening thinking about RTW to consider the complexities of its developmental nature holds promise for understanding and improving RTW, as it not only clarifies the importance of incremental milestones, but also facilitates intervention choice and evaluation.

4.5 Biopsychosocial Policy

SPPAN'S 2017 Policy and Advocacy Priorities
American Academy of Pain Management, State Pain Policy Advocacy Network
(2017). Retrieved July 2017 from http://sppan.aapainmanage.org/home
AIPM's State Pain Policy Advocacy Network works to increase access to integrative pain care, advocating for policies that allow pain care providers to deliver optimal care to their patients and that improve access to and affordability of optimal care. The Network's highest priorities for 2017 are to ensure access to, and adequate insurance coverage for, integrative pain care' advocate for increased pain education for clinicians; influence the development of state pain management policies and monitor unintended consequences of restrictions on pain medications; and advocate for federal initiatives that support balanced pain management (e.g., National Pain Strategy, Comprehensive Addiction and Recovery Act).

A Call for Saving Interdisciplinary Pain Management
Ruan X., & Kaye, A. D.
(2016). *Journal of Orthopaedic & Sports Physical Therapy, 46*(12), 1021-1023.
http://www.jospt.org/doi/pdf/10.2519/jospt.2016.0611?code=jospt-site
In 2011, the Institute of Medicine (IOM) released a landmark report on chronic pain, which estimated that more than 100 million Americans suffer from chronic pain, making pain a major and significant public health problem. The authors contend that the benefits of interdisciplinary pain management programs are undeniable and have been demonstrated for over a half century. Until health care leaders and other stakeholders such as insurers work together to ensure best practices in pain management, the status quo is likely to continue. The authors maintain that in order to impact health care policy more effectively, we need to better understand the politics of health policy decision making.

Interdisciplinary Chronic Pain Management: International Perspectives
Ballantyne, J., et al
(2012). *Pain Clinical Updates*, International Association for the Study of Pain, *XX*, (7). Retrieved July 2017 from http://www.iasp-pain.org/files/Content/ContentFolders/Publications2/PainClinicalUpdates/Archives/PCU_20-7_web.pdf
This article explores interdisciplinary treatment programs for chronic pain, which have the strongest evidence basis for efficacy, cost effectiveness, and lack of complications of all the approaches to the treatment of chronic pain. The article asses the availability of interdisciplinary pain treatment in the U.S. and other nations, and it concludes that U.S. policymakers need to recognize that the lack of a coherent and consistent pain policy in the U.S. serves to exacerbate the suffering of an already vulnerable chronic pain population.

Biopsychosocial Law, Health Care Reform, and the Control of Medical Inflation in Colorado
Bruns, D., Mueller, K., & Warren, P.A.
(2012). *Rehabilitation Psychology, 57(*2), 81-97.
http://psycnet.apa.org/record/2012-15239-001
A noteworthy attempt at health care reform was the 1992 Colorado workers' compensation reform bill, which led to the creation of what have been called "biopsychosocial laws." These laws mandated the use of treatment guidelines for patients with injury or chronic pain, which advocated a biopsychosocial model of rehabilitation, and aspired to use a "best practice" approach to controlling costs. The purpose of this study was to examine the financial impact of this health care reform process, and to test the hypothesis that this approach can be an effective strategy to contain costs while providing good care. Although there were confounding variables, and causality could not be determined, these data are consistent with the hypothesis that Colorado's 1992 legislative efforts to reform workers' compensation law using the biopsychosocial model worked as intended to provide good care while controlling costs.

Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research
Institute of Medicine of the National Academies
(2011). Retrieved July 2017 from
http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2011/Relieving-Pain-in-America-A-Blueprint-for-Transforming-Prevention-Care-Education-Research/Pain%20Research%202011%20Report%20Brief.pdf
The 2010 Patient Protection and Affordable Care Act required the Department of Health and Human Services (HHS) to enlist the Institute of Medicine (IOM) in examining pain as a public health problem. This report presents the IOM study committee's findings and recommendations and calls for a cultural transformation to better prevent, assess, treat, and understand pain of all types, encouraging government agencies, healthcare providers, healthcare professional associations, educators, and public and private funders of health care to take the lead in this transformation. The report recommends that HHS develop a plan to heighten awareness about pain and its health consequences, emphasize the prevention of pain, improve pain assessment and management in the delivery of healthcare and financing programs of the federal government, use public health communication strategies to inform patients on how to manage their own pain, and address disparities in the experience of pain among subgroups of Americans. The report also recommends further research into the biological, cognitive, and psychological underpinnings of pain, more effective and less risky pain relievers, as well as using advances in the implementation sciences to help translate effective treatments from research into practice and to adapt the regulatory process to enable more efficient evaluation and approval of potentially effective therapies.

4.6 Evidence of Effectiveness

Cost-Effectiveness of Early Versus Delayed Functional Restoration for Chronic Disabling Occupational Musculoskeletal Disorders

Theodore, B. R., Tom G. Mayer, T. G., & Gatchel, R. J.
(2015). *Journal of Occupational Rehabilitation*, *25*(2), 303–315.
https://www.ncbi.nlm.nih.gov/pubmed/25194706

Despite extensive evidence for the treatment effectiveness of interdisciplinary functional restoration (FR) for chronic disabling occupational musculoskeletal disorders (CDOMD), there is little documentation on the cost-effectiveness of early rehabilitation using FR. This article describes a study in which 1,119 CDOMD patients were classified according to duration of disability on FR entry, corresponding to early rehabilitation, intermediate duration, and delayed rehabilitation. Groups were matched on sex, age, ethnicity, and injured MSK region. One-year post-rehabilitation outcomes included RTW, work retention, and healthcare utilization. Economic analyses included a cost-effectiveness analysis of the FR program, and estimation of the total cost of illness. One year after rehabilitation, all groups were comparable on RTW, work retention, and additional healthcare utilization. Savings of up to 64 percent in medical costs, and up to 80 percent in disability benefits and productivity losses were associated with the ER group. The cost of rehabilitation was also up to 56 percent lower when administered early. Overall, ER resulted in estimated cost savings of up to 72 percent (or almost $170,000 per claim). The authors conclude that duration of disability does not negatively impact objective work or healthcare utilization outcomes following interdisciplinary FR. However, early rehabilitation is more likely to be a cost-effective solution compared to cases that progress for more than 8 months and cases of receipt of FR as a treatment of "last resort."

The Effectiveness of Cognitive Behavioural Treatment for Non-Specific Low Back Pain: A Systematic Review and Meta-Analysis

Richmond, H., Hall, A. M., Copsey, B., Hansen, Z., Williamson, E., Hoxey-Thomas, N., Cooper, Z., & Lamb, S. E. (2015). *PloS One*, *10*(8).
https://www.ncbi.nlm.nih.gov/pubmed/26244668

This article assesses whether cognitive behavioral therapy (CBT) improves disability, pain, quality of life, and/or work disability for patients with lower back pain of any duration at any age. CBT interventions yield long-term improvements in pain, disability, and quality of life in comparison to no treatment and other guideline-based active treatments for patients with lower back pain of any duration and of any age.

Interdisciplinary Chronic Pain Management: Past, Present, and Future

Gatchel, R., McGeary, D., McGeary, C., & Lippe, B.
(2014). Handbook of Musculoskeletal Pain and Disability Disorders in the Workplace. New York: Springer. 365-577.
https://www.apa.org/pubs/journals/releases/amp-a0035514.pdf

This article reviews the history of pain management, discusses major components of an interdisciplinary pain management program, describes the evidence-based effectiveness of interdisciplinary pain management approaches and describes the barriers to wider use of such programs. The biopsychosocial model of pain and disability recognizes pain and disability as a complex interaction among physiological, psychological and social factors, and the integration of services among providers. Key barriers to successful development of pain clinics include inadequate funding, lack of sufficient time to train and organize clinic staff, and absence of unifying model of pain care.

Optimized Antidepressant Therapy and Pain Self-management in Primary Care Patients with Depression and Musculoskeletal Pain: A Randomized Controlled Trial

Kroenke, K., Bair, M. J., Damush, T. M., Wu, J., Hoke, S., Sutherland, J., & Tu, W.
(2009). *JAMA*, *301*(20), 2099-2110.
http://jamanetwork.com/journals/jama/fullarticle/183973

Pain and depression are the most common physical and psychological symptoms in primary care, co-occur 30% to 50% of the time, and have adverse effects on quality of life, disability, and health care costs. The purpose of this study was to determine if a combined pharmacological and behavioral intervention improves both depression and pain in primary care patients with MSK pain and comorbid depression. Optimized antidepressant therapy followed by a pain self-management program resulted in substantial improvement in depression as well as moderate reductions in pain severity and disability.

Non-pharmacological treatment of chronic widespread MSK pain

Mannerkorpi, K., & Henriksson, C.
(2007). *Best Practice & Research Clinical Rheumatology*, *21*(3), 513–534.
http://www.sciencedirect.com/science/article/pii/S1521694207000435

Non-pharmacological treatment for patients with chronic widespread pain (CWP) and fibromyalgia (FM) aims to enhance overall health. This chapter reviews studies of exercise, education, movement therapies and sensory stimulation. Based on a systematic review of randomized controlled trials (RCTs), the authors report that aerobic exercise of low to moderate intensity, such as walking and pool exercise, can improve symptoms and distress, and may improve physical capacity in sedentary patients. Aerobic exercise of moderate to high intensity can improve aerobic capacity and tender-point status. Educational programs have been shown to enhance self-efficacy and health perception. There is no conclusive evidence about the type of educational program that works best, but a small-group format and interactive discussions appear to be important components. Exercise combined with education appears to produce synergies.

Effectiveness of Workplace Rehabilitation Interventions in the Treatment of Work-Related Low Back Pain: A Systematic Review

Williams, R.M., Westmorland, M.G., Lin, C.A., Schmuck, G., & Creen, M.
(2007). *Disability & Rehabilitation*, *29*, 607–624.
https://www.ncbi.nlm.nih.gov/pubmed/17453982

The authors conducted a review of peer-reviewed articles from 1982 -2005 of studies of rehabilitation interventions that were provided at the workplace to workers with musculoskeletal work-related lower back pain. Of 1,224 articles that were identified by the search, 15 articles, consisting of 10 studies, were of sufficient quality to be included in the review. The best evidence was that clinical interventions with occupational interventions as well as early return to work/modified work interventions were effective in returning workers to work faster, reducing pain and disability, and decreasing the rate of back injuries compared to clinical interventions alone. Ergonomic interventions also were found to be effective workplace interventions.

5. STRATEGIES TO MANAGE OPIOID USE

The previous chapter took a brief look at alternative pain management strategies. The IMPAQ team conducted a literature scan to identify examples of different strategies states are adopting to address the challenges associated with management of chronic pain associated with MSK injuries, and the impact of ineffective pain management on RTW. Much of the literature focuses on the need to limit the use of opioids, urging further education and research on more effective and lower-risk alternatives. Much of the research also acknowledges that opioids may be appropriately prescribed for some cases of chronic MSK pain. This chapter focuses on six examples of strategies for managing opioid use that are being used or considered by states around the country:

1. Dispensing limitations
2. Prescription drug monitoring programs
3. Treatment guidelines
4. Closed formularies
5. Opioid contracts
6. Overdose prevention programs/initiatives

5.1 Dispensing Limits

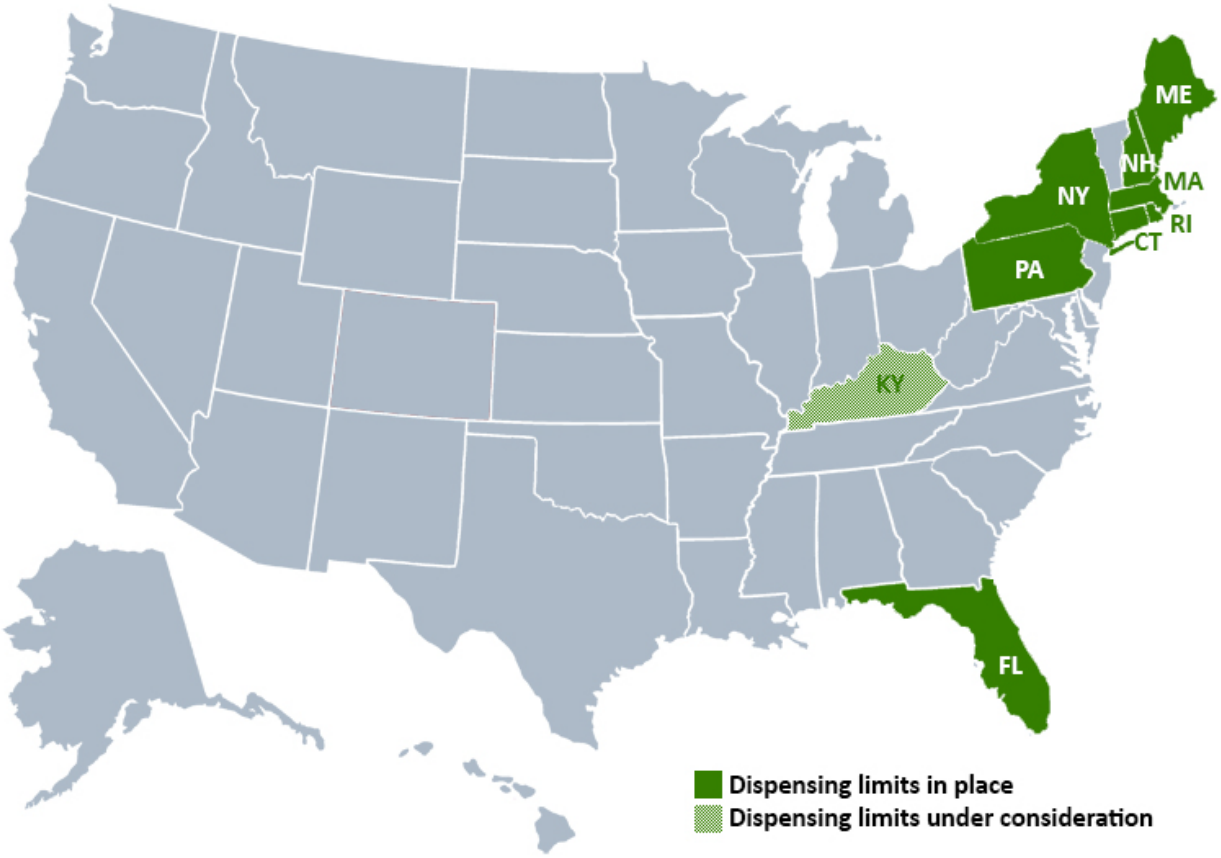
States have the primary responsibility to regulate and enforce prescription drug practice. One strategy that many states have used to combat the prescription drug overdose epidemic is to enact laws that set time or dosage limits on the prescribing or dispensing of controlled substances. One main category of laws that limit prescription drug dispensing sets forth time limits (hours' or days' supply) to the supply of prescription drugs. These rules typically limit the number of opioid prescriptions to seven days for acute pain or for first-time users. Another approach is to limit the number of doses that may be prescribed. For example, Rhode Island limits initial opioid prescriptions for acute pain to 30 morphine milligram equivalents (MMEs) total daily dose with a maximum of 20 doses. Dispensing limitations are considered an effective method of opioid control because they require the injured party to communicate regularly with his or her doctor to justify and obtain new prescriptions.

In some cases time limit laws might be specific to a certain setting or type of provider. For example, West Virginia statute stipulates that "[a] pain management clinic shall not dispense to any patient more than a seventy-two-hour supply of a controlled substance."[9] Pennsylvania passed the Safe Emergency Prescribing Act, which restricts opioid prescriptions from emergency rooms and urgent care centers to a seven-day limit.[10]

Most opioid-related controls are not specific to WC programs. Responsibility for these programs generally falls to state pharmacy or medical boards. This is significant because these agencies may not have the same interests and priorities as WC agencies, and they may not understand or appreciate the specific nature of the challenge of effective pain management in the context of SAW/RTW priorities.

[9] W.VA. CODE § 16-5H-4 2012, http://www.legis.state.wv.us/wvcode/ChapterEntire.cfm?chap=16&art=5H
[10] Safe Emergency Prescribing Act, P. L. 976, No. 122, Cl. 35, Nov. 2, 2016, http://www.legis.state.pa.us/cfdocs/legis/li/uconsCheck.cfm?yr=2016&sessInd=0&act=122

Figure 1: States with Dispensing Limits



Sources: Matrix Healthcare Services, *Opioid Legislation and Regulations Impacting Workers' Compensation: 2016 Summary and 2017 Outlook.* 2017. http://www.mymatrixx.com/wp-content/uploads/2014/09/Opioid-Legislation-and-Regulations-2016-Summary-and-2017-Recap-myMatrixx.pdf; Optum Inc., *Regulatory and Legislative Updates 2016 Session Review | Workers' Compensation.* 2016. http://helioscomp.com/docs/default-source/default-document-library/gov14-16201-ga-mid-year-update-8-2016.pdf; IMPAQ literature scan Feb/March 2017.

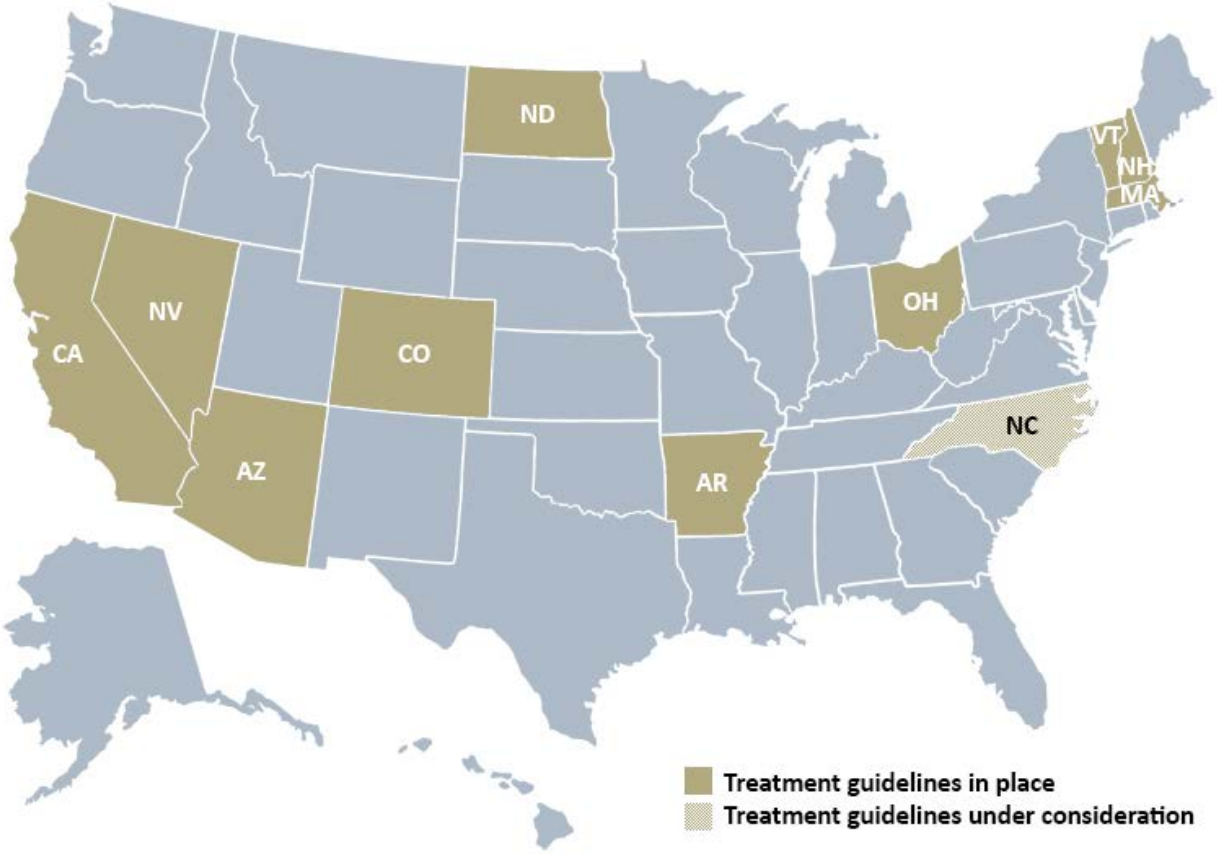
Standard Dispensing Limits
BlueCross BlueShield of Illinois
https://www.bcbsil.com/PDF/rx/rx_dispensing_limits_std_il.pdf
This 44-page document presents dispensing limits for prescription drugs under BlueCross BlueShield of Illinois health insurance plans. BlueShield of Illinois plan members can get higher amounts of listed medications if prescribed by their doctors, but their insurance will not cover amounts above the limits. The introduction also explains that the listed limits may vary based on member characteristics, plans, and state regulations.

5.2 Treatment Guidelines

This section features federal and state guidelines, and guidelines from outside the United States, for prescribing opioids for chronic pain. Articles cover convergence of guidelines around several best

mitigation practices, as well as the nature and effects of guidelines. Figure 2 illustrates states with recent adoption or revisions of treatment guidelines for controlled substances[11].

Figure 2: States with Treatment Guidelines for Controlled Substances



Sources: Matrix Healthcare Services, *Opioid Legislation and Regulations Impacting Workers' Compensation: 2016 Summary and 2017 Outlook.* 2017. http://www.mymatrixx.com/wp-content/uploads/2014/09/Opioid-Legislation-and-Regulations-2016-Summary-and-2017-Recap-myMatrixx.pdf; Optum Inc., *Regulatory and Legislative Updates 2016 Session Review | Workers' Compensation.* 2016. http://helioscomp.com/docs/default-source/default-document-library/gov14-16201-ga-mid-year-update-8-2016.pdf; IMPAQ literature scan Feb/March 2017.

[11] We use the term "controlled substances" here to include:
Schedule I –substances with no accepted medical use and a high potential for abuse (e.g. heroin, LSD, ecstasy).
Schedule II –narcotics and stimulants with a high potential for abuse that can result in severe psychological or physical dependence (e.g. Dilaudid, Demerol, OxyContin, Percocet, morphine, opium, codeine, methamphetamine)
Schedule III –substances with less potential for abuse but that can still lead to moderate or low physical dependence and high psychological dependence (e.g. Vicodin, Tylenol/Codeine)
Schedule IV – substances with a lower potential for abuse than Schedule III drugs (e.g. Xanax, Klonopin, Valium).
Schedule V –preparations that contain limited quantities of narcotics, including cough syrups that contain codeine.

CDC Guideline for Prescribing Opioids for Chronic Pain — United States, 2016
Dowell, D., Haegerich, T. M., & Chou, R.
(2016). Center for Disease Control and Prevention: *Morbidity and Mortality Weekly Report (MMWR), Recommendations and Reports*, *65*(1), 1–49.
https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm
This guideline provides recommendations for primary care clinicians who are prescribing opioids for chronic pain outside of active cancer treatment, palliative care, and end-of-life care. The guideline addresses 1) when to initiate or continue opioids for chronic pain; 2) opioid selection, dosage, duration, follow-up, and discontinuation; and 3) assessing risk and addressing harms of opioid use. The Centers for Disease Control and Prevention (CDC) developed the guideline using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) framework, and recommendations are made on the basis of a systematic review of the scientific evidence while considering benefits and harms, values and preferences, and resource allocation. CDC has provided a checklist for prescribing opioids for chronic pain (http://stacks.cdc.gov/view/cdc/38025) as well as a website with additional tools to guide clinicians in implementing the recommendations (http://www.cdc.gov/drugoverdose/prescribingresources.html).

CDC Guideline for Prescribing Opioids for Chronic Pain—United States, 2016
Dowell, D., Haegerich, T. M., & Chou, R.
(2016). *JAMA*, 3*15*(15), 1624-1645.
http://jamanetwork.com/journals/jama/fullarticle/2503508
Evidence of long-term efficacy of opioids for chronic pain is limited. Opioid use is associated with serious risks, including opioid use disorder and overdose. Non-opioid therapy is preferred for treatment of chronic pain. Before starting opioids, clinicians should establish treatment goals with patients and consider how opioids will be discontinued if benefits do not outweigh risks. When opioids are used, clinicians should prescribe the lowest effective dosage, carefully reassess benefits and risks when considering increasing dosage to 50 morphine milligram equivalents or more per day, and avoid concurrent opioids and benzodiazepines whenever possible. For patients with opioid use disorder, clinicians should offer or arrange evidence-based treatment, such as medication-assisted treatment with buprenorphine or methadone.

Opioid Prescribing: A Systematic Review and Critical Appraisal of Guidelines for Chronic Pain
Nuckols, T. K., Laura Anderson, L. A., Popescu, I., Diamant, A. L., Doyle, B., Di Capua, P., & Chou, R.
(2014). *Annals of Internal Medicine, 160*(1).
http://annals.org/aim/article/1767856/opioid-prescribing-systematic-review-critical-appraisal-guidelines-chronic-pain
The purpose of this review was to evaluate the quality and content of guidelines on the use of opioids for chronic pain. Despite limited evidence and variable development methods, recent guidelines on chronic pain agree on several opioid risk mitigation strategies, including upper dosing thresholds; cautions with certain medications; attention to drug–drug and drug–disease interactions; and use of risk assessment tools, treatment agreements, and urine drug testing. Future research should directly examine the effectiveness of opioid risk mitigation strategies.

American Society of Interventional Pain Physicians (ASIPP) guidelines for responsible opioid prescribing in chronic non-cancer pain: Part I--evidence assessment.
Manchikanti L., et al.
(2012). *Pain Physician*, *15*(3), S1-6.
http://europepmc.org/abstract/med/22786448
As documented by different medical specialties, medical boards, advocacy groups, and the Drug Enforcement Administration, available evidence suggests a wide variance in chronic opioid therapy of 90 days or longer in chronic non-cancer pain. The objectives of opioid guidelines as issued by the ASIPP are to provide guidance for the use of opioids for the treatment of chronic non-cancer pain, to produce consistency in the application of an opioid philosophy among the many diverse groups involved, to improve the treatment of chronic non-cancer pain, and to reduce the incidence of abuse and drug diversion. The focus of these guidelines is to curtail the abuse of opioids without jeopardizing non-cancer pain management with opioids.

Opioids for chronic noncancer pain: a new Canadian practice guideline
Furlan, A. D., Reardon, R., & Weppler, C.
(2010). *CMAJ*, *182*(9).
http://www.cmaj.ca/content/182/9/923.short
Canadian medical regulators (i.e., colleges of physicians and surgeons) have recognized a growing need for guidance in opioid use for chronic non-cancer pain. In November 2007, they formed the National Opioid Use Guideline Group to collaborate in developing the Canadian guideline for safe and effective use of opioids for chronic non-cancer pain. The research group identified 49 recommendations from 184 studies and conducted a Delphi process with 84 members of a national advisory panel to identify consensus on which recommendations to adopt as practice guidelines. The authors conclude: 1) in patients with chronic noncancer pain, opioids may be effective and should be considered; 2) opioid therapy should begin with a setting of realistic goals with the patient, a monitored trial of dosage titration, and follow-up to ensure opioid effectiveness; 3) Prescribers and dispensers can minimize potential harm associated with opioid use by assessing risks, educating patients, monitoring use over time, and reducing or stopping opioids when indicated; and 4) good communication and collaboration between health care providers and patients, across clinical disciplines, and between primary care and specialty care, is important when treating patients with chronic noncancer pain.

Clinical Guidelines for the Use of Chronic Opioid Therapy in Chronic Non-cancer Pain
Chou, R., et al.
(2009). *The Journal of Pain, 10*(2), 113–130.
http://www.sciencedirect.com/science/article/pii/S1526590008008316
This systematic review of the evidence concluded that chronic opioid therapy can be an effective therapy for carefully selected and monitored patients with chronic non-cancer pain. However, opioids are also associated with potentially serious harms, including adverse effects and outcomes related to abuse potential. The recommendations provide guidance on patient selection and risk stratification; informed consent and opioid management plans; initiation and titration of chronic opioid therapy; use of methadone; monitoring of patients on chronic opioid therapy; dose escalations, high-dose opioid therapy, opioid rotation, and indications for discontinuation of therapy; prevention and management of opioid-related adverse effects; driving and work safety; management of breakthrough pain; chronic opioid therapy in pregnancy; and opioid-related polices.

The role of tramadol in current treatment strategies for musculoskeletal pain
Schug, S. A.
(2007). *Therapeutics and Clinical Risk Management, 3*(5), 717–723.
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.275.239&rep=rep1&type=pdf
Non-steroidal anti-inflammatory drugs (NSAIDs) and cyclooxygenase-2 (COX-2) have been the mainstay of treatment for MSK pain of moderate intensity. However, in addition to gastrointestinal and renal toxicity, an increased cardiovascular risk may be a class effect for all NSAIDs. Despite these safety risks and the acknowledged ceiling effect of NSAIDs, many doctors still use them to treat moderate, mostly MSK pain. Recent guidelines for treating osteoarthritis and low back pain, recommend NSAIDs and COX-2 inhibitors only in strictly defined circumstances, at the lowest effective dose and for the shortest possible period of time, and bring more focus to the usage of paracetamol (acetaminophen) and opioids. Tramadol, an analgesic with weak opioid receptor affinity and possessing monoaminergic activity, is now regarded as the first-line analgesic for many MSK indications. The authors recommend better implementation of recent guidelines focusing on pain management and considering the role of tramadol in MSK pain treatment strategies.

Update on guidelines for the treatment of chronic musculoskeletal pain
Schnitzer, T. J.
(2006). *Clinical Rheumatology, 25*(Suppl 1), 22–29.
http://link.springer.com/article/10.1007/s10067-006-0203-8
An international multidisciplinary panel, the Working Group on Pain Management, has generated new recommendations for the treatment of moderate-to-severe MSK pain. These guidelines, formulated in response to recent developments concerning COX-2 inhibitors and other NSAIDs, focus on paracetamol as the baseline drug for chronic pain management; when greater analgesia is desired, the addition of weak opioids is recommended based on a preferable GI and cardiovascular profile, compared with NSAIDs.

Opioid Guidelines in the Management of Chronic Non-Cancer Pain
Trescot, A. M., et al.
(2006). *Pain Physician, 9*, 1-40.
http://almacen-gpc.dynalias.org/publico/Opioid%20Guidelines%20Pain%20Phsysician%202006.pdf
Opioid abuse has increased at an alarming rate. However, available evidence suggests a wide variance in the use of opioids, as documented by different medical specialties, medical boards, advocacy groups, and the Drug Enforcement Administration. After an extensive review and analysis of the literature, the authors conclude that opioid guidelines based on the best available scientific evidence, do not constitute inflexible treatment recommendations. Because of the changing body of evidence, this document is not intended to be a “standard of care.”

Opioid Therapy for Chronic Pain
Jane C. Ballantyne, J. C., & Mao, J.
(2003). *N Engl J Med*, 3(349), 1943-1953.
http://s3.amazonaws.com/academia.edu.documents/42701869/Final_final.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1490777479&Signature=jngLpJzSNVHE6n%2Bj5qCK7EhQG5k%3D&response-content-disposition=inline%3B%20filename%3DOpioid_Therapy_for_Chronic_Pain.pdf
A difficult decision for physicians who treat patients with chronic pain not associated with terminal disease is whether and how to prescribe opioid therapy, which can relieve pain and improve mood and level of functioning in many such patients. This review considers current guidelines for opioid therapy in patients with chronic pain unrelated to malignant conditions including recommending a cautious approach to

dose escalation and the dis-continuation of opioids if treatment goals are not met. The authors cite risks associated with opioid use including, increased sensitivity to pain (manifested as "apparent" opioid tolerance) and the need for dose escalation as well as the possibility of hormonal changes and altered immune function. The authors recommend management strategies such as limited dosage, opioid rotation and restarting after a period of abstinence to reduce these risks.

Tramadol in Musculoskeletal Pain – A Survey
Reig, E.
(2002). *Clinical Rheumatology*, *21*(Suppl 1), S9–S12.
http://link.springer.com/article/10.1007/s100670200030
The three-step analgesic ladder, originally proposed for cancer pain relief by the World Health Organization (WHO), is now widely employed for all types of pain, including the chronic pain of MSK disease. Tramadol, an analgesic with weak opioid receptor affinity and possessing monoaminergic activity, has proved suitable for use at Step 2 of the WHO ladder. Owing to its pharmacological properties, tramadol is more appropriate than NSAIDs for patients suffering from gastrointestinal and renal problems. Importantly, the analgesic potency of tramadol is greater than that of NSAIDs and of other weak opioids (codeine, dextropropoxyphene). In chronic MSK pain it is recommended that tramadol should be given by mouth and by the clock; the initial dose should be titrated upward gradually to reach the individual level required for suitable pain control. This dosage strategy will minimize the usual opioid-type adverse effects encountered with tramadol. Four recent publications are reviewed to illustrate the efficacy of tramadol, alone or in conjunction with an NSAID, in the management of low back pain.

5.3 Prescription Drug Monitoring Programs

Many states have chosen to enact prescription drug monitoring program (PDMP) legislation and regulations, partly because these programs are easier to implement and control compared to other options for managing use of opioids and other controlled substances. In a state or territory with a PDMP, doctors and/or pharmacies are required to report on what they prescribe and dispense. This information goes into a database, which prescribers, pharmacists, health insurers, and medical boards then can use for monitoring and control of prescription drug use by individuals and prescribing practices by doctors—that is, patients can be prevented from going to one doctor to another to get multiple prescriptions, and doctors can be contacted and advised if their prescribing practices seem excessive and not to be supporting the best interests of patients. The data collected may also be used by state public health officials in identifying needs and developing campaigns to improve understanding and prescribing practices.

According to the Prescription Drug Monitoring Program Training and Technical Assistance Center the number of PDMPs has grown rapidly in the past 15 years, with programs now operational in all states with the exception of Missouri[12],[13] However, in some states the number of prescribers utilizing PDMPs remains low, limiting their effectiveness. Nationwide, PDMP administrators, state and federal health officials, professional organizations, and legislators are examining ways to increase prescriber use of PDMPs.

---

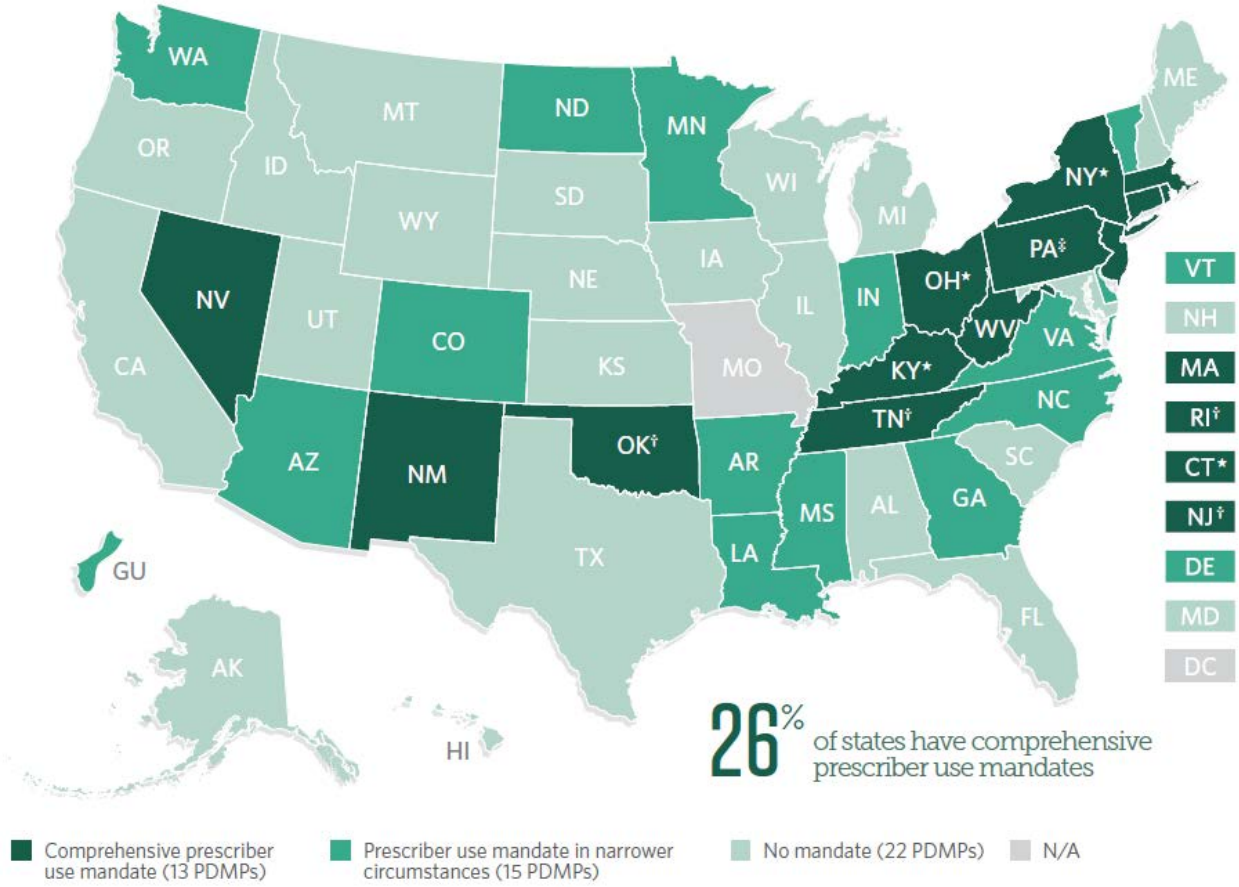
[12]"Missouri is the only state not monitoring prescription drug use. Will it finally create a database?" *STAT*, March 7, 2017. https://www.statnews.com/2017/03/07/missouri-prescription-drug-database/

[13] Prescription Drug Monitoring Program Training and Technical Assistance Center, "Prescription Drug Monitoring Frequently Asked Questions," http://www.pdmpassist.org/content/prescription-drug-monitoring-frequently-asked-questions-faq

The figures on the following pages were developed by the PDMP Technical Assistance Center at the Institute for Behavioral Health, Heller School for Social Policy and Management at Brandeis University in partnership with Pew Charitable Trusts and illustrate some of the strategies states are using to strengthen their PDMPs.[14]

Researchers from the Institute for Behavioral Health at Brandeis University in collaboration with The Pew Charitable Trusts surveyed states and compiled the following information on PDMP practices.

Figure 3: PDMPs with Prescriber Use Mandates, 2015



Source: Survey conducted by the Brandeis University PDMP Center of Excellence and the Pew Charitable Trusts from November to December 2015.
http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf

Notes: This analysis includes 50 operational PDMPs. Missouri, which did not have a law authorizing the establishment of a PDMP, and the District of Columbia, which did not have an operational program as of December 2015, were excluded. (DC's program is now operational.) Comprehensive prescriber use mandates apply to all prescribers and, at minimum, to all initial opioid prescriptions issued to patients.

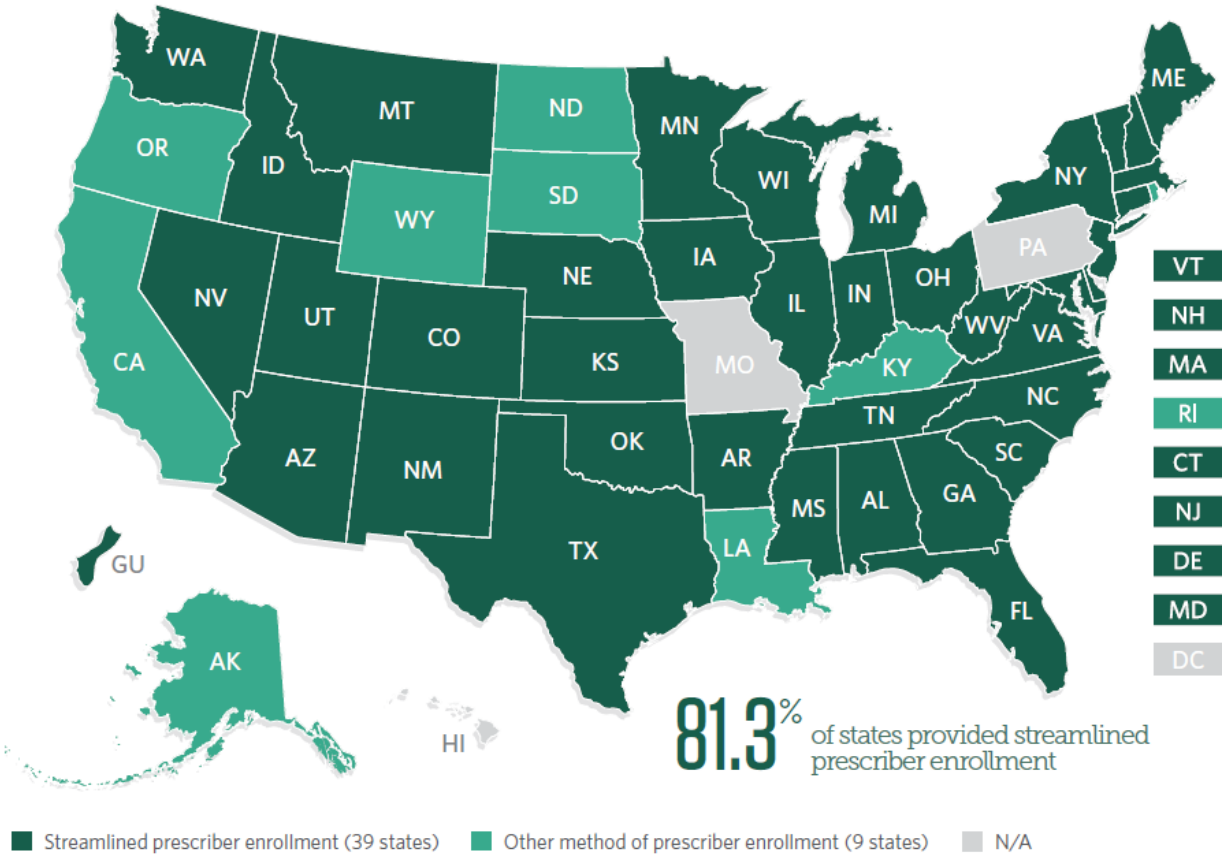
[14] Prescription Drug Monitoring Program: Evidence-based practices to optimize prescriber use. December 2016. http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf

★ States received the highest level rating from CDC for having universal PDMP use requirements, which are defined by requiring prescribers to consult the PDMP before initially prescribing opioids and benzodiazepines, and at least every three months thereafter.

† States received the mid-level rating from CDC for having requirements for prescribers to check the PDMP before initial opioid prescriptions.

‡ Pennsylvania statue authorized a comprehensive mandate, but the PDMP transitioned to the state Department of Health, and this practice had not been implemented at the time of the survey. Since that time mandatory use of the PDMP has been implemented.

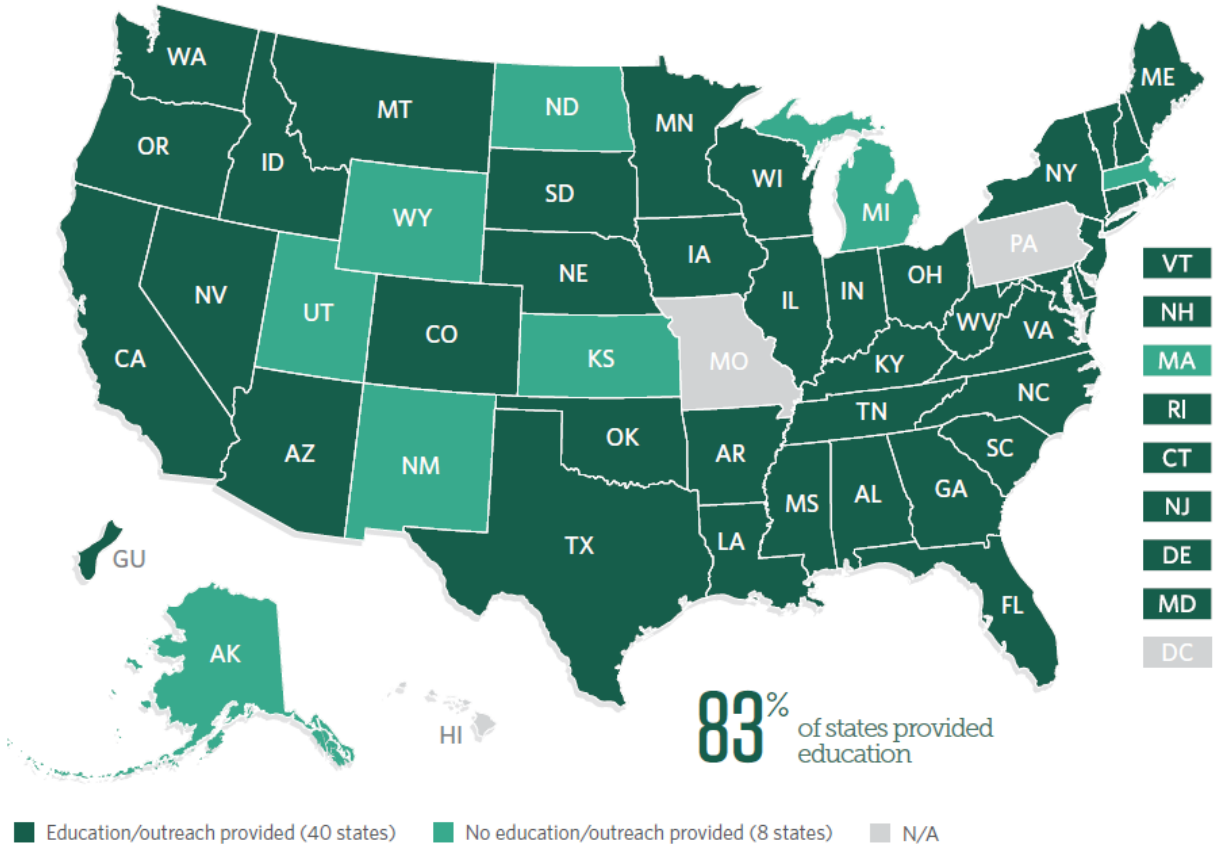
Figure 4: States That Streamline Prescriber Enrollment in PDMPs



Source: Survey conducted by the Brandeis University PDMP Center of Excellence and the Pew Charitable Trusts from November to December 2015.
http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf

Notes: Streamlined enrollment includes online registration and automatic registration triggered by a state controlled substance registration or medical license renewal. Other methods of enrollment include paper-based registration and notarization requirements. Data reflects survey of 48 operational PDMPs. The District of Columbia, Hawai'i, Missouri, and Pennsylvania are not included in this analysis. The District of Columbia PDMP was not operational as of December 2015 (but is now.) Hawai'i officials did not respond to this survey. Missouri does not have authority to establish a PDMP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was unavailable at the time of the survey.

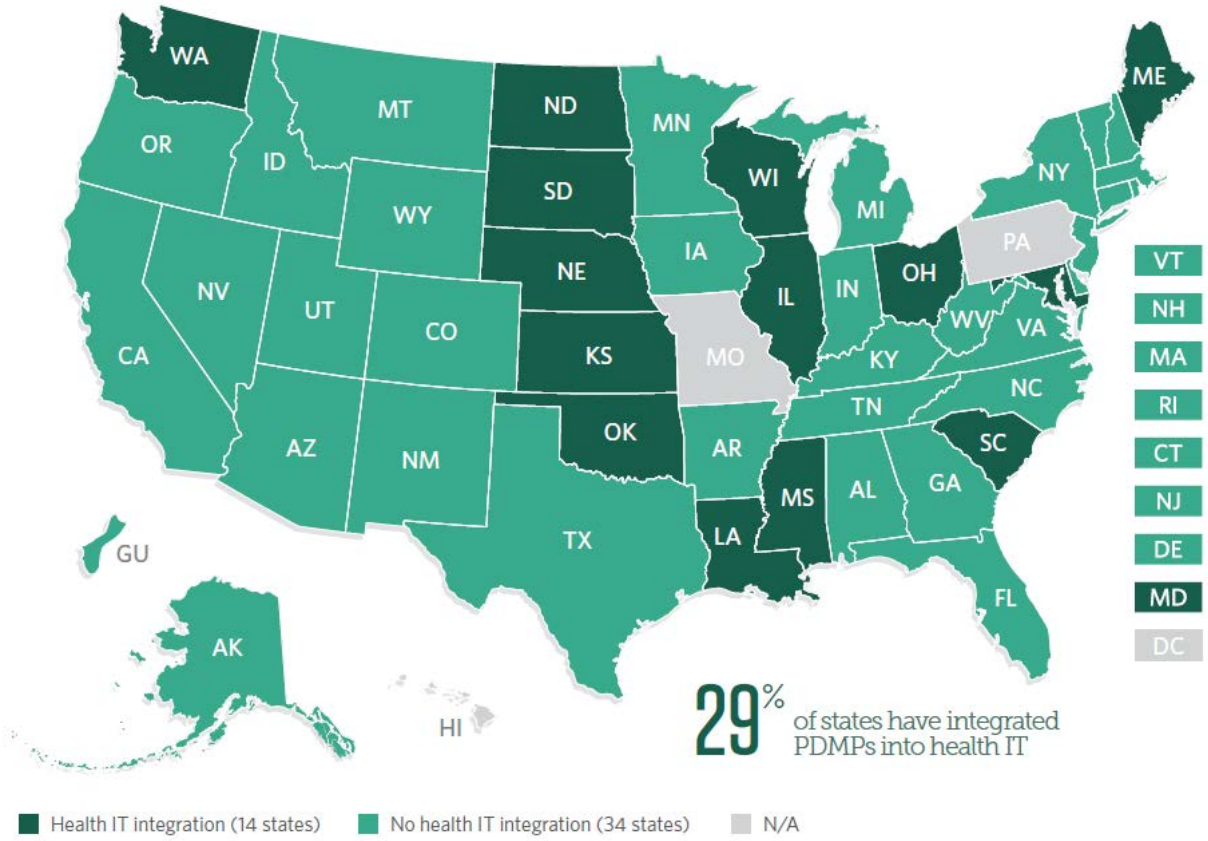
Figure 5: PDMPs That Provide Prescriber Education and Promotional Initiatives



Source: Survey conducted by the Brandeis University PDMP Center of Excellence and the Pew Charitable Trusts from November to December 2015.
http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf

Notes: Data reflects survey of 48 operational PDMPs. The District of Columbia, Hawai'i, Missouri, and Pennsylvania are not included in this analysis. The District of Columbia PDMP was not operational as of December 2015 (but is now.) Hawai'i officials did not respond to this survey. Missouri does not have the authority to establish a PMDP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was unavailable.

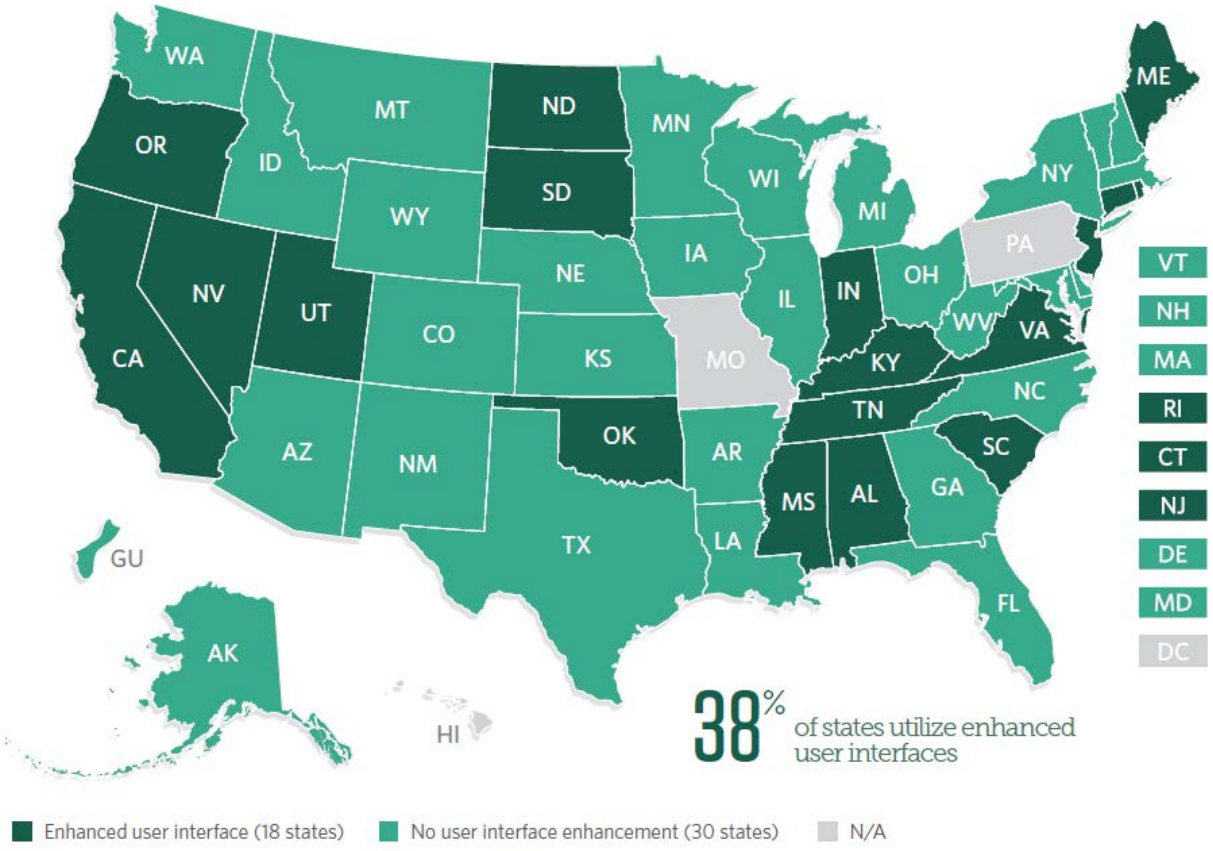
Figure 6: Programs That Have Integrated PDMPs into Health IT



Source: Survey conducted by the Brandeis University PDMP Center of Excellence and the Pew Charitable Trusts from November to December 2015.
http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf

Notes: For the purposes of this figure, health information technology (IT) integration efforts may include access to PDMP data via a health information exchange, electronic health records, or both. Data reflects survey of 48 operational PDMPs. The District of Columbia, Hawai'i, Missouri, and Pennsylvania are not included in this analysis. The District of Columbia PDMP was not operational when this survey was conducted (but is now). Hawai'i officials did not respond to this survey. Missouri does not have authority to establish a PDMP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was not available.

Figure 7: PDMP Adoption of Enhanced User Interfaces



Source: Survey conducted by the Brandeis University PDMP Center of Excellence and the Pew Charitable Trusts from November to December 2015.
http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf

Notes: Enhanced user interfaces include risk assessment tools, dashboards, data summaries, and red flags. Data reflects survey of 48 operational PDMPs. The District of Columbia, Hawai'i, Missouri, and Pennsylvania are not included in this analysis. The District of Columbia PDMP was not operational as of December 2015 (but is now.) Hawai'i officials did not respond to this survey. Missouri does not have authority to establish a PDMP. The Pennsylvania PDMP transitioned to the state Department of Health, and data for this measure was unavailable.

Figure 8: Evidence-Based PDMP Practices to Increase Prescriber Utilization

PDMP Practices	Description
Prescriber use mandates	Requiring a prescriber to view a patient's PDMP data under certain circumstances, such as before writing an initial prescription for a controlled substance.
Delegation	Allowing prescribers to designate someone on staff, such as a nurse, to access the PDMP on their behalf to help manage workflow.
Unsolicited reports	Proactively sending communications from PDMP staff to prescribers, dispensers, law enforcement, and regulators to flag potentially harmful drug use or prescribing activity based on PDMP data.
Data timeliness	Uploading of information to the database at set intervals, whether in real time, daily, weekly, or monthly. (Dispensers, which include pharmacies and prescribers who provide medications directly to patients, are responsible for uploading data.)
Streamlined enrollment	Simplifying processes, such as instituting automatic PDMP registration triggered by state controlled substance registration, to more easily enable prescribers to enroll in the PDMP.
Educational and promotional activities	Making efforts to promote the program, including prescriber training (via formats that include online videos and instructional materials) on how to access and use PDMP data.
Health information technology (IT) integration	Combining PDMP data with other clinical data through technologies that are used to store, communicate, and analyze health information, such as electronic health records.
Enhanced user interfaces	Implementing user-friendly technologies, such as dashboards and mobile applications that provide PDMP data in easily understandable formats.
Other practice(s)	Optimizing a PDMP, including those aimed at increasing prescriber utilization. Examples include prescriber self-lookup, prescriber report cards, and batch reporting to increase prescriber utilization.

Source: Survey conducted by the Brandeis University PDMP Center of Excellence and the Pew Charitable Trusts from November to December 2015.
http://www.pewtrusts.org/~/media/assets/2016/12/prescription_drug_monitoring_programs.pdf

Most Primary Care Physicians Are Aware of Prescription Drug Monitoring Programs, but Many Find the Data Difficult to Access
Rutkow, L., Turner, L., Lucas, E., Hwang, C., G. & Alexander, C.
(2017). *Health Affair, 36*(3).
http://content.healthaffairs.org/content/34/3/484.abstract
State PDMPs are common tools intended to reduce prescription drug abuse and diversion (non-medical use.) The success of these programs depends largely upon physicians' awareness and use of them. A nationally representative mail survey of 1,000 practicing primary care physicians was conducted in 2014 to characterize their attitudes toward and awareness and use of prescription drug monitoring programs. The results suggest that the majority of US primary care physicians are aware of and use PDMPs at least on occasion, although many did not access these programs routinely. To increase the use of the programs in clinical practice, states should consider implementing legal mandates, investing in prescriber education and outreach, and taking measures to enhance ease of access to and use of the programs.

Prescription Drug Monitoring Programs: Evidence-based practices to optimize prescriber use
The Pew Charitable Trusts
(2016). Retrieved July 2017 from
http://www.pewtrusts.org/en/research-and-analysis/reports/2016/12/prescription-drug-monitoring-programs
The report describes eight evidence-based practices aimed at increasing prescriber utilization of PDMPs: 1) Prescriber use mandates; 2) Delegation; 3) Unsolicited reports; 4) data timeliness; 5) streamlined enrollment; 6) educational and promotional initiatives; 7) health information technology integration; and 8) enhanced user interfaces.

Mapping Prescription Drug Monitoring Program Enrollment and Use: State-by-state data show prescriber utilization patterns
Reilly, C., & Lawal, S.
The Pew Charitable Trusts
(2016). Retrieved July 2017 from
http://www.pewtrusts.org/en/research-and-analysis/analysis/2016/09/01/mapping-prescription-drug-monitoring-program-enrollment-and-use
This online article presents results of an analysis of prescription drug monitoring programs from one state to another across the nation. PDMPs are intended in part to control prescribing, and prevent inadvertent overprescribing, of drugs including opioid pain relievers. In an information graphic and in tabular form, the authors map prescriber enrollment in PDMPs and prescriber use by state.

Electronic-Florida Online Reporting of Controlled Substances Evaluation: 2014-15 Prescription Drug Monitoring Program Annual Report
Florida Health
(2015). Retrieved July 2017 from
http://www.floridahealth.gov/statistics-and-data/e-forcse/news-reports/_documents/2015-pdmp-annual-report.pdf
Florida's Surgeon General and Secretary of Health describe Florida's PDMP as an effective tool to protect public health and safety, while supporting sound clinical prescribing, dispensing, and use of controlled substances. This Annual Report highlights 2014-15 key accomplishments including: 1) reducing the rate of inappropriate use of prescription drugs through Department of Health education and safety efforts, resulting in a 12% reduction in oxycodone deaths; 2) reducing the quantity of pharmaceutical controlled

substances obtained by individuals attempting to engage in fraud and deceit; 3) increasing coordination among interested parties participating in PDMP resulting in a 65% reduction the number of individuals with multiple providers; and 4) involving stakeholders in achieving improved patient health care and safety and reduction of prescription drug diversion.

Oregon's strategy to confront prescription opioid misuse: a case study
McCarty, D., Bovett, R., Burns, T., Cushing, J., Glynn, M. E., Senator Kruse, J., Millet, L. M., & Shames, J. (2015). *Journal of Substance Abuse Treatment, 48*(1), 91-95.
http://www.journalofsubstanceabusetreatment.com/article/S0740-5472(14)00149-4/abstract
Oregon's governor appointed a Prescription Drug Taskforce to address Oregon's opioid epidemic. This case study reviews the Taskforce's participation in the National Governors Association State Policy Academy on Reducing Prescription Drug Abuse. To address the challenge of the misuse and abuse of prescription opioids, the Taskforce developed a strategy for practice change, community education and enhanced access to safe opioid disposal using stakeholder meetings, consensus development, and five action steps: (1) fewer pills in circulation, (2) educate prescribers and the public on the risks of opioid use, (3) foster safe disposal of unused medication, (4) provide treatment for opioid dependence, and (5) continued leadership from the Governor, health plans and health professionals.

2015 Annual Review of Prescription Monitoring Programs
National Alliance for Model State Drug Laws (NAMSDL)
(2015). Retrieved July 2017 from
http://www.namsdl.org/library/1810E284-A0D7-D440-C3A9A0560A1115D7/
As part of addressing the problem of prescription drug abuse in America, 49 states and the District of Columbia have enacted PDMPs to curb prescription drug abuse, misuse, and diversion. This annual review outlines the year's changes to PDMPs across the country and includes information about state reporting mechanisms, program administration and how PDMPs are funded in different state. It reviews relevant information on changes made in areas related to PDMPs such as mandatory registration and access, types of authorized users, and includes a map of the current status of states within each category.

An Act to Prevent Opiate Abuse by Strengthening the Controlled Substances Prescription Monitoring Program
Maine State Legislature
(2015). Retrieved July 2017 from
http://www.maine.gov/dhhs/samhs/osa/data/pmp/files/PUBLIC488.pdf
Effective January, 1 2017, this law requires prescribers and dispensers to check the state's PDMP, limits opioids to seven days for acute pain and 30 days for chronic pain, places limits on maximum daily dosage and requires continuing education in opioid management. The law includes provisions to evaluate the effects of opioid limits on claims paid by health insurance carriers and the out-of-pocket costs, including copayments, coinsurance and deductibles, paid by individual and group health insurance policyholders.

Connecting Prescribers and Dispensers to PDMPs through Health IT: Six Pilot Studies and Their Impact
HealthIT.gov
(2012). Retrieved July 2017 from
https://www.healthit.gov/sites/default/files/pdmp_pilot_studies_summary_2.pdf
A 2011 White House Roundtable on Health Information Technology and Prescription Drug abuse found that prescription drug abuse is a preventable problem requiring immediate attention. The Office of the National Coordinator for Health IT partnered with the Substance Abuse and Mental Health Services Administration to ask the MITRE Corporation to identify possible ways to leverage health IT to improve access to PDMPs. MITRE collaborated with public and private stakeholders to conduct pilot studies making PDMP information more readily available to ambulatory and emergency department prescribers and dispensers. Stakeholders helped to identify three opportunities: 1) Use of secure email messages for sending unsolicited reports to prescribers and dispensers; 2) enhancements to provider or pharmacy electronic health record systems to automate PDMP queries; and 3) exploration of opportunities to leverage intermediaries for PMDP queries, including Health Information Exchanges (HIE), switches, and other hubs.

Medication Reconciliation for Controlled Substances — An "Ideal" Prescription-Drug Monitoring Program
Jeanmarie Perrone, J., & Nelson, L. S.
(2012). *The New England Journal of Medicine.* Retrieved July 2017 from
http://www.nejm.org/doi/full/10.1056/NEJMp1204493
This article analyzes the current thinking regarding the usefulness and successful characteristics of existing state PDMPs and how they can be enhanced for future impact. The authors identify promising state strategies such as web-based PDMPs, the use of serialized, bar-coded prescription paper, and interstate collaboration in urban areas that straddle state borders, and . The authors also identify barriers to implementation such as including complicated application and notarization procedures for provider verification, time burden on prescribers and dispensers, and program implementation costs.

Prescription Drug Monitoring Frequently Asked Questions (FAQs)
Brandeis University, Prescription Drug Monitoring Program Training & Technical Assistance Center
Retrieved July 2017 from
http://www.pdmpassist.org/content/prescription-drug-monitoring-frequently-asked-questions-faq
This online page defines PDMPs and answers frequently asked questions, including which agency administers the PDMP in each state, the types of controlled substances monitored by PDMPs, who typically has access to PDMP information, and the types of training and technical assistance available to stakeholders for planning, implementing, and enhancing PDMPs.

Use of Health Information Technology to Optimize Provider Access and Use of Prescription Drug Monitoring Information
The Office of the National Coordinator for Health Information Technology
Retrieved July 2017 from
https://www.healthit.gov/sites/default/files/aspa_0126_onc_fs_pdmp_rx_misuse_project.pdf
This press release details how HHS agencies and the Office of National Drug Control Policy helped the Office of the National Coordinator for Health Information Technology fund the "Enhancing Access to Prescription Drug Monitoring Programs Using Health Information Technology" project to improve the timely use of PDMP data by providers, emergency department physicians, and pharmacist. Six pilots were conducted in five states, leading to three universal findings: 1) Once prescriber and dispenser

communities were connected to the PDMP, immediate improvement to the patient care process was achieved; 2) user workflows were streamlined and improved; and 3) physician and pharmacist satisfaction was highest when technology automated the majority of workflow tasks.

5.4 State-Regulated Drug Formularies

According to a position statement from the American College of Occupational and Environmental Medicine, 12 states (Arizona, Arkansas, California, Delaware, Nevada, North Dakota, Ohio, Oklahoma, Tennessee, Texas, Washington, and Wyoming) have adopted, or are working on adopting, formularies for their workers' compensation systems, beginning with North Dakota in 2006.[15] Other states are also considering doing so, partly because, according to the position statement, "studies [have] demonstrate[ed] that formularies can dramatically decrease the direct cost of medications, the costs of utilization review, and the inappropriate use of certain medications including opioids, non-generics, and compounded topical medications."[16] On the other hand, Colorado has chosen not to adopt a formulary for its WC system. Instead, the state plans to ensure appropriate, safe prescribing in its WC cases through other utilization review processes.

State-regulated drug formularies may also encourage use of pain management strategies other than medication that involve less risk of dependency and development of opioid use disorder. A *Claims Journal* article reports that experts identify specific factors needed for a drug formulary to work well:[17]

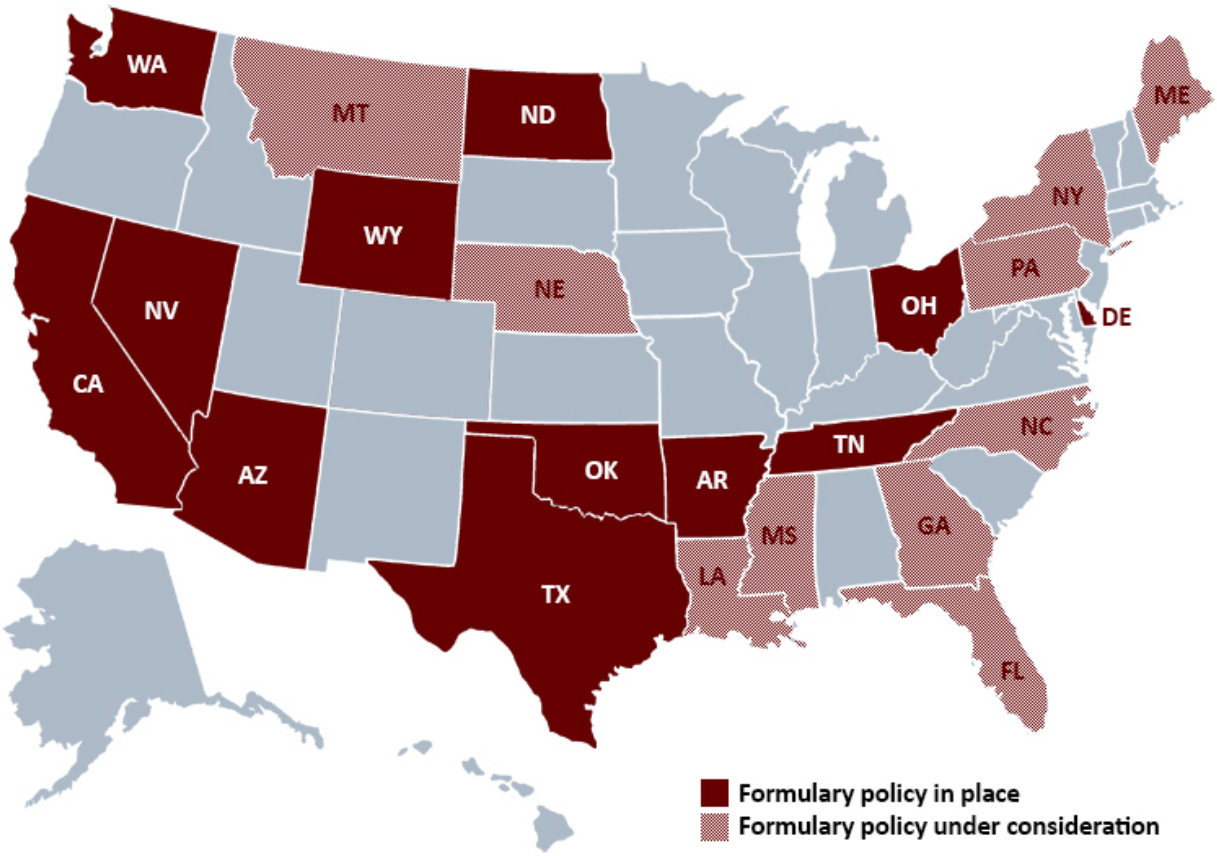
- A specific list of drugs
- Understanding how the drugs are assessed
- A firm dispute resolution process
- Some form of enforcement mechanism
- An expedited appeal process

[15] American College of Occupational and Environmental Medicine. (2016, August). *Drug formularies in workers' compensation systems: A position statement of the American College of Occupational and Environmental Medicine.* http://www.acoem.org/uploadedFiles/Public_Affairs/Policies_And_Position_Statements/Guidelines/Position_Statements/DrugFormulariesinWorkersCompensationSystems.pdf

[16] Swedlow A, Hayes S, David R. A report to the industry: Are Formularies a Viable Solution for Controlling Prescription Drug Utilization and Cost in California Workers' Compensation? California Workers Compensation Institute (CWCI), October 2014. http://www.cwci.org/research.html

[17] Johnson, Denise, More States Considering Workers' Compensation Drug Formularies. *Claims Journal* March 2, 2015. http://www.claimsjournal.com/news/national/2015/03/02/262063.htm

Figure 9: States with Drug Formulary Policies



Sources: Matrix Healthcare Services, *Opioid Legislation and Regulations Impacting Workers' Compensation: 2016 Summary and 2017 Outlook.* 2017. http://www.mymatrixx.com/wp-content/uploads/2014/09/Opioid-Legislation-and-Regulations-2016-Summary-and-2017-Recap-myMatrixx.pdf; Optum Inc., *Regulatory and Legislative Updates 2016 Session Review | Workers' Compensation.* 2016. http://helioscomp.com/docs/default-source/default-document-library/gov14-16201-ga-mid-year-update-8-2016.pdf; IMPAQ literature scan Feb/March 2017.

Drug Formularies in Workers' Compensation Systems
American College of Occupational and Environmental Medicine
(2016). Retrieved July 2017 from
http://erd.dli.mt.gov/Portals/54/Documents/LMAC/08-23-2016/DrugFormulariesinWorkersCompensationSystems.pdf
This position statement from the American College of Occupational and Environmental Medicine (ACOEM) regarding the use of drug formularies in WC systems defines the various types of drug formularies currently used by states and summarizes some of the clinical and policy issues for legislative consideration. AECOM recommends that if a WC formulary is to be established, a condition-triggered evidence -based formulary is the preferred approach, based on well-documented evidence-based methods, with robust oversight from a pharmacy and therapeutics committee, with regulations consistent with other utilization review processes, and should include an appeals process and monitoring program.

Impact of the Texas Pharmacy Closed Formulary
Texas Department of Insurance Workers' Compensation Research and Evaluation Group
(2016). Retrieved July 2017 from https://www.tdi.texas.gov/reports/wcreg/documents/formulary16.pdf
This report provides detailed data on changes associated with the implementation, beginning in 2011, in the state of Texas of a closed formulary in the workers' compensation system. Key findings include a reduction in injured employees receiving N-drugs (drugs with a status of "not recommended" in Appendix A, the ODG Workers' Compensation Drug Formulary, part of the *Official Disability Guidelines—Treatment in Workers' Compensation [ODG]*) from before to after implementation of the closed formulary. Additionally, N-drug costs went down by 78 percent, N-drug prescriptions diminished by 85 percent (while prescriptions for other drugs went down by 14 percent), and costs of opioid drugs went from 27 percent of total pharmacy costs (2009) to 18 percent (2015).

Report of the Findings and Recommendations of the North Carolina Industrial Commission Regarding the Implementation of a Drug Formulary in Workers' Compensation Claims
North Carolina Industrial Commission
(2016). Retrieved July 2017 from http://www.ic.nc.gov/NCICDrugFormularyStudyReport.pdf
This report presents findings of a study conducted by the North Carolina Industrial Commission that examined how implementation of a drug formulary would affect WC claims of state employees. The study was mandated by North Carolina Session Law 2014-241 (http://www.ncleg.net/EnactedLegislation/SessionLaws/HTML/2015-2016/SL2015-241.html). Although the Commission recommends additional study and other steps before implementation of a drug formulary across the WC system, it notes in the report that their findings suggest that adoption of a formulary could help reduce costs and increase efficiency in providing medications to injured workers. Next steps the Commission recommends include a study of implementation of a formulary across the entire WC system, investigation of potential medical treatment guidelines to be implemented in tandem with a formulary, and collaboration with other state agencies to learn more about how to plan for safe and effective prescribing and other activities within WC cases in light of the nationwide prescription opioid crisis.

Closed Formularies Hold the Line on Costs
Modern Medicine Network
(2015). Retrieved July 2017 from
http://managedhealthcareexecutive.modernmedicine.com/managed-healthcare-executive/news/closed-formularies-hold-line-costs
In this article, the author describes four basic formulary models—open, closed, hybrid, and value-based—and explores how they work in the real world, in businesses across various states. Open formularies are described as those non-formulary drugs are still available but require a higher copayment. Closed formularies, on the other hand, do not cover non-formulary drugs except for medical necessity. In the middle are hybrid formularies that are partially closed with a select mix of drugs identified as warranting exclusion for clinical and financial reasons. Value-based formularies emphasize the clinical effectiveness of a drug rather than its cost. The author offers examples of each type and notes that designing formularies can be challenging.

More States Considering Workers' Compensation Drug Formularies
Johnson, D.
(2015). *Claims Journal.* Retrieved July 2017 from
http://www.claimsjournal.com/news/national/2015/03/02/262063.htm
While only a small handful of states had workers compensation drug formularies in place at the time of writing, many states have been exploring and considering drug formularies for their workers' compensation systems. The authors describe the benefits of drug formularies as going beyond cost savings with biggest benefit being prescribing behavior changes to shift doctors from prescribing some medications out of habit to focusing on what's best for the injured worker in returning to function and returning to work as quickly, and efficaciously as possible.

5.5 Opioid Contracts

Opioid contracts are written agreements between doctors and patients about the conditions for prescribing opioids long term for chronic pain. They can vary from patient agreements to keep regular appointments and take medications as prescribed, to more stringent contracts that go so far as to involve testing for illicit drugs.

Opioid contracts, meant to curb addiction, can harm patients
Lahey, T.
(2016). *STAT.* Retrieved July 2017 from
https://www.statnews.com/2016/07/26/opioid-contracts-addiction-legislation/
The Comprehensive Addiction and Recovery Act of 2016 https://www.congress.gov/bill/114th-congress/senate-bill/524/text promotes the use of opioid contracts, written agreements between doctors and patients about the conditions for prescribing opioids long term for chronic pain. There is some risk that terminating a contract might harm patients, but overall contracts can formalize safer approaches to opioid prescribing, which is why they are already required by law in New Hampshire and Massachusetts.

Sample Opioid Treatment Agreement
Washington State Department of Labor & Industries
(2013). Retrieved July 2017 from http://www.lni.wa.gov/Forms/pdf/F252-095-000.pdf
This opioid treatment agreement is designed to be used by WC claimants in Washington. It describes treatment with opioid analgesics as part of an overall program and a complement to vocational counseling to help with RTW. The form delineates responsibilities for claimants and provides basic information about opioids, their side effects and risks, and safe methods of opioid disposal.

Long-Term Opioid Contract Use for Chronic Pain Management in Primary Care Practice. A Five Year Experience
Hariharan, J., Lamb, G. C., & Neuner, J. M.
(2007). *J Gen Intern Med*., *22*(4), 485–490.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1829426/
The use of opioid medications to manage chronic pain is complex and challenging, especially in primary care settings. Medication contracts are increasingly being used to monitor patient adherence, but little is known about the long-term outcomes of such contracts. In this study a total of 330 patients were placed on contracts during the study period. Contracts were discontinued in 37% of the cases. Only 17% were cancelled for substance abuse and noncompliance. Over 60% of patients adhered to the contract

agreement for opioids with a median follow-up of 22.5 months. The authors provide insight into establishing a systematic approach to opioid administration and monitoring in primary care practices and recommend a more structured drug testing strategy to identify non-adherent patients.

Opioid Contracts in Chronic Nonmalignant Pain Management: Objectives and Uncertainties
Arnold, R. M., Han, P. K. J., Seltzer, D.
(2006). *The American Journal of Medicine, 119*, (4), 292–296.
http://www.sciencedirect.com/science/article/pii/S0002934305008612
This article reviews the principal objectives and ideal elements of opioid contracts, as articulated by proponents of the practice, and examines the limited empirical evidence for the effectiveness of opioid contracts in achieving their intended objectives. The authors recommend that specialty and primary care clinicians contemplating the use of opioid contracts in treating patients with chronic nonmalignant pain be sensitive to the multiplicity of objectives they might serve, the lack of empirical evidence of effectiveness and ethical concerns over implementation.

Opioid Prescribing Resources
National Institute on Drug Abuse
Retrieved July 2017 from
https://www.drugabuse.gov/nidamed-medical-health-professionals/tool-resources-your-practice/opioid-prescribing-resources
At this web page, the National Institute on Drug Abuse presents resources for doctors and other health care professionals to use in prescribing opioids and in supporting patients in using opioids as part of their treatment safely and appropriately. Resources include downloadable documents, guidelines, a video, and a course. They encompass clinical resources to help providers safely prescribe opioids and to recognize and address opioid use disorder in patients, as well as patient consent and agreement forms.

Opioid Pain Contracts Can Damage Patient Trust, Bioethics Panel Says
Partnership for Drug-Free Kids
Retrieved July 2017 from
http://drugfree.org/learn/drug-and-alcohol-news/opioid-pain-contracts-can-damage-patient-trust-bioethics-panel-says
This online article relates information from a commentary in the *American Journal of Bioethics* noting that opioid pain contracts should be used carefully by doctors so that they do not lose the trust and confidence of their patients. The authors of the *American Journal of Bioethics* article write that these contracts can help to open lines of communication between doctors and patients, but that the contracts sometimes are worded in such a way that it sounds as though if patients do not sign they will not be able to receive care anymore from the provider. The article considers the issues involved in opioid pain contracts and the opinions of experts and national medical associations.

Sample Patient Agreement Forms
National Institute on Drug Abuse
Retrieved July 2017 from
https://www.drugabuse.gov/sites/default/files/files/SamplePatientAgreementForms.pdf
Written in straightforward language appropriate for people who are not health care or legal experts, these forms can be used to make sure patients are aware of, and have agreed to, their rights and responsibilities during treatment for pain with opioids or other controlled substances. They include information about the roles of patients, doctors, pharmacy professionals, and pain management programs in initiating and

moving through treatment. As noted on an introductory page, they can be used to foster discussion between a patient and his or her doctor (and perhaps also other health care providers) to ensure that questions and concerns are addressed before treatment begins.

5.6 Overdose Prevention Programs/Initiatives

According to the CDC, in 2015 more than 33,000 people in the United States—91 per day—died of an opioid overdose.[18,19] This section includes an initiative and program of the CDC to support states in addressing this public health crisis. Part of this work will involve data collection and analysis to enable development of more effective, targeted programs in communities across the country.

Data-Driven Prevention Initiative (DDPI)
Centers for Disease Control and Prevention
Retrieved July 2017 from https://www.cdc.gov/drugoverdose/foa/ddpi.html
In October 2016 the CDC's Prescription Drug Overdose: Data-Driven Prevention Initiative (DDPI) awarded $18 million over a three-year project period to 13 states and the District of Columbia to support efforts to end the opioid overdose epidemic in the United States. This program will help states advance and evaluate their actions to address opioid misuse, abuse, and overdose. That includes increasing their ability to: 1) Improve data collection and analysis around opioid misuse, abuse, and overdose; 2) Develop strategies that impact behaviors driving prescription opioid dependence and abuse; and 3) Work with communities to develop more comprehensive opioid overdose prevention programs in Washington DC, Alabama, Alaska, Arkansas, Georgia, Hawai'i, Idaho, Kansas, Louisiana, Michigan, Minnesota, Montana, New Jersey, and South Dakota. As the opioid overdose epidemic evolves, CDC will continue to provide scientific expertise, enhance surveillance activities, and tailor resources to address states' changing needs.

Prescription Drug Overdose: Prevention for States
Centers for Disease Control and Prevention – web page
Retrieved July 2017 from https://www.cdc.gov/drugoverdose/states/state_prevention.html
Prescription Drug Overdose: Prevention for States is a program that helps states combat the ongoing prescription drug overdose epidemic. The purpose of Prevention for States is to provide state health departments with resources and support needed to advance interventions for preventing prescription drug overdoses. As a result of increased funding in 2016, among 29 states, 14 are now receiving additional dollars in one-year supplemental funding to support their ongoing work, including: California, Colorado, Indiana, Kentucky, New Mexico, New York, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Utah, Washington, and Wisconsin.

[18] Centers for Disease Control and Prevention. (2017). Injury prevention and control: Opioid overdose. https://www.cdc.gov/drugoverdose/index.html
[19] Centers for Disease Control and Prevention. (2017). Injury prevention and control: Opioid overdose; Understanding the epidemic. https://www.cdc.gov/drugoverdose/epidemic

5.7 Policies/Laws/Regulations Governing Prescribing Controlled Substances

This chapter provides some additional resources that are not specific to the particular practices described in Chapter 4. These include information about federal and state laws, as well as reports on prescribing practices and patterns and the effects of federal and state policies related to controlled substances. Also featured are research articles about how policies, laws, and regulations affect prescribing in Europe and states across the country, as well as how state medical boards can support doctors in prescribing controlled substances safely and effectively.

State Pain Policy
State Pain Policy Advocacy Network
(2017). *American Academy of Pain Management*. Retrieved July 2017 from
http://sppan.aapainmanage.org/states
AAPM's State Pain Policy Advocacy Network maintains a database of current pain policies for very state. For each state, this website provides information about current legislation and regulations, news, analysis and opportunities for action related to pain management policies such as abuse deterrent formularies, pain clinic regulations, pain related prescribing and dispensing, prescription drug monitoring programs, pain related studies and task forces, and substance abuse treatment.

National Organizations Band Together to Ensure that Congress Passes Comprehensive Policies to Combat the U.S. Opioid Epidemic
Coalition to Stop Opioid Overdose
(2016). Retrieved July 2017 from http://www.stopopioidoverdose.org/press-room/
In response to the growing opioid epidemic in the United States, the Coalition to Stop Opioid Overdose was launched in May 2016 to unite diverse stakeholders around the common goal of achieving meaningful legislative solutions to address opioid misuse and overdose. The Coalition is composed of leading state and national groups that are committed to advancing meaningful legislative and regulatory policies and leads education and advocacy efforts through its website http://www.stopopioidoverdose.org/.

Opioid Dosage & Morphine Equivalency: Implications for Meeting the Standard of Care when Comparing CDC Recommendations to State Policies
SPPAN: State Pain Policy Advocacy Network
(2016). *Academy of Integrative Pain Management*. Retrieved July 2017 from
http://sppan.aapainmanage.org/
Today's healthcare practitioners are grappling with how to properly assess, care for, communicate with, and monitor patients with persistent pain, and who may be at risk for substance use disorders, while being mindful of public safety efforts related to inappropriate or excessive prescribing. This document is the first in a series to examine the CDC Guideline for Prescribing Opioids for Chronic Pain and its effect on a variety of important clinical practice issues, and to help practitioners better understand how the CDC guidelines compare to or conflict with state policy.

Controlled Substance Prescribing Patterns — Prescription Behavior Surveillance System, Eight States, 2013
Paulozzi, L. J., Strickler, G. K., Kreiner, P. W., & Koris, C. M.
(2015). *Surveillance Summaries, 64*(SS09), 1-14.
https://www.cdc.gov/mmwr/preview/mmwrhtml/ss6409a1.htm
This report presents rates of population-based prescribing and behavioral measures of drug misuse in the general population that have not been available previously for comparison among demographic groups and states. The higher prescribing rates for opioids among women compared with men are consistent with a higher self-reported prevalence of certain common types of pain, such as lower back pain among women. The trend in increased opioid prescribing rates with age is consistent with an increase in the prevalence of chronic pain with age, but the increasing prescribing rates of benzodiazepines with age is not consistent with the fact that anxiety is most common among persons aged 30–44 years. Most opioid prescribing occurs among a small minority of prescribers.

Opioid Painkiller Prescribing Varies Widely Among States
Centers for Disease Control and Prevention (CDC)
(2014). Retrieved July 2017 from
https://www.cdc.gov/media/releases/2014/p0701-opioid-painkiller.html
This article announces the release of a CDC report (https://www.cdc.gov/vitalsigns/opioid-prescribing/index.html) on opioid pain reliever prescribing at the state level across the United States. It also presents key findings of the report, which was based on retail pharmacy prescribing data collected in 2012. Findings include that states varied a lot in their prescribing rates—the state with the highest rate, Alabama, had nearly three times as many prescriptions written as the state with the lowest rate, Hawai'i—and most of the states with the highest rates were in the south. The report highlights Florida's success in reducing prescription drug overdoses and recommends steps for states, the federal government, health care providers, and individuals to take to reduce opioid pain reliever overprescribing and deaths due to overdoses of prescription pain relievers.

Opioid Analgesics for Pain Control: Wisconsin Physicians' Knowledge, Beliefs, Attitudes, and Prescribing Practices
Wolfert, M. Z., Gilson, A. M., Dahl, J. L., & Cleary, J. F.
(2010). *Pain Medicine, 11*(3), 425–434.
http://onlinelibrary.wiley.com/doi/10.1111/j.1526-4637.2009.00761.x/full
Opioid analgesics are the drugs of choice for the treatment of moderate to severe acute and cancer pain. Although their role in the management of chronic pain not related to cancer is controversial, there is increasing evidence for their benefit in certain patient populations. Wisconsin physicians who responded to this survey held many misconceptions about the prescribing of opioids. Such views, coupled with a lack of knowledge about laws and regulations governing the prescribing of controlled substances, may result in inadequate prescribing of opioids with resultant inadequate management of pain.

Achieving the Right Balance in Oversight of Physician Opioid Prescribing for Pain: The Role of State Medical Boards
Hoffmann, D. E., & Tarzian, A. J.
(2003). *ASMLE, 31(1).*
https://www.researchgate.net/publication/10747621_Achieving_the_Right_Balance_in_Oversight_of_Physician_Opioid_Prescribing_for_Pain_The_Role_of_State_Medical_Boards
To better understand how state medical boards are evaluating and balancing the need for adequate pain treatment with concerns about drug diversion and inappropriate prescribing, the authors undertook a

survey of state medical boards across the country. This article briefly describes the evaluation of medical knowledge regarding the treatment of pain, the history of efforts to regulate controlled substances used to treat pain, and the literature regarding physician concerns about legal repercussions for prescribing opioids, reports on the survey results.

Pain Management, Controlled Substances, and State Medical Board Policy: A Decade of Change
Joranson, D. E., Gilson, A. M., Dahl, J. L., & J. Haddox, J. D.
(2002). *Journal of Pain and Symptom Management, 23*(2), 138–147.
http://www.sciencedirect.com/science/article/pii/S0885392401004031
This article describes a ten-year program of research, education, and policy development implemented by the Pain & Policy Studies Group to update and clarify state medical board policies on the use of opioid analgesics to treat pain. Model Guidelines by the Federation of State Medical Boards of the U.S address professional standards for prescribing opioid analgesics for pain management, as well as physicians' fears of regulatory scrutiny. Although most state medical boards have adopted regulations, guidelines, or policy statements relating to controlled substances and pain management, to date ten boards have adopted the Model Guidelines, while ten more have adopted the Model Guidelines in part. Further actions are recommended so that state medical boards can address inadequate pain management and physician concerns about regulatory scrutiny.

Controlled Substances and Pain Management: Changes in Knowledge and Attitudes of State Medical Regulators
Gilson, A. M., & Joranson, D. E.
(2001). *Journal of Pain and Symptom Management, 21*(3), 227–237.
http://www.sciencedirect.com/science/article/pii/S0885392400002633
The views of medical regulators about the legality of prescribing controlled substances for pain management were studied in 1991, but little was known about whether these views had changed in light of increased emphasis on pain management and educational programs for state medical boards. The results of this study revealed significant and sustained changes in attitudes about the incidence of iatrogenic (caused by medical treatment) addiction when using opioids to treat pain, the analgesic and side-effect properties of opioids, and the perceived legality of prescribing opioids. The authors make recommendations for reducing concerns about regulatory scrutiny, including the need for a more intensive education program, increasing the rate of adoption of new state medical board policies, and improving communication between regulators and clinicians.

Comprehensive Addiction and Recovery Act of 2016—Public Law 114-198
U. S. Congress
Retrieved July 2017 from https://www.congress.gov/114/plaws/publ198/PLAW-114publ198.pdf
Signed into law on July 22, 2016, this act is identified by Community Anti-Drug Coalitions of America as "the first major federal addiction legislation in 40 years" (http://www.cadca.org/comprehensive-addiction-and-recovery-act-cara). The act authorizes the U.S. Department of Health and Human Services to help prevent, treat, and in other ways address the opioid (prescription opioids and heroin) addiction crisis across the United States, primarily through grantmaking. It passed with sweeping majorities in both the House and the Senate. Act subsections focus on prevention and education; law enforcement; treatment and recovery; addressing consequences of the crisis (helping people in jails, prisons, and juvenile detention centers who are there because of opioid addiction-related offenses); services for women, families, and veterans; supporting comprehensive initiatives at the state level to address the crisis; veterans' pain management; research the development of alternatives to opioids for effective pain treatments and opioid issue, and evaluation of the effectiveness of the grants funded under the Act.

Regulatory and Legislative Updates: 2016 Session Review – Workers' Compensation
Optum
Retrieved July 2017 from
http://helioscomp.com/docs/default-source/default-document-library/gov14-16201-ga-mid-year-update-8-2016.pdf
Provided by Optum for Workers' Compensation, a benefits management company, this report highlights key state-level legislative and regulatory changes related to workers' compensation across the United States in 2016. Sections cover legal and regulatory changes in the areas of opioid analgesics, naloxone (used to revive people who might otherwise die from opioid overdoses), state-mandated drug formularies, compounding medicines, and fee schedules. Updates from 25 states are mentioned, as well as some important changes at the federal level.