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Am J Ind Med. Author manuscript; available in PMC 2019 June 11.

Published in final edited form as:

Am J Ind Med. 2019 January ; 62(1): 21–29. doi:10.1002/ajim.22920.

Effect of an opioid management program for Colorado workers' compensation providers on adherence to treatment guidelines for chronic pain

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Abstract

Objective: The aim of this study was to examine adherence of state guidelines for Colorado workers' compensation physicians/providers treating individuals as injured workers with chronic pain after initiation of an opioid management program and provider incentives.

Methods: A retrospective cohort of chronic, non-cancer pain claims was constructed from the Colorado's workers' compensation database. Adherence to treatment guidelines and opioid prescribing practices were evaluated during implementation of a new billing code to incentivize adherence.

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AUTHORS' CONTRIBUTIONS

LT and LMM contributed equally to the conduct of this research and manuscript as co-first authors. KM and LSN helped conceive the project. BM contributed to the writing of the manuscript. All authors reviewed the results and contributed to the final manuscript. All authors agree to be accountable for all aspects of the work.

Institution at which the work was performed: Colorado School of Public Health, University of Colorado Denver, Anschutz Medical Campus.

ETHICS APPROVAL AND INFORMED CONSENT

Ethics review and exemption for our evaluation of these data were received from the Colorado Multiple Institution Review Board (COMIRB).

DISCLOSURE (AUTHORS)

The authors declare no conflicts of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

Rodney Ehrlich declares that he has no conflict of interest in the review and publication decision regarding this article.

DISCLAIMER

None.

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Results: Overall, less than 33% of claims showed evidence of opioid management. Comprehensive opioid management was observed in only 4.4% of claims. In 2010, after implementing the new billing code, the ratio of long acting opioids to short acting opioids decreased from 0.2 to 0.13; returning to 0.2 in one year. Similarly, morphine equivalent doses declined for a short period.

Conclusions: Incentivizing physicians to adhere to chronic pain management guidelines only temporarily improves prescribing practices.

Keywords

chronic pain; injured worker; opioid prevention; opioids; workers' compensation

1 | INTRODUCTION

Opioid use in the treatment of chronic non-cancer pain has been receiving increasing attention over the past decade because of the potential for death associated with unintentional overdose, addiction, misuse, and lack of efficacy.[1–12] Studies of workers' compensation claims indicate that opioid use for the treatment of chronic non-cancer pain increases the duration and cost of workers' compensation claims, prolongs disability, and decreases the functional gain after an injury.[13–21]

Preliminary evidence suggests that opioid dosing guidelines and/or physician training may reduce opioid dosage,[22–25] as well as change opioid prescribing practices.[26,27] However, this evidence is limited to a small number of states and a handful of clinics. Both state and national organizations have begun taking a more comprehensive approach to the management of chronic non-cancer pain in injured workers, by developing and promoting use of treatment guidelines.[28,29] However, there is little known about the awareness, adoption, and impact of such guidelines on clinical practice and patient outcomes; with some evidence that practitioners may still lack awareness or fail to modify their approach to patient care.[30]

1.1 | New guidelines & provider education

In 2010, the Colorado Division of Workers' Compensation in the State Department of Labor and Employment took a three-pronged approach to start to address these challenges. They updated the medical treatment guidelines for chronic pain disorder and added education sessions to accreditation courses for practitioners who treat workers' compensation patients and to other regional conferences, and added a new billing code to the Colorado workers' compensation medical fee schedule.[31] The new billing code became effective January 1, 2010, and was rolled-out and promoted through mandatory training for Level II Physician Reaccreditation, providing physicians with an understanding of the medical aspects of workers' compensation. Since most insurers require Level II Accreditation to be in their networks with a minimum of one person in a clinic to have completed the training, this implementation reached providers boarded in occupational medicine across multiple channels. Providers are required to re-accredit every three years to retain accreditation status. Trainings that reviewed the new guidelines and process for using the billing code

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began in the fall of 2010 and included multiple presentations by the director of the department and statewide outreach. Importantly, the Colorado practice guidelines presaged subsequent national recommendations from the American College of Occupational and Environmental Medicine.[29]

The Colorado Division of Workers' Compensation Rule 18, implemented on January 1, 2010, established a new opioid management program which included a specific billing code (DOWZ765), known as the Z-code, and stringent guidance for clinicians subscribing opioids. This billing code allows clinicians to be reimbursed $75 for every 15 min of pain management (up to 30 min per visit) for services provided in accordance with the state's Guidelines (Rule 18–8).[32]

This new opioid management program required clinicians to document a "Chronic Opioid Management Report" that includes ordering drug screening, ordering psychiatric evaluations, checking the state's Prescription Drug Monitoring Program, prescribing for long-term treatment through a single pharmacy, and documenting justification for injured workers receiving chronic opioid management. Under these guidelines, from approximately 2007 to 2009 psychological evaluations were required for all chronic pain patients. Part of the purpose of the opioid report was to encourage physicians to follow guidelines. Along with the implementation of Rule 18, a coinciding marketing and education campaign was initiated that consisted of a variety of public meetings, presentations at the Rocky Mountain Academy of Occupational and Environmental Medicine regional meetings, inclusion of education and information during accreditation (so-called Level II) courses, and conferences to promote best practices and Z-code utilization. This campaign continued throughout the period from 2010 to 2012, and included a total of 13 sessions. At the time, there were no other stipulations, policies, or procedures that would affect opioid prescribing practices in Colorado.

This study is a retrospective evaluation that examines the changes in workers' compensation provider behavior following the rollout of the new chronic pain treatment guidelines and the implementation of the associated billing code for reimbursement. Our primary research question was as follows. Do opioid prescribing patterns change in association with new treatment guidelines, specifically the three provider adherence measures described below? The time period assessed in the present study, 2005–2012, fell during the peak in opioid use nationwide. During this period prescriptions for opioid analgesics increased substantially from 2002 to 2010 in the U.S.,[2] while still predating the creation of national guidelines from American College of Occupational and Environmental Medicine and the development and launch of new provider education and major public awareness campaigns in Colorado and elsewhere.[2,30,33] The timing made it possible to evaluate the impact of a targeted physician incentive and education program on provider behavior, while minimizing confounding influences from other state and national programs.

The directed intervention efforts from the Colorado Division of Workers' Compensation to modify provider opioid prescription behaviors followed a three-pronged approach. This approach centered on (i) the creation of updated, evidence-based, clinical guidelines for the management of injured workers with chronic pain; (ii) marketing the guidelines through

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state-wide education and marketing efforts; and (iii) the creation of a billing code to compensate physicians for the additional clinical time spent in providing chronic pain management. The purpose of this study was to evaluate these efforts on the usage of the billing code and opioids prescribed in non-cancer chronic pain cases.

2 | METHODS AND MATERIALS

2.1 | Study population

The study population was a subset of claims filed by a private insurer in Colorado's workers' compensation database. In 2010, this private mutual insurance company wrote workers' compensation claims for approximately 59% of the State of Colorado's workforce. A cohort of 496 chronic, non-cancer pain claims was constructed from all claims that had a 2010 service date as follows, reporting on the latest year of data available. We defined a chronic non-cancer pain claim as having at least a one year duration with three or more separate opioid prescriptions over a six month interval occurring three months past the first billing date in the claim. All claims in the cohort were managed by physicians licensed in the State of Colorado, the majority of which had been trained and accredited to treat and manage injured workers by the State Department of Labor, Division of Workers' Compensation.

2.2 | Measures

To measure changes in provider behavior, we examined two sets of objective measures: (i) adherence to the guidelines, and (ii) opioid prescribing practices. Provider adherence was assessed by using both direct billable Z-codes (DOWZ765) and surrogate measurements of coinciding billable psychiatric (PY Vendor code) and drug screen codes (CPT codes 83925, 80181, 82520, 83840, 80102, 80151, 82145, 82205) as recommended on the "Chronic Opioid Management Report". Opioid prescribing practices were tracked for dose and drug type over time, and assessed for differences between cases that utilized the Z-code and those that did not.

To measure opioid dose, we used morphine equivalent dose (MED) as our dependent variable. For each claim, the database contained all prescriptions billed and the National Drug Code for each prescription, which was used to identify the opioid containing prescriptions, the opioid constituent, and l dose per unit (pill or patch) of the opioid constituent. Because not all opioids have the same analgesic effect, we converted the opioid constituent dose per pill (or patch) to a MED based on conversion standards established for the Washington State Department of Labor and Industries.[34] For claims lacking specific information on the opioid components, opioid strength was determined by searching National Drug Code numbers. We then calculated the MED conversion for each opioid prescription type in our database.

The total MED per prescription was then determined using the following formula:

$$D = c \times d \times r,$$

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where D in the MED in mg, c is the number of pills (or patches) in the prescription, d is the dose (mg) of an opioid drug in a pill (or patch), and r is the conversion ratio of morphine for the specific opioid medication.[14]

Opioids were defined as naturally occurring, semisynthetic, or wholly synthetic morphine-like substances utilized to control moderate to severe chronic pain. All prescriptions meeting this definition were grouped into short-acting (SA) (immediate release) and long acting (LA) (long-acting/extended release) opioids.

2.3 | Analysis

2.3.1 | Examination of opioid use as claim matures—Analyses were performed by the year past the first opioid billing date to examine opioid use as a claim matures. For each year past the first opioid billing date, the number of days that a claim was prescribed opioids was calculated by subtracting the first billing date for an opioid prescription in the year from the last billing date for an opioid prescription in the year and adding 30 days (assuming opioid prescriptions are written for 30-days). The number of days that a claim was prescribed opioids was used instead of the number of days in a year, to account for claims in which opioids were not prescribed for the full year. Analyses were performed on the total cohort and two mutually exclusive groups: (i) claims prescribed both LA and SA opioids and (ii) claims prescribed SA opioids only. The MED per day for each year past the first billing date was calculated by dividing the summed MED of all opioid prescriptions for the year (mg) by the number of days the claim was prescribed opioids for the year, for each group.

In each group, MED per day for each year past the first date exhibited a log-normal distribution. Therefore, MED per day data were log-transformed for statistical analysis. The number of claims, average MED per day, and the 5th and 95th percentile MED distributions were analyzed by the years past the first billing date. Repeated measures linear regression by claim was used to evaluate dose escalation (defined as an increase in mean daily opioid dose of ≥30 mg morphine equivalents over 1 year) by the number of years past the first opioid billing date, with MED per day as dependent variable and years past first billing date asthe independent variable, controlling for year of prescription and gender.

2.3.2 | Examination of opioid management program—Analyses were performed on the claim duration to examine the implementation of the new opioid management program. Claim duration (days) was calculated by subtracting the first billing date for the claim from the last billing date for the claim. The MED per day over the duration of the claim was calculated by dividing the summed MED for all opioid prescriptions billed in the claim (mg) by the claim duration (days). Opioid management was examined with three indicators of prescriber adherence to state guidelines for management of chronic, non-cancer pain: (i) use of Z-code (DOWZ765) implemented in 2010; (ii) claims with at least one billing for a psychiatric consult (vendor code PY); and (iii) claims with at least one billing for a drug screen (CPT codes 83925, 80181, 82520, 83840, 80102, 80151, 82145, 82205). To test the effect of implementation of the opioid management program in 2010, the duration of the claim from 1/1/2010 to the last billing was calculated.

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Chi-square tests were used to evaluate differences in opioid management between those prescribed SA opioids only and those prescribed LA and SA opioids, at an alpha level of 0.05. Chi-square tests also were used to evaluate differences between claims with at least one Z-code billing and claims with no billing code for the new opioid management program. Repeated measures linear regression methods were employed to assess trends in MED prescribing practices over time and by study group.

The SAS 9.2 (SAS Institute, Inc., Cary, NC) was used for analysis and significance testing. MS Excel 2010 (Microsoft, Redmond WA) was used for graphical representations.

3 | RESULTS

Table 1 presents information on the total cohort of chronic non-cancer pain claims, claims prescribed SA opioids only, and claims prescribed both LA and SA opioids. Forty percent of claims had been prescribed LA and SA opioids. Compared to claims prescribed SA opioids only, claims prescribed LA and SA opioids had a greater proportion of males, lasted on average 173 more days, and received an average 9.97 mg/day greater opioid use over the duration of the claim.

3.1 | Examination of opioid use as claim matures

Table 2 summarizes the number of claims open past the first opioid billing date, as well as the mean, 5th percentile, and 95th percentile of the MED per day for all claims, claims prescribed SA opioids only, and claims prescribed LA and SA opioids. The MED per day for all claims steadily increased up to 3 years past the first opioid prescription and then levels off at year 4. By five years past the first opioid prescription, 96 percent of all claims were closed, and patterns in MED per day became erratic due to low numbers.

Figure 1 shows that the mean MED per day increased with claim duration up to year two and then decreased starting at year three for claims prescribed LA and SA opioids. The mean MED per day increased with claim duration up to year three and then decreases starting at year four for claims prescribed SA opioids only. Figure 1 also shows that the mean MED per day from year 0 to year three is higher for claims prescribed LA and SA opioids than SA opioids alone. Figure 2 shows a large drop in the number of claims open more than one year past the first opioid prescription. For each year past the first opioid prescription billed, a smaller percentage of claims prescribed SA opioids only remained open with a statistically greater closing rate than claims prescribed LA and SA opioids ($P = 0.04$).

Repeated measures linear regression, adjusted for gender and the first year an opioid was prescribed, indicated an average 1.18 mg/day escalation in MED (CI: 1.12, 1.24 mg/day) for each year a claim is open past the first year an opioid is prescribed. Dose escalation was greater in claims prescribed both SA and LA opioids (1.22 mg/day, CI: 1.12,1.32) compared to claims prescribed SA opioids only (1.11 mg/day CI: 1.05, 1.16), although the difference was not statistically significant. In addition, we observed escalations of daily doses of SA opioids (1.13 mg/day, CI: 1.08, 1.18) and daily doses of LA opioids (1.39 mg/day, CI: 1.13, 1.70) for each year past the first opioid prescription.

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3.2 | Examination of opioid management program effects

Table 3 presents the number of claims with evidence of opioid monitoring and/or documentation of chronic opioid management reporting introduced in 2010 including psychiatric consults, urine drug screens, and use of a Z-code. The most commonly implemented management elements were psychiatric consults (32%), followed by drug screens (16%), and chronic opioid management report with the associated reimbursement Z-code (12.5%).[32] We observed comprehensive opioid management, including psychiatric consults, drug screens, and active opioid management, in only 4.4% of claims. Claims prescribed LA and SA opioids were more likely to receive some type of opioid management and were more likely to receive comprehensive opioid management (6.5%), than were claims prescribed SA opioids only.

Table 4 evaluated the impact of the new opioid management plan introduced in 2010 based on billing. Claims with at least one Z-code were more likely to ever have been prescribed LA and SA opioids. These claims had a daily MED 11.6 mg/day higher than claims with no Z-code ($P < 0.0001$). The duration of the claim from implementation of the opioid management program was 116 days longer for claims with at least one Z-code than for claims with no Z-code ($P = 0.004$, data not shown). Seventy-nine percent of claims with a daily MED of 120 mg or greater did not have the opioid billing code.

Figure 3 illustrates that the ratio of LA opioid prescriptions to SA opioid prescriptions rose until 2007 and then remained fairly constant until 2010. In 2010, the year Colorado's workers' compensation new opioid management guidelines and medical fee schedule were implemented, the ratio dropped from 0.2 to 0.13, indicating a decline in the proportion of LA opioid prescriptions. The ratio then rose back to pre-2010 levels in 2011, consistent with broader national trends in opioid use.[2] Figure 3 also shows that the mean MED per day did not decrease with the decrease in the proportion of LA opioid prescriptions in 2010. Rather, increasing mean daily MED doses are observed between 2009 and 2012 and between 2005 and 2007, with roughly stable doses between 2008 and 2009.

4 | DISCUSSION

This is the first time that the opioid prescribing patterns among injured workers with non-cancer chronic pain in a workers' compensation claims cohort have been analyzed in relation to the implementation of a new state-based chronic pain management program and associated billing codes. The results of this study confirm the importance of taking a comprehensive approach to improving chronic pain management at the peak of the national opioid prescription epidemic, and demonstrates a significant, although transient, improvement in provider adherence to medical treatment guidelines and in opioid prescribing practices with the development, promotion and compensation for use of chronic pain guidelines.

Our data confirm previous studies that have examined SA versus LA opioid prescribing and dose. The patients that were prescribed LA (40% of total) had nearly a 2.5 times higher average MED per day than those that were prescribed SA opioids only (16.8 vs 7.15 mg/day). The difference between the SA and LA groups was significant across the life of the

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claim, confirming that all patients prescribed LA are prescribed a higher MED during treatment. Additionally, we noted that claims that billed for a Z-code were more likely to have ever been prescribed both LA and SA opioids and had a MED of 11.6 mg/day higher than those that did not bill for a Z-code.

We also observed a general escalation in dose between Year 1 and Year 2 of all claims, suggesting that guidelines to implement non-opioid therapies were not being utilized fully. The results of this study also confirm previous findings showing that SA only claims close sooner than do LA claims. This trend might be interpreted as being consistent with literature showing that LA opioids are no more effective than SA opioids.[35,36] However, it is also probable that LA were prescribed for the more severe injuries, which is not adjusted for in our analysis

Our evaluation confirms the early findings of Franklin (2012) highlighting the limited impact of state-based medical treatment guidelines implemented in workers' compensation and shows that by providing physician incentives in the form of a new billing code, assuming increased awareness and adoption among providers, temporary decreases in mean MED per claim were achievable even at the time that opioid prescribing practices were peaking nationally. The observed short-term effects suggest that there was an increase in awareness initially among the practitioner cohort in our study, but that there was still poor adherence to best practice guidelines and low utilization of billing codes overall and long-term. The findings point to the possible role for more education and guidance in preventing LA opioid use, dose escalation, and the practice of non-opioid treatment, but also suggest there may still be low reach and lack of awareness among providers. Pushing educational content out to all in health care providers to increase the awareness and adoption of appropriate best practices is one way to increase the likelihood that the medical treatment guidelines are being reviewed and implemented as intended.

Without attempting to look at death rates or disability, this paper prompts research questions regarding the barriers to adoption of medical treatment guidelines and changes in provider prescribing behaviors. The reasons why this type of intervention failed long-term are unknown but are most likely complex and may differ across practice culture, practice type (small vs large), location (rural vs urban), as well as access to treatment centers and specialists. Possible reasons could involve failed dissemination strategies. For example, the marketing and education campaign promoting the new guidelines and billing code may have run for too short a time prior to implementation. It is also possible that other channels should have been used for raising awareness of treatment guidelines and the availability of reimbursement for improvement management.

There are gaps in understanding what channels, including regulators, associations, medical societies and other groups, are most effective at distributing this type of information. More details around messaging and marketing, such as identifying key barriers to adoption and communication strategies, may be needed to better achieve physician reach, awareness, and uptake. The billing code that reimburses physicians $75 for every 15 min of pain management (up to 30 min per visit) was clearly not being widely used. This leads to the questions of whether there needs to be more effort spent to increase the knowledge about

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reimbursement or whether the compensation is still insufficient relative to the time and expectations that chronic pain management cases require. One possible conclusion drawn from this study is that changing provider behavior might require an ongoing mechanism to remind and monitor providers so they consistently utilize the coding, consult, and drug test tools. This warrants future research and an intervention design that is tailored to physicians and evaluates the reach, effectiveness, implementation, awareness, and maintenance of desired changes.

4.1 | Study limitations

There are several limitations to this study. Because we conducted the evaluation retrospectively, we were not able to design the intervention and evaluate its implementation. We cannot exclude the possibility that the implementation of the new state guidelines was insufficient in generating full awareness, knowledge and adoption among all providers. Importantly, we cannot make any assumptions about the use of a management program for chronic pain prior to 2010, making the study subject to information bias and not representative of all non-cancer, chronic pain cases. Claims selected were only ones that had one or more refills; therefore, the claims that may have been treated without the use of opioids are not accounted for, likely resulting in selection bias. We did not have access to information on opioids prescribed prior to 2010. It also is possible that we may have underestimated the opioid use at later time points because we did not have access to follow-up data for claims that started in 2010.

There is little doubt that the existing claims are individuals suffering from chronic pain that are at risk for misuse and abuse and that they could benefit from pain management practices. In addition, as previously mentioned, more effort should be directed at educating providers and providing them with the resources they need to properly manage their chronic pain patients. Surveying providers about their views on current guidelines and policies for pain management would be beneficial to complement what is known about patient expectations and knowledge about the risks of taking opioids.

Omission of other covariates and confounders is an inherent limitation. Recent studies have shown that MED dose calculation can be used reliably in some cases, but there can be a wide range of dose estimations across provider groups.[37] The calculation also does not account for other prescriptions that individuals received, or any pharmacologic and non-pharmacologic responses that may affect drug metabolism. Many workers in this dataset may have access to health insurance offered through their employer. This could cause our calculations of opioid dosage to underestimate the true MED in these cases.

We also do not have data on pre-existing mental health issues in this cohort and we have no way of distinguishing mental health issues that are related to work-related injury. We have no reason to think that the frequency of these referrals would change over time and in relation to other mental health issues and therefore do not think this would introduce systematic bias.

The way we measured provider adherence to the guidelines assumes that if the injured worker received opioids and there was no code billed for the psychiatric evaluation, the

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primary referring doctor did not refer/test, and that therefore they are prescribing the chronic pain patient opioids without following the guidelines. We do not know whether this was because providers failed to order consults/tests or whether patients were noncompliant with provider orders. It is possible that the level of additional time, effort, and complication involved in adding a Z-code may have led coders to not bill the Z-code, even though the added services were provided. We have no evidence to indicate that this is the case, and other Z-codes are commonly available, so it is not a unique billing activity.

5 | CONCLUSIONS

The main intent of this study was to examine adherence of Colorado workers' compensation providers to chronic pain guidelines after initiation of an opioid management program that included incentives for physicians treating injured workers. We sought to test this intervention's effect on opioid dosing, type of opioid (SA and LA), and claim duration at a unique time when the U.S. was experiencing an historical peak in the use of prescription opioids, but prior to widespread public and physician awareness campaigns.

We observed a significant, but only temporary decrease in opioid dose and LA prescriptions with the introduction of an opioid management program and billing instrument. We conclude that more robust prescriber education along with other interventions may be required to improve adherence to current pain management guidelines.

The state of Colorado has been one of many states to develop wide reaching approaches to help curb the prescription drug epidemic. For example, in October 2012, the Center for Health, Work & Environment at the Colorado School of Public Health launched a two-hour comprehensive continuing medical education credit online course titled, *The Opioid Epidemic: Guidelines and Tools for Chronic Pain Management.* The online course, based on the treatment guidelines that had been developed by the state, aims to re-train providers on the current state and federal guidelines. Over its initial five years, the online course trained over 3,000 individuals and has received the endorsement of workers' compensation insurers, medical malpractice insurers, the state's division of workers' compensation, and the state's department of regulatory agencies (DORA).

In 2013, the Colorado Governor's Office signed a new comprehensive plan to combat the opioid crisis in the state, establishing the official Colorado Consortium for Prescription Drug Abuse Prevention.[38] One of the major efforts of the consortium's provider and prescriber education work group has been to change state board policies (or rules) for licensed prescribers to include opioid management guidelines that cover safe use, safe storage and safe disposal.

As a next step, provider and prescriber education needs to be supported and promoted by all health care providers, including those in the field of occupational medicine. Consistency of educational content and guidelines should focus not just on dosing but also on comprehensive approaches to assessing and improving patient function through evidence-based strategies including the use of non-opioid or alternative therapies prior to prescribing opioids. Future efforts should also consider provider behavior change and the need to tailor

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interventions to this audience. Tracking prescribing patterns by specialists, by geographic region, and by types of case (claim) will assist in directing resources to the providers and practices that lack training and tools. This study is one step toward understanding more about prescribing patterns and opportunities to improve non-cancer chronic pain management in injured workers. Finally, it should be acknowledged that although there is a national epidemic of opioid misuse, abuse, and diversion warranting careful consideration of who should be treated with chronic opioids, there are many workers who are able to remain gainfully employed and who require chronic treatment to remain employed.

ACKNOWLEDGMENTS

The authors wish to acknowledge Debra Northrup, RN and Doug Van Zet with the Colorado Department of Labor, Division of Workers Compensation for their assistance in data preparation. Funding for this study was provided in part by NIOSH T42 OH009449 Mountain and Plains Education and Research Center.

Funding information

National Institute for Occupational Safety and Health, Grant number: T42 OH009449

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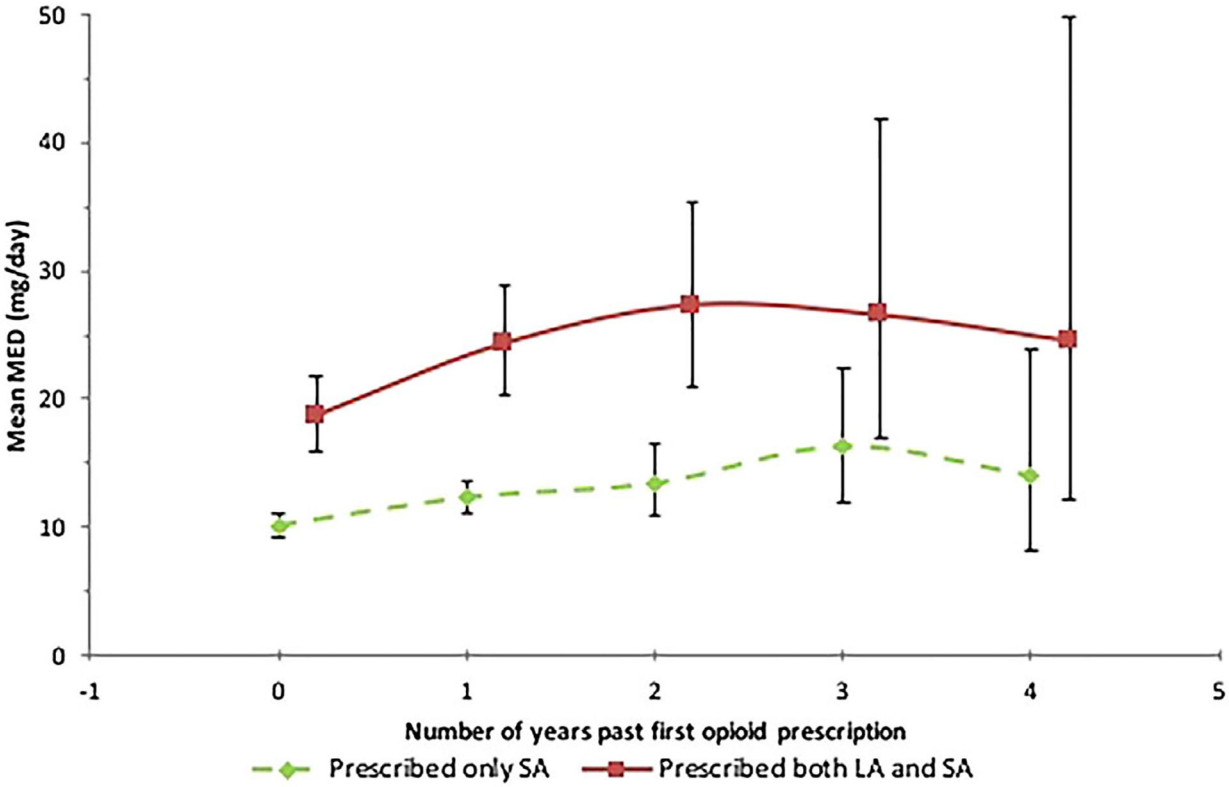

FIGURE 1.

Mean morphine equivalent dosage (MED) per day measured at years after the first opioid prescription was initiated; broken down by prescriptions for only short-acting (SA) opioids (dashed line) and combined long-acting (LA) and short-acting opioids (solid line) [Color figure can be viewed at wileyonlinelibrary.com]

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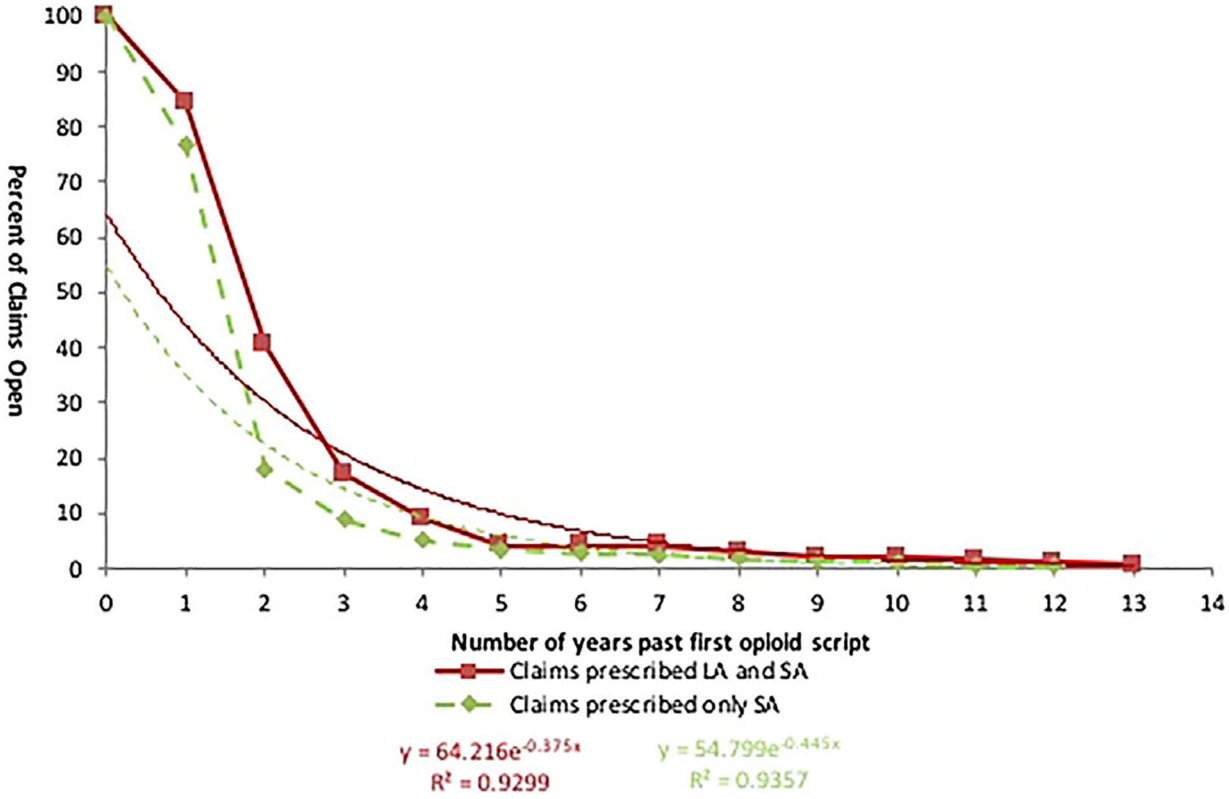

FIGURE 2.

Percentage of total claims prescribed opioids open each year past the first opioid prescription. Claims prescribed both long-acting opioids and short-acting opioids represented by solid lines; the bold line is study data graphed and nonbold line is data fit to equation as shown. Claims prescribed only short-acting opioids are represented by dashed lines; the bold dashed line is study data graphed and the nonbold dashed line is data fit to equation as shown [Color figure can be viewed at wileyonlinelibrary.com]

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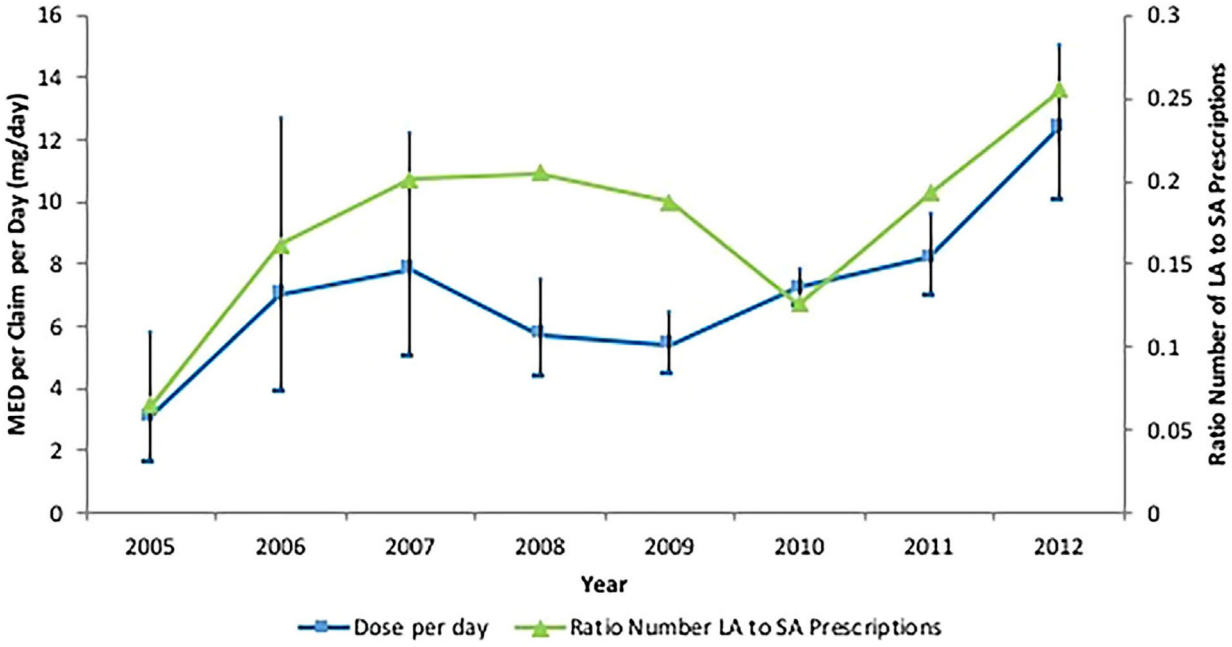

FIGURE 3.

Mean morphine equivalent dose (MED) per claim by year, split into dose per day in mg represented by the square line and ratio of number of long-acting (LA) opioid prescriptions to short-acting (LA) opioid prescriptions represented by triangle hashed line [Color figure can be viewed at wileyonlinelibrary.com]

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TABLE 1

Demographics, duration and morphine equivalent dose per day for open chronic pain claims in 2010 by type of opioid

Parameter	Claims, *n* (%)	Males, *n* (%)	Mean Age, years (95%CL)	Mean Duration of Claim, days[a] (95%CL)	Mean MED per day, mg/day (95%CL)[b]
All claims	496	337 (68)	43.7 (42.7,44.7)	769 (736, 803)	10.2 (9.21, 11.2)
Only prescribed SA opioids	296 (60)	186 (63)	43.9 (42.7, 45.2)	704 (666, 743)	7.33 (6.63, 8.11)
Prescribed LA and SA opioids	200 (40)	151 (75)	43.4 (41.4, 45.3)	877 (819, 939)	17.3 (14.7, 20.4)
P-value for Comparison of Differences by Opioid Type	<0.0001	0.0033	0.5859	<0.0001	<0.0001

95%CL, 95 percent confidence limit on the mean; LA, long-acting; MED, morphine equivalent dose; mg/day, milligrams per day; SA, short-acting.

[a]Mean duration of claim from first billing date to last billing date in days.

[b]MED per day = total morphine equivalent dose prescribed from the first billing date to the last billing date in mg average by the duration of the claim in days.

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TABLE 2

Number of years past first opioid billing date for open chronic pain claims in 2010 by opioid type and morphine equivalent dose[a]

Number of years past first opioid billing date	Number of open claims (percent remaining open)	Number of open claims prescribed only SA opioids (percent remaining open)	Number of open claims prescribed LA and SA opioids (percent remaining open)	MED (all claims) (mg/day)			MED (Only SA) (mg/day)			MED (SA and LA) (mg/day)		
				Mean	5th	95th	Mean	5th	95th	Mean	5th	95th
0	496 (100)	296 (100)	200 (100)	12.9	3.14	67.2	10.1	2.78	36.0	18.7	3.71	145
1	396 (80)	227 (76)	169 (85)	16.4	3.79	96.0	12.3	3.98	46.7	24.3	3.75	164
2	134 (27)	53 (18)	81 (41)	20.5	3.28	139	13.4	2.62	41.7	27.3	4.92	218
3	60 (12)	26 (8.8)	34 (17)	21.5	4.23	207	16.3	4.35	43.2	26.5	4.11	534
4	33 (6.7)	15 (5.1)	18 (9)	19.0	3.05	229	14.0	3.31	75.6	24.5	2.44	661
5	18 (3.6)	10 (3.4)	8 (4)	23.7	3.92	473	19.4	3.92	64.1	29.6	5.40	473
6	16 (3.2)	8 (2.7)	8 (4)	25.9	3.30	180	28.5	9.60	59.1	24.0	3.29	180
7	15 (3)	7 (2.4)	8 (4)	14.7	0.928	78.8	19.8	4.34	64.1	11.3	0.928	78.8
8	11 (2.2)	5 (1.7)	6 (3)	23.5	4.05	119	28.4	18.8	47.0	20.0	4.05	119
9	8 (1.6)	4 (1.3)	4 (2)	34.3	11.6	177	36.2	28.5	56.7	32.5	11.6	177
10	7 (1.4)	3 (1)	4 (2)	22.7	4.91	134	14.2	4.91	43.6	32.3	11.9	134
11	4	1 (<1)	3 (1.5)	16.5	9.41	43.7	43.7	-	-	12.0	9.41	16.4
12	3	1 (<1)	2 (1)	21.9	11.0	39.1	39.1	-	-	16.4	11.0	24.4
13	1	0	1 (<1)	15.0	-	-	-	-	-	15.0	-	-

5th, fifth percentile; 95th, ninety-fifth percentile; LA, long-acting; MED, morphine equivalent dose; mg/day, milligrams per day; SA, short-acting.

-No data.

[a]Morphine equivalent dose per day = sum of dose for year/days between first and last script for year plus 30 days.

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TABLE 3

Number and percentage of open chronic pain claims in 2010 with evidence of opioid monitoring/management

Opioid Type	Number of claims	Claims with at least one billing for a psychiatric[a] consult, *n (%)*	Claims with at least one billing for a drug screen test,[b] *n* (%)	Claims with at least one DOWZ765 billing code for opioid management,[c] *n* (%)	Two of three opioid monitoring/ management billings, *n* (%)	All three opioid monitoring/ management billings, *n* (%)
Total	496	157 (32)	80 (16)	62 (12.5)	52 (10.5)	22 (4.4)
Prescribed only SA opioid	296	64 (21)	33 (11)	29 (9.8)	19 (6.4)	9 (3.0)
Prescribed LA and SA	200	93 (46)	47 (23)	33 (17)	32 (16)	13 (6.5)
P-value for comparison of differences by Opioid Type		< 0.001	<0.001	0.027	<0.001	0.066

LA, long-acting; n, number; SA, short-acting.

[a]Vendor code, PY for psychiatric consult.

[b]CPT codes for laboratory drugs screens (83925, 80181, 82520, 83840, 80102, 80151, 82145, 82205).

[c]DOWZ765 billing code specifically for opioid management implemented 1/1/2010.

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TABLE 4

Demographics, duration, and morphine equivalent dose per day for open chronic pain claims in 2010 by use of DONZ765 billing code[a] for opioid management

Parameter	Claims, n (%)	Males, n (%)	Mean Age, years (95%CL)	Prescribed LA and SA, *n* (%)	MED 120 mg/day or greater for at least one year, *n* (%)	Mean MED per day[b], mg/day (95%CL)
All Claims	496	337 (68)	43.7 (42.7,44.7)	200 (40)	28 (5.6)	10.2 (9.21, 11.2)
At least one DOWZ765 billing code	62 (12.5)	43 (69)	43.3 (40.5, 46.0)	33 (53)	6 (21)	20.8 (16.0, 27,0)
No billing DOWZ765 billing code	434 (87.5)	294 (68)	43.8 (42.7, 44.8)	167 (38)	22 (79)	9.17 (8.28, 10.2)
P-values for comparison of difference by Z-765 billing code Utilization	<0.0001	0.799	0.738	0.037	0.0025	<0.0001

95%CL, 95 percent confidence limit on the mean; LA, long-acting; MED, morphine equivalent dose; mg/day, milligrams per day; SA, short-acting.

[a]DOWZ765 billing code specifically for opioid management program implemented 1/1/2010.

[b]MED per day = total morphine equivalent dose prescribed from the first billing to the last billing in mg per the duration of the claim in days.