



Research Update

California Workers' Compensation Prescription Drug Distributions & Opioid Trends

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Executive Summary

For more than two decades, there has been growing concern over the appropriateness and the cost of prescription drugs used to treat injured workers – much of it centered on the increased reliance on opioid analgesics for the treatment of chronic pain. Beginning in the 1990s, opioid use in California workers' compensation rose sharply, despite a growing recognition that the use of these drugs could have severe repercussions for long-term users. Several CWCI studies have tracked opioid growth trends, the most recent being a May 2016 analysis based on prescriptions and payments dispensed to California injured workers between January 2005 and December 2014. That study found that opioids had increased from 27 percent of California workers' compensation prescriptions filled in 2005 to 31.8% in 2009, but then declined to 27.2 percent in 2014. Similar fluctuations were noted in the payments, as opioid reimbursements as a proportion of the total workers' compensation drug spend climbed from 19.3 percent in 2005 to 31.9 percent at the peak in 2009, then began trending down, declining to 24.4 percent in 2014.

The findings in the 2016 study were encouraging, suggesting that the increased scrutiny of opioids by Utilization Review (UR) and Independent Medical Review (IMR) programs, physician education efforts, restrictions imposed by pharmacy benefit managers, medical provider networks and payors, as well as growing media attention and public awareness, were helping to curb the growth of opioids in workers' compensation. But, the study also showed that opioids were still the number one prescription drug category in terms of use and payments. This report, based on prescriptions dispensed to injured workers with indemnity claims through June 2017, extends the prior analyses of the prevalence and cost of prescription drugs by therapeutic group to provide baseline data for measuring the impact of California's workers' compensation prescription drug formulary that took effect on January 1, 2018. In addition, it offers an updated look at opioids in California workers' compensation, tracking recent trends in the volume, cost, potency and types of opioids used in the system. Among key findings:

- The 2017 data show opioids, anti-inflammatories and anticonvulsants were the most common drugs dispensed to injured workers with lost-time claims, accounting for more than half of all filled prescriptions on these claims. In terms of payments, opioids, dermatologicals, and anticonvulsants ranked as the top three drug categories, representing 46.5 percent of the indemnity claim drug spend.
- Opioids as a percent of indemnity claim prescriptions continued to decline, falling to 23.2 percent of the prescriptions filled in 2017, down from 24.6 percent in 2016, and down from the peak level of 32.1 percent in 2008 and 2009. Despite this ongoing decline, opioids remain the number one therapeutic group in terms of both use and payments.
- Opioid reimbursements as a proportion of total drug spend for indemnity claims fell from 20.4 percent in service year 2016 to 18.6 percent in service year 2017, which was the lowest level in more than a decade and nearly 12 percentage points below the record high of 30.5 percent in 2009.

- Recent data show opioids have become less prevalent in the early stages of lost-time claims. Among the accident year (AY) 2016 claims, 21.6 percent involved opioids in the first three months, down from 29.1 percent of the AY 2015 indemnity claims and down from a peak of 37.1 percent for the AY 2008 indemnity claims. More mature data from AY 2007-AY 2014 show the prevalence of opioids in indemnity claims prior to AY 2015 was far more stable at the 12-month benchmark and beyond, as the percentage of claims involving opioids at 12, 24, 36, 48 and 60 months was typically around 40 percent for these older claims.
- Among indemnity claims, the number of opioid prescriptions per user in the first three months hit a 12-year low of 1.8 in AY 2016, well below the peak level of 2.5 prescriptions in AY 2009. Data on more mature claims from earlier accident years also show a decline in the average number of opioid prescriptions per user in the first 60 months post injury, which fell 21 percent from a record 8.8 prescriptions for AY 2007 claims to 7.0 prescriptions for AY 2012 claims.
- The average strength of opioids dispensed in the first three months, measured by morphine milligram equivalents (MMEs) per prescription, has shown little change in recent years, suggesting that similar strength opioids are being dispensed in the early stages of a claim. In contrast, more developed data on claims from earlier accident years show a decline in average MMEs per prescription at 60 months post injury, as the average strength of all opioid prescriptions dispensed within the first five years fell 29 percent from 782 MMEs for AY 2007 indemnity claims to 555 MMEs for AY 2012 indemnity claims.
- The average potency of the opioids dispensed to injured workers increased dramatically within each accident year as the claims developed, often doubling between the 3-month and the 60-month benchmarks. For example, among AY 2012 indemnity claims, the average strength of opioid prescriptions dispensed to injured workers in the first three months post injury was 282 MMEs, while the average strength per opioid prescription dispensed at 60 months post injury was 555 MMEs. This pattern of increasing the quantity and/or strength of the drugs given to injured workers who remain on opioids for chronic pain suggests that these workers often develop a tolerance to these drugs and must rely on increasingly higher dosages or stronger medications if they are not weaned off of the opioids.
- After hitting a peak with AY 2007 and AY 2008 indemnity claims, the total number of MMEs dispensed per opioid user declined at all six levels of claim development examined (three months through five years), confirming that fewer opioid prescriptions are being provided.
- Generics accounted for 92.4 percent of the opioids dispensed on the 2017 indemnity claims, the highest level in the 9-1/2 year study period, while the average payment per opioid prescription fell to \$83 in 2017, the lowest level in the study period. This reduction reflected both the declining use of brand-name drugs and a decrease in the average amount paid for generics, which fell to \$45 in 2017, helping offset the increase in the average paid for brand-name opioids, which jumped to a record \$551 per prescription over the same period.
- Hydrocodone was the leading opioid dispensed to injured workers in each year of the study, accounting for between 50.1 percent and 62.9 percent of all opioids dispensed on indemnity claims during the 9-1/2 year span, followed by Tramadol and Oxycodone. Together these three drugs accounted for at least 80 percent of the opioids dispensed on indemnity claims for each year included in the study.
- Among opioids dispensed on indemnity claims over the study period, Hydrocodone had the largest share of the drug spend, but since 2011, it has represented a declining share of workers' compensation opioid prescriptions and the average Hydrocodone prescription payment has declined more than 20 percent. As a result, Hydrocodone represented just 21.2 percent of the 2017 indemnity claim opioid payments – the lowest level in the 9-1/2 year study period. Tramadol, with 19.3 percent of the payments, ranked second among all opioids in terms of drug spend, though Buprenorphine, used as a painkiller and an alternative to Methadone for opioid addiction, surpassed Oxycodone as the third most costly opioid in 2016, consuming 13.3 percent of the opioid spend, and its share of the opioid dollars continued to grow in 2017, increasing to 17.2 percent.

Background

CWCI has conducted several studies that have examined the types, quantities, and costs of workers' compensation prescription medications¹ and addressed several related topics, including physician dispensing of repackaged drugs;² the association between differential use of opioids on injured worker outcomes;³ the prevalence of compounded drugs;⁴ the potential impact of a workers' compensation prescription drug formulary;⁵ the growing use of urine drug testing;⁶ and the potential savings that could be derived from allowing third-party payor access to the state's Controlled Substance Utilization Review and Evaluation System (CURES) prescription drug monitoring database.⁷

Because of the risk factors associated with long-term opioid use, a number of Institute studies have also focused on the utilization, reimbursement, and physician prescribing patterns associated with these powerful narcotic painkillers. Those studies included a May 2016 Research Note which showed that opioids had increased from 27.0 percent of all California workers' compensation prescriptions filled in 2005 to 31.8 percent in 2009, but then declined to 27.2 percent in 2014, and that the pattern was mirrored in the payment data, as opioid reimbursements as a proportion of total workers' comp drug spend increased from 19.3 percent in 2005 to a peak of 31.9 percent in 2009 before falling back to 24.4 percent in 2014. Notably, the 2016 study found that the decline in opioid use accelerated in 2012, which coincided with increased scrutiny by UR and IMR programs and restrictions imposed by pharmacy benefit managers, medical provider networks, and payors, but even with the declining use over the past five years, opioids remained the number one therapeutic drug group in California workers' compensation in both use and payments.

Objective of this Research

This report builds on prior Institute research on the prevalence and cost of California workers' compensation prescription medications by examining data on prescription drugs dispensed to injured workers with lost-time claims through June 2017 in order to identify the distribution of California workers' compensation prescription drugs and pharmaceutical reimbursements across major therapeutic drug groups. The report then focuses on the changes in the volume, payments, potency, and types of opioids used in the system. The study provides updated outcomes on a number of trends, including:

- the distribution of indemnity claim prescriptions and workers' compensation drug spend by therapeutic group for service years 2008 through June 2017;
- opioids as a percent of all workers' compensation prescriptions and as a percent of total drug spend within the system;
- the prevalence of opioids at various levels of claim development, including data on the use of opioids within the first three months and the first 12 months of AY 2016 indemnity claims;

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1. Swedlow, A., Ireland, J. Changes in Pharmaceutical Utilization and Reimbursement In the California WC System. CWCI Research Update, September 2009.
 2. Swedlow, A., Gardner, L., Ireland, J. Differences in Outcomes for Injured Workers Receiving Physician-Dispensed Repackaged Drugs in the California Workers' Compensation System. CWCI Research Brief, February 2013.
 3. Swedlow, A., Gardner, L., Ireland, J., Genovese, E. Pain Management and the Use of Opioids in the Treatment of Back Conditions in the California Workers' Compensation System. CWCI Report to the Industry, June 2008.
 4. Swedlow, A., Auen, E. Current Trends in Compound Drug Utilization and Cost in the California Workers' Compensation System. CWCI Research Notes, February 2013.
 5. Swedlow A., Hayes, S., Bullis, R. California Workers' Compensation Formulary - Part II: A Review of the July 2017 Proposed Formulary Drug List of Exempt and Non-Exempt Drugs. CWCI Spotlight Report, August 2017.
 6. Jones, S. Utilization and Cost of Urine Drug Testing in California Workers' Compensation. CWCI Report to the Industry, October 2015.
 7. Swedlow, A., Ireland J. Estimated Savings from Enhanced Opioid Management Controls through 3rd Party Payer Access to the Controlled Substance Utilization Review and Evaluation System (CURES), CWCI Spotlight Report, January 2013.

- the average number and average strength of opioid prescriptions in California workers' compensation;
- the distribution of specific opioids dispensed each year from 2008 through June 2017;
- the breakdown of opioid prescriptions and opioid payments between brand vs. generic drugs; and
- the average amounts paid for specific types of opioids (by drug name).

Data and Methods

For this study, the authors compiled a pharmaceutical data sample drawn from CWCI's Industry Research Information System (IRIS) database.⁸ The sample included data on 12.5 million prescriptions from AY 2007 through 2016 claims, dispensed to injured workers between January 2007 and June 2017, with payments for the prescriptions totaling \$1.34 billion. This analysis focuses on prescription data from indemnity claims, as they are the primary cost driver in workers' compensation and accounted for the vast majority of the prescriptions (88.5 percent) and the prescription payments (93.8 percent) in the study sample.

Each drug in the sample was identified according to its National Drug Code (NDC) and descriptive detail from Medi-Span's Master Drug Data Base.⁹ Medi-Span data variables used in the analysis included the therapeutic group, active ingredient name, the availability of brand and/or generic versions of the drug, as well as other variables. Each prescription in the sample was classified into a therapeutic drug group. The authors' primary focus was on opioids, which were the top therapeutic drug group in the data set, accounting for 3.3 million prescriptions (26.3 percent of the total) and \$328.3 million in payments (24.5 percent of the total amount paid). The highest volume opioids were classified based on the name of the active drug ingredient. Opioids that did not fall into a major category were included in an "Other" category, though all together, these drugs represented more than 95 percent of all opioid prescriptions dispensed during the study period. To allow for different types of analyses, prescriptions in the study sample were grouped both by accident year (based on injury date) and by service year (based on fill date).

Accident year data were used to identify claim-level (or population-based) prescription drug experience at different levels of claim development, including the percentage of claims with opioid prescriptions; the average number of opioid prescriptions per opioid user; and the average MMEs per opioid user and per prescription.

Service year data were used to measure prescription drug utilization within a given calendar year, including the distribution of opioids by drug name; the distribution of prescriptions by therapeutic drug group; the average payments per prescription for the top drug groups and drug names; the distribution of the total drug spend broken out by therapeutic drug group and drug name; and the distribution of brand vs. generic opioids.

8. IRIS is CWCI's proprietary database containing data on employee and employer characteristics, medical service data, benefits, and administrative costs on approximately 5.3 million California workers' compensation claims.

9. (MDDB®, Version 2.5 Documentation Manual, published by Wolters Kluwer Health).

Findings

Prescription and Total Drug Spend Distributions (Indemnity Claims)

Exhibit 1 uses prescription drug data from service years 2008 through June 2017 to show the changes in the mix of therapeutic drug groups over the past several years. Opioids accounted for the largest share of California workers' compensation prescriptions in each of the years studied. However, opioids, as well as musculoskeletal drugs, hypnotics/sedatives, and antianxiety drugs have all show a dwindling share of the prescriptions dispensed to injured workers in recent years, with all four of those drug categories hitting a 9-1/2 year low in the first half of 2017. At the same time, anti-inflammatories, anticonvulsants, antidepressants, antihypertensives, antihyperlipidemics, and beta blockers all accounted for a higher share of the 2017 workers' compensation prescriptions than they did in 2008, with the proportion of workers' compensation prescription drug fills represented by each of these therapeutic groups at or near a 9-1/2 year high in 2017. With the declining prevalence of opioids, and the increasing prevalence of these other therapeutic drug categories, the gap between opioids and these drug groups – especially anti-inflammatories and anticonvulsants, which are often used as alternatives to narcotic pain medications – has narrowed considerably.

Exhibit 1: Distribution of Indemnity Claim Prescriptions by Therapeutic Group, Service Years 2008-2017

Therapeutic Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opioid	32.1%	32.1%	31.6%	31.0%	29.8%	29.0%	27.8%	25.5%	24.6%	23.2%
Anti-Inflammatory	16.6%	15.7%	15.4%	15.1%	14.8%	14.7%	16.8%	18.6%	19.4%	19.0%
Anticonvulsant	5.2%	5.5%	5.9%	5.7%	5.8%	6.1%	6.9%	8.0%	9.4%	10.5%
Musculoskeletal	11.1%	10.8%	9.9%	9.1%	9.0%	8.9%	9.0%	8.7%	8.1%	7.5%
Antidepressant	5.8%	5.9%	6.2%	6.5%	6.7%	6.9%	6.3%	6.7%	7.1%	7.5%
Ulcer	6.5%	7.1%	6.9%	6.3%	6.7%	7.1%	7.3%	6.8%	6.3%	6.4%
Dermatological	3.3%	4.3%	4.6%	4.8%	4.9%	5.2%	5.0%	4.5%	4.4%	4.7%
Antihypertensive	0.5%	0.5%	0.7%	1.1%	1.2%	1.2%	1.3%	1.6%	1.9%	2.2%
Antihyperlipidemic	0.2%	0.3%	0.5%	0.8%	0.8%	0.8%	0.9%	1.1%	1.4%	1.6%
Hypnotics/Sedative	4.0%	3.5%	3.4%	3.3%	3.3%	3.3%	2.5%	2.2%	1.7%	1.6%
Beta Blocker	0.2%	0.3%	0.4%	0.7%	0.7%	0.7%	0.7%	1.0%	1.2%	1.4%
Antianxiety	2.4%	2.3%	2.2%	2.1%	2.3%	2.5%	2.0%	1.9%	1.5%	1.3%
Laxative	0.5%	0.6%	0.7%	0.9%	1.2%	1.2%	1.0%	1.0%	1.0%	0.7%

Compared to the distribution of prescriptions, the drug payment distributions for indemnity claims, displayed in Exhibit 2, show that the prescription dollars have been less concentrated in opioids, and over the past decade there has been more fluctuation in the distribution of the workers' compensation prescription drug dollars among the drug groups.

Exhibit 2: Distribution of Indemnity Claim Prescription Payments by Therapeutic Group, Service Years 2008-2017

Therapeutic Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Opioid	29.4%	30.5%	29.9%	29.0%	26.5%	23.9%	22.8%	21.6%	20.4%	18.6%
Dermatological	6.9%	8.5%	9.5%	10.0%	11.3%	12.6%	12.0%	10.9%	12.9%	16.1%
Anticonvulsant	7.3%	5.8%	5.4%	5.1%	4.9%	5.2%	5.8%	7.4%	10.1%	11.8%
Anti-Inflammatory	11.8%	11.8%	11.4%	10.9%	11.5%	11.5%	14.0%	14.4%	11.5%	9.8%
Ulcer	9.4%	10.4%	10.4%	9.1%	9.1%	8.7%	8.2%	7.7%	5.1%	5.1%
Musculoskeletal	8.1%	7.6%	6.4%	5.2%	5.4%	6.2%	5.0%	5.1%	4.9%	4.6%
Antidepressant	6.0%	5.5%	5.8%	6.0%	6.5%	6.9%	5.3%	5.8%	5.3%	4.5%
Cardiovascular	0.4%	0.4%	0.6%	0.6%	0.6%	0.8%	0.9%	1.3%	2.1%	2.7%
Antidiabetic	0.1%	0.2%	0.3%	0.3%	0.4%	0.5%	0.6%	0.9%	1.5%	2.0%
Antipsychotics/Antimanic	1.4%	1.6%	1.9%	2.2%	2.1%	2.1%	2.0%	2.2%	2.2%	2.0%
Gastrointestinal	0.1%	0.1%	0.2%	0.2%	0.2%	0.3%	0.4%	0.7%	1.4%	1.9%
Antihyperlipidemic	0.2%	0.2%	0.5%	0.9%	0.9%	1.0%	1.0%	1.5%	1.9%	1.9%
Antiasthmatic & Bronchodilator	0.4%	0.4%	0.4%	0.5%	0.6%	0.6%	0.6%	0.8%	1.4%	1.6%

As with the prescription distribution, opioids have also led all therapeutic drug groups in terms of total payments, though since peaking in service year 2009 their share of the total drug spend has declined, falling to a 9-1/2 year low of 18.6 percent of the total paid for the prescription drugs filled in 2017, down from 20.4 percent in 2016, and down nearly 12 percentage points from the peak level of 30.5 percent in 2009.

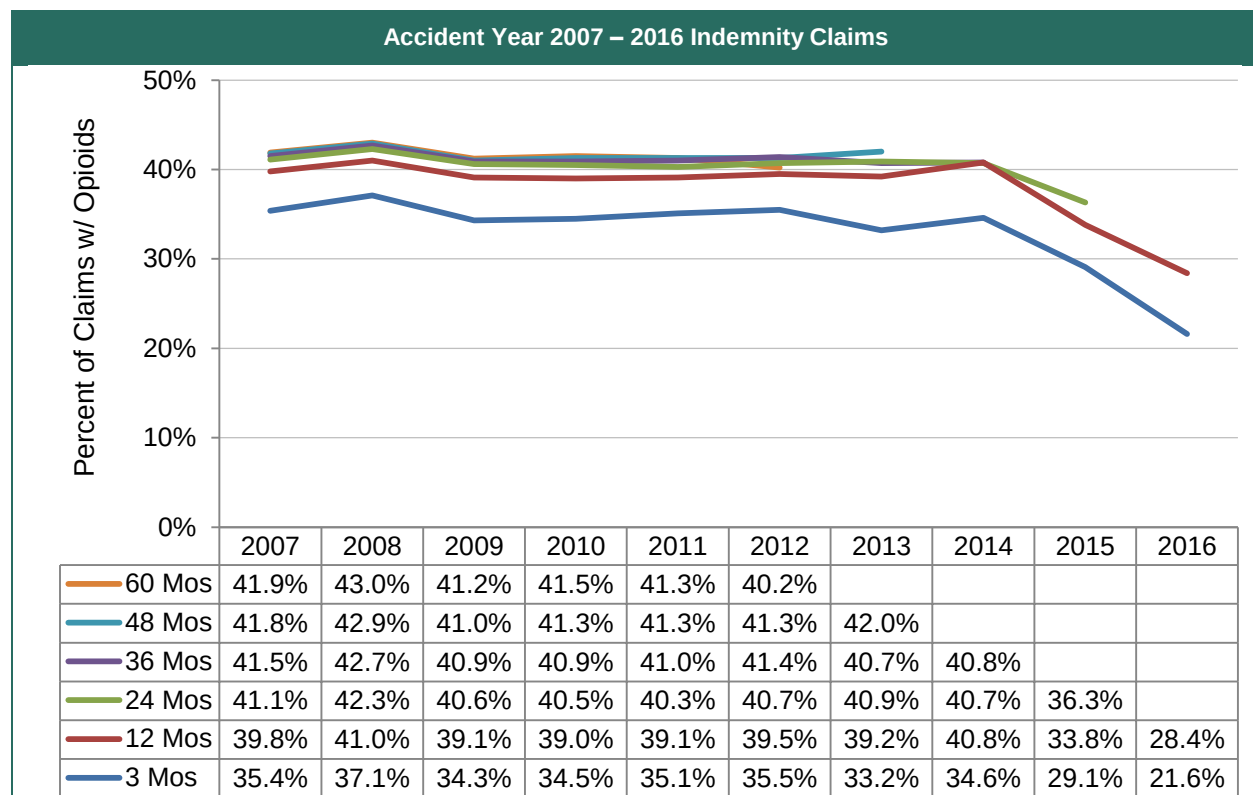
For most of the past decade, anti-inflammatories ranked second in terms of total prescription dollars, though they declined to 11.5 percent of the payments for prescriptions dispensed in 2016, and were surpassed by dermatologicals, which accounted for 12.9 percent of the prescription dollars, reflecting the growing prevalence of high-cost topical creams. That shift continued in 2017, as dermatologicals increased to a record 16.1 percent of the total drug spend, while anticonvulsants grew to 11.8 percent of the prescription dollars, also surpassing anti-inflammatories, which fell to 9.8 percent—the lowest level in the decade. Ulcer drugs and musculoskeletal drugs and antidepressants have all seen their share of workers' compensation prescription drug payments drop sharply over the past decade, while cardiovascular medications and the rest of the therapeutic drug groups listed in Exhibit 2 all registered relatively sharp increases in their share of the payments.

Unlike the first two exhibits, which were based on service year data (*i.e.*, the year in which the prescriptions were filled, regardless of the injury years), Exhibits 3, 4, and 5 use data from AY 2007-2016 claims to track changes in the proportion of indemnity claims in which opioids were dispensed at 3, 12, 24, 36, 48, and 60 months post injury, and in the volume and strength of opioid prescriptions dispensed at each of those levels of claim development.

Prevalence of Opioids in Indemnity Claims at Different Levels of Development

Exhibit 3 shows changes in the prevalence of opioids at various stages in the life of an indemnity claim, and how the presence of opioids among indemnity claims at the six levels of claim development has changed over the past decade.

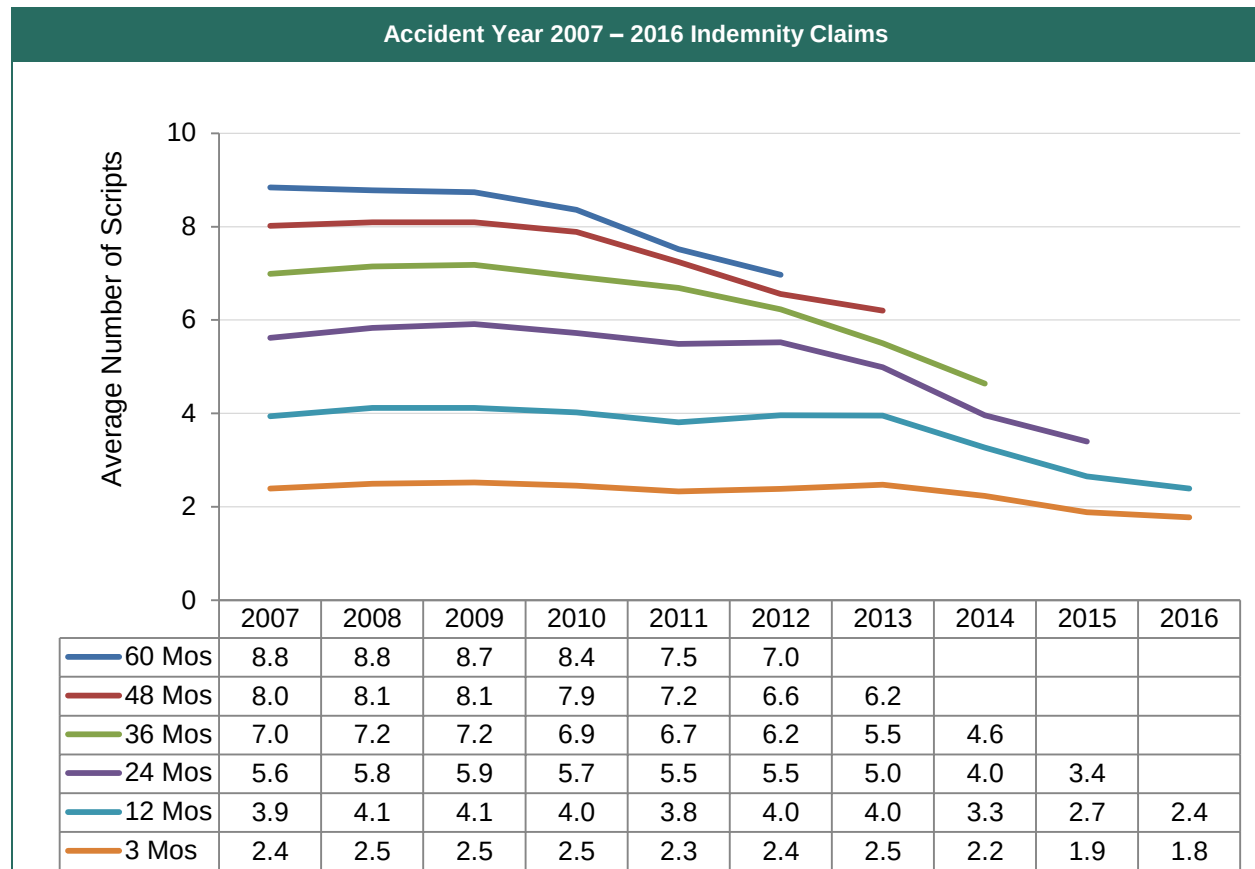
Exhibit 3: Percent of Indemnity Claims w/ Opioids at 3, 12, 24, 36, 48 & 60 Months



The results for AY 2015 and AY 2016 claims show significant reductions in the percentage of indemnity claims that had opioids prescribed in the early stages of the claim, though the data on AY 2007 to 2014 claims show only minor fluctuations in the prevalence of opioids at all levels of claim development, with very little change in the proportion of claims involving opioids after the first year post injury. For example, the most current data on the prevalence of opioids in the early stages of a lost-time claim show that 21.6 percent of indemnity claims from AY 2016 involved opioids in the first three months, which was down from 29.1 percent of the AY 2015 claims and down from the record 37.1 percent of AY 2008 indemnity claims that had opioids prescribed within the first three months. In contrast, the most recent 24-, 36-, 48- and 60-month indemnity claims data from earlier accident years show that at these later stages of claim development the percentage of claims that involved opioids has remained within a fairly narrow range of about 40 percent to 43 percent. The significant declines in the prevalence of opioids in the early stages of the AY 2015 and AY 2016 claims may foreshadow similar reductions as these more recent claims mature and reach the later stages of development.

While Exhibit 2 showed that opioids have represented a declining share of the prescription drugs dispensed on indemnity claims each year, Exhibit 4 uses a different measure of opioid utilization, revealing that among AY 2007-2016 indemnity claims, the average number of opioid prescriptions per opioid user has also declined at all six levels of claim development.

Exhibit 4: Average Number of Opioid Prescriptions Per Opioid User at 3, 12, 24, 36, 48 & 60 Months (Indemnity Claims)



The most recent data in the study sample show that the average number of opioid prescriptions dispensed per user at three months post injury on AY 2016 indemnity claims fell to 1.8 prescriptions, which was down 28.0% below the record 2.5 prescriptions/user dispensed in the first 90 days on AY 2009 claims.

The most fully developed data also show a significant reduction in the volume of opioid prescriptions per user, with the AY 2012 claims at 60 months post injury averaging 7.0 prescriptions per user, which was down 20.5 percent below the peak level of 8.8 prescriptions on AY 2007 and AY 2008 claims at 60 months.

Drug Strength

Two different gauges of drug strength were used to assess how the potency of the opioids prescribed to California injured workers has changed over time: The average number of MMEs dispensed per opioid prescription, measured at each of the six claim development benchmarks for AY 2007 to 2016 claims; and the total number of MMEs per opioid user at each benchmark. The most developed data show results at 60 months.

Exhibit 5: Average MMEs Per Opioid Prescription at 3, 12, 24, 36, 48 & 60 Months (Indemnity Claims)

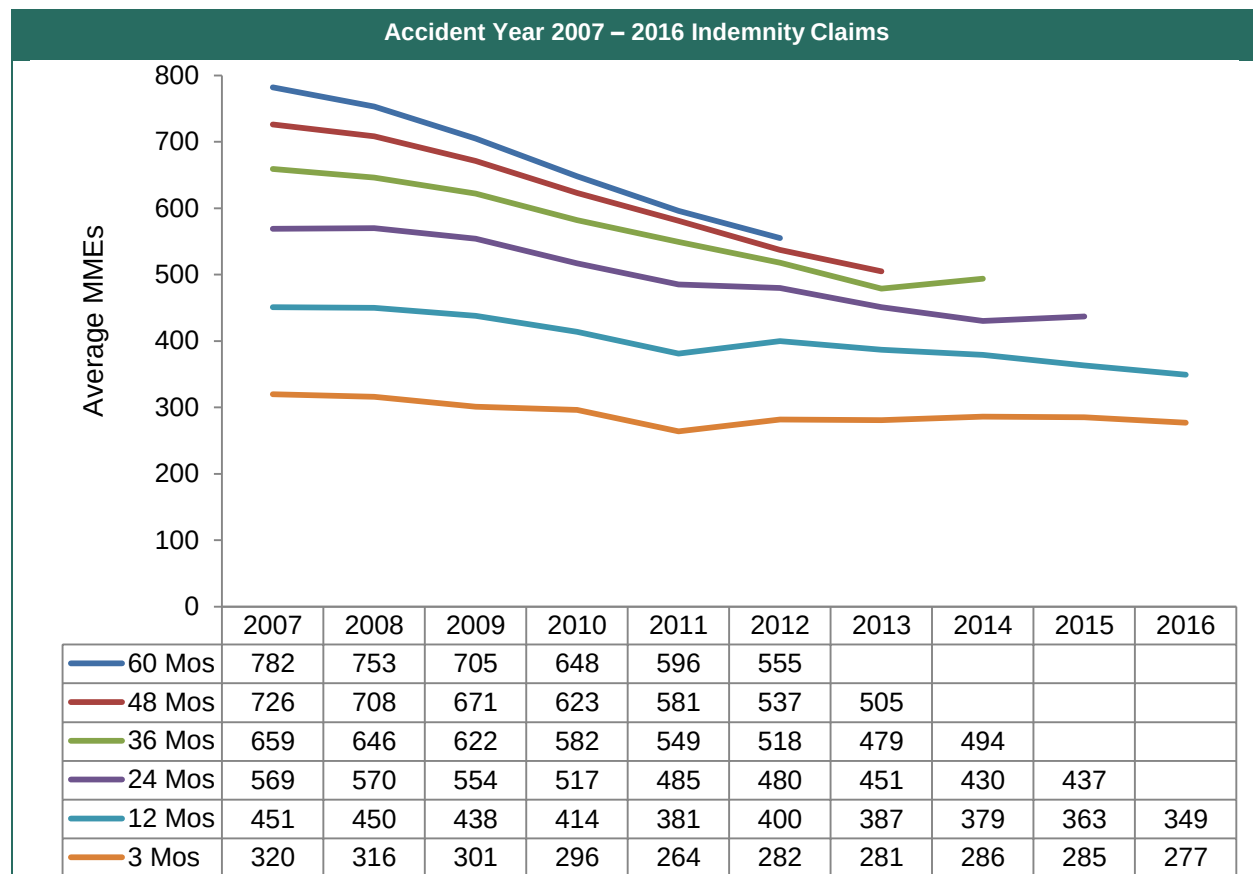
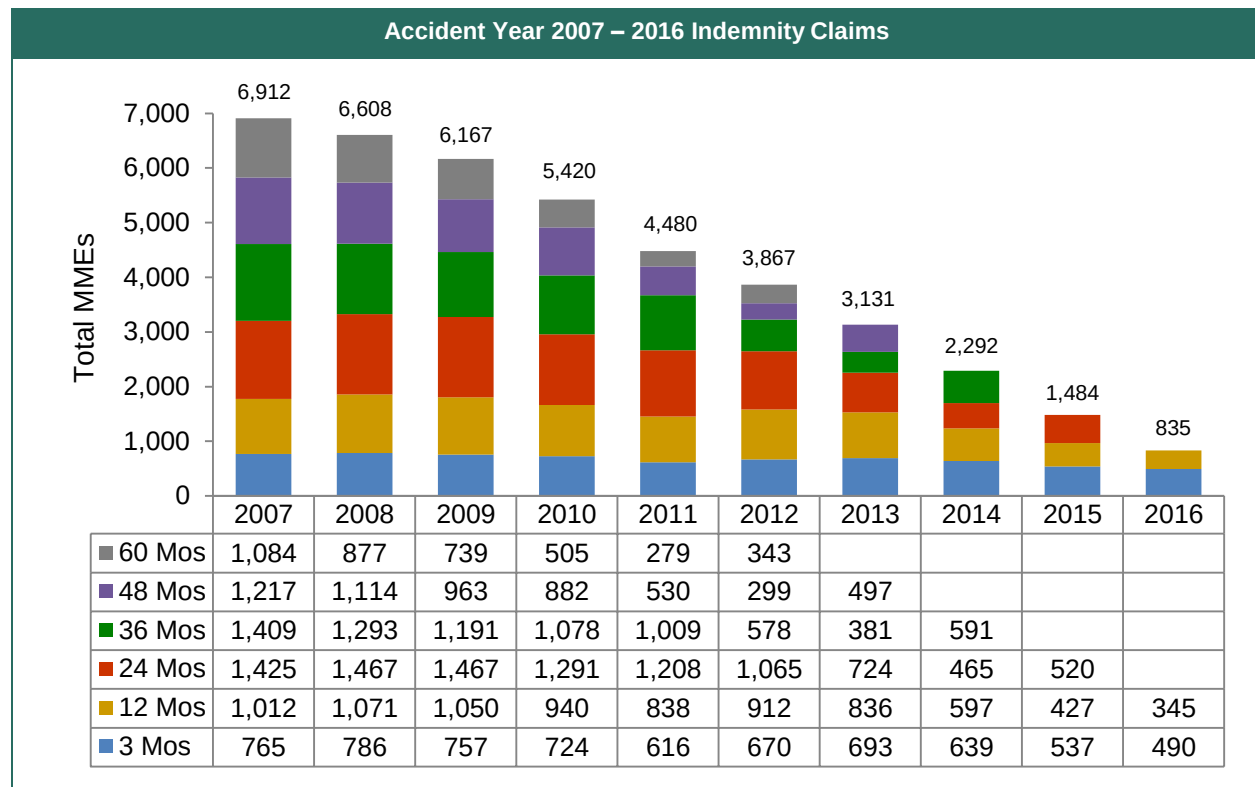


Exhibit 5 shows average MMEs per opioid prescription for AY 2007 to AY 2016 indemnity claims at six levels of development. Looking across the 10-year span shows that since AY 2007, the average strength of opioids dispensed in the first three months has ranged from 264 MMEs to 320 MMEs, with only minor fluctuations since AY 2012, suggesting that for the five most recent years similar strength opioids have been dispensed in the early stages of a claim, while the more developed data show the average strength of opioids in the first 60 months has fallen 29 percent from 782 MMEs per prescription for AY 2007 claims to 555 MMEs for AY 2012 claims. Looking at results within each accident year shows the average potency of opioid prescriptions has continued to increase as the claims mature, with average MMEs per prescription often more than doubling between the 3- and the 60- month benchmarks, which may reflect the closing of claims with lower average MMEs and changes in the strength and/or quantity of opioids dispensed. The pattern underscores how patients who receive opioids for chronic pain often develop a tolerance to these drugs and that failure to wean them off the painkillers means they must rely on increasingly higher dosages or stronger meds as the analgesic effect of the opioid diminishes – a consequence detailed by Volkow and McLellan.¹⁰

10. Volkow, N. D. and McLellan, A.T. March 31, 2016. Opioid Abuse in Chronic Pain – Misconceptions and Mitigation Strategies. *The New England Journal of Medicine*. 374:1253-1263 <http://www.nejm.org/doi/full/10.1056/NEJMr1507771>

The second measure of opioid strength is the cumulative number of MMEs per opioid user. Exhibit 6 shows the cumulative MMEs per opioid user at the different levels of development for indemnity claims from each accident year.

Exhibit 6: MMEs Per Opioid User at 3, 12, 24, 36, 48 & 60 Months



The most fully developed data show MMEs per opioid user at 60 months post injury peaked at 6,912 for AY 2007 indemnity claims, with the most recently available 60-month data (on AY 2012 indemnity claims) indicating that on average, the cumulative strength of the opioids dispensed at the five-year benchmark has declined by 44 percent to a total of 3,867 MMEs per opioid user.

In addition, as shown in Exhibit 6, after AY 2008 the total number of MMEs dispensed per opioid user at the 24-, 36-, 48-, and 60-month benchmarks declined steadily, while the number of MMEs dispensed in the first three months declined from AY 2008 through AY 2011, then increased slightly through AY 2013, before resuming the downtrend and hitting a 10-year low of 490 MMEs per user in AY 2016. Likewise, on average, the total MMEs dispensed per user in the first year post injury declined for AY 2008 through AY 2011 claims, then increased for AY 2012 claims, but since then the cumulative strength of the first-year opioids has declined steadily, hitting a 10-year low of 835 MMEs for AY 2016 claims, which was less than half of the total MMEs noted for first-year opioids dispensed on indemnity claims a decade earlier.

Brand vs. Generic Opioid Trends (Indemnity Claims)

Exhibit 7 displays the prescription and payment distributions for brand vs. generic versions of the opioids dispensed on indemnity claims between 2008 and June 2017, as well as the relative change in the volume and amount paid for brand versus generic versions of these drugs over the 9-1/2 year study period, and the change in the average amounts paid over this period.

Exhibit 7: Analgesic Opioid Trends by Brand/Generic Status & Service Year 2008 – 2017 Fill Dates

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2008-2017 Relative Change
Percent of Opioid Prescriptions											
Brand	11.2%	12.3%	11.3%	11.4%	10.3%	8.6%	9.4%	8.4%	7.9%	7.6%	- 32.1%
Generic	88.7%	87.6%	88.6%	88.5%	89.6%	91.3%	90.5%	91.5%	92.0%	92.3%	+ 4.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Percent of Opioid Payments											
Brand	45.1%	49.8%	48.1%	48.6%	45.9%	38.6%	39.5%	39.4%	46.6%	50.5%	+ 12.0%
Generic	54.8%	50.1%	51.8%	51.3%	54.0%	61.3%	60.4%	60.5%	53.3%	49.4%	- 9.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100%	
Average Payment											
Brand	\$373	\$404	\$419	\$444	\$470	\$469	\$468	\$519	\$529	\$551	+ 47.7%
Generic	\$57	\$57	\$57	\$60	\$63	\$70	\$74	\$73	\$52	\$45	- 21.1%
Total	\$92	\$99	\$98	\$104	\$105	\$104	\$112	\$111	\$90	\$83	- 9.8%

Brand-name drugs as a percentage of the opioids dispensed on lost-time claims peaked in 2009 at 12.3 percent, but after a fairly steady decline the most recent data show brand drugs accounted for just 7.6 percent of the opioids dispensed in 2017 -- a 10-year low.

The payment data tell a different story, however, as brand-name opioids, which have much higher average costs, accounted for 45.1 percent to 49.8 percent of the opioid payments between 2008 and 2012, then declined to less than 40 percent of the payments for opioids dispensed from 2013 through 2015. Since then however, payments for brand-name opioids have accounted for an increasing share of the opioid drug spend, hitting a 10-year high of 50.5 percent of the opioid dollars in 2017. The data on the average amount paid for generic and brand-name opioids reveal the reason for this recent shift in the opioid dollars. As noted at the bottom of Exhibit 7, since 2014, the average amount paid for brand-name opioids has increased from \$468 to \$551 (+17.7 percent), while the average paid for generic opioids has declined from \$74 to \$45 (-39.2 percent). Thus, even though brand-name drugs have represented a declining share of the opioids used in California workers' compensation, the average amounts paid for brand-name drugs have continued to rise while payments for generic opioids have fallen sharply, so the brand-name meds have captured an increasing share of the opioid dollars.

To gain a better understanding of the changing mix of opioid prescriptions used in workers' compensation, the opioid prescriptions in the study sample were categorized by drug name and by fill date (service year). The resulting distributions displayed in Exhibit 8 show that over the past decade a small number of drugs have accounted for the vast majority of opioid prescriptions used in California workers' compensation indemnity claims, with the eight drugs shown in the table below comprising between 95% and 97.3% of the opioids dispensed on these claims.

Exhibit 8: Distribution of Common Opioid Prescriptions on Indemnity Claims by Drug Name, Service Years 2008 – 2017

Drug Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2008 – 2017 Relative Change
Hydrocodone	62.4%	62.2%	62.3%	62.9%	61.4%	60.3%	57.4%	51.4%	50.2%	50.1%	- 19.7%
Tramadol	14.5%	14.8%	14.5%	15.7%	17.1%	19.1%	22.1%	24.2%	23.9%	23.9%	+ 64.8%
Oxycodone	4.3%	4.8%	5.4%	6.2%	6.4%	6.6%	6.5%	8.2%	9.2%	9.5%	+ 120.9%
Codeine	3.5%	3.3%	2.9%	3.2%	2.9%	2.6%	2.8%	4.9%	5.0%	5.2%	+ 48.6%
Morphine	3.2%	3.2%	3.3%	3.5%	3.4%	3.2%	3.0%	3.1%	3.1%	3.3%	+ 3.1%
Propoxyphene	6.6%	5.8%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	- 100.0%
Fentanyl	2.6%	2.5%	2.5%	2.5%	2.2%	2.0%	1.8%	1.7%	1.5%	1.2%	- 53.8%
Buprenorphine	0.3%	0.4%	0.5%	1.1%	1.6%	1.7%	2.0%	2.1%	2.6%	2.9%	+ 866.7%
Other Opioids	2.7%	3.0%	3.8%	4.8%	5.0%	4.5%	4.4%	4.4%	4.5%	3.9%	44.4%
Grand Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Hydrocodone has been the most heavily used opioid in workers' compensation across the entire 9-1/2 year study period, though it has declined from 62.4 percent of the opioids dispensed to injured workers in 2008 to just over half of the opioids dispensed since 2015. Tramadol has consistently been the second most prescribed opioid, and since 2008 it has grown from 14.5 percent of the opioid prescriptions to 23.9 percent. Similarly, Oxycodone has ranked third among the opioid drugs since 2010, and its share of the workers' compensation opioid prescriptions has more than doubled since 2008, increasing to 9.5 percent of the opioid prescriptions in 2017. Codeine also has accounted for an increased percentage of the opioids, as its share, which had declined from 3.5 percent in 2008 to 2.6 percent in 2013, has increased steadily to 5.2 percent over the past 3-1/2 years.

Since 2008, the most significant decline has been in the use of Propoxyphene (Darvon, Darvocet), which was the third most heavily used opioid in workers' compensation a decade ago, but which disappeared as an option for treating pain in 2011 after it was banned by the FDA due to safety concerns. The highly potent and addictive opioid Fentanyl, which is 75 to 100 times more powerful than oral morphine, has also accounted for a declining share of the opioids dispensed in indemnity claims, as it dropped steadily from 2.6 percent of the opioid prescriptions in 2008 to 1.2 percent of the 2017 opioid prescriptions, with most of that decline beginning in 2012 and coinciding with the growing percentages noted for Tramadol, Oxycodone, and "other opioids." The fastest growing opioid in recent years has been Buprenorphine, which is not only a painkiller (Butrans), but an alternative to Methadone for the treatment of opioid dependence (Suboxone). Buprenorphine has climbed from 0.3 percent of the workers' compensation opioids dispensed in 2008 to 2.9 percent of the opioids dispensed in 2017 – strong evidence of the increased efforts to address opioid dependence among injured workers.

Exhibit 9 shows the changes in the distribution of the workers' compensation opioid dollars among the most common drugs during the 9-1/2 span of the study.

Exhibit 9: Distribution of Opioid Payments Indemnity Claims by Drug Name, Service Years 2008 – 2017

Drug Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2008 – 2017 Relative Change
Hydrocodone	37.9%	39.3%	38.5%	36.4%	35.3%	33.4%	30.8%	28.8%	24.9%	21.2%	- 44.1%
Tramadol	14.2%	13.6%	10.0%	8.7%	11.6%	19.5%	21.4%	18.4%	16.6%	19.3%	+ 35.9%
Oxycodone	5.7%	6.8%	8.5%	9.5%	9.2%	8.7%	11.0%	13.0%	12.1%	10.4%	+ 82.5%
Codeine	1.1%	1.1%	0.9%	0.9%	0.8%	0.6%	0.6%	1.0%	1.2%	1.2%	+ 9.1%
Morphine	9.9%	9.8%	10.6%	10.4%	8.5%	6.8%	6.4%	6.2%	5.0%	4.4%	- 55.6%
Propoxyphene	2.0%	1.7%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	- 100%
Fentanyl	22.7%	18.9%	17.4%	15.8%	14.3%	12.8%	10.5%	10.9%	8.1%	7.6%	- 66.5%
Buprenorphine	1.5%	2.0%	2.5%	4.1%	5.7%	6.1%	7.1%	8.5%	13.3%	17.2%	+1,046.7%
Other Opioids	4.9%	6.8%	10.1%	14.2%	14.6%	12.0%	12.2%	13.2%	18.7%	18.7%	281.6%
Grand Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Hydrocodone, which has been the most heavily used opioid over the past decade, also consumed the most dollars, topping the list over the entire study period, though its share of the opioid prescriptions has been declining, so its share of the overall opioid drug spend has dropped as well, falling from the all-time high of nearly 40 percent in 2009 to just over 21 percent in 2017. Likewise, Fentanyl, which dropped from 2.6 percent of the opioid prescriptions in 2008 to 1.2 percent in 2017, also saw its share of the opioid drug spend decline from 22.7 percent to 7.6 percent, so it went from being the second most expensive opioid to the fifth.

In contrast, Tramadol's share of workers' compensation opioid prescriptions grew from 14.5 percent to 23.9 percent over the 9-1/2 year study period, so it now ranks second among opioids in terms of both volume and payments, accounting for 19.3 percent of the opioid payments in 2017. Meanwhile, Oxycodone's share of the opioid prescriptions more than doubled between 2008 and 2017, so its share of the opioid drug spend rose from 5.7 percent to a record 13 percent in 2015, though Oxycodone subsequently dropped back down to 10.4 percent in 2017 as a greater proportion of the opioid dollars paid for Buprenorphine, which increased more than tenfold from 1.5 percent of the opioid drug spend in 2008 to 17.2 percent in the 2017.

Other notable shifts in the distribution of opioid payments since 2008 reflect the disappearance of Propoxyphene, which was taken off the market in 2010; reduced spending on Morphine; which went from 9.9 percent of the opioid drug spend in 2008 to 4.4 percent in 2017; and the ongoing introduction of new, expensive medications, as evidenced by the increasing share of payments for "other drugs," which more than tripled from 4.9 percent of the opioid dollars in 2008 to 18.7 percent in 2016 and 2017.

Discussion

CWCI's 2016 analysis of California workers' compensation prescription drug utilization and costs from 2005 through 2014 indicated that the mix of drugs dispensed to injured workers had changed, and although opioids were still the number one therapeutic drug group in terms of both volume and payment, the use of these controversial painkillers to treat injured workers had peaked in 2009 followed by a steady decline. Many factors may have contributed to that decline, including the 2012 reforms that resulted in prescription drug requests facing increased scrutiny from UR and IMR programs, restrictions from pharmacy benefit managers, medical provider networks and payors, as well as growing public awareness of the risks associated with these drugs, especially when used to treat chronic pain rather than in acute care situations.

This study offers an updated look at California workers' compensation prescription trends, examining prescription drug volume and payment distributions, and providing detailed data on opioids, including the types of drugs prescribed, the potency, and the number of prescriptions at different levels of claim development, and finds that many of the trends indicated in the 2016 study have not only continued, but accelerated. Most notably, the increased concerns about long-term opioid use and the ongoing efforts to contain the widespread use of these drugs appear to be working as the latest results show that opioids as a percentage of workers' compensation prescriptions and total drug spend are now at the lowest point in the past decade, while other types of drugs, including anti-inflammatories and anticonvulsants have become more prevalent, suggesting that they are increasingly used as alternatives to opioids for pain relief. Other changes in the mix of drugs likely reflect, at least in part, the impact of UR and IMR. Examples of this include the declining prevalence of musculoskeletal drugs, where long-term use is not supported by the Medical Treatment Utilization Schedule, as well as reductions in hypnotics/sedatives and antianxiety drugs. On the other hand, among the therapeutic drug groups that represent a growing share of the workers' compensation prescriptions are antidepressants, antihypertensives, antihyperlipidemics, and beta blockers.

Other measures also point to a continued reduction in average opioid utilization and strength in California workers' compensation. The data on AY 2015 and AY 2016 indemnity claims indicate that the use of opioids in the early stages of a claim is well below the levels noted in claims from prior accident years. Given that historically the percentage of claims from a given accident year in which opioids were prescribed has only increased marginally after the first year, these early results from AY 2015 and 2016 bode well for continued reductions in opioid utilization rates as these claims develop. Furthermore, even when opioids are prescribed for indemnity claims, the study found that since AY 2014 the average number of opioid prescriptions per user has declined significantly at the 3-, 12-, 24, and 36-month benchmarks, and since AY 2012, the average morphine equivalents per prescription have declined. Despite these reductions in opioid use across accident years, however, looking at the development data on claims from each accident year show that when opioids have been used to treat chronic pain, the average strength per opioid prescription, measured by average MMEs per prescription, has continued to increase dramatically over time, often doubling between 3 months and 60 months post injury.

As the mix of drugs used to treat injured workers has shifted, so too has the distribution of the prescription drug dollars. Although opioids remain the top therapeutic drug group in terms of total drug spend on indemnity claims, their share of the prescription drug payments has declined from around 30 percent a decade ago to 18.6 percent in 2017. Over the same period, dermatologicals and anticonvulsants are consuming a much higher share of the total drug spend, with dermatologicals' share more than doubling from 6.9 percent to 16.1 percent, while anticonvulsants' share rose from 7.3 percent to 11.8 percent. These shifts in the distribution of the prescription dollars reflect multiple factors, including the growing awareness (and wariness) of the long-term risks of opioids and the desire to find alternative treatments for chronic pain, including off-label use of other medications; the impact of UR and IMR (where half of the disputed medical requests are for prescription drugs and 92 percent of the denials or modifications are upheld); and the increased use of generics rather than brand-name drugs.

Many of the trends evident in this study are positive, though the extent to which they will continue or accelerate remains to be seen. Implementation of the Medical Treatment Utilization Schedule Prescription Drug Formulary on

January 1, 2018 marked a sea change for California workers' compensation, as the formulary includes a number of requirements and limits on the types and quantities of drugs that can be dispensed to injured workers, including lists of drugs which are either "exempt" or "non-exempt" from utilization review. While the impact of the formulary remains to be seen, the Institute will continue to monitor both the utilization and reimbursement of prescription drugs used to treat injured workers in California. Data from this report will provide a baseline for measuring changes in prescribing patterns and costs.

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Acknowledgements

The authors would like to thank the following CWCI staff members for their input and contributions in the drafting and preparation of this report:

- Rena David, Senior Vice-President, Research and Operations
- Stacy L. Jones, Senior Research Associate
- Denise Niber, Claims and Medical Director

California Workers' Compensation Institute

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CWCI Research Updates are published by the California Workers' Compensation Institute.

1333 Broadway, Suite 510, Oakland, CA 94612 | www.cwci.org | (510) 251-9470

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