

March 2018

Study of Chronic Opioid Use and Weaning in California Workers' Compensation

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Acknowledgements

The authors wish to thank a number of employees at WCIRB for their valuable contributions to this report including Dave Bellusci, Ward Brooks, Susan Hensley and, in particular, Linda Radler, the WCIRB's former Director of Medical Analytics who was instrumental in the Study design and implementation. Dr. Rupa Das from Zenith Insurance Company and Dr. Roman Kownacki from Northern California Kaiser Permanente played significant roles in the Study design as well as making insightful and detailed suggestions throughout the course of this Study. Alex Swedlow, Stacy Jones and Steve Hayes from the California Workers' Compensation Institute (CWCI) made valuable suggestions. This Study also benefitted from helpful comments by Dr. Dinesh Govindarao of State Compensation Insurance Fund, Jonathan Nutt of AIG and other members of the WCIRB Medical Analytics Working Group.

Executive Summary

Until 2012, opioid use in California workers' compensation, as in many other systems, was growing. Since 2012, claims with opioid prescriptions in the California workers' compensation system have dropped sharply but opioid prescriptions still reflect a significant portion of all pharmaceutical costs. About 22% of the claims with accidents in 2013 and 2014 with at least one paid medical service had an opioid prescription,¹ with those claims accounting for about 60% of the total medical payments of all 2013 and 2014 claims within two years of the date of injury.

The recent decline in opioid use is attributable to both fewer newer claims for which opioids were prescribed and a reduction in opioid use on claims in which there was "chronic" opioid use. There is limited information available on workers' compensation claimants who "weaned" off of opioids. This Study analyzes characteristics of injured workers who were chronic opioid users and weaned off of opioids completely and injured workers who did not wean off of opioids to better understand the impacts of reduced opioid prescribing and use on the California workers' compensation system. For purposes of this Study, chronic opioid claimants were defined as those with prescribed opioids of 50 Morphine Milligram Equivalents (MME) or greater per day for at least 3 consecutive months² within the first two years from the date of injury. Weaning was defined as the process of gradual reduction in opioid use after chronic opioid status was achieved.

For claims that had accident dates in 2013 and 2014, a Study group of 1,030 injured workers achieved the chronic opioid status of 50 MME or greater daily within two years of the date of injury. The following observations were made of this Study group:

- About 47% of the injured workers demonstrating chronic opioid usage weaned off of opioids completely within the 24-month Study period. Injured workers who did not wean off completely over the Study period still reduced opioid dosage by an average of 52%.
- As expected, claims involving chronic opioid use are considerably more expensive than the typical workers' compensation claim. The average medical payments per claim for physician services over the 24-month period after the accident date for claims involving chronic opioid use was more than nine times the average of all claims.
- Among chronic opioid claims, medical payments per claim for physician services were significantly lower for weaned claims than not weaned claims, both during the 24-month study period and the last 6 months of the Study period.
- Chronic opioid usage builds gradually. The Study group injured workers reached 50 MME in a median of 11 months from the date of injury. Injured workers who weaned off of opioids completely over the Study period reached the 50 MME threshold significantly faster than those who did not wean off.
- The median time from achieving chronic opioid status to wean off of opioids completely was 8 months. The median time from accident date to when the worker was weaned off completely was 19 months.
- During the first 6 months after weaning started, weaned claim opioid payments dropped 48% and total drug payments decreased by 42% compared to the payments during the 6 months before weaning. The percentage of payments per claim for non-opioid pain medications (i.e., NSAIDs)

¹ Based on WCIRB Medical Data Call (MDC) data. Numerator is claim counts with any opioid transaction and denominator is all claim counts.

² The 50 MME level is identified by the Centers for Disease Control and Prevention as the inflection point when mortality risk spikes. CDC guideline for prescribing opioids for chronic pain—United States, 2016. *MMWR Recomm Rep*. 65(RR-1):1-49, Dowell, D., Haegerich, T.M. and Chou, R. (2016). <https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm>

reduced significantly less than the decreases of both total drug payments and the opioid payments for the weaned claims during the 6 months after weaning began.

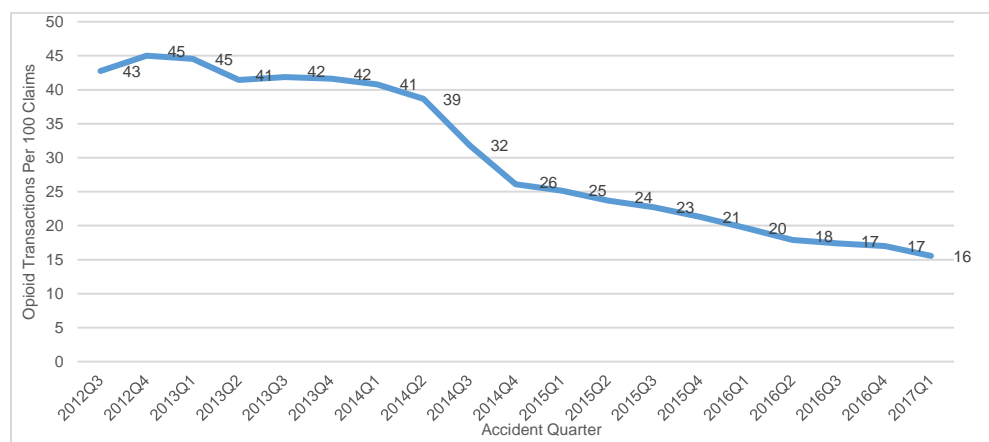
- Injured workers who did not wean off of opioids were significantly more likely to have a major surgery³ than those who weaned off. However, injured workers who weaned off of opioids were more likely to have a major surgery within 30 days of the injury date.
- The industry mix of chronic opioid claims is more dispersed than that of all similarly aged claims, with a higher proportion of chronic opioid claims among the Utilities and Construction sectors and a lower percentage in Manufacturing.
- Approximately 60% of the chronic opioid claims involved permanent disability compared to 11% of all claims. Conversely, only 3% of the chronic opioid claims were medical only claims compared to 65% of all claims.
- Over 80% of transactions associated with chronic opioid claimants had primary diagnoses of soft tissue injuries. Injured workers who weaned off were more likely to have Nature of Injury codes for Fractures, and less likely to have Unspecified Injuries than those who did not wean off.
- No clear patterns of non-drug treatments (e.g., Physical Medicine) for weaning off of opioids were evident, although the weaning process typically involved a gradual decrease in opioid prescribing combined with a mix of alternative non-drug treatments and non-narcotic drugs.
- Injured workers who did not wean off had higher drug costs and higher treatment transaction volumes and costs than those who weaned off, suggesting injured workers who do not wean off continue to impact the workers' compensation system with greater utilization of services and costs.

³ Major surgery was defined as a surgical procedure code with 90 global surgery days per the Physician Fee Schedule by the Centers for Medicare & Medicaid Services. National Physician Fee Schedule Relative Value File Calendar Year 2017, <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/PFS-Relative-Value-Files.html>

Background

Until 2012, opioid use in California workers' compensation, as in many other systems, was growing.⁴ However, since that time, the level of opioid prescribing in California workers' compensation system dropped sharply.^{5,6} Opioid prescriptions through the end of the calendar quarter subsequent to the accident quarter⁷ dropped almost two-thirds (64%) from a high of 45 per 100 claims in the 4th Quarter of 2012 to 16 per 100 claims in the 1st Quarter of 2017 (Figure 1). Claims with opioid prescriptions dropped from 29% of all claims in 2012 to 16% of all claims in 2016.

Figure 1. Opioid Transactions per 100 Claims by Accident Quarter for Services Rendered Through the Subsequent Quarter



Overall heightened public awareness, California's Controlled Substance Utilization Review and Evaluation System (CURES) used to track prescribing of controlled substances, and workers' compensation reform legislation (Senate Bill No. 863) that established the Independent Medical Review process to resolve medical treatment disputes have all helped drive these declining trends. The implementation of the California drug formulary pursuant to Assembly Bill No. 1124 in 2018 may further constrain opioid prescribing.

The WCIRB's Medical Data Call (MDC) system formed the basis of this analysis. The MDC system includes medical transactional data for over 1.4 million claims with dates of injury from July 1, 2012 through December 31, 2016. This data represents approximately 90% of all claims for these dates of injury arising from insured employers in California. Over 283,000, or 19.8%, of these MDC claims have one or more opioid prescriptions, with a median of 300 MME per claim with an opioid prescription. This data suggests there is a large number of claims with limited cumulative MME dosage that are more likely to reflect appropriate usage of opioid guidelines as defined by the Centers for Disease Control and Prevention (CDC) and California Medical Treatment Utilization Schedule (MTUS).

⁴ Ireland, J., Young, B. and Swedlow, A. (2014). *Part 1: Schedule II & Schedule III Opioids: Prescription and Payment Trends in California Workers' Compensation*, CWCI Research Update.

⁵ *Trends in the Use of Opioids in California's Workers' Compensation System*, CWCI Research Note, Hayes, S. and Swedlow, A. (2016).

⁶ Based on WCIRB's Medical Data Call (MDC) data.

⁷ For example, if an accident occurred in the 3rd Quarter of 2015, any opioid prescription for the claim in the 3rd and 4th Quarters of 2015 was counted.

Chronic opioid claims from all Accident Years, defined for purposes of this Study as those that achieved a daily average of 50 MME or greater for three consecutive months, comprised less than 1% of all claims but made up 11% of MDC total medical payments.

The recent decline in opioid use is attributable to both fewer newer claims for which opioids are prescribed and a reduction in opioid use among all chronic opioid claims. There is limited information available on workers' compensation claims that "weaned" off of opioids. In this Study, characteristics of claims that weaned off completely and claims that did not wean off were analyzed to better understand the impacts of reduced opioid prescribing and use on the California workers' compensation system.

Research Questions

This Study addresses the following research questions:

1. How long does it take to become a chronic opioid claim and how long does it take to wean off of opioids completely?
2. What are the characteristics of chronic opioid claims? What claim characteristics are observed before and after weaning began?
3. What are the diagnostic characteristics of chronic opioid claims? What types of injuries do chronic opioid claims have? Do these differ between weaned and not weaned claims?
4. What treatments are replacing opioids (e.g., other prescriptions, non-drug treatment substitutions such as acupuncture, physical therapy and cognitive behavior therapy)?

Study Approach

The WCIRB has collected detailed transactional level data on medical payments reported in its MDC data since July 1, 2012. This data represents approximately 90% of all claims for these dates of injury arising from insured employers in California. This data was used to identify and analyze claims with chronic and high dosage opioid use. Claims were also matched to the WCIRB Unit Statistical Report (USR) data at first report level to identify changes in nature of injury, case mix and reported loss amounts.⁸

This Study used claims that had accident dates in 2013 and 2014 and observations of transactional medical payments for the 24-month period following the date of injury. This Study focused on claims with chronic and high opioid usage, defined as those with a daily average of 50 MME or more for at least 3 consecutive months within 24 months of the injury date. This criteria resulted in 1,030 eligible claims, or less than 0.2% of all MDC claims (over 620,000) with accidents in years 2013 and 2014 with paid services within 24 months of accident. Claims that weaned off of opioids completely were compared to claims that did not wean off of opioids.

Opioid drug transactions were identified as those coded to Therapeutic Group 65 (TG65) as listed in the National Drug Codes (NDC) provided and maintained by the Food and Drug Administration. This Study calculated the total daily dose of opioids regardless of the opioid type and brand by applying the strength of opioid drugs (or MME) in the CDC's published conversion table to each opioid drug observation. The threshold of 50 MME was used to identify high opioid prescribing because the CDC guidelines identifies 50 MME as the threshold when mortality risk increases sharply.⁹

For the purposes of this Study, weaned claims were defined as chronic opioid claims that decreased MME dosage to zero for the last 3 months of a claim's 24-month observation window.

⁸ Claims valued at 18 months from policy inception.

⁹ CDC guideline for prescribing opioids for chronic pain—United States, 2016, MMWR Recomm Rep. 65(RR-1):1-49, Dowell, D., Haegerich, T.M. and Chou, R. (2016). <https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm>

Findings

Wean Status of Chronic Opioid Claims

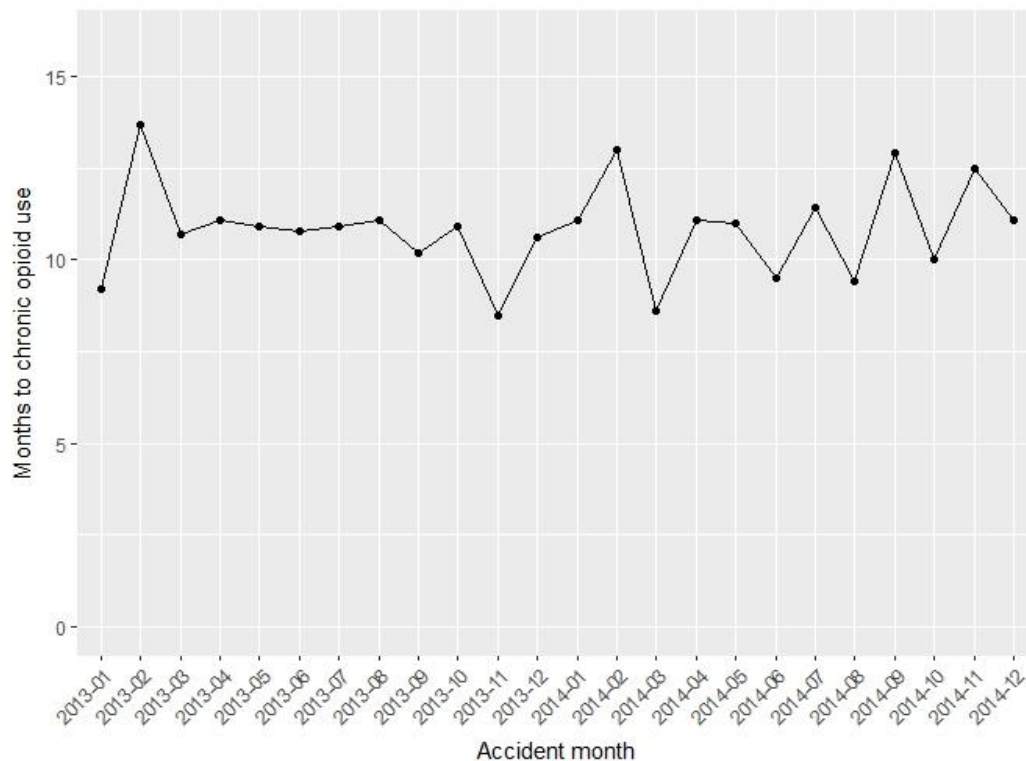
Of the 1,030 claims that reached the 50 MME threshold for an extended period, on average, opioid dosage was reduced by 28% at the end of the 24-month observation window.

There were 479 claims (47%) that weaned off of opioids completely by the end of the 24-month window, having zero MME in the last three months. For the 551 claims that did not wean off completely during the 24-month period, opioid dosage was reduced by an average of 52%.

Time to Chronic Opioid Use and Time to Wean Off Completely

The 1,030 claims reached the 50 MME threshold in a median time of 11 months from the date of injury (Figure 2). The median time to chronic opioid status did not change over the Study period.

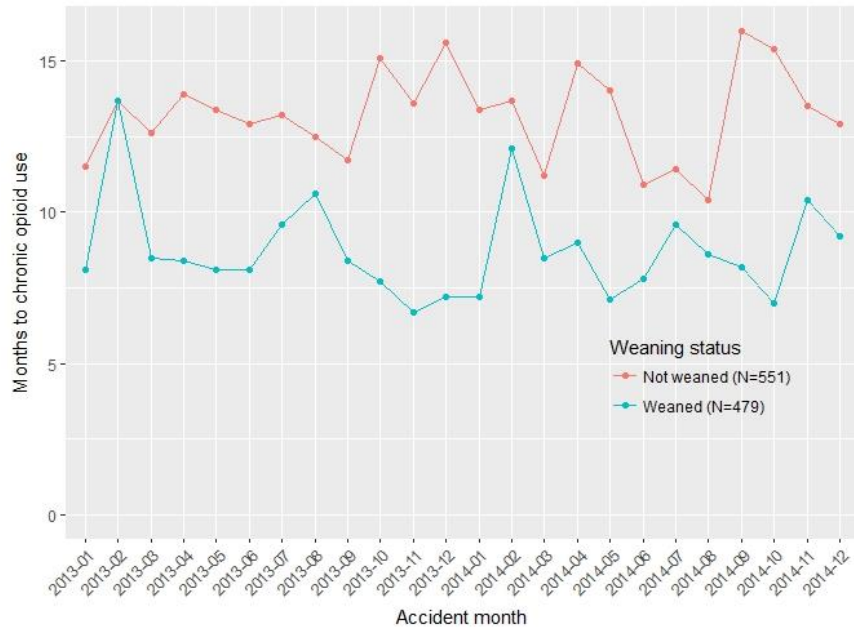
Figure 2. Time from Accident Date to Chronic Opioid Use (N=1,030)



As shown in Figure 3, claims that weaned off of opioids reached the 50 MME threshold faster (8-month median time) than the claims that did not wean off (13-month median time). The time difference between weaned claims and not weaned claims to achieve chronic opioid status is statistically significant ($p < 0.001$).¹⁰ The summary statistics on time to chronic opioid use are in Appendix Table A1.

¹⁰ Wilcoxon rank sum test was conducted to examine the difference in time from accident date to chronic opioid use.

Figure 3. Time from Accident Date to Chronic Opioid Status for Weaned and Not Weaned Claims (N=1,030)



Claims that weaned off completely took a median of 8 months to wean off after 50 MME status was achieved (Figure 4). The median time from accident date to completely wean off of opioids was 19 months (Figure 5). In both figures, no trend over time is observed.

Figure 4. Time from Chronic Opioid Status to Wean off of Opioids Completely (N=479)

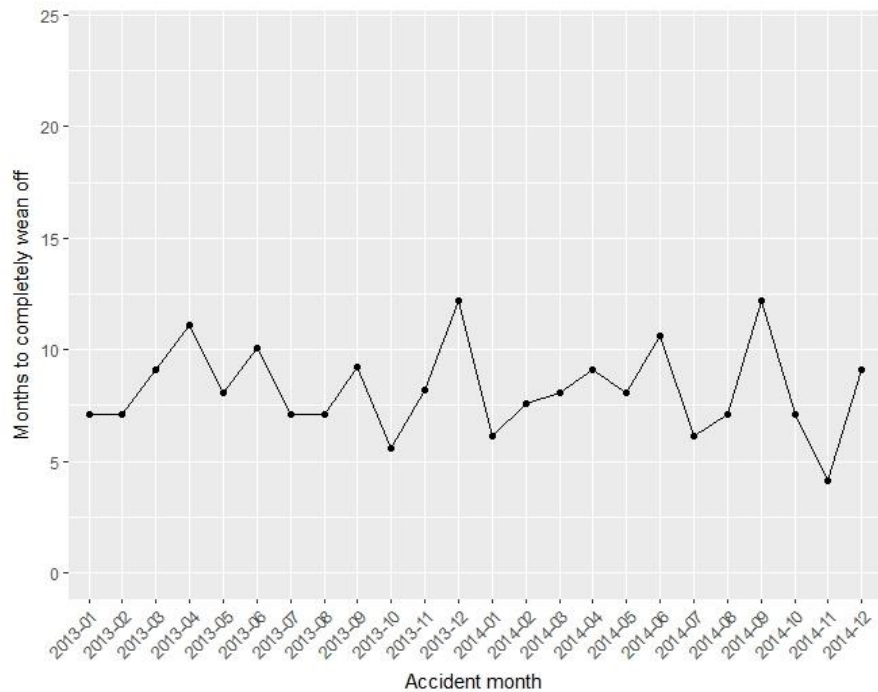
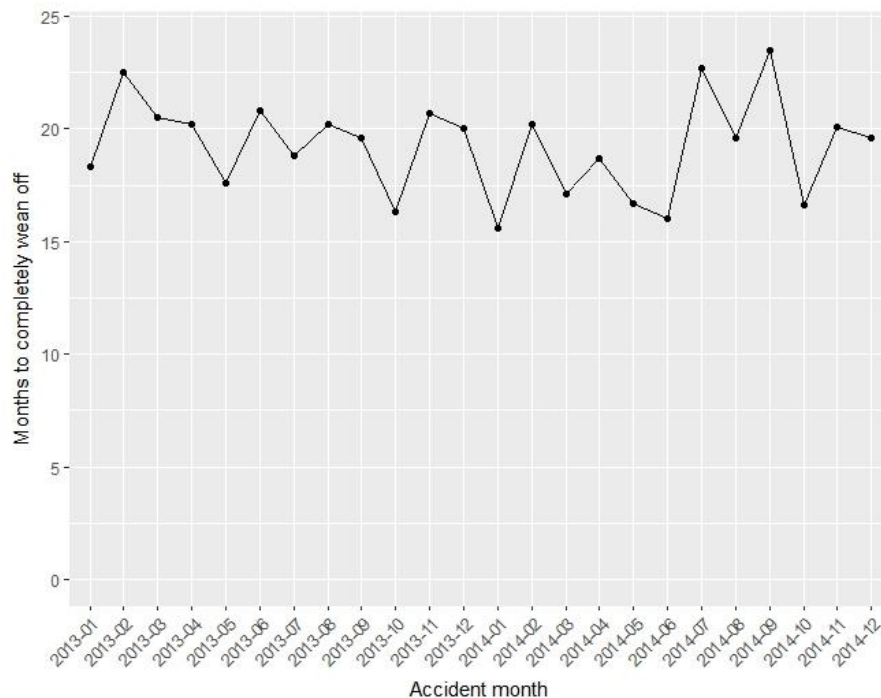


Figure 5. Time from Accident Date to Wean Off of Opioids Completely (N=479)



Time to First and Second Opioid Prescriptions

Compared to the claims that weaned off of opioids, claims that did not wean off had on average 23 more days between the accident date and the first opioid prescription; 35 more days between the accident date and the second opioid prescription, and 12 more days between the first and second opioid prescription (Table 1). The time differences for averages and medians between weaned and non-weaned claims are all statistically significant.

Table 1. Time to First and Second Opioid Prescriptions – for Chronic Opioid Claims

	Claim Count	Average Days	25th Percentile	50th Percentile (Median)	75th Percentile	Wilcoxon Test P-Value ¹¹
Days to 1st Opioid Prescription						
Not Weaned	551	76.5	6	26	94.5	<0.001
Weaned	479	52.6	3.5	18	67	
Days to 2nd Opioid Prescription						
Not Weaned	551	110	22	58	150	<0.001
Weaned	479	74.6	14	39	103.5	
Days from 1st to 2nd Opioid Prescription						
Not Weaned	551	34	6	15	34	<0.001
Weaned	479	22	4	12	25	

¹¹ Statistical tests including Wilcoxon sum rank test and permutation test were conducted to examine the difference between the weaned and the not weaned claims. All comparisons (i.e., time to 1st opioid prescription by weaned status, time to 2nd, and time from 1st to 2nd) were significantly different.

Prescription Drugs – All MDC Claims vs. Chronic Opioid Claims

Table 2 shows the prescription drug mix for all MDC claims within 24 months from the date of injury. Table 3 shows the prescription drug mix for the chronic opioid claims. The 49% share of opioid payments for the chronic opioid claims is three times greater than the 15% share of opioid payments for all claims. In addition, anticonvulsants are 5% of paid drug costs for chronic opioid claims as compared to 3% of all MDC claims.

Table 2. Top 5 Therapeutic Drug Classes by Transaction and Total Amount Paid – All MDC Claims

All MDC Claims (AY 2013 & AY 2014)				
Rank	Therapeutic Class Name	Trans	Total Paid Amount	% Paid Amount
1	Nonsteroidal Anti-inflammatory Agents (NSAIDs)	645,389	\$36,744,163	23.2%
2	Opioid Combination & Agonists	475,051	\$24,472,961	15.4%
3	Central Muscle Relaxants	235,308	\$11,688,535	7.4%
4	Proton Pump Inhibitors	109,536	\$16,176,307	10.2%
5	Analgesics Other	74,084	\$260,952	0.2%
Top 5 Therapeutic Classes		1,539,368	\$89,342,918	56.3%
Total of All Drug Transactions		2,153,158	\$158,585,592	

Table 3. Top 5 Therapeutic Drug Classes by Transaction and Total Amount Paid – Chronic Opioid Claims

Chronic Opioid Claims (AY2013 and AY2014)				
Rank	Therapeutic Class Name	Trans	Total Paid Amount	% Paid Amount
1	Opioid Combination & Agonists	26,492	\$3,349,573	49.3%
2	Nonsteroidal Anti-inflammatory Agents (NSAIDs)	6,697	\$663,911	9.8%
3	Central Muscle Relaxants	6,062	\$376,440	5.5%
4	Anticonvulsants - Misc.	3,532	\$346,350	5.1%
5	Proton Pump Inhibitors	2,235	\$392,130	5.8%
Top 5 Therapeutic Classes		45,018	\$5,128,404	75.4%
Total of All Drug Transactions		58,169	\$6,800,099	

Prescription Drugs – Not Weaned Claims vs. Weaned Claims

Total medical drug payments per claim¹² for claims that weaned off were 44% lower than for claims that did not wean off, and the payment per claim for opioid prescriptions were 51% lower comparing weaned to not weaned claims (Tables 4 and 5). The differences were due to a lower cost per transaction and fewer opioid transactions among the weaned claims.

Table 4. Top 5 Therapeutic Drug Classes by Transaction and Total Amount Paid – Not Weaned Claims

Not Weaned Claims (AY 2013 & AY 2014)					
Rank	Therapeutic Class Name	Trans	Total Paid Amount	% Total Paid Amount	Paid Amount per Claim (N=551)
1	Opioid combination & agonists	16,485	\$2,345,444	51.3%	\$4,257
2	Nonsteroidal Anti-inflammatory Agents (NSAIDs)	4,144	\$421,041	9.2%	\$764
3	Central Muscle Relaxants	3,767	\$231,484	5.1%	\$420
4	Anticonvulsants – Misc.	2,344	\$239,064	5.2%	\$434
5	Proton Pump Inhibitors	1,416	\$235,738	5.2%	\$428
Top 5 Therapeutic Classes		28,156	\$3,472,772	75.9%	\$6,303
Total of All Drug Transactions		36,885	\$4,574,882		\$8,303

Table 5. Top 5 Therapeutic Drug Classes by Transaction and Total Amount Paid – Weaned Claims

Weaned Claims (AY 2013 & AY 2014)						
Rank	Therapeutic Class Name	Trans	Total Paid Amount	% Total Paid Amount	Paid Amount per Claim (N=479)	% Diff in Paid Amount per Claim Weaned vs. Not Weaned ¹³
1	Opioid Combination & Agonists	10,007	\$1,004,128	45.1%	\$2,096	-50.8%
2	Nonsteroidal Anti-inflammatory Agents (NSAIDs)	2,553	\$242,870	10.9%	\$507	-33.6%
3	Central Muscle Relaxants	2,295	\$144,956	6.5%	\$303	-28.0%
4	Anticonvulsants - Misc.	1,188	\$107,286	4.8%	\$224	-48.4%
5	Proton Pump Inhibitors	819	\$156,392	7.0%	\$326	-23.7%
Top 5 Therapeutic Classes		16,862	\$1,655,632	74.4%	\$3,456	-45.2%
Total of All Drug Transactions		21,284	\$2,225,218		\$4,646	-44.0%

¹² These medical drug payments were from the date of accident to the end of the Study period, which spans 24 months including the accident month.

¹³ Percent difference in paid amount per claim weaned vs. not weaned was calculated as paid amount per weaned claim divided by the paid amount per not weaned claim less 1, with the result multiplied by 100%.

Prescription Drugs – Weaned Claims

For weaned claims, the total paid amount per claim for opioid prescriptions decreased by 48% in the first six months after weaning began compared to the six months prior to weaning (Tables 6 and 7). This is a greater percentage decline compared to the overall 42% decrease in all drug costs per weaned claim for the same period. A smaller decline in the percentage of payment per claim for non-opioid pain medications such as NSAIDs (26%) was observed in the first six months after weaning began, and those drugs are a higher share of the post-weaning drug costs (10.6% as compared to 8.2%). This is consistent with the California MTUS guideline supporting the use of non-narcotic drugs for chronic pain and may be suggestive of a substitution effect.

Table 6. Top 5 Therapeutic Drug Classes by Transaction and Total Amount Paid – 6 Months Before Weaning

Before Weaning: Weaned Claims				
Therapeutic Class Name	Trans	Total Paid Amount ¹⁴	% Total Paid Amount	Paid Amount per Claim (N=479)
Opioid combination & agonists	4,540	\$506,103	51.4%	\$1,057
Nonsteroidal Anti-inflammatory Agents (NSAIDs)	870	\$81,179	8.2%	\$169
Central Muscle Relaxants	913	\$58,949	6.0%	\$123
Anticonvulsants - Misc.	445	\$42,997	4.4%	\$90
Proton Pump Inhibitors	313	\$61,466	6.2%	\$128
Top 5 Therapeutic Classes	7,081	\$750,694	76.3%	\$1,567
Total of All Drug Transactions	8,857	\$984,466		\$2,055

Table 7. Top 5 Therapeutic Drug Classes by Transaction and Total Amount Paid – 6 Months after Weaning Began

After Weaning Began: Weaned Claims					
Therapeutic Class Name	Trans	Total Paid Amount ¹⁵	% Total Paid Amount	Paid Amount per Claim (N=479)	% Diff in Paid Amount per Claim After vs. Prior Weaning Began ¹⁶
Opioid combination & agonists	2,472	\$264,896	46.7%	\$553	-47.7%
Nonsteroidal Anti-inflammatory Agents (NSAIDs)	543	\$60,051	10.6%	\$125	-26.0%
Central Muscle Relaxants	527	\$31,633	5.6%	\$66	-46.3%
Anticonvulsants - Misc.	296	\$30,393	5.4%	\$63	-29.3%
Proton Pump Inhibitors	236	\$48,480	8.5%	\$101	-21.1%
Top 5 Therapeutic Classes	4,074	\$435,453	76.8%	\$909	-42.0%
Total of All Drug Transactions	5,117	\$567,114		\$1,184	-42.4%

¹⁴ The total paid amount was during the six months prior to weaning.

¹⁵ The total paid amount was during the first six months after weaning began.

¹⁶ Percent difference in paid amount per claim after vs. prior to weaning began was calculated as paid amount per weaned claim after weaning divided by the paid amount per weaned claim prior to weaning began less 1, with the result multiplied by 100%.

Type of Opioid Drugs Prescribed

Table 8 shows the top 5 opioid drugs prescribed to the 1,030 claims with chronic opioid use. These five drugs together accounted for 87.9% of all drug transactions with any opioid prescription, and nearly 72% of the total amount paid for opioids.

Table 8. Top 5 Opioid Drug Prescribed for the 1,030 Chronic Opioid Claims

GPI-8	Description	Trans	% Trans	Total Paid Amount	% Paid Amount
65991702	Hydrocodone Combination – Two Ingredients	12,822	48.4%	\$660,543	19.7%
65990002	Opioid Combination- Two Ingredients	4,038	15.2%	\$626,784	18.7%
65100095	Tramadol	2,878	10.9%	\$430,132	12.8%
65100075	Oxycodone	2,725	10.3%	\$597,191	17.8%
65100055	Morphine	819	3.1%	\$81,210	2.4%
Top 5 Opioid Drugs		23,282	87.9%	\$2,395,858	71.5%
Total of All Opioid Drug Transactions		26,492		\$3,349,573	

Surgery for Weaned and Not Weaned Claims

For purposes of this Study, the WCIRB identified a major surgery as a surgical procedure code with 90 global surgery days identified by the Physician Fee Schedule by the Centers for Medicare & Medicaid Services.¹⁷ Nearly 56% (or 578) of the chronic opioid claims had one or more major surgeries during the Study period (Table 9). About half of the weaned claims had a major surgery, while 63% of not weaned claims had surgery. The difference is statistically significant.

Table 9. Major Surgery for Weaned and Not Weaned (N=1,030)

Major Surgery	Weaned	Not Weaned	Chi-Square Test P-Value
Yes	48.2%	63.0%	<0.001
No	51.8%	37.0%	

¹⁷ Global Surgery indicator derived from global surgery data field within National Physician Fee Schedule Relative Value File Calendar Year 2017. , <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/PFS-Relative-Value-Files.html>

Approximately 25% of the weaned claims had their first major surgery within 30 days of the accident date, compared to about 15% of the not weaned claims (Table 10). The difference is statistically significant.

Table 10. Time from Accident Date to 1st Major Surgery for Weaned and Not Weaned – Within 30 Days of the Accident Date (N=578)

Time from Accident Date to 1 st Major Surgery	Weaned	Not Weaned	Chi-Square Test P-Value
<=30 days	24.7%	15.3%	<0.05
>30 days	75.3%	84.7%	

Approximately 76 percent of the Study group claims became chronic opioid claims after their first major surgery. The WCIRB observed no statistically significant difference in time from 1st major surgery to chronic opioid use between not weaned claims and weaned claims (Table 11).

Table 11. Time from 1st Major Surgery to Chronic Opioid Use (N=578)

	Claim Count	Average Days	25th Percentile	50th Percentile	75th Percentile	Wilcoxon Test P-Value
Weaned	231	95.4	16.5	84	174.5	0.11
Not weaned	347	118.6	-6.0	94	270.5	
Overall	578	109.3	6.0	88.5	241.5	

Diagnostic Mix

Chronic opioid claims can have multiple medical diagnoses, each associated with the medical service rendered.¹⁸ Over 80 percent of the claims had International Classification of Disease (ICD)¹⁹ codes related to Sprains and Strains of Joints and Adjacent Muscles (ICDs 840-848) in their primary diagnosis code. The second most common diagnosis code was for Certain Traumatic Complications and Unspecified Injuries followed by other back related injuries (Table 12). Claims that did not wean off had a higher percentage of the five leading diagnoses than the weaned claims.

¹⁸ A claim can have transactions with multiple International Classification of Disease (ICD) codes (for example, ICD 840 and ICD 720) that are in different ICD groups (840 is Sprains and Strains of Joints and Adjacent Muscles, and 720 is Dorsopathies).

¹⁹ The WCIRB converted reported 10th version of ICD (ICD-10) transactions to 9th version of ICD (ICD-9).

Table 12. Top 5 ICD Groups for Weaned and Not Weaned Claims

Code Range ²⁰			Weaned		Not Weaned	
Min	Max	ICD Classification	Claim Count	Share of All Chronic Opioid Claims	Claim Count	Share of All Chronic Opioid Claims
840	848	Sprains and Strains of Joints and Adjacent Muscles	393	82.6%	474	86.0%
958	959	Certain Traumatic Complications and Unspecified Injuries	345	72.5%	432	78.4%
720	724	Dorsopathies	332	69.7%	431	78.2%
710	719	Arthropathies and Related Disorders	274	57.6%	345	62.6%
725	729	Rheumatism, Excluding the Back	244	51.3%	318	57.7%

Nature of Injury

Over 50% of chronic opioid claims had Strain or Sprain Nature of Injury (NOI) codes compared to 41% of all MDC claims (Table 13). Chronic opioid claims were more likely to have Fracture and Multiple Physical Injuries than all MDC claims, but less likely to have Contusions. Of the chronic opioid claims, those that weaned off were more likely to have Fractures, and less likely to have Unspecified Injuries than those that did not wean off. The difference in the distribution of the top 8 nature of injury codes between weaned and non-weaned claims is statistically significant ($p < 0.01$).²¹

The Cause of Injury (COI) for both the MDC claims and chronic opioid claims were also examined (Appendix Table A3). There are no statistically significant differences in the distribution of the COI between weaned and not weaned claims.

Table 13. Nature of Injury for Weaned and Not Weaned Claims

NOI	Nature of Injury Description	% All MDC Claims	Chronic Opioid Claims	
			% Weaned	% Not Weaned
52	Strain or Tear	30.3%	44.1%	41.8%
49	Sprain or Tear	10.5%	14.2%	11.0%
28	Fracture	3.3%	12.1%	6.8%
59	All Other Specific Injuries, NOC	10.5%	7.1%	12.3%
90	Multiple Physical Injuries Only	3.2%	6.5%	4.6%
10	Contusion	10.3%	4.4%	5.5%
37	Inflammation	2.9%	2.7%	3.7%
16	Dislocation	0.6%	1.5%	4.8%

²⁰ ICD-9 codes were used to form the ICD groups. ICD-10 codes transactions were mapped to ICD-9 codes. The full distribution of ICD groups of chronic opioid use claims is in the Appendix Table A2.

²¹ Chi-square test was conducted to compare the distribution of NOI between chronic opioid claims and all MDC claims. The sample size after the top 8 NOI codes was too small to include in the test.

Physician Services for Chronic Opioid Claims

The MDC Primary Procedures Codes (PPC) associated with physician services were studied to determine the non-drug treatment patterns and costs of the chronic opioid claims, and if any alternative non-drug “treatment options” including Acupuncture, Chiropractic, Physical Medicine and Psych/Cognitive Therapy had greater utilization for weaned claims than for claims that did not wean off.

Of all physician service categories, the physician service payments per claim for the chronic opioid claims were more than nine times the average of all MDC claims (both claim groups were observed over the 24-month period after the accident dates) (Table 14). Payments per claim for Anesthesia, Surgery and Psych/Cognitive Therapy for the chronic opioid claims were over 10 times higher than corresponding payments for all MDC claims. For all physician services, the chronic opioid claims had a significantly higher volume of service transactions and higher costs per claim than the typical MDC claim.

Table 14. Physician Service Payments – Chronic Opioid Claims vs. All MDC Claims²²

Physician Service	Chronic Opioid Claims		All MDC Claims		% Difference Comparing Chronic Opioid Claims to All MDC Claims	
	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim
Acupuncture	\$82	2.1	\$27	0.7	+205%	+188%
Anesthesia	\$617	1.5	\$40	0.1	+1,452%	+1,160%
Chiropractic	\$45	1.4	\$16	0.5	+187%	+173%
Evaluation & Management	\$3,993	35.0	\$648	6.3	+516%	+458%
Physical Medicine	\$2,261	49.5	\$418	13.7	+440%	+261%
Psych/Cognitive	\$259	1.8	\$22	0.2	+1,058%	+673%
Other Medicine	\$594	4.0	\$65	0.7	+815%	+478%
Radiology	\$1,439	11.4	\$211	1.9	+583%	+497%
Special Services & Reports	\$5,147	21.4	\$183	4.0	+2,708%	+439%
Surgery	\$4,354	8.0	\$358	0.9	+1,116%	+759%
Physician Services Totals	\$18,792	136.2	\$1,988	29.1	+845%	+368%

In the 24-month observation window after the accident dates, the medical payments for all physician services per claim were 51.6% lower for the weaned claims than the claims that did not wean off, and these weaned claims also had 26.6% less service transactions per claim (Table 15a). For all categories except Chiropractic and Acupuncture, the volume of transactions and paid per claim were both significantly lower on the weaned claims. For Acupuncture, the transactions and paid amounts were relatively similar between weaned and not weaned claims. For Chiropractic services, the paid costs and transaction per claim were slightly higher for the weaned claims.

²² Physician services data for both chronic opioid claims and all MDC claims are within the 24-month observation window after the injury date.

Table 15a. Physician Service Payments for Weaned and Not Weaned Claims – Over the 24-Month Study Period

Physician Service	Weaned		Not Weaned		% Difference Comparing Weaned to Not Weaned	
	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim
Acupuncture	\$82	2.0	\$83	2.1	-1.4%	-6.3%
Anesthesia	\$428	1.1	\$782	1.9	-45.3%	-40.6%
Chiropractic	\$45	1.4	\$44	1.3	+1.1%	+6.4%
Evaluation & Management	\$3,231	29.2	\$4,655	40.1	-30.6%	-27.2%
Physical Medicine	\$1,986	43.8	\$2,501	54.5	-20.6%	-19.7%
Psych/Cognitive	\$173	1.6	\$335	2.0	-48.4%	-17.3%
Other Medicine	\$386	2.9	\$775	5.0	-50.1%	-41.7%
Radiology	\$1,194	10.0	\$1,652	12.7	-27.7%	-21.1%
Special Services & Reports	\$1,464	16.3	\$8,350	25.8	-82.5%	-36.5%
Surgery	\$2,983	5.7	\$5,545	10.0	-46.2%	-43.6%
Physician Services Totals	\$11,971	114.0	\$24,722	155.4	-51.6%	-26.6%

In the last 6 months of the Study period, the medical payments for all physician services per claim were 67.1% lower for the weaned claims, and the drug payments per claim were 82.0% lower (Table 15b). These claims also had 65.5% and 80.0% fewer physician service transactions and drug transactions, respectively, than the not weaned claims. All categories of physician services except for Acupuncture, Chiropractic and Physical Medicine had significantly fewer transactions and lower costs per claim. For Acupuncture, the transactions and paid amounts were one-third lower for the weaned compared to not weaned claims. For Chiropractic services, the paid costs and transaction per claim were higher for the weaned claims.

Table 15b. Physician Service and Drug Payments for Weaned and Not Weaned Claims – In the Last 6 Months of the Study Period

Physician Service	Weaned		Not Weaned		% Difference Comparing Weaned to Not Weaned	
	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim
Acupuncture	\$12	0.3	\$17	0.5	-30.5%	-38.0%
Anesthesia	\$23	0.1	\$123	0.3	-81.4%	-70.9%
Chiropractic	\$4	0.1	\$3	0.1	+14.9%	+11.1%
Evaluation & Management	\$318	2.6	\$889	7.4	-64.3%	-64.2%
Physical Medicine	\$333	3.7	\$524	10.1	-36.5 %	-63.1%
Psych/Cognitive	\$26	0.2	\$91	0.5	-72.0%	-64.9%
Other Medicine	\$36	0.3	\$116	0.8	-69.1%	-68.8%
Radiology	\$81	0.6	\$232	1.6	-64.9%	-63.0%
Special Services & Reports	\$74	1.8	\$373	6.1	-80.1%	-71.1%
Surgery	\$170	0.4	\$902	1.8	-81.2%	-77.2%
Physician Services Totals	\$1,076	10.1	\$3,271	29.3	-67.1%	-65.5%
All Drug Payments	\$418	3.2	\$2,322	15.9	-82.0%	-80.0%

The WCIRB also compared the treatment patterns and costs during the 6 months before and 6 months after weaning began for the weaned claims (Table 16). Of all physician services, the medical payments per claim and transactions per claim decreased by 57.1% and 48.5% in the 6 months after the weaning began. There were significant decreases in all categories although payments per claim for Acupuncture, Chiropractic, Physical Medicine and Psych/Cognitive Therapy decreased much less than for other physician services.

Table 16. Physician Service Payments for Weaned Claims – 6 Months before Weaning vs. 6 Months After Weaning Began

Physician Service	Before Weaning Began		After Weaning Began		% Change Comparing After to Before Weaning Began	
	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim	Paid per Claim	Transactions per Claim
Acupuncture	\$23	0.6	\$18	0.5	-22.4%	-13.4%
Anesthesia	\$189	0.5	\$52	0.2	-72.4%	-67.3%
Chiropractic	\$12	0.4	\$8	0.2	-31.9%	-38.3%
Evaluation & Management	\$1,151	10.7	\$636	5.2	-44.8%	-51.6%
Physical Medicine	\$641	15.3	\$488	9.3	-24.0%	-39.2%
Psych/Cognitive	\$62	0.6	\$47	0.5	-24.4%	-24.4%
Other Medicine	\$162	1.2	\$57	0.4	-64.6%	-63.3%
Radiology	\$424	3.9	\$164	1.3	-61.2%	-66.2%
Special Services & Reports	\$505	5.8	\$148	3.0	-70.6%	-48.3%
Surgery	\$1,499	2.7	\$383	0.8	-74.4%	-68.8%
Physician Services Totals	\$4,668	41.5	\$2,001	21.4	-57.1%	-48.5%

In summary, there were no significant differences in utilization of alternative non-drug “treatment options” including Acupuncture, Chiropractic, Physical Medicine, and Psych/Cognitive Therapy between claims that weaned off of opioids and claims that did not wean off. The claims that did not wean off had higher drug costs and higher treatment transaction volumes, suggesting claims that do not wean off continue to impact the workers’ compensation system with greater utilization of services and costs. Non-drug treatments before a claim started to wean and during the weaning period were also studied but no significant differences were observed. This may suggest the gradual reduction and replacement of opioid drugs was a primary treatment approach in the weaning process.

Industrial Sector Comparison

Table 17 shows that industry mix of chronic opioid claims is more dispersed than that of all workers’ compensation claims with a higher proportion of chronic opioid claims among the Utilities and Construction sectors and a lower percentage in Manufacturing.

Table 17. Industrial Sectors of the Chronic Opioid Claims

Industrial Sector(s)	% Chronic Opioid Claims (1)	% All MDC Claims (2)	Weaned Relativity ²³	Difference in % (1) - (2)
Utilities & Construction	15.9%	6.8%	101	+9.1%
Retail	13.9%	13.0%	113	+0.9%
Manufacturing	11.7%	16.1%	91	-4.4%
Health (Hospital)	9.4%	10.1%	88	-0.7%
Transportation & Warehousing	6.3%	5.5%	108	+0.8%
Administrative	5.8%	4.4%	107	+1.4%
Hospitality	5.8%	12.6%	107	-6.8%
Wholesale	5.5%	5.4%	117	+0.1%
Other	5.3%	3.8%	101	+1.5%
Agriculture & Mining	4.5%	5.6%	85	-1.1%
Clerical & Public Administration	4.3%	4.6%	77	-0.3%
Real Estate	3.5%	2.1%	85	+1.4%
Professional Services	2.4%	2.3%	73	+0.1%
Information	1.7%	2.0%	124	-0.3%
Education	1.2%	1.6%	77	-0.4%
Outside Sales	1.2%	1.3%	102	-0.1%
Finance and Insurance	1.0%	1.1%	115	-0.1%
Arts and Entertainment	0.6%	1.7%	184	-1.1%

²³ Weaned relativity is defined as the share of weaned claims in the chronic opioid claims in one sector as compared to the share of the chronic opioid claims in the sector, with the result multiplied 100.

Injury Type and Loss Amounts

Injury Type

The chronic opioid claims were matched to USR data to help understand their Permanent Disability (PD) ratings and reported loss amounts.²⁴ About 60% of the chronic opioid claims had permanent partial disability, while about 11% of all MDC-USR matched claims had permanent partial disability (Table 18). About 3% of the chronic opioid claims were medical only, while over 65% of MDC claims were medical only.

Table 18. Injury Types for All Chronic Opioid Claims vs. All MDC-USR Matched Claims

Injury Type	Share of All Chronic Opioid Claims (N=776)	Share of All MDC-USR Matched Claims ²⁵ (N=413,620)
Permanent Total	0.1%	0.0%
Major Permanent Partial²⁶	13.3%	0.8%
Minor Permanent Partial²⁷	45.0%	10.4%
Temporary Disability	38.4%	23.5%
Medical Only	3.2%	65.3%

The average and median PD ratings for major permanent partial injuries were 36.6 and 31.0 respectively for weaned claims, and 39.1 and 36.0 respectively for not weaned claims (Tables 19a and 19b). The average and median PD ratings for minor permanent partial injuries were 11.9 and 11.0 respectively for weaned claims, and 11.4 and 10.5 respectively for not weaned claims. There is no statistically significant difference in the PD ratings between weaned and not weaned claims.

The average reported incurred indemnity and medical, as well as the average reported paid indemnity and medical were determined for each injury type for weaned and not weaned claims (Tables 19a and 19b). In general, the medical costs on the non-weaned claims by injury type were higher than the weaned claims.

Table 19a. Incurred and Paid Indemnity and Medical – Weaned Claims (N=338)

Weaned Claims							
Injury Type	Claim Count	Incurred Indemnity per Claim	Incurred Medical per Claim	Paid Indemnity per Claim	Paid Medical per Claim	Avg. PD	Median PD
Major Permanent Partial	41	\$104,473	\$183,005	\$34,787	\$70,781	36.6	31.0
Minor Permanent Partial	151	\$34,851	\$48,091	\$17,482	\$21,585	11.9	11.0
Temporary Disability	132	\$29,955	\$52,218	\$17,755	\$25,806		
Medical Only	14	\$0	\$5,837	\$0	\$3,840		
Totals	338	\$39,940	\$64,318	\$18,964	\$28,466		

Table 19b. Incurred and Paid Indemnity and Medical – Not Weaned Claims (N=438)

²⁴ About 70% of the chronic opioid claims were matched to USR data because of different reporting time frames (Table 18).

²⁵ These claims were those with accidents in years 2013 and 2014.

²⁶ Major permanent partial disability claims are those with an estimated permanent disability rating of 25% to 99%.

²⁷ Minor permanent partial disability claims are those with an estimated permanent disability rating of 1% to 24%.

Not Weaned Claims							
Injury Type	Claim Count	Incurred Indemnity per Claim	Incurred Medical per Claim	Paid Indemnity per Claim	Paid Medical per Claim	Avg. PD	Median PD
Permanent Total	1	\$1,335,801	\$2,431,447	\$36,726	\$861,254		
Major Permanent Partial	62	\$100,908	\$262,680	\$30,758	\$115,460	39.1	36.0
Minor Permanent Partial	198	\$40,272	\$56,842	\$19,321	\$25,813	11.4	10.5
Temporary Disability	166	\$29,992	\$55,214	\$17,341	\$35,154		
Medical Only	11	\$0	\$6,542	\$0	\$3,539		
Totals	438	\$46,905	\$89,520	\$19,744	\$43,391		

Conclusion

Nearly half of the chronic opioid claims in this Study weaned off of opioids completely within 24 months after the injury. It took them shorter time to obtain the first opioid prescription and shorter time to achieve chronic opioid status than claims that did not wean off. However, our Study suggests that weaning off of high chronic opioid use is a long-term process, and the time period of our Study may be a limitation to observe a greater number of claims that weaned.

The weaned claims were found to have lower opioid drug payments and prescriptions, shorter time to 1st major surgery, and more specific injuries than not weaned claims. There was no clear association between industrial sectors or PD ratings and wean status, nor were there clear patterns of non-drug treatments for claims that weaned off of opioids. However, the use of non-opioid pain medications such as NSAIDs decreased significantly less than the use of opioids and other drugs for the weaned claims. This suggests that there may not be a defined weaning treatment plan, but rather a gradual decrease in opioid prescribing combined with a mix of alternative non-drug treatments and non-narcotic drugs. In addition, claims that did not wean off will continue to impact the workers' compensation system with significantly higher costs and greater utilization of services.

In general, transactions and medical costs associated with chronic opioid use have been decreasing, and more so for claims that weaned off, suggesting a downward trajectory of injured workers dependent on opioids. While the availability of data was limited, the WCIRB plans to continue to track and observe chronic opioid claims in the future.

Conditions and Limitations

The WCIRB completed this Study of claims with chronic opioid use using data from reported medical transactions for injuries occurring during 2013 and 2014 and the related reported unit statistical payroll and claim costs. Our data reflects approximately 90% of the insured system. In reviewing this information, the following should be noted:

1. This Study reflects a reasonable approximation of reported claims with chronic opioid usage within California during the Study period, but not a precise segregation of those components on a risk-by-risk basis. Nor does the Study suggest whether chronic opioid differences identified in the Study have existed at similar levels in the past, or will persist in the future. This Study is observational without making any causal inferences.
2. This report reflects a compilation of individual insurer submissions of data to the WCIRB.²⁸ While individual insurer data submissions are regularly checked for consistency and comparability with other data submitted by the insurer as well as with data submitted by other insurers, the source information underlying each insurer's data submission is not verified by the WCIRB.
3. The claim information used in this Study reflects claims information limited to services rendered within 24 months after the accident date. Development patterns may differ across California regions which is not explored in this analysis and longer maturity of claims may provide further information on how weaned and not weaned claims behave over time.
4. The claim information used in this Study reflects only that of insured employers. No self-insured claim experience is included.

²⁸ The data represents 51 insurers with California workers' compensation policies that reflect over \$11B Paid Medical and reflects a reasonable distribution of claims with 50 daily MME opioid claimants based on percentage Paid Medical.

Appendix

Table A1. Time to Chronic Opioid Use and Time to Wean Completely

	Claim Count	Average	25th Percentile	50th Percentile	75th Percentile	Wilcoxon Test P-Value	
Time from Accident Date to Chronic Opioid Use (months)							
Weaned	479	9.1	5.2	8.4	12.2	<0.001	
Not Weaned	551	13.1	8.1	13.3	18.1		
Overall	1030	11.3	6.5	10.8	15.8		
Time from Chronic Opioid Use to Wean Off Completely (months)							
Weaned	479	9.1	5.1	8.1	13.1	<0.001	
Time from Accident Date to Wean Off Completely (months)							
Weaned	479	18.3	14.4	19.4	22.7		

Table A2. ICD Groups for Weaned and Not Weaned Claims

ICD Code Range			Weaned		Not Weaned	
Min	Max	Classification	Claim Count	% Chronic Opioid Claims	Claim Count	% Chronic Opioid Claims
1	139	Infectious and Parasitic Diseases	14	2.9%	25	4.5%
140	239	Neoplasms	7	1.5%	10	1.8%
240	279	Endocrine, Nutritional, and Metabolic Diseases	21	4.4%	39	7.1%
280	289	Diseases of the Blood and Blood-Forming Organs	14	2.9%	16	2.9%
290	319	Mental Disorders	86	18.1%	124	22.5%
320	389	Diseases of the Nervous System and Sense Organs	188	39.5%	269	48.8%
390	459	Diseases of the Circulatory System	30	6.3%	87	15.8%
460	519	Diseases of the Respiratory System	24	5.0%	42	7.6%
520	579	Diseases of the Digestive System	16	3.4%	40	7.3%
580	629	Diseases of the Genitourinary System	13	2.7%	36	6.5%
630	676	Complications of Pregnancy, Childbirth, and the Puerperium	0	0.0%	1	0.2%
680	709	Diseases of the Skin and Subcutaneous tissue	23	4.8%	38	6.9%
Diseases of the Musculoskeletal System and Connective Tissue						
710	719	Arthropathies and Related Disorders	274	57.6%	345	62.6%
720	724	Dorsopathies	332	69.7%	431	78.2%
	720	Ankylosing Spondylitis and Other Inflammatory Spondylopathies	15	3.2%	16	2.9%
	721	Spondylosis and Allied Disorders	169	35.5%	103	18.7%
	722	Intervertebral Disc Disorders	339	71.2%	231	41.9%
	723	Other Disorders of Cervical Region	173	36.3%	120	21.8%
	724	Other and Unspecified Disorders of Back	368	77.3%	273	49.5%

725	729	Rheumatism, Excluding the Back	244	51.3%	318	57.7%
730	739	Osteopathies, Chondropathies, and Acquired Musculoskeletal Deformities	69	14.5%	124	22.5%
740	759	Congenital Anomalies	17	3.6%	24	4.4%
760	779	Certain Conditions Originating in the Perinatal Period	10	2.1%	5	0.9%
780	799	Symptoms, Signs, and Ill-Defined Conditions	186	39.1%	264	47.9%
Injury and Poisoning						
800	829	Fractures	103	21.6%	110	20.0%
830	839	Dislocation	123	25.8%	215	39.0%
840	848	Sprains and Strains of Joints and Adjacent Muscles	393	82.6%	474	86.0%
840		Sprains and Strains of Shoulder and Upper Arm	114	23.9%	99	18.0%
841		Sprains and Strains of Elbow and Forearm	12	2.5%	5	0.9%
842		Sprains and Strains of Wrist and Hand	30	6.3%	29	5.3%
843		Sprains and Strains of Hip and Thigh	23	4.8%	17	3.1%
844		Sprains and Strains of Knee and Leg	76	16.0%	56	10.2%
845		Sprains and Strains of Ankle and Foot	25	5.3%	26	4.7%
846		Sprains and Strains of Sacroiliac Region	93	19.5%	63	11.4%
847		Sprains and Strains of Other and Unspecified Parts of Back	292	61.3%	245	44.5%
848		Other and Ill-defined Sprains and Strains	168	35.3%	73	13.2%
850	854	Intracranial Injury, Excluding those with Skull Fracture	12	2.5%	25	4.5%
860	869	Internal Injury of Chest, Abdomen, and Pelvis	8	1.7%	9	1.6%
870	879	Open Wound of Head, Neck, and Trunk	8	1.7%	14	2.5%
880	887	Open Wound of Upper Limb	14	2.9%	17	3.1%
890	897	Open Wound of Lower Limb	11	2.3%	16	2.9%
900	904	Injury to Blood Vessels	67	14.1%	158	28.7%
905	909	Late Effects of Injuries, Poisonings, Toxic Effects, and Other External Causes	4	0.8%	19	3.4%
910	919	Superficial Injury	9	1.9%	14	2.5%
920	924	Contusion with Intact Skin Surface	120	25.2%	209	37.9%
925	929	Crushing Injury	17	3.6%	19	3.4%
930	939	Effects of Foreign Body Entering Through Orifice	2	0.4%	2	0.4%
940	949	Burns	6	1.3%	11	2.0%
950	957	Injury to Nerves and Spinal Cord	15	3.2%	26	4.7%
958	959	Certain Traumatic Complications and Unspecified Injuries	345	72.5%	432	78.4%

960	979	Poisoning by Drugs, Medicinal and Biological Substances	20	4.2%	22	4.0%
980	989	Toxic Effects of Substances Chiefly Nonmedical as to Source	2	0.4%	1	0.2%
990	995	Other and Unspecified Effects of External Causes	4	0.8%	14	2.5%
996	999	Complications of Surgical and Medical Care, Not Elsewhere Classified	57	12.0%	90	16.3%
Total Unique Claims			476		551	

Table A3. Cause of Injury (COI) for Weaned and Not Weaned Claims

COI	COI Description	% All MDC Claims	Chronic Opioid Claims	
			% Weaned	% Not Weaned
56	Strain by – Lifting	11.7%	13.3%	18.9%
60	Strain or Injury By, NOC	7.1%	11.5%	7.1%
29	Fall – On Same Level	4.7%	8.3%	7.5%
99	Other – Miscellaneous, NOC	9.5%	6.8%	7.3%
31	Fall, Slip or Trip Injury, NOC	3.9%	6.2%	4.3%
25	Fall – From Different Level (Elevation)	1.7%	5.6%	4.1%
57	Strain by – Pushing or Pulling	4.4%	5.6%	5.3%
26	Fall – From Ladder or Scaffolding	1.1%	3.8%	2.5%
97	Strain by – Repetitive Motion	4.3%	3.8%	3.2%
75	Struck or Injured By – Falling or Flying Object	3.7%	3.3%	4.1%
27	Fall – From Liquid or Grease Spills	1.2%	2.4%	1.6%
50	Motor Vehicle, NOC	0.7%	2.4%	1.1%
53	Strain by – Twisting	2.2%	2.4%	4.1%
58	Strain by – Reaching	1.2%	2.4%	0.7%
45	Motor Vehicle – Collision or Sideswipe with Another Vehicle	1.1%	2.1%	2.1%
77	Struck or Injured By – Motor Vehicle	0.4%	2.1%	0.5%
13	Caught In, Under or Between, NOC	1.2%	1.8%	1.1%
79	Struck or Injured By – Object Being Lifted or Handled	2.1%	1.5%	1.4%
98	Cumulative, NOC	3.0%	1.5%	1.8%
28	Fall – Into Openings	0.3%	1.2%	0.7%
55	Strain by – Holding or Carrying	1.6%	1.2%	1.4%
30	Slip or Trip But Did Not Fall	1.0%	0.9%	1.1%
54	Strain by – Jumping or Leaping	0.4%	0.9%	0.5%
12	Caught in – Object Handled	1.8%	0.6%	0.5%
32	Fall – On Ice or Snow	0.2%	0.6%	0.5%
33	Fall – On Stairs	1.0%	0.6%	2.3%
48	Motor Vehicle – Vehicle Upset	0.1%	0.6%	1.4%
59	Strain by – Using Tool or Machinery	0.7%	0.6%	0.7%
66	Struck or Stepped On – Object Being Lifted or Handled	0.6%	0.6%	0.2%
68	Struck or Stepped On – Stationary Object	2.3%	0.6%	1.6%
78	Struck or Injured By – Moving Parts of Machine	0.3%	0.6%	0.5%
1	Burn or Scald – Chemicals	0.5%	0.3%	0.0%
10	Caught in – Machine or Machinery	0.1%	0.3%	1.4%
15	Cut or Puncture by – Broken Glass	0.7%	0.3%	0.0%
17	Cut or Puncture by – Object Being Lifted or Handled	0.7%	0.3%	0.9%
18	Cut or Puncture by – Powered Hand Tool, Appliance	1.8%	0.3%	0.5%
19	Cut, Puncture, Scrape or Injured By, NOC	0.8%	0.3%	0.5%
3	Burn or Scald – Temperature Extremes	3.3%	0.3%	0.0%
46	Motor Vehicle – Collision with a Fixed Object	0.1%	0.3%	0.7%
61	Strain by – Welding or Throwing	0.1%	0.3%	0.0%
69	Struck or Stepped On – Stepping on Sharp Object	0.5%	0.3%	0.0%
70	Striking Against or Stepping On, NOC	1.1%	0.3%	0.5%
81	Struck or Injured By, NOC	2.1%	0.3%	2.3%
85	Struck or Injured By – Animal or Insect	1.7%	0.3%	0.5%
87	Foreign Matter (Body) in Eye(s)	1.8%	0.3%	0.0%

94	Rubbed or Abraded By – Repetitive Motion	0.6%	0.3%	0.5%
11	Burn or Scald – Dusts, Gases, Fumes or Vapors	0.2%	0.0%	0.2%
6	Burn or Scald – Cold Objects or Substances	0.1%	0.0%	0.2%
74	Struck or Injured By – Fellow Workers, Patient or Other Person	1.0%	0.0%	0.9%
76	Struck or Injured By – Hand Tool or Machine in Use	0.6%	0.0%	0.2%
80	Struck or Injured By – Object Handled by Others	0.4%	0.0%	0.5%
84	Burn or Scald – Electrical Current	0.1%	0.0%	0.5%

Notice

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