



Research Update

California Workers' Compensation Prescription Drug Trends

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Executive Summary

This report is the latest in a series of CWC studies to monitor California workers' compensation prescription drug trends in the wake of reforms dating back to the early 1990s. The study focuses on three key areas: changes in the types of drugs dispensed to injured workers and shifts in the total drug spend among the top 20 therapeutic drug groups over the past decade; changes in opioid utilization based on 4 different metrics at 24 months post injury, and regional variations in the use and strength of opioids dispensed to injured workers from accident year (AY) 2007 through AY 2018; and changes in the mix of prescriptions and payments by formulary category: Exempt, Non-Exempt, Not Listed; Special Fill, and Perioperative Drugs. Key findings include:

- With opioids declining from 31.5 percent of all prescriptions in 2011 to 11.6 percent in the first half of 2020, Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) have now become the most prescribed drug category and now account for three times as many prescriptions as opioids, which rank second.
- Anticonvulsants, dermatologicals, and antidepressants round out the top 5 most prescribed drug groups while use of musculoskeletal drugs is down sharply since the formulary took effect and they were categorized as Non-Exempt drugs, which in most cases are not exempt from Utilization Review (UR).
- NSAIDs, dermatologicals and anticonvulsants now rank ahead of opioids in their share of the total drug spend. NSAIDs registered the biggest increase in their share of total drug payments after the formulary took effect, as their share showed a relative increase of 65.4 percent in less than two years.
- Much of the growth in NSAID payments was driven by two low-volume, high-priced NSAIDs -- fenoprofen calcium and ketoprofen, that are exempt from prospective UR and lack price controls.
- The percentage of claims that involved opioids within 24 months post-injury was fairly stable from AY 2007-2014, but then fell to a 9-year low in AY 2015 and continued to decline over the next three years.
- The decline in opioid prescriptions per user began earlier, as that metric remained within a narrow range from AY 2007-AY 2012, but then began to drop steadily over a 6-year span beginning in AY 2013.
- Two other measures of opioid use, Morphine Milligram Equivalents (MMEs) per prescription and MMEs per user, both peaked in 2008 and both have had a nearly unbroken string of declines ever since.
- Opioid utilization and strength are highest in rural regions, and lowest in urban and suburban areas, which may reflect differences in the types of work, types of injuries, as well as access to medical care.
- Since the formulary took effect, the mix of drugs has shifted. Exempt drugs, which are not subject to prospective UR, increased to 45 percent of the prescriptions in the first half of 2020, up from 33 percent in 2016; Non-Exempt drugs, which require UR before they can be dispensed, fell from 52 percent to 40 percent; and Not Listed drugs, after increasing slightly in 2018, fell back to 15 percent of the prescriptions in 2019 and the first half of 2020, matching their pre-formulary percentage.
- The mix of prescription drug payments also changed between 2016 and the first half of 2020, as Exempt drugs increased from 23 percent to 25 percent of the payments; Non-Exempt drugs fell from 46 percent to 29.4 percent; and Not Listed drugs increased from 31 to 43 percent.

Background

Nearly 30 years ago, California public policymakers began enacting a series of workers' compensation reforms intended to address concerns about excessive and inappropriate treatment of injured workers and sharp increases in workers' compensation medical costs.¹ A major focus of that effort centered on prescription drugs, which had become a key cost driver due to the growing use of high-cost physician-dispensed repackaged drugs, compounded medications, and increased reliance on opioids to treat chronic pain. Among the reforms that sought to address workers' compensation prescription drug utilization and payment trends were:

- a mandate that workers' compensation medical care conform to the evidence-based treatment standards in the Medical Treatment Utilization Schedule (MTUS) or nationally recognized, evidence-based standards;
- elimination of the primary treating physician's presumption of correctness which had made it difficult to successfully challenge a primary treater's opinions and treatment plan, including recommended drugs;²
- development of chronic pain and opioid treatment guidelines;³
- the requirement that generics be substituted for brand drugs unless the physician specifies in writing that the generic drug is unavailable or explains why no substitution can be made;⁴
- adoption of the 2004 pharmacy fee schedule and subsequent modifications to the Medi-Cal Fee Schedule upon which the pharmacy fee schedule is based;
- imposition of mandatory UR and Independent Medical Review (IMR);⁵
- channeling of injured workers to Medical Provider Networks that could set physician-dispensing rules for their plan providers, contracting with Pharmacy Benefit Networks that had their own drug formularies, and maintain employer control of medical care beyond 30 days post injury;⁶
- new Pharmaceutical Fee Schedule rules on repackaged and compound drug reimbursement;^{7, 8}
- the requirement that doctors check the state's CURES prescription drug monitoring program at least 24 hours before prescribing a Schedule II, III or IV controlled substance to a patient for the first time and check CURES at least once every four months when continuing to prescribe a controlled substance;⁹ and
- adoption of the MTUS Drug Formulary that classifies drugs as Exempt from prospective UR; Non-Exempt, or subject to prospective UR; or Not Listed. The formulary also lists subsets of Non-Exempt drugs as "special fill" and "perioperative" drugs, including some opioids and musculoskeletal drugs.¹⁰

¹ AB 749 (eff. 7/1/03); SB 228 (eff. 1/1/04); SB 899 (eff. 4/19/04); SB 863 (eff. 1/1/13).

² AB 749, retained the presumption for pre-designated personal physicians and chiropractors only for dates of injury on/after 01/01/03; SB 899 eliminated the presumption altogether for all physicians and all dates of injury.

³ Chronic Pain Guidelines (7/18/09, 7/28/16, updated 5/15/17, eff. 12/1/17); Opioid Guidelines (7/28/16, updated 4/20/17, eff. 12/1/17).

⁴ SB 228 further expanded the provisions of §4600.1.

⁵ Mandatory Utilization Review took effect 1/1/03; Independent Medical Review took effect 1/1/13.

⁶ SB 228, eff. 1/1/04, operative on/after 1/1/05.

⁷ Effective for services provided in 2007.

⁸ Swedlow, A., Auen, E. "Current Trends in Compound Drug Utilization and Cost in California Workers' Compensation." CWCI Research Note, 2/13.

⁹ SB 482, effective 10/2/18.

¹⁰ Effective 1/1/18.

Objective

Over the past three decades, as California adopted various reforms affecting the utilization and reimbursement of workers' compensation prescription drugs, CWCI has conducted multiple studies using data from its Industry Research Information System (IRIS) database¹¹ to monitor the impact of those changes. More recently, the Institute also developed an online, Prescription Drug Interactive Data Application that expands on and regularly updates key exhibits from those studies. The Interactive Application¹² currently includes data on 10.186 million California workers' compensation prescriptions with 2007 through June 2020 fill dates, with aggregate payments for those prescriptions totaling \$1.027 billion. The app allows Institute members to build customized views of California workers' compensation prescription drug data and to gather updated information on prescription drug trends, including those highlighted in this report.

This study updates prior research by measuring shifts in the distribution of California workers' compensation prescription drugs and pharmaceutical reimbursements among major therapeutic drug groups over the past decade; takes a focused look at opioids, including changes in the volume, amounts paid, potency, and types of opioids dispensed to injured workers, and examines the changes in prescription drug utilization and reimbursement since the MTUS Prescription Drug Formulary took effect in January 2018. Specific metrics detailed in the analysis include:

- The top 20 therapeutic drug groups in California workers' compensation in service year 2020, based on the percentage of prescriptions and payments through June, and the proportion of prescriptions represented by those drug groups in each of the nine prior service years.
- The percentage of all California workers' compensation claims (medical-only and indemnity) from accident year (AY) 2007 through 2018 in which opioids were dispensed within 24 months post injury.
- The average number of opioid prescriptions per opioid user at the 24-month benchmark for AY 2007 through AY 2018 claims.
- The average number of MMEs per opioid prescription as well as cumulative MMEs for AY 2007 through AY 2018 claims.
- The regional variation in the percentage of claims with opioids and cumulative MMEs per opioid user, with results noted for seven specific regions of the state.
- The change in the proportion of prescriptions and pharmacy payments associated with drugs classified by the formulary as Exempt and Non-Exempt, as well as Not Listed drugs.

In addition, tables showing the distributions of the top 20 most utilized drugs in the formulary's Exempt, Non-Exempt, and Not Listed drug categories for the first half of 2020 are included as Appendices to this report. To identify shifts in the utilization trends for each of the top 20 drugs over the past decade, the tables also show the distributions of drugs by formulary category for each of the preceding 4 calendar years (CY 2016 through 2019). The appendices also note the relative change in each drug's utilization between pre-formulary period (CY 2016 and 2017) and the post-formulary period (CY 2018 - June CY 2020).

¹¹ IRIS is CWCI's proprietary database containing data on employee and employer characteristics, medical service data, benefits, and administrative costs on approximately 6.5 million California workers' compensation claims.

¹² CWCI members can access through the Research section of the Institute's website (www.cwci.org).

Data and Methods

The study sample used for this analysis includes data on 5.85 million prescriptions dispensed to California injured workers with insured claims from AY 2011 through June of AY 2020, and payments for those prescriptions totaled more than \$623 million. The dataset includes prescription data from both medical-only and indemnity claims.

Each drug in the sample was identified according to its National Drug Code (NDC) and Generic Product Identifier (GPI) from Medi-Span's Master Drug Data Base (MDBD).¹³ The MDBD was also used to classify the drugs into therapeutic groups and their ingredient names when matching them to the MTUS Drug List.

To allow for the different types of data and analyses provided in this report and accompanying Prescription Drug Interactive Application (Rev. 1/12/21), each prescription was categorized both by service year (based on the fill date), and by accident year (based on the injury date on the claim). The service year data were used to measure prescription drug utilization and payments within a given calendar year, and to compare year-to-year results. The service year data in this report include:

- the distribution of prescriptions by therapeutic drug group;
- the distribution of the total drug expenditure among the top 20 therapeutic drug groups;
- the average prescription payment within each therapeutic drug group;
- the distribution of prescriptions and payments by formulary category (*i.e.*, Exempt, Non-Exempt, and Not Listed, as well as Special Fill and Perioperative drugs) for 2016 and 2017 (pre-formulary) and 2018 through June 2020 (post-formulary); and
- the distribution of the top 20 drug names within each of the formulary categories for 2016 and 2017 (pre-formulary) and 2018 – June 2020 (post-formulary).

The accident year data used in this study were compiled from AY 2007 through AY 2018 claims and were used to identify claim-level prescription drug experience at 24 months post injury, with specific focus on monitoring changes in opioid utilization at the same level of claim development over that 12-year span. The accident year data in this report include:

- the percentage of claims with opioid prescriptions;
- the average number of opioid prescriptions per opioid user;
- the average MMEs per opioid user and per opioid prescription; and
- the heat maps identifying regional variations in opioid use (percent of claims with opioids and cumulative MMEs per opioid user).

¹³ MDDB®, version 2.5 Documentation Manual, published by Wolters Kluwer Health.

Findings

Prescription Distributions by Therapeutic Drug Group

The top 20 therapeutic drug groups based on utilization in the first half of service year 2020 are listed in Exhibit 1, which also shows how the proportion of workers' compensation prescriptions represented by each of those groups has changed over the past decade. Among all claims, NSAIDs, which are often prescribed as non-opioid alternatives to treat pain, have accounted for the largest percentage of prescriptions in all six of the service years since 2015, while in the four years prior to that, opioids were the number one drug category in California workers' compensation and anti-inflammatories ranked second. The use of opioids has declined steadily over the past decade, dropping from 31.5 percent of the prescriptions filled in 2011 to 27.0 percent in 2014, then continuing to dwindle over the past six years, falling to 11.6 percent of the 2020 prescriptions, which translates to a relative decline of 62.6 percent over the entire study period.

Exhibit 1: Distribution of California Workers' Compensation Prescriptions

Top 20 Therapeutic Drug Groups* 2011 – 2020 Fill Dates

Therapeutic Groups	Percentage of All Scripts										11-20 % Diff
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Anti-Inflammatory	17.1%	16.9%	17.1%	21.2%	24.8%	27.5%	28.9%	32.3%	35.6%	34.7%	102.9%
Opioid	31.0%	30.0%	29.1%	27.0%	24.0%	21.9%	19.3%	15.4%	12.1%	11.6%	-62.6%
Anticonvulsant	5.6%	5.8%	6.0%	6.2%	7.0%	7.9%	8.8%	9.8%	9.8%	10.7%	91.1%
Dermatological	5.5%	5.3%	5.5%	5.5%	4.4%	4.5%	5.0%	6.0%	7.4%	8.2%	49.1%
Antidepressant	6.1%	6.4%	6.6%	5.4%	5.6%	5.7%	5.9%	6.4%	6.2%	7.0%	14.8%
Musculoskeletal	9.5%	9.4%	9.5%	10.0%	10.3%	10.3%	10.1%	6.6%	6.1%	5.9%	-37.9%
Ulcer	6.7%	7.1%	7.3%	7.4%	7.0%	6.4%	6.1%	5.9%	5.7%	5.7%	-14.9%
Nonnarcotic Analgesic	0.7%	0.6%	0.6%	0.7%	0.8%	1.0%	1.1%	1.4%	1.6%	1.6%	128.6%
Cephalosporin	0.9%	0.8%	0.8%	0.9%	1.1%	1.2%	1.3%	1.6%	1.5%	1.2%	33.3%
Ophthalmic	0.5%	0.5%	0.5%	0.6%	0.7%	0.8%	1.0%	1.2%	1.1%	1.1%	120.0%
Corticosteroid	1.3%	1.3%	1.2%	1.1%	1.3%	1.3%	1.2%	1.0%	1.1%	1.0%	-23.1%
Antihypertensive	0.6%	0.7%	0.7%	0.6%	0.6%	0.6%	0.6%	0.7%	0.7%	0.7%	16.7%
Antiasthmatic & Bronchodilator	0.3%	0.4%	0.3%	0.3%	0.4%	0.4%	0.4%	0.6%	0.7%	0.7%	133.3%
Antianxiety	2.0%	2.2%	2.4%	1.7%	1.5%	1.0%	1.0%	1.0%	0.8%	0.7%	-65.0%
Antidiabetic	0.4%	0.4%	0.5%	0.4%	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%	25.0%
Beta Blocker	0.3%	0.4%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.5%	66.7%
Laxative	1.0%	1.2%	1.3%	1.1%	1.0%	0.9%	0.7%	0.7%	0.6%	0.5%	-50.0%
Penicillin	0.3%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%	0.5%	0.6%	0.5%	66.7%
Anti-Infective	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.5%	0.6%	0.6%	0.5%	66.7%
Antipsychotic/Antimanic	0.7%	0.6%	0.6%	0.5%	0.4%	0.4%	0.4%	0.6%	0.5%	0.5%	-28.6%
Top 20 Subtotal	90.8%	90.5%	90.8%	91.4%	92.3%	93.2%	93.5%	93.2%	93.6%	93.8%	3.3%

*Top 20 therapeutic group rankings based on 2020 volume.

As noted in Exhibit 1, NSAIDs, surpassed opioids as the top therapeutic drug group in California workers' compensation in 2015, and their share of the workers' compensation prescriptions has continued to increase, climbing to 34.7 percent of the drugs dispensed in the first half of 2020. With opioid use continuing to decline

while the use of NSAIDs is growing, the spread between these two drug groups has widened, with NSAID's share of the workers' compensation prescriptions now triple the percentage noted for opioids. Meanwhile, anticonvulsants' share of the workers' compensation prescriptions also has increased, and in 2018 they surpassed musculoskeletal drugs (*i.e.*, muscle relaxants) to become the third most common drug group. Since then, their share has continued to increase, with the latest data showing they accounted for 10.7 percent of the workers' compensation prescriptions from January through June of 2020, up from 8.8 percent in 2017 (pre-formulary) and up from 5.6 percent a decade ago, likely reflecting the increased use of these drugs as a non-opioid alternative to treat neuropathic pain. On the other hand, the sharp decline in musculoskeletal drugs since 2017 followed the adoption of the MTUS Prescription Drug Formulary, as under the formulary, musculoskeletal drugs are *not* exempt from utilization review, with the exception of limited "special fill" or "perioperative use" allowances, which place limits on the quantity of the drug that can be dispensed. Musculoskeletal drugs consistently accounted for about 9 to 10 percent of the workers' compensation prescriptions from 2009 to 2017, but took a sudden, sharp drop in 2018, falling to 6.6 percent of the drugs dispensed that year, and their share has continued to decline in the two most recent years, falling to 5.9 percent of the workers' compensation prescriptions in the first half of 2020.

Another notable change in the mix of therapeutic drug groups over the past decade involves dermatological drugs,¹⁴ which accounted for about one out of every 12 prescriptions dispensed to injured workers in the first half of 2020 – a relative increase of 49.1 percent since 2011. Most of that increase has occurred within the past five years, as dermatologicals' share of the workers' compensation prescriptions did fall below 5 percent in 2014 and 2015, but then began to climb steadily, increasing to a record 8.2 percent in the prescriptions in the 2020 sample. The breakdown of the dermatological therapeutic group by drug ingredients within CWCI's Prescription Drug Interactive Data Application traces most of the recent growth in the use of dermatologicals to an increase in diclofenac sodium¹⁵ prescriptions, typically dispensed as topical creams, which have tripled from 19.5 percent to 57.6 percent of the workers' compensation dermatological prescriptions between 2015 and the first half of 2020.

In addition to oral NSAIDs and dermatologicals, the search for safe opioid substitutes is also evidenced by the increased use of non-narcotic analgesics, which have doubled from 0.8 percent to 1.6 percent of the workers' compensation prescriptions since 2015. Beyond that, ophthalmics, cephalosporin antibiotics, beta blockers, antihypertensives, antiasthmatics/bronchodilators, antidiabetics, penicillin, and anti-infectives all accounted for an increased share of workers' compensation prescriptions in 2020 than they did in 2011. Notably, the latest data also show a recent increase in the use of antidepressants. After declining slightly in 2019 -- the first decline in 6 years -- antidepressants' share of the workers' compensation prescriptions rose to a 10-year high of 7.0 percent in the first half of 2020, making them the fifth most common therapeutic group dispensed to injured workers. The most recent data also shows that a broad array of antidepressants are prescribed to injured workers, led by Duloxetine HCl, which accounted for 27.4 percent of the antidepressants dispensed in the first half of last year.

Conversely, opioids and musculoskeletal drugs are not the only therapeutic drug groups that have seen a significant decline in recent years. Looking back across the past decade shows antianxiety drugs, laxatives, ulcer drugs, corticosteroids, and antipsychotic/antimanic drugs have all accounted for a reduced share of the workers' compensation prescriptions since 2011.

¹⁴ Dermatological drugs referenced in this report refer to prescription and/or private-label manufactured topicals, not compounded topicals.

¹⁵ Diclofenac sodium is an NSAID which is often dispensed as a topical cream, gel or other type of dermatological.

Distribution of Total Drug Spend by Therapeutic Drug Group

The latest payment data reveal that 7 of the 10 most prevalent drug groups are also on the top 10 list based on percent of total drug spend. The rankings based on payment rather than volume differ significantly, however, as the total amounts paid for each drug group are affected by a number of factors besides the volume of prescriptions. These include the allowable fees under the Official Medical Fee Schedule, the average quantities and dosages dispensed, the mode of delivery, and the availability and pricing of generics within each group.

Exhibit 2 shows the distribution of prescription drug payments for the top 20 therapeutic drug groups based on their share of the 2020 drug spend and notes the shifting percentages of prescription dollars flowing toward each drug category over the past decade. Altogether, these 20 drug groups accounted for 79.4 percent of the workers' compensation total drug spend in the first half of last year, down from 85.5 percent in 2011, indicating that over the past decade the prescription drug payments have become more broadly dispersed across different drug groups.

Exhibit 2: Distribution of California Workers' Comp Prescription Payments

Top 20 Therapeutic Drug Groups* 2011 – 2020 Fill Dates

Therapeutic Groups	Percent of Payments										11-20 Change
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Anti-Inflammatory	11.4%	12.4%	12.2%	15.1%	17.6%	17.0%	15.6%	14.2%	17.4%	23.5%	106.1%
Dermatological	10.6%	11.6%	13.0%	13.5%	11.7%	15.3%	17.0%	15.8%	15.8%	14.1%	33.0%
Anticonvulsant	5.4%	5.2%	5.5%	5.9%	7.4%	10.0%	12.9%	16.1%	15.6%	13.1%	142.6%
Opioid	30.7%	28.4%	25.7%	23.6%	21.4%	18.6%	14.9%	12.2%	8.7%	7.0%	-77.2%
Ulcer	10.2%	10.0%	9.6%	9.2%	9.3%	6.2%	6.7%	5.4%	6.4%	6.0%	-41.2%
Musculoskeletal	5.5%	5.5%	6.4%	5.5%	6.0%	6.4%	6.3%	3.7%	3.2%	4.1%	-25.5%
Antidepressant	6.0%	6.4%	7.0%	5.1%	5.4%	4.7%	4.0%	3.6%	2.7%	3.1%	-48.3%
Antidiabetic	0.3%	0.4%	0.5%	0.6%	0.9%	1.3%	1.6%	2.3%	2.4%	2.4%	700.0%
Antiasthmatic & Bronchodilator	0.5%	0.6%	0.6%	0.5%	0.7%	1.1%	1.4%	2.2%	2.2%	1.9%	280.0%
Antipsychotics/Antimanic	2.2%	2.1%	2.1%	1.9%	1.8%	1.7%	1.4%	1.5%	1.3%	1.2%	-45.5%
Ophthalmic	0.2%	0.3%	0.3%	0.3%	0.5%	0.7%	0.9%	1.1%	1.2%	1.2%	500.0%
Antihypertensive	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	33.3%
Anti-Infective	0.4%	0.4%	0.3%	0.3%	0.4%	0.3%	0.3%	0.5%	0.5%	0.2%	50.0%
Cephalosporin	0.3%	0.3%	0.3%	0.3%	0.3%	0.5%	0.6%	0.4%	0.3%	0.2%	-33.3%
Non-Narcotic Analgesic	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.2%	0.2%	-33.3%
Corticosteroid	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.2%	0.0%
Penicillin	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	100.0%
Beta Blocker	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	100.0%
Laxative	0.3%	0.4%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	-66.7%
Anti-Anxiety	0.5%	0.5%	0.5%	0.3%	0.3%	0.2%	0.2%	0.2%	0.1%	0.1%	-80.0%
Top 20 Subtotal	85.5%	85.4%	85.2%	83.2%	84.8%	85.2%	85.1%	80.6%	79.3%	79.4%	-7.1%

*Top 20 therapeutic group rankings based on payments for prescriptions filled in 2020.

The steady decline in opioid use has been the key factor behind the redistribution of California workers' compensation prescription dollars since 2011. As with the prescription distribution, opioids led all therapeutic drug groups in terms of total payments in the first several years of the past decade, but as their proportion of all prescriptions decreased, their share of prescription drug dollars also declined, falling from 30.7 percent in 2011 to

7.0 percent in the first half of 2020, a relative decline of 77.2 percent over the entire period. The growing awareness of the risks associated with long-term opioid use, the adoption of the Chronic Pain and Opioid guidelines (effective December 1, 2017) and the implementation of the MTUS drug formulary in 2018 contributed to that decline, as did changes in the mix, potency, and volume of opioids used to treat injured workers, increased reliance on generics and non-opioid pain management alternatives, and reductions in the average amounts paid per opioid prescription. As a result, in the first half of 2020 opioids ranked fourth among the drug groups in terms of total payments, behind anti-inflammatories, dermatologicals, and anticonvulsants, all of which have registered significant increases in their share of the overall drug spend since 2011.

Given that anti-inflammatories are the number one therapeutic drug group used in California workers' compensation, it is not surprising that they also rank first in terms of their share of the total drug spend. That said, NSAIDs have accounted for about one-third of the prescriptions dispensed since 2018, but their share of the total prescription payments over that period has been far less, ranging from 14.2 percent in 2018 to 23.5 percent in 2020. One key reason for the disparity between NSAIDs percentage of prescriptions and its percentage of the total drug spend is found in the CWCI Prescription Drug Interactive Data Application's list of the most commonly dispensed NSAIDs, which shows that as of 2020, two relatively inexpensive drugs, ibuprofen and naproxen accounted for two-thirds of all NSAIDs prescribed to injured workers, with ibuprofen accounting for 42.9 percent of all NSAID prescriptions and naproxen accounting for 24.2 percent.

On the other hand, NSAIDs' share of the total drug spend has jumped by 9.3 percentage points (a relative increase of 65.4 percent) in less than two years. The data reveals the key reason behind that surge, tracing much of the recent growth in NSAID payments to increased reimbursements for fenoprofen calcium (brand names Nalfon, Fenortho and Profeno), an NSAID used to treat mild to moderate pain and arthritis. This drug first appeared in pharmacy data in 2014, but only in nominal amounts, accounting for just 0.3 percent of the NSAID prescriptions and 0.6 percent of the anti-inflammatory payments that year. By 2017, there were no records of this drug in the IRIS data, but in 2018, the first year after the MTUS formulary took effect, it began to reappear. Notably, fenoprofen calcium is listed as an Exempt drug in the formulary, so it is not subject to prospective utilization review, and it is also not listed in the national Medicaid database so there is no Federal Upper Limit (FUL), which would serve as a price control for this drug in the California workers' compensation pharmacy fee schedule.¹⁶ The combined effect of the exempt status of this drug in the formulary and the lack of an FUL can be seen in the payment data, which shows fenoprofen calcium's share of the NSAID payments increased from 0.6 percent in 2014 to 11.6 percent in 2018; to 24.2 percent 2019; and to 25.2 percent in the first half of 2020, when it surpassed Naproxen as the number one NSAID in terms of total drug spend. The most recent data also show fenoprofen calcium's share of NSAID prescriptions has increased, but remains relatively low, increasing from 0.5 percent in 2018 to 0.8 percent in 2018 and to 1.0 percent in 2020. The key factor behind the dramatic growth in the total amount paid for this drug is the increase in the average payment per prescription, which rose from \$171 in 2014 to \$201 in 2016; to \$886 in 2018; to \$1,252 in 2019; and to \$1,479 in the first half of 2020 – a 765 percent increase over 5-1/2 years.

The data shows another Exempt NSAID, ketoprofen, also contributed to the post-formulary surge in NSAID payments. Ketoprofen which had grown from 0.8 percent of the NSAID prescriptions in 2015 to 8.1 percent in 2017, saw its share plunge back down to 0.4 percent in 2018 after the formulary took effect, and to 0.1 percent in 2019, before increasing to 0.8 percent in the first half of 2020. But the average amount paid per ketoprofen prescription rose from \$104 in 2017 to \$108 in 2018, then soared to \$910 in 2019 and \$1,097 in the first half of

¹⁶ Drugs for which there is no FUL are reimbursed at 83% of the Average Wholesale Price (AWP), which is set by the drug manufacturers. A review of fenoprofen calcium pricing data from several manufacturers shows their AWP for the generic brand of the drug is higher than the AWP for the brand-name drug.

2020, a 10-fold increase over 3-1/2 years which resulted in ketoprofen being the third most costly NSAID in California workers' compensation, consuming 14.7 percent of all NSAID dollars in the first half of 2020.

These examples show that while a high proportion of low-priced drugs like naproxen and ibuprofen within a therapeutic drug group can have a moderating effect on that drug group's share of the total drug spend, the presence of a few low-volume but extremely high-priced drugs that are exempt from prospective UR and which lack price controls have just the opposite effect and can drive up overall reimbursements for the entire group. Price spikes such as those recently seen with fenoprofen calcium and ketoprofen could be addressed via price constraints within the MTUS formulary, but at this point the formulary drug list does not consider cost differentials in assigning Exempt and Non-Exempt status.

While dermatologicals ranked fourth in terms of prescriptions dispensed in the first half of 2020, they ranked second (behind anti-inflammatories) in terms of total dollars paid, which also indicates a relatively high average payment per prescription. A decade ago, dermatological drugs were the third most costly therapeutic drug group in California workers' compensation, but their share of the prescription dollars increased across much of the past decade, climbing from 10.6 percent in 2011 to a record 17.0 percent in 2017, the final year before the formulary took effect. Prior Institute research¹⁷ linked much of that growth to mass-produced, high-cost, private label topicals, marketed to physicians either for in-office or mail-order dispensing by drug wholesalers who were forced to switch gears after state lawmakers enacted legislation that attempted to control the cost of often questionable, custom compounded drugs in the workers' compensation system.¹⁸ The subsequent growth in the use of manufactured private-label topicals, which are identified by a single NDC and usually contain one or more active ingredients commonly found in over-the-counter topical analgesics (*e.g.*, lidocaine, capsaicin) continue to account for a significant share of the dermatological payments, though as noted earlier, the Interactive Data Application shows that in recent years, the most significant growth in the use of dermatological drugs in California workers' compensation has been in diclofenac sodium topicals, which are exempt from prospective utilization review, and are available in brand and generic versions and in a variety of formulations and strengths. In the first half of 2020 diclofenac sodium topicals, which accounted for 56.2 percent of the dermatological prescriptions, represented 21.2 percent of the dermatological dollars – a nearly five-fold increase in 5-1/2 years. The shift in the distribution of dermatological payments toward diclofenac topicals, along with the significant share of the dollars that continue to pay for private-label topicals suggests that in recent years these two types of dermatologicals have been increasingly prescribed as non-opioid alternatives to treat pain.

Ulcer drugs (often used to treat digestive issues related to opioid and NSAID use) now rank fifth in terms of drug payments, just below opioids, consuming 6.0 percent of the prescription dollars in the first half of 2020, but that is down from 10.2 percent a decade earlier. The declines in the utilization and payments for ulcer drugs since 2011 are not as steep as those noted for opioids, the two are most certainly linked, as ulcer drugs are often dispensed along with opioids, so the sharp decline in opioid prescribing would have helped fuel the decline in the ulcer drugs. In addition to the opioids and ulcer drugs, musculoskeletal and antipsychotic/antimanic drugs also have accounted for a much smaller share of workers' compensation prescription drug payments over the past decade, which coincided with their declining share of prescriptions. Antidepressant's share of the total drug spend has also declined, though their share of the prescriptions has increased, which is likely associated with the wider availability of generics as a couple of major antidepressant drugs have gone off patent since 2011.

¹⁷ Young, B., Hayes, S. California Workers' Compensation Prescription Drug Utilization & Payment Distributions, 2009-2018: Part 1 CWCRI Research Note, February 2019.

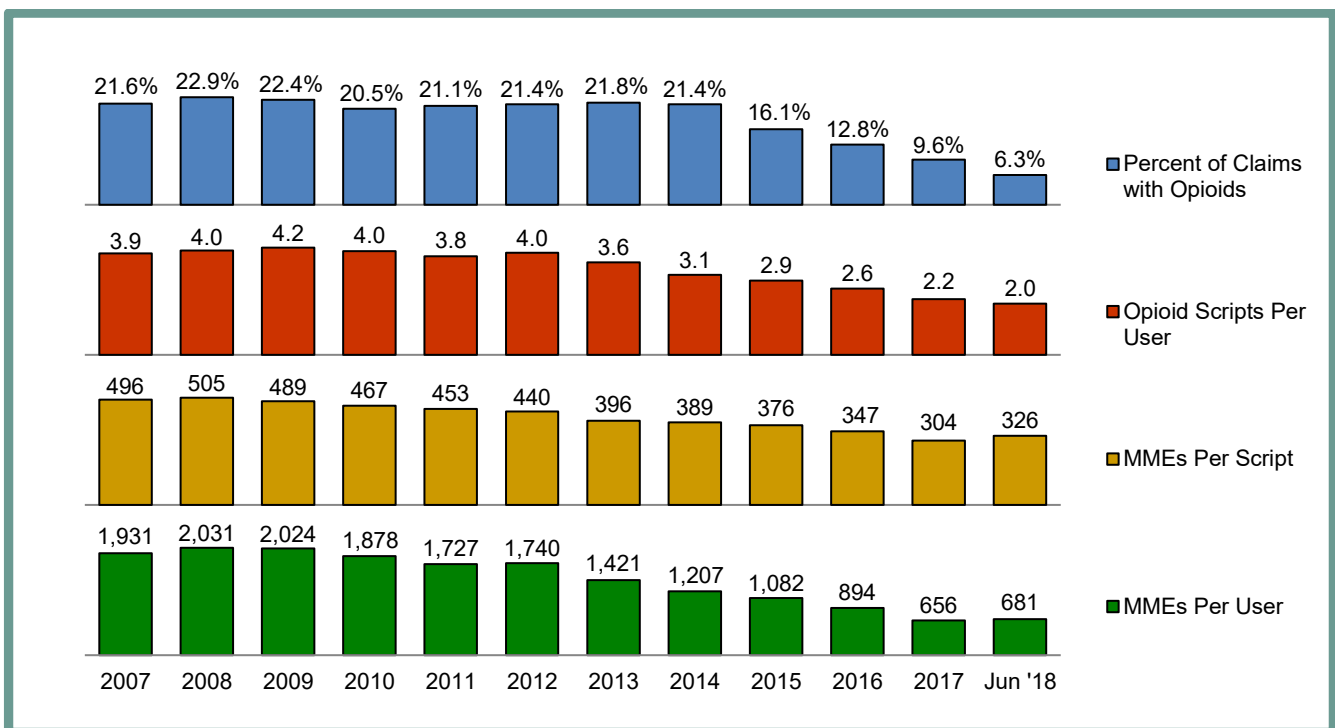
¹⁸ SB 378 (Solorio), eff. 1/1/12. Among other things, this bill established medical billing changes and unit price controls, required more detailed itemization of the National Drug Codes (NDCs) associated with pharmacy-compounded drug products, and capped the price for physician-dispensed compounded drugs.

Exhibit 2 also shows several therapeutic drug groups that barely registered in the payment rankings a decade ago are now among the 20 most costly drug groups. For example, the top 10 therapeutic drug groups based on 2020 payments include antidiabetic drugs (used to stabilize and control blood glucose levels for people with diabetes), which increased from 0.3 percent of the total drug spend in 2011 to 2.4 percent in 2020; and anti-asthmatic and bronchodilator medications (used to prevent and treat asthma, COPD, and other conditions affecting the lungs and airways), which increased from 0.5 percent to 1.9 percent during the same period. Among the factors that can lead to such increases are introduction of new medications or therapies (including off-label use of drugs), increased treatment of comorbid conditions, as well as the treatment of side effects of other medications.

Changes in Opioid Utilization

For the past 30 years, much of the history of prescription drug utilization and reimbursement in California workers' compensation has centered on opioids, including the dramatic increases in the use of these drugs to treat injured workers starting in the early 1990s; to the growing awareness of the risks associated with their use and the ongoing efforts that began more than a decade ago to control their use, assure that they are only prescribed when appropriate and medically necessary, and to find suitable substitutes to treat chronic pain. In 2016, CWCI published a study based on 10.8 million California workers' comp prescriptions filled between 2005 and 2014 that identified trends in the volume, cost, potency and types of opioids that had been used to treat injured workers over the prior decade.¹⁹ Exhibit 3 provides an update to one of the key exhibits from that report, depicting several population-based trends in the utilization of opioids and MMEs. Unlike the two prior exhibits where the prescription data was categorized by the year in which the prescription was filled, the data in this exhibit is categorized by injury date derived from AY 2007 to 2018 claims and shows four different measures of opioid utilization at 24 months post-injury across 12 accident years.

Exhibit 3. Opioid Utilization by Accident Year at 24 Months of Claim Development



¹⁹ Hayes, S., Swedlow, A. "Trends in the Use of Opioids in California Workers' Compensation." CWCI Research Note, May 2016.

As shown in Exhibit 3, at 24-months of claim development:

- The percentage of all claims in which opioids were dispensed decreased from 21.6 percent in AY 2007 to 6.3 percent in AY 2018. The proportion of claims with opioids dispensed at the 24-month benchmark showed little change from AY 2007 through AY 2014, ranging between 20.1 percent and 22.9 percent over the 8-year span, but then began a steady 4-year decline, decreasing by 61 percent between AY 2014 and AY 2018.
- The average number of opioid prescriptions per opioid user decreased from 3.93 in AY 2007 to 1.98 in AY 2018, a 49.6 percent decline over 12 years. The average number of prescriptions per user peaked at 4.2 in AY 2009, but over the next 9 years declined by 52.4 percent.
- The average number of MMEs per opioid prescription rose from 496 in AY 2007 to a record 505 in AY 2008, but then declined steadily over 9 consecutive years, falling 39.8 percent to 304 in AY 2017 before increasing 7.2 percent to 326 in AY 2018.
- The average number of MMEs per opioid user increased from 1,931 in AY 2007 to the peak level of 2,031 in AY 2008, but then declined in 9 out of the 10 next years, falling 68.2 percent to just 645 MMEs per opioid user in AY 2018.

Exhibit 3 shows that the percentage of claims that involved opioids at 24 months post-injury remained relatively stable from AY 2007 through AY 2014, but then dropped sharply, falling to a 9-year low in AY 2015, then continued to decline over the next three years. In contrast, the decline in opioid prescriptions per user began earlier, as that metric remained within a narrow range from AY 2007 through AY 2012, but then began to drop steadily over a 6-year span beginning in AY 2013. The two other measures of opioid use (MMEs per prescription and MMEs per user) both peaked in 2008, and both have had a nearly unbroken string of declines ever since.

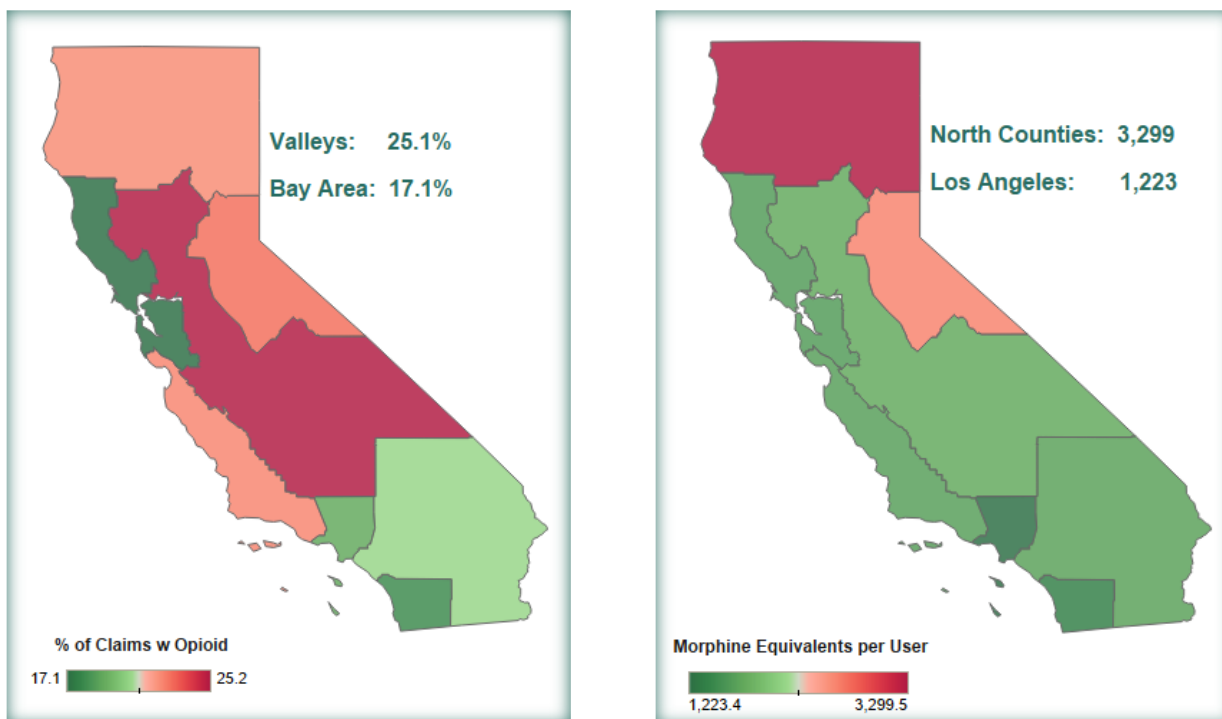
Regional Variations in Opioid Utilization and Morphine Equivalents

To better understand how opioid utilization varies in different parts of the state, the Institute's Interactive Prescription Drug Data Application features heat maps that display the claim-level data on opioid use for eight distinct regions of the state and allows users to use filters to isolate results by specific accident year, claim type, region, and county. The eight regions highlighted in the heat maps are: North Counties; Sierras; Bay Area; Valleys (Sacramento and San Joaquin Valleys); Central Coast; Los Angeles County; Inland Empire/Orange County; and San Diego County. Claims were categorized by region based on the ZIP code from the injured worker's home address. The following heat maps (Exhibit 4 and Exhibit 5) show:

- 1) the percent of AY 2007-AY 2018 claims that had opioids dispensed within 24 months post injury, and
- 2) the cumulative MMEs dispensed per opioid user at the 24-month benchmark.

The regional results on the heat maps are color coded, ranging from dark green for regions with the lowest valued results to dark red for regions with the highest valued results. The color key on the bottom of each map notes the range of results within the state for the metric displayed in the map.

Exhibit 4 and 5: Regional Variations in Opioid Utilization and Morphine Milligram Equivalents



The map on the left shows that the Central Valley has the highest percentage of claims with opioid prescriptions, with 25.1 percent of all claims from the Valley region receiving at least one opioid prescription at 24 months. The less populated Sierras (23 percent) and the North Counties (22.4 percent) rank just below the Valley. These are all largely rural regions with a high percentage of agricultural and blue-collar jobs, and many areas within these regions have limited access to medical care, so both the nature and severity of the work injuries as well as the lack of readily available medical care are likely contributors to the high percentage of claims involving opioids. The two regions with the lowest percentage of claims that involve opioids within the first two years are the Bay Area, where opioids were prescribed in 17.1 percent of the claims, and San Diego, where opioids were prescribed in 18.0 percent of the claims. Both these regions have primarily urban and suburban populations, and a high proportion of white-collar jobs, as well as a broad range of high-quality, easily accessible medical facilities, so again, both the nature of the injuries and the ready availability of medical care likely result in a smaller proportion of work injury claims requiring opioids.

The heat map on the right shows the cumulative number of MMEs per claim at 2 years post injury across the eight regions of the state. The cumulative MMEs reflect the overall potency or strength of the opioids prescribed to the injured worker, and depend on several factors, including the types of opioids prescribed, the quantity and dosage of each prescription, and the number and duration of the prescriptions. This heat map shows that the cumulative MMEs per opioid claim were highest in the North Counties, which averaged 3,299 MMEs per claim in the first two years. The sparsely populated and largely remote Sierras ranked second with 2,668 MMEs. Again, the high level of MMEs on claims from these regions is likely linked to the nature and severity of injuries in these regions and the lack of access to medical care. On the flip side, cumulative MMEs per claim were lowest in Los Angeles County, which averaged 1,223 MMEs per claim at 24 months, followed by San Diego County, which had 1,365.

The Impact of the Formulary

In October 2015, California lawmakers enacted AB 1124 which authorized the Administrative Director of the DWC to adopt a workers' compensation prescription drug formulary. The underlying goals were to improve injured workers' medical care by ensuring that the medications they receive meet evidence-based standards in terms of frequency, duration, strength, and appropriateness; reduce the total workers' compensation drug spend; and decrease frictional costs by reducing prescription drug disputes. After two years of development and public hearings, the DWC approved the MTUS prescription drug formulary in late 2017, with an effective date of January 1, 2018. As noted earlier, the formulary adopted by the DWC includes Exempt and Non-Exempt Drug Lists, based on the need for prospective UR, while drugs that are not on either list ("Not Listed") are allowed if the treating physician can show that their use for the specific injury is supported by the MTUS or other applicable treatment guidelines. In addition, the formulary allows for two subcategories of non-exempt drugs: "Special Fill" drugs, a 4-day supply of which is exempt from prospective UR if prescribed at an initial visit within 7 days of injury;²⁰ and "Perioperative" drugs, a limited supply of which is exempt from prospective UR if prescribed 4 days prior to a surgery to 4 days after a surgery.²¹

CWCI research on the topic of prescription drug formularies preceded AB 1124, dating back to a 2014 Report to the Industry that used data from 1.6 million California workers' compensation prescriptions filled between January 1, 2012 and June 30, 2013 to assess the impact of applying existing formularies from Texas and Washington State to these prescriptions.²² That study found that the adoption of a state-mandated workers' compensation prescription drug formulary such as those used in Texas and Washington State could clarify the rules for drug selection, increase the use of generic medications, decrease the use of opioids, and reduce pharmacy payments by an estimated \$124 million to \$420 million a year while raising the quality of care and reducing frictional costs in the system.

In 2017, following passage of AB 1124, but prior to the adoption of the formulary, the Institute published an analysis that used data from more than 650,000 California workers' compensation prescriptions to model the effect of the DWC's proposed MTUS Drug Formulary on workers' compensation prescription prescribing patterns and the UR/IMR dispute resolution process.²³ The Institute then issued a follow-up study a year after the formulary took effect that offered a preliminary assessment of the impact of the formulary by comparing pharmaceutical utilization and payment data from pre-implementation (service years 2016 and 2017) and post-implementation (service year 2018) time periods.²⁴ This section of the report updates and extends those analyses by comparing pre-formulary data derived from prescriptions filled between 2016 and 2017 to post-formulary data derived from prescriptions filled between January 2018 and June 2020.

As in the prior studies, to measure the extent of the changes that have occurred in prescribing patterns and reimbursements since the formulary took effect, the authors grouped the prescriptions in the study sample by fill date and formulary classification: Exempt, Non-Exempt, or Not Listed; and further segmented the Non-Exempt drugs to identify Special Fill and Perioperative drugs. The resulting distributions of the prescriptions and payments by formulary classification were then categorized into the five service years included in the sample to

²⁰ 8 CCR §9792.27.12(b). Version 1 of the formulary (effective 1/1/18) listed 15 Special Fill drugs, but 12 were subsequently added so Version 6 of the formulary (effective 1/15/20) had 27 Special Fill drugs.

²¹ 8 CCR §9792.27.13. Version 1 of the formulary (effective 1/1/18) listed 14 Perioperative drugs, but 5 were subsequently removed so Version 6 of the formulary (effective 1/15/20) had 9 Perioperative drugs.

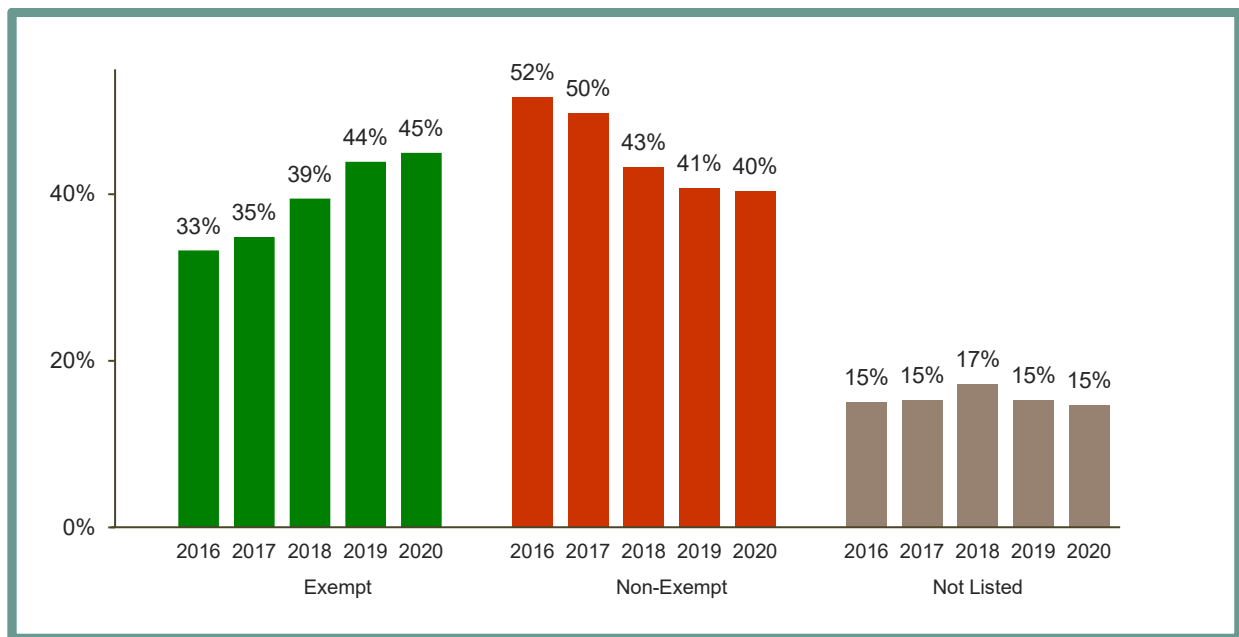
²² Swedlow, A., Hayes, S., David, R. Are Formularies a Viable Solution For Controlling Prescription Drug Utilization and Cost in California Workers' Compensation? CWCI Report to the Industry, October 2014.

²³ Swedlow, A., Hayes, S., Bullis, R. "California's Workers' Compensation Formulary Part 2: A Review of the July 2017 Proposed Formulary Drug List of Exempt and Non-Exempt Drugs." CWCI Spotlight Report, August 2017.

²⁴ Hayes, S., Swedlow, A. "California Workers' Comp Pharmaceutical Utilization & Reimbursement Part 2; Emerging Outcomes Under the MTUS Formulary." CWCI Spotlight Report, March 2019.

track changes in the distribution of prescriptions and payments among Exempt, Non-Exempt, and Not Listed drugs; and the percentage of prescriptions and payments for Special-Fill and Perioperative drugs dispensed to injured workers. Version 1 of the formulary did not take effect until January 1, 2018, so the prescription and payment distributions for 2016 and 2017 were based on the drug categories included in Version 1 of the formulary. Drugs that were recategorized or added to the formulary during the study period were included in the calculation for the relevant formulary category and calendar year.²⁵ Exhibit 6 notes the shift in the mix of prescriptions among the Exempt, Non-Exempt, and Not Listed formulary categories between the pre-formulary (2016-2017) and the post-formulary (2018-June 2020) periods.

Exhibit 6: Distribution of California Workers' Compensation Prescriptions by Drug Category



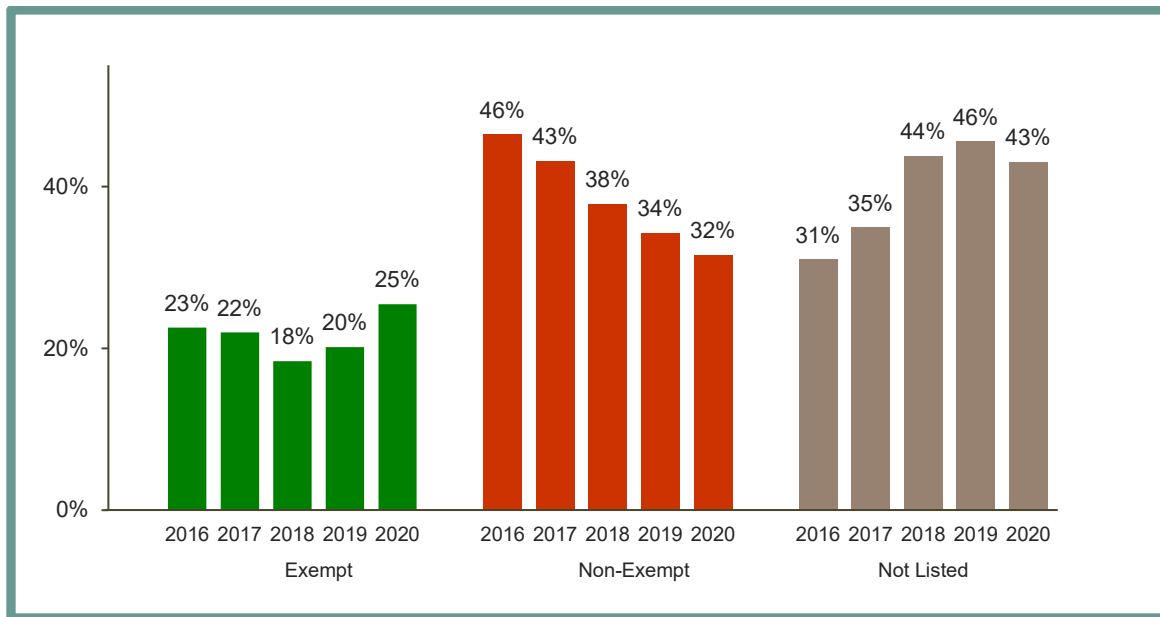
As shown, Exempt drugs as a percentage of all drugs dispensed in California workers' compensation have risen steadily from 33 percent in service year 2016 to 45 percent of the prescriptions filled in the first half of 2020 – an increase of 12 percentage points, with most of that increase occurring in 2018 and 2019, the first two years following the formulary's January 1, 2018 effective date. Meanwhile, Non-Exempt drugs' share of the prescriptions decreased by 12 percentage points over the study period, falling from 52 percent of the prescriptions in 2016 to 40 percent in the first half of 2020, and once again, most of that shift occurred in the 2 years after the formulary took effect in January 2018.

Not Listed drugs accounted for 15 percent of the prescriptions dispensed to injured workers in the two years prior to the formulary taking effect, then increased by 2 percentage points to 17 percent in 2018, immediately after the formulary took effect. After that first year under the formulary, however, Not Listed drugs' share of the prescriptions declined back down to 15 percent in 2019 and remained there in 2020.

²⁵ There were 275 drugs in Version 1 of the formulary (effective 1/1/18) and 358 in Version 6 (effective 1/15/20). That's a 30 percent increase in drugs, but it amounted to a small increase in utilization.

A different picture emerges from the data showing the change in the distribution of the total drug spend among the formulary's Exempt, Non-Exempt, and Not Listed drug categories (Exhibit 7).

Exhibit 7: Distribution of California Workers' Comp Payments Among Exempt, Non-Exempt and Not Listed Drug Categories



Exempt drugs' share of the total prescription payments increased by 2 percentage points from 23 percent in service year 2016 to 25 percent in the first half of 2020, but as was noted in Exhibit 6, their share of the prescriptions was up by 12 percentage points during this period, indicating that the average amount paid per Exempt drug prescription declined. The payment distribution also shows Exempt drugs' share of the total drug spend was relatively flat just prior to the formulary taking effect, decreasing by 1 percentage point between 2016 and 2017, then decreasing by 4 percentage points in 2018, the first year after the formulary took effect. The Exempt drug's share of the payments reversed course in 2019, increasing by 2 percentage points to 20 percent in 2019. Notably, the Exempt drugs' share of the prescription payments then increased to 25 percent in the first half of 2020, up by 5 percentage points from the prior year – which is a relative increase of 25 percent – even though their share of the prescriptions only rose by 1 percentage point from 2019 – a relative increase of 2.3 percent. As was shown in Exhibit 2 and discussed earlier, this coincided with the increase in payments for extremely high-priced NSAIDs such as fenoprofen calcium and ketoprofen that are exempt from prospective UR and which lack price controls.

Non-Exempt drugs' share of the prescription payments registered a significant and steady decline over the 4.5-year study period, falling by 14 percentage points from 46 percent in 2016 to 32 percent in the first half of 2020, which tracks closely with the 12-percentage point drop in their share of the prescriptions during this period. The downtrends in Non-Exempt drug utilization and payments largely reflect ongoing declines in the use of opioids, which as noted in Exhibits 1 and 2, fell from 21.9 percent of all workers' compensation prescriptions in 2016 to 11.6 percent of the prescriptions in the first half of 2020, while total reimbursements for opioids dropped from 18.6 percent to 7.0 percent of the total workers' compensation drug spend.

Although Not Listed drugs' share of the prescriptions has held steady at 15 percent with the exception of the brief 2-percentage point increase immediately after the formulary took effect, their share of the total drug spend

has seen a sharp increase, climbing from 31 percent in 2016 to 35 percent in 2017, then jumping by 9 percentage points to 44 percent after the formulary took effect in 2018 and remaining within 2 percentage points of that level in both 2019 and the first half of 2020. The disparity between the special fill drugs' share of the prescriptions and their share of the prescription dollars shows that the average amount paid per special fill prescription is relatively high, which is likely related to the presence of several high-cost specialty medications within this group. A closer look at the top 20 Not Listed drugs based on utilization (Appendix C) shows that no single drug dominates this category, with the number one drug in this category, the cholesterol drug Atorvastatin Calcium (Lipitor) accounting for only 3.4 percent of the Not Listed prescriptions since the formulary took effect, while the top 20 drugs in this category together accounted for less than one third of the Not Listed drugs.

The formulary includes two subcategories of Non-Exempt drugs – Special Fill and Perioperative drugs – to allow for special circumstances or pre- and/or post-operative situations in which physicians can prescribe limited amounts of certain medications that would otherwise be subject to prospective UR. There are currently 27 “Special-Fill” drugs for which a 4-day supply is exempt from UR if the doctor prescribes or dispenses them at an initial visit that occurs within 7 days of the date of injury. The Special Fill drugs include specific opioids, muscle relaxants, psychotropics, and corticosteroids. In addition, the formulary lists 9 Perioperative drugs that must be prescribed within the perioperative period (4 days prior to surgery to 4 days after surgery) the supply of which may not exceed the number of days indicated for the drug (either 4 days or 14 days) and the drugs prescribed must be in accordance with the MTUS guidelines. The Perioperative drugs include specific opioids, as well as an anticoagulant, an anticonvulsant and a muscle relaxant.

Exhibit 8: Distribution of California Workers' Comp Prescriptions by Special Drug Subcategories

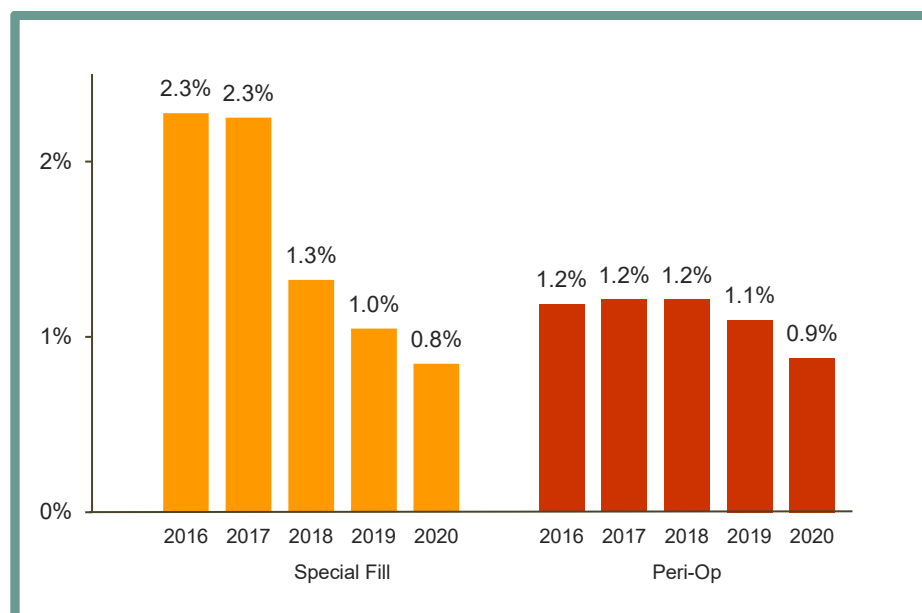
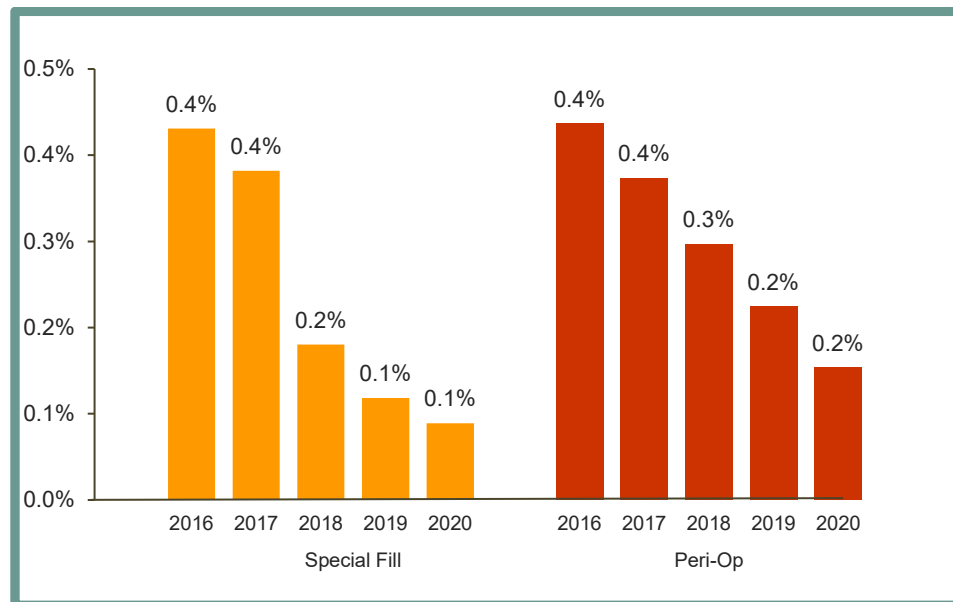


Exhibit 8 shows the Special Fill and Perioperative drugs as a percentage of all prescriptions since the formulary took effect in 2018. Both subcategories of drugs have accounted for a similar share of the workers' compensation prescriptions in 2018, 2019, and the first half of 2020, and both have registered similar declines over that 2.5-year period, starting with more than 1 percent of the percent of the prescriptions in 2018 then edging down to less than 1 percent of the prescriptions in the 2020 data.

Exhibit 9 shows that since the formulary took effect, Special Fill and Perioperative drugs have consistently accounted for a very small percentage of all workers' compensation prescription payments, and as noted, those marginal shares have declined over the 2.5-year period with Special Fill drug payments falling from 0.2 percent of the total drug spend in 2018 to 0.1 percent in 2020, while perioperative payments have fallen from 0.3 percent to 0.2 percent of the prescription payments.

Exhibit 9: Distribution of California Workers' Comp Payments by Special Drug Categories



Both the Special Fill and the Perioperative drug subcategories include some of the most heavily prescribed drugs in workers' compensation, (*e.g.*, Hydrocodone/APAP, Tramadol HCL, and Baclofen). In the vast majority of the cases where these drugs are used to treat injured workers, however, they do not fall within the Special Fill or Perioperative Drug parameters, so although they are very common, as Special Fills or Perioperative drugs their impact on the overall number of prescriptions and total prescription payments is minor.

Discussion

The findings in this study document significant shifts that have occurred in prescription drug utilization and payments in California workers' compensation over the past decade, as well as changes in opioid utilization dating back to AY 2007. To a great extent, these shifts have been spurred by legislative and regulatory changes, including mandatory UR programs and the adoption of IMR to resolve medical disputes and assure that the prescription drugs dispensed to injured workers are appropriate, safe, and efficacious; the growth of MPNs that set physician-dispensing rules for their plan providers and contract with Pharmacy Benefit Networks; the adoption of the Pharmacy Fee Schedule and subsequent changes in the Medi-Cal fee schedule on which it is based, including tighter rules on the reimbursement of repackaged and compounded drugs. In addition, the types of drugs dispensed and prescribing patterns in workers' compensation have reflected greater public awareness of the risks associated with the long-term use of opioids and other addictive drugs; increased reliance on generics; and more recently, the adoption of chronic pain and opioid treatment guidelines and the 2018 implementation of the MTUS Prescription Drug Formulary.

The formulary is subject to regular review and since it first took effect in 2018, the formulary's drug lists have been revised multiple times based on recommendations put forth by the DWC's Pharmacy and Therapeutics (P&T) Committee. The most recent revision to the formulary was Version 8, which took effect February 1, 2021. Further changes to the drug lists can be expected as the P&T Committee continues to review issues related to prescription drugs and has already suggested improvements that would augment the formulary drug list with "Dosage Form," "Strength," and "Unique Pharmaceutical Identifier" to further identify drugs as Exempt or Non-Exempt based on the form of dosage (*e.g.*, capsule, tablet, liquid, etc.) and strength (*e.g.*, 50 mg vs. 20 mg) for the same drug ingredient. These types of additional details are intended to allow more nuanced Exempt status designations for drugs at safe dosages, as well as to mitigate the use of special formulations to enhance reimbursement. This study's finding that low-volume, high-priced drugs such as fenoprofen calcium and ketoprofen that lack price controls and are exempt from prospective UR have become major cost drivers underscores the need for the P&T Committee and the Administrative Director to continue formulary augmentation and refinement, pointing to a key area that could be addressed through the adoption of appropriate price constraints within the formulary or through changes in the Pharmacy Fee Schedule.

To help bring such issues to light, and to assess the ongoing impact of legislative and regulatory changes and changes to the formulary, CWCI will continue to monitor the utilization and reimbursement of prescription drugs in California workers' compensation and publish results both in future reports as well in updates to our Prescription Drug Interactive Data Application and our new Formulary Interactive Data Application, which can be accessed by CWCI members who log on to our website, www.cwci.org and click Interactive Research Tools under the Research tab.

Appendix A

Top 20 Exempt Drugs as a Percentage of All Exempt Drugs (2016 – June 2020)

Drug Ingredient	Brand Example	Pre-Formulary			Post-Formulary				Net Change
		2016	2017	Subtotal	2018	2019	2020	Subtotal	
Ibuprofen	Motrin	23.3%	24.5%	23.9%	27.2%	26.8%	25.9%	26.8%	2.9%
Naproxen	Aleve, Naprosyn	17.4%	18.2%	17.8%	18.2%	16.6%	15.9%	17.1%	-0.6%
Diclofenac Sodium (Topical)	Voltaren 1% gel	3.1%	4.0%	3.5%	6.7%	9.0%	9.8%	8.2%	4.7%
Meloxicam	Mobic	5.6%	5.5%	5.6%	7.0%	6.9%	6.7%	6.9%	1.4%
Omeprazole	Prilosec	11.3%	7.6%	9.5%	6.7%	6.0%	6.3%	6.3%	-3.2%
Celecoxib	Celebrex	5.9%	5.1%	5.5%	5.2%	4.7%	4.9%	4.9%	-0.6%
Etodolac	Lodine	3.3%	5.6%	4.4%	4.0%	3.1%	2.1%	3.3%	-1.1%
Nabumetone	Relafen	7.0%	2.7%	4.9%	3.2%	3.1%	2.7%	3.1%	-1.8%
Lansoprazole	Prevacid	1.0%	2.2%	1.6%	2.3%	2.3%	2.9%	2.4%	0.8%
Cephalexin	Keflex	1.9%	1.9%	1.9%	2.6%	2.2%	1.8%	2.3%	0.4%
Acetaminophen	Tylenol	1.8%	1.8%	1.8%	2.0%	2.5%	2.5%	2.3%	0.5%
Pantoprazole Sodium	Protonix	3.1%	3.0%	3.1%	1.7%	1.2%	1.1%	1.4%	-1.7%
Famotidine	Pepcid	1.2%	1.4%	1.3%	1.4%	1.4%	1.3%	1.4%	0.1%
Ranitidine HCl	Zantac	1.4%	2.2%	1.7%	1.6%	1.3%	0.2%	1.2%	-0.5%
Esomeprazole Magnesium	Nexium	0.8%	0.9%	0.9%	0.9%	0.8%	0.8%	0.9%	0.0%
Albuterol Sulfate	Proventil	0.4%	0.5%	0.4%	0.8%	0.9%	1.0%	0.8%	0.4%
Amoxicillin/Clavulanate P	Augmentin	0.6%	0.7%	0.7%	0.8%	0.8%	0.7%	0.8%	0.1%
Sulfamethoxazole/Trimethoprim	Bactrim	0.8%	0.8%	0.8%	0.9%	0.7%	0.6%	0.8%	0.0%
Flurbiprofen	Ansaid	0.6%	0.2%	0.4%	0.4%	0.8%	0.8%	0.6%	0.2%
Ketoprofen	Oruvail	4.3%	6.5%	5.4%	0.4%	0.1%	0.4%	0.3%	-5.1%
All Other	N/A	5.2%	4.8%	5.0%	6.1%	8.9%	11.6%	8.2%	3.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%

Appendix B

Top 20 Non-Exempt Drugs as a Percentage of All Non-Exempt Drugs (2016 – June 2020)

Drug Ingredient	Brand Example	Pre-Formulary			Post-Formulary				Net Change
		2016	2017	Subtotal	2018	2019	2020	Subtotal	
Gabapentin	Neurontin	10.0%	11.5%	10.7%	14.1%	15.2%	17.3%	15.0%	4.3%
Hydrocodone/APAP	Norco, Vicodin, Xodol	18.9%	17.5%	18.2%	16.0%	13.5%	13.0%	14.5%	-3.7%
Cyclobenzaprine HCL	Flexeril	10.4%	10.5%	10.5%	8.1%	8.1%	8.0%	8.1%	-2.3%
Tramadol HCL	Ultram	9.2%	9.0%	9.1%	6.8%	5.5%	5.2%	6.1%	-3.0%
Pregabalin	Lyrica	2.7%	2.9%	2.8%	4.0%	4.8%	5.1%	4.5%	1.7%
Duloxetine HCL	Cymbalta	3.1%	3.2%	3.1%	4.0%	4.0%	4.4%	4.0%	0.9%
Lidocaine	Lidoderm	2.5%	3.0%	2.7%	3.3%	3.7%	4.2%	3.6%	0.9%
Oxycodone/APAP	Percocet	3.3%	3.2%	3.3%	3.2%	2.9%	2.8%	3.0%	-0.2%
Tizanidine HCL	Zanaflex	2.0%	2.2%	2.1%	2.3%	2.4%	2.3%	2.4%	0.3%
Diclofenac Sodium	Voltaren	3.0%	2.2%	2.6%	2.1%	1.9%	1.9%	2.0%	-0.6%
Oxycodone HCL	OxyContin, Roxicodone	2.2%	1.9%	2.1%	2.1%	1.9%	1.7%	1.9%	-0.1%
Baclofen	Lioresal	1.2%	1.4%	1.3%	1.8%	2.0%	2.2%	1.9%	0.6%
Trazodone HCL	Desyrel, Oleptro	1.2%	1.3%	1.2%	1.5%	1.7%	2.0%	1.6%	0.4%
Bupropion HCL	Wellbutrin	1.3%	1.4%	1.4%	1.6%	1.7%	1.6%	1.6%	0.3%
Codeine/APAP	Tylenol	2.4%	2.4%	2.4%	1.9%	1.4%	1.2%	1.6%	-0.8%
Methocarbamol	Robaxin	1.4%	1.5%	1.4%	1.4%	1.5%	1.5%	1.4%	0.0%
Amitriptyline HCL	Elavil	1.0%	1.1%	1.1%	1.3%	1.4%	1.6%	1.4%	0.3%
Carisoprodol	Soma	1.7%	1.3%	1.5%	1.0%	0.8%	0.7%	0.9%	-0.6%
Orphenadrine Citrate	Norflex	2.3%	1.9%	2.1%	0.8%	0.4%	0.3%	0.6%	-1.5%
Tramadol HCL /Ac	Ultracet	2.1%	1.5%	1.8%	0.7%	0.4%	0.4%	0.5%	-1.3%
All Other	N/A	18.1%	19.1%	18.6%	22.0%	24.8%	22.7%	23.2%	4.6%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%

Appendix C

Top 20 Not Listed Drugs as a Percentage of All Not Listed Drugs (2016 – June 2020)

Drug Ingredient	Brand Example	Pre-Formulary			Post-Formulary				Net Change
		2016	2017	Subtotal	2018	2019	2020	Subtotal	
Atorvastatin Calcium	N/A	1.5%	2.1%	1.8%	3.0%	3.8%	4.2%	3.4%	1.7%
Tetanus Toxoid-(TDAP)	N/A	3.2%	4.1%	3.6%	3.4%	1.7%	1.5%	2.5%	-1.1%
Losartan Potassium	N/A	1.3%	1.7%	1.5%	2.1%	2.5%	2.8%	2.4%	0.9%
Metoprolol Succinate	N/A	0.9%	1.3%	1.1%	1.9%	2.5%	2.9%	2.3%	1.2%
Lisinopril	N/A	1.6%	1.8%	1.7%	1.8%	2.5%	2.4%	2.2%	0.5%
Rosuvastatin Calcium	N/A	0.7%	1.1%	0.9%	1.6%	2.0%	2.3%	1.8%	0.9%
Diclofenac Epolamine	N/A	1.9%	1.7%	1.8%	1.7%	1.8%	1.8%	1.8%	-0.1%
Buspirone HCl	N/A	1.1%	1.3%	1.2%	1.5%	2.0%	1.7%	1.7%	0.5%
Tadalafil	N/A	1.0%	1.2%	1.1%	1.5%	1.7%	2.1%	1.7%	0.6%
Alprazolam	N/A	2.9%	2.4%	2.7%	1.9%	1.2%		1.4%	-1.3%
Triamcinolone Acetonide	N/A	2.0%	1.5%	1.8%	1.5%	1.3%	1.2%	1.3%	-0.4%
Zolpidem Tartrate	N/A	5.7%	4.9%	5.3%	2.8%			1.3%	-3.9%
Carvedilol	N/A	0.6%	0.8%	0.7%	1.1%	1.4%	1.5%	1.3%	0.6%
Sildenafil Citrate	N/A	0.9%	0.9%	0.9%	1.0%	1.4%	1.5%	1.3%	0.4%
Docusate Sodium	N/A	2.1%	1.4%	1.8%	1.2%	1.3%	1.3%	1.2%	-0.5%
Lidocaine-Capsaicin-Menthol-Methyl Salicylate	N/A	3.1%	2.6%	2.9%	1.4%	1.0%	1.2%	1.2%	-1.7%
Metformin HCl	N/A	1.0%	1.1%	1.1%	1.1%	1.3%	1.2%	1.2%	0.1%
Polyethylene Glycol 3350	N/A	1.0%	1.1%	1.1%	1.1%	1.2%	1.2%	1.2%	0.1%
Eszopiclone	N/A	2.5%	1.8%	2.2%	1.2%	1.0%	0.8%	1.1%	-1.1%
Ondansetron	N/A	2.4%	1.9%	2.2%	1.5%			0.7%	-1.5%
All Other	N/A	62.6%	63.3%	62.9%	65.6%	68.4%	68.6%	67.1%	4.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%

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California Workers' Compensation Institute

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