WCRI
Workers Compensation Research Institute

WCRI RESEARCH BRIEF:

A MULTISTATE PERSPECTIVE ON PHYSICIAN DISPENSING, 2011–2014

In the last decade, many workers' compensation jurisdictions in the United States have made legislative or regulatory changes to rules governing reimbursement for physician-dispensed pharmaceuticals, with the intent to reduce higher prices paid to physicians than to pharmacies for drugs they dispense. These price-focused reforms targeted physician-dispensed repackaged drugs by capping the prices paid to physicians based on the manufacturer's average wholesale price (AWP) of the original drug.[1] More recently, several states have also made changes to limit physician-dispensed prescriptions for certain drugs or to a short time frame. In this report, we describe the prevalence and costs of physician dispensing in 2014 across 26 state workers' compensation systems,[2] evaluating the impact of physician dispensing reforms by comparing the post-reform states with the states where no reforms were made or where there was a reform but the data reflect pre-reform experience.

Research Questions:

- In which states was physician dispensing common and representative of a significant share of prescription costs?
- How did the average price paid for common drugs compare between physician- and pharmacy-dispensed prescriptions? How did price differentials compare between post-reform states and states with either no reforms or where only pre-reform experience was observed?
- Did the reforms help reduce the prices paid for physician-dispensed drugs?
- Are the price-focused reforms effective and sustainable in the presence of higher-priced new drug products?

MAJOR FINDINGS

Overall, we found that physicians dispensed fewer prescriptions after the reforms, but physician dispensing was still common and represented a large share of prescription costs. The price-focused physician dispensing reforms reduced prices for existing drug products, which was evident in all post-reform states. However, the increased physician dispensing of higher-priced new drug strengths and formulation offset the price reduction for existing products, driving up the average price per pill paid for physician-dispensed prescriptions. This phenomenon was especially seen in California, Florida, and Illinois. We also found a noticeable shift in physician dispensing of certain drugs that may be associated with changes in the policies limiting physicians' ability to dispense.

FREQUENCY AND COST SHARE OF PHYSICIAN-DISPENSED PRESCRIPTIONS

- Physician dispensing continued to be common in 2014 and represented a significant share of prescription costs in several states, including California, Florida, Illinois, Maryland, and Pennsylvania.
  - In post-reform California, Florida, and Illinois, physician dispensing accounted for 44 percent of all prescriptions, representing 54 to 64 percent of total prescription payments. The considerably higher prescription cost shares in these three states were primarily the result of frequent physician dispensing of higher-priced new drug products.
  - In Maryland, physicians dispensed 38 percent of all prescriptions, accounting for 40 percent of total prescription payments. In the past few years, policymakers and stakeholders in Maryland have debated issues related to physician dispensing and proposed regulatory changes to address them. While the active debates and heightened awareness of the issue may have led to initiatives by some payors aimed at reducing the costs of physician-dispensed drugs, no policy changes have been made at the state level.
  - In 2014, prior to the reforms, physicians in Pennsylvania dispensed 33 percent of all prescriptions, representing 51 percent of total prescription payments. Effective December 2014, Pennsylvania changed

[1] Appendix A in the study provides a summary of state policies on physician dispensing and the reforms that are aimed at reducing the costs of physician dispensing for the states included in this study.

[2] The 26 states are Arkansas, California, Connecticut, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and Wisconsin.

the reimbursement rules to not only cap the prices paid for physician-dispensed drugs, but also to restrict physicians' ability to dispense opioids and other drugs to limited time frames.[3] The 2014 results for Pennsylvania may serve as a baseline for evaluating Pennsylvania's reforms.

- In 6 of the 26 states studied, physician dispensing is not allowed in general (Massachusetts, New York, and Texas) or physician dispensing is allowed but is infrequent in practice (Arkansas, Minnesota, and Nevada).

IMPACT OF PRICE-FOCUSED REFORMS ON FREQUENCY, PRICE, AND COST SHARE OF PHYSICIAN-DISPENSED DRUGS

- Overall, fewer prescriptions were dispensed in 2014 than in 2011, and considerable reductions in the frequency of physician dispensing were observed in all post-reform states and in the majority of the non-reform or pre-reform states studied. While the price-focused reforms may explain the decrease in frequency because of certain behavioral changes on the part of physician-dispensers and intermediaries in response to price reductions, other policies and initiatives may also explain some of the reductions.
- In the post-reform states, the average price per pill paid for physician-dispensed prescriptions decreased consistently when existing strengths of drugs were prescribed and dispensed by physicians. The price reduction for existing drug products was seen in all post-reform states.
- However, for several common drugs that had a new strength, the average price per pill paid to physicians increased, especially in California, Florida, and Illinois. The increases in physician prices were driven by increased physician dispensing of higher-priced new-strength drug products. As a result, the physician share of prescription costs changed little or increased in these three states, despite a large reduction in the frequency of physician dispensing.
- In the other seven post-reform states (Connecticut, Georgia, Indiana, Kentucky, Michigan, South Carolina, and Tennessee), the physician share of prescription costs decreased as a result of decreased frequency of physician dispensing and price reductions for physician-dispensed drugs.
- Over the same period, the physician cost share also decreased in most non-reform or pre-reform states, but it remained the same or increased in Kansas, Louisiana, Pennsylvania, and Virginia. Although a sizable price reduction for physician-dispensed drugs was seen in Iowa and Maryland, physician prices changed little or increased in the other non-reform or pre-reform states.

SOME PHYSICIANS DISPENSED HIGHER-PRICED NEW DRUG PRODUCTS

- Physician dispensing of higher-priced new strengths and formulation was more prevalent in California, Florida, and Illinois, as well as a few other states. These new-strength drug products include 7.5-milligram cyclobenzaprine, 150-milligram tramadol extended release, and 2.5-325-milligram hydrocodone-acetaminophen. Lidocaine-menthol is a new formulation of the lidocaine pain patch.
- When dispensing these new drug products, some physician-dispensers were paid much higher prices than they were paid when dispensing existing-strength drugs products. The results raise questions about the effectiveness and sustainability of the reforms in these states. Almost all of these new drug products were seen among physician-dispensed prescriptions and not among pharmacy-dispensed prescriptions.

DATA & METHODS

The data used for this report came from payors that represented 36–68 percent of all medical claims across the 26 states included in the study. The detailed prescription transaction data were organized by calendar year based on prescription fill date. The prescriptions included are those that were filled for all medical claims with injuries occurring within 24 months prior to the fill date.[4] The detailed prescription data cover service years from 2011 through 2014.

[3] See Appendix A in the study for a description of reforms in Pennsylvania.

[4] The yearly data were constructed to include prescriptions received by claims with dates of injury within 24 months of the fill date. In this way, we hold the mix of claims with longer or shorter maturity (i.e., experience with prescriptions) constant across service years. Note that the frequency of physician dispensing and prices for common drugs may be different when imposing a longer claim maturity. However, since we focus on comparative results and change over time, the difference in the cut-off of claim maturity is unlikely to affect the major findings of this study.

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A Multistate Perspective on Physician Dispensing, 2011–2014

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Of course, any errors or omissions that remain in the report are the responsibility of the authors.

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TABLE OF CONTENTS

LIST OF TABLES

List of Figures

EXECUTIVE SUMMARY

In the last decade, many workers' compensation jurisdictions in the United States have made legislative or regulatory changes to rules governing reimbursement for physician-dispensed pharmaceuticals, with the intent to reduce higher prices paid to physicians than to pharmacies for drugs they dispense. These price-focused reforms targeted physician-dispensed repackaged drugs by capping the prices paid to physicians based on the manufacturer's average wholesale price (AWP) of the original drug.[1] More recently, several states have also made changes to limit physician-dispensed prescriptions for certain drugs or to a short time frame. In this report, we describe the prevalence and costs of physician dispensing in 2014 across 26 state workers' compensation systems,[2] examining the trends in physician dispensing by comparing the post-reform states with the states where no reforms were made or where there was a reform but the data reflect pre-reform experience.

MAJOR FINDINGS

Overall, we found that fewer prescriptions were dispensed by physicians after the reforms, but physician dispensing was still common and represented a large share of prescription costs. The price-focused physician dispensing reforms reduced prices for existing drug products, which was evident in all post-reform states. However, the increased physician dispensing of higher-priced new drug strengths and formulation offset the price reduction for existing products, driving up the average price per pill paid for physician-dispensed prescriptions. This phenomenon was especially seen in California, Florida, and Illinois. We also found a noticeable shift in physician dispensing of certain drugs that may be associated with changes in the policies limiting physicians' ability to dispense.

FREQUENCY AND COST SHARE OF PHYSICIAN-DISPENSED PRESCRIPTIONS

- Physician dispensing continued to be common in 2014 and represented a significant share of prescription costs in several states, including California, Florida, Illinois, Maryland, and Pennsylvania.
  - In post-reform California, Florida, and Illinois, physician dispensing accounted for 44 percent of all prescriptions, representing 54 to 64 percent of total prescription payments. The considerably higher prescription cost shares were primarily the result of frequent physician dispensing of higher-priced new drug products in these post-reform states.
  - In Maryland, physicians dispensed 38 percent of all prescriptions, accounting for 40 percent of total prescription payments. In the past few years, policymakers and stakeholders in Maryland have debated issues related to physician dispensing and proposed regulatory changes to address them. While the active debates and heightened awareness of the issue may have led to initiatives by

[1] Appendix A provides a summary of state policies on physician dispensing and the reforms that are aimed at reducing the costs of physician dispensing for the states included in this study.

[2] The 26 states are Arkansas, California, Connecticut, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and Wisconsin.

some payors aimed at reducing the costs of physician-dispensed drugs, no policy changes have been made at the state level.

  - In 2014, prior to the reforms, physicians in Pennsylvania dispensed 33 percent of all prescriptions, representing 51 percent of total prescription payments. Effective December 2014, Pennsylvania changed the reimbursement rules to not only cap the prices paid for physician-dispensed drugs, but also to restrict physicians' ability to dispense opioids and other drugs to limited time frames.[3] The 2014 results for Pennsylvania may serve as a baseline for evaluating Pennsylvania's reforms.
- In 6 of the 26 states studied, physician dispensing is not allowed in general (Massachusetts, New York, and Texas) or physician dispensing is allowed but is infrequent in practice (Arkansas, Minnesota, and Nevada).

IMPACT OF PRICE-FOCUSED REFORMS ON FREQUENCY, PRICE, AND COST SHARE OF PHYSICIAN-DISPENSED DRUGS

- Overall, fewer prescriptions were dispensed in 2014 than in 2011, and considerable reductions in the frequency of physician dispensing was observed in all post-reform states and in the majority of the non-reform or pre-reform states studied. While the price-focused reforms may explain the decrease in frequency because of certain behavioral changes on the part of physician-dispensers and intermediaries in response to price reductions, other policies and initiatives may also explain some of the reductions.
- In the post-reform states, the average price per pill paid for physician-dispensed prescriptions decreased consistently when existing strengths of drugs were prescribed and dispensed by physicians. The price reduction for existing drug products was seen in all post-reform states.
- However, for several common drugs that had a new strength, the average price per pill paid to physicians increased, especially in California, Florida, and Illinois. The increases in physician prices were driven by increased physician dispensing of higher-priced new-strength drug products. As a result, the physician share of prescription costs changed little or increased in these three states, despite a large reduction in the frequency of physician dispensing.
- In the other seven post-reform states (Connecticut, Georgia, Indiana, Kentucky, Michigan, South Carolina, and Tennessee), the physician share of prescription costs decreased as a result of decreased frequency of physician dispensing and price reductions for physician-dispensed drugs.
- Over the same period, the physician cost share also decreased in most non-reform or pre-reform states, but it remained the same or increased in Kansas, Louisiana, Pennsylvania, and Virginia. Although a sizable price reduction for physician-dispensed drugs was seen in Iowa and Maryland, physician prices changed little or increased in the other non-reform or pre-reform states.

SOME PHYSICIANS DISPENSED HIGHER-PRICED NEW DRUG PRODUCTS

- Physician dispensing of higher-priced new strengths and formulation was more prevalent in California, Florida, and Illinois, as well as a few other states.[4] These new-strength drug products include 7.5-milligram cyclobenzaprine, 150-milligram tramadol extended release, and 2.5-325-milligram

[3] See Appendix A for a description of reforms in Pennsylvania.

[4] It is worth noting that some physician-dispensers also dispensed higher-priced new drug products shortly before the 2014 reform. This phenomenon was seen in Pennsylvania and Florida, perhaps as an anticipation of upcoming price-focused reforms. The post-reform experience in Pennsylvania should be closely monitored as more recent data become available for analysis.

hydrocodone-acetaminophen. Lidocaine-menthol is a new formulation of the lidocaine pain patch.[5]

- When dispensing these new drug products, some physician-dispensers were able to bypass the reimbursement rules that target physician-dispensed repackaged drugs and were paid much higher prices than they were paid when dispensing existing-strength drugs products. The results raise questions about the effectiveness and sustainability of the reforms in these states. Almost all of these new drug products were seen among physician-dispensed prescriptions.

IMPACT OF REFORMS LIMITING PHYSICIAN-DISPENSED DRUGS

- Noticeable changes were seen in the dispensing pattern of specific drugs that were commonly dispensed by physicians in several states including Florida, Indiana, Kentucky, and Tennessee. The shift observed in the prescription distribution of physician-dispensed prescriptions for common drugs suggests that the recent reforms that limit physicians' ability to dispense certain drugs had a direct impact on patterns of physician dispensing.

[5] We also observed a small number of prescriptions filled for the topical analgesic capsaicin-menthol.

1

INTRODUCTION

As of June 2017, 22 states have made legislative or regulatory changes to rules governing reimbursement for physician-dispensed pharmaceuticals. Almost all reforms capped the reimbursement amount for drugs dispensed by physicians to the same amount as if the drugs were dispensed at a pharmacy, and most reforms explicitly require that the reimbursement be based on the average wholesale price (AWP) of the original drug used in the repackaging process, with or without a dispensing fee. More recent reforms not only cap the prices paid to physicians for drugs they dispense, but also limit physician-dispensed prescriptions for certain drugs or to a short time frame. Several previously published Workers Compensation Research Institute (WCRI) studies evaluated the impact of physician dispensing reforms individually for a number of reform states. These studies highlighted the emerging issue of increased physician dispensing of higher-priced new drug products in several reform states that raised questions about the effectiveness and sustainability of the price-focused reforms. With detailed transaction data for prescriptions filled through December 31, 2014, this study offers a multistate perspective on physician dispensing and examines the impact of physician dispensing reforms on the frequency and costs of physician-dispensed drugs in a multistate context.

OBJECTIVE AND SCOPE OF THE STUDY

This report documents the state of physician dispensing across 26 state workers' compensation systems. It also provides key findings from our analysis of the impact of the reforms in a multistate context.[6] The questions answered in this study include the following:

- In which states was physician dispensing common and representative of a significant share of prescription costs?
- How did the average price paid for common drugs compare between physician- and pharmacy-dispensed prescriptions? How did price differentials compare between post-reform states and states with either no reforms or where only pre-reform experience was observed?
- Did the reforms help reduce the prices paid for physician-dispensed drugs?
- Are the price-focused reforms effective and sustainable in the presence of higher-priced new drug products?

[6] The states included in this study are Arkansas, California, Connecticut, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and Wisconsin. These states are diverse in their policies regarding physician dispensing. See Appendix A for a description of state policies on pharmacy fee schedules and physician dispensing.

This report is focused on comparing the frequency and costs of physician dispensing between the post-reform states and the non-reform or pre-reform states. We did not compare the results across post-reform states because the dynamic nature of the reforms, different language of the reforms, and other policy changes over the same time period in these post-reform states make it difficult, if not impossible, to isolate the impact of specific aspects of the reforms. Analysis of the impact of physician dispensing and related reforms on overall medical costs and outcomes is also beyond the scope of this report.

PHYSICIAN DISPENSING REFORMS

In most states, physicians are allowed to dispense prescription drugs at their offices directly to the patient. Previous WCRI studies reported considerably higher prices paid for physician-dispensed prescriptions when compared with prices paid to pharmacies for the same drug. In 2007, California became the first state to change reimbursement rules with the intention of equalizing the prices paid for physician- and pharmacy-dispensed prescriptions. As of June 2017, 22 states have made legislative or regulatory changes to rules governing reimbursement for physician-dispensed pharmaceuticals.[7,8] Most reforms were price-focused and targeted physician-dispensed repackaged drugs by capping the prices paid to physicians at the manufacturer's AWP of the original drug. More recently, several states also made changes to limit physician-dispensed prescriptions for certain drugs or to a short time frame.

Opponents of physician dispensing are concerned about the higher and possibly unnecessary costs associated with physician-dispensed medications, citing published studies.[9] In addition, they also argue that pharmacies or pharmacy benefit managers are better positioned than physician-dispensers to identify drug safety issues, such as drug-to-drug interactions, opioid abuse or diversion, or duplicate therapies. Advocates for physician dispensing often express concern that proposed changes would directly or indirectly limit physicians' ability to dispense prescription drugs and create barriers to access to medications. They maintain that physician dispensing is more convenient for patients, which may improve access to medications and patient compliance with the medication regimen.[10]

HIGHER-PRICED NEW STRENGTHS AND FORMULATION

Previously published WCRI studies highlighted the emerging issue of frequent physician dispensing of higher-priced new drug products. These new-strength drug products are 7.5-milligram cyclobenzaprine, 2.5-325-milligram hydrocodone-acetaminophen, and 150-milligram tramadol extended release. The new formulation of topical lidocaine pain medication, lidocaine-menthol, was also discussed in the 2016 report (Wang, Thumula, and Liu, 2016i). These new drug products share the same issue—they all have new National Drug Codes (NDCs) and are assigned much higher AWPs by a generic manufacturer (at least

[7] Appendix A summarizes the reforms for the states included in this study.

[8] Information about reforms for other states can be found in the reference data published by Optum (2017). In six states (Massachusetts, Montana, New York, Utah, Texas, and Wyoming), physician dispensing of prescription drugs is not permitted in general, either by law or in practice.

[9] For example, Swedlow, Gardner, and Ireland (2013) and White et al. (2014).

[10] We are not aware of any studies that report lower medical costs and better outcomes when physicians were involved in dispensing medications, except Munger et al. (2014).

labeled as such), not a repackager.[11] Because of this, these drug products are not subject to the specific reimbursement rules targeting high-priced repackaged drugs.[12] These new drug products were almost all dispensed by physicians and paid for at much higher prices compared with the existing drug products for the same drug.[13]

PHYSICIAN DISPENSING—EVIDENCE IN THE LITERATURE

Evidence of behavioral responses to price reductions has been reported by several studies. The responses may take different forms, but all are motivated by maintaining revenues or income. The most relevant behavioral responses were observed in a study by the California Workers' Compensation Institute. That study reported a rapid increase in physician dispensing of higher-priced pharmaceuticals, such as compound drugs, co-packs, and medical foods, after California's rule changes in 2007 capping prices paid for physician-dispensed repackaged drugs (Ireland and Swedlow, 2010). According to that study, the prescription payments made for these products increased from 2.3 percent of total prescription drug costs in 2006 to 12 percent in 2009. Several WCRI studies also provide evidence consistent with behavioral changes on the part of medical providers motivated by the desire to retain revenues. For example, states with relatively lower prices paid for office visits tended to have more frequent billing of more complex office visits, and these states tended to have more prevalent physician dispensing (Yang, 2014 and 2015; Radeva, 2015). Evidence of physicians increasing utilization of medical services in response to a reimbursement change that had the effect of reducing prices paid has also been reported based on Medicare data (Jacobson and Newhouse, 2010; Jacobson, Earle, and Newhouse, 2011).

Evidence of the impact of physician dispensing on safety, costs, and outcomes is somewhat mixed. Based on a survey of prescribers and patient-consumers about the prevalence and their perceptions of physician dispensing, Munger and his colleagues (2014) found that the reported rate of adverse drug reaction (ADR) was the same among the patients who obtained their medications in a local pharmacy versus a physician's office. The same study also suggested that physician or prescriber dispensing appeared to be associated with physician and patient perceptions of convenience and cost reductions.[14]

However, most studies we reviewed reported safety issues, higher costs, and adverse outcomes associated with physician dispensing. In examining the association between physician-dispensed repackaged drugs and

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[11] Repackaging firms (also known as repackagers) purchase large quantities of a given medication and repackage the pills into single-prescription-sized packages (e.g., 30 pills). Once registered with the U.S. Food and Drug Administration, a repackager obtains a new NDC for the drug they repackage and assigns an AWP for the repackaged drug. The AWP of a repackaged drug is almost always higher than the AWP of the original manufacturer drug used in the repackaging process.

[12] In most reform states where the reimbursement rate for a repackaged drug is tied to the AWP of the original drug, these new products would not be subject to the rules since these are original drugs by a manufacturer, not a repackager. In a few states, the maximum reimbursement amount is set to the lesser of the AWP of the original drug or the lowest price of the therapeutic equivalents. In these states, since these are new strengths or a new formulation, it may be difficult to find existing drug products or therapeutic equivalents that may have a lower price.

[13] Readers who are interested in more information about the new strengths and formulation are referred to the previously published reports (Wang, Thumula, and Liu, 2015 and 2016i).

[14] According to the study, most respondents perceived prescriber dispensing as less costly than pharmacies, associated it with reduced urgent care and emergency department visits, and had greater patient satisfaction (Munger et al., 2014). The authors noted that the study was based on survey responses of physicians and their patients. Most of the physicians who responded to the survey were specialists in the fields of optometry, dermatology, oncology, and plastic surgery. These specialty services are less often seen in workers' compensation health care. The authors also acknowledged the limitations of the lack of control for patient comorbidities or other risk factors leading to urgent care and emergency department visits when examining the outcomes.

overall claim outcomes for injured workers in California, Swedlow and his colleagues (2013) reported significantly higher medical costs and indemnity benefits per claim with physician-dispensed repackaged drugs, compared with those without them.[15] The average number of days receiving temporary disability benefits was also reported as higher among claims with repackaged drugs than those without them (Swedlow, Gardner, and Ireland, 2013). The California findings are consistent with Illinois' experience. In a study examining physician dispensing in Illinois, White and his colleagues (2014) found that physician dispensing is associated with higher costs and more lost time when comparing claims receiving physician-dispensed medications within 90 days as compared with claims without them.[16]

ORGANIZATION OF THIS REPORT

The report is organized into seven chapters. Chapter 2 describes the data and methods we used for this study. Chapter 3 describes the prevalence and costs of physician dispensing in 2014, the latest study year, across the 26 states included in the study and highlights the states where physician dispensing continued to be frequent and accounted for a significant share of prescription costs. Chapter 4 provides an analysis of the impact of physician dispensing reforms in a multistate context by comparing trends in the post-reform states and the states with either no reforms or where only pre-reform experience was observed. Chapter 5 highlights the issue of higher-priced new drug products and its impact on prices paid for common physician-dispensed drugs and the cost share of physician dispensing. Chapter 6 provides additional data on the distribution of specific drugs that were dispensed by physicians, which may be used to evaluate several more recent reforms prohibiting physicians from dispensing certain drugs or limiting physician-dispensed drugs to a short time frame after injury or before and after surgery. In Chapter 7, we discuss the implications of the results. Appendix A summarizes state policies regarding pharmacy fee schedules and physician dispensing for the 26 states included in the study. A glossary can be found at the end of the report.

[15] The average medical cost per claim with physician-dispensed repackaged drugs averaged $5,524, 16 percent higher than the $4,747 average for claims without them. The difference between the two groups increased from 16 to 37 percent, according to the report (Swedlow, Gardner, and Ireland, 2013). For the 10-year span of the study combining pre- and post-reform data, the average paid medical benefit per claim with repackaged drugs was 17 percent higher than that of those without them. The authors also reported a 7 percent difference in the paid indemnity per claim between the two claim groups before the rule changes and a much higher difference of 28 percent after the reform.

[16] According to the study, the average amount of lost time among claimants who received their medications from a physician's office was 85 days, 33 percent higher than the 64-day average for those receiving medications from a pharmacy for all medications. For opioid medications, the difference was larger (122 days for physician-dispensed versus 66 days for pharmacy-dispensed). Within 90 days, physicians dispensed more prescriptions than those dispensed at pharmacies. Claims with physician-dispensed drugs were also reported to have accounted for 39 percent of the incurred medical costs. See White et al. (2014).

2

DATA AND APPROACH

The data used for this report came from payors that represented 36–68 percent of all medical claims across the 26 states included in the study. The detailed prescription transaction data were organized by calendar year based on prescription fill date.[1] The prescriptions included are those that were filled for all medical claims with injuries occurring within 24 months prior to the fill date.[2] The detailed prescription data cover service years from 2011 through 2014. Table 2.1 provides, on average per year, the number of prescriptions included and the number of claims involved for those prescriptions for each of the states included in the study. The table also shows the percentage of all claims in the state represented by the data sources included in the study.

On average per year, the number of prescriptions included in the study ranged from 18,604 in Arkansas to 778,943 in California. These prescriptions were associated with 4,274–148,292 (medical-only and indemnity) claims, depending on the state (Table 2.1). Those claims and prescriptions are from 26 states: Arkansas, California, Connecticut, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and Wisconsin.

The analysis data were extracted from the WCRI Detailed Benchmark/Evaluation (DBE) database and consist of detailed prescription transaction data that were collected from workers' compensation payors and their medical bill review and pharmacy benefit management vendors. The data available for each prescription identify the specific medication prescribed, the date on which the prescription was filled, amounts charged and paid, the number of pills (for orally-administered medications), and the strength of the medication in milligrams. The specific medication prescribed was identified by its NDC.

[1] Throughout the report, we refer to this as *service year*.

[2] We constructed the yearly data to only include prescriptions received by claims with dates of injury within 24 months of the fill date. By doing so, we hold the mix of claims with longer or shorter maturity (i.e., experience with prescriptions) constant across service years. We chose to use a 24-month cut-off for constructing the yearly data so that we could evaluate pre- and post-reform results for most of the reform states. Note that the frequency of physician dispensing and prices for common drugs may be different when imposing a longer claim maturity (e.g., 36 months). However, since we focus on comparative results and change over time, the difference in the cut-off of claim maturity is unlikely to affect the major findings of this study.

Table 2.1 Prescriptions and Claims Included in the Study

	AR	CA[a]	CT[a]	FL[a]	GA[a]	IA	IL[a]	IN[a]	KS[b]	KY[a]	LA	MA	MD	MI[a]	MN	MO	NC[b]	NJ	NV[b]	NY	PA[b]	SC[a]	TN[a]	TX	VA	WI
Average number of all medical claims with prescriptions per service year	4,274	148,292	13,310	53,212	24,832	8,220	32,488	17,888	7,664	9,699	6,700	8,344	14,466	22,000	10,976	13,058	17,658	24,189	6,435	23,336	36,550	9,108	18,499	64,709	14,823	11,146
Average number of prescriptions per service year	18,604	778,943	54,403	233,514	117,566	32,912	148,660	66,215	31,461	42,997	49,714	41,343	60,281	74,837	44,793	49,165	85,504	86,292	25,145	127,777	169,093	48,146	79,560	321,070	61,323	42,152
Percentage of all claims in the state workers' compensation system that were represented by the data sources contributing data to the study	36%	44%	64%	37%	43%	38%	51%	45%	38%	46%	37%	50%	44%	46%	47%	43%	39%	61%	34%	48%	41%	46%	47%	68%	59%	35%

Notes: The underlying data include prescriptions filled in service years 2011 to 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), South Carolina (2011), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] The 2014 data for North Carolina are a mix of pre- and post-reform results. For Kansas, Nevada, and Pennsylvania, the data reflect pre-reform experience. See Appendix A for a description of the reforms.

Unlike other WCRI benchmark reports, the claims included in this study may not necessarily be representative of the total population of claims in some states. This occurs for two reasons. First, the reporting of detailed prescription data was less complete than other benchmarking data for a few data sources in some states, which resulted in additional exclusions of data sources from this study. This occurred when a data source in a state did not have complete and adequate data on NDCs and quantities for prescriptions—the two data elements critical for constructing benchmark metrics for this study. Although we included several additional data sources in this study as compared with the previous study, the exclusions of some data sources may affect the representativeness of the data if the claims from those excluded data sources were very different in some way. Second, we did not obtain data from one or more important data sources for a few states, which may affect the representativeness of our data for these states.[3]

The prescription transactions included in this study were those for medications of prescription strengths and over-the-counter strengths (referred to as *prescriptions* throughout the report). These prescriptions could be filled or refilled by the injured worker at a pharmacy or physician's office and were paid for under workers' compensation. Prescription medications that were dispensed at a hospital or administered by a medical provider (e.g., injections received at a physician's office) were excluded. Also excluded were compounded drugs, nutritional supplements, and medical supplies/equipment that were billed under NDCs.

Physician-dispensed prescriptions were defined as those that were filled at the offices of independent practitioners, physician groups, or medical centers or clinics which may or may not have had an on-site pharmacy.[4,5] By our definition, prescriptions dispensed at and billed for by a medical center or clinic are considered physician-dispensed prescriptions. This is because, although the medical center may have an on-site pharmacy that functions like a retail pharmacy, prescriptions dispensed and billed for by a medical center as a financial entity are often reimbursed differently compared with retail pharmacies. Pharmacy-dispensed prescriptions were those dispensed at retail or mail-order pharmacies.

For medications in the form of tablets and capsules, we used the average price per pill for the medication dispensed by physicians or at pharmacies for the price comparison. The price per pill is computed by taking the amount paid for a prescription divided by the number of pills in the prescription.[6] When aggregated across prescriptions for the same medication, the price per pill takes into account the difference in the number of pills, making the price per pill between physician- and pharmacy-dispensed prescriptions more comparable than making a comparison based on price per prescription. This per-unit price measures the

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[3] We do not provide more detailed information regarding the states and data sources due to confidentiality concerns.

[4] We identified physician-dispensed prescriptions based on several critical data elements, including (1) the information provided by the data sources that indicates if a physician or pharmacy was the provider of the medication; (2) the Medi-Span® indicator that specifies repackaged drugs using the NDCs assigned for a repackaged drug by the U.S. Food and Drug Administration; and (3) the place of service. For a small percentage of prescription transactions for which we do not have the above information for identification of the dispensing point, we used the unique provider identification number to assign the dispensing point based on what was learned in the data for the same provider. Because of the combined methods, we were able to identify more than 95 percent of the non-hospital prescriptions for the study. Note that prescriptions for repackaged drugs are considered physician-dispensed prescriptions. Based on the evidence we saw in our detailed data review and our understanding of the incentive mechanism in the business process, we believe that retail pharmacies rarely dispense repackaged drugs in practice.

[5] It should be noted that all prescriptions included for this study were identified as either physician- or pharmacy-dispensed prescriptions. Although more detailed data allowed us to observe, as needed, some more details about dispensing entities that were associated with certain prescription transactions, it did not allow us to systematically differentiate between medical clinics with a pharmacy and independent pharmacies, or between medical clinics and physician groups. Throughout the report, we focus on physician- and pharmacy-dispensed prescriptions for major findings, and occasionally, we discuss some observations about the types of dispensing entities to provide more detail for better understanding of what we see in the data.

[6] A vast majority of the drugs that are commonly dispensed by physicians are in the form of tablets or capsules.

amount paid by the payor for the drug, reflecting the drug payment as a result of repricing based on state-specific reimbursement rules, dispensing fees, and for pharmacy transactions, pharmacy benefit manager (PBM) discounts and fees.

Note that the average price per pill paid for individual drugs reported is the price paid for generic versions of the drug. We focus on generic drugs for two reasons. First, for drugs commonly dispensed by physicians, a vast majority of the drugs are generic drugs regardless of dispensing point, which make the price comparison based on generic drug products valid. Second, some physicians may dispense brand names, but this occurs infrequently. However, relatively more prescriptions for brand name drugs are dispensed at pharmacies, and most often, these brand name drugs are prescribed and dispensed after generics are used. A higher proportion of brand name drugs among pharmacy-dispensed prescriptions would make the average pharmacy price for all drugs higher than if a similar proportion of brand names was dispensed between physician- and pharmacy-dispensed prescriptions. As a result, if the average price per pill is computed regardless of generic or brand name status of the drug, the results may overstate the pharmacy price substantially, overall and for some drugs.

In tracking trends and comparing prices between physician- and pharmacy-dispensed prescriptions, we report the average price per pill for drugs dispensed by physicians or pharmacies, either for the drug as a whole across different strengths or for a common strength of the drug. Reporting the average price per pill for a drug of existing strength or new strength helps to separate the impact of price-focused reforms from the emerging new strength issue, which is the result of behavioral changes on the part of some physicians likely due to certain economic incentives embedded on the pricing of these drug products. In addition to the average price per pill, we also examined the underlying distribution of the prices. While the spread of the price distribution tended to narrow in the post-reform states, the price distributions did not add significant additional information for the price comparison and trends. For simplicity, we continue to focus on the average price per pill for specific drugs dispensed by physicians versus pharmacies.

We also constructed a price metric to measure unit price for topical pain relief patches. For the analysis of topical patches, we included both generic and brand name products. We did this because a significant proportion of topical pain relief products dispensed to injured workers were brand name, especially before the patent for Lidoderm® expired in 2013. This approach is different than that used for the price comparison of the pill-form drugs. Note that we included the topical pain patches in this report to provide additional evidence of the same issue observed in physician-dispensed higher-priced new strengths.

To investigate the underlying reasons for noticeable changes in the prices paid for physician- and pharmacy-dispensed drugs, we used the Medi-Span® price history data to obtain the AWP for unique NDCs. This additional dataset helps to separate the impact of increases in the manufacturer prices for individual drug products on the changes in the average price paid for specific drugs across strengths and formulations.

Although infrequent, outlier prices could be seen in the distribution of price per pill for a given drug, after controlling for drug name, dispensing point, generic or brand name status of the drug, short- or long-acting version of the drug, time period during which it was dispensed, and state of jurisdiction. These outlier values were likely due to data entry errors in the variables underlying the computation of price per pill (mainly amount paid and quantity). In our data, these were seen within the top 1 percent of the distribution for most of the common drugs and up to 3 percent for a few drugs. However, these outlier values may have a considerable impact on the accuracy of the average price per pill because of the large values. To address this issue, we established a set of thresholds in price per pill for individual drugs based on the percentile distribution, controlling for the key variables described above by taking 150 percent of the value at the 97th percentile. This set of thresholds was reviewed and, in a few cases, modified to address residual issues with

upper bounds that remained unusually high. The established set of thresholds was subsequently used to cap the price per pill for prescriptions of specific drugs.[7]

It should be noted that although the numbers reported here may be somewhat different from previously published WCRI studies, the major findings and supporting data are consistent between this study and the past WCRI studies on physician dispensing. The reasons for different numbers include (1) a larger sample of data covering proportionally more claims in the self-insured market; (2) enhancements to the data and methodology related to sample selection for constructing prescription metrics and price comparisons (e.g., capping outlier prices, as discussed earlier); (3) improvement in the mapping of dispensing point, especially for detailed prescription transaction data from PBMs and third-party billers who may handle some physician-dispensed prescriptions; and (4) incorporation of a more recent update of the Medi-Span® database.

It should also be noted that the numbers reported in this study may be different from studies conducted by other researchers on the same topic. The differences, if any, usually reflect different study designs in terms of how physician-dispensed prescriptions should be defined and identified, whether compounded drugs and other workers' compensation pharmaceuticals should be included in a study, and the time frame based on which the experience of the injured workers are observed. In general, physician dispensing is more likely to occur earlier in the claim, and our study focused on prescribing and dispensing patterns for the first two years of each claim. Claims with much longer maturity may receive a different mix of drugs compared with those with shorter maturity. Compounded drugs are often dispensed at pharmacies at a higher price, and the prevalence of compounded drugs increased in some states. These are major factors that may explain the difference in the frequency and costs of physician dispensing across different studies.[8]

[7] Because the underlying variables are amount paid and quantity, we implemented the capping so that if the amount paid for a prescription was greater than a converted value (i.e., the product of the price-per-pill threshold for capping and the quantity or number of pills for the prescription) for the drug in a given group, the amount paid was capped at the converted value. This way, the price capping would have an effect on other related prescription benchmark measures to maintain internal consistency. For a few other drugs reported in other WCRI prescription benchmarks studies, the value at the 97th percentile could still be unusually high, resulting in some residual "outliers" after the 1.5*97th percentile capping. In these cases, we checked the data to make sure that it was not caused by a data anomaly due to processing. Once we ruled out a systematic error, we adjusted the capping thresholds by using the maximum value of the capping thresholds for the same drug separately for generic and brand name drug products.

[8] See Chapter 3 for a discussion, as an example, which compares this study and the California studies on physician dispensing.

3

Frequency and Costs of Physician Dispensing

In this chapter, we describe the prevalence and costs of physician dispensing in 2014 across the 26 states studied. We also analyze the data in light of physician dispensing reforms and highlight several post-reform states where physician dispensing continued to be prevalent and represented a higher share of prescription costs.

Figures 3.1 and 3.2 provide snapshots of the percentage of all prescriptions and the percentage of total prescription payments that were for physician-dispensed prescriptions in 2014. Table 3.1 presents the numerical data underlying Figures 3.1 and 3.2.[1]

Among the 26 states included in the study, there are six states (Arkansas, Massachusetts, Minnesota, Nevada, New York, and Texas) where physician dispensing was infrequent (Figure 3.1). In Arkansas, Massachusetts, Minnesota, New York, and Texas, physician dispensing is not allowed in general or is infrequent in practice. Nevada allows physicians to dispense prescription drugs and had reforms to address the costs of physician-dispensed prescriptions, but physician dispensing was infrequent. These six states are included in the frequency and costs of physician dispensing measures but are excluded from the subsequent analyses in the report.

Of the remaining 20 states, 13 states (California, Connecticut, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Michigan, North Carolina, Pennsylvania, South Carolina, and Tennessee) had reforms that were aimed at reducing the costs of physician-dispensed drugs.[2] For 10 of the 13 states, we observed full post-reform experience in the 2014 data. The 2014 data are pre-reform for Kansas and Pennsylvania and reflect a mix of pre- and post-reform experience for North Carolina.[3] The rest of the states (Iowa, Louisiana, Maryland, Missouri, New Jersey, Virginia, and Wisconsin) did not have reforms aimed at addressing costs of

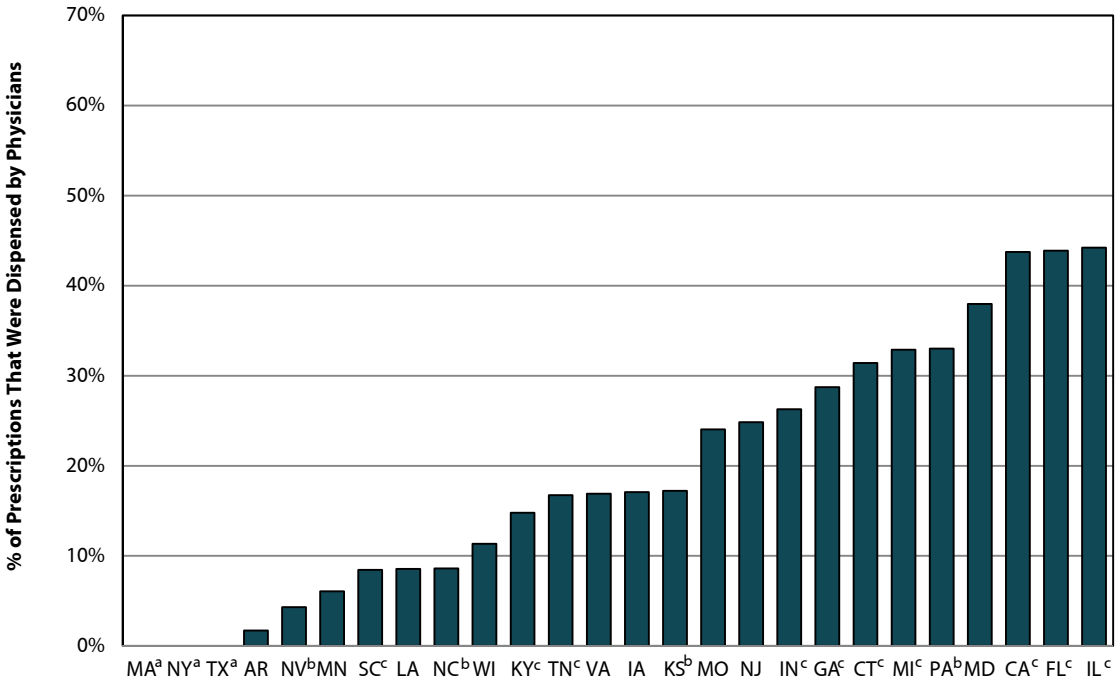
[1] In Table 3.1, the states are ordered by the cost share of physician-dispensed prescriptions for easy reference. While many states had reforms and the 2014 data reflect post-reform experience, some states did not have reforms, and several other states had reforms but the 2014 data were pre-reform. Because the states were in different situations that influence the frequency and cost share of physician dispensing, we provide background information about the reforms to help the reader better interpret the results.

[2] See Appendix A for a summary of state policies regarding pharmacy fee schedules and physician dispensing.

[3] Kansas updated its pharmacy fee schedule on January 1, 2015; it requires compound drugs and physician-dispensed drugs to be reimbursed at the same level as pharmacies, based on the original manufacturer NDC, and the updated fee schedule also requires prior approval of the employers/carriers for drugs to be dispensed outside pharmacies. Effective December 26, 2014, Pennsylvania capped the prices paid for physician-dispensed drugs to 110 percent of the AWP of the original drug while limiting physician-dispensed drugs to a short time frame (i.e., a 7-day supply for nonsurgical claims and a 15-day supply for surgical claims). The data presented are pre-reform for these two states; they serve as a baseline for evaluating the physician dispensing reforms. In North Carolina, a physician dispensing reform, which went into effect on August 7, 2014, caps the prices paid for physician-dispensed drugs to 100 percent of the AWP of the least expensive therapeutically equivalent drug. North Carolina's reform also limits physician-dispensed Schedule II and III opioids to five days of supply. The data for 2014 are a mix of pre- and post-reform for North Carolina.

physician-dispensed drugs.[4]

Figure 3.1 Percentage of All Prescriptions That Were Dispensed by Physicians, Service Year 2014



Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details.

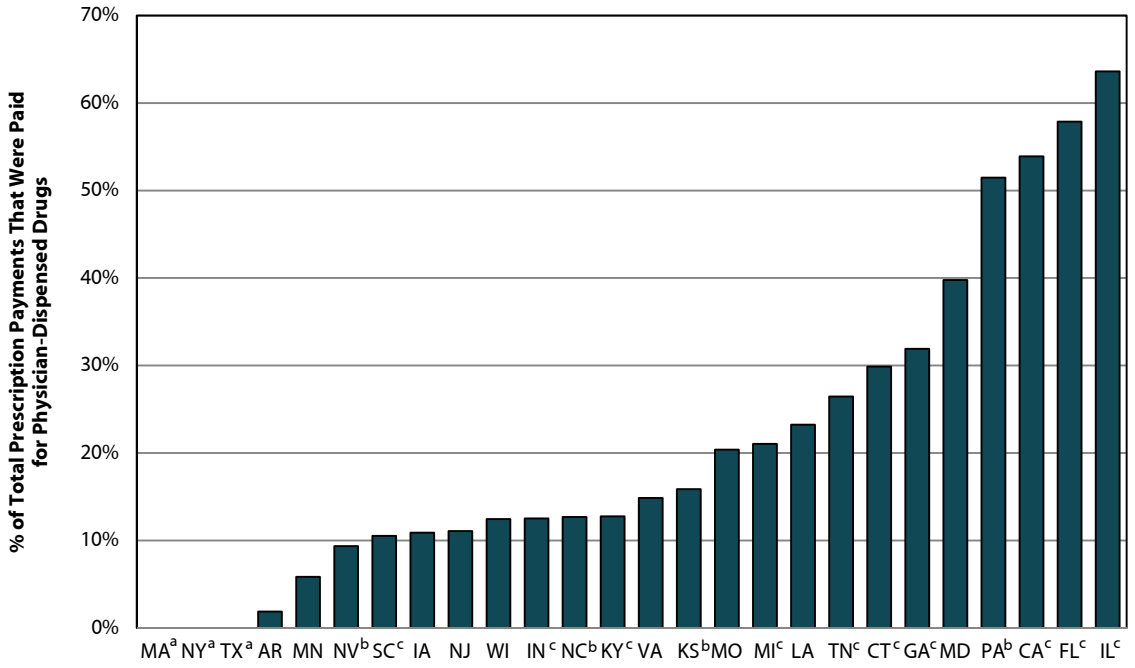
[a] In Massachusetts, New York, and Texas, physician dispensing is not allowed in general.

[b] The 2014 data for North Carolina are a mix of pre- and post-reform results. For Kansas, Nevada, and Pennsylvania, the data reflect pre-reform experience. In North Carolina (effective August 2014) and Pennsylvania (effective December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. Effective January 2016, Nevada's fee schedule sets the maximum reimbursement amount for physician-dispensed drugs to the average wholesale price of the original NDC. See Appendix A for a description of the reforms.

[c] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), South Carolina (2011), and Tennessee (2012). See Appendix A for a description of the reforms.

[4] Wisconsin passed legislation, effective March 2016, requiring that drugs dispensed outside retail pharmacies be reimbursed at the same rate as that paid to pharmacies for the same drug. However, the statutory language does not explicitly state that the reimbursement be based on the price of the original drug if a repackaged drug is dispensed. Because of this, we did not group Wisconsin with the other price-focused reform states. Our definition of a price-focused reform includes two basic elements (a reimbursement rate tied to that of pharmacies and a reference price of the original drug assigned by the manufacturer).

Figure 3.2 Percentage of Total Prescription Payments That Were Paid for Physician-Dispensed Drugs, Service Year 2014



Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details.

[a] In Massachusetts, New York, and Texas, physician dispensing is not allowed in general.

[b] The 2014 data for North Carolina are a mix of pre- and post-reform results. For Kansas, Nevada, and Pennsylvania, the data reflect pre-reform experience. In North Carolina (effective August 2014) and Pennsylvania (effective December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. Effective January 2016, Nevada's fee schedule sets the maximum reimbursement amount for physician-dispensed drugs to the average wholesale price of the original NDC. See Appendix A for a description of the reforms.

[c] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), South Carolina (2011), and Tennessee (2012). See Appendix A for a description of the reforms.

Table 3.1 Frequency and Costs of Physician Dispensing, Service Year 2014

	Percentage of All Rx That Were Dispensed by Physicians	Percentage of Total Rx Payments That Were Paid for Physician-Dispensed Rx
Illinois[a]	44%	64%
Florida[a]	44%	58%
California[a]	44%	54%
Pennsylvania[b]	33%	51%
Maryland	38%	40%
Georgia[a]	29%	32%
Connecticut[a]	31%	30%
Tennessee[a]	17%	26%
Louisiana	9%	23%
Michigan[a]	33%	21%
Missouri	24%	20%
Kansas[b]	17%	16%
Virginia	17%	15%
Kentucky[a]	15%	13%
North Carolina[b]	9%	13%
Indiana[a]	26%	13%
Wisconsin	11%	12%
New Jersey	25%	11%
Iowa	17%	11%
South Carolina[a]	8%	11%
Nevada[b]	4%	9%
Minnesota	6%	6%
Arkansas	2%	2%
Massachusetts[c]	n/a	n/a
New York[c]	n/a	n/a
Texas[c]	n/a	n/a

Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The states are ranked by the percentage of prescription payments that were paid for physician-dispensed prescriptions.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), South Carolina (2011), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] The 2014 data for North Carolina are a mix of pre- and post-reform results. For Kansas, Nevada, and Pennsylvania, the data reflect pre-reform experience. In North Carolina (effective August 2014) and Pennsylvania (effective December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. Effective January 2016, Nevada's fee schedule sets the maximum reimbursement amount for physician-dispensed drugs to the average wholesale price of the original NDC. See Appendix A for a description of the reforms.

[c] In Massachusetts, New York, and Texas, physician dispensing is not allowed in general.

Key: n/a: not applicable; Rx: prescriptions.

Figure 3.1 shows that in post-reform California, Florida, and Illinois, physicians dispensed 44 percent of all prescriptions in 2014.[5] Physician dispensing was also common in Connecticut, Maryland, Michigan, and Pennsylvania, with the physician share of prescriptions ranging from 31 to 38 percent. Among these states with frequent physician dispensing, all but Maryland had reforms to address the costs of physician dispensing. In several other states (Georgia, Indiana, Missouri, and New Jersey), physicians dispensed more than 20 percent of the prescriptions. Note that in Indiana, Missouri, and New Jersey, the physician share of prescription costs was not as high as several other states with frequent physician dispensing, and when physicians dispensed in these three states, they dispensed prescriptions with fewer quantities than those of the prescriptions dispensed at pharmacies.[6]

Table 3.1 shows that the cost share for physician-dispensed drugs varied more substantially among the states studied. In California, Florida, Illinois, and Pennsylvania, 51 to 64 percent of the total prescription payments were paid to physicians for drugs they dispensed.[7] The same figure was 30 to 40 percent in Connecticut, Georgia, and Maryland.

Overall, physician dispensing was still common and represented substantially higher prescription cost shares in California, Florida, Illinois, Maryland, and Pennsylvania. For post-reform California, Florida, and Illinois, the higher prescription cost share was primarily driven by frequent physician dispensing of higher-priced new strengths and formulation.[8] In Maryland, policymakers and stakeholders have debated issues related to physician dispensing and proposed regulatory changes to address them in the past years. However, no policy changes have been made at the state level. Pennsylvania had reforms, effective in December 2014, that capped the prices paid for physician-dispensed drugs and limited physician dispensing to a short time frame. The 2014 results for Pennsylvania may serve as a baseline to evaluate the reforms. Note that several states where physician dispensing was less frequent also had reforms, including North Carolina, South

[5] Note that the frequency of physician dispensing reported for California (44 percent in 2014) was higher than what was reported by RAND (Wynn, et al., 2016) based on data from the Workers' Compensation Insurance Rating Bureau of California (about 35 percent in the same year). See a discussion of several main reasons for the difference in footnote 7.

[6] For several other states, including Iowa, Kentucky, Michigan, and Virginia, the physician cost share was lower than the share of prescriptions (Figures 3.1–3.2 and Table 3.1). This is because, when they dispensed in these states, physicians often dispensed prescriptions with fewer pills compared with the same prescriptions dispensed at pharmacies. For example, the average number of pills per prescription in Michigan was 28, lower than the 49 pills per prescription for prescriptions dispensed at pharmacies. As a result, the price per prescription for a specific drug dispensed by physicians may have been lower than that for the same drug dispensed at a pharmacy. However, the average price per pill paid for physician-dispensed prescriptions was still higher than that for the same drug dispensed at a pharmacy.

[7] It should be noted that the cost share of physician dispensing reported for California (54 percent in 2014) was higher than the cost share reported by a Workers' Compensation Insurance Rating Bureau of California (WCIRB) study (37 percent in the first half of 2014 and 35 percent in the second half of 2014) (see Johnson, 2016). The difference in the reported numbers may be largely explained by the differences in the study design as well as possible differences in the underlying data used for the two studies. There are two main differences in study design: (1) this study is based on prescriptions for all medical claims with injuries occurring within two years prior to the fill date (i.e., 24 months of maturity), while the WCIRB data has prescriptions for claims of all maturities; and (2) this study excludes compounded drugs, which are included in the WCIRB data. These are factors that likely contributed to the higher cost share of physician-dispensed prescriptions because physician-dispensed prescriptions tend to be front loaded to some extent (i.e., physician dispensing tends to occur earlier in the claim), and California saw an increase in the use of compound drugs in recent years, which tend to be dispensed at pharmacies with higher prices. Note that the cost share was similar in earlier years between the two studies. Differences in the definition and identification of physician-dispensed drugs and different ways of including and excluding the prescription transactions may also have contributed to the difference in the cost share between the two studies. See Chapter 2 for a detailed description of how we define and identify physician-dispensed prescriptions. For California, we included almost all nonhospital prescriptions from the data sources that represented 44 percent of all claims in the state workers' compensation system. One may be concerned about the representativeness of the data that only accounted for 44 percent of the market. This should not be a major concern because there is a large overlapping pool of medical providers in the same health care delivery system that are shared by different payors.

[8] Chapter 5 describes the issue of frequent physician dispensing of higher-priced new drug products.

Carolina, and Tennessee.[9]

As mentioned above, the physician cost share was substantially higher for several post-reform states. The cost share was much higher than the prescription share for physician-dispensed prescriptions, especially in post-reform California, Florida, and Illinois (Figures 3.1–3.2 and Table 3.1). The higher cost share in these states was mainly because of the higher average price paid for physician-dispensed prescriptions, relative to the average price paid for pharmacy-dispensed prescriptions, which was driven by the frequent physician dispensing of higher-priced new drug products.

Tables 3.2a–c illustrate the results of a price comparison for the same drug between physician- and pharmacy-dispensed prescriptions, focusing on three drugs that are commonly dispensed by physicians (cyclobenzaprine, hydrocodone-acetaminophen, and tramadol). For each of these common drugs, we show the average price per pill paid for physician- and pharmacy-dispensed prescriptions for the drug across all strengths and for the most common strength, which existed in the market at the time of the reforms (referred to as an *existing strength*). We also show the price differentials across the states, which measure physician price as a percentage above or below pharmacy price for the same drug. Data in each section are sorted by the price differential from the lowest to the highest. The post-reform states are labeled and highlighted. For the price comparison, we focus on the 20 states excluding Arkansas, Massachusetts, Minnesota, Nevada, New York, and Texas.

For example, the average price paid for physician-dispensed cyclobenzaprine was $2.08 per pill in Pennsylvania, which was 132 percent higher than if the same drug were dispensed at pharmacies ($0.90 per pill). The price differential for the same drug ranged from 14 percent in Michigan to 232 percent in Illinois, for all states except California.[10]

When looking at the prices paid for these common drugs holding the strength constant, the price differentials for the drug products of common strengths were significantly smaller. For example, for 10-milligram cyclobenzaprine, the price differential for the post-reform states ranged from 20 percent in Indiana to 63 percent in Illinois, with most of the post-reform states clustered on the lower side of the price differentials (Table 3.2b).[11] Similar clustering was seen for the two other drugs (tramadol and hydrocodone-acetaminophen). By contrast, the price differentials for the common strengths were higher for states that did not have reforms or had reforms with pre-reform experience observed.

In four post-reform states (California, Florida, Illinois, and Tennessee), the much higher price differential for cyclobenzaprine across all strengths was because some physicians frequently dispensed the new 7.5-milligram strength and were paid much higher prices. Similar patterns can be seen for the other two common drugs (Tables 3.2a–c). Since these three drugs accounted for 22–27 percent of all physician-

[9] Physician dispensing was less frequent in these states. The percentage of all prescriptions that were dispensed by physicians was 11–15 percent in North Carolina in the years between 2011 and 2013. The 2014 data reflect a mix of pre- and post-reform experience for North Carolina. In South Carolina, 23 percent of the prescriptions were dispensed by physicians in 2011. In Tennessee, the same figure was 24 percent.

[10] In California, the average price per pill paid to physicians for cyclobenzaprine was higher than the physician price in most study states, but the average price per pill paid to pharmacies for the same drug was much lower in California than in the other study states (Table 3.2b). As a result, the price differential for cyclobenzaprine in California was much higher (524 percent). A similar pattern was seen for tramadol. The much lower pharmacy prices for these drugs were because California's pharmacy fee schedule is based on Medi-Cal, the state Medicaid fee schedule, which sets the maximum amount for drugs to the lesser of a discounted AWP or the federal upper limit for specific drugs. The discounted AWP is typically 17 percent below the AWP. By contrast, pharmacy fee schedules in most other states are mostly at or higher than the AWP.

[11] Because the 7.5-milligram new strength of cyclobenzaprine was rarely seen among pharmacy-dispensed prescriptions, we cannot compare the average price paid for physician- and pharmacy-dispensed prescriptions for this strength.

dispensed prescriptions, the higher prices paid to physicians for these common drugs were the main reason the physician cost share was substantially higher relative to the prescription share for physician-dispensed drugs.

Table 3.2a Difference in the Average Price per Pill Paid for Physician- and Pharmacy-Dispensed Prescriptions for Hydrocodone-Acetaminophen, Service Year 2014

Hydrocodone-acetaminophen, all strengths	KY[a]	NJ	CT[a]	FL[a]	TN[a]	SC[a]	GA[a]	IA	MI[a]	CA[a]	VA	KS[b]	MO	MD	IN[a]	WI	PA[b]	NC[b]	IL[a]	LA
Average price per pill paid to physician-dispensers	–	–	$0.85	$0.67	$0.61	$0.62	$0.74	$0.71	$0.72	$0.88	$0.87	$0.80	$0.89	$1.07	$1.05	$1.13	$1.86	$1.64	$1.87	$2.83
Average price per pill paid to pharmacies	$0.52	$0.93	$0.84	$0.60	$0.53	$0.52	$0.56	$0.52	$0.50	$0.59	$0.59	$0.50	$0.52	$0.57	$0.54	$0.51	$0.63	$0.52	$0.54	$0.58
Price differentials	–	–	1%	11%	14%	19%	34%	35%	44%	48%	48%	61%	70%	87%	93%	121%	196%	218%	244%	390%
Existing strength of hydrocodone-acetaminophen, 325-5 mg[c]	**FL[a]**	**KS[b]**	**KY[a]**	**MI[a]**	**NC[b]**	**NJ**	**SC[a]**	**TN[a]**	**CA[a]**	**GA[a]**	**IL[a]**	**CT[a]**	**IN[a]**	**IA**	**VA**	**MO**	**MD**	**WI**	**PA[b]**	**LA**
Average price per pill paid to physician-dispensers	–	–	–	–	–	–	–	$0.53	$0.60	$0.63	$0.65	$0.69	$0.71	$0.72	$0.82	$0.95	$0.97	$1.18	$1.82	$2.56
Average price per pill paid to pharmacies	$0.50	$0.47	$0.48	$0.45	$0.47	$0.43	$0.47	$0.51	$0.52	$0.51	$0.48	$0.49	$0.50	$0.50	$0.49	$0.49	$0.44	$0.48	$0.46	$0.51
Price differentials	–	–	–	–	–	–	–	3%	15%	24%	37%	42%	43%	45%	68%	95%	122%	145%	295%	401%

Table 3.2b Difference in the Average Price per Pill Paid for Physician- and Pharmacy-Dispensed Prescriptions for Cyclobenzaprine HCL, Service Year 2014

Cyclobenzaprine HCL, all strengths	MI[a]	IA	KY[a]	IN[a]	WI	VA	GA[a]	MD	CT[a]	NC[b]	NJ	KS[b]	SC[a]	PA[b]	MO	LA	TN[a]	FL[a]	IL[a]	CA[a]
Average price per pill paid to physician-dispensers	$0.94	$1.17	$1.22	$1.38	$1.37	$1.57	$1.65	$1.48	$1.78	$1.69	$1.70	$1.49	$1.80	$2.08	$1.74	$2.11	$1.99	$3.10	$2.55	$2.17
Average price per pill paid to pharmacies	$0.82	$0.87	$0.82	$0.86	$0.80	$0.87	$0.88	$0.77	$0.89	$0.82	$0.81	$0.71	$0.81	$0.90	$0.73	$0.88	$0.80	$1.05	$0.77	$0.35
Price differentials	14%	34%	48%	60%	71%	80%	87%	93%	100%	108%	110%	111%	121%	132%	138%	139%	150%	195%	232%	524%
Existing strength of cyclobenzaprine HCL, 10 mg[c]	**IN[a]**	**MI[a]**	**CA[a]**	**FL[a]**	**TN[a]**	**SC[a]**	**CT[a]**	**IA**	**GA[a]**	**KY[a]**	**WI**	**IL[a]**	**VA**	**MD**	**NC[b]**	**KS[b]**	**NJ**	**PA[b]**	**MO**	**LA**
Average price per pill paid to physician-dispensers	$0.95	$0.91	$0.37	$1.26	$1.03	$1.06	$1.15	$1.19	$1.21	$1.19	$1.17	$1.14	$1.41	$1.33	$1.60	$1.47	$1.62	$1.84	$1.68	$2.10
Average price per pill paid to pharmacies	$0.79	$0.75	$0.29	$0.91	$0.75	$0.75	$0.79	$0.82	$0.83	$0.76	$0.74	$0.70	$0.80	$0.69	$0.77	$0.68	$0.73	$0.83	$0.70	$0.81
Price differentials	20%	21%	25%	37%	38%	40%	45%	45%	46%	57%	58%	63%	76%	93%	108%	117%	122%	122%	141%	158%

Table 3.2c Difference in the Average Price per Pill Paid for Physician- and Pharmacy-Dispensed Prescriptions for Tramadol HCL, Service Year 2014

Tramadol HCL, all strengths	KY[a]	WI	IN[a]	IA	MI[a]	CT[a]	MO	KS[b]	NJ	MD	VA	SC[a]	GA[a]	NC[b]	TN[a]	PA[b]	LA	FL[a]	IL[a]	CA[a]
Average price per pill paid to physician-dispensers	–	–	$0.93	$1.05	$1.11	$1.24	$1.39	$1.35	$1.67	$1.61	$1.92	$2.34	$2.44	$2.54	$2.92	$2.83	$3.50	$3.68	$5.96	$3.97
Average price per pill paid to pharmacies	$0.66	$0.69	$0.71	$0.70	$0.66	$0.66	$0.67	$0.63	$0.66	$0.63	$0.72	$0.68	$0.70	$0.68	$0.73	$0.69	$0.77	$0.74	$0.69	$0.32
Price differentials	–	–	32%	50%	68%	86%	108%	114%	153%	154%	168%	243%	247%	272%	301%	308%	357%	396%	759%	1,125%
Existing strength of tramadol HCL, 50 mg[c]	**KY[a]**	**WI**	**CA[a]**	**TN[a]**	**IN[a]**	**SC[a]**	**FL[a]**	**IL[a]**	**GA[a]**	**MI[a]**	**CT[a]**	**IA**	**MO**	**KS[b]**	**MD**	**VA**	**NC[b]**	**PA[b]**	**NJ**	**LA**
Average price per pill paid to physician-dispensers	–	–	$0.23	$0.75	$0.78	$0.84	$0.94	$0.90	$0.92	$0.87	$0.89	$1.05	$1.39	$1.34	$1.25	$1.47	$1.43	$1.59	$1.60	$2.40
Average price per pill paid to pharmacies	$0.65	$0.67	$0.22	$0.66	$0.66	$0.64	$0.71	$0.67	$0.67	$0.64	$0.62	$0.67	$0.65	$0.62	$0.57	$0.64	$0.62	$0.65	$0.60	$0.71
Price differentials	–	–	3%	13%	19%	31%	33%	34%	36%	37%	43%	57%	112%	115%	120%	128%	129%	146%	169%	238%

Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. For a given drug, the states are ranked by the price differential, measured as the percentage of the physician price above/below the pharmacy price for the drug. The average price per pill paid to physicians and pharmacies are for the drugs with either all prescription strengths or existing strengths to make a meaningful price comparison.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), South Carolina (2011), and Tennessee (2012).

[b] The 2014 data for North Carolina are a mix of pre- and post-reform results. For Kansas and Pennsylvania, the data reflect pre-reform experience. In North Carolina (effective August 2014) and Pennsylvania (effective December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

[c] For the three common drugs, we present the average price per pill paid to physicians for an existing strength to illustrate the impact of the price-focused reforms. These are the drug strengths that were commonly dispensed regardless of dispensing point.

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

4

TRENDS AND IMPACT OF REFORMS

In this chapter, we provide evidence that helps answer two main questions: (1) whether the reforms reduced the frequency of physician dispensing, and (2) whether the reforms reduced the prices paid for physician-dispensed prescriptions. Unlike previous WCRI reports that focused on the post-reform experience of individual states, we examine these two questions in a multistate context by comparing the results between post-reform states and states that did not have reforms or had reforms with pre-reform experience observed.

Over the study period between 2011 and 2014, 11 of the 26 states included in the study had price-focused reforms (Connecticut, Florida, Georgia, Illinois, Indiana, Kentucky, Michigan, North Carolina, Pennsylvania, South Carolina, and Tennessee).[1] California's reforms were prior to the study period, so we observed post-reform experience over the entire study period. Among these 11 reform states, 9 states had full post-reform experience observed in the 2014 data.[2] Throughout the report, we refer to these 9 states and California as post-reform states in 2014. Six states are not included in this analysis (Arkansas, Massachusetts, Minnesota, Nevada, New York, and Texas). In these states, physician dispensing is either not allowed in general or infrequent in practice. Seven states (Iowa, Louisiana, Maryland, Missouri, New Jersey, Virginia, and Wisconsin[3]) did not have physician dispensing reforms. Since the 2014 data are either pre-reform or a mix of pre- and post-reform for Kansas, North Carolina, and Pennsylvania, we grouped these 3 states with the 7 non-reform states and refer to these 10 states as non-reform or pre-reform states.[4]

Overall, we found that physicians dispensed fewer prescriptions in 2014 than in 2011, and the frequency of physician dispensing decreased considerably in all post-reform states and a majority of the non-reform or pre-reform states. While the price-focused reforms may be associated with the reduction, partly because of behavioral changes of some physician-dispensers and intermediaries in response to price reductions, other policies and initiatives may also explain some of the reductions.

In all post-reform states except California, Florida, and Illinois, the physician share of prescription costs decreased substantially as a result of large reductions in the frequency of physician dispensing and considerable decreases in the average price paid for physician-dispensed prescriptions. In California, Florida, and Illinois, however, the average price paid overall for physician-dispensed prescriptions increased, primarily

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[1] Kansas and Nevada had reforms in 2015 and 2016, respectively.

[2] The 2014 data are pre-reform for Pennsylvania and reflect a mix of pre- and post-reform experience for North Carolina.

[3] Wisconsin passed legislation, effective March 2016, requiring that drugs dispensed outside retail pharmacies be reimbursed at the same rate as that paid to pharmacies for the same drug. However, the statutory language does not explicitly state that the reimbursement be based on the price of the original drug if a repackaged drug is dispensed. Because of this, we did not group Wisconsin with the other price-focused reform states. Our definition of a price-focused reform includes two basic elements (a reimbursement rate tied to that of pharmacies and a reference price of the original drug assigned by the manufacturer).

[4] See Appendix A for a description of pharmacy fee schedules and physician dispensing reforms for these states.

driven by increased physician dispensing of higher-priced new strengths and new formulation.[5] For existing drug products, large price reductions were evident across the post-reform states. The increased physician dispensing of higher-priced new drug products offset the decrease in the average price paid to physicians for existing drug products in these three states. Over the same period, the physician share of prescription costs decreased in most non-reform or pre-reform states, but remained the same or increased in Kansas, Louisiana, Pennsylvania, and Virginia. Although a sizable price reduction for physician-dispensed drugs was seen in Iowa and Maryland, the physician price changed little or increased in the other non-reform or pre-reform states.

Figures 4.1 and 4.2 show changes in the frequency of physician dispensing and the physician share of prescription costs between 2011 and 2014. The frequency and cost shares were measured separately as the percentage of prescriptions that were dispensed by physicians and the percentage of total prescription payments that were paid for physician-dispensed prescriptions. The states are grouped into two groups, with post-reform states on the right side and non-reform or pre-reform states on the left side of the chart. Within each state group, the states are ranked by the 2014 data. Table 4.1 provides the data underlying the measures shown in Figures 4.1 and 4.2 in service years 2011 and 2014, with the percentage change between the two years.[6,7]

[5] Chapter 5 describes the issue of physician dispensing of higher-priced new strengths and formulation and also presents data showing the prevalence of the issue and the impact on prices paid for physician-dispensed prescriptions.

[6] For analysis purposes, we consider a state to have frequent physician dispensing if the state had more than 25 percent of all prescriptions dispensed by physicians. For physician cost share of prescriptions, a state is considered to have a high-cost share if the state had more than 30 percent of total prescription payments that were paid for physician-dispensed prescriptions in a given year. Indiana and Michigan had frequent physician dispensing, but the prescription cost share for physician-dispensed prescriptions was relatively low. This is because in these two states (and several other states including Missouri and New Jersey), physicians often dispense prescriptions with smaller quantities than the same prescriptions dispensed at pharmacies. Tennessee had less frequent physician dispensing, and the physician prescription cost share was slightly higher. In Kentucky and South Carolina, the frequency and cost share of physician-dispensed prescriptions were lower than most study states.

[7] Since the table was designed to show the impact of the reforms, we separated the post-reform states from the non-reform or pre-reform states. For all the post-reform states in the top section of Table 4.1, the 2014 data were post-reform. For the same set of states, the 2011 data were pre-reform for all except California and Georgia. The footnotes provide reform-related information for these states. For the states in the bottom section of the same table, we also identify the states where a reform was made but the 2014 data reflect pre-reform experience.

Figure 4.1 Changes in the Percentage of All Prescriptions That Were Physician-Dispensed Prescriptions, between Service Years 2011 and 2014

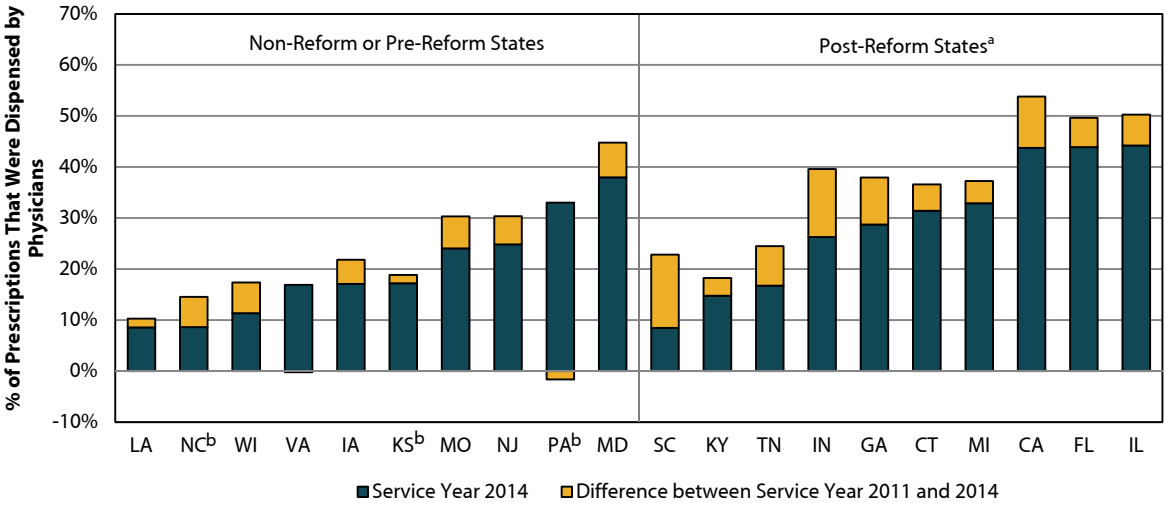
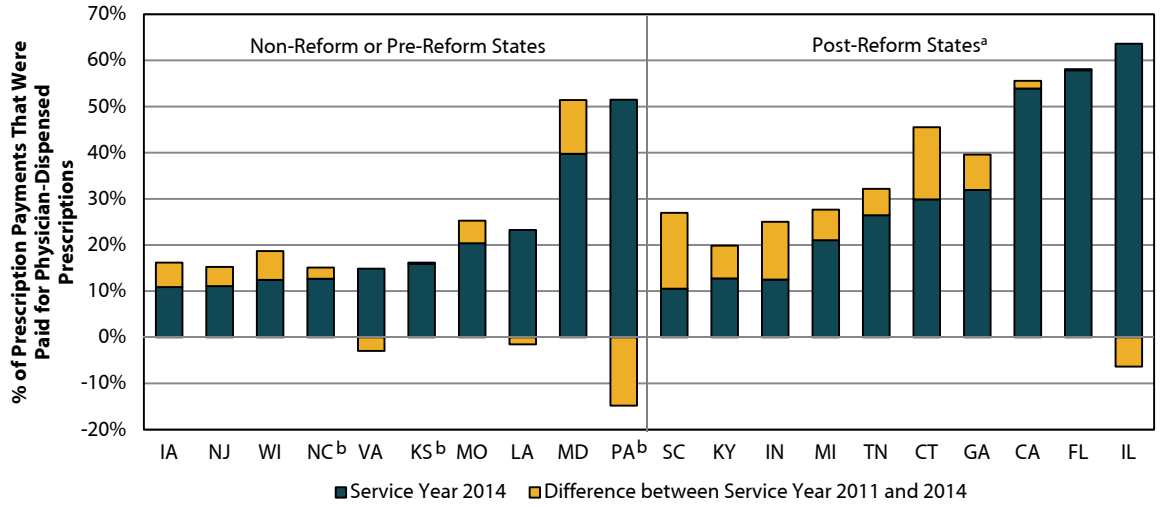


Figure 4.2 Changes in the Percentage of Total Prescription Payments That Were Paid for Physician-Dispensed Drugs, between Service Years 2011 and 2014



Notes: The underlying data include prescriptions filled in service years 2011 and 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The 10 post-reform states are presented on the right of the bar chart, and the states that did not have reforms or had reforms but the data show pre-reform experience are presented on the left side of the chart. See Appendix A for a description of the reforms.

[a] The change in the frequency of physician dispensing between 2011 and 2014 reflects the results before and after the price-focused reforms for all reform states on the right side of the chart, except for California and Georgia. The 2014 data are post-reform for all 10 states and the 2011 data are pre-reform for all but California and Georgia. For California, the 2011 data are post-reform, and for Georgia, the 2011 data are a mix of pre- and post-reform. The 10 post-reform states include, with the effective date in parentheses, California (March 2007), Connecticut (July 2012), Florida (July 2013), Georgia (April 2011), Illinois (November 2012), Indiana (July 2013), Kentucky (2013), Michigan (December 2012), South Carolina (December 2011), and Tennessee (August 2012).

[b] The 2014 data are a mix of pre-and post-reform experience for North Carolina (effective August 2014), pre-reform for Pennsylvania (effective December 2014), and pre-reform for Kansas (effective January 2015). This report provides a baseline for evaluating the reforms for these three states. Note that the rule change in North Carolina and Pennsylvania not only capped the prices paid for physician-dispensed drugs but also restricted physician-dispensed drugs to a short time frame. Kansas' new fee schedule sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

Table 4.1 Changes in the Frequency and Costs of Physician Dispensing, Service Years 2011 through 2014

	% of All Rx That Were Dispensed by Physicians		% Difference (2011–2014)	% of Rx Payments That Were Paid for Physician-Dispensed Rx		% Difference (2011–2014)
	2011	2014		2011	2014	
States with post-reform data						
Illinois[a]	50%	44%	-12%	57%	64%	11%
Florida[a]	50%	44%	-12%	58%	58%	0%
California[b]	54%	44%	-19%	56%	54%	-3%
Michigan[a]	37%	33%	-12%	28%	21%	-24%
Connecticut[a]	37%	31%	-14%	46%	30%	-34%
Georgia[b]	38%	29%	-24%	40%	32%	-19%
Indiana[a]	40%	26%	-34%	25%	13%	-50%
Tennessee[a]	24%	17%	-32%	32%	26%	-18%
Kentucky[a]	18%	15%	-19%	20%	13%	-36%
South Carolina[a]	23%	8%	-63%	27%	11%	-61%
States with no reforms or pre-reform data						
Maryland	45%	38%	-15%	51%	40%	-23%
Pennsylvania[c]	31%	33%	5%	37%	51%	40%
New Jersey	30%	25%	-18%	15%	11%	-27%
Missouri	30%	24%	-21%	25%	20%	-19%
Kansas[c]	19%	17%	-9%	16%	16%	-2%
Iowa	22%	17%	-22%	16%	11%	-33%
Virginia	17%	17%	1%	12%	15%	25%
Wisconsin	17%	11%	-35%	19%	12%	-33%
North Carolina[c]	15%	9%	-41%	15%	13%	-16%
Louisiana	10%	9%	-17%	22%	23%	7%

Notes: The underlying data include prescriptions filled in service years 2011 through 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The 10 post-reform states are presented in the top section of the table and the states that did not have reforms or had reforms but the data show pre-reform experience are presented in the bottom section of the table. See Appendix A for a description of the reforms.

[a] The change in the frequency of physician dispensing between 2011 and 2014 reflects the results before and after the price-focused reforms for these states, with the 2014 data reflecting post-reform experience and the 2011 data reflecting pre-reform experience. These post-reform states include, with the effective date in parentheses, Connecticut (July 2012), Florida (July 2013), Illinois (November 2012), Indiana (July 2013), Kentucky (2013), Michigan (December 2012), South Carolina (December 2011), and Tennessee (August 2012).

[b] For California, the 2011 and 2014 data are post-reform, and for Georgia, the 2011 data are a mix of pre- and post-reform, with the 2014 data reflecting post-reform experience. These two states had price-focused reforms in March 2007 and April 2011, respectively.

[c] The 2014 data are a mix of pre-and post-reform experience for North Carolina (effective August 2014), pre-reform for Pennsylvania (effective December 2014), and pre-reform for Kansas (effective January 2015). This report provides a baseline for evaluating the reforms for these three states. Note that the rule change in North Carolina and Pennsylvania not only capped the prices paid for physician-dispensed drugs but also restricted physician-dispensed drugs to a short time frame. Kansas' new fee schedule sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

Key: Rx: prescriptions.

In most reform states, physician-dispensed prescriptions represented a larger share of all prescriptions when compared with non-reform states. In 2011, more than 30 percent of all prescriptions were dispensed by physicians in 8 of the 13 reform states[8] (Connecticut, Florida, Georgia, Illinois, Indiana, Michigan, and Pennsylvania,[9] as well as California[10]), representing 25–58 percent of total prescription costs (Figure 4.1 and Table 4.1). In the other 5 reform states (Kansas, Kentucky, North Carolina, South Carolina, and Tennessee), physician dispensing was not as common. These states made reforms to address the higher prices paid for physician-dispensed prescriptions. In Maryland, physician dispensing was also common and represented a large cost share (45 percent of prescriptions and 51 percent of prescription payments in 2011). While policymakers and stakeholders in Maryland have debated the issues related to physician dispensing and proposed regulatory changes to address them in 2012–2013, no changes have been made at the state level.

Figure 4.1 shows that the frequency of physician dispensing decreased considerably in all post-reform states (on the right side of the bar chart) and in most of the non-reform or pre-reform states, except for Kansas, Pennsylvania, and Virginia (they had a less than 10 percent change between 2011 and 2014).[11] For Kansas and Pennsylvania, the 2014 data reflect pre-reform experience, which may serve as a baseline for evaluating the reforms. The considerable reductions in the frequency of physician dispensing across the post-reform states may be in part explained by certain behavioral changes of physician-dispensers or intermediaries in response to substantial price reductions as a result of the price-focused reforms. For several non-reform or pre-reform states, including Iowa, Missouri, North Carolina, and Wisconsin, the large reductions in the frequency of physician dispensing may have been associated with heightened awareness and policy discussion of the issues and increased efforts at various levels to control the costs of physician-dispensed drugs.[12] Other changes in policy initiatives that were aimed at reducing opioid prescriptions and/or limiting physicians' ability to dispense drugs may have also contributed to the frequency reductions across a number of states with or without price-focused reforms.[13]

Figure 4.2 shows large decreases in the percentage of total prescription payments for physician-dispensed prescriptions between 2011 and 2014 in all post-reform states except for California, Florida, and Illinois. The

[8] The 13 reform states included in this analysis are California, Connecticut, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Michigan, North Carolina, Pennsylvania, South Carolina, and Tennessee. Among these reform states, 10 had reforms between 2011 and 2014. California made rule changes prior to the study period. Kansas had a reform after the study period.

[9] We did not observe post-reform results for Pennsylvania in this report. Effective December 2014, Pennsylvania made changes to cap prices paid for physician-dispensed drugs to 110 percent of the AWP based on the NDC of the original drug used in the repackaging process if a repackaged drug is dispensed. In addition, the December 2014 physician dispensing reform also limits physician-dispensed drugs to a short time frame (7 days of supply for nonsurgical cases and 15 days of supply for surgical cases). See Appendix A for more details.

[10] We observed post-reform experience over the study period for California since California had reforms prior to the study period.

[11] Overall, on average, the reforms tended to be associated with a larger reduction in the frequency of physician dispensing (the correlation between the percentage reduction and reform indicator was -0.2337). However, the magnitude of reduction in some non-reform states was also substantial. Note that in reporting trends in physician dispensing, we took a conservative approach to just highlight the states with considerable decreases in the frequency of physician dispensing based on a 10 percent threshold.

[12] The 2014 data for North Carolina, where there was a substantial reduction in the frequency of physician dispensing, reflect a mix of pre-reform and post-reform experience.

[13] Over the study period, Florida, Indiana, Kentucky, and Tennessee, for example, had reforms limiting physician-dispensed prescriptions. For several non-reform states, changes in opioid policies may also have contributed to the frequency reduction. For example, Maryland's prescription drug monitoring program was fully operational in 2013, and prescribers are required to enroll in the program and use the database (see Thumula, Wang, and Liu, 2017, and Wang, forthcoming). Wisconsin made a change to the pharmacy reimbursement rules, effective March 2016, that requires prescriptions dispensed outside pharmacies to be reimbursed at the same level as if the same prescriptions were dispensed at a pharmacy.

physician share of prescription costs decreased by more than 30 percent in Connecticut, Indiana, Kentucky, and South Carolina, and the same figure decreased by 18–24 percent in Georgia, Michigan, and Tennessee. In these states, the large reduction in the cost share of physician-dispensed prescriptions was a product of a decrease in the frequency of physician dispensing and a price reduction for physician-dispensed drugs. However, in post-reform California, Florida, and Illinois, the physician share of prescription costs changed little or increased, despite a considerable decrease in the frequency of physician dispensing (Figures 4.1 and 4.2). In these three states, the average price paid to physicians for existing drugs decreased, but the increased physician dispensing of higher-priced new strengths and formulation[14] outweighed the price reduction for the existing drug strengths, driving up the average price overall for physician-dispensed prescriptions. As a result, there was little change or increase in the physician share of prescription costs despite a decrease in frequency.

For non-reform or pre-reform states, we also saw different trends in the physician share of prescription costs for different reasons. In Iowa and Wisconsin, the physician prescription cost share decreased by 33 percent. In several other non-reform or pre-reform states (Maryland, Missouri, New Jersey, and North Carolina), reductions were also seen, although the magnitudes were smaller (reductions of 16–27 percent). See Figure 4.2. Over the same period, the same figure changed little or increased in Kansas, Louisiana, Pennsylvania, and Virginia. In Pennsylvania, the physician share of prescription costs increased 40 percent between 2011 and 2014. Since 2014 is the last pre-reform year for Pennsylvania, we expect to see a decrease in the subsequent years after Pennsylvania's December 2014 reform. In Maryland, there was a decrease of 23 percent in the physician prescription cost share even though there were no reforms at the state level in the past few years. Although the physician cost share decreased in several non-reform or pre-reform states, the reduction was more consistently seen, and the magnitude of reduction was on average larger, for the post-reform states than for the non-reform or pre-reform states, except for California, Florida, and Illinois.[15]

As mentioned earlier, California, Florida, and Illinois saw little change or an increase after the reforms in the percentage of total payments for physician-dispensed prescriptions. This was the case despite a noticeable decrease in the percentage of all prescriptions that were dispensed by physicians (Figures 4.1 and 4.2). Since the physician share of prescription costs is a product of the frequency of physician dispensing and the average price paid for physician-dispensed prescriptions relative to that for the same drugs dispensed at pharmacies, we examined changes in the average price per pill paid for several drugs commonly dispensed by physicians. Tables 4.2 and 4.3 show changes in the average price per pill paid to physicians for several common drugs they dispensed, overall and by strength for common strengths, for the 10 post-reform states. The results on the same measures for non-reform or pre-reform states are presented in Tables 4.4 and 4.5. We do not report the average price paid per pill in these tables if the underlying prescription transactions do not support a minimum cell size (100 prescriptions) or physician dispensing was infrequent for certain drugs (less than 3 percent).[16]

[14] Chapter 5 provides the results and discussion of physician dispensing of new strengths and formulations.

[15] The percentage reduction in the physician share of prescription costs was correlated with the price-focused reforms to some extent (the correlation coefficient was 0.3181).

[16] For example, Florida's 2011 legislation banned physicians from dispensing Schedule II and III opioids. As a result, we saw few prescriptions dispensed by physicians for hydrocodone-acetaminophen. Because of the small number of prescriptions, it is not meaningful to report the average price per pill paid to physicians in Florida for hydrocodone-acetaminophen. In California, very few prescriptions for meloxicam were dispensed partially because of the low price set by Medi-Cal, the state Medicaid fee schedule, which was approximately 80 percent lower than the AWP of the same drug.

Table 4.2 Changes in the Average Price per Pill Paid for Physician-Dispensed Drugs in Post-Reform States,[a] between Service Years 2011 and 2014

	CA	CT	FL	GA	IL	IN	KY	MI	TN	SC
Ibuprofen (Motrin®)										
2011	$0.24	$0.60	$0.52	$0.38	$0.45	$0.34	$0.28	$0.51	$0.48	$0.58
2014	$0.22	$0.57	$0.63	$0.48	$0.28	$0.31	$0.26	$0.47	$0.49	$0.56
% change	-9%	-4%	23%	27%	-37%	-8%	-6%	-8%	2%	-4%
Meloxicam (Mobic®)										
2011	–	$4.51	$4.09	$3.89	$5.57	$4.43	$5.52	–	$4.93	$4.20
2014	–	$3.67	$4.13	$3.51	$4.21	$2.72	$4.85	–	$3.38	$3.86
% change	–	-19%	1%	-10%	-24%	-39%	-12%	–	-31%	-8%
Naproxen (Naprosyn®)										
2011	$0.66	$1.61	$1.61	$1.42	$1.78	$0.98	$1.67	$1.42	$1.66	$1.72
2014	$0.53	$1.27	$1.34	$1.22	$1.19	$0.91	$1.47	$1.25	$1.10	–
% change	-20%	-21%	-17%	-14%	-33%	-8%	-12%	-12%	-33%	–
Cyclobenzaprine HCL (Flexeril®)										
2011	$0.45	$1.55	$1.50	$1.37	$1.80	$1.27	$1.29	$1.42	$1.46	$1.68
2014	$2.17	$1.78	$3.10	$1.65	$2.55	$1.38	$1.22	$0.94	$1.99	$1.80
% change	385%	15%	107%	20%	42%	8%	-6%	-34%	37%	7%
Tramadol HCL (Ultram®)										
2011	$0.38	$1.57	$1.13	$1.09	$1.57	$1.26	$1.50	$1.25	$1.56	$1.47
2014	$3.97	$1.24	$3.68	$2.44	$5.96	$0.93	–	$1.11	$2.92	$2.34
% change	947%	-21%	225%	125%	281%	-26%	–	-11%	88%	59%
Hydrocodone-acetaminophen (Vicodin®)										
2011	$0.66	$1.46	–	$0.80	$1.42	$0.96	$1.14	$0.85	$1.08	$1.13
2014	$0.88	$0.85	–	$0.74	$1.87	$1.05	–	$0.72	$0.61	$0.62
% change	34%	-42%	–	-7%	32%	10%	–	-16%	-44%	-45%

Notes: The underlying data include prescriptions filled in service years 2011 and 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The 10 post-reform states are included in this table. The states that did not have reforms or had reforms but the data show pre-reform experience are presented in separate tables. See Appendix A for a description of the reforms.

[a] The change in the average price per pill paid for physician-dispensed drugs between 2011 and 2014 reflects the results before and after the price-focused reforms, except for California and Georgia. The 2014 data are post-reform for all 10 states, and the 2011 data are pre-reform for all but California and Georgia. For California, the 2011 data are post-reform, and for Georgia, the 2011 data are a mix of pre- and post-reform. The 10 post-reform states include, with the effective date in parentheses, California (March 2007), Connecticut (July 2012), Florida (July 2013), Georgia (April 2011), Illinois (November 2012), Indiana (July 2013), Kentucky (2013), Michigan (December 2012), South Carolina (December 2011), and Tennessee (August 2012).

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

Table 4.3 Changes in the Average Price per Pill Paid for Physician-Dispensed Drugs of Common Strengths in Post-Reform States,[a] between Service Years 2011 and 2014

	CA	CT	FL	GA	IL	IN	KY	MI	TN	SC
Ibuprofen (Motrin®), 200 mg										
2011	$0.14	–	$0.27	$0.16	$0.22	$0.13	$0.10	$0.16	$0.27	–
2014	$0.13	–	$0.22	$0.09	$0.10	$0.15	$0.06	$0.10	–	–
% change	-12%	–	-18%	-43%	-57%	20%	-35%	-40%	–	–
Meloxicam (Mobic®), 15 mg										
2011	–	$6.23	$4.89	$4.96	$7.04	$4.03	$6.03	–	$6.54	$5.59
2014	–	$4.84	$5.07	$4.64	$4.89	–	$5.34	–	$4.36	$4.60
% change	–	-22%	4%	-6%	-31%	–	-11%	–	-33%	-18%
Naproxen (Naprosyn®) 500 mg										
2011	$0.72	$1.60	$1.62	$1.42	$1.83	$1.01	$1.68	$1.43	$1.67	$1.73
2014	$0.53	$1.28	$1.34	$1.22	$1.22	$0.91	$1.47	$1.26	$1.12	–
% change	-26%	-20%	-17%	-14%	-33%	-10%	-12%	-12%	-33%	–
Cyclobenzaprine HCL (Flexeril®), 10 mg										
2011	$0.47	$1.53	$1.42	$1.35	$1.81	$1.26	$1.28	$1.43	$1.45	$1.65
2014	$0.37	$1.15	$1.26	$1.21	$1.14	$0.95	$1.19	$0.91	$1.03	$1.06
% change	-23%	-25%	-12%	-10%	-37%	-25%	-7%	-36%	-29%	-36%
Tramadol HCL (Ultram®), 50 mg										
2011	$0.38	$1.55	$1.13	$1.09	$1.57	$1.26	$1.50	$1.25	$1.53	$1.46
2014	$0.23	$0.89	$0.94	$0.92	$0.90	$0.78	–	$0.87	$0.75	$0.84
% change	-39%	-42%	-16%	-16%	-43%	-38%	–	-30%	-51%	-43%
Hydrocodone-acetaminophen (Vicodin®), 5-325 mg										
2011	$0.61	$1.55	–	$0.71	$1.58	$0.96	–	–	$1.09	–
2014	$0.60	$0.69	–	$0.63	$0.65	$0.71	–	–	$0.53	–
% change	-1%	-55%	–	-10%	-59%	-25%	–	–	-51%	–

Notes: The underlying data include prescriptions filled in service years 2011 and 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The 10 post-reform states are included in this table. The states that did not have reforms or had reforms but the data show pre-reform experience are presented in separate tables. See Appendix A for a description of the reforms.

[a] The change in the average price per pill paid for physician-dispensed drugs between 2011 and 2014 reflects the results before and after the price-focused reforms, except for California and Georgia. The 2014 data are post-reform for all 10 states, and the 2011 data are pre-reform for all but California and Georgia. For California, the 2011 data are post-reform, and for Georgia, the 2011 data are a mix of pre- and post-reform. The 10 post-reform states include, with the effective date in parentheses, California (March 2007), Connecticut (July 2012), Florida (July 2013), Georgia (April 2011), Illinois (November 2012), Indiana (July 2013), Kentucky (2013), Michigan (December 2012), South Carolina (December 2011), and Tennessee (August 2012).

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

Table 4.4 Changes in the Average Price per Pill Paid for Physician-Dispensed Drugs in Non-Reform or Pre-Reform States, between Service Years 2011 and 2014

	IA	KS[a]	LA	MD	MO	NC[a]	NJ	PA[a]	VA	WI
Ibuprofen (Motrin®)										
2011	$0.56	$0.46	$0.79	$0.58	$0.58	$0.51	$0.52	$0.74	$0.46	$0.42
2014	$0.59	$0.48	$0.80	$0.49	$0.65	$0.49	$0.65	$0.79	$0.47	$0.60
% change	5%	4%	1%	-14%	14%	-4%	24%	6%	2%	42%
Meloxicam (Mobic®)										
2011	–	$4.03	$7.49	$4.91	$4.34	$6.56	$4.25	$5.11	$5.77	$4.57
2014	–	$4.41	$6.95	$3.65	$4.71	$5.91	$3.50	$5.54	$5.77	$3.99
% change	–	9%	-7%	-26%	8%	-10%	-18%	8%	0%	-13%
Naproxen (Naprosyn®)										
2011	$1.43	$1.26	$2.55	$1.70	$1.70	$2.44	$1.48	$1.97	$1.13	$1.42
2014	$1.15	$1.59	–	$1.31	$1.57	$1.56	$1.64	$1.98	$1.07	$1.61
% change	-19%	27%	–	-23%	-7%	-36%	11%	0%	-5%	14%
Cyclobenzaprine HCL (Flexeril®)										
2011	$1.33	$1.34	$2.38	$1.71	$1.57	$1.23	$1.49	$1.75	$1.19	$1.22
2014	$1.17	$1.49	$2.11	$1.48	$1.74	$1.69	$1.70	$2.08	$1.57	$1.37
% change	-12%	11%	-11%	-13%	10%	38%	14%	19%	31%	12%
Tramadol HCL (Ultram®)										
2011	$1.32	$1.17	$2.09	$1.56	$1.51	$1.49	$1.58	$1.59	$1.40	$1.40
2014	$1.05	$1.35	$3.50	$1.61	$1.39	$2.54	$1.67	$2.83	$1.92	–
% change	-20%	15%	68%	3%	-8%	70%	6%	78%	37%	–
Hydrocodone-acetaminophen (Vicodin®)										
2011	$1.21	$0.67	$1.21	$1.31	$1.13	$1.36	$1.06	$1.30	$0.77	$1.07
2014	$0.71	$0.80	$2.83	$1.07	$0.89	$1.64	–	$1.86	$0.87	$1.13
% change	-41%	19%	134%	-18%	-21%	21%	–	43%	13%	6%

Notes: The underlying data include prescriptions filled in service years 2011 and 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The 10 states included are those that did not have reforms or had reforms but the data show pre-reform experience.

[a] The 2014 data are a mix of pre-and post-reform experience for North Carolina (effective August 2014), pre-reform for Pennsylvania (effective December 2014), and pre-reform for Kansas (effective January 2015). This report provides a baseline for evaluating the reforms for these three states. Note that the rule change in North Carolina and Pennsylvania not only capped the prices paid for physician-dispensed drugs but also restricted physician-dispensed drugs to a short time frame. Kansas' new fee schedule sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

Table 4.5 Changes in the Average Price per Pill Paid for Physician-Dispensed Drugs of Common Strengths in Non-Reform or Pre-Reform States, between Service Years 2011 and 2014

	IA	KS[a]	LA	MD	MO	NC[a]	NJ	PA[a]	VA	WI
Ibuprofen (Motrin®), 200 mg										
2011	–	–	–	$0.26	$0.26	$0.19	$0.17	$0.42	–	–
2014	–	–	–	$0.28	$0.30	–	$0.21	$0.45	–	–
% change	–	–	–	8%	14%	–	27%	8%	–	–
Meloxicam (Mobic®), 15 mg										
2011	–	$4.90	$8.67	$5.51	$4.83	$8.03	–	$6.92	$7.67	$6.23
2014	–	$5.09	$8.74	$5.47	$5.39	$8.13	–	$7.06	$6.70	–
% change	–	4%	1%	-1%	12%	1%	–	2%	-13%	–
Naproxen (Naprosyn®), 500 mg										
2011	$1.44	$1.26	–	$1.71	$1.71	$2.45	$1.62	$2.01	$1.13	$1.45
2014	$1.15	$1.60	–	$1.30	$1.57	$1.55	$1.78	$2.01	$1.10	$1.62
% change	-20%	26%	–	-24%	-8%	-37%	10%	0%	-3%	12%
Cyclobenzaprine HCL (Flexeril®), 10 mg										
2011	$1.23	$1.34	$2.38	$1.73	$1.57	$1.29	$1.47	$1.77	$1.15	$1.22
2014	$1.19	$1.47	$2.10	$1.33	$1.68	$1.60	$1.62	$1.84	$1.41	$1.17
% change	-3%	10%	-12%	-23%	7%	23%	10%	4%	23%	-4%
Tramadol HCL (Ultram®), 50 mg										
2011	$1.32	$1.17	$2.09	$1.55	$1.47	$1.49	$1.57	$1.59	$1.40	$1.40
2014	$1.05	$1.34	$2.40	$1.25	$1.39	$1.43	$1.60	$1.59	$1.47	–
% change	-20%	15%	15%	-19%	-6%	-4%	2%	0%	5%	–
Hydrocodone-acetaminophen (Vicodin®), 5-325 mg										
2011	$1.52	–	–	–	$1.18	$1.57	–	–	–	$1.24
2014	$0.72	–	$2.56	$0.97	$0.95	–	–	$1.82	$0.82	$1.18
% change	-52%	–	–	–	-20%	–	–	–	–	-4%

Notes: The underlying data include prescriptions filled in service years 2011 and 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The 10 states included are those that did not have reforms or had reforms but the data show pre-reform experience.

[a] The 2014 data are a mix of pre-and post-reform experience for North Carolina (effective August 2014), pre-reform for Pennsylvania (effective December 2014), and pre-reform for Kansas (effective January 2015). This report provides a baseline for evaluating the reforms for these three states. Note that the rule change in North Carolina and Pennsylvania not only capped the prices paid for physician-dispensed drugs but also restricted physician-dispensed drugs to a short time frame. Kansas' new fee schedule sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

Table 4.2 shows that the average price per pill paid for physician-dispensed meloxicam and naproxen decreased in most post-reform states. The lack of price reduction for ibuprofen in several states was due to a large increase in the AWP of certain ibuprofen products in the first quarter of 2014. For cyclobenzaprine, tramadol, and hydrocodone-acetaminophen, however, the average physician price increased between 2011 and 2014 in many post-reform states, especially in California, Florida (except for hydrocodone-acetaminophen), and Illinois. In Tennessee, considerable increases in physician prices were also seen for cyclobenzaprine and tramadol. It is worth noting that the average price paid to physicians for these three drugs decreased in Michigan, where the higher-priced new-strength drug products were rarely seen among

physician-dispensed drugs.[17] The physician price for hydrocodone-acetaminophen also decreased in several post-reform states (Connecticut, Tennessee, and South Carolina).

When looking at the existing common strengths of these drugs, the physician price decreased consistently in the post-reform states. Table 4.3 shows that for a given drug of a common strength that existed in the market at the time of reforms, the average price paid per pill for physician-dispensed prescriptions decreased substantially for most of the common strengths of drug products. This was true for almost all post-reform states, except for California, Florida, and Indiana. In Indiana, the physician price for 200-milligram ibuprofen increased from $0.13 to $0.15 per pill, and in California, the physician price for hydrocodone-acetaminophen remained the same, between 2011 and 2014. The large price reductions for existing-strength drugs dispensed by physicians suggest that the price-focused reforms had a positive impact on reducing the prices paid for physician-dispensed drugs for most drug products that existed in the market. However, the increased physician dispensing of certain drug products with a much higher AWP (e.g., 7.5-milligram cyclobenzaprine, 150-milligram tramadol extended release, and 2.5-325-milligram hydrocodone-acetaminophen) offset and, in some cases, outweighed the price reduction seen for the existing-strength drug products that were dispensed by physicians. This was especially the case in California, Florida, and Illinois.

Table 4.4 shows different trends in the average physician prices for the same set of drugs among the non-reform or pre-reform states. While the physician price decreased for most common drugs reported in Iowa and Maryland, the same figure increased in several other non-reform or pre-reform states, especially in Louisiana, North Carolina,[18] and Pennsylvania. Unlike the large and consistent price reductions for the common drugs observed in most post-reform states (Table 4.3), the physician prices for the same set of drugs of common strengths decreased in Iowa and Maryland but increased or changed little in the other states (Table 4.5). For example, the average price per pill paid to physicians for 10-milligram cyclobenzaprine increased in New Jersey (by 10 percent) and Virginia (by 23 percent), states without reforms, and increased in pre-reform Kansas and North Carolina.

One may question whether the price changes for the common drugs included in Tables 4.2–4.5 are representative of the price changes for other drugs not reported and how prices have changed over the study period overall for physician- and pharmacy-dispensed prescriptions. To address these questions, we show data for 2011 and 2014 price differentials, measured as the percentage of the price aggregated for all generic drugs dispensed by physicians above/below the price for all generic drugs dispensed at pharmacies.[19]

Figure 4.3 shows that in the post-reform states, the price differentials narrowed between physician- and pharmacy-dispensed prescriptions for all generic drugs in most states, except for California, Florida, and Illinois, where the price differentials were larger in 2014 than in 2011. In California, Florida, and Illinois, the considerable increase in the overall average price paid to physicians more than offset the decrease in the frequency of physician dispensing. By contrast, the price differentials changed little or widened in most non-

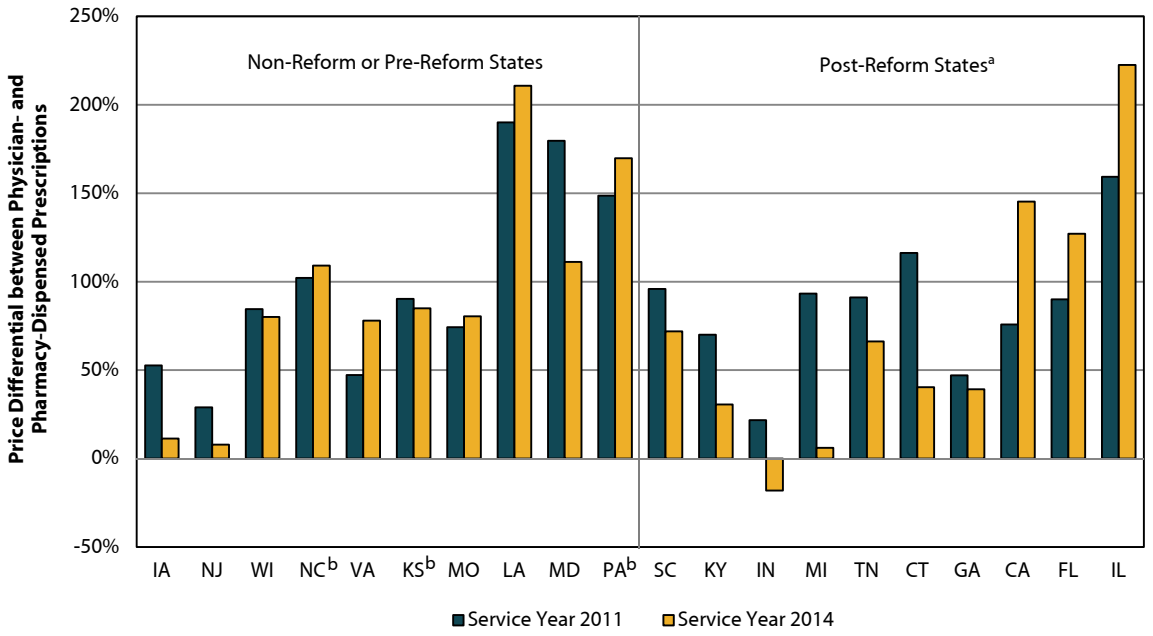
[17] A more in-depth analysis of Michigan's post-reform experience that may shed light on why the phenomenon seen in California, Florida, and Illinois was not seen in Michigan is beyond the scope of this study.

[18] North Carolina had reforms effective August 2014. The changes in the physician prices between 2011 and 2014 partially reflect the post-reform experience in the state. The increase in the average price per pill paid for the three common drugs was the result of some physicians dispensing the higher-priced new-strength drug products. Since physician dispensing was not frequent in North Carolina (less than 10 percent of all prescriptions in 2014), we do not highlight the issue of higher-priced new strengths for the state.

[19] We report data for generic drugs to make the price comparison and trends more meaningful because of a considerable difference in dispensing generic and brand name drugs between physician- and pharmacy-dispensed prescriptions. However, it should be noted that even for generic drugs, differences in the aggregated price for physician- and pharmacy-dispensed prescriptions may reflect differences in the mix of drugs between physician- and pharmacy-dispensed prescriptions. See Chapter 2 for a more detailed discussion.

reform or pre-reform states, except Iowa, Maryland, and New Jersey. In Iowa and New Jersey, the aggregate price differential was relatively small and decreased.[20] In Maryland, policymakers and stakeholders have debated issues related to physician dispensing and proposed regulatory changes to address them. The active debates and heightened awareness of the issues may have contributed to the narrowed price differential between physician- and pharmacy-dispensed prescriptions.

Figure 4.3 Difference in the Average Price Paid per Pill between Physician- and Pharmacy-Dispensed Generic Drugs, Service Years 2011 and 2014



Notes: The underlying data include prescriptions filled in service years 2011 and 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. The 10 post-reform states are presented on the right side of the chart, and the states that did not have reforms or had reforms but the data show pre-reform experience are presented on the left side of the chart. See Appendix A for a description of the reforms.

[a] The change in the difference in the average price per pill paid between physician- and pharmacy-dispensed generic drugs between 2011 and 2014 reflect the results before and after the price-focused reforms for all reform states on the right side of the chart, except for California and Georgia. The 2014 data are post-reform for all 10 states, and the 2011 data are pre-reform for all but California and Georgia. For California, the 2011 data are post-reform, and for Georgia, the 2011 data is the mix of pre- and post-reform. The 10 post-reform states include, with the effective date in parentheses, California (March 2007), Connecticut (July 2012), Florida (July 2013), Georgia (April 2011), Illinois (November 2012), Indiana (July 2013), Kentucky (2013), Michigan (December 2012), South Carolina (December 2011), and Tennessee (August 2012).

[b] The 2014 data are a mix of pre-and post-reform experience for North Carolina (effective August 2014), pre-reform for Pennsylvania (effective December 2014), and pre-reform for Kansas (effective January 2015). This report provides a baseline for evaluating the reforms for these three states. Note that the rule change in North Carolina and Pennsylvania not only capped the prices paid for physician-dispensed drugs but also restricted physician-dispensed drugs to a short time frame. Kansas' new fee schedule sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

[20] Note that the price differential at the aggregate level reflects not only the difference in the mix of drugs between physician- and pharmacy-dispensed prescriptions but also the changes in pharmacy prices. For New Jersey, the narrowed price differential at the aggregate level was not driven by reductions in physician prices for drugs commonly dispensed by physicians; it was driven by increases in pharmacy prices for certain drugs.

5

NEW STRENGTHS AND FORMULATION

As mentioned in the previous chapters, the increased physician dispensing of higher-priced new strengths was the main reason behind the increase in the average price per pill paid for physician-dispensed drugs, in post-reform California, Florida, and Illinois. As a result, no reduction was seen in the physician share of prescription costs in these three states, despite a considerable reduction in the frequency of physician dispensing. This issue was reported by a previous WCRI study and described based on quarter-by-quarter data, using metrics that capture the prevalence and prices of the new-strength drug products (Wang, Thumula, and Liu, 2016i). This chapter describes the issue and analyzes the prevalence of physician dispensing of new drug products and the impact on the prices for physician-dispensed prescriptions in a multistate context.

The new-strength drug products include 7.5-milligram cyclobenzaprine, 150-milligram tramadol extended release, and 2.5-325-milligram hydrocodone-acetaminophen. Lidocaine-menthol is a new formulation of the lidocaine pain patch.[1] These new products were introduced to the market between the end of 2011 and 2013 and were almost all dispensed by physicians. When physicians dispensed these new drug products, they were paid much higher prices compared with the prices paid when they dispensed existing products of the same drug. In several post-reform states, more frequent physician dispensing of these higher-priced drug products outweighed price reductions seen among existing drug products dispensed by physicians, resulting in large increases in the average price for several drugs commonly dispensed by physicians. Note that we did not see these higher-priced new-strength drug products among pharmacy-dispensed prescriptions.[2]

The issue of physicians dispensing higher-priced new drug products was observed initially in post-reform California and Illinois, and was later reported for post-reform Florida and Tennessee.[3] To illustrate the issue, we use cyclobenzaprine (a muscle relaxant) in Florida as an example (see Figure 5.1). In Florida prior to 2012, physicians wrote and dispensed cyclobenzaprine with two common strengths, 5 and 10 milligrams. The 7.5-milligram new strength of cyclobenzaprine was introduced to the market in late 2011, and we saw some physicians in Florida start to dispense the new-strength drug product.[4] By 2014, when physicians in Florida

[1] We also observed a small number of prescriptions filled for the topical analgesic capsaicin-menthol.

[2] This is true for states with physician dispensing reforms. It is also true for states without physician dispensing reforms, including those states where physician dispensing is not allowed in general or infrequent in practice.

[3] See Wang, Thumula, and Liu (2016i). It should be noted that we also reported the evidence of new formulations seen in Pennsylvania prior to the physician dispensing reforms that went into effect in December 2014. The emerging pattern of the new drug products was somewhat similar to what we saw in Florida. As more recent data become available for analysis, we will continue to closely monitor the post-reform experience in Pennsylvania to see if the emerging trend continues.

[4] Wang, Thumula, and Liu (2016i) reported the distribution of physician-dispensed prescriptions by strength on a quarterly basis, which provided evidence that some Florida physicians dispensed the new-strength drug products prior to the reform in July. Because the data are organized by year in this report, the more detailed pattern of physician dispensing

dispensed prescriptions for cyclobenzaprine, 41 percent of the physician-dispensed prescriptions were for the 7.5-milligram new strength, with 15 percent and 43 percent for the existing strengths of 5 and 10 milligrams, respectively (Figure 5.1). When physicians dispensed, they were paid much higher prices for the 7.5-milligram new strength than for the existing strengths of 5 and 10 milligrams. By contrast, little change was seen in the distribution of prescriptions by strength for the same drug dispensed at pharmacies, with a slight increase in the proportion of pharmacy-dispensed prescriptions for 5-milligram cyclobenzaprine and a drop for the 10-milligram strength. Note that the 7.5-millgram new strength was rarely seen among pharmacy-dispensed prescriptions.[5]

Among the states with price-focused reforms, the specific language of the new reimbursement rules typically targets physician-dispensed repackaged drugs by limiting the reimbursement amount to an amount based on the AWP set by the manufacturer of the original drug and explicitly requiring the use of original NDCs to determine the reimbursement for physician-dispensed repackaged drugs.[6] New reimbursement rules like these were expected to help reduce prices paid for physician-dispensed drugs because, prior to these reforms, physicians often dispensed repackaged drugs that were assigned much higher AWPs[7] compared with the AWP assigned by the original manufacturer of the drug, and they were paid much higher prices. However, the emerging issue of physician dispensing of higher-priced new strengths raises a question about the effectiveness and sustainability of these reforms.

How can these new drug products be paid for at much higher prices? Like repackaged drugs, the mechanism involves the creation of an opportunity to assign a much higher AWP to these new-strength and new-formulation products. Consider cyclobenzaprine. If a new strength comes to market and the original manufacturer of that new strength sets a new AWP, this AWP could be much higher than the AWPs set by the original manufacturers for the existing 5- and 10-milligram strengths. These new drug products are often labeled as drugs made by generic manufacturers, not repackagers, and therefore, are not subject to the price-focused reimbursement rules that targeted only physician-dispensed repackaged drugs.

There may be some clinical benefits of prescribing and dispensing these new strengths and formulation, though we are not aware of published studies supporting this argument. However, if potential clinical benefits of using these new products and patients' preference for receiving the products are all that are considered by physicians, there should not be a dramatic difference in the prescribing patterns between physicians who dispense and those who do not. The different patterns between physician- and pharmacy-dispensed prescriptions observed in Figure 5.1 suggest that some dispensing physicians wrote prescriptions for the new strengths in response to the economic incentives embedded in the higher-priced new drug products.

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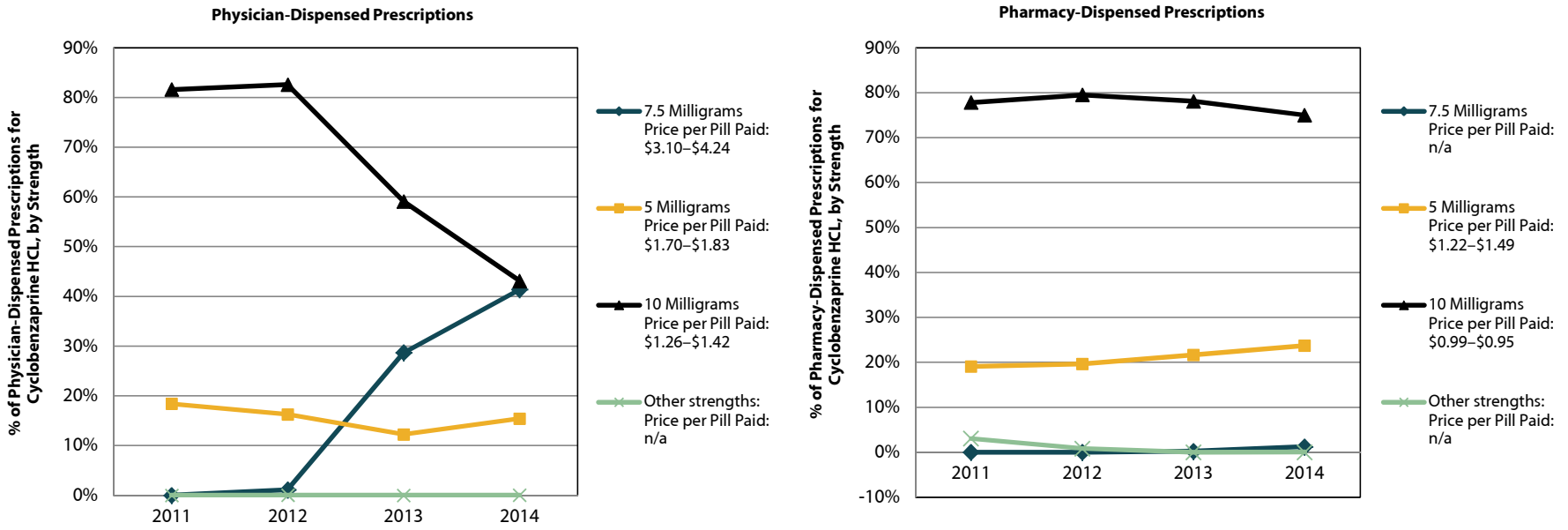
of new-strength drug products is not obvious. See the 2016 report for more detailed changes in the dispensing pattern by quarter.

[5] We also saw cyclobenzaprine of 20 milligrams among pharmacy-dispensed prescriptions, but the frequency was extremely low.

[6] As of June 2017, 22 states have made changes to the rules governing reimbursement for physician-dispensed drugs by setting the maximum reimbursement to the AWP with or without a multiplier, plus a dispensing fee. These new rules targeted high-priced repackaged drugs by tying the reimbursement to the NDC of the original drug. For the states included in the study, please see Appendix A for a description of policy changes. For other states, see the recent report published by Optum that documents pharmacy fee schedules for all 50 U.S. states (Optum, 2017).

[7] This is because an intermediary (or repackager) buys the original drug in bulk and repackages it into small quantities. The intermediary subsequently obtains a new NDC for the repackaged drug and assigns a new AWP to the repackaged drug, which is almost always much higher than the AWP assigned by the original manufacturer of that drug.

Figure 5.1 Change in Distribution of Physician- and Pharmacy-Dispensed Prescriptions for Cyclobenzaprine HCL in Florida,[a] by Strength



Notes: The underlying data include prescriptions filled in service years 2011 to 2014, for all medical claims that had injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details and for the definition of physician- and pharmacy-dispensed prescriptions.

[a] Effective July 1, 2013, Florida's legislation requires that physician-dispensed repackaged drugs be reimbursed at 112.5 percent of the average wholesale price of the original drug used in the repackaging process, plus a dispensing fee of $8.00. The 2014 data reflect post-reform experience in Florida. Data for 2011–2012 are pre-reform, and the 2013 data are a mix of pre- and post-reform for Florida.

Key: n/a: not applicable.

In this chapter, we present the evidence of physician-dispensed new strengths and formulation, focusing on 17 of the 20 states included in the previous chapters where physicians dispensed more than 10 percent of all prescriptions in 2014.[8] Wang, Thumula, and Liu (2016i) provides more detailed descriptions of the drug products, possible benefits and clinical reasons for the use of these products, and patterns of physician dispensing of these drug products.

CYCLOBENZAPRINE HCL, 7.5 MILLIGRAMS

Figure 5.2 shows the frequency of physician-dispensed prescriptions for 7.5-milligram cyclobenzaprine as a percentage of all physician-dispensed prescriptions for cyclobenzaprine across all strengths in 2014. It also presents the average price per pill paid for the 7.5-milligram new strength and for the existing strengths dispensed by physicians. In most states, including several post-reform states (e.g., Michigan), the 7.5-milligram strength was not commonly dispensed by physicians. However, the new strength was commonly dispensed by physicians in California (47 percent) and Florida (41 percent) and frequently seen in several other reform states including Illinois (26 percent) and Tennessee (16 percent).

The prices paid were much higher for the 7.5-milligram products than for the existing strengths of 5 and 10 milligrams. On average, the price paid for the new strength was between $3.09 and $4.24 per pill, while the average price paid for the existing strengths ranged from $0.38 to $1.85 per pill for the same set of states.

Note that the states where there was significant physician dispensing of the new strength tended to be the states with price-focused reforms. In some of these states (California and Illinois), the increased physician dispensing of the new strength occurred after the reforms, which was likely a shift in practices of some physician-dispensers and suppliers in response to the reforms.[9] In other states, the increased physician dispensing of the new strength was either prior to the reforms (e.g., Florida) or after a period of price reductions as a result of the reforms (e.g., Tennessee).[10] The results suggest that some physician-dispensers may have been motivated by the higher price for the new strength, shifting from existing strengths to the new strength. It is worth noting that not all reform states appeared to have this issue. In Michigan, for example, the new strengths were rarely seen, and as a result, the average price paid to physicians decreased considerably for all three common drugs with new strengths.[11] We will continue to monitor this in the states with or

[8] The 17 states are California, Connecticut, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Missouri, New Jersey, Pennsylvania, Tennessee, Virginia, and Wisconsin. Louisiana, North Carolina, and South Carolina were excluded from the analysis of new strengths and formulation due to infrequent physician dispensing overall. For these three states, we observed that some physicians dispensed the new strengths, but we do not highlight these states due to relatively infrequent physician dispensing. The other six states included in the report but not included in the analysis focusing on physician dispensing issues are those states where physician dispensing is generally not permitted by law (Massachusetts, New York, and Texas) or is permitted but infrequent (less than 5 percent of all prescriptions) in practice (Arkansas, Minnesota, and Nevada).

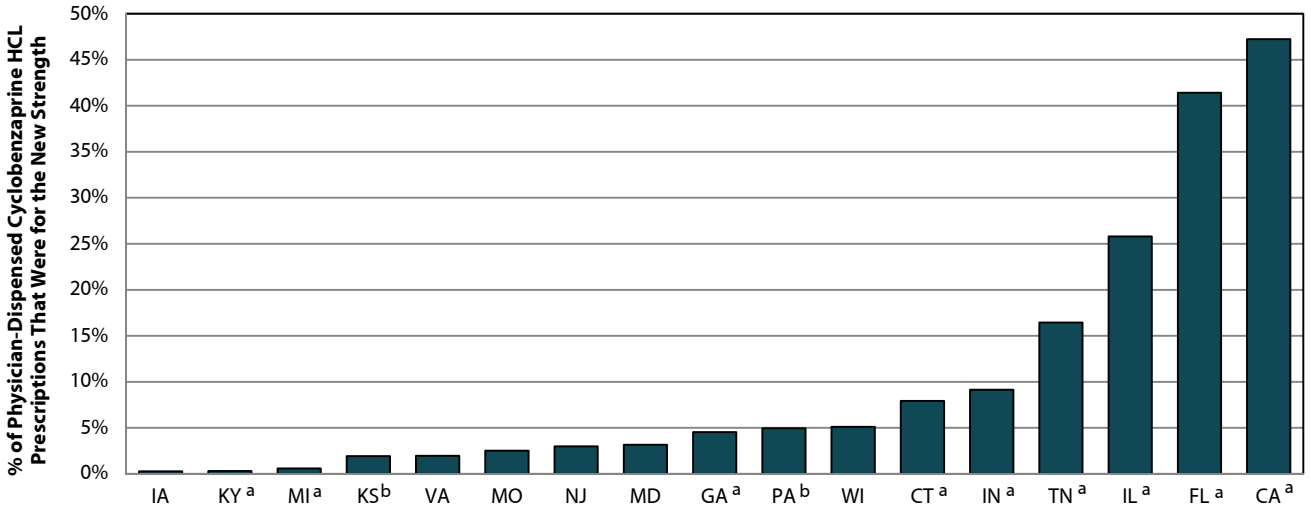
[9] This type of response is consistent with what has been documented in California by the California Workers' Compensation Institute (Ireland and Swedlow, 2010; Swedlow, Gardner, and Ireland, 2013) and several other studies in various settings (see Chapter 1 for more discussion). Also see Chapters 4 and 6 of Wang, Thumula, and Liu (2016i) for more details for these two states.

[10] Wang, Thumula, and Liu (2016i) also discussed the results for these two states. See Chapters 5 and 7 of that report for more detailed results for Florida and Tennessee, respectively.

[11] We do not know exactly what explains the observed difference in physician dispensing of new-strength drug products, even for states with similar reforms. However, we speculate that several possible reasons might be at work. These include specific reform language and whether the drugs with new strengths were frequently dispensed in a state prior to the reform or introduction of the new strengths. The frequency of dispensing certain drug products may also be dependent on how the workers' compensation medical care delivery system is organized, what typical distribution channels are in a market, and decisions made by health care organizations as dispensing entities. More in-depth analysis is needed to

without physician dispensing reforms as we have more recent data.

Figure 5.2 Frequency of and Prices Paid for Physician-Dispensed 7.5-Milligram Cyclobenzaprine HCL, Service Year 2014



Average price per pill paid for physician-dispensed prescriptions, service year 2014																	
7.5 milligrams	–	–	–	–	–	–	–	–	–	$3.98	–	–	–	$3.88	$3.95	$4.24	$3.09
Existing strengths	$1.16	$1.19	$0.91	$1.46	$1.42	$1.66	$1.62	$1.32	$1.24	$1.85	$1.23	$1.23	$1.05	$1.05	$1.21	$1.43	$0.38

Notes: The underlying data include prescriptions filled in service year 2014 for all medical claims that had injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. These prescriptions were physician-dispensed cyclobenzaprine of various strengths (e.g., 5, 7.5, and 10 milligrams). The 7.5-milligram strength is the new strength that was introduced to the market at the end of 2011. Not included in this figure are Louisiana, North Carolina, and South Carolina, where physicians dispensed less than 10 percent of all prescriptions in 2014.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] Kansas and Pennsylvania also had price-focused reforms. The 2014 data are pre-reform for Kansas and Pennsylvania. See Appendix A for a description of the reforms.

Key: – : not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

Prior to the introduction of the 7.5-milligram products, the most common strengths for the drug included 5 and 10 milligrams.[12] The 7.5-milligram strength, also known as Fexmid®, was first introduced in 2006 but was rarely seen in the workers' compensation data until the end of 2011. Generic 7.5-milligram cyclobenzaprine products have been produced by several manufacturers since 2011 and quickly picked up by physician-dispensers in a number of states.[13]

One may think that having an intermediate strength between 5 and 10 milligrams might be more convenient for the patient, which may be considered by some prescribers. Recognizing that some physicians might prescribe this new strength in consideration of the patient's preference rather than financial incentives,

understand why physicians in some reform states did not prescribe and dispense the higher-priced new products in response to a substantial price reduction of existing products.

[12] There have been strengths of 15 and 30 milligrams for the drug, but these are extremely rare in the workers' compensation data.

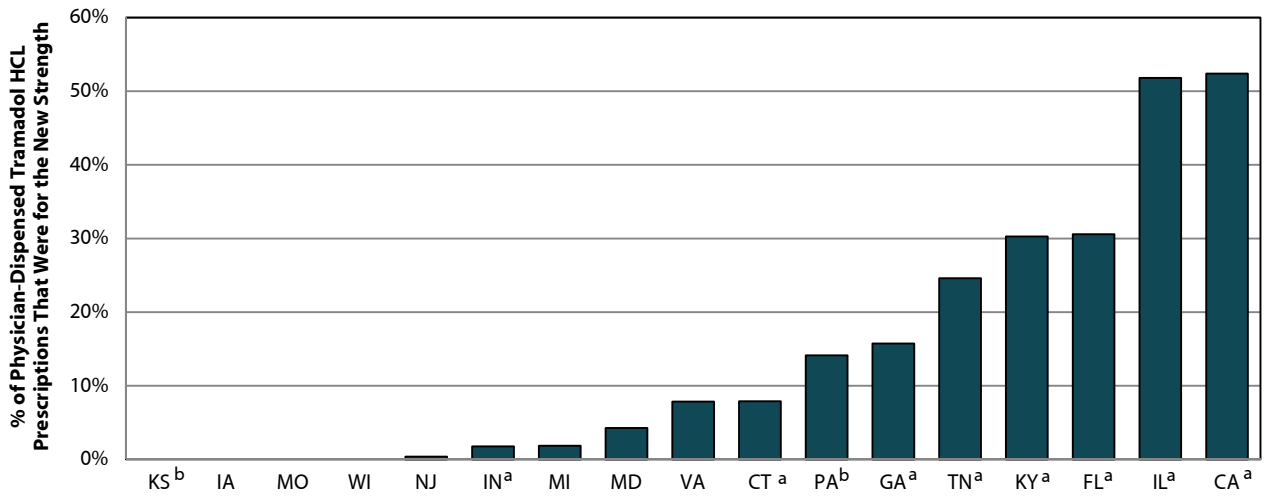
[13] It is worth noting that we started to see a small number of prescriptions for the new strength dispensed at pharmacies. We will check the frequency and the nature of the dispensing as we collect more recent data.

for policy relevance, we only highlight the states where the frequency of physician dispensing of the new strength was considerably higher (at least 15 percent). If the new strength was seen mostly in physician-dispensed prescriptions, rarely dispensed at pharmacies, and dispensed at a higher price, it is unlikely that the prescribers who dispensed the new strength were motivated only by the concerns of their patients.

TRAMADOL HCL, 150 MILLIGRAMS EXTENDED RELEASE

Figure 5.3 shows the frequency of physician-dispensed prescriptions for 150-milligram tramadol extended release as a percentage of prescriptions for tramadol across all strengths in 2014. It also presents the average price per pill paid for the new strength of tramadol versus 50 milligrams (an existing strength) dispensed by physicians. Physician dispensing of 150-milligram extended release appeared to be common in a greater number of states, compared with the new strengths dispensed by physicians for hydrocodone-acetaminophen and cyclobenzaprine. It was most common in California and Illinois (52 percent) and frequent in Florida, Kentucky, and Tennessee (25–31 percent). The same figure was 14–16 percent in Pennsylvania and Georgia.

Figure 5.3 Frequency of and Prices Paid for Physician-Dispensed 150-Milligram Tramadol HCL Extended Release, Service Year 2014



Average price per pill paid for physician-dispensed prescriptions, service year 2014																	
150 milligrams ER	–	–	–	–	–	–	–	–	–	–	$10.72	$8.72	$9.15	–	$9.63	$9.45	$7.49
50 milligrams RR	$1.34	$1.05	$1.39	–	$1.60	$0.78	$0.87	$1.25	$1.47	$0.89	$1.59	$0.92	$0.75	–	$0.94	$0.90	$0.23

Notes: The underlying data include prescriptions filled in service year 2014 for all medical claims that had injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. These prescriptions were physician-dispensed tramadol of various strengths (e.g., 50 milligrams regular release and 150 milligrams extended release). The 150-milligram extended release is the new strength that was introduced to the market in 2012. Not included in this figure are Louisiana, North Carolina, and South Carolina, where physicians dispensed less than 10 percent of all prescriptions in 2014.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] Kansas and Pennsylvania also had price-focused reforms. The 2014 data are pre-reform for Kansas and Pennsylvania. See Technical Appendix A for a description of the reforms.

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data; ER: extended release; RR: regular release.

The average price paid for 50-milligram regular release prescriptions was between $0.23 and $1.59 per

pill depending on the state (for states with a sufficient number of prescriptions for the price comparison), but the prices for 150-milligram extended release prescriptions were much higher, ranging from $7.49 to $10.72 per pill for the same set of states.

Prior to the introduction of 150-milligram tramadol extended release, almost all physicians dispensed the 50-milligram regular release strength of the drug. After the introduction of the 150-milligram extended release strength in 2012, some physician-dispensers shifted to prescribe the 150-milligram strength. The 150-milligram new-strength tramadol prescriptions were almost all dispensed by physicians. Among pharmacy-dispensed prescriptions, there had been a small percentage of tramadol prescriptions for extended release of 100, 200, and 300 milligrams, which were rarely seen among physician-dispensed prescriptions.[14] Once the 150-milligram strength was introduced, physicians who did not dispense did not make the switch to the 150-milligram strength. The results suggest different prescribing patterns between physicians who dispense and those who do not. It is worth noting that the AWP of the 150-milligram strength was similar to the AWP for 300-milligram extended release products and is considerably higher than the average AWP for the 100- and 200-milligram products. The substantial difference in the prescribing patterns between physicians who dispense and those who do not suggests that the large shift in physicians prescribing and dispensing new products was unlikely to be due to possible clinical benefits for using the new products and cannot all be explained by changes in the mix of injuries, medical needs of the patients, or the mix of providers and their specialties.

HYDROCODONE-ACETAMINOPHEN, 2.5-325 MILLIGRAMS

Figure 5.4 shows the frequency of physician-dispensed prescriptions for 2.5-325-milligram hydrocodone-acetaminophen as a percentage of prescriptions for the same drug across all strengths in 2014. It also presents the average price per pill paid for the new strength versus existing strengths dispensed by physicians. The 2.5-325-milligram drug products were commonly dispensed by physicians in Illinois (34 percent) and California (12 percent). When dispensed by physicians, 2.5-325-milligram hydrocodone-acetaminophen cost about $2.61–$3.19 per pill, while the existing strengths of the same drug cost between $0.63 and $0.72 per pill in these two states. Note that 2.5-milligram hydrocodone is the lowest strength among all strengths available for hydrocodone (5, 7.5, and 10 milligrams), but bears the highest costs.

For injured working adults who were prescribed hydrocodone-acetaminophen, many physicians would agree that clinically most adult patients would start with 5-milligram hydrocodone for pain relief with or without an increased dosage. Most of the dosing instructions provide recommended doses based on weight, and per these recommendations, 2.5 milligrams of hydrocodone would not be enough for adult patients for pain relief.[15]

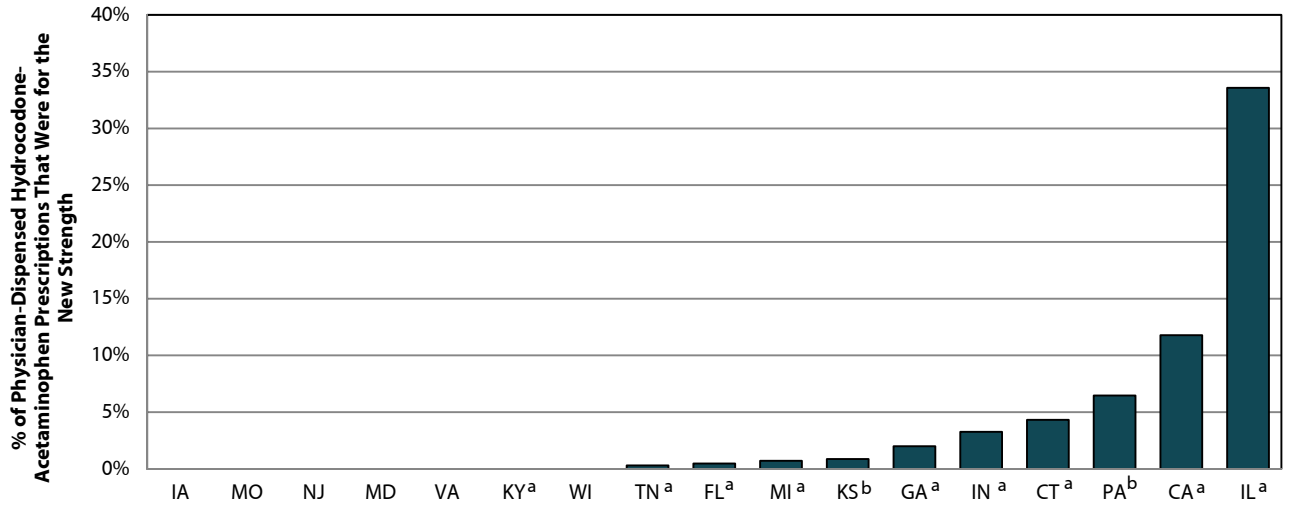
Note that the new strength of hydrocodone-acetaminophen was only seen in a few states. This might be explained by several reasons. First, an increasing number of states made policy changes prohibiting or limiting physician dispensing of stronger Schedule II and III opioids. For example, the 2011 legislation in Florida banned physicians from dispensing Schedule II and III opioids. Tennessee made changes in 2013 that also limited physicians' ability to dispense stronger opioids. Second, since 2.5 milligrams is the lowest strength

[14] We observed a small percentage of physician-dispensed prescriptions for 300-milligram tramadol extended release. The 300-milligram tramadol was a new drug product but an existing strength, which we have seen dispensed at pharmacies.

[15] The recommended usual adult dose for pain relief is 20 milligrams per day at a minimum (5 milligrams, four times a day). Adult and child dosage information is available at www.drugs.com.

among all hydrocodone strengths, it requires a dramatic shift in prescribing for physicians who usually prescribe higher strengths (e.g., 10-millgram hydrocodone combined with acetaminophen). Finally, there are potentially serious concerns about the adverse effects of high-dose acetaminophen if a patient takes multiple pills of the new strength to achieve the required daily dose needed for pain relief.[16]

Figure 5.4 Frequency of and Prices Paid for Physician-Dispensed 2.5-325-Milligram Hydrocodone-Acetaminophen, Service Year 2014



Average price per pill paid for physician-dispensed prescriptions, service year 2014																	
2.5-325 milligrams	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	$2.61	$3.19
Existing strengths	$0.71	$0.89	–	$1.07	$0.87	–	$1.13	$0.61	$0.65	$0.70	$0.80	$0.69	$0.71	$0.73	$1.73	$0.63	$0.72

Notes: The underlying data include prescriptions filled in service year 2014 for all medical claims that had injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. These prescriptions were physician-dispensed hydrocodone-acetaminophen of various strengths (e.g., 2.5-325, 5-325, 5-500, 10-325 milligrams). The 2.5-325-milligram strength is the new strength that was introduced to the market in 2012. Not included in this figure are Louisiana, North Carolina, and South Carolina, where physicians dispensed less than 10 percent of all prescriptions in 2014.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Technical Appendix A for a description of the reforms.

[b] Kansas and Pennsylvania also had price-focused reforms. The 2014 data are pre-reform for Kansas and Pennsylvania. See Appendix A for a description of the reforms.

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

[16] There have been concerns about liver damage and other adverse effects of high-dose or prolonged use of acetaminophen. In January 2011, the U.S. Food and Drug Administration asked all manufacturers of oral prescription acetaminophen-combination products to limit the maximum amount of acetaminophen in these products to 325 milligrams per dosage unit (e.g., tablet or capsule) by January 14, 2014, to reduce the adverse health risks (e.g., liver damage) of higher doses or long-term use of acetaminophen.

LIDOCAINE-MENTHOL

Table 5.1 shows the frequency of physician dispensing of lidocaine-menthol prescriptions as a percentage of physician-dispensed prescriptions for topical pain medications, for states that had payments for physician-dispensed topical analgesics accounting for more than 5 percent of total prescription payments in 2014. The new formulation of lidocaine pain patch was rarely dispensed by physicians in most states studied. However, the new formulation was dispensed frequently by some physicians in Illinois and Louisiana, accounting for 23–25 percent of physician-dispensed topical analgesics.[17] In California, Florida, Maryland, and Pennsylvania, the new formulation was also dispensed by physicians when they dispensed topical analgesics (12–15 percent).

Table 5.1 Frequency of Physician-Dispensed Lidocaine-Menthol, Service Year 2014

	% of Total Rx Payments That Were for Physician-Dispensed Topical Analgesics	% of Physician-Dispensed Topical Analgesic Rx That Were for Lidocaine-Menthol
Illinois[a]	27%	25%
Louisiana	8%	23%
Maryland	11%	15%
Pennsylvania[b]	12%	15%
Florida[a]	16%	13%
California[a]	12%	12%
Connecticut[a]	5%	4%
Geogia[a]	10%	4%
Tennessee[a]	10%	2%

Notes: The underlying data include prescriptions filled in service year 2014 for all medical claims that had injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. These prescriptions were for physician-dispensed topical analgesics, which are pre-manufactured patches and creams dispensed by physicians. The new formulation is the lidocaine-menthol pain patch. For the analysis of frequency and prices of the new formulation, we only included the states that had payments for physician-dispensed topical analgesics accounting for more than 5 percent of total prescription payments.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] The 2014 data are pre-reform for Pennsylvania. See Appendix A for a description of the reform.

Key: Rx: prescriptions.

Prior to the introduction of the new lidocaine formulation in 2013,[18] brand name lidocaine (i.e., Lidoderm®) was the most common pain patch used to treat injured workers, and most Lidoderm® patches were dispensed at pharmacies. When the patent protection for Lidoderm® expired in September 2013, several

[17] In Louisiana, approximately 9 percent of all prescriptions were dispensed by physicians. Although the overall frequency of physician dispensing was lower in Louisiana than in most states reported on this measure, it met the threshold we set for reporting. In 2014, 17 percent of physician-dispensed prescriptions were for topical analgesics in Louisiana, accounting for 36 percent of the payments for physician-dispensed prescriptions.

[18] Prior to the market introduction of the new formulation, several lidocaine-menthol products were available but rarely seen in the workers' compensation data.

generic versions of Lidoderm® were approved by the U.S. Food and Drug Administration (FDA) and introduced to the market. Along with these generic lidocaine patches, new formulations of lidocaine products with other active ingredients (such as capsaicin, menthol, and methyl-salicylate) were also introduced to the market, including lidocaine-menthol. We saw a rapid increase of physicians dispensing the lidocaine-menthol products, especially in the states highlighted above.

When dispensed, these lidocaine-menthol pain patches were paid for at higher prices compared with what was paid for generic Lidoderm® and other pain patches. For example, in 2014 in Illinois, the average price paid to physicians was $952 per prescription or $29.10 per patch for lidocaine-menthol patches, but for other pain patches, physicians were paid on average $211 per prescription or $10.13 per patch. We did not see these lidocaine-menthol products in pharmacy-dispensed prescriptions.

IMPACT OF NEW STRENGTHS ON PHYSICIAN-DISPENSED DRUG PRICES

Table 5.2 shows the impact of frequent physician dispensing of higher-priced new drug products on the average price paid for physician-dispensed drugs, for the two commonly used drugs with new strengths—cyclobenzaprine and tramadol.[19] We did not include price trends for hydrocodone-acetaminophen because of a confounding factor.[20]

In Florida, for example, the average price per pill paid for physician-dispensed cyclobenzaprine increased 107 percent between 2011 and 2014, from $1.50 per pill in 2011 to $3.10 per pill in 2014. Prior to the 2013 rule change in Florida, we saw an increase in the price due to some physicians dispensing the higher-priced new strength. A substantial increase was seen for the same figure after the 2013 reform because of the increased physician dispensing of the higher-priced new strength. Florida physicians also started to dispense 150-milligram tramadol extended release prior to the reform, with a substantial increase in the frequency of dispensing after the reform. As a result, the average price per pill paid for physician-dispensed tramadol was $3.68 per pill in 2014, more than triple the price paid for the same drug in 2011 ($1.13 per pill). Since physician dispensing of new strengths was more prevalent in California, Florida, and Illinois, a large impact was observed on the average price for these common drugs. In several other states, we also saw some physicians dispensing new-strength drug products, although to a lesser extent, which also contributed to an increase in the average price for the two common drugs.

[19] For cyclobenzaprine and tramadol, the changes in the average price paid between 2011 and 2014 were primarily due to two competing factors: (1) more frequent physician dispensing of higher-priced new strengths, and (2) price reductions for the existing strengths of the drug as a result of the reforms.

[20] Hydrocodone-acetaminophen is not included because the price changes for the drug also reflect other factors, including a considerable shift in acetaminophen strength from 500 to 325 milligrams due to the federal rule change. In January 2011, the FDA asked all manufacturers of oral prescription acetaminophen-combination products to limit the maximum amount of acetaminophen in these products to 325 milligrams per dosage unit (e.g., tablet or capsule) by January 14, 2014, to reduce the adverse health risks (e.g., liver damage) of higher doses or long-term use of acetaminophen.

Table 5.2 Impact of New Strengths on Prices Paid for Physician-Dispensed Prescriptions, Service Years 2011 through 2014

	CA[a]	CT[a]	FL[a]	GA[a]	IA	IL[a]	IN[a]	KS[b]	KY[a]	MD	MI[a]	MO	NJ	PA[b]	TN[a]	VA	WI
Average price per pill paid for physician-dispensed drugs, by service year																	
Cyclobenzaprine HCL																	
2011	$0.45	$1.55	$1.50	$1.37	$1.33	$1.80	$1.27	$1.34	$1.29	$1.71	$1.42	$1.57	$1.49	$1.75	$1.46	$1.19	$1.22
2012	$1.93	$1.50	$1.54	$1.36	$1.42	$1.63	$1.17	$1.40	$1.20	$1.59	$1.45	$1.49	$1.61	$1.83	$1.40	$1.27	$1.21
2013	$2.30	$1.25	$2.42	$1.39	$1.31	$2.30	$1.32	$1.51	$1.16	$1.47	$0.94	$1.66	$1.68	$1.98	$1.35	$1.49	$1.53
2014	$2.17	$1.78	$3.10	$1.65	$1.17	$2.55	$1.38	$1.49	$1.22	$1.48	$0.94	$1.74	$1.70	$2.08	$1.99	$1.57	$1.37
% change 2011–2014	385%	15%	107%	20%	-12%	42%	8%	11%	-6%	-13%	-34%	10%	14%	19%	37%	31%	12%
Tramadol HCL																	
2011	$0.38	$1.57	$1.13	$1.09	$1.32	$1.57	$1.26	$1.17	$1.50	$1.56	$1.25	$1.51	$1.58	$1.59	$1.56	$1.40	$1.40
2012	$1.53	$1.37	$1.17	$0.95	$1.21	$1.34	$1.13	$1.29	$1.51	$1.54	$1.33	$1.50	$1.58	$1.61	$1.31	$1.48	$1.16
2013	$3.85	$1.00	$2.59	$1.26	$1.21	$3.32	$1.19	$1.36	$1.85	$1.30	$0.88	$1.45	$1.65	$1.94	$1.40	$1.78	$1.50
2014	$3.97	$1.24	$3.68	$2.44	$1.05	$5.96	$0.93	$1.35	–	$1.61	$1.11	$1.39	$1.67	$2.83	$2.92	$1.92	–
% change 2011–2014	947%	-21%	225%	125%	-20%	281%	-26%	15%	–	3%	-11%	-8%	6%	78%	88%	37%	–

Notes: The underlying data include prescriptions filled in service years 2011 to 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. Not included in this table are Louisiana, North Carolina, and South Carolina, where physicians dispensed less than 10 percent of all prescriptions in 2014.

[a] For these states, the 2014 data presented are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012).

[b] Kansas and Pennsylvania also had price-focused reforms. The 2014 data are pre-reform for Kansas and Pennsylvania. See Appendix A for a description of the reforms.

Key: –: not reported due to small cell sizes (fewer than 100 prescriptions) or not seen in the data.

STATES WITH PREVALENT PHYSICIAN DISPENSING OF NEW STRENGTHS AND FORMULATION

Overall, we found that physician dispensing of new-strength and new-formulation drug products was more prevalent in several states, including California, Florida, and Illinois. In these three states, the three common drugs accounted for 22–26 percent of all physician-dispensed prescriptions, representing 25–27 percent of total payments for physician-dispensed drugs (Table 5.3). Collectively, the new strengths for these common drugs represented 7–10 percent of physician-dispensed prescriptions and 21–22 percent of payments paid to physicians for all prescriptions they dispensed.[21] For Tennessee, physician dispensing of new strengths was also noticeably more frequent compared with the other states, representing nearly 4 percent of physician-dispensed prescriptions and 11 percent of payments paid for physician-dispensed drugs.

Note that in California, Florida, and Illinois, physician dispensing was common, representing 44 percent of all prescriptions and 54–64 percent of total prescription payments. In Tennessee, physicians dispensed 17 percent of all prescriptions, representing 26 percent of total prescription payments in 2014.

[21] The frequency and cost shares of the new strengths among physician-dispensed prescriptions are based on the frequency and cost measures presented in Table 5.3 for the common drugs and new strengths.

Table 5.3 Prevalence and Costs of Physician-Dispensed New Strengths, Service Year 2014

	CA[a]	CT[a]	FL[a]	GA[a]	IA	IL[a]	IN[a]	KS[b]	KY[a]	MD	MI[a]	MO	NJ	PA[b]	TN[a]	VA	WI
% of all Rx that were physician-dispensed Rx	44%	31%	44%	29%	17%	44%	26%	17%	15%	38%	33%	24%	25%	33%	17%	17%	11%
% of total Rx payments that were paid for physician-dispensed Rx	54%	30%	58%	32%	11%	64%	13%	16%	13%	40%	21%	20%	11%	51%	26%	15%	12%
Physician-dispensed Rx for drug as a % of all physician-dispensed Rx																	
Cyclobenzaprine HCL (Flexeril®)	8%	10%	8%	10%	13%	9%	10%	15%	17%	10%	11%	9%	15%	9%	10%	10%	7%
Tramadol HCL (Ultram®)	6%	9%	13%	10%	11%	8%	9%	12%	3%	11%	10%	10%	6%	9%	8%	5%	3%
Hydrocodone-acetaminophen (Vicodin®)	8%	7%	0%	7%	5%	10%	4%	3%	1%	3%	2%	4%	1%	5%	9%	10%	11%
Payments for the drug dispensed by physicians as a % of payments for all physician-dispensed Rx																	
Cyclobenzaprine HCL (Flexeril®)	8%	5%	9%	6%	7%	6%	9%	9%	7%	4%	5%	6%	13%	4%	6%	4%	3%
Tramadol HCL (Ultram®)	14%	4%	17%	13%	9%	13%	8%	10%	7%	8%	10%	9%	7%	8%	9%	10%	3%
Hydrocodone-acetaminophen (Vicodin®)	4%	3%	0%	3%	3%	6%	4%	1%	1%	1%	1%	2%	1%	3%	2%	3%	7%
Physician-dispensed Rx for the new strength as a % of physician-dispensed Rx for the drug																	
Cyclobenzaprine HCL (Flexeril®), 7.5 mg	47%	8%	41%	5%	0%	26%	9%	2%	0%	3%	1%	3%	3%	5%	16%	2%	5%
Tramadol HCL (Ultram®) 150 mg ER	52%	8%	31%	16%	0%	52%	2%	0%	30%	4%	2%	0%	0%	14%	25%	8%	0%
Hydrocodone-acetaminophen (Vicodin®), 2.5-325 mg	12%	4%	0%	2%	0%	34%	3%	1%	0%	0%	1%	0%	0%	6%	0%	0%	0%
Payments for the new strength as a % of payments for the drug dispensed by physicians																	
Cyclobenzaprine HCL (Flexeril®), 7.5 mg	93%	42%	81%	36%	1%	75%	30%	3%	4%	20%	9%	7%	8%	22%	64%	14%	14%
Tramadol HCL (Ultram®) 150 mg ER	96%	41%	82%	71%	0%	93%	20%	0%	51%	26%	23%	0%	5%	52%	79%	30%	0%
Hydrocodone-acetaminophen (Vicodin®), 2.5-325 mg	37%	29%	3%	9%	0%	79%	42%	1%	0%	0%	3%	0%	0%	13%	0%	0%	0%

Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions are for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. Not included in this table are Louisiana, North Carolina, and South Carolina, where physicians dispensed less than 10 percent of all prescriptions in 2014.

[a] For these states, the 2014 data are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] Kansas and Pennsylvania also had price-focused reforms. The 2014 data are pre-reform for Kansas and Pennsylvania. See Technical Appendix A for a description of the reforms.

Key: ER: extended release; Rx: prescriptions.

For the three common drugs that have higher-priced new strengths, Table 5.4 lists the states where physician dispensing was frequent and there was strong evidence of physician dispensing of these products.[22] Table 5.4 also lists the states where more than 5 percent of prescription payments paid were for physician-dispensed topical analgesics and more than 10 percent of physician-dispensed topical pain patches were for lidocaine-menthol.

Table 5.4 States with Prevalent Physician Dispensing of Higher-Priced New Strengths and Formulation, Service Year 2014

New Strength/Formulation (drug name)	Frequency of New Strength/Formulation (as a % of Rx dispensed by physicians for the drug)	States in Each Frequency Group
7.5-milligram cyclobenzaprine HCL	>30%	CA, FL
(cyclobenzaprine HCL)	15–30%	IL, TN
150-milligram tramadol HCL extended release	>30%	CA, FL, IL
(tramadol HCL)	15–30%	GA, KY, TN
2.5-325-milligram hydrocodone-acetaminophen	>30%	IL
(hydrocodone-acetaminophen)	15–30%	
Lidocaine-menthol	>20% of topical Rx	LA, IL
(topical pain relief patches)	>10% of topical Rx	CA, FL, MD, PA

Note: The results are based on prescriptions filled in service year 2014, for all medical claims that had injuries occurring in two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. All states listed are the states with physician dispensing reforms, except for Louisiana and Maryland. For the reform states, the 2014 data are pre-reform for Pennsylvania and post-reform for the rest of the reform states.

Key: Rx: prescriptions.

In summary, in post-reform Illinois, there was frequent physician dispensing of all three new strengths and the new formulation. In Florida, we saw three of the four (7.5-milligram cyclobenzaprine, 150-milligram tramadol extended release, and lidocaine-menthol).[23] In California, two of the new strengths were prevalent, 7.5-milligram cyclobenzaprine and 150-milligram tramadol extended release. There was also an increase in physician dispensing of 2.5-325-milligram hydrocodone-acetaminophen over the study period in California; in 2014, 12 percent of physician-dispensed prescriptions for hydrocodone-acetaminophen were for the new strength. Lidocaine-menthol was also dispensed by California physicians, accounting for more than 10 percent of physician-dispensed topical analgesic prescriptions. Post-reform Tennessee saw noticeable physician dispensing of new drug products in 2014, nearly one and a half years after the reform. There was some physician-dispensed lidocaine-menthol in Pennsylvania. For several other states, we also saw some evidence of the new strengths and formulation, as indicated in Table 5.3.

[22] Among the 17 states with physicians dispensing more than 10 percent of prescriptions, we highlight the states where physician-dispensed new strengths accounted for 15 percent or more of prescriptions for the drug associated with the strength. For example, the 7.5-milligram new-strength prescriptions accounted for 16 percent of physician-dispensed cyclobenzaprine in 2014 in Tennessee. The figure was 9 percent in Indiana. We highlight Tennessee. We took this conservative approach to make sure that the key findings of the analysis are most policy relevant, provided that physician dispensing of new strengths is more likely to occur with price regulation. We also recognize that some physicians who wrote and dispensed these new products may well be motivated by possible clinical benefits of the products and consideration of patients' preference and comfort.

[23] Florida's 2011 legislation banned physicians from dispensing Schedule II and III opioids. As a result, we did not see noticeable dispensing of 2.5-325-milligram hydrocodone-acetaminophen in Florida.

6

PATTERNS OF PHYSICIAN DISPENSING

As mentioned in the previous chapters, almost all reform states have capped the prices paid to physicians for drugs they dispense. In more recent years, several states made legislative or regulatory changes to limit physician-dispensed prescriptions for certain drugs or to a short time frame. For example, Florida's 2011 legislation prohibits physicians from dispensing Schedule II and III opioids; physicians in Florida continue to be able to dispense weaker opioids and other non-opioid medications. In Kentucky, the 2013 rule change limits physician dispensing of hydrocodone-combined drug products to a 48-hour supply.[1] While price-focused reforms are expected to have a direct impact on prices (with an indirect impact on frequency), these drug-limiting reforms directly impact the frequency of physician dispensing overall and for specific drugs. In this chapter, we provide some data to illustrate the impact of this type of policy, focusing on the prescription distribution of physician-dispensed drugs for common pill-form drugs and drugs with over-the-counter strengths.[2]

Table 6.1 presents the distribution of physician-dispensed prescriptions for drugs that were commonly dispensed by physicians. The drugs listed are the combined top 10 drugs for the individual states. For the purposes of analysis, we grouped these top drugs into four groups: opioid medications, non-opioid pain medications, muscle relaxants, and other common drugs dispensed by physicians. Figure 6.1 shows the percentage of physician-dispensed prescriptions for pain medications broken into opioid and non-opioid pain medications. Like the analysis on physician dispensing of new strengths and formulation, we only include the states where physicians dispensed more than 10 percent of all prescriptions. In addition to the exclusion of the six states where physician dispensing is not allowed or infrequent in practice, we further excluded, based on the 10 percent criteria, Louisiana, North Carolina, and South Carolina from the analysis of dispensing patterns.

[1] Several states also had reforms at the end of or after the study period, for which the results presented in this report may be a baseline for evaluating the reforms. In 2014, Pennsylvania and North Carolina made changes in the reimbursement rules to restrict physician-dispensed drugs to a limited supply. Effective January 2015, Kansas requires carrier preapproval for physician-dispensed medications to be reimbursable. California is making an effort to address physician dispensing in the proposed formulary through prior authorization. See Appendix A for more details.

[2] The patterns of physician dispensing of topical medications are not included in this chapter; they may be examined in a future study.

Table 6.1 Prescription Distribution of Drugs Commonly Dispensed by Physicians among All Physician-Dispensed Prescriptions, Service Year 2014

	CA[a]	CT[a]	FL[a]	GA[a]	IA	IL[a]	IN[a]	KS[b]	KY[a]	MD	MI[a]	MO	NJ	PA[b]	TN[a]	VA	WI	17-State Median
Opioid medications																		
% of physician-dispensed Rx that were for opioids	19%	23%	17%	22%	20%	19%	15%	17%	4%	19%	13%	17%	9%	19%	18%	20%	26%	19%
Tramadol HCL (Ultram®)	6%	9%	13%	10%	11%	8%	9%	12%	3%	11%	10%	10%	6%	9%	8%	5%	3%	9%
Hydrocodone-acetaminophen (Vicodin®)	8%	7%	0%	7%	5%	10%	4%	3%	1%	3%	2%	4%	1%	5%	9%	10%	11%	5%
Oxycodone-acetaminophen (Percocet®)	0%	6%	0%	1%	1%	0%	0%	1%	0%	2%	0%	1%	0%	3%	1%	1%	6%	1%
Other opioids	5%	2%	3%	4%	2%	0%	2%	0%	0%	3%	1%	2%	3%	3%	0%	4%	5%	2%
Non-opioid pain medications																		
% of physician-dispensed Rx that were for non-opioid pain medications	38%	41%	40%	38%	46%	38%	51%	49%	57%	42%	54%	49%	59%	38%	39%	39%	42%	42%
Ibuprofen (Motrin®)	9%	16%	8%	10%	25%	11%	19%	8%	19%	17%	30%	20%	28%	11%	8%	14%	7%	14%
Meloxicam (Mobic®)	1%	10%	15%	7%	3%	10%	2%	11%	5%	8%	1%	6%	5%	11%	14%	4%	12%	7%
Naproxen sodium (Aleve®)	12%	4%	2%	5%	5%	5%	6%	13%	5%	5%	10%	10%	11%	3%	4%	2%	10%	5%
Naproxen (Naprosyn®)	2%	6%	6%	6%	7%	5%	10%	7%	10%	5%	7%	4%	6%	6%	3%	10%	4%	6%
Other non-opioid pain medications	15%	5%	9%	9%	6%	6%	13%	10%	18%	6%	7%	9%	9%	7%	10%	9%	9%	9%
Muscle relaxants																		
% of physician-dispensed Rx that were for muscle relaxants	13%	19%	17%	15%	22%	11%	15%	19%	24%	18%	16%	19%	17%	17%	16%	18%	13%	17%
Cyclobenzaprine HCL (Flexeril®)	8%	10%	8%	10%	13%	9%	10%	15%	17%	10%	11%	9%	15%	9%	10%	10%	7%	10%
Metaxalone (Skelaxin®)	0%	3%	1%	0%	6%	1%	3%	1%	0%	2%	3%	6%	1%	1%	1%	2%	2%	1%
Other muscle relaxants	6%	6%	8%	5%	4%	1%	2%	3%	7%	5%	2%	3%	1%	6%	6%	6%	4%	5%
Other medications																		
% of physician-dispensed Rx that were for other medications	29%	18%	27%	25%	12%	32%	19%	15%	15%	21%	17%	15%	15%	26%	26%	23%	19%	19%

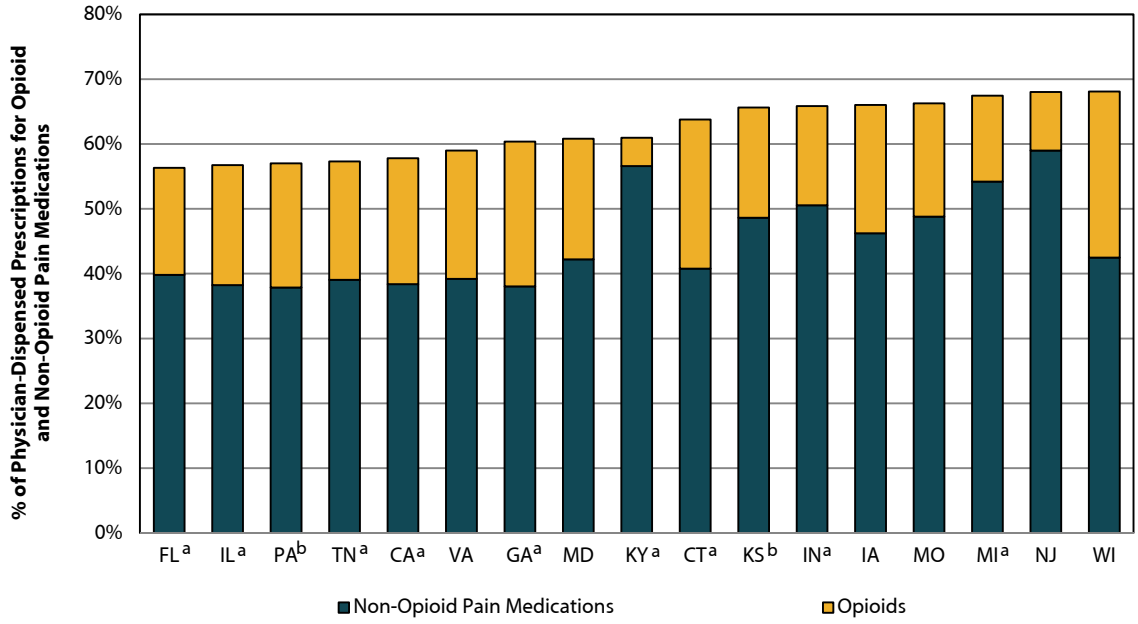
Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. Louisiana, North Carolina, and South Carolina are not included because physician dispensing was less frequent in these states in 2014 (less than 10 percent of all prescriptions).

[a] For these states, the 2014 data presented are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] For Kansas and Pennsylvania, the data reflect pre-reform experience. In Pennsylvania (effective December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

Key: Rx: prescriptions.

Figure 6.1 Frequency of Physician Dispensing of Opioid and Non-Opioid Pain Medications, Service Year 2014



Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. Louisiana, North Carolina, and South Carolina are not included because physician dispensing was less frequent in these states in 2014 (less than 10 percent of all prescriptions).

[a] For these states, the 2014 data presented are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] For Kansas and Pennsylvania, the data reflect pre-reform experience. In Pennsylvania (December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

Across the 17 states, at least 1 in 2 physician-dispensed prescriptions were for pain medications in 2014. When physicians dispensed, the likelihood of dispensing pain medications fell in a fairly narrow range from 56 percent in Florida to 68 percent in Wisconsin (Figure 6.1 and Table 6.1). When physicians dispensed pain medications, most states had a 1-to-2 ratio between opioid and non-opioid prescriptions; in several states (Kentucky, Michigan, and New Jersey), dispensing physicians predominantly dispensed non-opioid pain medications. In Michigan and New Jersey, when physicians dispensed, they frequently dispensed ibuprofen; with 28–30 percent of all physician-dispensed prescriptions for ibuprofen, the dispensing rate was double that in most states studied. While the less frequent dispensing of opioids by physicians in Michigan and New Jersey was likely reflective of local practices, the lower use of opioids in Kentucky was likely associated with the comprehensive opioid reforms in the state.

Among non-opioid pain medications, the top four drugs were ibuprofen, meloxicam, naproxen, and naproxen sodium. Note that meloxicam was infrequently dispensed by physicians in several states, including California, Indiana, and Michigan (below 3 percent, as shown in Table 6.1). For California, the fee schedule price for meloxicam was low, and the drug was not frequently seen among pharmacy-dispensed prescriptions. In Michigan, ibuprofen was the most commonly used drug when physicians dispensed drugs, representing 30

percent of all physician-dispensed prescriptions; naproxen products were also common, accounting for 17 percent of physician-dispensed prescriptions. The large variation across states in the use of specific drugs among dispensing physicians might be associated with several factors, including differences in state policies that limit physician-dispensed prescriptions for certain drugs or to a short time frame, pharmaceutical fee schedules, recent changes in opioid policies, as well as the level of concentration of medical centers or clinics, local practices, and drug supply.

Table 6.2 provides changes in the prescription distribution, between 2011 and 2014, for the common drugs in a few states where noticeable changes were observed, including Florida, Indiana, Kentucky, and Tennessee.[3]

- In Florida, the 2011 legislation banned physicians in the state from dispensing Schedule II and III opioids. A previous WCRI study suggested that the reduction of physician-dispensed prescriptions was associated with an increase in physicians dispensing other weaker opioids (e.g., tramadol) and non-opioid drugs.[4] As Table 6.2 shows, in 2014 after the Florida's rule change, physician-dispensed prescriptions for hydrocodone- and oxycodone-related drug products were reduced from approximately 4 percent of all physician-dispensed prescriptions to 0 percent. Over the same period, the frequency of physician-dispensed tramadol increased by 2.8 percentage points. As a result, there was a more than 2 percentage point reduction in the frequency of physician-dispensed opioids, and opioid prescriptions dispensed by Florida physicians were almost all tramadol-containing drug products, accounting for more than two-thirds of the 17 percent of all physician-dispensed prescriptions in 2014.
- In Indiana, 24 percent of physician-dispensed prescriptions were for opioids in 2011. The same figure decreased to 15 percent in 2014. The large decrease between the two years was mostly due to a substantial decrease in the frequency of physician-dispensed hydrocodone-acetaminophen (Table 6.2). Effective July 2014, Indiana's legislation put additional restrictions on physician dispensing after the 2013 change. Senate Bill 294 provides that a medical service provider may not be reimbursed for more than one office visit for each repackaged drug prescribed, and a medical provider may not receive reimbursement for a repackaged drug beyond the first seven days of injury. Since the reform went into effect in the middle of 2014, we observed the partial impact of the legislative change that limits physicians' ability to dispense prescription drugs.
- Kentucky was the lowest among the states studied on the frequency of physician-dispensed opioid pain medications—4 percent of all physician-dispensed prescriptions were for opioid pain medications in 2014 (3 percent for tramadol and 1 percent for hydrocodone-acetaminophen, as shown in Table 6.2). This is in contrast to the frequent physician dispensing of opioid pain medications in Connecticut, Georgia, and Wisconsin. Effective July 2012, Kentucky's comprehensive legislation changed the rules regarding opioid prescriptions including regulating pain clinics and establishing standards for prescribing and dispensing opioids. Kentucky's 2013 rule change further limits physician dispensing of Schedule II and III opioids to 48 hours of supply. These changes may explain the low frequency of opioid prescriptions in the state.

[3] We also saw a considerable shift in physician dispensing of certain drugs in South Carolina over the study period. However, the frequency of physician dispensing decreased substantially after South Carolina's reform. As a result, less than 10 percent of all prescriptions were dispensed by physicians in South Carolina. Because of this, we do not include South Carolina in the analysis of shifts in prescribing/dispensing patterns.

[4] See Thumula (2014).

Table 6.2 Changes in Prescription Distribution of (pill form) Drugs Commonly Dispensed by Physicians among All Physician-Dispensed Prescriptions, between Service Years 2011 and 2014

	Florida			Indiana			Kentucky			Tennessee		
	2011[a]	2014	% Point Change	2011	2014	% Point Change	2011	2014	% Point Change	2011	2014	% Point Change
Opioid medications												
% of physician-dispensed Rx that were for opioids	19%	17%	-2.4	24%	15%	-8.3	16%	4%	-11.4	27%	18%	-9.0
% of physician-dispensed Rx that were for the most commonly dispensed opioids												
Tramadol HCL (Ultram®)	10%	13%	2.8	7%	9%	2.1	3%	3%	-0.5	9%	8%	-0.8
Hydrocodone-acetaminophen (Vicodin®)	3%	0%	-2.8	13%	4%	-9.2	11%	1%	-9.5	16%	9%	-7.0
Oxycodone-acetaminophen (Percocet®)	1%	0%	-0.9	0%	0%	-0.3	1%	0%	-1.0	1%	1%	-0.3
Other opioids	4%	3%	-1.5	3%	2%	-0.9	1%	0%	-0.5	1%	0%	-0.8
Non-opioid pain medications												
% of physician-dispensed Rx that were for non-opioid pain medications	41%	40%	-1.0	44%	51%	6.3	50%	57%	6.9	42%	39%	-2.7
% of physician-dispensed Rx that were for the most commonly dispensed non-opioid pain medications												
Ibuprofen (Motrin®)	9%	8%	-1.8	16%	19%	3.2	19%	19%	0.2	11%	8%	-3.1
Meloxicam (Mobic®)	10%	15%	4.4	2%	2%	0.7	5%	5%	-0.3	10%	14%	3.6
Naproxen sodium (Aleve®)	3%	2%	-0.8	9%	6%	-3.0	5%	5%	0.1	5%	4%	-1.2
Naproxen (Naprosyn®)	8%	6%	-1.7	7%	10%	3.0	6%	10%	4.0	6%	3%	-2.3
Other non-opioid pain medications	10%	9%	-1.2	10%	13%	2.3	15%	18%	2.9	10%	10%	0.2
Muscle relaxants												
% of physician-dispensed Rx that were for muscle relaxants	17%	17%	-0.1	15%	15%	0.2	19%	24%	4.8	16%	16%	0.6
% of physician-dispensed Rx that were for the most commonly dispensed muscle relaxants												
Cyclobenzaprine HCL (Flexeril®)	7%	8%	1.6	10%	10%	0.5	13%	17%	4.2	9%	10%	0.5
Metaxalone (Skelaxin®)	1%	1%	-0.6	4%	3%	-0.8	1%	0%	-0.6	1%	1%	-0.3
Other muscle relaxants	9%	8%	-1.1	1%	2%	0.5	6%	7%	1.2	6%	6%	0.4
Other medications												
% of physician-dispensed Rx that were for other medications	23%	27%	3.5	17%	19%	1.7	16%	15%	-0.3	15%	26%	11.2

Notes: The underlying data include prescriptions filled in service years 2011 and 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details.

[a] The 2011 data for Florida reflect a mix of pre-and post-reform results for the 2011 legislative change. Effective July 2011, Florida's legislation banned all physicians in the state from dispensing Schedule II and III opioids. For more details, see Thumula (2014), which evaluates the impact of Florida's 2011 reform.

Key: Rx: prescriptions.

- In Tennessee, several reforms were introduced during and shortly after the study period that were aimed at addressing physician dispensing of opioids.[5] These policies are expected to change the dispensing

[5] In November 2012, Tennessee's legislation (Senate Bill 3315) explicitly included Schedule II, III, and IV drugs as part of standard utilization review for pain management, if opioids are prescribed for a period of time exceeding 90 days from the initial prescription. Effective October 1, 2013, a new Tennessee legislation (Senate Bill 676) required that a prescription for opioids or benzodiazepines not be dispensed in quantities greater than a 30-day supply. Also effective October 1, 2013, House Bill 868 added a new section to the state's existing pain management clinic statutes that no pain management clinic or medical doctor is permitted to dispense controlled substances—with the exception of a 72-hour maximum dose of a Schedule IV or V controlled substance at no charge. The 2014 data reflect the impact of the reforms described above.

patterns of physicians to some extent. Table 6.2 shows that the percentage of physician-dispensed prescriptions for hydrocodone-acetaminophen decreased 7 percentage points, from 16 to 9 percent. For non-opioid pain medications, there was a 3.6 percentage point increase in physician-dispensed meloxicam and a 3.1 percentage point decrease for ibuprofen. The pattern of physician-dispensed prescriptions in Tennessee appears to have shifted from opioid and non-opioid pain medications to other drugs mainly because of the reduction in physician dispensing of opioid pain medications.

Beyond the study period, several states also made changes, through legislation, reimbursement rules, or drug formularies, to limit physician dispensing of opioids and other prescription drugs. In the states with a higher percentage of physician-dispensed prescriptions for opioids, the results may serve as a baseline to evaluate reforms.

For example, Pennsylvania's new reimbursement rules (effective December 2014) limit physician-dispensed opioids to 15 days of supply for nonsurgical cases and 30 days for surgical cases. In North Carolina, effective August 2014, reimbursement for Schedule II and III opioids is limited to an initial 5 days of supply when dispensed by outpatient providers other than a licensed pharmacist. Effective January 2015, Kansas requires prior authorization for physician-dispensed prescriptions to be reimbursed.

A drug formulary may also help address issues related to physician dispensing. For example, California recently passed a law that requires adoption of a drug formulary by July 2017 that also addresses physician dispensing of opioid prescriptions through prior authorization. In March 2017, the California Division of Workers' Compensation released the formal draft of the medical treatment utilization schedule (MTUS) drug formulary, which is anticipated to take effect for services on or after January 1, 2018.[6] In January 2016, Tennessee adopted workers' compensation medical treatment guidelines, with a drug formulary adopted at the same time as part of a comprehensive set of treatment guidelines. Based on the experience of several states (Ohio, Texas, and Washington), evidence-based formularies are expected to have a significant impact on the frequency of use of opioids.

Physician dispensing of over-the-counter (OTC) medications was also seen in several states where physician dispensing was common, and some OTC drugs were paid for at higher prices when physicians dispensed them. A few states addressed the issue by restricting the reimbursement for OTC drugs. In Pennsylvania, for example, House Bill 1846 not only caps the reimbursement amount for physician-dispensed drugs and allows dispensing for a short time frame but also limits reimbursement for OTC drugs to pharmacies.

Figure 6.2 shows that the percentage of physician-dispensed prescriptions for drugs with OTC strengths was higher in California, Illinois, and Indiana, at 14–16 percent. The percentage was also higher than the median of the 17 states in several other states including Georgia, Kentucky, and New Jersey. By contrast, OTC drugs were rarely dispensed by physicians in Kansas—only 1 percent of physician-dispensed prescriptions

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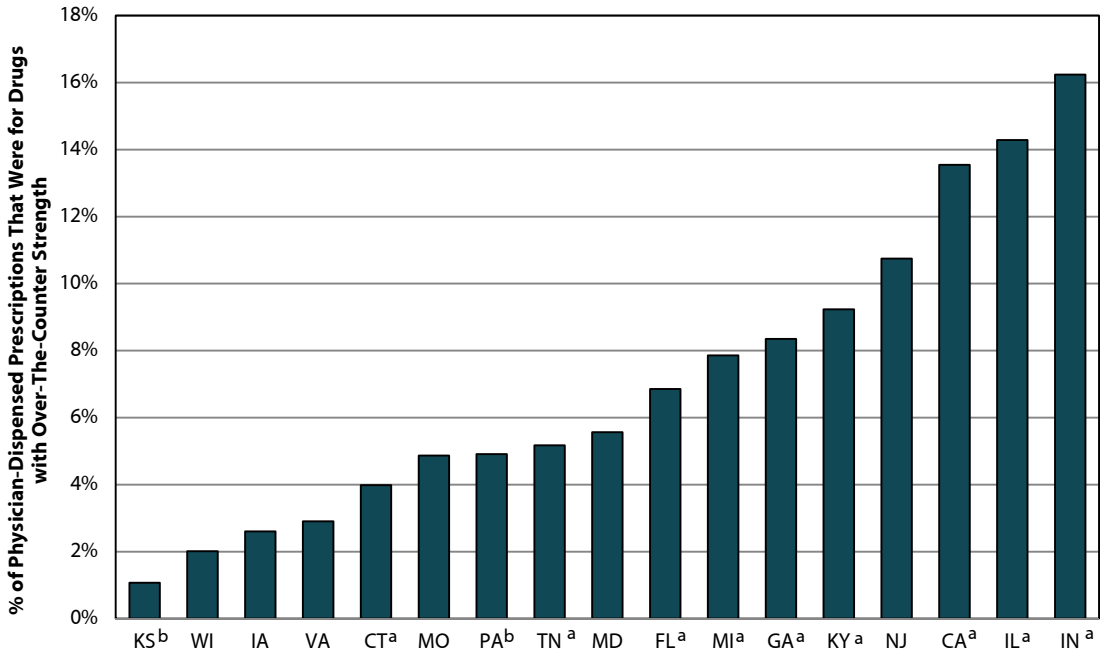
Effective January 1, 2015, House Bill 1512 further prohibits all licensed health care prescribers from dispensing Schedule II or III controlled substances, with some exceptions.

[6] The effective date for the drug formulary was originally set for July 1, 2017. In May 2017, there was some stakeholder input toward recommending a delay in the implementation. The anticipated delay is intended to address additional comments. It also allows time for stakeholders to program necessary changes and for the California Division of Workers' Compensation to provide education sessions to providers and injured workers about the formulary. New development of the drug formulary should be closely monitored. See http://www.businessinsurance.com/article/20170530/NEWS08/912313633/California-drug-formulary-delay-workers-comp for more details.

were for drugs with OTC strengths (Figure 6.2 and Table 6.3). Over the study period, the frequency of physician-dispensed prescriptions for OTC drugs changed little in most states included in the analysis, except for Georgia, Illinois, and Indiana. In Indiana, the percentage increased by 5 percentage points. The same figure decreased by 4–5 percentage points in Georgia and Illinois.[7]

Figure 6.2 Percentage of Physician-Dispensed Prescriptions for Drugs with Over-the-Counter Strengths, Service Year 2014



Notes: The underlying data include prescriptions filled in service year 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. Louisiana, North Carolina, and South Carolina are not included because physician dispensing was less frequent in these states in 2014 (less than 10 percent of all prescriptions).

[a] For these states, the 2014 data presented are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] For Kansas and Pennsylvania, the data reflect pre-reform experience. In Pennsylvania (effective December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

[7] Effective May 1, 2014, Georgia's workers' compensation medical fee schedule sets reimbursement for OTC drugs at the retail price, not to exceed the AWP of the original manufacturer's NDC, plus 50 percent. We are not aware of a pharmacy fee schedule requirement for OTC drugs in Illinois.

Table 6.3 Percentage of Physician-Dispensed Prescriptions That Were for Over-the-Counter Drugs, Service Years 2011 through 2014

	CA[a]	CT[a]	FL[a]	GA[a]	IA	IL[a]	IN[a]	KS[b]	KY[a]	MD	MI[a]	MO	NJ	PA[b]	TN[a]	VA	WI
2011	14%	4%	7%	13%	5%	18%	11%	1%	9%	7%	9%	6%	10%	6%	4%	2%	2%
2012	14%	5%	8%	12%	3%	20%	13%	1%	10%	7%	8%	7%	9%	6%	4%	2%	2%
2013	13%	4%	8%	9%	2%	15%	14%	1%	12%	6%	8%	7%	11%	5%	5%	3%	2%
2014	14%	4%	7%	8%	3%	14%	16%	1%	9%	6%	8%	5%	11%	5%	5%	3%	2%

Notes: The underlying data include prescriptions filled in service years 2011 to 2014, for all medical claims with injuries occurring within two years prior to the fill date. These prescriptions were for medications of prescription strengths and over-the-counter strengths dispensed in a nonhospital setting. See Chapter 2 for more details. Louisiana, North Carolina, and South Carolina are not included because physician dispensing was less frequent in these states in 2014 (less than 10 percent of all prescriptions).

[a] For these states, the 2014 data presented are post-reform after the changes made to the rules governing reimbursements for physician-dispensed drugs. These states include, with the effective year in parentheses, California (2007), Connecticut (2012), Florida (2013), Georgia (2011), Illinois (2012), Indiana (2013), Kentucky (2013), Michigan (2012), and Tennessee (2012). See Appendix A for a description of the reforms.

[b] For Kansas and Pennsylvania, the data reflect pre-reform experience. In Pennsylvania (December 2014), the physician dispensing reforms not only cap the prices paid for physician-dispensed drugs but also limit physician-dispensed drugs to a short time frame. Kansas' new fee schedule, effective January 2015, sets the reimbursement for physician-dispensed drugs at the same level as for the same drugs dispensed at pharmacies, based on the original National Drug Code (NDC), and requires the payor's pre-approval for reimbursement of physician-dispensed drugs. See Appendix A for a description of the reforms.

7

IMPLICATIONS AND CONCLUSION

As of June 2017, 22 states have made legislative and regulatory changes aimed at reducing the costs associated with physician dispensing.[1] All reforms targeted higher prices paid for physician-dispensed repackaged drugs by capping the price paid at the AWP of the original drug used in the repackaging process. Several more recent reforms also limit physician-dispensed prescriptions for certain drugs or to a short time frame.[2] This report provides information in a multistate context for the readers who are interested in learning about the impact of similar reforms across different states and comparing the experience in the post-reform states with that in the states that did not have reforms.[3]

We found that fewer prescriptions were dispensed by physicians in all post-reform states, but physician dispensing was still prevalent in the states where physician dispensing was common prior to the reforms. In several states that did not have reforms or where we observed data for only pre-reform experience, a decrease in the frequency of physician dispensing was also seen. For these non-reform states or pre-reform states, other policies and initiatives might have explained part of the reduction.

In the post-reform states studied, the new reimbursement rules helped reduce prices paid to physicians for existing drug products. However, increased physician dispensing of higher-priced new strengths and formulation emerged, especially in post-reform California, Florida, and Illinois. More frequent physician dispensing of higher-priced new drug products offset or even outweighed the price reductions for the existing drug products, driving up the average price paid for several drugs commonly dispensed by physicians. By contrast, those new drug products were rarely seen in post-reform Michigan among physician-dispensed prescriptions. In Michigan, the price-focused reform resulted in an overall reduction in the average price paid

[1] Among the 22 states, 18 states had reforms described in previous WCRI reports (Wang, Liu, and Thumula, 2013b and 2014; Wang, Thumula, and Liu, 2014a–c). Optum (2017) also published reference data on pharmacy laws and regulations across all states in the United States. More recently, two new states (Kansas and Nevada) made changes regarding physician-dispensed drugs. Effective January 1, 2015, the Kansas Department of Labor Workers' Compensation Division updated the pharmacy fee schedule to require that compound drugs and physician-dispensed medications be reimbursed the same as pharmacies, based on the original manufacturer NDC, and dispensed on prior approval of the employer/carrier. Effective January 1, 2016, Senate Bill 231 prohibits physicians in Nevada from dispensing more than an initial 15-day supply of Schedule II and III controlled substances. The legislation also requires the use of original NDCs for physician-dispensed medications and prevents physician-dispensers from charging for a non-prescription medication.

[2] For example, Florida's 2011 legislation prohibits physicians from dispensing Schedule II and III opioids. Kentucky's 2013 reform limits physician dispensing of hydrocodone-combined drug products to 48 hours of supply. Pennsylvania, effective 2014, limits physician-dispensed drugs to 7 days of supply for nonsurgical claims and 15 days of supply for surgical claims. North Carolina also limits physician-dispensed drugs to a short time frame (effective 2014). Kansas requires the carrier's approval (effective 2015). In March 2017, the California Division of Workers' Compensation released the formal draft of the medical treatment utilization schedule drug formulary, which is anticipated to take effect for services on or after January 1, 2018. Our analysis on the frequency of physicians dispensing certain drugs as a percentage of all physician-dispensed drugs can be useful to measure the impact of such reforms.

[3] Previous WCRI studies on physician dispensing focused on individual states' experiences. See Wang Thumula, and Liu (2016a–2016h).

for physician-dispensed drugs. Overall, the post-reform experience in multiple states suggests an impact of the price-focused reforms on cost reduction for physician-dispensed prescriptions, in the absence of higher-priced new drug products. However, the increased physician dispensing of higher-priced new drug products, as a result of behavioral changes on the part of some physician-dispensers and intermediaries in response to substantial price reductions after the reforms, drove up physician prices for several drugs commonly used to treat injured workers. The physician dispensing of higher-priced new drug products occurred ahead of reforms in Florida and Pennsylvania, perhaps in anticipation of upcoming price-focused reforms.

Although there might be certain clinical benefits of prescribing these new strengths and formulation, the different prescribing patterns between physicians who dispensed and those who did not suggests that the shift to the new strengths and formulation was unlikely to have been driven by new evidence about superior medical practices. Rather, it is likely that financial incentives led some physicians to choose the new drug products for their patients.

It is worth noting that in several states without reforms (e.g., Iowa and Maryland), the average price per pill paid to physicians for drugs they dispensed also decreased. However, price reductions were not as consistently seen as in the post-reform states for existing drug products. For those non-reform states, the physician share of prescription costs also decreased, but to a lesser degree, compared with the post-reform states. For Maryland, there was a considerable price reduction for the most common drugs, and the physician share of prescription costs also decreased as a result of decreased frequency and prices. Although issues of physician dispensing have been debated in Maryland, no policy changes have been made at the state level. Conceivably, the heightened awareness of the issues and changes in business practices may help explain the results in Maryland.[4]

In more recent years, several states made legislative or regulatory changes that are more restrictive on physicians' ability to dispense. The earliest example is Florida's 2011 legislation that prohibits physicians from dispensing Schedule II and III opioids. Several other states introduced more restrictive rules, including Indiana, Kansas, Kentucky, North Carolina, and Pennsylvania.[5] These drug-limiting reforms directly impact the frequency of physician dispensing overall and for specific drugs. In Indiana, for example, the percentage of physician-dispensed prescriptions for hydrocodone-acetaminophen decreased from 13 percent in 2011 to 4 percent in 2014, with a slight increase for tramadol (up by 2 percentage points). In Florida, for example, the percentage of physician-dispensed prescriptions for hydrocodone- and oxycodone-containing products decreased from 4 percent in 2011 to 0 percent in 2014. Over the same period, there was a 3 percentage point increase in the same measure for tramadol. The drug-limiting policies may have resulted in the shift in dispensing practices and overall decrease in the frequency of physician dispensing.

In this study, we compared the frequency and costs of physician dispensing in post-reform states with non-reform or pre-reform states. We did not compare the results across different post-reform states because of the dynamic nature of the reforms, different language of the reforms, and other policy changes over the same time period. While more rigorous analysis is needed to examine the impact of the reforms on physician dispensing, costs, and associated outcomes, it may not be feasible to isolate the effect of certain reforms. Despite these limitations, we hope that the findings of this study are helpful for policymakers and stakeholders who are interested in finding the most effective solutions to the issues related to physician

[4] Examining changes in business practices and their impact on physician dispensing is beyond the scope of this study. Because of concerns of confidentiality and our focus on public policy issues, any analysis of this nature is beyond the scope of WCRI research.

[5] A more detailed description of the reforms can be found in Appendix A.

dispensing. With several states' reforms not fully reflected in the study period, including Kansas, North Carolina, and Pennsylvania, we will continue to monitor the reforms as additional data become available.

APPENDIX A:

STATE POLICIES ON PHARMACY FEE SCHEDULES AND PHYSICIAN DISPENSING

Table A.1 provides a summary of state policies regarding pharmacy fee schedules, state laws for physician dispensing, and workers' compensation reimbursement rules for physician-dispensed prescriptions. The information is provided for the states included in this report to help the reader interpret the results reported.

Information in Table A.1 was based on the same table published in a previous WCRI report,[1] updated primarily by WCRI staff, through communications with state agencies and a number of system participants who are knowledgeable about pharmacy fee schedules and related rules and regulations. The information was also checked against recent reports on pharmacy fee schedules published by Optum and reviewed through our external review process.

As of June 2017, 3 of the 26 study states included in this study (Massachusetts, New York, and Texas) generally prohibit physicians from dispensing prescription drugs by law. For each of the three states, there are certain exceptions to the prohibition. In Massachusetts, physicians may dispense drugs only when necessary for the immediate and proper treatment of the patient until it is possible for the patient to have a prescription filled at a pharmacy.[2] Physicians in New York may dispense up to a 72-hour supply of prescription drugs in a number of restricted circumstances, including dispensing drugs in a medical emergency, in an office that is situated 10 miles or more from a registered pharmacy, or at no charge to their patients.[3] In Texas, physicians are allowed to dispense prescription drugs in rural counties in the state.[4]

In the other 23 states, physician dispensing is either allowed or permitted. In several states, physician dispensing is permitted with more restrictive conditions. For example, in Arkansas, dispensing physicians (as well as pharmacists) are required to report the price paid by the dispenser at the point of purchase, and no dispensing fee is allowed when dispensing drugs at physicians' offices. Moreover, the Arkansas Medical Practices Act requires special approval by the Arkansas State Medical Board for a licensed physician to dispense opioids. Minnesota permits physician dispensing, but the state Board of Medical Practice requires physicians who dispense prescription drugs to register with the Board, and dispensing physicians are required to disclose to patients that the physician profits from dispensing the drug and that the patient has the option of obtaining the drug elsewhere.

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[1] *The Prevalence and Costs of Physician-Dispensed Drugs* (Wang, Thumula, and Liu, 2013).

[2] See the Massachusetts Administration of the Government, Title XV, Chapter 94C, Section 9 for more details.

[3] See the New York Education Law Article 137, Section 6807(2) for more details.

[4] A rural area is defined as an area in which there is no pharmacy within a 15-mile radius of the physician's office and which is within either a county with a total population of 5,000 or less or a city or town with a population of less than 2,500, according to the most recent federal census (see Texas Administrative Code, Title 22, Part 9 for more details). Note that in 2013, Senate Bill 227, which included a provision allowing optometrists and dermatologists to dispense certain cosmetic drugs for profit, passed the House and Senate but was vetoed by Governor Perry.

As of June 2017, 22 states that allow physicians to dispense medications have made changes to the rules governing reimbursement for physician-dispensed drugs by setting the maximum reimbursement to the AWP with or without a multiplier and with or without a dispensing fee. These new rules targeted higher-priced repackaged drugs by tying the reimbursement to the NDC of the original drug. Among the 22 reform states, 14 states are included in this study (California, Connecticut, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Michigan, Nevada, North Carolina, Pennsylvania, South Carolina, and Tennessee).[5] In most states with reforms, the intent was to reduce the prices paid for physician-dispensed prescriptions by setting the maximum reimbursement amount for physician-dispensed prescriptions to the same level as that for pharmacies.[6] All of the states with reforms require that the reimbursement amount be determined based on the underlying NDC of the original drug product used in the repackaging process if a repackaged drug is dispensed. Some states explicitly require that dispensing physicians include the underlying manufacturer NDC on all bills for repackaged drugs dispensed, while others set reimbursement amounts to the lesser of the AWP of the underlying NDC or the lowest of the reference prices for therapeutic equivalent drugs.[7] In this report, we observed post-reform experience in 2014 for 11 of the 14 reform states, with 10 post-reform states included in the analysis.

In the past few years, several states also made legislative or regulatory changes to either prohibit physicians from dispensing certain drugs or to restrict physician dispensing to a short time frame.

Seven states in this study (Florida, Kentucky, Louisiana, Nevada, North Carolina, Pennsylvania, and Tennessee) either prohibit or restrict physicians from dispensing controlled substances. In Florida and Tennessee, physicians are prohibited, by law, from dispensing Schedule II and Schedule III controlled substances with limited exceptions. Kentucky limits physician dispensing of Schedule II and Schedule III controlled substances containing hydrocodone to a 48-hour supply. Louisiana restricts physician dispensing of controlled substances, carisoprodol, and tramadol to up to a 48-hour supply.[8] In North Carolina, reimbursement for Schedule II–V controlled substances is limited to an initial 5 days of supply when dispensed by outpatient providers other than a licensed pharmacist. Nevada prohibits physicians from dispensing more than an initial 15-day supply of Schedule II and III controlled substances. In Pennsylvania, reimbursement for physician-dispensed Schedule II and hydrocodone-containing drugs is limited to 7 and 15 days of supply for nonsurgical and surgical cases, respectively.

Physician dispensing is restricted to a shorter time frame for all drugs in Indiana, New Jersey,[9] and Pennsylvania. Indiana physicians can only dispense medications to injured workers in the first seven days of the injury, including the day of the injury.[10] In New Jersey, physician dispensing is limited to a seven-day

[5] The states with similar reforms on physician dispensing that are not included in the study are Alaska, Alabama, Arizona, Delaware, Hawaii, Idaho, Mississippi, and Oklahoma.

[6] Florida was an exception. Effective July 2013, the state reimbursement rules for physician-dispensed drugs set the maximum amount to the AWP + 12.5 percent of the original drug product used in the repackaging process, with an $8.00 dispensing fee.

[7] See the footnotes in Table A.1 for states with reforms.

[8] Louisiana's restrictive policy was in place before the study period, while the restrictive rules for the other states were made during or after the study period from 2011 to 2014.

[9] The restrictive policy that limits physician dispensing to a short time frame existed prior to the study period.

[10] The price-focused reform (House Bill 1320) that capped the reimbursement for physician-dispensed drugs went into effect in July 2013. Effective July 2014, Senate Bill 294 states that a medical service provider may not be reimbursed for more than one office visit for each repackaged legend drug prescribed, and the maximum period during which a medical service provider may receive reimbursement for a repackaged legend drug begins on the date of the injury or disablement

supply, with exceptions for rural areas. Pennsylvania, beside the 7- or 15-day supply limit for physician-dispensed Schedule II drugs (as mentioned above), also limits all other drugs that are dispensed by physicians to a 30-day supply. Kansas adopted new reimbursement rules, effective January 2017, requiring prior authorization from the employer or carrier before compounds and physician-dispensed medications can be dispensed.

and ends at the beginning of the eighth day after the date of the injury or disablement (i.e., limited to the first seven days of the injury).

Table A.1 Summary of State Policies on Fee Schedules for Physician- and Pharmacy-Dispensed Prescription Drugs

State	Major Changes in Physician Dispensing and Repackaging Since 2007	Physician Dispensing of Prescription Drugs				Workers' Compensation Pharmacy Fee Schedule		
				Workers' Compensation Fee Schedule for Physician-Dispensed Drugs				
		Physician Dispensing	Licensing Requirements and Restrictions	Maximum Reimbursement Rates	Required to Include Manufacturer NDC on Bills for Repackaged Drugs[a]	Maximum Rates Set Using Formulaic Fee Schedule	Reimbursement for Brand Name Drugs[b]	Reimbursement for Generic Drugs[b]
Arkansas		Permitted[c]	License for dispensing required	Reimbursement set to pharmacy fee level with no dispensing fee	n/a[c]	Yes	Lesser of provider's usual charge or AWP, $5.13	Lesser of provider's usual charge or AWP, $5.13
California	Reimbursements for physician-dispensed Rx (March 2007)	Allowed	No license required	Reimbursement set to pharmacy fee schedule rate using underlying NDC, effective March 2007[d]	Not explicitly required	Yes	Lesser of EAC plus $7.25 or U&C[e]	Lesser of EAC plus $7.25 or U&C[e]
Connecticut	Reimbursements for physician-dispensed Rx (July 2012)	Allowed	License for dispensing required for controlled substances; no license required in general	Reimbursement set to lesser of AWP of underlying NDC or the therapeutic equivalent drug product, plus a dispensing fee, effective July 2012[f]	Not explicitly required	Yes	AWP, $5.00	AWP, $8.00
Florida	Prohibition of physician dispensing of Schedule II and III opioids (July 2011) Reimbursements for physician-dispensed Rx (July 2013)	Limited for controlled substances[g]	License for dispensing required	Reimbursement set to AWP + 12.5% of underlying NDC, plus $8.00 dispensing fee, effective July 2013[h]	Not explicitly required	Yes	AWP, $4.18	AWP, $4.18
Georgia	Reimbursements for physician-dispensed Rx (April 2011)	Allowed	No license required; state law allows physicians to dispense after notifying the GA Composite Medical Board in writing of their intent as a dispensing physician	Reimbursement set to AWP of underlying NDC, plus dispensing fee (1 per NDC per day), effective April 1, 2011[i]	Explicitly required	Yes	AWP, $4.31	AWP, $6.45
Illinois	Reimbursements for physician-dispensed Rx (November 2012)	Allowed	Not available	Reimbursement set to AWP of underlying NDC, plus $4.18 dispensing fee, effective November 2012[j]	Explicitly required	No	Provider's U&C	Provider's U&C
Indiana	Reimbursements for physician-dispensed Rx (July 2013)	Limited[k]	License for dispensing required; physician assistant cannot dispense	Reimbursement set to AWP of underlying NDC, effective July 1, 2013[l]	Not explicitly required	No	Provider's U&C[k]	Provider's U&C[k]
Iowa		Permitted	License for dispensing required	Silent	n/a	No	Provider's U&C	Provider's U&C
Kansas	Prior authorization required for dispensing physician-dispensed Rx (January 2015) Reimbursements for physician-dispensed Rx (January 2015)	Limited[m]	No license required	Reimbursement set to pharmacy fee schedule rate using underlying NDC, plus $3.00 dispensing fee, effective January 2015	Not explicitly required	Yes	Lesser of U&C or AWP - 10%, $3.00	Lesser of U&C or AWP - 15%, $5.00

continued

Table A.1 Summary of State Policies on Fee Schedules for Physician- and Pharmacy-Dispensed Prescription Drugs (continued)

State	Major Changes in Physician Dispensing and Repackaging Since 2007	Physician Dispensing of Prescription Drugs				Workers' Compensation Pharmacy Fee Schedule		
				Workers' Compensation Fee Schedule for Physician-Dispensed Drugs				
		Physician Dispensing	Licensing Requirements and Restrictions	Maximum Reimbursement Rates	Required to Include Manufacturer NDC on Bills for Repackaged Drugs[a]	Maximum Rates Set Using Formulaic Fee Schedule	Reimbursement for Brand Name Drugs[b]	Reimbursement for Generic Drugs[b]
Kentucky	Quantity limits on physician dispensing of Schedule II and Schedule III controlled substances containing hydrocodone (March 2013) Reimbursements for physician-dispensed Rx (2013)	Limited for controlled substances[n]	No license required	Reimbursement set to AWP of underlying NDC, effective October 2013[n]	Explicitly required	Yes	AWP, $5.00	AWP, $5.00
Louisiana		Limited for controlled substances[o]	License for dispensing required	Silent[p]	n/a	Yes	Lesser of U&C or provider/insurer contracted charge or AWP + 10%, dispensing fee[q]	Lesser of U&C or provider/insurer contracted charge or AWP + 40%, dispensing fee[q]
Maryland		Permitted	License for dispensing required	Silent[r]	n/a	No	Provider's U&C	Provider's U&C
Massachusetts		Prohibited in general[s]	n/a	n/a	n/a	Yes	Lesser of EAC plus $3.00 (dispensing fee) or U&C[t]	Lesser of FUL, state upper limit, or EAC plus $3.00 (dispensing fee) or U&C[t]
Michigan	Reimbursements for physician-dispensed Rx (December 2012)	Allowed	License for dispensing controlled substances required	Reimbursement set to AWP - 10% of underlying NDC, plus a dispensing fee[u]	Explicitly required	Yes	AWP - 10%, $3.50	AWP - 10%, $5.50
Minnesota		Limited[v]	No license required; registration required[v]	Not available	n/a	Yes	Bi-furcated Paper: Lesser of AWP, $5.14 or U&C Electronic: Lesser of AWP - 12%, $3.65 or state MAC, $3.65 or U&C	Bi-furcated Paper: Lesser of AWP, $5.14 or U&C Electronic: Lesser of AWP - 12%, $3.65 or state MAC, $3.65 or U&C
Missouri		Permitted	Registration with the state is required, must be renewed every year	Silent[w]	n/a	No	Fair & reasonable[w]	Fair & reasonable[w]
Nevada	Reimbursements for physician-dispensed Rx; quantity limits on physician-dispensed Schedule II and III controlled substances (January 2016)	Limited for controlled substances	License for dispensing required	Reimbursement set to AWP of underlying NDC	Explicitly required	No	Lesser of U&C, negotiated contract amount or AWP, $10.94	Lesser of U&C, negotiated contract amount or AWP, $10.94
New Jersey		Limited	No license required	Not available	n/a	No	Provider's U&C	Provider's U&C
New York		Prohibited in general[s]	n/a	Reimbursement set to AWP of underlying NDC[x]	n/a	Yes	AWP - 12%, $4.00	AWP - 20%, $5.00

continued

Table A.1 Summary of State Policies on Fee Schedules for Physician- and Pharmacy-Dispensed Prescription Drugs (continued)

State	Major Changes in Physician Dispensing and Repackaging Since 2007	Physician Dispensing of Prescription Drugs				Workers' Compensation Pharmacy Fee Schedule		
				Workers' Compensation Fee Schedule for Physician-Dispensed Drugs				
		Physician Dispensing	Licensing Requirements and Restrictions	Maximum Reimbursement Rates	Required to Include Manufacturer NDC on Bills for Repackaged Drugs[a]	Maximum Rates Set Using Formulaic Fee Schedule	Reimbursement for Brand Name Drugs[b]	Reimbursement for Generic Drugs[b]
North Carolina	Reimbursements for physician-dispensed Rx; quantity limits on physician-dispensed controlled substances (August 2014)	Limited for controlled substances[y]	License for dispensing required	Reimbursement set to AWP of underlying NDC	Explicitly required	No	Lesser of negotiated contract amount or AWP - 5%	Lesser of negotiated contract amount or AWP - 5%
Pennsylvania	Reimbursements for physician-dispensed Rx; quantity limits on physician-dispensed Rx (December 2014)	Limited to a time frame	No license required	Reimbursement limited to AWP + 10%[z]	Explicitly required	Yes	AWP + 10%[aa]	AWP + 10%[aa]
South Carolina	Reimbursements for physician-dispensed Rx (December 2011)	Permitted	License for dispensing required	Reimbursement set to AWP of underlying NDC, plus $5.00 dispensing fee, effective December 19, 2011[bb]	Explicitly required	Yes	Lesser of U&C or AWP, $5.00	Lesser of U&C or AWP, $5.00
Tennessee	Reimbursements for physician-dispensed Rx (August 2012) Prohibits pain management clinics and doctors from dispensing opioids (October 2013) Quantity limits on dispensing of opioids and benzodiazepines (October 2013) Prohibits physician dispensing of Schedule II and III opioids (January 2015)	Limited for controlled substances[cc]	No license required	Reimbursement set to AWP of underlying NDC, with no dispensing fee, effective August 2012[dd]	Explicitly required	Yes	Lesser of U&C or negotiated contract amount or AWP, $5.10	Lesser of U&C or negotiated contract amount or AWP, $5.10
Texas		Prohibited in general[s]	n/a	n/a	n/a	Yes	AWP + 9%, $4.00	AWP + 25%, $4.00
Virginia		Permitted[ee]	License for dispensing required; inspection of location required	Not available	n/a	No	Provider's U&C	Provider's U&C
Wisconsin		Allowed	No license required	Reimbursement set to AWP of the drug dispensed, with no dispensing fee[ff]	n/a[ff]	Yes	AWP, $3.00	AWP, $3.00

continued

Table A.1 Summary of State Policies on Fee Schedules for Physician- and Pharmacy-Dispensed Prescription Drugs (continued)

Notes: Policies are current as of June 2017. Indicated in the major changes column are policy changes that have been made since 2007 affecting reimbursements for pharmacy- and physician-dispensed prescriptions. Website addresses are valid as of June 2017.

[a] For the states with recent fee schedule reforms on physician dispensing, this column indicates whether the reimbursement rules require that the NDC of the original drug product used in the repackaging process be included on the prescription bills when repackaged drugs are dispensed (explicitly required, not explicitly required, and not applicable).

[b] The data presented are the reimbursement rate, plus a dispensing fee, as of June 2017.

[c] In Arkansas, physicians are permitted to dispense prescription drugs. Physician-dispensed drugs are subject to the same fee schedule as pharmacies in the state, except that there is no dispensing fee for physician-dispensed medications. The Arkansas pharmacy fee schedule also requires the reporting of the purchasing price for the drug dispensed. Moreover, under the Arkansas Medical Practices Act, no licensed physicians shall dispense opioids without prior approval by the Arkansas State Medical Board after application to the board and on the showing of need.

[d] If the underlying NDC for the repackaged drug is not in the Medi-Cal database, the maximum fee shall be 83 percent of the AWP of the lowest-priced therapeutically equivalent drug, calculated on a per-unit basis, plus the dispensing fee. Note that effective January 1, 2012, California has new caps on fees for physician-dispensed compound drugs, limiting the maximum reimbursement to no more than 300 percent of documented paid costs, but in no case more than $20 above documented paid costs (CA Labor Code 5300-5318, Section 5301.7 (2)).

[e] The EAC (referred to in the California pharmacy fee schedule for both brand name and generic drugs) is the lesser of the AWP minus 17 percent, the FUL, the state maximum allowable ingredient cost, or the selling price to the general public.

[f] Effective July 15, 2012, the reimbursement allowed in Connecticut shall be based on the AWP of the underlying NDC for the drug dispensed or the therapeutic equivalent drug product, whichever is less. If the underlying NDC is not known, discretion rests with the payor to determine the most appropriate NDC code. A dispensing fee is applied ($5.00 for brand name, $8.00 for generic).

[g] Effective July 2011, physician dispensing of Schedule II and Schedule III controlled substances is not permitted in Florida, with limited exceptions. Physicians may continue to dispense other prescription drugs. Details of House Bill 7095 can be retrieved from http://flsenate.gov/Session/Bill/2011/7095/BillText/er/PDF.

[h] Florida's legislature passed Committee Substitute/Senate Bill 662, which includes a provision capping the reimbursement rate for repackaged or relabeled drugs dispensed by a physician-dispenser at 112.5 percent of the AWP of the underlying NDC, plus a dispensing fee of $8.00. It also maintains the reimbursement rate for other prescription medications at the AWP plus a $4.18 dispensing fee. The AWP is calculated by multiplying the number of units dispensed times the per-unit wholesale price set by the original manufacturer of the underlying drug dispensed, based on the AWP published in the Medi-Span® Master Drug Database as of the date of dispensing.

[i] Effective April 2011, Georgia's rule restricts the basis of calculating reimbursement rates for repackaged drugs to the current AWP (published as of the date of dispensing) of the original manufacturer NDC of the same drug dispensed by the physician. Information about the fee schedule reforms can be found at http://sbwc.georgia.gov/april-1-2011-medical-fee-schedule-updates. Effective April 1, 2013, the fee schedule states that one dispensing fee shall be paid per NDC per day.

[j] Effective November 20, 2012, Illinois' fee schedule sets maximum reimbursement for prescriptions dispensed outside of a licensed pharmacy to the AWP for the underlying drug product, as identified by its original manufacturer NDC, plus a dispensing fee of $4.18. The AWP of the underlying drug product is determined by the original manufacturer NDC set forth in Medi-Span®. (See Section 8.2 [a-3] of the Workers' Compensation Act amended.)

[k] The geo-zip pricing limits in Indiana are "equal to or less than the charges made by medical service providers at the 80th percentile in the same community for like services or products" (Indiana Code, Section 22-3-6). The usual and customary pricing appears to be the only applicable standard for claims under Indiana's jurisdiction.

[l] Effective July 1, 2013, the new reimbursement rules in Indiana set the maximum reimbursement amount for repackaged prescription drugs to the AWP set by the original manufacturer of the drug. If the NDC for a drug cannot be determined from the medical service provider's billing or statement, the maximum reimbursement amount for the repackaged prescription drug shall be the lowest cost generic for the drug. Effective July 1, 2014, a physician can only dispense medications in the first seven days postinjury.

[m] Effective January 2015, dispensing of compounds and physician-dispensed medications in Kansas requires prior authorization from the employer or carrier. Prior authorization is also required for dispensing more than a 100-unit dose or 30-day supply of any medication and any subsequent refills.

[n] In Kentucky, the dispensing of medication by a physician in any form is controlled by the Pharmacy Fee Schedule. If the drug being dispensed has been repackaged, the average wholesale price is determined using the National Drug Code (NDC) of the original product from the manufacturer. The dispensing physician shall include the NDC from the original manufacturer with the invoice. Invoices that do not include the NDC of the original product may be returned to the physician as incomplete. Only a licensed pharmacist may charge or receive a $5.00 dispensing fee. For additional information, please refer to the Kentucky Pharmacy Fee Schedule regulation, 803 KAR 25:092. Effective March 2013, Kentucky licensed physicians shall not dispense more than a 48-hour supply of any Schedule II controlled substances or a Schedule III controlled substance containing hydrocodone, unless the dispensing is done as part of a licensed narcotic treatment program.

[o] In Louisiana, physicians can dispense only a 48-hour supply of controlled substances or drugs of concern including carisoprodol, tramadol, and drugs with a high potential of abuse. Physicians are allowed to dispense drugs other than those specified above.

[p] Louisiana currently has no price control for physician-dispensed prescriptions. The Workers' Compensation Commission established a Task Force in 2012 to look into issues related to physician dispensing. The dispensing fee, tied to Medicaid, is subject to change.

[q] In Louisiana, the dispensing fee is tied to Medicaid, which is subject to change.

[r] In Maryland, there were regulatory activities in recent years aimed at capping the prices for repackaged drugs, but no policy changes were made.

[s] In three states (Massachusetts, New York, and Texas), physician dispensing is prohibited in general, with some exceptions. See the text in Appendix A for some examples of the exceptions.

[t] Massachusetts' pharmacy fee schedule sets the reimbursement rates for brand name drugs to the lesser of the EAC plus a $3.00 dispensing fee or usual and customary charges. EAC is the WAC plus 5 percent, which is equivalent to the AWP minus 16 percent. For generic drugs, the pharmacy fee schedule sets the reimbursement rates to the lesser of the FUL, the Massachusetts upper limit, the EAC plus a $3.00 dispensing fee, or usual and customary charges.

continued

Table A.1 Summary of State Policies on Fee Schedules for Physician- and Pharmacy-Dispensed Prescription Drugs (continued)

[u] Effective December 26, 2012, the regulation in Michigan requires that all pharmaceutical bills submitted for repackaged or physician-dispensed products shall include the original manufacturer (underlying) NDC, and the reimbursements for repackaged pharmaceuticals be based on the Redbook (as referenced in R 418.10107) manufacturer's AWP minus 10 percent, plus a dispensing fee ($3.50 for brand name drugs and $5.50 for generics). (See Michigan Department of Licensing and Regulatory Affairs, Workers' Compensation Agency, Rule 418.101003a Reimbursement for dispensed medication.) A dispensing fee cannot be paid more often than every 10 days for each prescription drug; a dispensing fee is not paid for over-the-counter drugs (Michigan Workers' Compensation Agency Health Care Services Manual). Additionally, effective January 2017, reimbursement for commercially manufactured topical medications that are over-the-counter or contain over-the-counter ingredients shall be dispensed in a 30-day supply and reimbursed at the maximum of the dispenser's acquisition cost, plus an $8.50 dispensing fee (see R 418.101003a(3)).

[v] Minnesota permits physician dispensing, but the State Board of Medical Practice requires physicians who dispense prescription drugs to register with the Board. In addition, physicians are required to disclose to patients that the physician profits from dispensing the drug and that the patient has the option of obtaining the drug elsewhere.

[w] Physicians may dispense as long as they register with the Missouri Bureau of Narcotics and Dangerous Drugs (BNDD) and the DEA. State registration must be renewed every year. The regulation regarding payments for medical services (including medications) states that fees should be fair and reasonable.

[x] Physicians in New York may dispense up to a 72-hour supply of prescription drugs in a number of restricted circumstances, including dispensing drugs in a medical emergency, in an office which is situated 10 miles or more from a registered pharmacy, or at no charge to their patients. The amount of reimbursement is set to the AWP of the underlying NDC for drugs dispensed in these limited circumstances.

[y] In North Carolina, reimbursement for Schedule II–V controlled substances is limited to an initial five-day supply when dispensed by outpatient providers other than a licensed pharmacist, while physician-dispensed drugs are reimbursed at 100 percent of the AWP of the least expensive therapeutically equivalent drug.

[z] In Pennsylvania, when a prescription is filled at a physician's office, payment for the prescription drug is limited to 110 percent of the AWP of the product. Physicians may not bill, or otherwise hold the patient liable, for the difference between the actual charge for the prescription drug and 110 percent of the AWP of the product (see Chapter 127.135). Note that the policy is silent regarding whether the underlying NDCs should be used for reimbursement.

[aa] For Pennsylvania, no dispensing fee is indicated in the statute, which has been in effect since November 1995.

[bb] In South Carolina, Medi-Span® is used to determine the AWP. If the NDC is not in Medi-Span®, any nationally published pharmacy price index may be used as a secondary source, effective December 2011. If the original manufacturer NDC information is not provided or unknown, the payor shall select the most reasonable and closely associated AWP to use for reimbursement of the repackaged drug (see South Carolina Workers' Compensation Commission Pharmacy Fee Schedule Effective December 19, 2011, Section 10, which can be found at http://www.wcc.sc.gov/insurance/Pages/MedicalServicesDivision.aspx).

[cc] In Tennessee, all pharmaceutical bills submitted for repackaged or compounded products must include the original manufacturer NDCs registered with the U.S. Food and Drug Administration. The reimbursement amount is based on the current published manufacturer's AWP of the product, calculated on a per-unit basis, as of the date of dispensing. If the original manufacturer NDC is not provided on the bill, the reimbursement shall be based on the AWP of the lowest-priced therapeutically equivalent drug, calculated on a per-unit basis. See Chapter Number 0800-02-18, which can be found at http://share.tn.gov/sos/rules/0800/0800-02/0800-02-18.20140326.pdf

[dd] Tennessee House Bill (HB) 868 and Senate Bill (SB) 676, which impact prescribing and dispensing of controlled substances, were effective in October 2013. HB 868 updated the state's existing pain management clinic statutes that no pain management clinic or medical doctor shall be permitted to dispense controlled substances—with the exception of a 72-hour maximum dose of a Schedule IV or V controlled substance at no charge (see Section 1 of Tenn. Code Ann. § 63-1-313). SB 676 added a new provision to the state's existing prescription requirements that no prescription for any opioids or benzodiazepines may be dispensed in quantities greater than a 30-day supply (see Section 4 of Tenn. Code Ann. § 53-11-308). Effective January 1, 2015, HB 1512 further prohibited all licensed health care prescribers from dispensing Schedule II or III controlled substances, with some exceptions (see Sections 3 and 4 of Tenn. Code Ann. § 63-1-154).

[ee] In Virginia, physicians may dispense prescription drugs under limited circumstances unless licensed by the Board of Pharmacy.

[ff] In Wisconsin, the maximum reimbursement amount for physician-dispensed drugs is set to the AWP of the drug dispensed. However, the reimbursement rules do not explicitly require that the underlying manufacturer NDC be used in determining the reimbursement amount.

Key: AWP: average wholesale price; DEA: Drug Enforcement Administration; EAC: estimated acquisition cost; FUL: Federal Upper Limit; MAC: maximum allowable cost; n/a: not applicable; NDC: National Drug Code; Rx: prescriptions; U&C: usual and customary fees; WAC: wholesale acquisition cost.

Sources: Optum, 2017; Tanabe, 2015; information shared by PMSI, Progressive Medical, and CorVel; information from state agencies, system participants, and online searches.

GLOSSARY

Average wholesale price (AWP): The AWPs of individual drug products are the prices reported by manufacturers and labelers. They do not necessarily represent the actual prices charged or paid in sales transactions. In workers' compensation systems, the AWP is often used as a price benchmark for pharmacy reimbursements of prescription drugs.

Drug: A group of drug products that have the same active ingredients across different strengths. For example, cyclobenzaprine is referred to as a drug, including all cyclobenzaprine drug products of 5-, 7.5-, and 10-milligram strengths.

Drug product: A specific product by a manufacturer or repackager. Each drug product is associated with a National Drug Code (NDC).

Existing strength: Refers to a drug strength that existed in the market at the time of the reforms.

Medi-Span®: A publisher that offers a series of comprehensive drug databases, tools, and applications utilized by health care professionals. Medi-Span® is part of Wolters Kluwer Health, Inc.

National Drug Code (NDC): A unique 11-digit code assigned by the U.S. Food and Drug Administration (FDA) to each medication in the United States that is intended for use on humans. The number identifies the specific drug product, its strength and dosage, package size, manufacturer, and repackaging firm.

New drug products: Refers to the drug products that are associated with new strengths or new formulations. See *new formulation* and *new strength* below.

New formulation: Refers to a formulation of an existing drug that was introduced in recent years. In this report, we use this term to refer to lidocaine-menthol, which has a much higher AWP set by the manufacturer.

New strength: Refers to a drug strength that was introduced in recent years. In this report, we use this term to refer to 7.5-milligram cyclobenzaprine, 2.5-325-milligram hydrocodone-acetaminophen, and 150-milligram tramadol extended release, which have much higher AWPs set by the manufacturers.

Original drug: The drug product produced by a manufacturer that is used to make repackaged drugs by a repackager. The AWPs of original drugs are established based on the reported prices by the manufacturers, while the AWPs of repackaged drugs are based on prices reported by repackagers.

Physician-dispensers: Physicians who dispense drugs at their offices directly to patients.

Physician dispensing: Refers to the practice of physicians dispensing prescription drugs at their offices directly to patients.

Pharmacy fee schedule: A schedule of maximum reimbursement levels for drugs dispensed at pharmacies and/or physician offices as part of workers' compensation laws.

Repackaged drug: A drug product supplied by a repackager. Repackaging firms (also known as repackagers) purchase large quantities of a given medication and repackage the pills into single-prescription-sized packages (e.g., 30 pills). Once registered with the U.S. Food and Drug Administration, a repackager obtains a new NDC for the drug it repackages and assigns an AWP for the repackaged drug. The AWP of a repackaged drug is almost always higher than the AWP of the original manufacturer drug used in the repackaging process.

REFERENCES

Alpert, A., M. Duggan, and J. Hellerstein. 2013. *Perverse reverse price competition: Average wholesale prices and Medicaid pharmaceutical spending.* Working Paper 19367. Cambridge, MA: National Bureau of Economic Research.

Blozik, E., R. Rapold, and O. Reich. 2015. Prescription of potentially inappropriate medication in older persons in Switzerland: Does the dispensing channel make a difference? *Risk Management and Healthcare Policy* (8): 73–80.

Borenstein, D., and S. Korn. 2003. Efficacy of a low-dose regimen of cyclobenzaprine hydrochloride in acute skeletal muscle spasm: Results of two placebo-controlled trials. *Clinical Therapy* 25 (4): 1,056–1,073.

Eggleston, K. 2011. *Prescribing institutions: Explaining the evolution of physician dispensing.* Asia Health Policy Program Working Paper #24. Stanford University.

Hegmann, K. 2011. *Occupational medicine practice guidelines: Evaluation and management of common health problems and functional recovery in workers.* American College of Occupational and Environmental Medicine.

Iizuka, T. 2007. Experts' agency problems: Evidence from the prescription drug market in Japan. *RAND Journal of Economics* 38 (3): 844–862.

_____. 2012. Physician agency and adoption of generic pharmaceuticals. *The American Economic Review* 102: 2,826–2,858.

Ireland, J., and A. Swedlow. 2010. *The cost and utilization of compound drugs, convenience packs, and medical foods in California workers' compensation.* Oakland, CA: California Workers' Compensation Institute.

Johnson, G. 2016. *Patterns of drug dispensing in California workers' compensation.* Oakland, CA: Workers' Compensation Insurance Rating Bureau of California.

Jacobson, M., C. Earle, and J. Newhouse. 2011. Geographic variation in physicians' responses to a reimbursement change. *The New England Journal of Medicine* 365 (22): 2,049–2,052.

Jacobson, M., and J. Newhouse. 2010. Expect the unexpected? Physicians' responses to payment changes. *Expert Voices* by NIHCM Foundation. November 2010.

Kaiser, B., and C. Schmid. 2014. Does physician dispensing increase drug expenditures? Empirical evidence from Switzerland. *Health Economics* 25: 71–90.

Lipton, B., C. Laws, and L. Li. 2011. *Workers' compensation prescription drug study: 2011 update.* Boca Raton, FL: National Council on Compensation Insurance, Inc.

Liu, Y., Y. Yang, and C. Hsieh. 2009. Financial incentives and physicians' prescription decisions on the choice between brand-name and generic drugs: Evidence from Taiwan. *Journal of Health Economics* 28: 341–349.

Munger, M., J. Ruble, S. Nelson, L. Ranker, R. Petty, S. Silverstein, E. Barton, and M. Feehan. 2014. National evaluation of prescriber drug dispensing. *Pharmacotherapy* 34 (10): 1,012–1,021.

Neuhauser, F., A. Swedlow, and B. Wynn. 2006. *Impact of physician-dispensing of repackaged drugs on California workers' compensation, employers cost, and workers' access to quality care: A study for the Commission on Health and Safety and Workers' Compensation.* Oakland, CA: Commission on Health and Safety and Workers' Compensation.

Optum. 2017. *Pharmacy resource guide.* Retrieved from http://helioscomp.com/docs/default-source/default-document-library/phm14-16219-2016-optum-dtr-prg-v6.pdf (accessed April 11, 2017).

Radeva, E. 2015. *CompScope™ medical benchmarks for Illinois, 16th edition.* Cambridge, MA: Workers Compensation Research Institute.

Rischatsch, M., M. Trottmann, and P. Zweifel. 2013. Generic substitution, financial interests, and imperfect agency. *International Journal of Health Care Finance and Economics* 13: 115–138.

Swedlow, A., and E. Auen. 2013. *Current trends in compound drug utilization and cost in the California workers' compensation system.* Oakland, CA: California Workers' Compensation Institute.

Swedlow, A., B. Gardner, and J. Ireland. 2013. *Difference in outcomes for injured workers receiving physician-dispensed repackaged drugs in the California workers' compensation system.* Oakland, CA: California Workers' Compensation Institute.

Swedlow, A., and J. Ireland. 2009. *Analysis of post-reform outcomes: Changes in pharmaceutical utilization and reimbursement in the California workers' compensation system.* Oakland, CA: California Workers' Compensation Institute.

Tanabe, R. 2015. *Workers' compensation medical cost containment: A national inventory, 2015.* Cambridge, MA: Workers Compensation Research Institute.

Thumula, V. 2014. *The impact of physician dispensing on opioid use.* Cambridge, MA: Workers Compensation Research Institute.

Victor, R. 2003. *A WCRI professional paper: Evidence of effectiveness of policy levers to contain medical costs in workers' compensation.* Cambridge, MA: Workers Compensation Research Institute.

Wang, D. 2012. *Physician dispensing in workers' compensation.* Cambridge, MA: Workers Compensation Research Institute.

Wang, D., and T. Liu. 2011a. *Prescription benchmarks, 2nd edition: Trends and interstate comparisons.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2011b. *Prescription benchmarks for Florida, 2nd edition.* Cambridge, MA: Workers Compensation Research Institute.

Wang, D., T. Liu, and V. Thumula. 2013a. *Impact of reform on physician dispensing and prescription prices in Georgia.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2013b. *The prevalence and costs of physician-dispensed drugs.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2014. *Impact of physician dispensing reform in Georgia, 2nd edition.* Cambridge, MA: Workers Compensation Research Institute.

Wang, D., V. Thumula, and T. Liu. 2014a. *Early impact of Connecticut reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2014b. *Early impact of South Carolina reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2014c. *Early impact of Tennessee reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2015. *Are physician dispensing reforms sustainable?* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016a. *Early impact of Florida reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016b. *Impact of Georgia reforms on physician dispensing.* Cambridge, MA: Workers Compensation

Research Institute.

_____. 2016c. *Impact of South Carolina reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016d. *Monitoring Connecticut reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016e. *Monitoring Illinois reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016f. *Monitoring Indiana reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016g. *Monitoring Michigan reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016h. *Monitoring Tennessee reforms on physician dispensing.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2016i. *Physician dispensing of higher-priced new drug strengths and formulation.* Cambridge, MA: Workers Compensation Research Institute.

White, J., X. Tao, R. Artuso, C. Billimski, J. Rademacher, and E. Bernacki. 2014. Effect of physician-dispensed medication on workers' compensation claim outcomes in the state of Illinois. *Journal of Occupational and Environmental Medicine* 56 (5): 459–464.

White, J., X. Tao, M. Talreja, J. Tower, and E. Bernacki. 2012. The effect of opioid use on workers' compensation claims cost in the state of Michigan. *Journal of Occupational and Environmental Medicine* 54 (8): 948–953.

Wynn, B., C. Buttorff, E. Meza, E. Taylor, and A. Mulcahy. 2016. Implementing a drug formulary for California's workers' compensation program. Santa Monica, CA: RAND Corporation.

Yang, R. 2014. *Estimating the effect of California's fee schedule changes: Lessons from WCRI studies.* Cambridge, MA: Workers Compensation Research Institute.

_____. 2015. *CompScope™ medical benchmarks for Florida, 16th edition.* Cambridge, MA: Workers Compensation Research Institute.

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PHYSICIAN DISPENSING IN THE MARYLAND WORKERS' COMPENSATION SYSTEM. Dongchun Wang, Te-Chun Liu, and Vennela Thumula. September 2013. wc-13-22.

IMPACT OF BANNING PHYSICIAN DISPENSING OF OPIOIDS IN FLORIDA. Vennela Thumula. July 2013. wc-13-20.

IMPACT OF REFORM ON PHYSICIAN DISPENSING AND PRESCRIPTION PRICES IN GEORGIA. Dongchun Wang, Te-Chun Liu, and Vennela Thumula. July 2013. wc-13-21.

A NEW BENCHMARK FOR WORKERS' COMPENSATION FEE SCHEDULES: PRICES PAID BY COMMERCIAL INSURERS?. Olesya Fomenko and Richard A. Victor. June 2013. wc-13-17.

COMPARING WORKERS' COMPENSATION AND GROUP HEALTH HOSPITAL OUTPATIENT PAYMENTS. Olesya Fomenko. June 2013. wc-13-18.

WCRI MEDICAL PRICE INDEX FOR WORKERS' COMPENSATION, FIFTH EDITION (MPI-WC). Rui Yang and Olesya Fomenko. June 2013. wc-13-19.

WORKERS' COMPENSATION MEDICAL COST CONTAINMENT: A NATIONAL INVENTORY, 2013. Ramona P. Tanabe. February 2013. wc-13-02.

HOSPITAL OUTPATIENT COST INDEX FOR WORKERS' COMPENSATION, 2ND EDITION. Olesya Fomenko and Rui Yang. January 2013. WC-13-01.

LONGER-TERM USE OF OPIOIDS. Dongchun Wang, Dean Hashimoto, and Kathryn Mueller. October 2012. wc-12-39.

IMPACT OF TREATMENT GUIDELINES IN TEXAS. Philip S. Borba and Christine A. Yee. September 2012. wc-12-23.

PHYSICIAN DISPENSING IN WORKERS' COMPENSATION. Dongchun Wang. July 2012. wc-12-24.

DESIGNING WORKERS' COMPENSATION MEDICAL FEE SCHEDULES. Olesya Fomenko and Te-Chun Liu. June 2012. wc-12-19.

COMPSCOPE™ MEDICAL BENCHMARKS FOR MARYLAND, 12TH EDITION. Rui Yang. May 2012. wc-12-06.

WHY SURGEON OWNERS OF AMBULATORY SURGICAL CENTERS DO MORE SURGERY THAN NON-OWNERS. Christine A. Yee. May 2012. WC-12-17.

WCRI MEDICAL PRICE INDEX FOR WORKERS' COMPENSATION, FOURTH EDITION (MPI-WC). Rui Yang and Olesya Fomenko. March 2012. WC-12-20.

HOSPITAL OUTPATIENT COST INDEX FOR WORKERS' COMPENSATION. Rui Yang and Olesya Fomenko. January 2012. WC-12-01.

WCRI MEDICAL PRICE INDEX FOR WORKERS' COMPENSATION, THIRD EDITION (MPI-WC). Rui Yang. August 2011. WC-11-37.

PRESCRIPTION BENCHMARKS, 2ND EDITION: TRENDS AND INTERSTATE COMPARISONS. Dongchun Wang and Te-Chun Liu. July 2011. wc-11-31.

PRESCRIPTION BENCHMARKS FOR FLORIDA, 2ND EDITION. Dongchun Wang and Te-Chun Liu. July 2011. wc-11-32.

PRESCRIPTION BENCHMARKS FOR WASHINGTON. Dongchun Wang and Te-Chun Liu. July 2011. wc-11-33.

INTERSTATE VARIATIONS IN USE OF NARCOTICS. Dongchun Wang, Kathryn Mueller, and Dean Hashimoto. July 2011. wc-11-01.

IMPACT OF PREAUTHORIZATION ON MEDICAL CARE IN TEXAS. Christine A. Yee, Philip S. Borba, and Nicole Coomer. June 2011. wc-11-34.

WORKERS' COMPENSATION MEDICAL COST CONTAINMENT: A NATIONAL INVENTORY, 2011. April 2011. wc-11-35.

PRESCRIPTION BENCHMARKS FOR MINNESOTA. Dongchun Wang and Richard A. Victor. October 2010. wc-10-53.

PRESCRIPTION BENCHMARKS FOR FLORIDA. Dongchun Wang and Richard A. Victor. March 2010. wc-10-06.

PRESCRIPTION BENCHMARKS FOR ILLINOIS. Dongchun Wang and Richard A. Victor. March 2010. wc-10-05.

PRESCRIPTION BENCHMARKS FOR LOUISIANA. Dongchun Wang and Richard A. Victor. March 2010. wc-10-10.

PRESCRIPTION BENCHMARKS FOR MARYLAND. Dongchun Wang and Richard A. Victor. March 2010. wc-10-08.

PRESCRIPTION BENCHMARKS FOR MASSACHUSETTS. Dongchun Wang and Richard A. Victor. March 2010. wc-10-07.

PRESCRIPTION BENCHMARKS FOR MICHIGAN. Dongchun Wang and Richard A. Victor. March 2010. wc-10-09.

PRESCRIPTION BENCHMARKS FOR NORTH CAROLINA. Dongchun Wang and Richard A. Victor. March 2010. wc-10-16.

PRESCRIPTION BENCHMARKS FOR NEW JERSEY. Dongchun Wang and Richard A. Victor. March 2010. wc-10-15.

PRESCRIPTION BENCHMARKS FOR PENNSYLVANIA. Dongchun Wang and Richard A. Victor. March 2010. wc-10-11.

PRESCRIPTION BENCHMARKS FOR TENNESSEE. Dongchun Wang and Richard A. Victor. March 2010. wc-10-13.

PRESCRIPTION BENCHMARKS FOR TEXAS. Dongchun Wang and Richard A. Victor. March 2010. wc-10-12.

PRESCRIPTION BENCHMARKS FOR WISCONSIN. Dongchun Wang and Richard A. Victor. March 2010. WC-10-14.

FEE SCHEDULES FOR HOSPITALS AND AMBULATORY SURGICAL CENTERS: A GUIDE FOR POLICYMAKERS. Nicole M. Coomer. February 2010. WC-10-01.

NATIONAL INVENTORY OF WORKERS' COMPENSATION FEE SCHEDULES FOR HOSPITALS AND AMBULATORY SURGICAL CENTERS. Nicole M. Coomer. February 2010. WC-10-02.

WORKERS' COMPENSATION MEDICAL COST CONTAINMENT: A NATIONAL INVENTORY. August 2009. WC-09-15.

WCRI FLASHREPORT: *INFORMATION REQUESTED BY MEDICARE TO SUPPORT DECISION-MAKING ON MEDICARE SECONDARY PAYER REGULATIONS.* Ramona P. Tanabe. April 2009. FR-09-01.

WCRI MEDICAL PRICE INDEX FOR WORKERS' COMPENSATION, SECOND EDITION (MPI-WC). Stacey M. Eccleston with the assistance of Juxiang Liu. June 2008. WC-08-29.

WCRI FLASHREPORT: *CONNECTICUT FEE SCHEDULE RATES COMPARED TO STATE MEDICARE RATES: COMMON MEDICAL SERVICES DELIVERED TO INJURED WORKERS BY NONHOSPITAL PROVIDERS.* Stacey M. Eccleston. December 2007. FR-07-04.

WCRI FLASHREPORT: *WHAT ARE THE MOST IMPORTANT MEDICAL CONDITIONS IN WORKERS' COMPENSATION.* August 2007. FR-07-03.

WCRI FLASHREPORT: *WHAT ARE THE MOST IMPORTANT MEDICAL CONDITIONS IN NEW YORK WORKERS' COMPENSATION.* July 2007. FR-07-02.

WCRI FLASHREPORT: *ANALYSIS OF ILLUSTRATIVE MEDICAL FEE SCHEDULES IN WISCONSIN.* Stacey M. Eccleston, Te-Chun Liu, and Richard A. Victor. March 2007. FR-07-01.

WCRI MEDICAL PRICE INDEX FOR WORKERS' COMPENSATION: THE MPI-WC, FIRST EDITION. Stacey M. Eccleston. February 2007. WC-07-33.

BENCHMARKS FOR DESIGNING WORKERS' COMPENSATION MEDICAL FEE SCHEDULES: 2006. Stacey M. Eccleston and Te-Chun Liu. October 2006. WC-06-14.

ANALYSIS OF THE WORKERS' COMPENSATION MEDICAL FEE SCHEDULES IN ILLINOIS. Stacey M. Eccleston. July 2006. WC-06-28.

STATE POLICIES AFFECTING THE COST AND USE OF PHARMACEUTICALS IN WORKERS' COMPENSATION: A NATIONAL INVENTORY. Richard A. Victor and Petia Petrova. June 2006. WC-06-30.

THE COST AND USE OF PHARMACEUTICALS IN WORKERS' COMPENSATION: A GUIDE FOR POLICYMAKERS. Richard A. Victor and Petia Petrova. June 2006. WC-06-13.

HOW DOES THE MASSACHUSETTS MEDICAL FEE SCHEDULE COMPARE TO PRICES ACTUALLY PAID IN WORKERS' COMPENSATION? Stacey M. Eccleston. April 2006. WC-06-27.

THE IMPACT OF PROVIDER CHOICE ON WORKERS' COMPENSATION COSTS AND OUTCOMES. Richard A. Victor, Peter S. Barth, and David Neumark, with the assistance of Te-Chun Liu. November 2005. WC-05-14.

ADVERSE SURPRISES IN WORKERS' COMPENSATION: CASES WITH SIGNIFICANT UNANTICIPATED MEDICAL CARE AND COSTS. Richard A. Victor. June 2005. WC-05-16.

WCRI FLASHREPORT: *ANALYSIS OF THE PROPOSED WORKERS' COMPENSATION FEE SCHEDULE IN TENNESSEE.* Stacey M. Eccleston and Xiaoping Zhao. January 2005. FR-05-01.

WCRI FLASHREPORT: *ANALYSIS OF SERVICES DELIVERED AT CHIROPRACTIC VISITS IN TEXAS COMPARED TO OTHER STATES.* Stacey M. Eccleston and Xiaoping Zhao. July 2004. FR-04-07.

WCRI FLASHREPORT: *SUPPLEMENT TO BENCHMARKING THE 2004 PENNSYLVANIA WORKERS' COMPENSATION MEDICAL FEE SCHEDULE.* Stacey M. Eccleston and Xiaoping Zhao. May 2004. FR-04-06.

WCRI FLASHREPORT: *IS CHIROPRACTIC CARE A COST DRIVER IN TEXAS? RECONCILING STUDIES BY WCRI AND MGT/TEXAS CHIROPRACTIC ASSOCIATION.* April 2004. FR-04-05.

WCRI FLASHREPORT: *POTENTIAL IMPACT OF A LIMIT ON CHIROPRACTIC VISITS IN TEXAS.* Stacey M. Eccleston. April 2004. FR-04-04.

WCRI FLASHREPORT: *ARE HIGHER CHIROPRACTIC VISITS PER CLAIM DRIVEN BY "OUTLIER" PROVIDERS?* Richard A. Victor. April 2004. FR-04-03.

WCRI FLASHREPORT: *BENCHMARKING THE 2004 PENNSYLVANIA WORKERS' COMPENSATION MEDICAL FEE SCHEDULE.* Stacey M. Eccleston and Xiaoping Zhao. March 2004. FR-04-01.

EVIDENCE OF EFFECTIVENESS OF POLICY LEVERS TO CONTAIN MEDICAL COSTS IN WORKERS' COMPENSATION. Richard A. Victor. November 2003. WC-03-08.

WCRI MEDICAL PRICE INDEX FOR WORKERS' COMPENSATION. Dongchun Wang and Xiaoping Zhao. October 2003. WC-03-05.

WCRI FLASHREPORT: *WHERE THE MEDICAL DOLLAR GOES? HOW CALIFORNIA COMPARES TO OTHER STATES.* Richard A. Victor and Stacey M. Eccleston. March 2003. FR-03-03.

PATTERNS AND COSTS OF PHYSICAL MEDICINE: COMPARISON OF CHIROPRACTIC AND PHYSICIAN-DIRECTED CARE. Richard A. Victor and Dongchun Wang. December 2002. WC-02-07.

PROVIDER CHOICE LAWS, NETWORK INVOLVEMENT, AND MEDICAL COSTS. Richard A. Victor, Dongchun Wang, and Philip Borba. December 2002. WC-02-05.

WCRI FLASHREPORT: *ANALYSIS OF PAYMENTS TO HOSPITALS AND SURGERY CENTERS IN FLORIDA WORKERS' COMPENSATION.* Stacey M. Eccleston and Xiaoping Zhao. December 2002. FR-02-03.

BENCHMARKS FOR DESIGNING WORKERS' COMPENSATION MEDICAL FEE SCHEDULES: 2001–2002. Stacey M. Eccleston, Aniko Laszlo, Xiaoping Zhao, and Michael Watson. August 2002. WC-02-02.

WCRI FLASHREPORT: *CHANGES IN MICHIGAN'S WORKERS' COMPENSATION MEDICAL FEE SCHEDULE: 1996–2002.* Stacey M. Eccleston. December 2002. FR-02-02.

TARGETING MORE COSTLY CARE: AREA VARIATION IN TEXAS MEDICAL COSTS AND UTILIZATION. Richard A. Victor and N. Michael Helvacian. May 2002. WC-02-03.

WCRI FLASHREPORT: *COMPARING THE PENNSYLVANIA WORKERS' COMPENSATION FEE SCHEDULE WITH MEDICARE RATES: EVIDENCE FROM 160 IMPORTANT MEDICAL PROCEDURES.* Richard A. Victor, Stacey M. Eccleston, and Xiaoping Zhao. November 2001. FR-01-07.

WCRI FLASHREPORT: *BENCHMARKING PENNSYLVANIA'S WORKERS' COMPENSATION MEDICAL FEE SCHEDULE.* Stacey M. Eccleston and Xiaoping Zhao. October 2001. FR-01-06.

WCRI FLASHREPORT: *BENCHMARKING CALIFORNIA'S WORKERS' COMPENSATION MEDICAL FEE SCHEDULES.* Stacey M. Eccleston. August 2001. FR-01-04.

MANAGED CARE AND MEDICAL COST CONTAINMENT IN WORKERS' COMPENSATION: A NATIONAL INVENTORY, 2001–2002. Ramona P. Tanabe and Susan M. Murray. December 2001. WC-01-04.

WCRI FLASHREPORT: *BENCHMARKING FLORIDA'S WORKERS' COMPENSATION MEDICAL FEE SCHEDULES.* Stacey M. Eccleston and Aniko Laszlo. August 2001. FR-01-03.

THE IMPACT OF INITIAL TREATMENT BY NETWORK PROVIDERS ON WORKERS' COMPENSATION MEDICAL COSTS AND DISABILITY PAYMENTS. Sharon E. Fox, Richard A. Victor, Xiaoping Zhao, and Igor Polevoy. August 2001. DM-01-01.

THE IMPACT OF WORKERS' COMPENSATION NETWORKS ON MEDICAL AND DISABILITY PAYMENTS. William G. Johnson, Marjorie L. Baldwin, and Steven C. Marcus. November 1999. WC-99-5.

FEE SCHEDULE BENCHMARK ANALYSIS: OHIO. Philip L. Burstein. December 1996. FS-96-1.

THE RBRVS AS A MODEL FOR WORKERS' COMPENSATION MEDICAL FEE SCHEDULES: PROS AND CONS. Philip L. Burstein. July 1996. WC-96-5.

BENCHMARKS FOR DESIGNING WORKERS' COMPENSATION MEDICAL FEE SCHEDULES: 1995–1996. Philip L. Burstein. May 1996. WC-96-2.

FEE SCHEDULE BENCHMARK ANALYSIS: NORTH CAROLINA. Philip L. Burstein. December 1995. FS-95-2.

FEE SCHEDULE BENCHMARK ANALYSIS: COLORADO. Philip L. Burstein. August 1995. FS-95-1.

BENCHMARKS FOR DESIGNING WORKERS' COMPENSATION MEDICAL FEE SCHEDULES: 1994–1995. Philip L. Burstein. December 1994. WC-94-7.

REVIEW, REGULATE, OR REFORM: WHAT WORKS TO CONTROL WORKERS' COMPENSATION MEDICAL COSTS. Thomas W. Grannemann, ed. September 1994. WC-94-5.

FEE SCHEDULE BENCHMARK ANALYSIS: MICHIGAN. Philip L. Burstein. September 1994. FS-94-1.

MEDICOLEGAL FEES IN CALIFORNIA: AN ASSESSMENT. Leslie I. Boden. March 1994. WC-94-1.

BENCHMARKS FOR DESIGNING WORKERS' COMPENSATION MEDICAL FEE SCHEDULES. Stacey M. Eccleston, Thomas W. Grannemann, and James F. Dunleavy. December 1993. WC-93-4.

HOW CHOICE OF PROVIDER AND RECESSIONS AFFECT MEDICAL COSTS IN WORKERS' COMPENSATION. Richard B. Victor and Charles A. Fleischman. June 1990. WC-90-2.

MEDICAL COSTS IN WORKERS' COMPENSATION: TRENDS & INTERSTATE COMPARISONS. Leslie I. Boden and Charles A. Fleischman. December 1989. WC-89-5.

WORKER OUTCOMES

COMPARING OUTCOMES FOR INJURED WORKERS IN INDIANA, 2016 INTERVIEWS. Bogdan Savych and Vennela Thumula. June 2017. wc-17-22.

COMPARING OUTCOMES FOR INJURED WORKERS IN MASSACHUSETTS, 2016 INTERVIEWS. Bogdan Savych and Vennela Thumula. June 2017. wc-17-23.

COMPARING OUTCOMES FOR INJURED WORKERS IN MICHIGAN, 2016 INTERVIEWS. Bogdan Savych and Vennela Thumula. June 2017. wc-17-24.

COMPARING OUTCOMES FOR INJURED WORKERS IN NORTH CAROLINA, 2016 INTERVIEWS. Bogdan Savych and Vennela Thumula. June 2017. wc-17-25.

COMPARING OUTCOMES FOR INJURED WORKERS IN VIRGINIA, 2016 INTERVIEWS. Bogdan Savych and Vennela Thumula. June 2017. wc-17-26.

COMPARING OUTCOMES FOR INJURED WORKERS IN WISCONSIN, 2016 INTERVIEWS. Bogdan Savych and Vennela Thumula. June 2017. wc-17-27.

COMPARING OUTCOMES FOR INJURED WORKERS IN ARKANSAS. Bogdan Savych and Vennela Thumula. May 2016. wc-16-23.

COMPARING OUTCOMES FOR INJURED WORKERS IN CONNECTICUT. Bogdan Savych and Vennela Thumula. May 2016. wc-16-24.

COMPARING OUTCOMES FOR INJURED WORKERS IN FLORIDA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-25.

COMPARING OUTCOMES FOR INJURED WORKERS IN GEORGIA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-26.

COMPARING OUTCOMES FOR INJURED WORKERS IN INDIANA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-27.

COMPARING OUTCOMES FOR INJURED WORKERS IN IOWA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-28.

COMPARING OUTCOMES FOR INJURED WORKERS IN KENTUCKY. Bogdan Savych and Vennela Thumula. May 2016. wc-16-29.

COMPARING OUTCOMES FOR INJURED WORKERS IN MASSACHUSETTS. Bogdan Savych and Vennela Thumula. May 2016. wc-16-30.

COMPARING OUTCOMES FOR INJURED WORKERS IN MICHIGAN. Bogdan Savych and Vennela Thumula. May 2016. wc-16-31.

COMPARING OUTCOMES FOR INJURED WORKERS IN MINNESOTA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-32.

COMPARING OUTCOMES FOR INJURED WORKERS IN NORTH CAROLINA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-33.

COMPARING OUTCOMES FOR INJURED WORKERS IN PENNSYLVANIA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-34.

COMPARING OUTCOMES FOR INJURED WORKERS IN TENNESSEE. Bogdan Savych and Vennela Thumula. May 2016. wc-16-35.

COMPARING OUTCOMES FOR INJURED WORKERS IN VIRGINIA. Bogdan Savych and Vennela Thumula. May 2016. wc-16-36.

COMPARING OUTCOMES FOR INJURED WORKERS IN WISCONSIN. Bogdan Savych and Vennela Thumula. May 2016. wc-16-37.

PREDICTORS OF WORKER OUTCOMES IN ARKANSAS. Bogdan Savych, Vennela Thumula, and Richard A. Victor. January 2015. wc-15-02.

PREDICTORS OF WORKER OUTCOMES IN CONNECTICUT. Bogdan Savych, Vennela Thumula, and Richard A. Victor. January 2015. wc-15-03.

PREDICTORS OF WORKER OUTCOMES IN IOWA. Bogdan Savych, Vennela Thumula, and Richard A. Victor. January 2015. wc-15-04.

PREDICTORS OF WORKER OUTCOMES IN TENNESSEE. Bogdan Savych, Vennela Thumula, and Richard A. Victor. January 2015. wc-15-05.

PREDICTORS OF WORKER OUTCOMES IN INDIANA. Bogdan Savych, Vennela Thumula, and Richard A. Victor. June 2014. wc-14-20.

PREDICTORS OF WORKER OUTCOMES IN MASSACHUSETTS. Bogdan Savych, Vennela Thumula, and Richard A. Victor. June 2014. wc-14-21.

PREDICTORS OF WORKER OUTCOMES IN MICHIGAN. Bogdan Savych, Vennela Thumula, and Richard A. Victor. June 2014. wc-14-22.

PREDICTORS OF WORKER OUTCOMES IN MINNESOTA. Bogdan Savych, Vennela Thumula, and Richard A. Victor. June 2014. wc-14-23.

PREDICTORS OF WORKER OUTCOMES IN NORTH CAROLINA. Vennela Thumula, Bogdan Savych, and Richard A. Victor. June 2014. wc-14-24.

PREDICTORS OF WORKER OUTCOMES IN PENNSYLVANIA. Vennela Thumula, Bogdan Savych, and Richard A. Victor. June 2014. wc-14-25.

PREDICTORS OF WORKER OUTCOMES IN VIRGINIA. Vennela Thumula, Bogdan Savych, and Richard A. Victor. June 2014. wc-14-26.

PREDICTORS OF WORKER OUTCOMES IN WISCONSIN. Vennela Thumula, Bogdan Savych, and Richard A. Victor. June 2014. wc-14-27.

HOW HAVE WORKER OUTCOMES AND MEDICAL COSTS CHANGED IN WISCONSIN? Sharon E. Belton and Te-Chun Liu. May 2010. wc-10-04.

COMPARING OUTCOMES FOR INJURED WORKERS IN MICHIGAN. Sharon E. Belton and Te-Chun Liu. June 2009. wc-09-31.

COMPARING OUTCOMES FOR INJURED WORKERS IN MARYLAND. Sharon E. Belton and Te-Chun Liu. June 2008. wc-08-15.

COMPARING OUTCOMES FOR INJURED WORKERS IN NINE LARGE STATES. Sharon E. Belton, Richard A. Victor, and Te-Chun Liu, with the assistance of Pinghui Li. May 2007. wc-07-14.

COMPARING OUTCOMES FOR INJURED WORKERS IN SEVEN LARGE STATES. Sharon E. Fox, Richard A. Victor, and Te-Chun Liu, with the assistance of Pinghui Li. February 2006. WC-06-01.

WCRI FLASHREPORT: *WORKER OUTCOMES IN TEXAS BY TYPE OF INJURY*. Richard A. Victor. February 2005. FR-05-02.

OUTCOMES FOR INJURED WORKERS IN CALIFORNIA, MASSACHUSETTS, PENNSYLVANIA, AND TEXAS. Richard A. Victor, Peter S. Barth, and Te-Chun Liu, with the assistance of Pinghui Li. December 2003. WC-03-07.

OUTCOMES FOR INJURED WORKERS IN TEXAS. Peter S. Barth and Richard A. Victor, with the assistance of Pinghui Li and Te-Chun Liu. July 2003. WC-03-02.

THE WORKERS' STORY: RESULTS OF A SURVEY OF WORKERS INJURED IN WISCONSIN. Monica Galizzi, Leslie I. Boden, and Te-Chun Liu. December 1998. WC-98-5.

WORKERS' COMPENSATION MEDICAL CARE: EFFECTIVE MEASUREMENT OF OUTCOMES. Kate Kimpan. October 1996. WC-96-7.

BENEFITS AND RETURN TO WORK

ADEQUACY OF WORKERS' COMPENSATION INCOME BENEFITS IN MICHIGAN. Bogdan Savych and H. Allan Hunt. June 2017. wc-17-20.

RETURN TO WORK AFTER A LUMP-SUM SETTLEMENT. Bogdan Savych. July 2012. wc-12-21.

FACTORS INFLUENCING RETURN TO WORK FOR INJURED WORKERS: LESSONS FROM PENNSYLVANIA AND WISCONSIN. Sharon E. Belton. November 2011. wc-11-39.

THE IMPACT OF THE 2004 PPD REFORMS IN TENNESSEE: EARLY EVIDENCE. Evelina Radeva and Carol Telles. May 2008. FR-08-02.

FACTORS THAT INFLUENCE THE AMOUNT AND PROBABILITY OF PERMANENT PARTIAL DISABILITY BENEFITS. Philip S. Borba and Mike Helvacian. June 2006. WC-06-16.

RETURN-TO-WORK OUTCOMES OF INJURED WORKERS: EVIDENCE FROM CALIFORNIA, MASSACHUSETTS, PENNSYLVANIA, AND TEXAS. Sharon E. Fox, Philip S. Borba, and Te-Chun Liu. May 2005. WC-05-15.

WHO OBTAINS PERMANENT PARTIAL DISABILITY BENEFITS: A SIX STATE ANALYSIS. Peter S. Barth, N. Michael Helvacian, and Te-Chun Liu. December 2002. WC-02-04.

WCRI FLASHREPORT: *BENCHMARKING OREGON'S PERMANENT PARTIAL DISABILITY BENEFITS*. Duncan S. Ballantyne and Michael Manley. July 2002. FR-02-01.

WCRI FLASHREPORT: *BENCHMARKING FLORIDA'S PERMANENT IMPAIRMENT BENEFITS*. Richard A. Victor and Duncan S. Ballantyne. September 2001. FR-01-05.

PERMANENT PARTIAL DISABILITY BENEFITS: INTERSTATE DIFFERENCES. Peter S. Barth and Michael Niss. September 1999. WC-99-2.

MEASURING INCOME LOSSES OF INJURED WORKERS: A STUDY OF THE WISCONSIN SYSTEM—A WCRI Technical Paper. Leslie I. Boden and Monica Galizzi. November 1998.

PERMANENT PARTIAL DISABILITY IN TENNESSEE: SIMILAR BENEFITS FOR SIMILAR INJURIES? Leslie I. Boden. November 1997. WC-97-5.

WHAT ARE THE MOST IMPORTANT FACTORS SHAPING RETURN TO WORK? EVIDENCE FROM WISCONSIN. Monica Galizzi and Leslie I. Boden. October 1996. WC-96-6.

DO LOW TTD MAXIMUMS ENCOURAGE HIGH PPD UTILIZATION: RE-EXAMINING THE CONVENTIONAL WISDOM. John A. Gardner. January 1992. WC-92-2.

BENEFIT INCREASES AND SYSTEM UTILIZATION: THE CONNECTICUT EXPERIENCE. John A. Gardner. December 1991. WC-91-5.

DESIGNING BENEFIT STRUCTURES FOR TEMPORARY DISABILITY: A GUIDE FOR POLICYMAKERS—Two-Volume Publication. Richard B. Victor and Charles A. Fleischman. December 1989. WC-89-4.

RETURN TO WORK INCENTIVES: LESSONS FOR POLICYMAKERS FROM ECONOMIC STUDIES. John A. Gardner. June 1989. WC-89-2.

INCOME REPLACEMENT FOR LONG-TERM DISABILITY: THE ROLE OF WORKERS' COMPENSATION AND SSDI. Karen R. DeVol. December 1986. SP-86-2.

COST DRIVERS AND BENCHMARKS OF SYSTEM PERFORMANCE

COMPSCOPE™ BENCHMARKS FOR CALIFORNIA, 17TH EDITION. Rui Yang. April 2017. WC-17-01.

COMPSCOPE™ BENCHMARKS FOR FLORIDA, 17TH EDITION. Rui Yang. April 2017. WC-17-02.

COMPSCOPE™ BENCHMARKS FOR GEORGIA, 17TH EDITION. Rui Yang and William-Monnin Browder. April 2017. WC-17-03.

COMPSCOPE™ BENCHMARKS FOR ILLINOIS, 17TH EDITION. Evelina Radeva. April 2017. WC-17-04.

COMPSCOPE™ BENCHMARKS FOR INDIANA, 17TH EDITION. Carol A. Telles. April 2017. WC-17-05.

COMPSCOPE™ BENCHMARKS FOR KENTUCKY, 17TH EDITION. William-Monnin Browder. April 2017. WC-17-06.

COMPSCOPE™ BENCHMARKS FOR LOUISIANA, 17TH EDITION. Carol A. Telles. April 2017. WC-17-07.

COMPSCOPE™ BENCHMARKS FOR MASSACHUSETTS, 17TH EDITION. Evelina Radeva. April 2017. WC-17-08.

COMPSCOPE™ BENCHMARKS FOR MICHIGAN, 17TH EDITION. Evelina Radeva. April 2017. WC-17-09.

COMPSCOPE™ BENCHMARKS FOR MINNESOTA, 17TH EDITION. Sharon E. Belton. April 2017. WC-17-10.

COMPSCOPE™ BENCHMARKS FOR NEW JERSEY, 17TH EDITION. Evelina Radeva. April 2017. WC-17-11.

MONITORING THE NORTH CAROLINA SYSTEM: COMPSCOPE™ BENCHMARKS, 17TH EDITION. Carol A. Telles. April 2017. WC-17-12.

COMPSCOPE™ BENCHMARKS FOR PENNSYLVANIA, 17TH EDITION. Evelina Radeva. April 2017. WC-17-13.

COMPSCOPE™ BENCHMARKS FOR TEXAS, 17TH EDITION. Carol A. Telles. April 2017. WC-17-14.

COMPSCOPE™ BENCHMARKS FOR VIRGINIA, 17TH EDITION. Bogdan Savych. April 2017. WC-17-15.

COMPSCOPE™ BENCHMARKS FOR WISCONSIN, 17TH EDITION. Sharon E. Belton. April 2017. WC-17-16.

MONITORING TRENDS IN THE NEW YORK WORKERS' COMPENSATION SYSTEM, 2005–2014. Carol A. Telles and William Monnin-Browder. February 2017. WC-17-19.

MONITORING TRENDS IN THE NEW YORK WORKERS' COMPENSATION SYSTEM, 2005–2013. Carol A. Telles and Ramona P. Tanabe. February 2016. WC-16-38.

MONITORING TRENDS IN THE NEW YORK WORKERS' COMPENSATION SYSTEM. Carol A. Telles and Ramona P. Tanabe. September 2014. WC-14-33.

MONITORING CHANGES IN NEW YORK AFTER THE 2007 REFORMS. Carol A. Telles and Ramona P. Tanabe. October 2013. WC-13-24.

MONITORING THE IMPACT OF THE 2007 REFORMS IN NEW YORK. Carol A. Telles and Ramona P. Tanabe. October 2012. WC-12-22.

COMPSCOPE™ BENCHMARKS FOR MARYLAND, 12TH EDITION. Rui Yang, with the assistance of Syd Allan. December 2011. WC-11-45.

EARLY IMPACT OF 2007 REFORMS IN NEW YORK. Carol A. Telles and Ramona P. Tanabe. December 2011. WC-11-38.

COMPSCOPE™ BENCHMARKS FOR TENNESSEE, 11TH EDITION. Evelina Radeva, Nicole M. Coomer, Bogdan Savych, Carol A. Telles, Rui Yang, and Ramona P. Tanabe, with the assistance of Syd Allan. January 2011. WC-11-13.

BASELINE TRENDS FOR EVALUATING THE IMPACT OF THE 2007 REFORMS IN NEW YORK. Ramona P. Tanabe and Carol A. Telles. November 2010. WC-10-36.

UPDATED BASELINE FOR EVALUATING THE IMPACT OF THE 2007 REFORMS IN NEW YORK. Ramona P. Tanabe, Stacey Eccleston, and Carol A. Telles. April 2009. WC-09-14.

INTERSTATE VARIATIONS IN MEDICAL PRACTICE PATTERNS FOR LOW BACK CONDITIONS. Dongchun Wang, Kathryn Meuller, Dean Hashimoto, Sharon Belton, and Xiaoping Zhao. June 2008. WC-08-28.

WCRI FLASHREPORT: *TIMELINESS OF INJURY REPORTING AND FIRST INDEMNITY PAYMENT IN NEW YORK: A COMPARISON WITH 14 STATES.* Carol A. Telles and Ramona P. Tanabe. March 2008. FR-08-01.

BASELINE FOR EVALUATING THE IMPACT OF THE 2007 REFORMS IN NEW YORK. Ramona P. Tanabe, Stacey Eccleston, and Carol A. Telles. March 2008. WC-08-14.

WHY ARE BENEFIT DELIVERY EXPENSES HIGHER IN CALIFORNIA AND FLORIDA? Duncan S. Ballantyne and Carol A. Telles. December 2002. WC-02-06.

COMPSCOPE™ BENCHMARKS: MASSACHUSETTS, 1994–1999. Carol A. Telles, Aniko Laszlo, and Te-Chun Liu. January 2002. CS-01-03.

COMPSCOPE™ BENCHMARKS: FLORIDA, 1994–1999. N. Michael Helvacian and Seth A. Read. September 2001. CS-01-1.

WCRI FLASHREPORT: *WHERE THE WORKERS' COMPENSATION DOLLAR GOES.* Richard A. Victor and Carol A. Telles. August 2001. FR-01-01.

PREDICTORS OF MULTIPLE WORKERS' COMPENSATION CLAIMS IN WISCONSIN. Glenn A. Gotz, Te-Chun Liu, and Monica Galizzi. November 2000. WC-00-7.

AREA VARIATIONS IN TEXAS BENEFIT PAYMENTS AND CLAIM EXPENSES. Glenn A. Gotz, Te-Chun Liu, Christopher J. Mazingo, and Douglas J. Tattrie. May 2000. WC-00-3.

AREA VARIATIONS IN CALIFORNIA BENEFIT PAYMENTS AND CLAIM EXPENSES. Glenn A. Gotz, Te-Chun Liu, and Christopher J. Mazingo. May 2000. WC-00-2.

AREA VARIATIONS IN PENNSYLVANIA BENEFIT PAYMENTS AND CLAIM EXPENSES. Glenn A. Gotz, Te-Chun Liu, and Christopher J. Mazingo. May 2000. WC-00-1.

BENCHMARKING THE PERFORMANCE OF WORKERS' COMPENSATION SYSTEMS: COMPSCOPE™ MEASURES FOR MINNESOTA. H. Brandon Haller and Seth A. Read. June 2000. CS-00-2.

BENCHMARKING THE PERFORMANCE OF WORKERS' COMPENSATION SYSTEMS: COMPSCOPE™ MEASURES FOR MASSACHUSETTS. Carol A. Telles and Tara L. Nells. December 1999. CS-99-3.

BENCHMARKING THE PERFORMANCE OF WORKERS' COMPENSATION SYSTEMS: COMPSCOPE™ MEASURES FOR CALIFORNIA. Sharon E. Fox and Tara L. Nells. December 1999. CS-99-2.

BENCHMARKING THE PERFORMANCE OF WORKERS' COMPENSATION SYSTEMS: COMPSCOPE™ MEASURES FOR PENNSYLVANIA. Sharon E. Fox and Tara L. Nells. November 1999. CS-99-1.

COST DRIVERS AND SYSTEM PERFORMANCE IN A COURT-BASED SYSTEM: TENNESSEE. John A. Gardner, Carol A. Telles, and Gretchen A. Moss. June 1996. WC-96-4.

THE 1991 REFORMS IN MASSACHUSETTS: AN ASSESSMENT OF IMPACT. John A. Gardner, Carol A. Telles, and Gretchen A. Moss. May 1996. WC-96-3.

THE IMPACT OF OREGON'S COST CONTAINMENT REFORMS. John A. Gardner, Carol A. Telles, and Gretchen A. Moss. February 1996. WC-96-1.

COST DRIVERS AND SYSTEM CHANGE IN GEORGIA, 1984–1994. John A. Gardner, Carol A. Telles, and Gretchen A. Moss. November 1995. WC-95-3.

COST DRIVERS IN MISSOURI. John A. Gardner, Richard A. Victor, Carol A. Telles, and Gretchen A. Moss. December 1994. WC-94-6.

COST DRIVERS IN NEW JERSEY. John A. Gardner, Richard A. Victor, Carol A. Telles, and Gretchen A. Moss. September 1994. WC-94-4.

COST DRIVERS IN SIX STATES. Richard A. Victor, John A. Gardner, Daniel Sweeney, and Carol A. Telles. December 1992. WC-92-9.

PERFORMANCE INDICATORS FOR PERMANENT DISABILITY: LOW-BACK INJURIES IN TEXAS. Sara R. Pease. August 1988. WC-88-4.

PERFORMANCE INDICATORS FOR PERMANENT DISABILITY: LOW-BACK INJURIES IN NEW JERSEY. Sara R. Pease. December 1987. WC-87-5.

PERFORMANCE INDICATORS FOR PERMANENT DISABILITY: LOW-BACK INJURIES IN WISCONSIN. Sara R. Pease. December 1987. WC-87-4.

ADMINISTRATION/LITIGATION

WCRI FLASHREPORT – WORKER ATTORNEY INVOLVEMENT: A NEW MEASURE. Rui Yang, Karen Rothkin, and Roman Dolinschi. May 2017. FR-17-01.

WORKERS' COMPENSATION LAWS AS OF JANUARY 1, 2016. Joint publication of IAIABC and WCRI. May 2016. wc-16-43.

WORKERS' COMPENSATION LAWS AS OF JANUARY 1, 2014. Joint publication of IAIABC and WCRI. April 2014. wc-14-28.

WORKERS' COMPENSATION LAWS AS OF JANUARY 2012. Joint publication of IAIABC and WCRI. Ramona P. Tanabe. March 2012. wc-12-18.

WORKERS' COMPENSATION LAWS, 3RD EDITION. Joint publication of IAIABC and WCRI. Ramona P. Tanabe. October 2010. WC-10-52.

AVOIDING LITIGATION: WHAT CAN EMPLOYERS, INSURERS, AND STATE WORKERS' COMPENSATION AGENCIES DO?. Richard A. Victor and Bogdan Savych. July 2010. WC-10-18.

WORKERS' COMPENSATION LAWS, 2ND EDITION. Joint publication of IAIABC and WCRI. June 2009. WC-09-30.

DID THE FLORIDA REFORMS REDUCE ATTORNEY INVOLVEMENT? Bogdan Savych and Richard A. Victor. June 2009. WC-09-16.

LESSONS FROM THE OREGON WORKERS' COMPENSATION SYSTEM. Duncan S. Ballantyne. March 2008. WC-08-13.

WORKERS' COMPENSATION IN MONTANA: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. March 2007. WC-07-12.

WORKERS' COMPENSATION IN NEVADA: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. December 2006. WC-06-15.

WORKERS' COMPENSATION IN HAWAII: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. April 2006. WC-06-12.

WORKERS' COMPENSATION IN ARKANSAS: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. August 2005. WC-05-18.

WORKERS' COMPENSATION IN MISSISSIPPI: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. May 2005. WC-05-13.

WORKERS' COMPENSATION IN ARIZONA: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. September 2004. WC-04-05.

WORKERS' COMPENSATION IN IOWA: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. April 2004. WC-04-02.

WCRI FLASHREPORT: *MEASURING THE COMPLEXITY OF THE WORKERS' COMPENSATION DISPUTE RESOLUTION PROCESSES IN TENNESSEE.* Richard A. Victor. April 2004. FR-04-02.

REVISITING WORKERS' COMPENSATION IN MISSOURI: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. December 2003. WC-03-06.

WORKERS' COMPENSATION IN TENNESSEE: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. April 2003. WC-03-01.

REVISITING WORKERS' COMPENSATION IN NEW YORK: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. January 2002. WC-01-05.

WORKERS' COMPENSATION IN KENTUCKY: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. June 2001. WC-01-01.

WORKERS' COMPENSATION IN OHIO: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. October 2000. WC-00-5.

WORKERS' COMPENSATION IN LOUISIANA: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. November 1999. WC-99-4.

WORKERS' COMPENSATION IN FLORIDA: ADMINISTRATIVE INVENTORY. Peter S. Barth. August 1999. WC-99-3.

MEASURING DISPUTE RESOLUTION OUTCOMES: A LITERATURE REVIEW WITH IMPLICATIONS FOR WORKERS' COMPENSATION. Duncan S. Ballantyne and Christopher J. Mazingo. April 1999. WC-99-1.

REVISITING WORKERS' COMPENSATION IN CONNECTICUT: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. September 1998. WC-98-4.

DISPUTE PREVENTION AND RESOLUTION IN WORKERS' COMPENSATION: A NATIONAL INVENTORY, 1997–1998. Duncan S. Ballantyne. May 1998. WC-98-3.

WORKERS' COMPENSATION IN OKLAHOMA: ADMINISTRATIVE INVENTORY. Michael Niss. April 1998. WC-98-2.

WORKERS' COMPENSATION ADVISORY COUNCILS: A NATIONAL INVENTORY, 1997–1998. Sharon E. Fox. March 1998. WC-98-1.

THE ROLE OF ADVISORY COUNCILS IN WORKERS' COMPENSATION SYSTEMS: OBSERVATIONS FROM WISCONSIN. Sharon E. Fox. November 1997.

REVISITING WORKERS' COMPENSATION IN MICHIGAN: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne and Lawrence Shiman. October 1997. WC-97-4.

REVISITING WORKERS' COMPENSATION IN MINNESOTA: ADMINISTRATIVE INVENTORY. Carol A. Telles and Lawrence Shiman. September 1997. WC-97-3.

REVISITING WORKERS' COMPENSATION IN CALIFORNIA: ADMINISTRATIVE INVENTORY. Carol A. Telles and Sharon E. Fox. June 1997. WC-97-2.

REVISITING WORKERS' COMPENSATION IN PENNSYLVANIA: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne. March 1997. WC-97-1.

REVISITING WORKERS' COMPENSATION IN WASHINGTON: ADMINISTRATIVE INVENTORY. Carol A. Telles and Sharon E. Fox. December 1996. WC-96-10.

WORKERS' COMPENSATION IN ILLINOIS: ADMINISTRATIVE INVENTORY. Duncan S. Ballantyne and Karen M. Joyce. November 1996. WC-96-9.

WORKERS' COMPENSATION IN COLORADO: ADMINISTRATIVE INVENTORY. Carol A. Telles and Sharon E. Fox. October 1996. WC-96-8.

workers' compensation in oregon: administrative inventory. Duncan S. Ballantyne and James F. Dunleavy. December 1995. WC-95-2.

revisiting workers' compensation in texas: administrative inventory. Peter S. Barth and Stacey M. Eccleston. April 1995. WC-95-1.

workers' compensation in virginia: administrative inventory. Carol A. Telles and Duncan S. Ballantyne. April 1994. WC-94-3.

workers' compensation in new jersey: administrative inventory. Duncan S. Ballantyne and James F. Dunleavy. April 1994. WC-94-2.

workers' compensation in north carolina: administrative inventory. Duncan S. Ballantyne. December 1993. WC-93-5.

workers' compensation in missouri: administrative inventory. Duncan S. Ballantyne and Carol A. Telles. May 1993. WC-93-1.

workers' compensation in california: administrative inventory. Peter S. Barth and Carol A. Telles. December 1992. WC-92-8.

workers' compensation in wisconsin: administrative inventory. Duncan S. Ballantyne and Carol A. Telles. November 1992. WC-92-7.

workers' compensation in new york: administrative inventory. Duncan S. Ballantyne and Carol A. Telles. October 1992. WC-92-6.

the ama guides in maryland: an assessment. Leslie I. Boden. September 1992. WC-92-5.

workers' compensation in georgia: administrative inventory. Duncan S. Ballantyne and Stacey M. Eccleston. September 1992. WC-92-4.

workers' compensation in pennsylvania: administrative inventory. Duncan S. Ballantyne and Carol A. Telles. December 1991. WC-91-4.

reducing litigation: using disability guidelines and state evaluators in oregon. Leslie I. Boden, Daniel E. Kern, and John A. Gardner. October 1991. WC-91-3.

workers' compensation in minnesota: administrative inventory. Duncan S. Ballantyne and Carol A. Telles. June 1991. WC-91-1.

workers' compensation in maine: administrative inventory. Duncan S. Ballantyne and Stacey M. Eccleston. December 1990. WC-90-5.

workers' compensation in michigan: administrative inventory. H. Allan Hunt and Stacey M. Eccleston. January 1990. WC-90-1.

workers' compensation in washington: administrative inventory. Sara R. Pease. November 1989. WC-89-3.

workers' compensation in texas: administrative inventory. Peter S. Barth, Richard B. Victor, and Stacey M. Eccleston. March 1989. WC-89-1.

reducing litigation: evidence from wisconsin. Leslie I. Boden. December 1988. WC-88-7.

workers' compensation in connecticut: administrative inventory. Peter S. Barth. December 1987. WC-87-3.

use of medical evidence: low-back permanent partial disability claims in new jersey. Leslie I. Boden. December 1987. WC-87-2.

use of medical evidence: low-back permanent partial disability claims in maryland. Leslie I. Boden. September 1986. SP-86-1.

Vocational Rehabilitation

improving vocational rehabilitation outcomes: opportunities for early intervention. John A. Gardner. August 1988. WC-88-3.

appropriateness and effectiveness of vocational rehabilitation in florida: costs, referrals, services, and outcomes. John A. Gardner. February 1988. WC-88-2.

vocational rehabilitation in florida workers' compensation: rehabilitants, services, costs, and outcomes. John A. Gardner. February 1988. WC-88-1.

vocational rehabilitation outcomes: evidence from new york. John A. Gardner. December 1986. WC-86-1.

vocational rehabilitation in workers' compensation: issues and evidence. John A. Gardner. June 1985. S-85-1.

Occupational Disease

liability for employee grievances: mental stress and wrongful termination. Richard B. Victor, ed. October 1988. WC-88-6.

asbestos claims: the decision to use workers' compensation and tort. Robert I. Field and Richard B. Victor. September 1988. WC-88-5.

Other

workers' compensation: where have we come from? where are we going?. Richard A. Victor and Linda L. Carrubba, eds. November 2010. wc-10-33.

recession, fear of job loss, and return to work. Richard A. Victor and Bogdan Savych. April 2010. WC-10-03.

WCRI FLASHREPORT: *what are the prevalence and size of lump-sum payments in workers' compensation: estimates relevant for medicare set-asides.* Richard A. Victor, Carol A. Telles, and Rui Yang. November 2006. FR-06-01.

the future of workers' compensation: opportunities and challenges. Richard A. Victor, ed. April 2004. WC-04-03.

managing catastrophic events in workers' compensation: lessons from 9/11. Ramona P. Tanabe, ed. March 2003. WC-03-03.

WCRI FLASHREPORT: *workers' compensation in california: lessons from recent wcri studies.* Richard A. Victor. March 2003. FR-03-02.

WCRI FLASHREPORT: *workers' compensation in florida: lessons from recent wcri studies.* Richard A. Victor. February 2003. FR-03-01.

workers' compensation and the changing age of the workforce. Douglas J. Tattrie, Glenn A. Gotz, and Te-Chun Liu. December 2000. WC-00-6.

medical privacy legislation: implications for workers' compensation. Ramona P. Tanabe, ed. November 2000. WC-00-4.

the implications of changing employment relations for workers' compensation. Glenn A. Gotz, ed. December 1999. WC-99-6.

workers' compensation success stories. Richard A. Victor, ed. July 1993. WC-93-3.

the americans with disabilities act: implications for workers' compensation. Stacey M. Eccleston, ed. July 1992. WC-92-3.

twenty-four-hour coverage. Richard A. Victor, ed. June 1991. WC-91-2.

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