

# The Impact of Cost Intensive Physicians on Workers' Compensation

Edward J. Bernacki, MD, MPH, Xuguang Tao, MD, PhD, and Larry Yuspeh, BA

**Objective:** To identify physicians linked to high-cost workers' compensation claims. **Methods:** Contrast the cost and duration of claims associated with cost intensive physicians (CIPs) and other physicians (OPs) on 5 years of closed claims paid by the Louisiana Workers' Compensation Corporation. **Results:** Identified 77 CIPs of 2034 physicians who treated Louisiana Workers' Compensation Corporation claimants. CIPs made up 3.8% of physicians but accounted for 72% of costs. CIP's treated 16 times more claimants, and their average claim cost was four times higher than the OPs (\$46,239 vs \$11,390,  $P < 0.01$ ). CIP claims settled in 697 versus 278 days for OPs. Adjusted for age, sex, marital status, International Classification of Diseases, 9th revision group, and initial reserve, the odds ratio of CIP claims with a final cost of  $> \$50,000$  was 5.4. **Conclusion:** A small group of physicians ( $< 4\%$ ) have a profound effect on overall workers' compensation costs.

In the \$85 billion US state workers' compensation system, health care providers are paid to render care to injured workers from the time of injury through recovery. Costs are paid by employers (no copayments or deductibles) directly or through insurance premiums.<sup>1-4</sup> Most state workers' compensation systems allow injured employees to choose health care providers. Some states allow the employer to make the initial provider choice after which injured employees are free to select a provider.<sup>2,3</sup> The payment mechanism for medical care is fee-for-service, which is generally subject to state-based fee schedules.<sup>4</sup> Once a claim has been accepted, time lost from work is also paid by the employer to the claimant, usually two thirds of their average weekly wage, tax-free up to a state-specific maximum.<sup>3</sup>

Physicians, for the most part, direct the diagnostic and treatment process, including the amount of time claimants remain out of work.<sup>2-4</sup> Because the workers' compensation system pays lost wages that approximate pre-injury salaries, there are few claimant incentives to return to work before full functional recovery. The parameters of recovery are defined by treating physicians. This arrangement removes restraints on physicians to return injured workers to work as soon as possible. It differs from non-occupational injuries or illnesses where disability benefits are limited by plan designs.<sup>5</sup>

An employer may challenge the care provided or the permitted recovery time at an administrative law hearing, but these challenges are rarely supported by hearing examiners.<sup>1,6</sup> Thus, physicians, for the most part, are free to determine the type and

amount of medical care as well as the amount of time required for full recovery. Injured workers may accept prescribed care and recovery time without restraint.

In a complex compensation system where incentives may align to increase medical costs and lost time wages, we have investigated whether some physicians (termed cost intensive physicians [CIPs]) have a style of practice or intensity of service, independent of injury severity, that is associated with higher medical, indemnity, and other costs. Can CIPs be identified? What characteristics mark the claims associated with these physicians? Can the cost differences between CIP claims and other physician (OP) providers be quantified to determine the effect of both on the system?

## METHODS

To study these questions, we used workers' compensation claims from the Louisiana Workers' Compensation Corporation (LWCC). LWCC is a private mutual insurance company, writing workers' compensation insurance for ~30% of the fully insured market in Louisiana. Louisiana's statutes permit free choice of health care providers by covered injured workers, pay temporary or total benefits until injured workers return to work, and employ fee schedules that permit uniform payments to providers for particular services.<sup>7-10</sup> At LWCC, reserves are placed on workers' compensation claims to insure that sufficient funds have been allocated to pay future claim expenses as well as to determine the company's aggregate future liability. The claim representative places, an initial reserve on a claim within 14 days of the accident. If there are no complicating factors, or if the claim will involve only medical payments, this reserve may be assigned immediately on receipt of the claim. The initial reserve serves as an estimate of the injury severity by the representative. Throughout the claim life, reserves are updated to reflect the cost of ongoing and future medical care and other claim expenses.<sup>7,8</sup>

Information on workers' compensation claims administered by LWCC resides in the LWCC Claims Payment Database.<sup>7</sup> This file contains data on age, sex, and marital status of claimants; treating health care providers; premium size; payroll size of employers; dates of injury; dates claim were entered into the database; financial quarter in which the reserves were placed; nature of the accidents or diagnoses; attorney representations; dates of initial attorney involvement; dates of claim closure; and medical, indemnity, and other claim payments (defense-related litigation, investigation expenses etc).

## Data Collection

Two Claims Payment Database files were involved in this study. The claim file contained individual claims filed during the 5-year period, from 1998 to 2002, and closed by December 31, 2006. The closed claims accounted for 97% of the claims filed during this period. The provider file contained information about all providers, including physicians associated with the 1998 to 2002 claims. This file included providers names, ID numbers, specialties, associated claim numbers, and amounts paid per claim. In this file, providers included physicians, clinical practices, or facilities such as hospitals.

From the Department of Medicine (Dr Bernacki, Dr Tao), Division of Occupational and Environmental Medicine, Johns Hopkins University School of Medicine, Baltimore, Md; and Department of Research, Development and Strategy Management (Mr Yuspeh), Louisiana Workers' Compensation Corporation, Baton Rouge, La.

Address correspondence to: Edward J. Bernacki, MD, MPH, Division of Occupational and Environmental Medicine, Johns Hopkins University, School of Medicine, 600 North Wolfe Street, Billings Administration 129, Baltimore, MD 21287-1629; E-mail: bernacki@jhmi.edu.

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### Definition of Claim Categories

Similar to previous investigations, we constructed four categories, which we used to indicate changes in claim development.<sup>7</sup>

- a. Minor claims—“minor”: initial reserve <\$15,000 and final cost <\$50,000.
- b. Migrated catastrophic claims—“migratory”: initial reserve <\$15,000 and final cost ≥\$50,000.
- c. False catastrophic claims—“false catastrophics”: initial reserve ≥\$15,000 and final cost <\$50,000;
- d. True catastrophic claims—“true catastrophics”: initial reserve ≥\$15,000 and final cost ≥\$50,000.

The initial reserve is the first reserve placed on a claim by the LWCC representative. The final cost includes the total amount paid on closed claims as of December 31, 2006.

The majority of medical-only and lost time claims are minor claims reserved for <\$15,000. Typically, there is nothing about the injuries with a reserve of <\$15,000 that would involve costly medical expenses or an extended recovery period. Adverse development, or cost escalation above the norm, almost always takes place as claims age, rather than at the time of injury. When cost escalation occurs, the claims move from minor claims to more expensive or migratory claims with final costs ≥\$50,000. In our investigation, minor, false catastrophic, and true catastrophic claims do not undergo unanticipated development. Migratory claims experience cost-escalation above the norm.

### Identifying the CIP Group

In previous research, we identified a small number of claims involving minor injuries such as a strain that have certain attributes (lawyer involvement, advanced age, sex, low-back cases, etc) that led to unanticipated cost escalation that affect medical as well as overall costs.<sup>7</sup> We termed this group of claims “migrated catastrophic” or “migratory” claims. Victor et al<sup>3</sup> defined a related workers’ compensation claim category with similar outcomes which he termed “adverse surprise claims.” These claims had an incurred medical cost ratio (incurred medical at 36 months to incurred medical at 12 months) of >2. Typically, migratory claims start with what appears to be a minor injury but costs develop to the same level as catastrophic injuries such as multiple fractures. Both migratory and “adverse surprise claims” are associated with different care patterns than claims in other categories: more surgery, physical therapy, chiropractic services, and mental health services.<sup>11</sup> Migratory claims also are associated with longer disability durations and higher indemnity costs. We set out to study physicians who had a significant involvement in managing claimants involved in migratory claims. We hypothesized that physician’s style of practice or manner of providing health care exerted an influence on the development of these claims. If they influenced the development of these claims, it could be likely that they influenced the development of all claims in the LWCC inventory. Physicians who had five or more migratory claims during 1998–2002 were chosen because the potential “CIPs,” whose claims would be compared to claims of OPs.

We looked at the distribution of migratory claims (Table 1) and found 77 physicians with five or more claims who accounted for 3.7% of the 2034 physicians in the database. We used five migratory claims because the dividing point to explore possible differences between the two groups.

### Claim File Analysis

This analysis was based on the claim file that contains exclusive claim information. The CIP group included claims of injured workers treated by CIPs, and the OP group studied claims of injured workers treated by the OPs.

**TABLE 1.** Physician Provider Frequency by Migratory Claim Category

Migratory Claims Number	Provider Frequency	Cumulative Provider Number	Cumulative Provider (%)
0	1,418	2,034	100.00
1	326	616	30.29
2	111	290	14.26
3	62	179	8.80
4	40	117	5.75
5	11	77	3.79
6	16	66	3.24
7	8	50	2.46
8	9	42	2.06
9	9	33	1.62
10	5	24	1.18
11	2	19	0.93
12	2	17	0.84
13	1	15	0.74
14	2	14	0.69
15	0	12	0.59
16	1	12	0.59
17	0	11	0.54
18	2	11	0.54
19	1	9	0.44
20	4	8	0.39
More	4	4	0.20

Physicians that have five or more migratory claims are CIPs.

Descriptive statistical comparisons were used to describe the distribution of claim frequency, total cost, indemnity cost, medical cost, and claim duration between CIP claims and OP claims, stratified by the four claim categories.

The distribution of International Classification of Diseases, 9th revision (ICD-9) groups among CIPs and OPs was analyzed to determine whether there were differences in the types of injuries or illnesses treated. In addition, the average claim cost in each ICD-9 group was assessed to determine if there were cost differences between the groups. The claims that did not contain an identifiable ICD-9 code were analyzed as a group.

Multivariate logistic regression models were used to evaluate the risk of claims associated with CIPs of having final a cost of ≥\$50,000. Six models were constructed adjusting for the following variables in various combinations; age, sex, marital status, initial reserve (adjuster perception of ultimate claim costs) ICD- 9 group, and claim duration.

### Provider File Analysis

The distribution of various types of health care providers were compared to determine if certain types of providers were over or under represented in either group. Only the types of providers that were contained in both provider groups were included in the analysis.

## RESULTS

Data from Table 2 indicates that CIPs were 16 times more likely to provide medical care paid by LWCC than OPs (41.8% of claims per provider vs 2.6% claims per provider) and 83 times more likely to provide care for high cost claims (≥\$50,000) than OPs (11.7% of high cost claims per provider vs 0.14% high cost claims per provider). The proportion of claims reserved <\$15,000 that

**TABLE 2.** Claim Duration and Total Costs by Risk Category Among Physician Groups

Risk Category	1,957 OP				77 CIP				Ratio of CIP/OP			
	Claims	Average Claim Duration (d)	Total Paid	Cost per Claim	Claims	Average Claim Duration (d)	Total Paid	Cost per Claim	Percentage of Claims	Ratio-Average Claim Duration CIP/OP*	Percentage of Total Cost	Ratio-Cost per Claim CIP/OP
Minor	3,951	208	\$16,702,220	\$4,227	1,485	460	\$20,096,124	\$13,533	27.32	2.21	54.61	3.20*
Migratory	97	1,266	\$10,837,528	\$111,727	476	1,397	\$61,546,968	\$129,300	83.07	1.10	85.03	1.16*
False catastrophic	902	364	\$12,200,552	\$13,526	871	480	\$17,342,786	\$19,911	49.13	1.32	58.70	1.47*
Catastrophic	134	1,048	\$18,165,066	\$135,560	385	1,239	\$49,764,126	\$129,257	74.18	1.18	73.26	0.95
Total	5,084	278	\$57,905,366	\$11,390	3,217	697	\$148,750,004	\$46,239	38.75	2.51	71.98	4.06*

\**P* < 0.01.

moved into claims  $\geq$ \$50,000 (migratory claims) was 2.4% among OPs, whereas it was 24.3% among CIPs. The proportion of claims reserved for  $\geq$ \$15,000 that developed into claims  $\geq$ \$50,000 (catastrophic) was 12.9% among OPs and 30.7% among CIPs. CIPs represented 3.7% (77/2034) of all physicians but were associated with 38.8% of claims (3217/8301). Nevertheless, CIP claims represented almost 72% of total costs of claims (\$149M/\$207M). The aggregate per claim cost (medical indemnity and other costs) of CIP claims was 4.1 times higher than the aggregate per claim cost of OPs (\$46,239 vs \$11,390, *P* < 0.01). In each category, except catastrophic, the average CIP claim costs were significantly higher than the average OP claim costs. The greatest differences were in the minor claim category where CIP mean costs per minor claim were more than three times the mean cost per minor claim of OPs (\$13,533 vs \$4227, *P* < 0.01). Therefore, the differences in claim cost between both groups were driven by cost differences in the minor claims and the greater involvement by CIPs in claims  $\geq$ \$50,000 at the time of settlement.

The average CIP claim duration was 697 days, whereas the average OP claim duration was 278 days. Again, while there were significant differences in claim duration for all categories, the difference was greatest in the minor claims where the average CIP claim duration was 460 days compared with 208 days for OP claims.

The CIP group's indemnity cost per claim was 4.6 times greater than the indemnity cost per claim for the OPs (\$20,187 vs \$4413, *P* < 0.01) (Table 3). There was >3-fold difference in indemnity costs per claim between the CIP and OP groups in the minor claim category (\$3224 vs \$1007, *P* < 0.01). The CIP group's medical cost per claim for all claim categories was 3.7 times greater than the per claim medical cost of the OP group (\$23,136 vs \$6340, *P* < 0.01). Similar to the indemnity cost difference, medical cost per claim between the CIP and OP groups was greatest for minor claims (\$9523 vs \$2977, *P* < 0.01). The increased medical and indemnity costs for CIPs were significant for all claim categories except for the catastrophic group.

Table 4 presents the average claim duration and claim costs by ICD-9 groups. There were more knee derangements, intervertebral disc disorders and thoracic and lumbar radiculopathies treated by CIPs than OPs. Nevertheless, there were significantly higher mean claim costs among the CIP group than for the OP group for all but six ICD-9 groups. The aggregate cost adjusted for ICD-9 groups, excluding the "other" ICD-9 category, was \$60,020 per claim for the CIP group and \$21,546 (*P* < 0.01) per claim for the OP group, or 2.8 times greater. When including the "other" ICD-9 category, the aggregate cost adjusted for ICD-9 groups was four times greater among the CIP group than the OP group (\$46,239 vs \$11,390). In every ICD-9 group except two, there were significant cost differences and claim durations.

The logistic regressions for the risk of a CIP with a final total cost of a claim equal or exceeding \$50,000 are contained in Table 5. Adjusting for age, sex, marital status, ICD-9 and initial reserve, the odds ratio for the CIP achieving a per claim cost of  $\geq$ \$50,000 was 5.4 times that of the OP group.

The proportion of specialties/subspecialties was approximately the same among the CIP and OP groups for most categories. The proportion of "general practitioners" (family practice) was lower in the CIP group than the OP group (3.9% vs 19.6%). The proportion of providers practicing anesthesia, pain medicine and physical medicine and rehabilitation (PM&R) was higher in the CIP group. Specialties found in the OP group, but not in the CIP group, included occupational medicine, ophthalmology, and plastic surgery (Table 6). Practitioners classified as pain medicine may have been placed in any one of four categories: pain medicine, anesthesiology, PM&R, and psychiatry by LWCC coders.

**TABLE 3. Indemnity and Medical Costs by Risk Category Among Physician Groups**

Risk Category	1,957 OP						77 CIP						Ratio of CIP/OP			
	Total Indemnity Paid		Total Med Cost per Claim		Total Indemnity Paid		Total Med Cost per Claim		Total Indemnity Paid		Total Med Cost per Claim		Indemnity Cost per Claim		Med Cost per Claim	
Minor	\$3,978,867	\$1,007	\$11,761,182	\$2,977	\$4,787,784	\$3,224	\$14,142,112	\$9,523	1.20	3.20*	1.20	3.20*	1.20	3.20*	1.20	3.20*
Migratory	\$5,686,033	\$58,619	\$4,329,078	\$44,630	\$31,592,867	\$66,372	\$26,128,566	\$54,892	5.56	1.13*	6.04	1.23*	6.04	1.23*	6.04	1.23*
False catastrophic	\$4,207,100	\$4,664	\$7,464,876	\$8,276	\$5,244,985	\$6,022	\$11,220,176	\$12,882	1.25	1.29*	1.50	1.56*	1.50	1.56*	1.50	1.56*
Catastrophic	\$8,565,183	\$63,919	\$8,676,055	\$64,747	\$23,315,105	\$60,559	\$22,938,961	\$59,582	2.72	0.95	2.64	0.92	2.64	0.92	2.64	0.92
Total	\$22,437,184	\$4,413	\$32,231,192	\$6,340	\$64,940,741	\$20,187	\$74,429,815	\$23,136	2.89	4.57*	2.31	3.65*	2.31	3.65*	2.31	3.65*

\*P < 0.01.

### DISCUSSION

Our decision to use the migratory claim category as a method of identifying potential CIPs was validated by our findings. The 77 individuals identified as CIPs differed from the OPs with regard to claim costs, claim duration and participation in the workers' compensation system. They were associated with 83% of claims that underwent adverse development (migratory claims), as well as 74% of the catastrophic claims (initial reserve <\$15,000, final cost ≥\$50,000). These few physicians as a group treated proportionately more claimants than the OPs, accounting for 39% of claims as opposed to 61% for the OPs. They were also involved in claims that took longer to resolve (2.5 times longer) and treated a different mix of conditions than the OPs treating injured workers.

Did the CIPs treat individuals with more complicated injuries that required more sophisticated medical treatment and resulted in longer disability than the OPs? Did this account for the differences? The CIPs had a higher proportion of certain costly conditions such as carpal tunnel, intervertebral disc disorders, and internal derangements of the knee. Furthermore, the mean initial reserve for the OP group was \$9242 and the mean final cost was \$11,390, or a final or initial cost ratio of 1.23. For the CIPs, the mean initial reserve was \$20,061 and the mean final cost was \$46,239 for a final or initial cost ratio of 2.30. This indicates that CIPs treated claimants with more severe injuries (higher initial reserves placed by the representatives at the time of injury). Nevertheless, as indicated, the final claim cost doubled the initial reserve in the CIP group (ratio = 2.30) while it barely changed the OP group (ratio = 1.23). This suggests that CIP status was an effect modifier which had a cost impact independent of severity. When adjusting for claim category, type of injury, age, sex, marital status, ICD-9 code and initial reserve, however, the CIPs were found to be an independent predictor of high claim costs (≥\$50,000). This observation is supported by the fact that 12.9% of the OP claims settled for ≥\$50,000, whereas 30.7% of the CIP claims settled for those amounts. This indicates that cost migration also occurs among more severe injuries and that the physician plays a role in that migration. This may explain why there were little differences in the mean total, medical and indemnity costs between the CIPs and OPs for catastrophic claims. That is, some CIP catastrophic claims may have been claims that migrated from the false catastrophic category or the CIP catastrophic claim category may have been of lower severity than the OP catastrophic claims.

We used the initial reserve placed on a claim at the time of injury by the claims representatives, as an indicator of injury severity. We acknowledge that it is an imperfect measure of severity because adjusters are not trained medical professionals. Nevertheless, the claims representative's ability to predict the final claim costs and, therefore, correctly categorize injury severity was reasonably accurate for the OP group, where the average initial reserve was \$9242 and the final costs was \$11,390. There is no reason to believe that the difference in reserving practices would differ dramatically by physician group. The same methodological flaws, if any, would apply to both groups more or less equally. Similarly, we used ICD-9 groupings as an indicator of injury severity. We also acknowledged that there was variability within ICD-9 groups regarding severity levels. Nevertheless, it is unlikely that this variability in severity within an ICD-9 group would be limited to a particular group of physicians and not to another.

It has been recognized that there is great variability in treatment of common injuries financed by the workers' compensation system and this variability leads to higher costs.<sup>12-15</sup> Our study supported this observation. The cost and duration differences of CIP and OP claims were greatest among minor conditions where the greatest variability in treatment options were available. A few medical specialty societies and other groups have constructed

**TABLE 4. ICD-9 Group Distribution and Average Claim Cost by Physician Group**

ICD-9	1,957 OP						77 CIP						
	Claims	Percentage of All Claims	Percentage Without Other	Claim Duration	Final Cost	Indemnity	Medical Claims	Percentage of All Claims	Percentage Without Other	Claim Duration	Final Cost	Indemnity	Med
All other Icd-9s	4,332	85.2		246	\$9,627	\$3,546	2,361	73.4		641***	\$41,242***	\$17,857***	\$21,209***
Neoplasm (140-239)	3	0.1	0.4	422	\$4,446	\$3,860	2	0.1	0.2	556	\$5,569	\$0	\$4,058
Carpal tunnel syndrome (3,540)	56	1.1	7.4	527	\$16,589	\$5,844	70	2.2	8.2	762***	\$27,934	\$12,517	\$13,687
Essential hypertension (4,019)	4	0.1	0.5	433	\$12,936	\$4,861	1	0.0	0.1	532	\$21,664	\$6,031	\$13,726
Mental disorders (290-319)	6	0.1	0.8	1,121	\$80,679	\$35,793	17	0.5	2.0*	1,543*	\$148,832***	\$55,444**	\$79,825***
Lesion of Ulnar nerve (3,542)	4	0.1	0.5	582	\$65,303	\$33,237	8	0.2	0.9	965**	\$62,799	\$34,786	\$23,515
Neuralgia/neuritis/radiculitis (7,292)	0	0.0	0.0				4	0.1	0.5	430	\$46,572	\$19,835	\$25,122
Osteoarthritis (715)	19	0.4	2.5	736	\$35,596	\$20,940	31	1.0	3.6	815	\$50,398	\$23,793	\$23,758
Internal derangement knee (717)	19	0.4	2.5	587	\$33,651	\$20,772	44	1.4	5.1**	784	\$49,194	\$24,502	\$23,137
Spondylosis (721)	2	0.0	0.3	822	\$93,046	\$56,385	15	0.5	1.8	1,167	\$94,464	\$40,344	\$42,954
Intervertebral disc disorders (722)	56	1.1	7.4	808	\$46,204	\$22,413	106	3.3	12.4**	1,181***	\$111,337***	\$54,907***	\$43,090***
Other cervical region disorders (723)	29	0.6	3.9	764	\$45,418	\$18,639	55	1.7	6.4	1,092***	\$70,325***	\$32,180***	\$33,358
Peripheral entheopathies (726)	75	1.5	10.0	494	\$22,191	\$10,970	59	1.8	6.9*	807***	\$36,268	\$18,105**	\$16,777
Synovium/tendon/bursa (727)	37	0.7	4.9	536	\$19,115	\$8,899	38	1.2	4.4	473	\$20,767	\$10,585	\$9,489
Muscle/lig/fascia (728)	5	0.1	0.7	646	\$12,222	\$3,408	8	0.2	0.9	1,469***	\$105,947***	\$67,456***	\$36,344
Other bone/cartilage (733)	3	0.1	0.4	320	\$10,095	\$1,050	7	0.2	0.8	1,002**	\$48,238	\$17,416	\$27,977
Pain in joints (7,194)	96	1.9	12.8	419	\$19,436	\$7,480	74	2.3	8.6*	950***	\$63,554***	\$24,752***	\$29,803***
Fracture skull/neck (80)	327	6.4	43.5	319	\$13,338	\$5,048	287	8.9	33.5**	652***	\$46,442***	\$17,382***	\$26,982***
Traumatic pneumo/hemothorax (86)	4	0.1	0.5	287	\$17,041	\$7,041	4	0.1	0.5	1,267***	\$130,734***	\$80,743***	\$44,237
Thoracic/lumbosacral neuritis/radiculitis (7,244)	7	0.1	0.9	722	\$42,649	\$15,548	26	0.8	3.0**	1,186**	\$103,379**	\$50,489***	\$37,107
Total exclude other ICDs	752	14.8	100.0	462	\$21,546	\$9,408	856	26.6	100.0	854***	\$60,020***	\$26,614***	\$28,452***
Total	5,084	100.0		278	\$11,390	\$4,413	3,217	100.0		697***	\$46,239***	\$20,187***	\$23,136***

\*P < 0.05; \*\*P < 0.01 comparing to OP.

**TABLE 5.** Logistic Regression for the Risk of a CIP Claim With Final Cost of  $\geq$ \$50,000

Models	Odds Ratio	95% CIP	
Adjusted for age, sex and marital status	6.53	5.50	7.75
Adjusted for age, sex, marital status, and ICD-9 group	6.01	5.04	7.16
Adjusted for age, sex, marital status, and initial reserve	5.74	4.82	6.85
Adjusted for age, sex, marital status, ICD-9 group, and initial reserve	5.38	4.50	6.44
Adjusted for age, sex, marital status, and claim duration	2.57	2.08	3.19
Adjusted for age, sex, marital status, ICD-9 group, initial reserve, and claim duration	2.32	1.86	2.89

evidence-based practice guidelines for use by physicians to decrease the variability of medical care.<sup>16</sup> These guidelines have been adopted by health care providers in workers' compensation systems in some states including California, Connecticut, Colorado, and Texas to control costs.<sup>15,16</sup> Swedlow et al<sup>14</sup> found that in the treatment of low back soft tissue injuries, use of medical services beyond the recommended levels of care was strongly associated

with higher medical and indemnity costs, prolonged medical treatments and delayed return to work.

It is unclear whether the differences in claim costs that we found would be diminished if evidence-based medical practice guidelines were required by Louisiana to guide the diagnosis and treatment of work-related injuries. Nevertheless, use of guidelines most certainly would have had an effect on the variability between physician groups for the minor claims which could have an effected overall cost differences.

Specialty groups involved in pain management, anesthesia, PM&R, and psychiatry, as well as physicians who identified themselves as pain medicine physicians constituted 55% of CIPs. Perhaps evidence-based guidelines for treatment of chronic pain would help in addressing a significant portion of the cost differences.

In our study, clinical outcomes were not assessed. Nevertheless, days lost due to injury has been cited as a measure of poor treatment outcomes.<sup>17-19</sup> Although we did not directly determine the number of days lost due to an injury, but we did quantify indemnity costs and found that CIPs had significantly higher costs in this category. In Louisiana, the majority of indemnity payments are related to temporary or total or wage replacement and could be used as a surrogate measure for time lost from work (ie, the higher the indemnity payments, the greater the time lost from work). By this measure, CIPs may have had poorer treatment outcomes than OPs. Nevertheless, it was not possible to determine this because the

**TABLE 6.** Specialty Frequencies

Specialty/Subspecialty	OP	Percent	CIP	Percent	Ratio of CIP/OP
Anesthesiology	204	10.42	21	27.27	2.62**
Cardiovascular disease	15	0.77		0.00	0.00
Chiropractic*	11	0.56		0.00	0.00
Dentistry*	50	2.55		0.00	0.00
Dermatology	7	0.36		0.00	0.00
Otolaryngology	48	2.45		0.00	0.00
Emergency medicine	31	1.58		0.00	0.00
Endocrinology	1	0.05		0.00	0.00
Gastroenterology	14	0.72		0.00	0.00
General practitioner (family practice)	384	19.62	3	3.90	0.20*
Infectious disease	2	0.10		0.00	0.00
Internal medicine	42	2.15		0.00	0.00
Neurology	3	0.15		0.00	0.00
Neurological surgery	95	4.85	6	7.79	1.61
Obstetrics and gynecology	5	0.26		0.00	0.00
Occupational medicine	105	5.37		0.00	0.00
Ophthalmology	147	7.51		0.00	0.00
Orthopedic surgery	417	21.31	25	32.47	1.52
Pain medicine**	37	1.89	12	15.58	8.24**
Pathology	11	0.56		0.00	0.00
Physical medicine and rehabilitation	34	1.74	8	10.39	5.98**
Plastic surgery	50	2.55		0.00	0.00
Podiatry*	21	1.07		0.00	0.00
Psychiatry and psychology*	9	0.46	1	1.30	2.82
Pulmonary disease	13	0.66		0.00	0.00
Radiology	8	0.41		0.00	0.00
Rheumatology	2	0.10		0.00	0.00
Surgery	180	9.20	1	1.30	0.14
Urology	11	0.56		0.00	0.00
Total	1957	100.00	77	100.00	1.00

\* $P < 0.05$ ; \*\* $P < 0.01$ .

proportion of indemnity payment costs related to the treatment of more severe injuries by the CIPs could not be accurately assessed. In the future, days lost due to injury will be quantified to study the issue of differing clinical outcomes by physician groups.

Can our study results be applied to other payers in Louisiana or other jurisdictions? Because all physicians who treat claimants in Louisiana are subject to the same state laws, it is doubtful that our findings would be different among other payers in the state. Our findings also can be generalized to other states that permit physician choice. In states that restrict injured worker's physician choice, we expect the magnitude of differences would not be as great. Victor et al noted that there was a difference among the states in the percentage of significant adverse surprise claims. Louisiana ranked fourth in this percentage, suggesting that the magnitude of differences between CIP and OP providers would probably be higher in Louisiana.<sup>3</sup>

An objective method to identify high cost health care providers and quantify their costs to the system has not been previously described. This lack of information on provider cost behaviors may have restricted workers' compensation policy makers to focus cost-containment activities on discounting individual medical services. Change is needed in the workers' compensation arena, but perhaps also in public and private major medical insurance. Policy makers should move away from their focus on fee schedules and look more intently at the practice patterns of providers.

The ability to use information in this study to effect changes in state workers' compensation systems is limited because of the regulatory nature of the system. Nevertheless, a similar process of identifying high cost physicians to target cost control mechanisms may be useful in major medical insurance and Medicare, where restraints currently exist to control medical and disability costs (negotiated hospital and physician rates, networks, capitation arrangements, copayments and deductibles, premium contributions etc).<sup>5,20–24</sup> The biggest hurdle in assessing non-workers' compensation information in this manner is the way information is captured by payers. In major medical, an individual procedure or service is a claim. In workers' compensation, a claim is a patient and costs are accrued until the individual achieves full recovery. Thus, while the strategy that we have described to identify potential CIPs would be difficult in the non-workers' compensation environment, there may be an incentive to do so.

In summary, we have demonstrated that it is possible to objectively identify a group of high cost physicians and quantify their effect on a system of health care. Our major finding was that there are a few physicians treating workers' compensation claimants that have a profound effect on the medical and indemnity costs of the entire system. Although some of the differences between physician groups were related to injury severity, differing practice patterns accounted for a major portion of the differences. The finding that over half of the high cost physicians were associated with specialties engaged in pain management argues for an investigation of pain management practices in workers' compensation.

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