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Post-Reform Changes in Inpatient Hospital Use and Back Surgery in the California Workers' Compensation System

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Executive Summary

Goals: This study measures the association between recent medical reforms in the California workers' compensation system and changes in inpatient hospital utilization. It also compares inpatient hospitalization patterns in workers' compensation to those found in other systems, with special focus on surgical interventions for back-related problems.

The study is based on an analysis of inpatient hospital discharge data compiled by the California Office of Statewide Health Planning and Development (OSHPD). The OSHPD data includes information on all 2002 through 2006 inpatient hospitalization discharges for workers' compensation, group health and government programs in California.

Findings: Inpatient hospital use in California is dominated by three payors: Medicare, MediCal and group health. In contrast, workers' compensation accounts for less than 1 percent of all inpatient hospitalization discharges in the OSHPD dataset. This study shows that:

- The total number of inpatient discharges in California remained relatively stable between 2002 and 2006, but the number of discharges associated with work injuries declined 15.4 percent, from 31,348 cases in 2002 to 26,551 cases in 2006 -- with most of that decline occurring in the post-reform period of 2004 through 2006.
- The number of inpatient discharges for workers' compensation back injuries fell steadily between 2002 and 2006, a trend not found in the general population of all other back-related discharges.
- Workers' compensation back injuries involved shorter hospital stays, fewer overall procedures and fewer surgeries than non-workers' compensation back injuries, yet the average charges per hospital stay were similar.

Discussion: While some of the reduction in the total number of inpatient hospitalizations for work-related injuries and work-related back conditions can be ascribed to the ongoing decline in California workers' compensation claim frequency, several reforms enacted between 2002 and 2004 are also likely to have contributed to these reductions. These include the adoption of utilization review procedures and the application of evidence-based clinical guidelines; the shift toward the use of medical provider networks; and the requirement for a second opinion prior to authorization of back surgery.

Background

Reforming California Workers' Compensation Medical Care

Workers' compensation reform legislation signed into law between 2002 and 2004 contained provisions to control the growth of medical development; most notably, the partial repeal of the primary treating physician's presumption of correctness in matters of medical treatment. Beginning in January 2004, reform laws also called for the implementation of utilization controls featuring medical treatment guidelines (beginning with the ACOEM Guidelines) and mandatory utilization review, as well as second opinions for spinal surgery.

In large part, the 2002 – 2004 reforms were driven by the inflation of medical costs, which began following the passage of 1993 legislation that gave a rebuttable presumption of correctness to the primary treating physician's opinion for the purpose of calculating permanent disability. Subsequent case law handed down in 1996 (the Minniear decision) expanded the application of the treating physician's presumption of correctness to all medical issues, including the appropriateness of any given medical treatments. This ruling effectively limited the ability of workers' compensation payors to question or object to medical utilization, allowing challenges to the primary treating physician's opinion only if it could be proven that the opinion was not supported by medical literature – a standard that was rarely overcome in the appeals process,

even when it was clear that a given treatment was not curative. Following the Minniear decision, medical utilization in the California workers' compensation system increased sharply, which in turn drove up treatment costs. According to the Workers' Compensation Insurance Rating Bureau, from 1994 to 2002, the estimated ultimate medical cost per indemnity claim increased 167% from $10,064 to $26,876.[1]

Several studies document links between the physicians' presumption and increased medical utilization and cost.[2]

The Debate Over Back Treatment

Concerns over medical cost inflation and the related effectiveness of medical treatment were not limited to the workers' compensation arena. Representative of the persistent controversy over the cost and associated benefit of various types of medical treatment was the use of invasive procedures for soft tissue injuries -- notably the increasing use of spinal fusion to treat low back pain. In 2006, the Department of Orthopedics at the Dartmouth Medical School observed that lumbar fusion rates increased dramatically during the 1980s, and even more so in the 1990s. The Dartmouth data showed that the surgical rate among the Medicare population nearly quadrupled from 0.3 surgeries per thousand enrollees to 1.1 surgeries per thousand enrollees between 1992 and 2003.[3] Furthermore, regional differences in rates varied by nearly 20-fold among Medicare enrollees in 2002 – 2003. Correlated with the increase in rates was the increase in expenditures. Between 1992 and 2003, Medicare expenditures for lumbar fusions increased 500 percent.

A growing body of scientific clinical literature shows that many individuals with back problems benefit from conservative treatment without the risk of surgery. Put another way, if the risk or cost of a surgical procedure exceeds the potential benefit, the procedure should not be recommended. For example, early surgery for back nerve root compression, when the condition will usually resolve spontaneously within 4-8 weeks, produces risks and harms greater than potential benefits (Groopman 2002, Abelson 2003).[4,5]

From 2001 through 2005, a series of studies brought the question of surgery for low back pain into clear focus. Fritzell (2001) concluded that among patients suffering from low back pain, those who underwent spinal fusions reported less pain in the first two years after surgery than those who did not undergo surgery, but there was no difference in outcome beyond two years.[6] Brox (2003) showed that an aggressive exercise program in conjunction with cognitive behavioral therapy reduced pain just as much as fusion after the first year.[7] Fairnank (2005) reported similar results from a randomized controlled trial, noting that there was no clear evidence of increased benefit from spinal fusion compared to intensive rehabilitation.[8]

Despite this evidence, the medical community does not agree on the proper use and application of surgery to address low back pain. The debate has been complicated by the development of new surgical implants. In 2004, the FDA first approved the artificial disc. Although there are no long-term results currently available, the manufacturers of these implants purport quicker recovery, more flexibility and fewer problems in adjacent areas of the spine providing the same near-term relief from pain as spinal fusions, and a better long-term solution – especially if coupled with an aggressive exercise program.

Harris[9] summarized the application of ACOEM guidelines in cases of low-back soft tissue injury with the following: "Stakeholders should recognize the need for flexibility in treating the individual patient, so the finding that specific procedures are associated with higher costs and delayed return to work should not be taken as evidence to support a zero-tolerance policy for exceptions to the ACOEM Guidelines. A reasonable middle ground would be to allow differing treatment plans for individuals only for compelling reasons, and to try to avoid variations in care that in the past have led to vastly different medical outcomes."

This analysis explores the association between the California workers' compensation medical reforms enacted between 2002 and 2004 – most notably, the introduction of evidence-based guidelines beginning in 2004 -- and changes in inpatient treatment patterns of injured workers. The study tracks changes in the number of hospitalizations since the reforms, and also provides an in-depth look at changes in the characteristics of hospitalizations involving surgical interventions for back problems. This research is an adjunct to CWCI's July 2001 study that compared the clinical severity of inpatient care in California workers' compensation to the care provided in group health and Medicare systems.[10] That study concluded that overall, injured workers admitted to a hospital were less clinically severe and required fewer clinical resources than either group health or Medicare patients.

1 WCIRB Summary of March 31, 2008 Insurer Experience.

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3 Weinstein JN, Lurie JD, Olson PR, Bronner KK, Fisher ES, United States trends and regional variations in lumbar spine surgery: 1992 – 2003, Spine. 2006 Nov 1; 31(23):27 07-14

4 Groopman , J. Knife in the Back, The New Yorker Magazine, April 8, 2002.

5 Abelson, R., Peterson, M. An Operation to Ease Back Pain Bolsters the Bottom Line, Too. The New York Times, December 31, 2003

6 Fritzell P, Hagg O, Wessberg P, Nordwall A, and the Swedish Lumbar Study Group. Volvo Award winner in Clinical studies: Lumbar fusion versus nonsurgical treatment for chronic low back pain, Spine, 2001;26:2521-34

7 Brox JI, Sorensen R, Friis A, Nygaard O, Indahl A, Keller A, et al. Randomized clinical trial of lumbar instrumented fusion and cognitive intervention and exercises in patients with chronic low back pain and disc degeneration, Spine 2003;28: 1913-21

8 Fairbank J, Frost H, Wilson-MacDonald J, Yu L, Barker K, Collins R for the Spine Stabilisation Trial Group. Randomised controlled trial to compare surgical stabilisation of the lumbar spine with an intensive rehabilitation programme for patients with chronic pain: the MRC spine stabilization trial. BMJ 2005;330: 1233-9

9 Swedlow A, Gardner LB, Harris J, Crane R, Measuring the Value of Medical Treatment Outside ACOEM Guildeine Targets in Low Back Soft Tissue Injury Outcomes, CWCI, Sept 2005

10 CWCI Research Abstract, Clinical Severity in Workers' Compensation Inpatient Care, July 2001

The Study

Data

To explore the association of California's 2002 – 2004 workers' compensation medical reforms on hospitalizations and surgical intervention for work-related injuries, the Institute examined data on all inpatient hospital discharges (encompassing group health, Medicare and workers' compensation hospitalizations) reported to the California Office of Statewide Health Planning and Development (OSHPD). OSHPD maintains a public Patient Discharge Database, with data categorized into more than 500 standard diagnostic related groups (DRGs). OSHPD data includes:

- patient demographic variables (age, gender, ethnicity, race, and patient location);
- financial information (payor source, total charges); and
- clinical information (principal diagnosis, DRG assignment, type of care, cause of injury, principal procedure and other procedures).

To obtain representative data from both pre- and post-reform years, the authors examined inpatient hospitalization discharge data from 2002 through 2006. For each inpatient discharge in the study sample, data was extracted on the DRG, the primary procedure, the length of stay and total charges. The final dataset also included a count of all major medical and surgical procedures and a subset of surgical procedures for each discharge.

Payor Characteristics

Table 1 shows an array of California inpatient hospitalization discharges by year and payor type.

Inpatient hospital use in California is dominated by three types of non-workers' compensation payors; Medicare, MediCal and Private Coverage (primarily individuals with coverage through their employer, also known as Group Health). During each of the five years covered in this analysis, workers' compensation represented less than 1 percent of all inpatient discharges. While the total number of inpatient hospital discharges across all payors was relatively stable from year to year, rising just over 2 percent over the five-year span of the study (3,916,363 in 2002; 3,997,182 in 2006), the number of workers' compensation discharges dropped sharply, falling 15.4 percent from 31,348 in 2002 to 26,551 in 2006. The most notable drop in workers' compensation hospitalizations occurred between 2004 and 2005, when the total number of inpatient discharges declined 5.8 percent from 29,247 to 27,542.

Table 1: Distribution of All California Inpatient Hospitalization Discharges by Payor Type 2002 – 2006

Payor Type	2002	2003	2004	2005	2006	Total
Workers' Compensation	31,348	30,736	29,247	27,542	26,552	145,425
WC as a % of All Inpatient Discharges	0.81%	0.78%	0.74%	0.70%	0.67%	0.74%
Non-Workers' Compensation Payors	3,885,015	3,948,889	3,928,393	3,962,713	3,970,630	19,695,640
Private Coverage	1,435,597	1,430,496	1,399,146	1,396,793	1,409,754	7,071,786
Medicare	1,222,090	1,245,722	1,235,330	1,259,318	1,248,265	6,210,725
Medi-Cal	939,835	981,437	991,853	1,003,144	1,011,309	4,927,578
Self Pay	116,781	123,341	131,070	134,988	135,464	641,644
County Indigent Programs	70,856	70,681	67,439	69,767	68,621	347,364
Other Government	59,662	63,274	64,778	67,884	67,467	323,065
Other Payor	29,271	21,848	25,267	18,861	16,970	112,217
Other Indigent	10,444	11,333	12,716	10,649	12,141	57,283
Not Reported or Reported in Error	479	757	794	1,309	639	3,978
Total	**3,916,363**	**3,979,625**	**3,957,640**	**3,990,255**	**3,997,182**	**19,841,065**

Inpatient Hospitalizations for Back Problems

To identify all hospitalizations involving back injuries, the authors identified all inpatient hospital discharges in which any one of eight different discharge DRGs had been assigned (Table 2).

Table 2: DRG Codes Associated with Back Problems

DRG Code	DRG Description
520	Cervical Spinal Fusion w/o Complication
519	Cervical Spinal Fusion w/Complication
500	Back & Neck Procedures Except Spinal Fusion w/o Complication
499	Back & Neck Procedures Except Spinal Fusion w/Complication
498	Spinal Fusion Except Cervical w/o Complication
497	Spinal Fusion Except Cervical w/Complication
496	Combined Anterior/Posterior Spinal Fusion
243	Medical Back Problems

Table 3 summarizes the volume and distribution of California inpatient discharges for back problems both inside and outside the workers' compensation system.

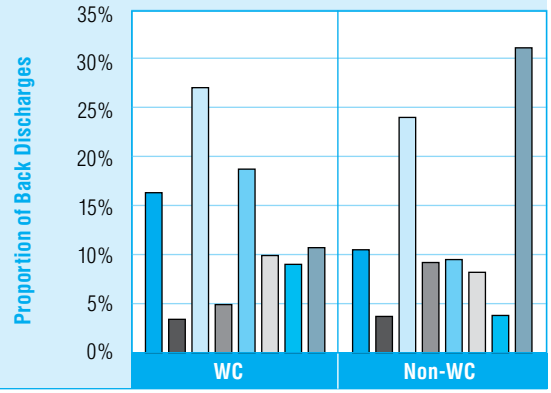
As with the overall number of workers' compensation inpatient hospitalizations, the number of inpatient hospitalizations for back injuries in the California workers' compensation system decreased with each successive study year, beginning with 11,237 discharges in 2002 and ending with 8,385 discharges in 2006 (-25.4 percent across the 5-year period). In contrast, the number of hospitalizations for back injuries covered under systems other than workers' compensation gradually edged up from 58,803 discharges in 2002 to 61,254 in 2006 (+4.2 percent).

Table 3 also shows the percentage of the 2002 through 2006 inpatient discharges in workers' compensation and in other systems that were associated with back injuries. The back DRGs accounted for one-third of the 2002-2006 workers' compensation hospitalizations, compared to only 1.5 percent of the non-workers' compensation hospitalizations.

Medical and Surgical Services

In order to isolate the intensity of medical and surgical services provided on back discharges, the authors analyzed the mix of DRGs within and outside the workers' compensation system (Chart 1).

Chart 1: 2002 – 2006 California Inpatient Hospitalizations for Back Injuries – Distribution by Diagnostic Group Workers' Compensation Vs. Non-Workers' Compensation



	WC	Non-WC
Cervical Spinal Fusion w/o Complication	16.3%	10.5%
Cervical Spinal Fusion w/Complication	3.4%	3.7%
Back and Neck Procedures Except Spinal Fusion w/o complication	27.0%	24.0%
Back and Neck Procedures Except Spinal Fusion w/Complication	4.9%	9.2%
Spinal Fusion Except Cervical w/o Complication	18.7%	9.5%
Spinal Fusion Except Cervical w/Complication	9.9%	8.2%
Combined Anterior/Posterior Spinal Fusion	9.0%	3.8%
Medical Back Problems	10.7%	31.1%

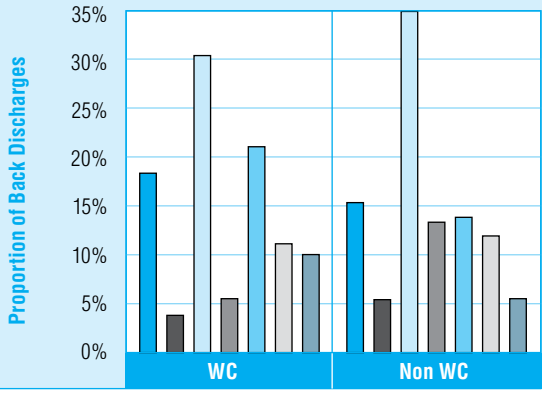
There is a clear difference in the diagnostic composition of the two study groups. The DRG for "Medical Back Problems," which consists primarily of various types of back sprains, accounted for nearly one third (31.1 percent) of the non-workers' compensation back problems resulting in hospitalization -- almost triple the proportion noted in workers' compensation (10.7 percent). In order to focus on the severity

Table 3: Distribution of 2002 – 2006 California Inpatient Hospitalizations for Back Problems Workers' Compensation vs. Non-Workers' Compensation

	2002	2003	2004	2005	2006	Total
# of Workers' Compensation Inpatient Discharges	11,237	10,640	9,920	9,021	8,385	49,203
# of Non-Workers' Compensation Inpatient Discharges	58,803	59,935	60,616	61,517	61,254	302,125
Back Discharges as % of Workers' Compensation Inpatient Discharges	35.8%	34.6%	33.9%	32.8%	31.6%	33.8%
Back Discharges as % of Non-Workers' Compensation Inpatient Discharges	1.5%	1.5%	1.5%	1.6%	1.5%	1.5%

of back cases that involved surgery, the authors calculated the proportion of cases that involved inpatient treatment of back conditions other than medical back problems (Chart 2).

Chart 2: Distribution of California Surgical Back Inpatient Hospitalizations By DRG Workers' Compensation Vs. Non-Workers' Compensation



	WC	Non WC
Cervical Spinal Fusion w/o Complication	18.3%	15.3%
Cervical Spinal Fusion w/Complication	3.8%	5.4%
Back and Neck Procedures Except Spinal Fusion w/o complication	30.3%	34.8%
Back and Neck Procedures Except Spinal Fusion w/Complication	5.5%	13.3%
Spinal Fusion Except Cervical w/o Complication	21.0%	13.8%
Spinal Fusion Except Cervical w/Complication	11.1%	11.9%
Combined Anterior/Posterior Spinal Fusion	10.0%	5.5%

Cervical spinal fusions with and without complication accounted for 22.1 percent of the workers' compensation surgical back discharges, compared to 20.7 percent of the back surgery discharges in other systems. In workers' compensation, about one in six of the cervical spinal fusions had complications, compared to about a quarter of the cervical fusions in other systems. Similarly, fewer than one in six of the back and neck procedures in workers' compensation resulted in complications, compared to more than a quarter of these procedures in other systems. Finally, in workers' compensation one third of the spinal fusions except cervical had complications, compared to nearly half of these procedures in other systems. These results show a larger proportion of higher severity inpatient back injury DRGs outside of the workers' compensation system.

To compare the intensity of medical and surgical services associated with inpatient hospitalizations for back injuries in workers' compensation to other payor groups, the authors examined discharge data from workers' compensation and non-workers' compensation hospitalizations and calculated the average length of stay, the average charge, the average number of procedures and the average number of surgical procedures. Due to the significantly different mix of DRGs within each of the back discharge study groups, the analysis was adjusted by normalizing the mix across all non-workers' compensation payor groups to similar proportions of back DRGs among the workers' compensation discharges. Also, to better analyze service intensity to inpatient cases with surgery, the following analysis eliminated DRG 243, "Medical Back Problem" DRG. The results are shown in Table 4.

Workers' compensation inpatient back injuries had a shorter average length of stay, fewer total procedures and fewer

Table 4: Adjusted Service Intensity Indicators Associated with 2002 - 2006 California Inpatient Hospitalizations for Back Injuries Workers' Compensation Vs. Non Workers' Compensation

	2002	2003	2004	2005	2006	Total
Average Length of Stay (Days)						
Workers' Compensation	3.5	3.4	3.3	3.2	3.3	3.3
Non-Workers' Compensation	4.1	4.0	3.9	3.9	3.4	3.9
Average Charge*						
Workers' Compensation	$56,363	$64,618	$69,832	$75,300	$83,964	$69,095
Non-Workers' Compensation	$56,109	$63,296	$69,191	$74,182	$72,925	$69,369
Average Number of All Procedures						
Workers' Compensation	2.7	3.0	3.6	3.6	3.8	3.3
Non-Workers' Compensation	2.8	3.2	3.7	3.7	3.4	3.5
Average Number of Surgical Procedures						
Workers' Compensation	2.2	2.3	2.7	2.7	2.7	2.5
Non-Workers' Compensation	2.3	2.4	2.8	2.7	2.5	2.6

* Dollars adjusted to 2002 dollars using the Bureau of Labor Statistics Medical Price indices for Medical Care Services

surgical procedures for almost all study years. This pattern, evident in 2002 through 2005 discharges, reversed somewhat in 2006. In that year, the average number of total procedures and the average number of surgical procedures were greater for workers' compensation discharges than for non-workers' compensation discharges, while the difference in average length of stay was reduced by half a day. It remains to be seen if this is the beginning of a trend or a one-year anomaly. Despite the differences in average length of stay, average number of total procedures, and the average number of surgical procedures, the average charge per hospitalization was the same.

Among workers' compensation *surgical* back discharges, the average number of all procedures and the average number of surgical procedures increased, while the average length of stay decreased. Specifically, the average length of stay for an injured worker hospitalized for a back problem fell from 3.5 days in 2002 to 3.3 days in 2006 (-5.7 percent). However, over the same period, the average number of procedures (including surgical procedures) for these patients increased from 2.7 to 3.8 (+40.7 percent); while the average number of surgical procedures rose from 2.2 to 2.7 (+22.7 percent). The average adjusted charge per hospitalization (unrelated to the reimbursement for inpatient stays), adjusted to 2002 dollars, increased 49.0 percent from $56,363 to $83,964.

The average length of stay for the non-workers' compensation discharges declined by 0.7 days over the 5-year span of the study (-17.1 percent), while the average number of all procedures increased from 2.8 to 3.4 (+21.4 percent); the average number of surgical procedures per back discharge rose from 2.3 to 2.5 (+8.7 percent); and the average adjusted charge per back discharge climbed from $56,109 to $72,925 (+30.0 percent).

Table 5 compares the number of surgical procedures for each study year for each back DRG.

The average number of all surgical procedures in surgical back cases was similar for workers' compensation and non-workers' compensation injuries across all study years, and both the workers' compensation and non-workers' compensation cases showed a similar increase in the average number of surgical procedures from 2002 to 2006. Among the workers' compensation surgical back cases, the average number of surgical procedures rose from 2.2 to 2.7 (+22.7 percent) over the 5-year period; while among the non-workers' compensation surgical back cases, the average number of surgical procedures climbed from 2.3 to 2.5 (+8.7 percent).

The similarities were also consistent for all DRGs for all study years. For example, among the workers' compensation cases, those involving "Combined Anterior/Posterior Spinal Fusions" averaged 4.0 surgical procedures in 2002, while the non-workers' compensation claims in this category averaged 4.2 surgical procedures. In 2006, the average number of surgical procedures increased for both groups, with the average for those covered under workers' compensation climbed to 4.9 procedures and the average for the non-workers' compensation cases increased to 4.8 procedures. In addition, in both the workers' compensation and non-workers' compensation groups there was a marked increase in the average number of surgical procedures from 2003 to 2004 in the DRG categories of Combined Anterior/Posterior Spinal Fusion, Spinal Fusion except Cervical with and without Complications, and Cervical Spinal Fusions with and without Complications.

Table 5: Average Number of Surgical Procedures by Diagnostic Group,
2002 – 2006 California Inpatient Hospitalizations for Surgical Back Injuries: Workers' Compensation vs. Non-Workers' Compensation

	Combined Anterior/ Posterior Spinal Fusion		Spinal Fusion Except Cervical w/ Complications		Spinal Fusion Except Cervical w/o Complications		Back and Neck Procedures Except Spinal Fusion/ Complications		Back and Neck Procedures Except Spinal Fusion w/o Complications		Cervical Spinal Fusion		Cervical Spinal Fusion w/o Complications		Total	
Year	WC	Non-WC	WC	Non-WC	WC	Non-WC	WC	Non-WC	WC	Non-WC	WC	Non-WC	WC	Non-WC	WC	Non-WC*
2002	4.0	4.2	2.7	2.6	2.4	2.3	1.7	2.0	1.3	1.5	2.5	2.4	2.4	2.3	2.2	2.3
2003	4.1	4.2	2.7	2.8	2.5	2.6	1.7	2.0	1.3	1.5	2.4	2.3	2.3	2.3	2.3	2.4
2004	4.8	5.0	3.4	3.4	3.1	3.1	1.6	2.0	1.3	1.5	3.3	3.2	3.1	3.1	2.7	2.8
2005	5.0	5.0	3.5	3.3	3.2	3.0	1.6	2.0	1.2	1.5	3.3	3.2	3.1	3.1	2.7	2.7
2006	4.9	4.8	3.5	3.3	3.1	3.0	1.6	1.9	1.3	1.5	3.4	3.2	3.2	3.1	2.7	2.5

* The averages for total non-workers' compensation procedures are adjusted to reflect the workers' compensation mix of DRGs.

DISCUSSION

This analysis found that the number of California workers' compensation inpatient discharges related to work injuries has decreased steadily throughout the study period of 2002 to 2006. When the analysis looked specifically at discharges associated with workers' compensation back injuries, the number of discharges also decreased. These decreases in the volume of hospitalizations and back injury hospitalizations were specific to workers' compensation, and were not found among hospitalizations covered under other payor groups, which increased by small margins.

Almost one in four injuries and one in three inpatient hospital admissions in the California workers' compensation system are back-related injuries. These injuries, and the treatment they receive, have been the subject of a growing body of studies.[11] Because workers' compensation has such a high number of hospitalizations involving back injuries, the study compared the discharge profiles of workers' compensation and non-workers' compensation patients who were hospitalized for these problems. The results showed that back-related hospital discharges in workers' compensation were one-third less likely to be only medical. Put another way, hospitalized workers' compensation patients with back injuries were more likely to have surgery. When looking at the profile of surgical back cases on the dimensions of length of stay, average procedure count, average surgical procedure count and average charge per hospital stay, the study found that the workers' compensation patients had shorter lengths of stay, fewer surgical procedures, and fewer overall procedures, yet a similar average charge per stay. Finally, the authors found that the average number of surgical procedures for specific types of diagnoses was similar in workers' compensation to what was found in other systems.

There are several possible contributing factors for these differences. Reductions in the number of inpatient discharges for injured workers may be associated with the application of evidence-based clinical guidelines, first implemented in the California workers' compensation system in 2004. The American College of Occupational and Environmental Medicine (ACOEM) guidelines, which were given the presumption of correctness in California workers' compensation, support conservative treatment of soft tissue injuries and, conversely, discourage aggressive treatment such as invasive surgery. Prior studies have shown that a significant number of injured workers receiving back surgery in the California workers' compensation system did not appear to have met the state's proposed utilization review criteria for back surgery.[12] Although it is unclear if the spinal surgery second opinion program included in the 2003 reforms has met with success,[13] the mere presence of the program demonstrates a bias in the system towards a nuanced approach to surgical intervention for back injuries. However, there are other potential contributing factors to the decrease in hospital admissions in the California workers compensation system between 2002 and 2006. The overall number of nonfatal occupational injury and illness count among workers in California dropped 13.1 percent from 694,100 injuries in 2002 to 603,000 injuries in 2006. Injuries involving days away from work dropped even more dramatically over the same time period, falling from 231,800 injuries in 2002 to 171,000 injuries in 2006; a 26.2 percent change.[14] Such significant reductions in the overall number of reported work injuries during this period undoubtedly had an effect on the number of inpatient discharges as well -- regardless of the prevailing guidelines.

In addition, the change in the average number of surgical procedures from 2002 to 2006 was likely influenced by SB 899's introduction of a mandatory medical treatment utilization schedule (MTUS) which featured clinical treatment guidelines.[15] One can imagine, with the implementation of the ACOEM guidelines, that a greater proportion of injured workers with back injuries may be treated on an outpatient basis or, at least, that surgery may be delayed until more conservative treatment had been exhausted. This could have the effect of increasing the acuity of back injuries admitted to the hospital for surgical intervention. On the other hand, the explanation could be as simple as a change in billing practices between 2002 and 2006. This possibility is supported by the concurrent increase in surgical counts for back-related diagnoses noted in non-workers' compensation cases.

11 Injury Scorecard - Medical Back Problems without Spinal Cord Involvement, CWCI April 2007; Injury Scorecard - Medical Back Problems without Spinal Cord Involvement, CWCI, June 2007

12 Harris, JS, Swedlow, A. Evidence-Based Medicine & The California Workers' Compensation System. A Report To The Industry. CWCI. Jan 2004

13 Spinal Surgery Second-Opinion Process. CHSWC, February 2007

14 Department of Industrial Relations, Division of Labor Statistics and Research, Reporting of nonfatal occupational injuries and illnesses by industry and case type

15 Harris, JS, Swedlow, A., Gardner, L., Ossler, C., Crane, R. Utilization Review and Medical Treatment Guidelines in the California Workers' Compensation System. A Report to the Industry. CWCI. February 2005

Appendix 1: Unadjusted Number of California Inpatient Hospitalizations for Back Injuries by Diagnostic Group, 2002 – 2006						
Workers' Comp: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	1,275	1,192	1,068	929	825	5,289
Combined Anterior/Posterior Spinal Fusion	981	1,050	967	677	731	4,406
Spinal Fusion Except Cervical w/Complications	1,003	1,053	930	933	967	4,886
Spinal Fusion Except Cervical w/o Complications	2,200	2,271	1,767	1,584	1,378	9,200
Back and Neck Procedures Except Spinal Fusion w/Complications	470	495	456	456	535	2,412
Back and Neck Procedures Except Spinal Fusion w/o Complications	3,012	2,805	2,672	2,571	2,249	13,309
Cervical Spinal Fusion w/Complications	330	269	352	348	359	1,658
Cervical Spinal Fusion w/o Complications	1,966	1,505	1,708	1,523	1,341	8,043
Total	**11,237**	**10,640**	**9,920**	**9,021**	**8,385**	**49,203**
Non-Workers' Comp Payors: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	19,335	18,968	18,715	18,456	18,450	93,924
Combined Anterior/Posterior Spinal Fusion	1,753	2,302	2,501	2,240	2,574	11,370
Spinal Fusion Except Cervical w/Complications	4,274	4,946	4,815	5,690	5,057	24,782
Spinal Fusion Except Cervical w/o Complications	5,055	6,371	5,483	6,191	5,663	28,763
Back and Neck Procedures Except Spinal Fusion w/Complications	5,338	5,580	5,540	5,572	5,690	27,720
Back and Neck Procedures Except Spinal Fusion w/o Complications	15,004	15,057	14,480	14,131	13,875	72,547
Cervical Spinal Fusion w/Complications	1,789	1,572	2,420	2,528	2,866	11,175
Cervical Spinal Fusion w/o Complications	6,255	5,139	6,662	6,709	7,079	31,844
Total	**58,803**	**59,935**	**60,616**	**61,517**	**61,254**	**302,125**

Appendix 2: Unadjusted Average Length of Stay by Diagnostic Group, 2002 – 2006 California Inpatient Hospitalizations for Back Injuries						
Workers' Comp: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	4.1	4.5	3.9	4.0	4.0	4.1
Combined Anterior/Posterior Spinal Fusion	6.3	5.9	5.6	5.7	5.7	5.9
Spinal Fusion Except Cervical w/Complications	5.6	5.5	5.5	5.5	5.5	5.5
Spinal Fusion Except Cervical w/o Complications	4.2	3.9	4.0	3.8	3.9	4.0
Back and Neck Procedures Except Spinal Fusion w/Complications	3.9	3.6	3.5	3.4	3.6	3.6
Back and Neck Procedures Except Spinal Fusion w/o Complications	2.1	2.0	2.0	2.0	2.0	2.0
Cervical Spinal Fusion w/Complications	3.6	3.1	3.1	3.4	3.0	3.2
Cervical Spinal Fusion w/o Complications	2.2	2.1	2.0	2.0	1.9	2.0
Total	**3.6**	**3.5**	**3.3**	**3.3**	**3.4**	**3.4**
Non-Workers' Comp Payors: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	5.7	5.0	4.8	4.7	4.3	4.9
Combined Anterior/Posterior Spinal Fusion	9.0	8.5	8.1	8.5	7.9	8.4
Spinal Fusion Except Cervical w/Complications	7.3	6.9	6.8	7.1	6.3	6.9
Spinal Fusion Except Cervical w/o Complications	4.4	3.9	4.3	4.2	4.1	4.2
Back and Neck Procedures Except Spinal Fusion w/Complications	4.8	4.8	4.7	4.5	4.3	4.6
Back and Neck Procedures Except Spinal Fusion w/o Complications	2.3	2.2	2.1	2.1	2.0	2.1
Cervical Spinal Fusion w/Complications	5.0	5.1	4.8	5.0	4.8	4.9
Cervical Spinal Fusion w/o Complications	2.2	2.1	2.1	2.1	2.0	2.1
Total	**4.4**	**4.2**	**4.1**	**4.1**	**3.8**	**4.1**

Appendix 3: Unadjusted Average Charge by Diagnostic Group, 2002 – 2006 California Inpatient Hospitalizations for Back Injuries						
Workers' Comp: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	$14,817	$17,266	$19,192	$21,186	$25,609	$19,054
Combined Anterior/Posterior Spinal Fusion	$110,735	$127,425	$136,474	$154,129	$172,921	$137,346
Spinal Fusion Except Cervical w/Complications	$94,567	$104,852	$116,596	$127,788	$137,281	$115,774
Spinal Fusion Except Cervical w/o Complications	$75,196	$80,112	$92,165	$95,351	$104,353	$87,506
Back and Neck Procedures Except Spinal Fusion w/Complications	$37,008	$41,077	$44,611	$52,521	$61,452	$47,635
Back and Neck Procedures Except Spinal Fusion w/o Complications	$25,345	$27,907	$31,023	$37,304	$39,988	$31,809
Cervical Spinal Fusion w/Complications	$54,638	$55,713	$67,895	$78,853	$76,943	$67,539
Cervical Spinal Fusion w/o Complications	$41,102	$47,023	$51,383	$57,401	$60,689	$50,745
Total	**$51,649**	**$59,313**	**$64,380**	**$69,728**	**$78,223**	**$63,716**
Non-Workers' Comp Payors: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	$16,518	$18,542	$20,507	$22,033	$23,754	$20,227
Combined Anterior/Posterior Spinal Fusion	$136,808	$155,147	$162,833	$175,041	$186,211	$164,962
Spinal Fusion Except Cervical w/Complications	$94,839	$98,609	$111,237	$128,052	$128,733	$113,320
Spinal Fusion Except Cervical w/o Complications	$64,994	$67,442	$81,927	$92,504	$99,024	$81,385
Back and Neck Procedures Except Spinal Fusion w/Complications	$40,314	$44,110	$46,811	$50,998	$53,504	$47,232
Back and Neck Procedures Except Spinal Fusion w/o Complications	$23,672	$26,380	$28,521	$31,727	$34,174	$28,780
Cervical Spinal Fusion w/Complications	$63,219	$68,409	$73,639	$84,216	$87,317	$77,136
Cervical Spinal Fusion w/o Complications	$38,415	$42,452	$48,785	$53,609	$57,860	$48,760
Total	**$37,700**	**$43,302**	**$48,690**	**$55,352**	**$58,246**	**$48,776**

Appendix 4: Unadjusted Average Number of Procedures by Diagnostic Group, 2002 – 2006 California Inpatient Hospitalizations for Back Injuries						
Workers' Comp: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	0.8	0.8	0.7	0.8	0.8	0.8
Combined Anterior/Posterior Spinal Fusion	5.0	5.6	6.7	7.0	7.3	6.2
Spinal Fusion Except Cervical w/Complications	3.7	4.1	5.2	5.5	5.5	4.8
Spinal Fusion Except Cervical w/o Complications	3.0	3.5	4.3	4.6	4.6	3.9
Back and Neck Procedures Except Spinal Fusion w/Complications	2.2	2.3	2.1	2.2	2.2	2.2
Back and Neck Procedures Except Spinal Fusion w/o Complications	1.5	1.5	1.5	1.5	1.6	1.5
Cervical Spinal Fusion w/Complications	3.2	3.0	4.2	4.5	4.7	4.0
Cervical Spinal Fusion w/o Complications	2.6	2.7	3.7	3.9	3.9	3.3
Total	**2.5**	**2.8**	**3.3**	**3.3**	**3.5**	**3.0**
Non-Workers' Comp Payors: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	0.8	0.7	0.8	0.8	0.8	0.8
Combined Anterior/Posterior Spinal Fusion	5.8	6.4	7.4	7.8	7.6	7.1
Spinal Fusion Except Cervical w/Complications	3.9	4.3	5.2	5.4	5.3	4.9
Spinal Fusion Except Cervical w/o Complications	3.0	3.4	4.2	4.3	4.3	3.9
Back and Neck Procedures Except Spinal Fusion w/Complications	2.5	2.6	2.6	2.7	2.6	2.6
Back and Neck Procedures Except Spinal Fusion w/o Complications	1.6	1.7	1.7	1.7	1.7	1.7
Cervical Spinal Fusion w/Complications	3.2	3.3	4.3	4.5	4.5	4.1
Cervical Spinal Fusion w/o Complications	2.6	2.7	3.6	3.7	3.8	3.3
Total	**2.0**	**2.2**	**2.6**	**2.7**	**2.7**	**2.4**

Appendix 5: Unadjusted Average Number of Surgical Procedures by Diagnostic Group, 2002 – 2006 California Inpatient Hospitalizations for Back Injuries						
Workers' Comp: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	0.0	0.0	0.0	0.0	0.0	0.0
Combined Anterior/Posterior Spinal Fusion	4.0	4.1	4.8	5.0	4.9	4.5
Spinal Fusion Except Cervical w/Complications	2.7	2.7	3.4	3.5	3.5	3.1
Spinal Fusion Except Cervical w/o Complications	2.4	2.5	3.1	3.2	3.1	2.8
Back and Neck Procedures Except Spinal Fusion w/Complications	1.7	1.7	1.6	1.6	1.6	1.6
Back and Neck Procedures Except Spinal Fusion w/o Complications	1.3	1.3	1.3	1.2	1.3	1.3
Cervical Spinal Fusion w/Complications	2.5	2.4	3.3	3.3	3.4	3.0
Cervical Spinal Fusion w/o Complications	2.4	2.3	3.1	3.1	3.2	2.8
Total	**2.0**	**2.0**	**2.4**	**2.4**	**2.4**	**2.2**
Non-Workers' Comp Payors: Back Injury Diagnostic Group	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Medical Back Problems	0.0	0.0	0.0	0.0	0.0	0.0
Combined Anterior/Posterior Spinal Fusion	4.2	4.2	5.0	5.0	4.8	4.7
Spinal Fusion Except Cervical w/Complications	2.6	2.8	3.4	3.3	3.3	3.1
Spinal Fusion Except Cervical w/o Complications	2.3	2.6	3.1	3.0	3.0	2.8
Back and Neck Procedures Except Spinal Fusion w/Complications	2.0	2.0	2.0	2.0	1.9	2.0
Back and Neck Procedures Except Spinal Fusion w/o Complications	1.5	1.5	1.5	1.5	1.5	1.5
Cervical Spinal Fusion w/Complications	2.4	2.3	3.2	3.2	3.2	3.0
Cervical Spinal Fusion w/o Complications	2.3	2.3	3.1	3.1	3.1	2.8
Total	**1.4**	**1.5**	**1.8**	**1.8**	**1.8**	**1.7**

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