WORKING PAPER

HOSPITAL EMERGENCY DEPARTMENT SERVICES FURNISHED UNDER CALIFORNIA'S WORKERS' COMPENSATION PROGRAM

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Preface

This working paper examines hospital emergency room services received by injured workers covered by the California workers' compensation (WC) system. It uses ED data for 2005-2007 from the California Office of Statewide Health Planning and Development to explore whether there might be payment or quality of care issues for WC patients that warrant further examination. The findings should be of interest to policymakers and others involved in the medical care payment and quality of care issues under California's workers' compensation system.

The work presented here was performed for the California Commission on Health and Safety and Workers' Compensation under Contract Number 40536045. It is part of an on-going study evaluating the impact of recent legislative changes on the medical care provided to injured workers. Separate working papers have been prepared on hospital inpatient services and ambulatory surgery facility services furnished to WC patients. The study's final report will integrate the analyses presented in these working papers with additional analyses of data from other sources and findings from interviews with individuals with different perspectives on the WC medical treatment system.

Acknowledgements

The work represented in this working paper as well as the larger study evaluating the impacts of the recent legislative changes on medical care provided under California's workers' compensation program have benefited greatly from the on-going support and insights of Christine Baker, Executive Director of the California Commission on Workers' Compensation and Health and Safety as well as Irina Nemirovsky and Judge Lachlan Taylor, CHSWC staff members.

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Background

Until recently, no comprehensive data have been available on ED (ED) services furnished to WC patients. In 2005, the California Office of Statewide Health Planning and Development (OSHPD) began to collect transaction-level data on services provided in EDs. [1] This working paper reports the results of analyses of data for 2005-2007 as part of our on-going evaluation of the impacts of changes in WC medical care.

ED services include not only care for injuries and other emergent-conditions that require immediate treatment in EDs but also urgent care that could have been provided in a physician's office and non-emergent care that does not require immediate attention. A survey conducted for the California Healthcare Foundation found that 21 percent of ED encounters by insured Californians could be considered "avoidable". [2] The survey identified several drivers for overuse of ED services:

- Lack of timely access to routine medical care. The survey found that patients who are unable to obtain "same day" or whose primary physician does not have evening or weekend hours are more likely to use ED services.
- Generally poor communication between primary care physicians and patients. This includes lack of advice from physicians on how to manage immediate health needs after-hours as well as lack of encouragement to call the physician's office before going to the ED.
- Lack of awareness of alternatives to ED services such as urgent care clinics and a nurse advisor phone line.
- Positive attitudes towards quality and convenience of ED services, such as easier access to specialists and diagnostic testing.

The survey results suggest that a finding of excessive use of ED services for non-emergent WC care would be an indicator of potential access problems and poor communication between patients and primary care physicians. Appropriate use of ED services is of particular interest in for WC patients because of provisions in SB 228 (Alarcon, 2004) and SB 899 (Poochigan, 2004) that affected medical care under the California workers' compensation program. The most notable changes with potential impact on access to care and the use of ED services for non-emergent conditions were to:

- Adopt medical treatment guidelines as presumptively correct medical treatment (effective March 23, 2004). Previously, the medical decisions of the primary treating physician were presumptively correct. The medical treatment guidelines may improve quality and coordination of care and reduce the need for emergent care. However, some injured workers and their primary treating physician may perceive that a hospital's ED provides the easiest access to specialists and

[1] See Healthcare Information-ED Data at http://www.oshpd.ca.gov/HID/Products/EmerDeptData/index.html.

[2] California Healthcare Foundation, "Overuse of EDs Among Insured Californians," September 2006 available at http://www.chcf.org/topics/hospitals/index.cfm?itemID=126089 as of 3/31/09.

diagnostic testing since utilization review is generally less restrictive for services provided in conjunction with an ED visit.

- Require that injured workers of employers with medical provider networks use network providers throughout the course of their treatment (effective January 1, 2005). Networks must have a sufficient number of providers representing a variety of specialties in locations convenient to covered workers. Those that meet this requirement with designated providers with occupational-health experience and interest in treating WC patients could increase access and quality of care and reduce the need to use EDs for non-emergent care. However, use of ED services could increase if there are insufficient providers in the network to treat WC patients conveniently. Network adequacy has been a concern in rural areas, particularly with respect to specialist services.
- Provide up to $10,000 in immediate medical care for work-related injuries before a determination is made regarding whether the claim is compensable. Previously, benefits were not payable until the compensability determination. This provision may increase access to office-based care and reduce the need to use EDs for non-emergent care following an injury.

Because the OSHPD data are available beginning in 2005, we cannot these data to directly compare pre-reform ED usage with post-reform usage. However, benchmarking data is available from the Workers' Compensation Research Institute (WCRI) for claims involving more than seven days of lost time valued on average after 12 months.[3] For example, the column labeled 2002/2003 is based on claims with more than seven days of lost time arising in October 2001 through September 2002, evaluated as of March 2003.The WCRI reports include three measures of ED utilization: percent of claims with ED services, ED visits per claim, and services per ED encounter. Throughout the study period, fewer claims with more than seven days of lost time used ED services in California than the median for the comparison group, but there were more visits per claim in California. Further, fewer services were provided during an ED visit. With respect to the trends within California, the data show a slight reduction in all three utilization measures from claims arising between October 2001 through September 2002, evaluated as of March 2003 (2002/2003) and claims arising between October 2003 through September 2004, evaluated as of March 2005.

WCRI also creates a utilization index that captures the volume (number of emergency services per claim) and intensity (resources required for the mix of services provided during an ED encounter). Relative to the median for the state comparison group,

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[3] Eccleston, Stacey M. and Xiaoping Zhao, The Anatomy of Workers' Compensation Medical Costs and Utilization in California, 5th Edition, WCRI, November 2005; Eccleston, Stacey M., Petia Petrova and Xiaoping Zhao, Baselines for Evaluating the Impact of the 2003 Reforms in Florida and an Early Look at the Impact of the 2004 Fee Schedule Changes: The Anatomy of Workers' Compensation Medical Costs and Utilization, 6th Edition, February 2007; Eccleston, Stacey M., Petia Petrova and Xiaoping Zhao, The Anatomy of Workers' Compensation Medical Costs and Utilization in California, 7th Edition: Monitoring Reforms, WCRI, January 2009. Available as of 3/31/09 at http://www.wcrinet.org/order_now.html.

California's utilization was five percent higher (utilization index = 1.05) for the 2003/2004 claims and one percent lower (utilization index = 0.99) for the 2004/2005 claims.

Table 1 ED Usage for WC Claims with More than Seven Days of Lost Time: A Comparison of California Workers' Compensation Claims to Other States[4]

Measure	CA WC Program			12-state median	13-state median	14-state median
	2002/ 2003	2003/ 2004	2004/ 2005	2002/ 2003	2003/ 2004	2004/ 2005
% of claims with ED services	20	19	19	32	31	33
ED visits per claim	1.5	1.4	1.4	1.2	1.2	1.2
Services per ED visit	1.3	1.37	1.2	1.5	1.6	1.6
% of total payments	0.8	1.3	1.9	1.2	1.2	1.4
Utilization Index	1.03	1.05	.99	1.0	1.0	1.0
Price index	1.32	1.85	1.20	1.0	1.0	1.0

Payers (insurers and self-insured employers) under California's WC program generally pay for medical services on a fee-for-service basis. The Administrative Director (AD) of the Division of Worker's Compensation maintains an Official Medical Fee Schedule (OMFS) that establishes the maximum allowable fees for most medical services. The OMFS amounts apply unless the payer and provider have contracted for a different price. Prior to 2004, fees for emergency services provided by hospitals were exempt from the OMFS; payments for these services were based on rates the payer negotiated with the provider. SB 228 (Alarcon 2003) eliminated the exemption for these services effective January 1, 2004. As amended, Section 5307.1 of the California Labor Code requires that the OMFS for hospital ED services be based on the fee-related structure and rules of Medicare program. Implementing regulations define the ED services for which a facility fee is payable to the hospital as evaluation and management services provided in an ED (CPT codes 99281-99285). A facility fee is also payable for surgical services provided by the hospital. The OMFS allowances for clinical laboratory tests are based on 120 percent of the amounts payable under Medicare. Other services provided in conjunction with an ED encounter, such as diagnostic radiology, are payable under the OMFS for physician services at the same rate as applies to services provided in an office-setting.

The impact of the changes in the OMFS provisions for emergency services is reflected in the WCRI price index shown in Table 1. We assume most emergency services provided for accident year 2003/2004 (claims arising from October 1, 2002 through September 30, 2003, valued as March 31, 2004) were provided prior to the effective date of the OMFS for emergency services. Relative to the state comparison group, the California WC price

[4] The 2002/2003 12-state comparison group included: California, Connecticut, Florida, Illinois, Indiana, Louisiana, Massachusetts, North Carolina, Pennsylvania, Tennessee, Texas, and Wisconsin. For the 2003/2004 13-state comparison group, Arkansas and Maryland were added and Connecticut was deleted. For the 2004/2005 14-state comparison group, Michigan was added.

index for these claims was 85 percent higher than the median for the state comparison group. The California price index dropped to 1.20 for accident year 2003/2004. Because about one-quarter of these claims would have arisen prior to the January 1, 2004 effective date of the OMFS (i.e., claims arising during the last quarter of calendar year 2003), the price index is likely to decline further for later accident years. Despite the lower price levels, the percentage of payments attributable to emergency services increased from 1.3% to 1.9% between the two accident years. A likely explanation is that other types of services also had price reductions and relatively larger reductions in utilization.

The OMFS limits allowable fees for hospital ED and ambulatory surgical services to 120 percent of the amounts payable under the Medicare program for comparable services furnished to hospital outpatients. Medicare assigns hospital outpatient procedures to ambulatory payment classification (APC) groupings of clinically coherent procedures with similar costs. Each APC has a relative weight reflecting the costliness of the median procedure in the group relative to the median cost for a mid-level clinic visit. To determine payment, the relative weight is multiplied by a conversion factor and geographic adjustment factor. To determine the OMFS allowance, the Medicare payment is multiplied by 1.20. The 1.20 multiplier is intended to compensate for any higher costs attributable to WC patients and to provide a reasonable profit. Approximately two percent in additional payments are made for high cost outlier cases.

Study Questions

The study questions are directed understanding the ED services that are being provided to WC patients and whether there are any indications of potential access or quality of care problems. We do not have access to pre-2005 trend data that could be used to investigate the changes that have occurred since the implementation of the reform provisions. We examined the following questions in our analyses:

- What were the most common conditions treated in EDs?
- To what extent were ED encounters related to injuries? What is the likelihood that other visits were “avoidable” ED services? Does the pattern vary across counties?
- What percentage of ED encounters resulted in a hospital admission? Does the pattern vary across counties?
- What are the high volume services provided to WC patients in EDs?
- What were the maximum allowable fees for ED services? To what extent were services subject to the OMFS for outpatient services versus the OMFS for physician services and for laboratory services?

Data and Methods

We used administrative data obtained from OSHPD for 2005-2007 ED encounters for our analyses. OSHPD requires each hospital with a licensed ED in California to submit an encounter record each time a patient is treated in the ED. Hospitals report their encounter data via the Medical Information Reporting for California System (MIRCal). OSHPD makes the data available in a public use file after it has been screened by automated

reporting software and corrected by the individual facilities. [5] These transaction-level data for each ED encounter include basic patient demographics such as sex, age, race, ethnicity and zip code of residence, procedures performed, disposition code, diagnoses, expected payer, and facility level information such as license type of the reporting facility and facility ID. Records include both encounters that resulted in an inpatient admission and those that did not. Further, the records include diagnostic tests and other services that a patient registered in the hospital ED received elsewhere in the hospital during the encounter.

We used the expected payer variable to identify WC patients and developed summary statistics for WC patients reported in the ED data. We examined the diagnosis codes for all WC encounters and separately for those encounters with and without an E-Code. The E-codes describe the external cause of injuries, poisonings, and adverse effects. Hospitals are instructed to report the E-code on the record for the encounter during which the injury, poisoning and/or adverse effect was first diagnosed or treated by the hospital so that the E-codes can be used to distinguish between initial and follow-up treatment for injuries and poisonings. A limitation of using the E-codes is that hospital coding practices may vary in reporting these codes.

We used an algorithm developed by the New York University (NYU) Center for Health and Public Service to identify potentially "avoidable" encounters. [6] The algorithm first assigns encounters to one of four categories based on the principal diagnosis: injury, psychiatric, substance abuse, and other. For the "other" category, the algorithm then uses the diagnosis to assign a specific percentage of each encounter representing the likelihood that the care was:

- non-emergent (care not needed within 12 hours),
- emergent/primary care treatable (care needed within 12 hours but could be provided by a primary care physician)
- emergent/ED care needed-preventable/avoidable (ED care required but was potentially avoidable if timely and effective primary care had been received during the episode of illness)
- emergent/ED care needed/ not preventable (ED care required and ambulatory care could not have prevented the condition.

The proportion of encounters assigned to each category serves as an indicator of whether there may be access or quality issues that are causing WC patients to use ED excessively.

We grouped the services reported as part of a WC ED encounter into APCs. The groupings serve two purposes. First, APCs classify the type of services being furnished in conjunction with ED visits into clinically coherent groups with comparable costs.

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[5] The documentation includes an exceptions report for facilities that were unable to comply with full reporting requirements. We did not identify any problems of concern for our analyses. The most frequently noted problem was a facility's inability to report race/ethnicity codes. However, as noted below, some facilities used imprecise coding that affects the findings.

[6] Billings J, Parikh N, Mijanovich T. *Instructions for Use of the SAS and SPSS Versions of the ED Classification Algorithm*. New York: NYU Center for Health and Public Service Research, 2007. Available *at www*.ahrq.hhs.gov/data/safetynet/nyu**algorithm**.doc as of 3/31/09.

Second, APCs are used to compute the estimated facility fee allowance for each record that reported ED visits and/or surgical procedures in the OSHPD data using the following method and information from the DWC website.

1. We assigned relative weights to each APC for emergency visits (CPT codes 99281-99285) and surgical services (CPT codes 10040-69990 with status code indicators “S”, “T”, or “X”).
2. We applied the discounting rules for multiple surgical procedures and summed the relative weights for each record.
3. We multiplied the sum of the relative weights by the conversion factor applicable to the county where care was provided and the date of service to obtain the total estimated amount allowed under the OMFS for that record. We used a 1.22 multiplier and did not compute outlier payments for individual encounters.

In addition, we separately examined other services provided during an ED encounter that are payable under the OMFS for physician services or the clinical laboratory services. Most of the services payable under the OMFS for physician services are diagnostic tests with separate allowances for the technical component (the cost of performing the test) and for the professional component (physician supervision and interpretation of the results). We computed the allowance for the technical component only. For clinical laboratory tests, we used the amounts payable under the OMFS for these tests. Pricing the services subject to the OMFS for physician and non-physician professional services was not straightforward. The OMFS uses an outdated 1997 version of the CPT codes and some codes, most notably the injection and infusion codes that group to the Drug Administration APCs have undergone substantial change. For these, we needed to make assumptions regarding how the reported codes would crosswalk to the OMFS CPT codes. We dropped low-volume procedures that either did not have an established allowance (“By Report”) under the OMFS or did not have a readily identifiable code in the CPT 1997 version that corresponded to the CPT codes used by the hospitals to report ED services in 2005-2007.

Results

Between 2005-2007, the number of annual WC ED encounters reported in the OSHPD data declined 14.1 percent from 186,970 to 160,600 encounters (Table 2). The decline is higher than the reduction in the number of number of reported WC injuries and illnesses, which fell 5.6 percent over the period. The decline in the number of encounters with E-codes for injuries (5.9 percent) is consistent with the reduction in WC injuries and illnesses. Encounters without E-codes declined 27.2 percent. We are unable to determine whether this decline reflects fewer medical services or a shift in where care is provided.

Table 2 Summary of ED Encounter Volume 2005-2007

	2005		2006		2007	
Total Encounters	186,970	100.0%	176,349	100.0%	160,600	100.0%
With E-codes	115,174	61.6%	114,980	65.2%	108,325	67.5%
Without E-Codes	71,796	38.4%	61,369	34.8%	52,275	32.6%

In the analyses that follow, we found that the patterns of ED care were fairly similar over the period and therefore report only the results for 2007.

ED Encounter Volume and Discharge Destinations by County

Table 3 shows the distribution of encounters across counties in 2007 and the percentage of encounters with reported E-codes. Statewide, E-codes were reported for 67 percent of encounters. The proportion of encounters with E-codes in 2007 (67.5%) is comparable to the percentage of claims with injuries identified through the NYU algorithm (65 %), but there are notable differences across the counties that may reflect under-reporting of E-codes. Hospitals in two other rural counties (Sutter and Yuba) reported E-codes for fewer than 25 percent of the ED encounters. This appears to be a coding issue in that these counties did not have a disproportionately low percentage of encounters for injuries using the NYU algorithm (Table 5). More than 75 percent of the ED encounters were reported as first-time visits for injuries in five individual rural counties and Alpine, Inyo, Mariposa & Mono Counties combined.

Table 4 shows the discharge destinations of WC patients following an ED encounter in 2007. Statewide, 98 percent were sent home while less than one percent was admitted as an inpatient hospital. The remaining discharges went to a mix of destinations, including death, and discharges to home with home health services and to nursing facilities. More than half of the discharges in this category were reported as patients who left against medical advice or discontinued care. The atypically high percentage of discharges in this category in some counties is attributable to a large number of discharges reported as "other" without any specification of the actual discharge destination of the patient following ED care.

Table 3 2007 WC Patient ED Encounters and Percent with E-Codes by County in 2007

County	Total WC Encounters	% of Encounters Statewide	% of County Encounters with E-Codes
ALL COUNTIES	160,600	100.00	67.45
ALAMEDA	6,671	4.15	66.36
AMADOR	474	0.30	73.84
BUTTE	1,404	0.87	67.66
CALAVERAS	416	0.26	76.20
CONTRA COSTA	5,728	3.57	66.29
DEL NORTE	161	0.10	59.63
EL DORADO	1,370	0.85	73.07
FRESNO	4,514	2.81	72.95
HUMBOLDT	1,448	0.90	72.24
IMPERIAL	1,998	1.24	63.76
KERN	1,731	1.08	75.97
KINGS	860	0.54	77.09
LAKE	1,024	0.64	71.68
LASSEN	432	0.27	78.24
LOS ANGELES	30,389	18.92	68.74
MADERA	620	0.39	68.06
MARIN	1,054	0.66	60.44
MENDOCINO	1,520	0.95	74.67
MERCED	1,202	0.75	65.39
MONTEREY	2,627	1.64	57.18
NAPA	1,490	0.93	74.03
NEVADA	852	0.53	69.48
ORANGE	9,551	5.95	63.53
PLACER	1,268	0.79	72.24
RIVERSIDE	8,251	5.14	67.99
SACRAMENTO	5,100	3.18	69.59
SAN BENITO	552	0.34	62.14
SAN BERNARDINO	7,541	4.70	69.61
SAN DIEGO	14,237	8.86	59.79
SAN FRANCISCO	2,776	1.73	75.25
SAN JOAQUIN	4,125	2.57	77.65
SAN LUIS OBISPO	1,655	1.03	65.20
SAN MATEO	3,321	2.07	67.12
SANTA BARBARA	965	0.60	66.53
SANTA CLARA	6,648	4.14	64.65
SANTA CRUZ	1,180	0.73	71.02
SHASTA	1,022	0.64	57.34
SISKIYOU	391	0.24	72.63
SOLANO	2,531	1.58	74.87
SONOMA	3,401	2.12	68.01
STANISLAUS	3,495	2.18	71.79
SUTTER	713	0.44	21.46
TEHAMA	463	0.29	58.75
TULARE	2,235	1.39	73.42
TUOLUMNE	708	0.44	70.34
VENTURA	3,612	2.25	63.07
YOLO	915	0.57	74.32
YUBA	670	0.42	20.15
ALPINE, INYO, MARIPOSA & MONO combined	629	0.39	75.99
DEL NORTE, MODOC, PLUMAS & SIERRA combined	616	0.38	68.34
COLUSA, GLENN & TRINITY combined	688	0.43	73.26
UNSPECIFIED	3,356	2.09	71.16

Table 4 WC Patient Destinations Following an ED Encounter by County

County	% of County Encounters Discharged to: Home	Inpatient Hospital	Other
ALL COUNTIES	98.30	0.57	1.13
ALAMEDA	98.20	0.58	1.21
AMADOR	99.37	0.21	0.42
BUTTE	99.07	0.36	0.57
CALAVERAS	97.84	0.72	1.44
CONTRA COSTA	99.15	0.40	0.45
DEL NORTE	96.89	1.86	1.24
EL DORADO	98.18	0.36	1.46
FRESNO	98.23	1.06	0.71
HUMBOLDT	98.83	0.55	0.62
IMPERIAL	98.55	0.60	0.85
KERN	97.11	1.04	1.85
KINGS	97.91	1.05	1.05
LAKE	98.24	1.07	0.68
LASSEN	97.45	2.31	0.23
LOS ANGELES	98.48	0.41	1.12
MADERA	97.58	1.77	0.65
MARIN	99.43	0.28	0.28
MENDOCINO	98.55	1.12	0.33
MERCED	98.09	1.33	0.58
MONTEREY	98.93	0.30	0.76
NAPA	98.59	0.81	0.60
NEVADA	98.83	0.47	0.70
ORANGE	98.82	0.58	0.61
PLACER	99.29	0.47	0.24
RIVERSIDE	98.50	0.84	0.67
SACRAMENTO	98.33	0.51	1.16
SAN BENITO	98.01	0.72	1.27
SAN BERNARDINO	98.10	0.62	1.27
SAN DIEGO	98.55	0.42	1.03
SAN FRANCISCO	99.39	0.11	0.50
SAN JOAQUIN	97.33	0.82	1.84
SAN LUIS OBISPO	98.91	0.91	0.18
SAN MATEO	98.31	0.18	1.51
SANTA BARBARA	98.14	0.62	1.24
SANTA CLARA	96.42	0.38	3.20
SANTA CRUZ	98.98	0.00	1.02
SHASTA	98.92	0.29	0.78
SISKIYOU	100.00	0.00	0.00
SOLANO	98.66	0.63	0.71
SONOMA	99.06	0.53	0.41
STANISLAUS	98.14	0.72	1.14
SUTTER	97.06	0.56	2.38
TEHAMA	99.14	0.65	0.22
TULARE	97.85	0.72	1.43
TUOLUMNE	98.31	0.56	1.13
VENTURA	98.20	0.25	1.55
YOLO	98.47	0.77	0.77
YUBA	97.46	0.30	2.24
ALPINE, INYO, MARIPOSA & MONO combined	82.67	0.79	16.53
DEL NORTE, MODOC, PLUMAS & SIERRA combined	97.40	1.95	0.65
COLUSA, GLENN & TRINITY combined	97.97	1.45	0.58
UNSPECIFIED	97.74	0.95	1.31

Table 5 Percentage of 2007 WC Encounters for Injuries and Other Conditions by County

County	Total Count	Injury Count	Injury Pct	Other* Count	Other* Pct
ALL COUNTIES	160,600	104,258	64.9	55,130	34.3
ALAMEDA	6,671	4,464	66.9	2,151	32.2
AMADOR	474	343	72.4	129	27.2
BUTTE	1,404	865	61.6	526	37.5
CALAVERAS	416	273	65.6	141	33.9
CONTRA COSTA	5,728	3,780	66.0	1,898	33.1
DEL NORTE	161	101	62.7	59	36.6
EL DORADO	1,370	933	68.1	428	31.2
FRESNO	4,514	3,205	71.0	1,280	28.4
HUMBOLDT	1,448	959	66.2	483	33.4
IMPERIAL	1,998	1,167	58.4	825	41.3
KERN	1,731	1,207	69.7	517	29.9
KINGS	860	608	70.7	245	28.5
LAKE	1,024	689	67.3	334	32.6
LASSEN	432	300	69.4	129	29.9
LOS ANGELES	30,389	20,069	66.0	10,068	33.1
MADERA	620	395	63.7	218	35.2
MARIN	1,054	703	66.7	342	32.4
MENDOCINO	1,520	1,046	68.8	463	30.5
MERCED	1,202	761	63.3	434	36.1
MONTEREY	2,627	1,334	50.8	1,281	48.8
NAPA	1,490	1,097	73.6	388	26.0
NEVADA	852	563	66.1	280	32.9
ORANGE	9,551	5,856	61.3	3,606	37.8
PLACER	1,268	871	68.7	388	30.6
RIVERSIDE	8,251	5,353	64.9	2,836	34.4
SACRAMENTO	5,100	3,380	66.3	1,674	32.8
SAN BENITO	552	305	55.3	241	43.7
SAN BERNARDINO	7,541	4,964	65.8	2,513	33.3
SAN DIEGO	14,237	8,057	56.6	6,064	42.6
SAN FRANCISCO	2,776	2,054	74.0	701	25.3
SAN JOAQUIN	4,125	2,828	68.6	1,264	30.6
SAN LUIS OBISPO	1,655	1,029	62.2	617	37.3
SAN MATEO	3,321	2,354	70.9	953	28.7
SANTA BARBARA	965	597	61.9	359	37.2
SANTA CLARA	6,648	4,232	63.7	2,377	35.8
SANTA CRUZ	1,180	729	61.8	444	37.6
SHASTA	1,022	550	53.8	463	45.3
SISKIYOU	391	255	65.2	133	34.0
SOLANO	2,531	1,794	70.9	724	28.6
SONOMA	3,401	2,404	70.7	959	28.2
STANISLAUS	3,495	2,382	68.2	1,086	31.1
SUTTER	713	468	65.6	242	33.9
TEHAMA	463	256	55.3	201	43.4
TULARE	2,235	1,522	68.1	698	31.2
TUOLUMNE	708	474	66.9	233	32.9
VENTURA	3,612	2,112	58.5	1,481	41.0
YOLO	915	651	71.1	255	27.9
YUBA	670	402	60.0	262	39.1
ALPINE, INYO, MARIPOSA & MONO combined	629	410	65.2	217	34.5
DEL NORTE, MODOC, PLUMAS & SIERRA combined	616	383	62.2	230	37.3
COLUSA, GLENN & TRINITY combined	688	476	69.2	210	30.5
UNSPECIFIED	3,356	2,248	67.0	1,080	32.2

*Excludes 1,212 discharges for psychiatric (976), alcohol (190) and drug-related (86) conditions.

Table 6: Classification of WC 2007 Encounters in the "Other" Category

	Non-Emergent		Emergent						Unclassified	
			Primary Care Treatable		Need ED Care/ Preventable		Need ED Care / Not Preventable			
	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
All Counties	19,979.1	36.2	12,110.7	22.0	1,340.6	2.4	5,439.6	9.9	16,260	29.5
ALAMEDA	760.2	35.3	496.2	23.1	74.2	3.5	266.4	12.4	554	25.8
AMADOR	47.3	36.6	21.4	16.6	1.7	1.3	15.7	12.2	43	33.3
BUTTE	252.0	47.9	95.6	18.2	14.9	2.8	52.5	10.0	111	21.1
CALAVERAS	42.0	29.8	24.3	17.2	5.6	4.0	18.1	12.8	51	36.2
CONTRA COSTA	92.3	42.5	35.8	16.5	3.8	1.8	19.1	8.8	66	30.4
DEL NORTE	749.7	39.5	394.2	20.8	50.1	2.6	238.0	12.5	466	24.6
EL DORADO	21.0	35.6	14.4	24.3	1.4	2.3	7.3	12.4	15	25.4
FRESNO	161.9	37.8	68.9	16.1	13.9	3.2	43.3	10.1	140	32.7
HUMBOLDT	409.0	32.0	329.7	25.8	39.3	3.1	181.0	14.1	321	25.1
IMPERIAL	213.0	44.1	96.7	20.0	18.3	3.8	56.0	11.6	99	20.5
KERN	368.9	44.7	150.1	18.2	12.0	1.5	70.9	8.6	223	27.0
KINGS	160.3	31.0	100.4	19.4	18.9	3.7	60.4	11.7	177	34.2
LAKE	95.3	38.9	45.8	18.7	7.7	3.2	26.2	10.7	70	28.6
LASSEN	147.8	44.3	51.1	15.3	5.3	1.6	35.8	10.7	94	28.1
LOS ANGELES	42.4	32.9	22.3	17.3	3.0	2.4	21.3	16.5	40	31.0
MADERA	4,009.4	39.8	2,024.3	20.1	203.4	2.0	853.8	8.5	2,977	29.6
MARIN	85.6	39.3	46.7	21.4	5.9	2.7	27.7	12.7	52	23.9
MENDOCINO	104.5	30.6	67.5	19.7	13.7	4.0	35.2	10.3	121	35.4
MERCED	186.0	40.2	90.8	19.6	19.5	4.2	50.7	10.9	116	25.1
MONTEREY	202.9	46.7	84.5	19.5	12.8	3.0	42.8	9.9	91	21.0
NAPA	392.0	30.6	255.1	19.9	12.1	0.9	120.8	9.4	501	39.1
NEVADA	146.2	37.7	70.9	18.3	9.6	2.5	46.3	11.9	115	29.6
ORANGE	68.3	24.4	43.2	15.4	9.7	3.5	25.8	9.2	133	47.5
PLACER	95.4	41.5	41.0	17.8	6.2	2.7	25.4	11.0	62	27.0
RIVERSIDE	100.4	47.8	35.7	17.0	2.9	1.4	20.1	9.5	51	24.3
SACRAMENTO	1,102.9	30.6	1,157.0	32.1	94.1	2.6	308.9	8.6	943	26.2
SAN BENITO	105.4	27.2	64.1	16.5	9.7	2.5	50.9	13.1	158	40.7
SAN BERNARDINO	1,064.6	37.5	648.9	22.9	69.9	2.5	265.6	9.4	787	27.8
SAN DIEGO	631.2	37.7	307.9	18.4	43.1	2.6	212.9	12.7	479	28.6
SAN FRANCISCO	93.0	38.6	46.4	19.3	8.0	3.3	27.6	11.5	66	27.4
SAN JOAQUIN	953.4	37.9	496.2	19.7	58.7	2.3	266.7	10.6	738	29.4
SAN LUIS OBISPO	1,793.6	29.6	1,592.6	26.3	108.7	1.8	392.2	6.5	2,177	35.9
SAN MATEO	251.7	35.9	150.1	21.4	20.5	2.9	89.8	12.8	189	27.0
SANTA BARBARA	491.2	38.9	212.9	16.8	27.1	2.1	120.8	9.6	412	32.6
SANTA CLARA	230.4	37.3	144.3	23.4	14.3	2.3	65.1	10.5	163	26.4
SANTA CRUZ	301.3	31.6	186.0	19.5	31.6	3.3	99.1	10.4	335	35.2
SHASTA	145.3	40.5	70.0	19.5	7.7	2.1	43.0	12.0	93	25.9
SISKIYOU	943.0	39.7	558.3	23.5	46.7	2.0	253.0	10.6	576	24.2
SOLANO	167.4	37.7	77.3	17.4	7.9	1.8	37.4	8.4	154	34.7
SONOMA	137.2	29.6	75.5	16.3	16.2	3.5	32.1	6.9	202	43.6
STANISLAUS	56.9	42.8	30.1	22.6	4.4	3.3	14.6	11.0	27	20.3
SUTTER	285.3	39.4	144.4	20.0	16.5	2.3	99.7	13.8	178	24.6
TEHAMA	294.4	30.7	207.4	21.6	26.3	2.7	120.9	12.6	310	32.3
TULARE	416.0	38.3	204.6	18.8	19.2	1.8	112.3	10.3	334	30.8
TUOLUMNE	115.0	47.5	44.6	18.4	5.3	2.2	28.1	11.6	49	20.2
VENTURA	57.0	28.4	30.3	15.1	3.4	1.7	12.2	6.1	98	48.8
YOLO	236.7	33.9	156.5	22.4	36.2	5.2	80.6	11.6	188	26.9
YUBA	81.0	34.8	42.0	18.0	11.3	4.9	28.7	12.3	70	30.0
ALPINE, INYO, MARIPOSA & MONO	407.9	37.8	242.2	22.4	38.4	3.6	118.5	11.0	273	25.3
DEL NORTE, MODOC, PLUMAS & SIERRA	448.2	30.3	426.6	28.8	35.5	2.4	139.7	9.4	431	29.1
COLUSA, GLENN & TRINITY	97.5	38.2	45.9	18.0	9.5	3.7	32.1	12.6	70	27.5
UNSPECIFIED	392.0	30.6	255.1	19.9	12.1	0.9	120.8	9.4	501	39.1

Classification of ED Encounters

Table 5 shows the distribution of encounters for injuries and other conditions by county in 2007. The table excludes 2,212 encounters (0.75 percent) attributable to psychiatric, drug and alcohol-related conditions. The NYU algorithm classifies 65 percent of encounters as injuries, which is comparable to the 67 percent reported with E-codes. Most counties are within one standard deviation of the average percentage of encounters attributable to injuries. Counties with atypically high percentages of encounters for injuries include both urban (San Francisco, Fresno, Napa, Yolo) and rural (Amador) counties. Similarly, the counties with atypically low percentages of WC encounters attributable to injuries include both urban (San Diego, Monterey, Ventura, Shasta) and rural (Imperial, Tehama) counties.

The algorithm classified 34 percent of the 2007 WC encounters into the "other" category, i.e., encounters that were not for an injury, psychiatric, drug or alcohol-related condition. The algorithm further classified the "other" encounters into the categories shown in Table 6. Nearly 30 percent of the "other" encounters could not be classified. The following diagnoses were reported most frequently for the unclassified encounters:

- Imprecise diagnosis codes, i.e., use of "not otherwise specified" and "not elsewhere classifiable" diagnosis codes (35 percent)
- Removal of sutures and surgical dressings (27 percent)[7]
- Observation (11 percent)
- History of exposure to hazardous body fluid (7 percent)
- Serous conjunctivitis (3 percent)
- Meningococcus contact (3 percent)

The high percentage of unclassified encounters implies that the proportion of encounters assigned to the remaining categories is likely to be understated. Nevertheless, the majority of encounters in the "other" category were classified as non-emergent (i.e., did not require care within 12 hours) or were emergent but could have been treated in an office-based setting. Across the state, these encounters comprised 58 percent of the "other" encounters (and 20 percent of total WC encounters). The counties with percentages that were more than one standard deviation above the statewide average were either rural or small urban counties: Merced, Butte, Sutter, Siskiyou, Humboldt, and the combined northwestern counties of Colusa, Glenn and Trinity.

We compared the classification of WC encounters to encounters for a comparison group of non-WC patients age 18-64 (excluding Medicare, Medicaid and self-pay). The WC patients have a much higher percentage of encounters attributable to injuries than the comparison group (67 percent versus 23 percent). Within the encounters assigned to the

[7] The CPT coding rules consider suture removal "normal, uncomplicated follow-up care" as part of the surgical package. It is not separately billable as a physician service unless a doctor removes sutures inserted by another physician. Follow-up care is not packaged into the Medicare payment for hospital outpatient facility services. Instead, hospitals are instructed to bill a visit code for follow-up services such as suture removal.

"other" category, the WC patients had a higher percentage of unclassified encounters (30 versus 14 percent), nearly the same percentage of encounters that were either classified as non-emergent or primary care treatable (58 percent versus 59 percent), and a lower percentage that were classified as requiring ED care (12 percent versus 28 percent).

Most Common Diagnosis Codes

Table 7 Most Common Principal Diagnoses for WC ED Encounters in 2007

ICD-9-CM (3-Digit) Diagnosis Code	Description	Percent of Encounters
883	Open wound of finger(s)	9.3
847	Sprains and strains of the back other than lumbrosacral	6.9
724	Other and unspecified disorders of the back	5.3
V58	Encounter for other and unspecified procedures and aftercare	4.8
924	Contusions of the lower limb and other unspecified sites	3.2
923	Contusions of the upper limb	3.0
959	Injuries not otherwise specified	3.0
V67	Follow-up examination	2.9
882	Open wound of hand except fingers alone	2.9
873	Open wounds of the head and mouth	2.6
845	Sprains and strains of ankle and foot	2.6
719	Other and unspecified disorders of joint	1.9
840	Sprains and strains of shoulder and upper arm	1.8
844	Sprains and strains of knee and leg	1.8
922	Contusion of trunk	1.6
881	Open wound of elbow, forearm, and wrist	1.6
842	Sprains and strains of wrist and hand	1.6
920	Contusion of face, scalp, and neck except eye(s)	1.5
930	Foreign body on external eye	1.4
816	Fracture of one or more phalanges of hand	1.3
V71	Observation and evaluation for suspected conditions not found	1.2
786	Symptoms involving respiratory system and other chest symptoms	1.1
338	Pain, not elsewhere classified	1.1
729	Other disorders of soft tissues	1.1
780	General symptoms	1.0
918	Superficial injury of eye and adnexa	1.0
	All other principal diagnoses	32.4
		100.0

Table 7 lists the principal diagnosis codes reported for one percent or more of ED encounters in 2007. The principal diagnosis is defined as the condition problem or other reason determined to be the chief cause of the encounter for care. Consistent with the classification of the encounters by the NYU algorithm, most codes describe injuries, including wounds, contusions, and sprains and strains. V-codes are used to describe

encounters with health services that do not involve disease or injury. For example, the codes included within V58, which was reported for 4.8 percent of encounters, is an aftercare visit code that covers situations when the initial treatment of a disease or injury has been performed and the patient requires continued care during the healing or recovery phase, or for the long-term consequences of the disease.[8] A V58 code is reported for attention to surgical dressings or sutures. V67, which was reported for 2.9 percent of encounters, is used for continuing surveillance following completed treatment of a condition or injury. The code implies that the condition has been fully treated and no longer exists. While aftercare and follow-up care may be appropriately provided in the ED, it is also care that might be provided at lower cost in an office-based setting.

Most Common Procedures

We used the APC groupings to describe the procedures that were performed on WC patients during 160,600 ED encounters in 2007 (Table 8). Some encounters involved multiple APCs, resulting in a total of 167, 583 APCs. Only 40 percent of the encounters included an APC for an ED visit for evaluation and management services. In addition to the procedures that are assigned to APCs, 31,340 diagnostic clinical laboratory tests were reported in connection with ED services.

Table 8 High Volume WC APCs Reported as ED Services in 2007

Total Encounters	160,600	
Description	**Count***	**% of tot**
Emergency Visits	67,164	40.08
Drug Administration	25,038	14.94
Plain Film Except Teeth Including Bone Density Measurement	25,013	4.93
Skin Repair	19,916	11.88
Strapping and Cast Application	11,147	6.65
Computed Tomography without Contrast	4,064	2.43
Debridement & Destruction	1,995	1.19
Electrocardiograms	1,959	1.17
Other APCs	11,287	6.74
Total	167,583	100.00

* Does not include 31,340 diagnostic clinical laboratory tests.

OMFS Allowances by Type of Service

Table 9 summarizes the allowances under the OMFS for hospital outpatient services for ED visits and surgical procedures in 2005-2007. The estimated total OMFS allowances decreased over the period, but less than the decline in number of encounters (11.1 percent versus 14.1 percent). One reason is annual updates for inflation in the OMFS allowances. The difference in the service mix for patients with E-codes for first time visits for injuries

[8] Centers for Medicare and Medicaid Services and the National Center for Health Statistics, ICD-9-CM Official Guidelines for Coding and Reporting Effective April 1, 2005. Available at http://www.cdc.gov/nchs/data/icd9/icdguide.pdf as of 3/12/09.

and those without E-codes is striking. Most surgical procedures are performed on patients with reported E-codes. Surgical procedure allowances constitute 42.7 percent of the total allowances under the OMFS for outpatient facility fees for patients with E-codes compared to 12.9 percent for patients without E-codes.

Table 9 WC ED Encounters and Allowances under the OMFS for Hospital Outpatient Services 2005-2007 ($ millions)

	2005		2006		2007	
Total Encounters	186,970	100.0%	176,349	100.0%	160,600	100.0%
With E-codes	115,174	61.6%	114,980	65.2%	108,325	67.5%
Without E-Codes	71,796	38.4%	61,369	34.8%	52,275	32.6%
Total Allowances for Outpatient Facility Fees	$18.3	100.00%	$18.4	100.00%	$16.3	100.00%
ER Visit Allowances	$11.9	65.1%	$12.1	65.9%	$10.5	64.5%
Surgery Allowances	$6.4	34.9%	$6.3	34.1%	$5.8	35.5%
Total with E-codes	$12.4	100.00%	$13.1	100.00%	$12.3	100.00%
ER Visit Allowances	$6.8	54.9%	$7.5	57.2%	$7.1	57.3%
Surgery Allowances	$5.6	45.1%	$5.6	42.8%	$5.3	42.7%
Total without E-codes	$5.9	100.00%	$5.3	100.00%	$4.0	100.00%
ER Visit Allowances	$5.1	86.2%	$4.6	87.7%	$3.4	87.1%
Surgery Allowances	$0.8	13.8%	$0.6	12.3%	$0.5	12.9%

The allowances for outpatient facility fees apply to about 70 percent of the services provided in EDs to WC patients. We estimated the total allowances for all services (other than professional services) at $23.4 million in 2007 (Table 10). In making this estimate, we separated the OMFS allowances for facility services into those services payable under the OMFS for hospital outpatient services (emergency visits and surgical procedures), the OMFS for diagnostic laboratory tests, and the OMFS for physician and non-physician professional services (technical components only). We were unable to price about 250 low-volume procedures under the OMFS for physician and practitioner professional services and dropped them from this analysis. The allowances do not include amounts allowed for professional services.

Table 10 Estimated Total OMFS Allowances for ED Services Provided to WC Patients in 2007 ($ millions)

Total OMFS Allowances	$23.4	100.0%
ER Visit Facility Allowances	$10.5	44.9%
Surgery Facility Allowances	$5.8	24.7%
Diagnostic Clinical Laboratory Allowances	$4.1	17.5%
Physician Fee Schedule Allowances for Other Services	$3.0	12.8%

The top five procedures in OMFS allowances by type of service in 2007 are shown in Table 11. The top five surgical procedures account for 75 percent of the OMFS facility fee allowances for surgery provided in connection with ED services. The services that are subject to the OMFS for physician services are also highly concentrated in a few types of

services. Drug administration services, which include both therapeutic, prophylactic, and diagnostic injections and infusions (excluding chemotherapy) and immunizations, account for 21 percent of the allowances for services subject to the OMFS for physician services. The allowances for the technical component of four types of diagnostic radiology tests account for another 72 percent of allowances in this category of services. In contrast, diagnostic clinical laboratory tests are not as concentrated. The top five tests account for only 19 percent of the allowances subject to the OMFS for diagnostic laboratory tests.

Table 11 Top Procedures Furnished to WC Patients During ED Encounters By Type of Service in 2007

Type of Service	OMFS Allowances	% of Total Allowances for Service
Emergency Visits	$10,516,585	100.0%
Surgical Procedures	$5,782,981	100.0%
Skin Repair	$2,507,727	43.4%
Strapping and Cast Application	$988,608	17.1%
Hand Musculoskeletal Procedures	$360,380	6.2%
Treatment Fracture/Dislocation	$290,548	5.0%
Incision & Drainage	$192,899	3.3%
Other Surgical Procedures	$1,442,819	24.9%
Other Services	$2,991,524	100.0%
Computerized Tomography	$1,310,863	43.8%
Plain Film X-ray Except Teeth Including Bone Density Measurement	$690,181	23.1%
Drug Administration	$631,204	21.1%
Magnetic Resonance Imaging and Magnetic Resonance Angiography	$98,161	3.3%
Electrocardiograms	$66,690	2.2%
Other Non-Surgical Services	$194,426	6.5%
Diagnostic Clinical Laboratory Allowances	$409,728	100.0%
Acute hepatitis panel	$23,316	5.7%
Basic metabolic panel	$21,379	5.2%
Routine venipuncture	$16,243	4.0%
Natriuretic peptide	$9,790	2.4%
Assay of creatine kinase	$8,507	2.1%
Other Clinical Laboratory Tests	$330,494	80.7%

Summary of Findings and Discussion

Key findings from our analysis of ED encounters for WC patients from 2005-2007 include the following:

- Most ED encounters for WC patients are for treatment of injuries. The proportion of ED encounters reported as initial treatment of injuries increased from 62 to 68 percent of total ED encounters during the study period.

- The volume of encounters that were for other than initial treatment of injuries declined 27.2 percent compared to a 5.9 percent reduction in encounters for initial treatment of injuries.
- Statewide, about 20 percent of total WC encounters were classified by the NYU algorithm as either non-emergent or emergent conditions that could have been treated in an office-based setting.
- The trend in the WCRI price index documents the impact of the implementation of the OMFS for outpatient facility fees. These represent the majority of the payments provided in conjunction with ED services, but the technical component of diagnostic tests and drug administration also account for a significant portion of allowances.

The underlying question for our study was whether there is evidence of excessive use of ED services that might be indicative of potential access or quality of care issues following implementation of the reform provisions affecting WC medical care. We did not find any indications that the recent reforms may contribute to excessive use of ED services. The findings from our analyses of the 2005-2007 OSHPD data as well as the WCRI trend data show a reduction in the use of ED services. Further, the disproportionately higher reduction in non-injury encounters is a potential sign of improvement in access to office-based care. However, the results from applying the NYU algorithm suggest that about 20 percent of ED care for WC patients is non-emergent or could be provided in an office-based setting. There are county-level differences in these potentially inappropriate ED usage rates, but both urban and rural counties are among those with atypically high rates of potentially inappropriate ED usage. A broader study examining the provision of initial and aftercare across ambulatory settings would further inform the issue of whether ED services are being used appropriately.