

SHORT ARTICLES

Medical Cost Development in Workers' Compensation

Joseph A. Fields
and
Emilio C. Venezian

ABSTRACT

The cost of medical care for workers' compensation claims is a significant determinant of the total costs of coverage. In this article the effect of legal representation the evolution of the total medical cost of individuals' claims is examined. Two samples, one of non-controverted claims and the other including both controverted and non-controverted claims, were analyzed. Two important results can be reported for both samples. First, the cost of medical care associated with workers' compensation claims is positively related to representation by a lawyer. Second, although the times series of total medical cost for workers' compensation claims is adjusted by the medical care price index the total cost of medical care for workers' compensation claims increases over the sample period. This suggests that there is a change in utilization patterns or costs of services for workers' compensations claims that is not captured by general medical care costs.

The average cost of medical care for workers' compensation is determined by a variety of factors, two of which are of paramount importance. First, rapidly increasing costs for hospital and physician services have caused medical care costs to increase at a rate substantially higher than that for costs in general (see *Statistical Abstract of the United States*, 1979-1986). Second, more utilization of hospital and physician services also have increased the cost of workers' compensation coverages. Other factors may affect the costs of medical care under workers' compensation. The frequency and severity of work place injuries may change. Technology may improve the effectiveness of medical procedures. The environment may encourage defensive medicine requiring additional tests and procedures. Regulation may impact costs as cost containment measures are often political issues.

Joseph A. Fields is Associate Professor of Finance and Research Associate, Center for Health Systems Management, University of Connecticut. Emilio C. Venezian is Associate Professor of Business Administration at Rutgers University-Newark and President of Venezian and Associates.

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The rate of increase in costs for workers' compensation has been of substantial interest. Some argue (eg. Appel, 1989) that "Paid medical expenditures per covered worker have increased at roughly the same rate as per capita medical expenditure in the economy at large." Morrison (1990) argues that workers' compensation costs have been driven up because of legislative restrictions prohibiting the use of cost containment measures that are commonplace in non-occupational forms of health insurance.

Agency problems due to the presence of legal representatives also may affect the utilization of medical services under workers' compensation.¹ Legal representation can increase the costs of medical care if the legal process requires the use of physician services as evidence of the nature of the injury. The physician acts both as an agent for the claimant and as a provider of services. Conflict exists as the physician is paid to determine the appropriate level of treatment while the level of treatment substantially determines the same physician's compensation.

The plaintiff's lawyer's incentive is to increase medical costs to demonstrate the nature of the injury, often expending substantial funds on diagnostic tests. Thus, legal representation is likely to increase the use of medical services as the physician not only treats the injury but also develops proof of the extent of injury that is consistent with legal rather than medical requirements. A number of authors have associated legal representation with increases in the costs of workers' compensation. Worrall, Butler, Borba and Durbin (1984) found employees with counsel less likely to return to work after injuries. Venezian (1984) reported that the duration of temporary total disability doubled for claimants with counsel. Butler and Worrall (1985) and Worrall, Butler, Borba and Durbin (1988) reported similar effects. It should be emphasized that in these studies the finding is one of correlation rather than causality. The results obtained are consistent with the hypothesis that severe cases seek representation more frequently than less severe cases.²

Here the relationship between the evolution of medical care costs and legal counsel is examined. Changes in secular time are measured, by the calendar year in which the case arose and by the age of the case. As in prior studies, the effect of specific variables related to the injury on the decision to seek counsel is not modeled. This study differs in that it measures the relation between legal counsel and the development of medical costs, (i.e. it examines the time pattern of incurred costs in claims with and without representation).

¹ For a discussion of the agency problem in insurance contracts see Mayers and Smith (1981, 1986) and Fields and Tirtiroglu (1991). See Butler and Worrall (1989) and Dionne and St-Michel (1989) for further discussion of incentive conflicts specifically in workers compensation.

² The results are also consistent with the insurer denying liability more frequently in more severe cases. The factors motivating an insurer to deny such a claim are different from those of a claimant seeking legal representation. The available data on legal representation unfortunately does not specify the reason for engaging such counsel.

Nature of Legal Representation

A claimant may seek legal representation for a variety of reasons. The claimant may appeal an insurers denial of a claim. If liability is originally denied but eventually found to exist it is referred to as a "controverted" case. Table 1 presents the distribution of legal representation in controverted and non-controverted cases involving claims for time lost at work for a sample that will be described later.

Table 1
Relation Between Representation and Controversion by State
(percent of cases with claims for lost time, by group)

State	Controverted Cases		Non-Controverted Cases	
	With Lawyer	No Lawyer	With Lawyer	No Lawyer
FL	1.2	1.1	4.6	93.1
GA	2.8	2.8	6.7	87.7
IL	9.7	4.8	11.2	74.3
KY	6.7	3.5	3.0	86.8
ME	2.9	1.7	8.6	86.8
MA	3.7	2.8	6.6	86.9
MI	16.8	6.3	2.9	74.0
MN	1.9	3.4	2.2	92.5
PA	1.7	3.5	3.8	91.0
VA	2.1	3.2	2.8	91.9

Source: Detailed Claim Study, National Council on Compensation Insurance 1979-1985.

Even when the liability of the carrier is not at issue the claimant may find counsel useful. A lawyer, for example, may persuade the claimant that representation will lead to a higher net recovery, the claimant may desire the services of an experienced negotiator, or a claimant in poor health may require a trustee.

The data available for analysis, however, include little information about the reason for the presence of an attorney. In fact the only indicator of what may have led the claimant to use a representative is the indication of whether the case has been controverted. For this reason separate analysis is performed on all cases and non-controverted cases.

Framework for Analysis

Data

Most of the data used in this analysis were provided by the National Council on Compensation Insurance using information from their "Detailed Claims Survey". The Council provided aggregate data from two equally weighted samples, one for workers with legal representation and another for those without legal representation, and provided information on other key independent variables. The data were restricted to cases in the states that had

been part of the detailed claim data base since 1979. These states are listed in Table 1. The data were further restricted to workers in the top ten workers' compensation class codes of the top ten insurers. As a result the total number of claims in the underlying data is reduced to 29,472. These restrictions limit the heterogeneity in injuries and claim practices across jurisdictions and insurers.

The data cover claims that occurred between 1979 and 1985, summarized by year of accident and year of development. The individual cells are aggregates weighted for the sampling fraction in each state and period. The need for confidentiality precluded obtaining the data on a disaggregated basis.

In order to investigate whether the costs of medical care under workers' compensation have been increasing at a rate different from other medical care prices the dependent variable (nominal medical costs) was adjusted to 1983 dollars using the consumer price index for medical care. If the year in which the case was reported is found to be significant it implies that there are differences in the rate of change between workers' compensation medical care costs and non-occupational health care costs. Rejecting this hypothesis would provide support for Morrison's (1990) contention that the lack of utilization containment creates differences in the growth rate between workers' compensation and other health care costs.

The primary independent variables used in the analysis were legal representation, a binary variable indicating the presence (1) or absence (0) of counsel; the number of doctor visits; days of hospitalization; months since the case was reported; and the year in which the case was reported. A description of the sample can be found in Table 2.

Table 2
Description of the Sample

Variable	Full Sample		Non-Controverted Cases	
	Mean	Standard Deviation	Mean	Standard Deviation
Hospital Days	5.74	3.73	7.02	4.48
Doctors Visits	24.68	22.74	30.59	29.66
Months of Development	24.00	13.53	24.00	13.56

Note: As the sample is composed to be equally weighted by lawyer the dummy value for lawyer would have a mean of .5.

Estimation Procedure

The empirical model was developed to allow flexibility in the estimation while maintaining parsimony. The continuous explanatory variables enter the model in linear, quadratic and cross product forms, except for year which enters only as linear and quadratic terms. Equation 1 was estimated for the sample of non-controverted cases and for the full sample composed of controverted and non-controverted cases.

$$C_i = \alpha_0 + \beta_{01} L + \beta_{02} V + \beta_{03} H + \beta_{04} D + \beta_{05} Y \\ + \beta_{12} LxV + \beta_{13} LxH + \beta_{14} LxD + \beta_{23} VxH + \beta_{24} VxD \\ + \beta_{34} HxD + \beta_{22} V^2 + \beta_{33} H^2 + \beta_{44} D^2 + \beta_{55} Y^2 + \epsilon_i \quad (1)$$

Where:

- C_i = medical costs incurred standardized in 1983 dollars,
 α_i and β_i = parameters to be estimated,
 L = a binary variable for legal representation,
 V = the number of visits to a physicians office,
 H = the number of days hospitalized,
 D = the number of months of development since the injury was reported,
 Y = the year in which the claim was recorded,
 ϵ_i = the random error component.

The residuals were examined for heteroskedasticity using White's (1980) test. In both cases the hypothesis of homoskedasticity was rejected at the .01 level. Thus, standard errors were estimated using White's heteroskedastic consistent procedure. Durbin-Watson (1950) tests indicated that the hypothesis of no autocorrelation could not be rejected at the .05 level for either model.

Results

The parameter estimates for the total sample and the non-controverted cases are reported in Table 3. Explanatory power was high with adjusted R^2 s of .9389 and .9213 respectively. An F-test indicated that both regressions were significant at the .01 level. All estimated parameters were significant at the .01 level except for the DxV interaction variable which was not significant in the all cases regression and the intercept term which was not significant in the non-controverted regression.

Parameter estimates on individual variables must be interpreted cautiously as each variable enters the equation in several terms. Hence, the individual parameter estimates do not represent the partial derivatives of our inflation-adjusted measure of total medical costs. In order to evaluate the effect of changes in the independent variables on medical cost, the partial derivatives of inflation-adjusted total medical costs with respect to the independent variables were examined at the mean levels. If x_i enters the equation in linear, quadratic, and cross product forms then the best estimate of $\delta C / \delta X_i = \beta_{0i} \mu_{0i} + 2 \times \beta_{ii} \mu_i^2 + \sum \beta_{ij} \times \mu_i \mu_j$, where μ_i and μ_j are the values of the sample means for the variables entering in cross product with x_i are evaluated.

The partial derivatives of inflation-adjusted medical costs with respect to the primary independent variables are shown in Table 4. These indicate that the addition of legal representation, hospital days, doctor visits and the passage of time all added to total medical costs from workers' compensation claims.

Table 3
Parameter Estimates and Heteroskedastic Consistent Standard Errors

	All Cases		Non-Controverted Cases	
Adjusted R ²	.9389		9213	
Prob > F	.0001		.0001	
Sample size	56		48	
Parameter	Estimate	Std. Error	Estimate	Std. Error
Intercept	-610.9	93.7**	203.6	171.9
L	1235.3	76.8**	1469.8	133.7**
V	-47.5	3.6**	-76.5	3.6**
H	1100.0	56.6**	1272.0	53.0**
D	46.8	9.8**	-40.9	14.8**
Y	166.5	41.6**	-438.0	88.9**
V ²	-2.9	0.1**	-0.9	0.1**
H ²	-71.0	2.6**	-88.2	3.9**
D ²	0.6	0.3**	-2.4	0.3**
Y ²	13.9	4.6**	134.7	11.4**
LxV	62.8	3.4**	29.1	3.2**
LxH	-182.3	24.4**	145.4	24.5**
LxD	-69.5	4.8**	-113.1	8.2**
VxH	38.5	0.8**	4.2	0.7**
VxD	-0.1	0.3	3.8	0.2**
HxD	-6.6	1.5**	24.7	2.0**

** Significant at the 0.01 level

Table 4
Partial Derivatives of the Total Incurred Cost of Medical Care
(with respect to the primary variables in 1983 medical care dollars evaluated
at the sample mean)

Variable	Partial Derivatives	
	Full Sample	Non-Controverted
Lawyer	69.3	666.4
Hospital Days	1394.9	1446.8
Doctor Visits	136.1	31.2
Accident Year	222.0	100.8

Summary and Discussion

Two primary research questions are addressed in this article: Does a relationship exist between medical costs and legal representation, and has the cost of providing medical care under workers' compensation been growing at

a different rate from non-occupational medical care costs? Two models, one for non-controverted cases the other for both controverted and non-controverted cases were examined. In both models the variable L was significant at the .01 level in each of four terms, indicating that legal representation affects the development of medical costs in workers' compensation.

The form of the relationship between medical costs and legal representation is complex. In order to examine the overall magnitude of the effect of legal representation the partial derivatives of cost with respect to legal representation were examined. The results suggest that legal representation increases costs in both samples. The magnitude of the effect, however, is much larger in the non-controverted sample. These results imply that the relationship between counsel and medical costs are higher in cases where there is no disagreement as to the firms' responsibility for the injury. Thus it appears that much of the costs associated with the involvement of attorneys occurs in cases where there is a disagreement with regards to the nature of the injury rather than the responsibility for the injury.

The results with regards to the cross product variables indicate that legal representation is positive in cross product with visits in both regressions indicating that representation increases costs per visit to a doctor. This would be consistent with more extensive testing to demonstrate the nature of the injury if the number of hospital days is an effective proxy for severity. The results also indicate that legal representation has a negative interaction with the time it requires to settle the case. This is consistent with the notion that cases with representation that take a long time to close are usually the more severe cases where additional medical diagnosis is less necessary.

The other main research question of whether medical costs are rising faster in workers' compensation than in the general population was examined by taking the partial derivative of cost with respect to the variable for the year of injury at the mean of the sample. For both samples the partial derivative was positive indicating that the total cost of workers' compensation claims has increased more rapidly than the price index for medical care. This suggests that a part of the increase in this cost is attributable to increased utilization, supporting Morrison's (1990) contention. The regression structure for the total and non-controverted groups is somewhat different. The linear term is of larger magnitude in the first regression while the quadratic term is more important in the regression based on non-controverted cases. If the derivatives were estimated for 1983 the values would be 235.9 for the first and 235.5 for the second. This implies that in the mid 1980s the rate of increase in utilization contributed about \$250 per year to the costs of medical care under workers' compensation.

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