

# The Relationship of Unions to Prevalence and Claim Filing for Work-Related Upper-Extremity Musculoskeletal Disorders

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**Background** Unionization has been found to be related to higher filing of workers' compensation (WC) claims, but the extent of the relationship and the relationships to other variables have not been previously reported.

**Methods** Telephone interviews were conducted with both a population-based and WC-based samples of musculoskeletal disorder (MSD) cases.

**Results** Workers at unionized facilities were 5.7 times (95% CI 2.5–13.1) more likely to file a claim for WC, despite a comparable rate of MSD cases. Higher filing was also associated with several measures of MSD severity (1.8–14.1 odds ratios), economic sector (OR = 10.1 for manufacturing), hourly (vs. salary) wages (OR = 2.6), and for having a personal physician (OR = 2.5). Unions appeared to have a protective effect on social effects of work-related MSD.

**Conclusions** Unions appear to improve filing of work-related MSD, particularly for less severe conditions. The higher filing does not appear to be a case of "moral hazard," but rather improved and earlier reporting, as is advocated by early intervention approaches to reducing MSD. Am. J. Ind. Med. 44:83–93, 2003. © 2003 Wiley-Liss, Inc.

**KEY WORDS:** musculoskeletal disorders; cumulative trauma disorder; ergonomics; workers' compensation; unions; claim filing

## INTRODUCTION

Union membership is associated with a higher level of reporting of work-related musculoskeletal disorders (MSD),

as well as longer disability periods [Taylor, 1987; Hirsch et al., 1997]. It is not clear, however, what conclusion to draw from these observations and there are several possible explanatory models for such findings, including "moral hazard" arguments that unions assist workers in filing false or exaggerated claims, that unions assist in filing legitimate claims that would otherwise be unreported, or that the apparent relationship is masking a more fundamental association with higher MSD rates in unionized industries or other co-variates.

Unions have a potential impact on health and safety and workers compensation through direct activities, indirect activities, and spurious associations. Direct activities are those that are intended to affect health and safety (primary prevention) or disability following an injury or illness (secondary prevention). Indirect activities are those that are intended to affect other issues, but which also have an impact on health and safety. Spurious associations are largely

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historical factors concerning the economic sectors that are organized.

Direct activities include:

- Training and information to members on hazards, prevention, and the legal system [Leigh and Gill, 1991; Merrill, 1994], and advocating with the company to provide better training [Rebitzer, 1998].
- Participation in prevention: health and safety committees, filing grievances on safety hazards or discriminatory actions, contract language, etc. [Stellman et al., 1978; Taylor, 1987; Wands and Yassi, 1992; Lanoie and Tavenas, 1996; Ochsner and Greenberg, 1998; Weil, 1999].
- Workers' compensation (WC) representation or access to pertinent resources (e.g., lawyers, physicians) [Hyatt and Kralj, 2000].

Indirect effects include:

- Improved job security through seniority provisions and other contract language [Fried and Tiegs, 1993].
- Improved benefits such as sick days and health insurance [Olson et al., 1983].
- Protection from discrimination, including retaliation from reporting a hazard or an illness.
- Unions (and/or larger workplaces) have been negatively associated with job satisfaction and relationships with supervisors and co-workers [Olson et al., 1983; Bender and Sloane, 1998; Eakin and MacEachen, 1998].

Widespread compensability of MSDs is relatively recent and still controversial in many states. It is also appearing in industries and occupations (such as insurance and computer workers) that have not historically had frequent WC claims for other occupational injuries or illnesses. One potentially important issue is how usual it is to file a WC claim in a specific company, in contrast to a perception of filing a claim as aberrant or anti-employer behavior. It would be reasonable to assume that filing claims would be considered more normal where there have historically been claims for traumatic injuries, such as in manufacturing or construction. This may also be affected by a union culture, where workers routinely apply for benefits where appropriate.

If unions do have an impact, most of these variables may affect the entire workforce at a unionized workplace, and not just union members. Similarly, it should also be recognized that the presence of unions in workplaces may also have an impact on non-union firms, both because it can change what is recognized as compensable, and also because some non-union firms may provide additional benefits and protections to employees as a strategy to avoid unionization.

This paper explores possible models of workplace unionization and MSD claim filing using two state-level datasets. First, interviews with randomly chosen Connecticut

residents permits estimation of the prevalence of upper extremity (UE) MSD and of union membership. Second, interviews of workers with UE MSD in the first dataset are combined with similar interviews from a representative sample of workers who had filed for Connecticut WC benefits for UE MSD, permitting analytic comparisons between the two groups of cases.

## MATERIALS AND METHODS

### Study Population

This analysis is based on a 1996 telephone survey of Connecticut workers. Two samples of workers with work-related upper-extremity MSD were interviewed by telephone in 1996, including both a random population sample and a random sample drawn from a list of Connecticut WC First Reports of Injury. Details on the methodology have previously been reported [Morse et al., 1998, 2000].

The first sample was drawn from a random-digit dial (RDD) method of 3,200 working-age residents of Connecticut who were screened for significant MSD. The National Health Interview Survey (NHIS) definition of chronic upper-extremity pain was utilized, defined as pain or discomfort of the hand, arm, shoulders, or neck for one continuous week or 20 days total over the previous 12 months. Only 11–21% of the work-related MSD cases had been reported to WC [Morse et al., 1998].

Workers with significant MSD were classified as “likely work-related” based on a positive response to one of the following questions:

- Was this pain or discomfort either due to or made worse by your work?
- Did you tell the medical person your problem was work related?
- Did they [the medical person] say that your pain or discomfort was caused by your job?
- Did they say that your pain or discomfort was made worse by your job?
- As your workday went on did the pain increase, decrease or stay the same?
- As your workweek went on did the pain increase, decrease or stay the same?
- When you were away from work (e.g., weekends, vacations) did the pain increase, decrease, or stay the same?

A weighted sample of the 292 cases and 600 controls from the Random Digit Dial (RDD) sample was constructed to approximate the proportions of cases and controls in the initial 3,200 screening interviews. The controls were, therefore, weighted by 4.7, and cases had a weight of 1. Tabular analysis was performed. This included chi-square

tests as well as difference of means tests for risk factors for independent samples (no assumption of equal variance, two-tailed tests, confidence intervals at 0.05 levels).

This weighted sample was used to assess the prevalence of union membership, and the relationship of union membership to prevalent MSD and to occupational characteristics.

### **Workers' Compensation Sample and Combined Dataset**

The second dataset was a random sample of 323 cases drawn from a list of all upper-extremity MSD cases that had filed for WC, based on both electronic and paper-based First Reports of Injury filed with the Connecticut WC Commission for 1996. This dataset was combined with the 292 cases from the random digit sample, who were all determined to have likely work-related MSD, but only 31 of whom had filed for WC. Within this pooled data set, comparisons were made between those who had filed claims ( $323 + 31 = 354$ ), and those who had not filed ( $292 - 31 = 261$ ), regarding their occupational characteristics, including union membership.

The combined data set was utilized as a case-referent sample, defining the cases as UE MSDs that resulted in WC claims and the referents as UE MSDs that did not lead to claims. Thus, the comparison between the two groups was used to examine the increase in odds of filing a claim associated with occupational and other characteristics.

All of the samples were interviewed by telephone for approximately 30 min by trained interviewers from the University of Connecticut Center for Survey Research and Analysis. The questionnaire included questions concerning symptoms and health status, demographics, job variables, risk factors, level of disability (including Activities of Daily Living), social and economic status, and WC beliefs, knowledge, and attitudes (four-point agree/disagree scales).

Severity was measured by several variables, including self-assessment, lost time from work, and an activity of daily living scale. Subjects were asked whether a medical provider had told them they had a work-related MSD. Unionization status was ascertained by asking respondents if there was a union in their workplace, and (if yes) were they members. Industry and occupation was based on the employer name and job title for the job that was attributed by cases to be the cause of the MSD, and was coded based on 14 grouped Standard Industrial Classification (SIC) codes and 14 grouped Census occupation codes as identified by the respondent.

Several social and economic outcome variables were assessed. Job outcome measures included reported promotions, light duty accommodations, and changing jobs after the MSD. A combined measure of "any social effect" of MSD was affirmative if any of the following was reported: divorce, losing home or auto due to financial reasons, moving due to

financial reasons, losing health insurance, or significant stress at home during the 12 months prior to interview.

### **Data Analysis**

Data analysis was performed using SPSS version 10 for personal computer. In the first RDD data set, prevalent MSD was cross-tabulated with demographics and occupational characteristics. The second data set was analyzed as a case-referent study (MSD cases with WC claims vs. those without WC claims). To reduce the number of independent variables, data reduction was performed using factor analysis to inform the combination of related items. Factors were constructed for severity ("I thought my injury was serious," "I didn't think the problem would cause me to lose time from work"); knowledge of WC ("I had a good knowledge of benefits available from WC," "I didn't know how to file a Workers' Comp claim," "Filing a claim is important, in case I had problems in the future"); fear of the consequences ("I was afraid of what my employer would think or do," "I was afraid of what my co-workers would think or do," "I was discouraged from filing a claim by my employer," "I was afraid that filing a claim would make it harder to get jobs in the future," "I was afraid that I would end up losing my job if I filed a claim"); activities of daily living (nine questions such as, "How much difficulty do you have writing or using small objects such as keys?"); and the psycho-social features of work (14 questions adapted from the Karasek–Theorell Job Content Questionnaire by Warren et al., 2000). All factor analyses utilized principal components analysis with Varimax rotation, with mean substitution for missing values. Created factors were utilized in subsequent logistic regression analysis. Factor analysis for psychosocial variables resulted in five factors: (1) supervisor and company concerned and helpful, (2) job creativity, (3) colleagues helpful, (4) job autonomy, and (5) job security.

Two approaches were utilized for multivariate modeling of the relationship between unionization and filing behaviors. In forward stepwise logistic regression ( $P \leq 0.05$  for entry, 0.10 for removal), coefficient values were observed at each step to identify any that changed markedly as other variables were added and to explore covariation among the factors associated with both unionization and filing behavior. Overall fit of the model was evaluated by the log likelihood test. Odds ratios for variables were calculated by exponentiating the logistic regression coefficients, with 95% confidence intervals. Analyses were also stratified by unionization (yes/no) to examine for effect modification. Non-stepwise logistic regression models were then fitted including all of the variables that were significant in the above analyses and for those with theoretic importance. Both the stepwise and non-stepwise results are presented (stepwise results maximize sample size due to fewer missing cases; non-stepwise models which include additional non-significant variables

provide a more complete picture of how variables relate to each other).

Regression modeling was repeated using only the population-based sample to ensure that there was not a significant bias introduced due to the combining of the population sample with the WC sample, although the power of that analysis was low due to the low number of cases that filed a claim. The final model was repeated using only the variables that were significant in the full sample runs to minimize missing cases.

## RESULTS

### Sample Characteristics

There was a 78% interview rate (of people spoken to) and a 66% overall response rate (of households called) for the RDD sample, and a 60% interview rate and a 34% overall response rate for the WC sample (with the lower rate due primarily to missing or old telephone numbers in the WC sample). Of the 3,200 workers screened by RDD, 374 people were identified with chronic upper-extremity pain (11.7%), and 292 (9.1%) cases were classified as “likely work-related.”

### Organized and Unorganized Workplaces

Approximately one-quarter (26%, 95% CI 23–28%) of the weighted random sample of the Connecticut working-age population reported having a union at the workplace, and 16% (95% CI 14–19%) reported being a union member, similar to the Bureau of Labor Statistics (BLS) estimates that 19% of the Connecticut’s 1.45 million working population were represented by a union, and 18% were members of a union in 1999. The analysis reported below uses union at the workplace as the primary variable, since most of the

relationships are thought to be workplace characteristics; results were very similar using either variable.

Unions were reported at the workplaces of most respondents in the public sector, and by about one-third of subjects in manufacturing and in agriculture–construction–mining (this sector is dominated by construction in Connecticut). Unions were less prevalent in service and transportation, and in finance, insurance, and real estate.

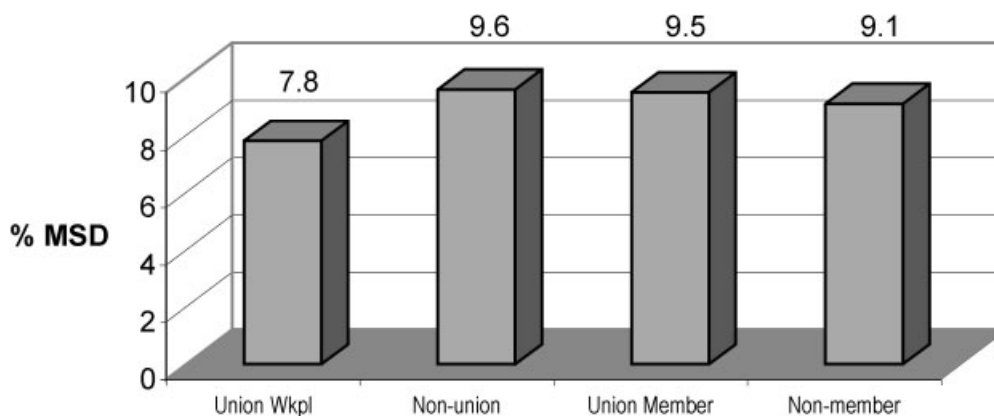
### Unions and MSD Prevalence

The 12-month period prevalence of 9% for UE MSD was nearly the same for union and non-union workplaces, and for union members and non-members (Fig. 1). However, there were significant differences in period prevalence between unionized and non-unionized workplaces in the two largest industry categories. Both government and “service, transportation, and trade” workers had significantly more MSDs when non-unionized (17% non-union to 8% union in government, and 10–6% in service). There was no significant correlation between having a union at the workplace and self-reported length of pain.

### Claim Filing for MSD Cases

The second subset consisted of the 292 cases of MSD from the population sample combined with 323 cases of MSD from the sample of WC First Report of Injury database. All 323 of the WC cases had by definition filed claims, as did 31 (10.6%) of the population sample.

The WC sample was found to be demographically similar to the population sample of RDD cases that had filed for WC, with no significant differences by race, age, education, or occupation. There were small but significant differences by industry (higher proportion in manufacturing and lower public sector in the WC sample), and by marital status (more married persons among compensation cases).



**FIGURE 1.** MSD prevalence by union status, weighted sample of general population, CT 1996.

Overall, only 47% (95% CI 42–52%) of workers at non-union facilities had filed a workers compensation claim for their MSD, compared to 78% (73–84%) at union facilities (Table I), with an odds ratio of 4.2 (95% CI 2.8–6.2) for filing a claim from a unionized workplace.

Unions had a different impact in different industries. Cases in manufacturing had a very high rate of filing overall, which varied little between union and non-union workplaces (Fig. 2). By contrast, government, trade, and transportation-utility workers with UE MSDs had a much higher rate of filing in union workplaces than non-union. The effect of unionization was intermediate in service and in agriculture/construction/mining.

Similarly, machine operators with UE MSDs were very likely to file claims, whether they were in a union workplace or not. However, service workers, crafts workers, and clerical workers were heavily affected by unionization (Fig. 3). There was no difference in the percent of union members between men and women. However, the association between union membership and filing was much stronger among men (OR = 5.6, CI 3.1–9.8) than women (OR 3.6, CI 2.1–6.2).

In crude analysis, filing of claims was significantly more common in workplaces with health and safety committees than those without committees (Odds ratio = 2.5, 95% CI 1.7–3.7). Fewer than 20% of cases not labeled work-related by the health care provider had filed a claim. This was true in each economic sector except manufacturing (range of 9–18%). In manufacturing, however, 56% (95% CI of 41–71%) of non-doctor-called cases filed a claim (94% of doctor-called were filed).

In cross-tabulations, workers with jobs low in creativity and autonomy were more likely to file a claim (OR 1.4 (CI 1.2–1.7) and 1.4 (CI 1.2–1.7), respectively). However, these relationships disappeared when occupation was entered into the regression.

## Logistic Regression

There were 557 subjects available for stepwise regression modeling (58 had missing information on at least one of the stepwise variables) and 518 for the non-stepwise.

At the initial step, MSD cases in unionized workplaces had an odds ratio of 3.7 (95% CI 2.5–5.5) for filing a WC claim (Table II). Three other case characteristics related to

severity were added (doctor said it was work-related, lost time from work, and self-assessed severity). Each maintained a statistically significant relationship with claim filing; in the model with all four variables, the odds ratio for unionization was 5.1 (CI 2.8–9.3). Industry, having a personal physician (at all, not just in relation to the MSD), and self-assessed knowledge of WC were significantly related to filing a claim, but none of these variables changed the effect of unionization noticeably (Table II). Neither age nor ethnicity had a significant impact on filing, nor did type of insurance. Age was examined by age deciles in tabular analysis; there were no statistically significant differences in rates of filing by age, although subjects in the oldest two deciles were slightly more likely to file claims.

Whether a health care provider had labeled the MSD “work-related” was a powerful factor in filing, with an odds ratio of 14.1 in the final model (95% CI 7.1–28.1). This effect also modified the association between filing and having a union at a workplace. When analyses were performed on the 159 cases that were not doctor-called, the odds ratio of filing rose from 12.9 to 66.4 (CI 15.5–283.5) for union workplaces compared to non-union. The two measures of severity (self-assessed severity and lost time from work in the prior 12 months to interview) were also related to filing. The significant association for economic sector was driven by a 10.1 (CI 4.3–23.3) times odds ratio for manufacturing. Workers who were paid on an hourly basis (vs. salary) were 2.6 times (CI 1.3–5.0) more likely to file, and those with a personal physician were 2.5 times (CI 1.1–5.7) more likely to file. Self-assessed higher knowledge of workers compensation was related to lower filing of claims; however, this relationship was only marginally significant, and included a question that contained difficult language.

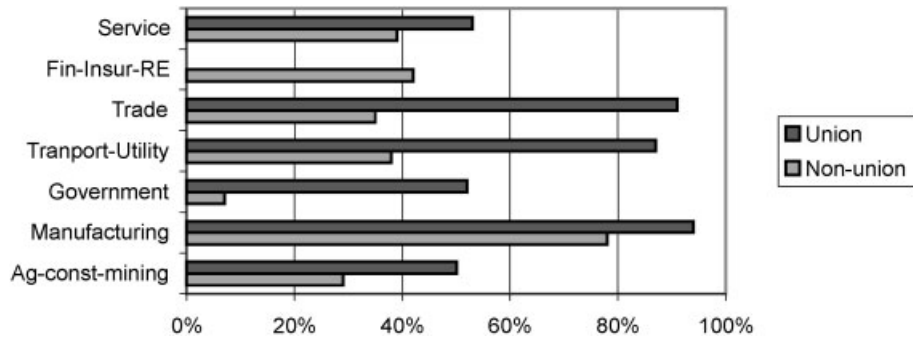
In the sample of cases using only the population-based survey, the same model had similar results (Table III). This sample was much smaller and only 31 people reported filing claims.

When the logistic regression was run separately for union and non-union workplaces (Table IV), relationships and strengths of association changed somewhat. Having a doctor-called work-related condition and case severity factor were related to filing a claim for both types, although the effect of severity was much higher in unionized workplaces. Several other factors had similar effects in the two groups, including knowledge of WC; being paid on an hourly basis (vs. salary); and having a personal physician.

In contrast, having a lost-time injury had an effect on claim filing only in unionized workplaces. Overall, economic sector was statistically significant in non-union settings only; the OR for manufacturing was similar in both groups but the coefficient for transport and utilities was markedly different. High fear of reprisal was associated with lower filing for unionized workplaces, but higher filing for non-union. Being married was associated with a much higher probability of

**TABLE I.** Claim Filing by Union at Workplace, UE MSD Cases From Combined Random Population Sample and Workers' Compensation Sample, CT, 1996

	Non-union	Union
No claim	203 (53%)	48 (21%)
Filed claim	177 (47%)	175 (78%)



**FIGURE 2.** Percentage of UEMSD cases who filed WC claim, by industry and union at workplace, combined random digit, and workers' compensation (WC) samples, n = 622.

filing for unionized workers than non-unionized. Health and safety committees were negatively associated with filing for union, but positively for non-union. Higher job autonomy was related to higher filing for unionized workplaces, but lower filing for non-union.

When the logistic regression model was fit only to the non-doctor called cases, the association of unions increased to 27.6 (CI 5.6–135.2), compared to only 2.9 (CI 1.2–7.3) for doctor-called cases. Economic sector and case severity were also retained in this model.

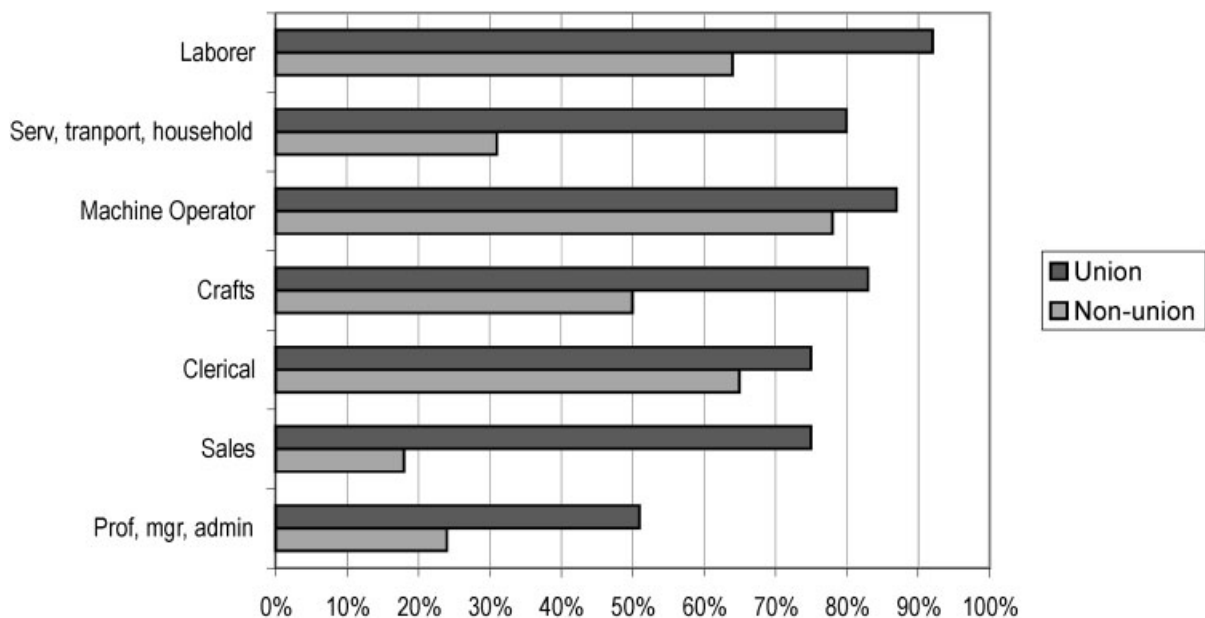
### Occupational and Social Impact of MSD

Workers in union workplaces were significantly more likely to be provided light duty work for MSD, more likely to have been promoted over the last 12 months, less likely to have changed jobs after the MSD, and less likely to report significant stress at home (Fig. 4).

A combined measure of “any social effects” of MSD (divorce, losing home or auto due to financial reasons, moving due to financial reasons, lose health insurance, or significant stress at home over the prior 12 months) was significantly lower in union workplaces (OR = 0.68, CI 0.46–0.99). In a logistic regression model, union status retained a significant protective effect for any social stress (OR 0.66, CI 0.45–0.98), even with severity in the equation (OR 1.4, CI 1.2–1.8). However, union became insignificant once industry was entered in the equation, driven by a significant protective effect of government employment (OR 0.40, CI 0.17–0.92), which was highly unionized. Gender was not significant in this analysis.

### DISCUSSION

This is one of few studies using a population-based sample to examine filing of MSD claims to a state WC



**FIGURE 3.** Filing a claim by union and occupation, combined random digit, and WC samples, n = 579.

**TABLE II.** Stepwise Logistic Regression Model of Predictors for Filing a Workers' Compensation Claim for Upper Extremity Musculoskeletal Disorder

	B	SE	Signif.	Odds ratio (OR) Exp(B)	95% Confidence interval for OR	
					Lower	Upper
Union at workplace	1.74	0.42	0.000	5.7	2.5	13.1
Lost work time	0.61	0.32	0.058	1.8	1.0	3.4
Severity (factor)	1.73	0.19	0.000	5.6	3.9	8.2
Doctor-called work-related	2.65	0.35	0.000	14.1	7.1	28.1
Industry (vs. service)			0.000			
Constr—Ag—mining	0.31	0.89	0.728	1.4	0.24	7.8
Manufacturing	2.31	0.43	0.000	10.0	4.3	23.3
Government	-0.44	0.58	0.456	0.65	0.21	2.0
Transp-utility	0.46	0.85	0.586	1.6	0.30	8.5
Trade	-0.18	0.48	0.702	0.83	0.33	2.1
Fin—insur—RE	0.71	0.54	0.188	2.0	0.71	5.8
Hourly vs. salary worker	0.95	0.33	0.004	2.6	1.3	5.0
Knowledge (factor)	-0.32	0.15	0.033	0.7	0.54	1.0
Personal doctor	0.91	0.43	0.034	2.5	1.1	5.7
Constant	-5.04	0.86	0.000			

Cases who did and did not file workers' compensation claims in CT, 1996 (n = 557). Model log likelihood statistic (chi-square) = 305.35 on 13 d.o.f., P-value < 0.001.

system, and also one of very few studies that have examined the association between unions and MSD filing. We found that workers with unions at the workplace had approximately a six times increased rate of filing a likely work-related MSD to WC particularly for less serious conditions and in certain industrial sectors (such as government, transportation/utility, and trade). This higher level of claims filed does not appear to be a result of higher levels of MSD at union workplaces, since the levels of MSD appeared to be similar at both union and non-union workplaces.

There are several limitations to this study. Since it was cross-sectional, the time sequence of the variables was often not identifiable (such as the relationship of health and safety committees to unionization) and we cannot always attribute causation to the relationships observed. There are several variables for which the direction of causality is

ambiguous. For example, being told by a doctor that a condition is work-related could be a parallel outcome to filing a claim, rather than antecedent. However, since it is rare in Connecticut for a worker to file a compensation claim without at least having seen a physician, it seems highly unlikely that the filing of the claim could lead to the MSD being labeled work-related by a physician.

A similar concern relates to the severity measures, particularly in terms of taking time off from work. It is possible that someone would be more likely to take time off from work as a result of having a WC claim accepted, since s/he would be paid for the lost time. Along the same lines, the association between higher severity and claim filing could result from subjects waiting to file and to leave work until their conditions were more severe and they could no longer tolerate their employment conditions. Either of these would

**TABLE III.** Logistic Regression on Filing a Workers' Compensation Claim for MSD, Cases From Random Population Survey Only, CT, 1996, n = 272

	B	SE	Signif.	Exp(B)	95.0% C.I. for Exp(B)	
					Lower	Upper
Union at workplace	1.97	0.63	<0.001	7.2	2.1	24.9
Lost time	1.27	0.55	0.021	3.6	1.2	10.5
Doctor-called	2.03	0.65	0.002	7.6	2.1	27.3
Seriousness (factor)	2.06	0.47	<0.001	7.8	3.2	19.7
Manufacturing sector	1.22	0.64	0.057	3.4	0.96	11.9
Constant	-4.8	0.75	<0.001			

Model log likelihood statistic (chi-square) = 93.3 on 5 d.o.f., P-value < 0.001.

**TABLE IV.** Logistic Regression Models of the Odds of Filing a Workers' Compensation Claim for UE MSD, for Unionized (n = 202), Non-Unionized (n = 316), and all Respondents (n = 518); Combined Random Digit Sample and Workers' Compensation Sample, CT, 1996

Variable	Union only; n = 202			Non-union only; n = 316			All; n = 518		
	OR	Lower CI	Upper CI	OR	Lower CI	Upper CI	OR	Lower CI	Upper CI
Lost time	<b>15.0</b>	1.4	160.8	1.4	0.64	3.18	1.6	0.82	3.2
Seriousness factor	<b>20.8</b>	4.9	87.5	<b>5.8</b>	3.5	9.4	<b>5.7</b>	3.8	8.5
Doctor-called	<b>16.5</b>	3.4	80.4	<b>17.7</b>	7.0	44.8	<b>14.4</b>	7.0	29.5
Industry (vs. service)									
Construct, Ag, mine	0.23	0	17.3	1.6	0.15	16.1	1.3	0.23	7.1
Manufacturing	11.4	0.65	200.3	<b>119</b>	4.0	35.3	<b>8.9</b>	3.6	21.7
Government	0.57	0.04	9.1	0.99	0.09	10.9	0.71	0.21	2.4
Transport & utilities	20.9	0.81	540.5	0.24	0.02	3.3	1.5	0.26	8.6
Trade	1.2	0.01	93.4	0.78	0.26	2.3	0.81	0.31	2.1
Finance, insur, RE <sup>a</sup>	NA	NA	NA	2.8	0.84	9.2	2.7	0.86	8.5
Hourly vs. salary	3.3	0.56	19.4	2.0	0.86	4.4	<b>2.1</b>	1.0	4.2
Knowledge of workers comp	<b>0.33</b>	0.13	0.83	0.78	0.54	1.1	0.76	0.56	1.0
Personal doctor	4.5	0.11	176.9	<b>3.3</b>	1.1	9.6	<b>2.5</b>	1.0	5.8
Fear factor	<b>0.22</b>	0.07	0.65	1.2	0.85	1.8	0.95	0.70	1.3
Job freedom	<b>2.9</b>	1.2	7.2	0.89	0.59	1.3	1.2	0.85	1.7
Married	<b>15.4</b>	1.9	128.5	1.2	0.57	2.7	1.4	0.73	2.6
Has a H&S Committee	<b>0.1</b>	0.01	0.81	1.5	0.61	3.5	1.2	0.61	2.5
Union at workplace	NA	NA	NA	NA	NA	NA	<b>5.4</b>	2.3	12.5

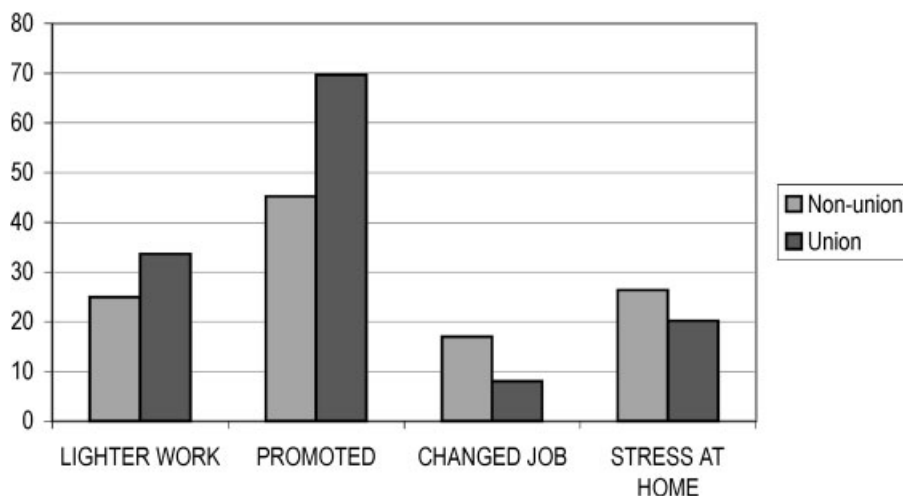
Bold numbers indicate statistical significance at or below the 0.05 level. Numbers of cases are somewhat different than Table II due to the higher number of variables and consequent missing values. Model log likelihood statistic for union only (chi-square) = 57.6 on 15 d.o.f., P-value < 0.001. Model log likelihood statistic for non-union only (chi-square) = 194.9 on 16 d.o.f., P-value < 0.001. Model log likelihood statistic for all (chi-square) = 283.0 on 17 d.o.f., P-value < 0.001.

<sup>a</sup>There were no unionized cases in the finance, insurance, and real estate sector.

result in a bi-directional effect: the more severe conditions would lead to claims filed, and conditions covered under compensation would be more likely to be severe and to result in time off. It is not possible to control for this temporal ambiguity in a cross-sectional study. Severity has been found

to be an important association in other studies of claim filing as well as here [Rosenman et al., 2000; Shannon and Lowe, 2002].

The study was based on self-reported data, so there may be misclassification of risk factors or of MSD. Self-report



**FIGURE 4.** Percent social effects, union and non-union workplaces, case-WC, CT, 1996.



may also lead to recall bias, if recollection of risk factors is affected by the presence of MSD.

Telephone interviews can result in a lower response rate for low-income individuals since they are less likely to have telephones and less likely to have multiple lines. Selection bias could result, especially in the WC sample where there was a lower response rate. Results may have been affected by the different sample sources (population survey and WC), particularly since the compensation cases by definition were filed with WC whereas the population sample had a low rate of claim filing. The differences between those that filed claims and those that did not may have been due to other sample characteristics that were not measured or controlled for.

Despite the decline in unionization over the past two decades, unions remain an important element in worker and employer behavior. In one of the only population-based studies of union differences in WC (utilizing the Current Population Survey), Hirsch et al. [1997] found union workers about three times more likely to have received WC for all types of injury and illness (not just MSD), reduced to about a 60% increase once industry, occupation, labor market, and personal differences are controlled. Shannon and Lowe [2002] also found that union members were more likely to file a claim (44 vs. 37% for non-union,  $P = 0.35$ ) in a Canadian study of all types of injuries (not just MSD). They also found workers in more marginal jobs (defined as holding multiple jobs or temporary jobs) were more likely to file a claim, though this was for injuries that already were defined as compensable and so did not include less severe conditions (this could also be due to single job holders having better access to non-WC sick time or other resources). However, marginality of job would also be related to union status, and may explain some of the differences we found between union and non-union workplaces, though the opposite directionality of this relationship of the predicted in Shannon and Lowe's study makes this a complex relationship.

Our study was consistent with the findings of Hirsch that unionized workers were more likely to seek compensation, and that there was important variation by industry sector. This analysis indicates that the effect of unionization is different for different industries. In manufacturing, where filing WC claims for work-related injuries is fairly routine, there were high rates of filing in both union and non-union workplaces. In industries with less of a clear history of filing and with traditionally better alternative general health insurance and disability programs, such as government and transportation/utilities, unionization had a pronounced effect. Construction ran counter to this trend, in that rates of filing were fairly low despite a culture of routine filing for injuries. This could conceivably be due to the chronic nature of MSD combined with the lack of a consistent employer which makes it more difficult to identify the employer under whom the disorder began, or to a construction culture that

encourages ignoring less serious conditions. The higher impact of unions in our study compared to Hirsch may be due to a focus on MSD, which is considered to be a more "marginal" claim due to its chronic nature. It may be that unions have a stronger impact on more marginal claims such as occupational disease, similar to the stronger impact on less serious MSDs.

Hirsch et al. [1997] also found that unionized workers were more responsive to different benefit levels. They concluded that the difference was most probably due to "moral hazard" issues such as filing marginal injuries and preventing employers from punishing workers based on filing. However, their study was not able to assess reported symptoms or severity levels. The moral hazard model, popular among commercial insurers, hypothesizes that higher claim filing and longer disability periods reflect abuse of the WC system. Such abuse includes filing false claims, exaggerating disability, or even intentional injury, as put forth by moral hazard models [Baker, 1996; Durbin, 1997]. In this model, unions might be perceived as having a role in protecting workers from appropriate punishment for such abuses, or in counseling workers in how to "get away with it," in connecting workers with unscrupulous attorneys or physicians, or generally promoting a non-productive environment. Although our study cannot directly answer whether all of the claims filed were "legitimate" claims, the high rate of MSD cases without compensation claims in our population sample and others [Biddle et al., 1998; Morse et al., 1998; Rosenman et al., 2000; Shannon and Lowe, 2002] would suggest that unions support earlier reporting and reporting of less serious conditions to WC, rather than use of group health insurance or other possible avenues (see also Pader et al., 1998). Possible reasons for this finding could be that unions provide information that enhances recognition of work-relatedness of injury and/or protection against employer retaliation for claim filing (see, for example, Azaroff et al., 2002 on filters to claim filing). It does appear that unions act to connect workers to physicians who are more likely to diagnose conditions as work-related; our study cannot answer whether this may mean "over-diagnosis" or proper diagnosis.

Dembe and Boden [2000] noted that while some economists use the term "moral hazard" as a neutral term, others give it a clearly negative connotation. Tarasuk and Eakin [1995] identified the damage that such connotations can cause, in finding that suspicion of injured workers contributed to damaged work relations and job security, as well as possibly leading to more chronic conditions. Card and McCall [1996] countered the moral hazard theory in finding that there was no "Monday effect" (a high number of presumably non-work-related claims that are filed on Mondays) in their analysis of WC claims.

Another explanatory model is that the association between unionization and MSD claim filing is a spurious

correlation that obscures more proximate explanations. For example, historically unions are more common in certain industries and occupations (such as manufacturing, construction, and government) that also have generally higher underlying rates of MSD [Shirom and Kirmeyer, 1988]. Additionally, union members may be older, due to job seniority systems, and thus have different claim rates [Shannon et al., 1996]. Although unions have historically organized primarily white male workers, this has changed in recent decades, an important fact since rates of MSD are higher for women [Punnett and Herbert, 2000], although lower for others such as Black workers [Hirsch et al., 1997]. We did find some differences between different industries in relation to the impact of unions, but the association between unions and filing was not appreciably affected by these patterns. Other demographic factors also did not appear to have appreciable effects, although being married was important in relation to filing for unionized, but not non-unionized, companies.

Unionization may be more frequent in larger companies, and better reporting of MSD may occur in larger organizations with well-established safety programs. BLS figures, for example, show higher rates of occupational disease reports in larger companies [NIOSH, 2000]. We did not have adequate information on size of company in this study to evaluate this possibility.

Unions may contribute to a workplace culture where filing claims is seen as a legitimate process as opposed to a deviant one. Workplaces with less history of acute injuries which are clearly covered under WC, (e.g., insurance, as opposed to manufacturing) have much lower filing rates overall, and unions therefore may have more impact on filing claims.

Having a doctor diagnose a condition as work-related was very important in filing a claim, as was the related issue of seriousness of the condition. While workers at unionized workplaces were not more likely to have a personal doctor, they were more likely to have a doctor-called condition. In addition, they were much more likely to file a claim even where it was not doctor-called; in fact, unions had more of an impact on filing for non-doctor-called cases.

Study findings did not, in general, support the possibility that MSD claim filing is higher due to higher levels of MSD in unionized workplaces, since overall there were not significant differences in period prevalence of MSD in the population-based survey between union and non-union workplaces. This is consistent with Reardon's [1996] findings of no significant differences in union and non-union severe injury rates in mining. However, there was some limited evidence that MSD levels were higher in non-unionized workplaces in the government and service sectors. This could indicate that union safety and health measures have some effectiveness but there was not a consistent association in other industries. In addition, workers in unionized workplaces reported some risk factors more

frequently, although this could be a result of higher awareness of risk factors in unionized workplaces rather than actually higher levels of risk. Alternatively, these differences could be due at least in part to the lower probability of unionization in the service sector compared with manufacturing.

Unions appear to have some protective value in relation to social and economic consequences (including promotion opportunities, stress at home, divorce, losing home or auto due to financial reasons) of MSD, although this relationship was complicated by correlations with industrial (particularly government) sector. This may be a result of higher reporting to WC or to other factors such as improved job security or other benefits, both of which were related to both the presence of unions and industrial sector.

A better understanding of the factors in under-reporting of MSD is important for a number of reasons. First, it is important for estimation of the full magnitude of the MSD problem for setting policy and designing prevention programs; second, it is important for predicting the specific sub-populations that may increase claim filing as a result of an ergonomic standard or early reporting programs. Finally, it is important to secondary prevention, in that early reporting has been shown to reduce severity of MSD [Winzeler and Rosenstein, 1997; Morse, 1999] and so this understanding can be used to improve early reporting systems and identify sub-populations that are most at risk for under-reporting.

The short-lived OSHA Ergonomics Standard [OSHA, 2000] put heavy emphasis on early reporting, with a controversial compensation plan for workers devised expressly for encouraging claim filing. It appears from this study that unions are useful in this regard, and that non-union employers may need to take additional measures to ensure such reporting (such as active requests for reports, and attention to disincentives to reporting such as rewards for low numbers of reported injuries).

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