Linking Workers' Compensation and Group Health Insurance Data to Examine the Impact of Occupational Injury on Workers' and their Family Members' Health Care Use and Costs: Two Case Studies[1]

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Background

Linking workers' compensation (WC) and group health insurance (GHI) data provides information that allows researchers to follow the pre- and post-work injury health status of both workers and their family members. Although the use of such administrative data for research has some drawbacks, the use of medical and workers' compensation claims data also avoids the limitations that can be associated with surveys, including issues of recall and self-report. The objective of the two case studies described here was to examine the impact of occupational injury on injured workers' and their family members' GHI health care use and costs. In the first case study, we examined the incidence and costs of hospitalization among family members before and after occupational injury. In the second study, we examined GHI utilization and costs following acceptance or denial of WC medical claims.

Case study 1

Incidence and Costs of Family Member Hospitalization Following Injuries of Workers' Compensation Claimants[2]

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Introduction

The objective of this study was to determine whether occupational injuries for which WC claims were filed were associated with subsequent short-term increases in inpatient medical care for family members. There are several reasons why occupational injury might have consequences for the family. First, as indicated by Weil (2001), occupational injuries may reduce family income in two ways, since WC benefits do not fully replace regular wages and family members also might not be able to seek employment or stay as fully employed while caring for an injured worker as they were before the injury. In the most difficult situations, families may be forced to sell their assets, leave or change school, or move (Morse et al. 1998). Second, family members may also have to shoulder greater physical burdens to care for the injured worker and perform household tasks to which the injured worker cannot contribute (Morse et al., 1998; Strunin and Boden, 2004). Third, the psychological distress of the injured worker might also lead to stress and psychological problems among family members (Morse et al., 1998; Strunin and Boden, 2004). As a result of these impacts, families of injured workers may also experience additional health problems. Using data from Canada, Brown et al. (2007) found that medical care use was higher for the families of injured workers over the five year period following the year of injury. In this study, we focused on hospitalizations as indicators of the most severe impacts on health and medical care use and cost of family members. We also

[1]The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

[2] The full paper, upon which this discussion is based, has been published: Asfaw, A., Pana-Cryan, R. and Bushnell, P. T. (2012), Incidence and costs of family member hospitalization following injuries of workers' compensation claimants. Am. J. Ind. Med., 55: 1028–1036. doi: 10.1002/ajim.22110

focused on short periods of time (3 months) before and after injury. We hypothesized that occupational injury would increase the incidence and costs of hospitalization among workers' families, and that the impact would be higher for family members of more severely injured (SI) workers.

Data and Method

We used the MarketScan Health and Productivity Management (HPM) and Commercial Claims and Encounters (CCE) databases compiled by Thomson Reuters. The data contain information on WC and GHI claims of injured workers' and family members, respectively. Eighteen employers (all clients of Thomson Reuters) provided employee data for the HPM database. The WC claims information in HPM includes an enrollment id, the date of injury, the status of claims (closed /open /reopened), and the amount of indemnity and medical payments. We used the HPM database to identify workers who suffered an occupational injury between 2002 and 2005, and whose WC claim was closed by December 31, 2006 (the last date of data availability at the time of our analysis). An occupational injury was classified as severe if the injured worker received indemnity payments and stayed away from work for at least seven working days following injury. The CCE database includes data files for inpatient, outpatient, and pharmacy GHI claims for workers and their family members. The claims information in CCE includes enrolment id, dates of service, diagnoses, procedures, and payments. Hospitalization data for family members of injured workers were extracted from the CCE inpatient data files for the period between January 1, 2002 and December 31, 2005. We linked the HPM and the CCE files using the anonymous and unique 'enrollment id' variable. We used a conditional logistic regression to estimate the odds ratio of family hospitalization three months before and after occupational injury.

We chose to focus on comparison of 3-month periods before and after injury for two reasons. First, we found that the incidence rate of family hospitalizations rose over the first three months following occupational injury and then fell to approximately the pre-injury rate in the sixth month, so that comparison of 3-month periods might increase the likelihood that differences of statistical significance are detectable. Second, a rise in hospitalization rates within a short time after injury is more plausibly linked to the injury and would be virtually unaffected by long term trends. To observe the GHI medical claims of family members within the three months before and after occupational injury, workers injured before April 1, 2002 and after September 30, 2005 were excluded from the analysis. Before-after comparisons were carried out separately for the families of SI workers and the families of all injured workers. These before-after comparisons addressed our hypothesis that incidence and costs of family hospitalization would be higher following occupational injury.

Results

We used a before-after analysis to compare the odds and costs of family hospitalization three months before and after occupational injury for 18,411 families, 15.7% of whom were SI. Since the claims of each family were observed twice (three months before and three months after occupational injury), the total sample size was 36,822 observations. Table 1 presents the conditional logistic regression results, with odds ratios for family hospitalization after injury versus before injury, and 95% confidence intervals (CI).

Among families of all injured workers, in the three months following occupational injury, the odds of at least one family member being hospitalized were 31% higher than in the three months preceding injury. Among the families of SI workers, the odds of hospitalization were 56% higher in the three months following injury. Because there was no evidence of change in the cost per hospitalization, hospitalization costs were estimated to have increased by approximately the same percentage as the odds of hospitalization.

These results support our hypotheses but should be interpreted with caution for several reasons, including the following. First, it may be possible that the work injury could alter

family decisions about undergoing hospitalization, although we could not identify a clear reason that this is responsible for our results. Second, we did not include data on health care services that were not directly attributable to a stay in the hospital or for which claims were not filed. Third, the 3-month comparison periods were designed to capture only short run impacts of occupational injury. Fourth, costs may also have been underestimated due to exclusion of WC cases that were not closed by December 31, 2006. If WC cases of more severe injuries take longer to close, this could have reduced the number and average severity of SI workers in our data set. Finally, the findings may not generalize to segments of the U.S. working population that were underrepresented in the data set we used.

Conclusion

The impact of occupational injury may extend beyond the workplace and adversely affect the health and inpatient care use of family members. To further explore the complex pathways between an occupational injury and the health of family members, future research could focus on the specific nature of occupational injuries (e.g. acute versus cumulative trauma) associated with increases in family health problems, as well as the specific nature of these problems.

Case Study 2

Group Health Insurance Utilization and Cost Following Acceptance or Denial of Workers Compensation Medical Claims

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Introduction

Occupational injuries impose high costs on the U.S. healthcare system. Evidence also suggests that workers with known or suspected occupational injuries and illnesses may not file for WC benefits due to fear of disciplinary action, stigmatization, harassment, or denial of benefits. (Biddle et al., 1998; Conway and Svenson, 1998; Rosenman et al., 2000; Morse et al., 2000). Even if some workers apply for WC benefits, employers could dispute the work-relatedness of an injury or condition or challenge its severity. As a result, WC claimants might not receive full indemnity or medical payments or their claim could be totally denied (Ellenberger, 2000; Dembe, 2001; Boden et al., 2001). Based on data from the 2007 Behavioral Risk Factor Surveillance System (BRFSS), CDC (2010) indicated that successful WC claims for medical costs ranged from 47% in Texas to 77% in Kentucky. Leigh & Robbins (2012) indicated that the WC system does not adequately cover the costs of occupational injuries and illnesses, resulting in workers use of other insurance programs to help pay for those costs. Using macro level data from the Bureau of Labor Statistics (BLS) and the National Council on Compensation Insurance (NCCI) and the total costs of occupational injuries and illnesses estimated from Leigh (2011), Leigh and Marcin reported that for medical costs not covered by WC, other insurance programs covered $14,22 billion, Medicare covered $7.16 billion and Medicaid covered $5.47 billion. This study complements such macro level studies by estimating GHI utilization and cost differences between workers whose WC medical claims were accepted and denied using individual level WC and GHI utilization information within a short period after the incidence of occupational injury.

Data and method

The 2002-2005 Thomson Reuters MarketScan Health and Productivity Management (HPM) and Commercial Claims and Encounter (CCE) data described above were used. Overall 52,046 workers who were injured and filed for WC benefits between 2002 and 2005 were used for analysis. Workplace injury was defined by filing for WC indemnity and medical benefits and a WC medical claim was considered denied if no medical costs were paid from the WC program. GHI utilization and costs were measured using outpatient and inpatient GHI records within two weeks before and after the occurrence of an occupational injury. Two-

week pre- and post-injury periods were chosen to reduce the influence of other unobservable factors that might affect the health status of the injured workers. Utilization was defined as at least one outpatient or inpatient visit during the time under consideration. Costs were determined separately for the two weeks before and after the occupational injury as the total amount of money paid by GHI during each two-week period.

Results

Overall, 17% and 1% of injured workers used outpatient and inpatient GHI during the study period, respectively. In the two weeks before an occupational injury, 18.8% of workers whose WC medical claims were accepted and 19.9% of workers whose WC medical claims were denied used outpatient GHI at least once. Within two weeks following an occupational injury, GHI utilization for outpatient services increased to 30.4% and 37.8% for workers whose claims were accepted and denied, respectively. Inpatient GHI utilization also increased from 0.05 to 0.1% and from 0.31 to 0.97% for injured workers whose claims were accepted and denied, respectively. All of these differences were statistically significant.

We used logistic regression to examine outpatient and inpatient utilization of group health insurance within two weeks after injury while controlling for pre-injury utilization and other factors. Covariates included in the model were pre-injury health-care utilization, sex, age, hourly versus salaried compensation, union membership status, health plan type, industry, and region of WC claimants. Separate regression equations were estimated for outpatient and inpatient services. The results are presented in Table 2. Holding all other factors constant, the odds of WC claimants whose medical claims were denied using GHI outpatient services at least once within two weeks after injury was 30% higher than that of WC claimants whose medical claims were accepted. The effect was much stronger in the case of GHI inpatient service utilization.

We also estimated the effect WC medical claims denial on the unconditional outpatient and inpatient GHI costs, and part of the results are presented in Figure 1. Denial of WC claims increased outpatient and inpatient GHI costs by 45% and 239%, respectively, controlling for all covariates included in the model.

To give the issue a national perspective, we extrapolated our cost estimates following WC claim denials to national injury figures provided by the Bureau of Labor Statistics (BLS). According to BLS, more than 5 million nonfatal occupational injuries and illnesses were reported per year during our study period. Based on a WC claim rejection range of 19.4% in our sample to 39% in a CDC report (CDC, 2010), denial of WC medical claims could cost other parts of the health care system between $245 to $484 million within two weeks after injury.

The study has the following limitations. First, we did not have any information about why the medical claims were denied. If most of denied claims were not work-related, our results could overestimate the impact of WC denial on the GHI. Second, we did not consider workers who were injured but did not apply for WC. Third, to reduce the effect of other unobservable factors that might affect the health status of the injured workers, we considered costs incurred only within two weeks before and after injury. Costs incurred after two weeks of injury could be substantial. Finally, the data we used were restricted to large employers who were clients of Thomson Reuters and all of the workers had GHI. This might not represent the U.S. working population.

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Table 1. Conditional logistic regression results: odds of one or more family hospitalizations three months after versus three months before occupational injury

	All injured workers	Severely injured workers
Odds ratio	1.31	1.56
Z-score	3.17	2.18
P>|z|	0.002	0.029
95% Confidence Interval	1.11 - 1.55	1.05 - 2.34
Number of observations†	1,340	212

† The conditional logistic regression analysis procedure employs only observations for families with a change in hospitalization status before and after injury.

Table 2. Determinants of group health insurance utilization within two weeks after injury: Logistic regression results

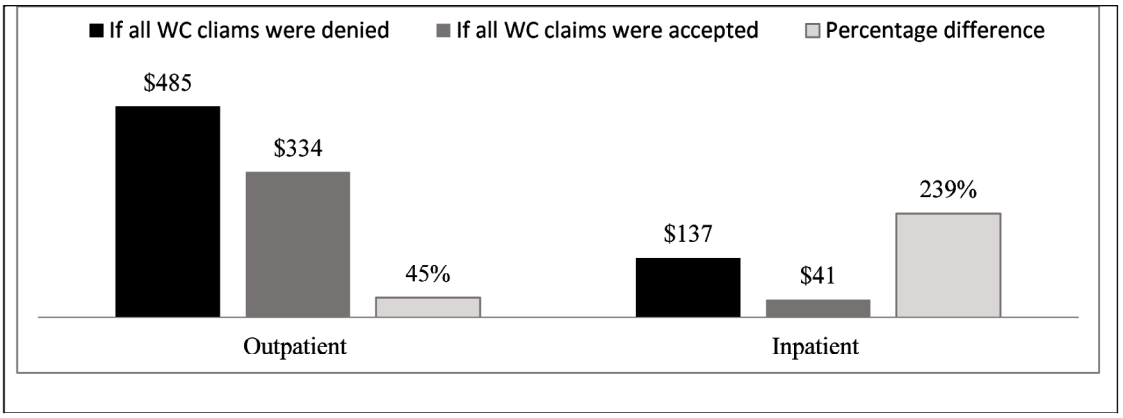
Variables	Utilization of group health insurance			
	Outpatient		Inpatient	
	OR	95% CI	OR	95% CI
WC medical claim status (1 if denied & 0 otherwise)	1.295***	1.233 - 1.361	3.340***	2.511 - 4.441
Outpatient visit 15 days before injury[§]	3.332***	3.181 - 3.491		
Male	0.762***	0.728 - 0.798	1.191	0.895 - 1.585
Age	1.014***	1.012 - 1.016	1.027***	1.012 - 1.041
Paid hourly (1 if yes & 0 otherwise	0.808***	0.750 - 0.871	0.754	0.457 - 1.243
Member of a union	0.921***	0.874 - 0.971	0.89	0.611 - 1.298
Region[†]				
Industry[†]				
Health plan type[†]				
Observations	51990		51859	
Wald chi^2 (Prob > chi^2)	3847 (0.001)		151 (0.001)	
Pseudo R2	0.06		0.04	
Log pseudolikelihood	-30472.727		-1403.5365	

*** p<0.01, ** p<0.05, * p<0.1

[§] In the inpatient equation the variable was dropped due to perfect collinearity.

† Results omitted for brevity.

Figure 1. Impact of WC claims denial on inpatient GHI costs within 2 weeks after injury



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