



# Workers' compensation loss prevention representative contact and risk of lost-time injury in construction policyholders

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## ABSTRACT

**Introduction:** Insurance loss prevention (LP) representatives have access and contact with businesses and employees to provide targeted safety and health resources. Construction firms, especially those smaller in size, are a high-risk population. This research evaluated the association between LP rep contact and risk for lost-time injuries in construction policyholders. **Methods:** Workers' compensation data were utilized to track LP rep contact with policyholders and incidence of lost-time injury over time. Survival analysis with repeated events modeling calculated hazard ratios (HR) and 95% confidence intervals (CI). **Results:** Compared no LP contact, one contact was associated with a 27% reduction of risk (HR = 0.73, CI = 0.65–0.82), two with a 41% (HR = 0.59, CI = 0.51–0.68), and three or more contacts with a 28% reduction of risk (HR = 0.72, CI = 0.65–0.81). **Conclusions:** LP reps appear to be a valuable partner in efforts to reduce injury burden. Their presence or contact with policyholders is consistent with reduction in overall incidence of lost-time injuries. **Practical applications:** Reduction in lost-time injuries, resulting in reduced workers' compensation costs for policyholders and insurance companies, builds a business-case for safety and injury prevention. LP reps are often a low or no-cost benefit for insurance policyholders and may be an important injury prevention resource for small firms and/or those with lack of safety resources and staff.

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## 1. Introduction

Workers in the construction industry experience a high rate of fatalities and injuries (National Institute of Occupational Safety and Health (NIOSH), 2009). The injuries tend to be severity-driven (Courtney, Matz, & Webster, 2002; Dement, 1999) and result in higher instances of disability, lost-work time, increased workers' compensation claim costs (Stover, Wickizer, Zimmerman, Fulton-Kehoe, & Franklin, 2007), and disproportionate financial impact on workers (Waehrer, Dong, Miller, Haile, & Men, 2007). Small construction firms of fewer than 10 employees comprise one-fourth of the construction industry; yet, they experience one half of the fatal injuries (National Institute of Occupational Safety and Health (NIOSH), 2009). It has been reported that smaller companies (under 100 employees) are at increased risk of injury, including lost-work time (Bernacki, Yuspeh, & Tao, 2007; Lowery et al., 1998; Stover et al., 2007). Smaller and non-union companies also

report less health and safety (regulatory) attention on their jobsites (Gillen, Baltz, Gassel, Kirsch, & Vaccaro, 2002), and data on work, hours, and injury occurrence may be more limited (Lipscomb, Dement, & Behlman, 2003), making categorization of risk difficult. Further, smaller companies may lack the knowledge, staff, or resources for safety programs and injury prevention measures that larger companies can provide.

Providers of safety and health assistance are important injury prevention partners, especially for small contractors. Meaningful and impactful collaborative efforts have been the focus of the researchers studying the construction industry (Boatman, Chaplan, Teran, & Welch, 2015; Chang, Nixon, & Baker, 2015; Macario, Hannon, Baker, Branche, & Trahan, 2015; Welch, Russell, Weinstock, & Betit, 2015). Workers' compensation insurance carriers, in particular, have been recognized as powerful agents to partner with the construction industry, disseminate injury prevention information, and motivate change through making business cases for safety (Boatman et al., 2015; National Institute for Occupational Safety and Health, 2014; Welch et al., 2015). Moreover, insurance carrier loss prevention representatives (LP reps) have essential access into businesses and their worker populations, and thus, a unique ability to influence and direct injury prevention interventions (National Institute for Occupational Safety and Health, 2014).

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Research has indicated that LP reps can help reduce the rates of injury and lower the cost of existing claims once they occur (Bernacki & Tsai, 2003; Davis, Badii, & Yassi, 2004; Green-McKenzie, Parkerson, & Bernacki, 1998; Nave & Veltri, 2004; Schofield, Alexander, Gerberich, & Ryan, 2015). Occupational Safety and Health Administration (OSHA) enforcement/consultation contact with construction employers has also produced measurable reduction in workers' compensation claims (Baggs, Silverstein, & Foley, 2003; Foley, Fan, Rauser, & Silverstein, 2012; Haviland, Burns, Gray, Ruder, & Mendeloff, 2010; Levine, Toffel, & Johnson, 2012; McQuiston, Zakocs, & Loomis, 1998).

The objective of this study was to evaluate the association between insurance LP rep contact with construction firms and risk for lost-time injuries in small and medium-sized construction firms.

## 2. Materials and methods

### 2.1. Population data

Workers' compensation claims were used to examine injuries to employees of 1360 construction policyholders who obtained workers' compensation insurance from a self-insured workers' compensation fund. The fund insures small- and medium-sized construction and construction-related businesses within the state of Minnesota and is the largest writer of construction workers' compensation in Minnesota. The study included all policyholders insured by the workers' compensation fund and all employee injury claims during a 2192 day time-period from January 1st, 2004 until December 31st, 2009. Most companies were policyholders for the entire length of the study. A small percentage entered or exited during the study time period (Schofield, Alexander, Gerberich, & Ryan, 2013; Schofield et al., 2015).

Time at-risk for the population was based upon hours at-risk for each company and class code estimated from monthly payroll. Class codes are an indicator of expected job risk and are determined by the Minnesota Workers' Compensation Insurance Association (MWCIA), the independent rating bureau for Minnesota. Policyholder data were classified by union-status and premium size. Premium size is largely based on payroll volume and employee job-risk classification (class codes), and the premium size correlates with number of policyholder employees. Workers' compensation claim experience may also affect premium size. A history of higher than average workers' compensation claim costs may inflate premium; lower than average costs may decrease premium. Companies with larger premium sizes may receive more attention from loss prevention representatives. Policyholders were stratified into three premium bands: \$0–15,000; \$15,001–75,000; and \$ > 75,001 (Schofield et al., 2013, 2015).

### 2.2. Injury claim data and outcomes

Claims data captured all injuries submitted by all policyholders to the workers' compensation insurance fund (WCIF). Claims data include the date of injury, injury characteristics, and costs, and are classified as medical-only or lost-time, depending on claim severity and days of lost work-time. Minnesota workers' compensation classifies an injury as lost-time when injury severity results in more than three consecutive calendar days of lost work time and includes payment of medical and wage loss (indemnity) costs plus reserves for future expected costs (Schofield et al., 2013, 2015). In addition to impact on the injured employee, lost-time injuries have a greater impact on policyholder insurance costs, as the full total of paid and reserved costs will be factored into premium calculations.

### 2.3. Loss control prevention contact

The WCIF included an LP department staffed with safety and health professionals. All services were provided at no-cost to policyholders. The LP reps were focused on partnering with policyholders to assist

them and their employees with hazard identification and mitigation, injury prevention, and awareness. When an LP rep made contact with a policyholder and/or their employees, if often involved personalized injury prevention services based on the policyholders' needs and goals. Record of the contact and date were documented for all LP activities. Contacts were broken into the following categories: claim investigation, on-site evaluation or updates combined with a jobsite visit, company evaluation or update, jobsite visit, personalized services, providing materials or resources electronically or via mail, recommendation follow-up, and training/education/awareness. Contacts could involve multiple activities in one visit, and were characterized by the main purpose of the contact. Prevention and reduction of employee injuries, particularly more severe lost-time injuries, was the main goal of LP. Furthermore, preventing lost-time injuries is in the best financial interest of both the insurance fund and the policyholder. A total of 4549 documented contact or activities with policyholders occurred during the study time period.

### 2.4. Modeling repeated events and time-varying covariates

To examine the effect of LP rep contact on the rate of employee lost-time injury claims, each day of the study was individually numbered. Policyholders entered into the study on Day 1, January 1st, 2004 or upon the first date of insurance with the fund. Policyholders exited the study in one of two ways: by leaving the insurance fund or upon end of the study time period. Proportional hazards regression was used to model and measure the time prior to a lost-time event and LP contact during this time interval for each policyholder. Each lost-time injury event was considered independent of prior lost-time injuries. A policyholder could experience multiple lost-time injury events during the six year study time period; therefore, a repeated events model and counting process format was selected. Each record was compiled as (day<sub>1</sub>, day<sub>2</sub>, I<sub>event</sub>...), where day<sub>1</sub> represented the day at which the interval started, day<sub>2</sub> the day at which the interval ended, and I<sub>event</sub> was an indicator showing the end-status of the interval (lost-time injury event, no event, or exit from the study). When a lost-time event occurred, a new time interval would begin the next day.

The exposure variable of interest, LP contact, was included in the model as a time-varying covariate. LP contacts categorized into four levels: 0 contacts; 1 contact; 2 contacts; and 3 or more contacts. Level of LP contact varied from policyholder to policyholder and could change over time, and duration to lost-time injury event varied from company to company. These were measured to maintain the proportional hazards assumption and determine the influence that LP contact had on a lost-time injury event (Ake & Carpenter, 2003; Allison, 2010; Andersen & Gill, 1982; Cox, 1972; Gharibvand, Jeske, & Liao, 2008).

## 3. Analysis

Data for injury claims and hours at-risk per 100 full-time-equivalents (FTEs) enabled estimation of rates for overall, lost-time, and medical-only injuries. Injury claims were further stratified by trade and union status. Categories of LP rep contact type were created and broken down by size and union status for a descriptive analysis.

Cox proportional hazards regression measured the effect of LP contact on risk of lost-time injury by estimating hazard ratios (HR) and 95% confidence intervals (CI) as a function of injury rate. Each claim was considered to be independent of prior claims. Generalized estimating equations with an auto-regressive correlation structure were used to account for correlated observations within companies over time (Liang & Zeger, 1986). For a multivariate model that included static covariates of union status, company premium size, and hours worked, adjusted hazard ratios were calculated. All analyses were done using proc PHREG procedure (Ake & Carpenter, 2003; Allison, 2010) in SAS (SAS Institute, Inc, 2011).

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